Jeffcoat-Sacco, Illona

From: Schuh, John M.
Sent: Thursday, September 20, 2018 5:01 PM
To: jj@baumstarkbraaten.com; sstrand@elpc.org; rgranneman@elpc.org; Bender, Lawrence; Patrick Ward
Cc: Jeffcoat-Sacco, Illona
Subject: Case No. PU-18-223 Record Addition

All,

I saw most of you were in attendance at the last work session. For those who weren't in attendance, the Commission discussed moving the previously gathered correspondence and recorded meeting with the Company (some of which has been referenced by both parties) into the case record. The following two emails have links that should allow you to download the correspondence in pdf form and the meeting in audio.

The purpose of this email is to provide the opportunity of parties to respond to this action.

Let me know if there are any questions or if the links are no longer working.

Thanks,

John M. Schuh
Special Assistant Attorney General
North Dakota Public Service Commission
600 E Boulevard Dept. 408
Bismarck, ND 58505
701.328.2421

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Jeffcoat-Sacco, Illona

From: Schuh, John M.
Sent: Thursday, September 20, 2018 5:03 PM
To: jj@baumstarkbraaten.com; sstrand@elpc.org; rgranneman@elpc.org; Bender, Lawrence; Patrick Ward
Cc: Jeffcoat-Sacco, Illona
Subject: Invitation to Download a File

John G. Hamre from the Public Service Comm. has invited you to download a file named copy of Electronic record of 19 Dec. 2017 informational meeting.mp3. The description of the file is as follows: copy of Electronic record of 19 Dec. 2017 informational meeting.

You can download the file using the following link: https://apps.nd.gov/itd/filetransfer/downloadByInvitation.htm?id=1-03a3e32e9a36024115f369991ce294dd.

PU-18-223 ELPC & DRC v. Meridian Energy Grp. Energy Conversion Facility Davis Refinery Complaint Audio recording

****
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Jeffcoat-Sacco, Illona

From: Schuh, John M.
Sent: Thursday, September 20, 2018 5:02 PM
To: jj@baumstarkbraaten.com; sstrand@elpc.org; rgranneman@elpc.org; Bender, Lawrence; Patrick Ward
Cc: Jeffcoat-Sacco, Illona
Subject: Invitation to Download a File

John G. Hamre from the Public Service Comm. has invited you to download a file named Documents from I-Case re Davis Refinery.pdf. The description of the file is as follows: Documents from I-Case re Davis Refinery and the copy of Electronic record of 19 Dec. 2017 informational meeting.

You can download the file using the following link: https://apps.nd.gov/itd/filetransfer/downloadByInvitation.htm?id=1-ab92f8b8b64d5252479c20b6598a2a94.

PU-18-223 ELPC & DRC v. Meridian Energy Grp. Energy Conversion Facility ◆ Davis Refinery Complaint

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Hamre, John G.

From: Fahn, Patrick J.
Sent: Thursday, July 21, 2016 11:03 AM
To: Fedorchak, Julie L.; Christmann, Randel D.; Kalk, Brian P.
Cc: Schuh, John M.; Jeffcoat-Sacco, Illona; Hamre, John G.
Subject: FW: Meridian Energy Group, Inc. - Billings County Refinery Letter
Attachments: Meridian - LT Pat Fahn re Billings County Oil Refinary-c.pdf

I am forwarding this email from Fredrikson & Byron, with letter attached, providing information on the capacity of the proposed Davis Refinery in Billings County. Lawrence Bender states that the refinery is being designed to be capable of refining 27,500 barrels of oil per day and that, at this time, there is no design in existence nor plans to propose a design for more than 27,500 barrels. The letter indicates that an addition to the refinery would be required to result in a facility to refine more than 50,000 barrels per day.

The letter will be kept in an I-case.

Patrick Fahn

From: Hughes, Bethany [mailto:BHughes@fredlaw.com]
Sent: Wednesday, July 20, 2016 1:11 PM
To: Fahn, Patrick J. <pfahn@nd.gov>
Cc: twilliams@meridianenergygroupinc.com; Nitschke, Darrell D. <dnitschk@nd.gov>
Subject: Meridian Energy Group, Inc. - Billings County Refinery Letter

Mr. Fahn,

Please see the attached letter.

Thanks,

Bethany Hughes
Legal Secretary
Fredrikson & Byron, P.A.
1133 College Drive
Suite 1000
Bismarck, ND 58501
Phone: 701-221-8641
Fax: 701-221-8750

This is a transmission from the law firm of Fredrikson & Byron, P.A. and may contain information which is privileged, confidential, and protected by the attorney-client or attorney work product privileges. If you are not the addressee, note that any disclosure, copying, distribution, or use of the contents of this message is prohibited. If you have received this transmission in error, please destroy it and notify us immediately at our telephone number (701) 221-8700. The name and biographical data provided above are for informational purposes only and are not intended to be a signature or other indication of an intent by the sender to authenticate the contents of this electronic message.*

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Fredrikson & BYRON, P.A.

July 20, 2016

VIA EMAIL

Mr. Patrick Fahn
ND Public Service Commission
600 E. Boulevard, Dept. 408
Bismarck, ND 58505

RE: Meridian Energy Group, Inc. – Billings County Refinery

Dear Mr. Fahn:

This firm represents Meridian Energy Group, Inc. ("Meridian") with respect to its plans to construct an oil refinery in Billings County, North Dakota. In that regard, we have been advising Meridian with respect to the various permits which are required from state and local governmental entities prior to construction of refinery.

As you know, North Dakota's Energy Commission and Transmission Facility Siting Act, codified as Chapter 49-22 of the North Dakota Century Code, grants the Public Service Commission ("PSC") the authority to regulate the siting of energy conversion and transmission facilities to be located and constructed in the state. With regard to refineries, the PSC has jurisdiction over the siting of "energy conversion facilities" that are designed for or are capable of "refining fifty thousand [50,000] barrels or more of liquid hydrocarbon products per day." NPCC § 49-22-03(5).

In your recent telephone conversation with representatives of Meridian, we are advised that you have questioned whether the plans of Meridian are for a facility that will be capable of refining 50,000 barrels or more of oil and if Meridian intends to make application to the PSC for siting the facility under Chapter 49-22. Please be advised that at this time Meridian is designing its refinery to be capable of refining twenty seven thousand five hundred (27,500) barrels per day. Further, at this time, there is no design in existence nor plans to propose a design for more than 27,500 barrels. This is not to suggest that in the future an addition to the facility will never

Attorneys & Advisors
main 701.221.8700
fax 701.221.8750
fredlaw.com

Fredrikson & Byron, P.A.
1133 College Drive, Suite 1000
Bismarck, North Dakota
58501-1215

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be considered. Neither is this to suggest that Meridian has not had conversations and discussions with others, both private and public, that sometime in the future Meridian may propose an addition to the proposed refinery that will result in a facility greater than 50,000 barrels per day. Nonetheless, at the present time the facility is being designed and contemplated to be constructed at a capacity of 27,500 barrels of oil per day. As such, Meridian is not required to, nor does it have any intention of, making an application for a certificate of site compatibility for the proposed refinery.

Should you have any further questions with regard to Meridian proposed refinery, please advise.

Sincerely,

LAWRENCE BENDER

LB/sr

cc: Tom Williams (via email)
Darrell Nitschke (via email)

59218601_1.DOC

Hamre, John G.

From:	Fedorchak, Julie L.
Sent:	Tuesday, February 21, 2017 2:31 PM
To:	Fahn, Patrick J.; Jeffcoat-Sacco, Illona
Cc:	Hamre, John G.
Subject:	FW: PSC and siting of refineries
Attachments:	The-Davis-Refinery-FAQs.pdf; DAVIS REFINERY PROJECT - Zoning CUP Application PDF Final.pdf; 20170207154841.pdf; AQP2868_16866_20160916.pdf

Here is more information that we should include in the I-file on this issue.

From: Jan Swenson [mailto:bcajan@bis.midco.net]
Sent: Tuesday, February 21, 2017 11:47 AM
To: Fedorchak, Julie L.
Subject: Re: PSC and siting of refineries

CAUTION: This email originated from an outside source. Do not click links or open attachments unless you know they are safe.

Hi Julie,

I would find question with the letter from Fredrikson & Byron dated July 20, 2016. It is certainly not representative of Meridian's Davis Refinery proposal as presented to Billings County and its Commissioners, the SWC, the ND DOH, the press, the interested public and Meridian shareholders.

Here's a few examples:

1) *Frequently Asked Questions* from Meridian's webpage and attached:
Note first question.
http://www.meridianenergygroupinc.com/wp-content/uploads/2016/10/Davis-Refinery-FAQ-Fall-2016.pdf

2) Meridian cover letter and application to Billings County. Note 55,000 BBL in cover letter - 1st and 3rd paragraphs. Scroll to page 8 to affirm and repeated throughout.
Attached.

3) Meridian's water appropriation request to the SWC was four times the amount Meridian had been repeatedly quoting at Billings County Commission hearings. Attached is a Meridian representative letter (SEH) prepared for the SWC informational hearing in Medora on February 8th. You might note particularly #9 for timing.

4) September 2016 letter from the ND DOH to Meridian regarding their air quality modeling. Check page 3 for the first references to 55,000 BBL per day throughput. Numerous other mentions. Attached.

5) Message to shareholders (3rd paragraph) on Meridian webpage:
http://www.meridianenergygroupinc.com/shareholders/

Thank you for your attention to this matter, Julie. We certainly believe the PSC has a role in this project and that PSC scrutiny would be of benefit.

Best,
Jan

On 2/20/2017 1:45 PM, Fedorchak, Julie L. wrote:

> Hi Jan -- Based on multiple reports in the media we were reading about the proposed size of the Meridian owned refinery, the PSC inquired of the company regarding their plans for siting. Attached is the letter we received back from the company's attorney last July regarding their intentions in regard to siting. Our policy has been to strongly encourage companies who believe their facilities may one day reach the siting threshold to come to us for siting on the front end to be as true as possible to the spirit of the state's siting laws.
>
> Julie
>
> -----Original Message-----
> From: Jan Swenson [mailto:bcajan@bis.midco.net]
> Sent: Thursday, February 16, 2017 9:20 AM
> To: Fedorchak, Julie L.
> Subject: Re: PSC and siting of refineries
>
> ***** CAUTION: This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****
>
> Thank you, Julie.
> Jan
>
> On 2/16/2017 9:13 AM, Fedorchak, Julie L. wrote:
>
> > Hi Jan -- Good to hear from you. The information you received about the 55,000 threshold for siting is correct. We have been in touch with Meridian several times regarding their plans and are continually told that they are not permitting at our level. I will follow up again. Thanks for the heads up.
> > Julie
> > -----Original Message-----
> > From: Jan Swenson [mailto:bcajan@bis.midco.net]
> > Sent: Wednesday, February 15, 2017 4:18 PM
> > To: Fedorchak, Julie L.
> > Subject: PSC and siting of refineries
> >
> > ***** CAUTION: This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****
> >
> > Commissioner Fedorchak,
> >
> > I am trying to confirm whether or not the PSC has any role in siting of a refinery. Specifically, here, Meridian's proposed Davis Refinery within 2.5 miles of the South Unit of Theodore Roosevelt National Park.
> > BCA is not opposed to the refinery per se, but as you might guess, we are opposed to the location.
> >
> > I attended the State Water Commission's informational hearing in Medora on the 8th and their staff suggested that the PSC is

involved if the refinery is 55,000 BBLs per day or more. That is the figure projected by Meridian. While Meridian is planning to come on line in two phases, so far Billings County, the SWC and the DOH are holding them to the entire project when considering applications.

I did a search of the PSC webpage and could not find my answer so thanks much for clarifying this for me.

Best,
Jan

Jan Swenson, ED
Badlands Conservation Alliance
bcajan@bis.midco.net
701-255-4958

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What is the expected output of the Davis Refinery?	The Davis Refinery will process approximately 55,000 barrels per day ***("bpd")*** of crude oil, and will refine that oil into a full slate of liquid fuels and specialty chemicals, including a substantial amount of Gasoline, Kerosene (jet fuel) and Diesel. The exact quantities of each product will depend upon a number of things, including the mix or blend of crude oils that are used as the feedstock for the Refinery, and upon other issues that are currently the subject of the ongoing design of the Refinery.
What is the current refinery output in the Bakken today?	Currently, only 94,000 barrels per day of refining capacity exists in North Dakota – the 74,000 bpd Tesoro Refinery in Mandan and the 20,000 bpd Prairie Refinery in Dickinson. The rest of the crude oil produced in the Bakken has to be shipped out of North Dakota to distant refineries.
How much crude oil is currently produced in the Bakken Region requiring a refinery?	The Bakken Formation currently produces 1.2 million barrels per day ***("bpd")***. Crude oil has no economic value unless it is run through a refinery.
What products will the Davis Refinery produce?	The Davis Refinery is a high-conversion refinery having a high complexity index, and will create a full range of refined products, including: - Light Distillates: Gasoline, Naphtha, Gasoline - Middle Distillates: Diesel Fuel, Fuel Oil, Kerosene [Jet Fuel] - Heavy/Bottom Distillates: Lubricants, Motor Oil, Asphalt Base
Who is Vepica and what is your relationship with them?	Meridian has entered into an engineering services agreement with Vepica USA, Inc., an international engineering firm specializing in - the energy and refinery industry, to provide process engineering, detailed design, -

Meridian Energy Group Inc.

	equipment procurement, construction and equipment inspection and other related services to Meridian in connection with the Davis Refinery.
Who is BASIC Equipment and what is your relationship with them?	BASIC is a fully-integrated design, fabrication, construction and logistics firm that serves the oil & gas, refining, petrochemical and specialty process industries worldwide. Among other things, BASIC recently completed the design, installation, construction and start-up of a 25,000 bpd refinery Houston. Meridian has entered into a MOU with BASIC under which BASIC will provide a wide range of services to Meridian, up to and potentially including turnkey design-construction services in connection with the Refinery.
Who is Trapezium and what is your relationship with them?	Trapezium is a professional technical services and project development firm that has significant expertise in the energy, oil-gas, and petrochemicals industries. Trapezium has performed a wide range of services to Meridian over the past two years.
Where is the Davis Refinery and how much land will it occupy?	The Davis Refinery will be located on the 620-acre property that Meridian is acquiring for the Refinery in Billings County, North Dakota, just west of the town of Belfield.
What is a greenfield plant and why is it important?	The Davis Refinery will be only the second Greenfield Refinery built in the US since 1976. A Greenfield plant is a brand new facility, as opposed to a facility that requires an addition to or a modification to an existing facility – in other words, when construction starts, it is on a "green field." A greenfield refinery like the Davis Refinery is not burdened with the need to make the new operating units work in conjunction with pre-existing legacy operating units that might also represent old technology. This will insure that the Davis plant can -

	leverage the latest technology from the ground up, and can much more easily and efficiently comply with modern environmental or safety requirements.
Have you applied for an Air Quality Permit? If so, what is the status?	We're in the process of performing the engineering that will provide the information necessary to complete our Air Quality Permit application. Following recent meetings with state and local permitting officials, Meridian understands the requirements and knows what has to be done in order to earn expeditious permit approval. The State of North Dakota's Department of Health will be the lead agency for review of the Refinery's applications for Air Quality and Water Quality Permits for the project. Billings County will be the lead agency for the Refinery's zoning and conditional use permitting.
Have you applied for a zoning permit? If so, what is the status?	The engineering necessary to complete the application for the rezoning of the property, as well as the Conditional Use Permit; with Billings County, is still in progress.
When is the Davis Refinery expected to receive approval to begin construction?	Assuming that all other permits and approvals have been received at the time, Meridian will commence field construction of the Refinery as soon as the Permit to Construct is awarded by the State of North Dakota Department of Health.
How long will construction of the Davis Refinery take?	Field construction of a large complex refinery such as the Davis Refinery would typically require two years or longer, but Meridian is working on innovative ways to shorten that construction schedule substantially.
How many jobs will the Davis Refinery create, both short- and long-term?	Construction of the Refinery may require as many as 500 people, with that number -

Meridian Energy Group Inc.

	peaking sometime during 2017. Permanent employment at the Davis Refinery will be about 225 to 250. Meridian will take steps to maximize the proportion of Refinery jobs, at all levels in the organization, that come from the local pool of potential employees. This includes supporting local training and apprenticeship programs. -Studies conducted by the State of Washington of the social impact of a refinery in Anacortes showed that each permanent job at the refinery created an additional 9.18 jobs in the local community. In other words, the permanent jobs at the Davis Refinery may create over 2,000 additional jobs in North Dakota, and those jobs would be primarily in Billings and Stark Counties.
When is the Davis Refinery expected to begin operation?	Meridian expects that mechanical completion of the Refinery will be achieved within two years of commencing construction. Full commercial operation of a facility this large and complex may require from six months to a year following mechanical completion.
How will the Davis Refinery impact the cost of crude oil refining and transport in the Bakken?	The Davis Refinery will substantially increase the number of competitive choices to the oil producers in the Bakken, and to the local and regional consumers of refined products.
How will the Davis Refinery remain profitable?	Meridian expects the Davis Refinery to operate successfully and profitable for decades to come because of the manner in which it is being designed, the manner in which it will be constructed, and the long-term relationships that Meridian is establishing with selected crude oil producers. The wide array of high-quality finished product will allow Meridian to be flexible with a variety of demand.
How will local crude be transported to/from	The Davis Refinery will initially accept crude oil

the Davis site for refining?	shipments by truck, rail and pipeline, but will gradually migrate the vast majority of its crude-shipments to pipeline gathering systems, which are safer and more cost effective.
What is clean fuels technology?	Clean fuels technology refers to the application of modern chemical and process design, information and controls technology, and environmental engineering to ensure that the Refinery operates with minimal waste and inefficiency. Clean fuels technology leveraged in the Davis Refinery will ensure its operation and products comply with all applicable environmental and safety requirements.
What are the key advantages to building a refinery within the Bakken?	By building the Davis Refinery close to the oil producers, Meridian can enter into long-term supply arrangements with producers that make them stronger financially, and at the same time reduce its feedstock costs substantially. This will also enable Meridian to provide local and regional fuel consumers with additional competitive choices, which will result in reduced costs and increased service levels to those consumers. The existing practice of exporting Bakken crude to distant refineries and then transporting the refined products back into the area results in waste, inefficiency and needless pollution.
Has the Davis Refinery met all energy and environmental requirements?	The Davis Refinery is being designed to meet the requirements of the State of North Dakota's Department of Health in connection with all - areas of environmental concern, including air and water quality and waste disposal.
Has the Davis Refinery met all clean fuels standards?	The Davis Refinery is being designed to do so, and must do so in order to operate.

Meridian Energy Group Inc.

Will the Davis Refinery reduce our dependence on foreign oil?	Indirectly it will. First of all, note that because of the Bakken and the other unconventional oil development in the US, our nation is once again the world's largest oil producer. However, during the many decades during which the US imported most of its oil, the refining industry concentrated its assets in major coastal port areas so that they could source their crude from world markets – and that is why Bakken producers suffer such a price disadvantage compared to other producers that can readily access, for instance, Gulf Coast refineries. By locating a major refinery close to the Bakken producers, Meridian will make those producers more competitive, and as more refinery operators do the same, the incentives to further develop US energy resources rather than rely on imported oil will increase.
What is a tolling agreement?	A tolling agreement is a commercial arrangement under which a commodity producer, like a Bakken oil producer, and a commodity processor, such as Meridian, share the risks and benefits of a processing facility such as the Davis Refinery, in a way that benefits both parties financially. By contracting with Meridian to process a substantial amount of his production into refined product for a fee, an oil producer can ensure a long-term sustainable profit margin for that increment of production – he might make higher profits in some years by playing the market, but he establishes a secure long-term commercial base through his Meridian tolling deal. By committing a substantial proportion of its capacity to tolling arrangements, Meridian - ensures a long-term supply of crude oil for the Davis Refinery at a secure and sustainable margin – Meridian might be able to make more money in some years by buying crude in the spot market and selling the products, but the tolling arrangements provide Meridian with a

	profitable long-term sustainable resource base.
How will the Davis Refinery impact the price of oil?	By locating a major refinery in the Bakken, Meridian will remove inefficiencies and increase competitive choices. The net result will be that the crude suppliers that work with Meridian will be more profitable and financially stable and the consumers and businesses that rely on refined products will benefit from a more competitive market.
What is a topping plant?	Essentially they are simple atmospheric distillation units that produce hydrocarbon boiling point cuts, typically focusing on diesel fuels. A topping unit is an inexpensive, technically simple means to enhance the value of crude oil near the source of production.
What impact will construction and operation of the Davis Refinery have on the neighboring communities in terms of: - **Noise due to transport and construction?**	During the two-year construction period of the Refinery there will be some noise from the heavy equipment used in building the facility, but most of that will be focused on the site work during the first year of the schedule. When the Refinery is in operation, there will be noise – not a few big noises, but an accumulation of smaller noises – that we will take steps to minimize. Noise is typically a function of line of sight and weather conditions, and there is a lot we can and will do to isolate and reduce the auditory impact of rotating machinery like pumps and compressors in a facility like the Refinery.
What impact will construction and operation of the Davis Refinery have on the neighboring communities in terms of: - **Bright lighting during late-night/overnight construction?**	It would be unsafe to our employees to eliminate lighting, and of course there will be some taller structures that must follow legal requirements intended to protect aircraft. However, lighting is something that can be minimized though good engineering. For

Meridian Energy Group Inc.

	instance, the Davis Refinery will be using special "down reflecting" lighting for its - construction and operational lighting. We will also use the latest LED technology which is not only safer than traditional bulbs, but have proprietary optics designed to focus light directionally so they illuminate only the required area within the refinery, such as straight walkways, avoiding adjacent and upward spill.
What impact will construction and operation of the Davis Refinery have on the neighboring communities in terms of: - **Water supply due to waste disposal?**	The Davis Refinery will be using more than one source of water for its process water requirements. The waste disposal of solids and liquids from the refinery operations will be processed by latest technology treatments before disposal. The Refinery will not be negatively impacting water supply or water quality in the area, and the presence of the Refinery might enable certain local problems in water supply and disposal to be eliminated. Meridian has engaged SEH, Inc. who will be performing site surveying and geotechnical analysis for the Davis Refinery to undertake a thorough water availability study, and has indicated the unique opportunity of using reclaimed waste water from a nearby sewage treatment plant in Belfield for our process water.
What impact will construction and operation of the Davis Refinery have on the neighboring farms and livestock near the grounds?	A large percentage of the traffic into and out of the Refinery, both during construction and operations, will be by rail, which will reduce dust and other emissions substantially. And finally, we consider dust control on the site during construction to be a construction safety hazard and a health issue for our own employees, and therefore we will be controlling it both through paving on the site and by liberal use of water trucks where paving is not possible.

	We will not be hauling a significant amount of aggregate to the site from the quarry or borrow pit near neighboring property. It appears that our earthwork on the site is very nearly balanced, so we do not need to build things up substantially. If we do need to haul substantial amounts of aggregate, then we will simply have to extend our dust control measures to the haul roads that serve our sites.
What does zero-sulfur diesel and jet fuel mean, and why is that important?	The EPA has promulgated regulations on the content of liquids transportation fuels that the Refinery must meet in order to market its products. These regulations not only mandate current requirements, but also require that certain changes take place over time. The Refinery is being designed to be able to meet these requirements.
What is gas flaring, and how does the Davis Refinery intend to address the issue of gas-flaring emissions?	The flaring of low-value natural gas at the wellhead, which results in the release of a large amount of carbon dioxide into the atmosphere, has created an ongoing environmental crisis in the Bakken. The Davis Refinery will reduce flaring emissions by over 50% for every cubic foot of gas that it consumes.

March 22, 2016

Ms. Stacey Swanson
Tax and Zoning Director
Billings County Planning and Zoning Department
Tax Equalization & Zoning Office
Billings County Courthouse
495 4th Street
Post Office Box 247
Medora, North Dakota 58645

Dear Ms. Swanson:

Meridian Energy Group, Inc. is pleased to submit the attached **Application for Building & Zoning Certificate** and the **Application for Conditional Use Permit** for the proposed Davis Refinery Project near Belfield, North Dakota. Meridian is seeking an Industrial Zoning Certificate and a Conditional Use Permit to construct the Davis Refinery, an approximately 55,000 barrel per day petroleum refinery. The Refinery will be constructed in two phases, with the initial design capacity of the Refinery being 27,500 bpd capacity.

The Applications have been prepared in accordance with the information requirements outlined within the Billings County Comprehensive Plan, Section B, paragraph ii – The Energy Industry, and Section C – Future Growth in Billings County, and Billings County Zoning Ordinance Article V: Zoning District Regulations, Section 5.5 Industrial District Purpose, and Section 5.5.2 - Conditionally Permitted Uses, Subsection e), and Article VII: Administration and Enforcement, Section 7.3 – Conditional Use Permits. In this regard, the attached Survey, Site and Location Maps were prepared by SEH Engineers Inc., Bismarck, North Dakota, (www.sehinc.com) and the Site Plan and General Plot Plan were prepared by the Houston offices of Vepica USA, Inc. (www.vepica.com/home/en), on behalf of Meridian.

Using state-of-the-art operating and controls technology, the proposed Davis Refinery will refine, once fully installed, approximately 55,000 barrels per day of a variety of locally produced crude oils brought to the facility by pipeline, truck and rail. Refined products include gasoline, diesel, jet fuel, heating oil, as well as lesser-known products such as lubricants, asphalt base, ethane for plastics, waxes and other specialty chemicals. The initial phase of the Refinery will focus on the production of jet fuel, diesel fuel and other distillate products, primarily for local markets.

The Applications' attachments in Exhibit J include environmental review reports from SEH Engineers **(1)** to assess the suitability of the Project site from a soils, geologic hazards, and flooding perspective, **(2)** to assess the impact on biological resources in the vicinity of the Project site, including potential environmental impacts from constructing and operating the refinery, **(3)** to assess cultural and

MERIDIAN ENERGY GROUP, INC.
Thomas Williams – Executive Vice President, Planning and Permitting
151 Kalmus Drive, Suite E-140, Costa Mesa, California 92626
707.299.0182 (c) - 949.207.3815 (o) - 949.207.6550 (f)
twilliams@meridianenergygroupinc.com
www.meridianenergygroupinc.com

paleontological resources and wetlands, and (4) visual impact mitigation attainment. These reviews will be used in the design phase of the refinery to minimize environmental impacts, including noise, light, and so forth. Exhibit J also includes a Memorandum from SEH that addresses the manner in which Meridian will mitigate construction period impacts.

The Refinery will employ up to 500 people at the peak of the construction period, and full-time permanent employment is expected to be approximately 150 – 200 people. A refinery job creation report from the state of Washington is attached as Exhibit K which concludes refinery employment creates total permanent employment, including indirect and induced jobs, equal to over twelve for each direct refinery employee. Pursuant to the Billings County Comprehensive Plan, "maintaining the energy industry in Billings County is of utmost importance to the citizens of the County and the County itself."

State-of-the-art refinery safety equipment and technology will be utilized during construction and operation of the refinery. During construction, all local, state and federal construction site requirements will be met, such as, but not limited to, storm-water runoff control, erosion and sediment control, wash water control (concrete, tools, equipment), wastewater control (portable toilets) and dust and weed control, and site safety and security.

Meridian is requesting that Billings County provide, as part of its approval of the permits and approvals requested herein, the ability of Meridian to begin limited site work on the Project so that the Project does not lose this coming summer as part of the construction schedule for the Project. The work that would be initiated this summer would include grading and earthwork, work on rail sidings and switches, and construction of the agricultural visual buffer that Meridian will be designing with help from a local University. We have learned from Craig Thorstenson, Environmental Engineer for the North Dakota Department of Health, Division of Air Quality that all sources requiring an air quality permit can begin grading and site construction prior to receiving the air quality permit.

Meridian has entered into an agreement with BASIC Equipment, Inc. (www.basic-equipment.com), a Houston based turnkey engineering, procurement and construction firm to serve as its contractor for the refinery, and Vepica USA will continue as the Project's engineer

Meridian would like to arrange to meet with you in the near future to discuss the Project in greater detail and address any questions concerning the Project that you may have based upon your review of the Applications. Please call me if you have any questions or comments in the interim.

Sincerely,

MERIDIAN ENERGY GROUP, INC.

Tom Williams
Executive Vice President, Planning & Permitting

MERIDIAN ENERGY GROUP, INC.

Application for Building and Zoning Certificate

and

Application for Conditional Use Permit

for the

DAVIS REFINERY PROJECT

SUBMITTED TO THE BILLINGS COUNTY
PLANNING AND ZONING DEPARTMENT
TAX EQUALIZATION AND ZONING OFFICE

MERIDIAN ENERGY GROUP, INC.
Corporate Offices: 51 Kalmus Drive, Suite E-140, Costa Mesa, California 92626
949.207.3815 (o) 949.207.6550 (f) www.meridianenergygroupinc.com

THE DAVIS REFINERY PROJECT

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Socioeconomic Impact and Job Creation Report	K

Exhibit A – Application Forms for Building and Zoning Certificate and the Conditional Use Permit

1. **Billings County Application for Building and Zoning Certificate**

2. **Billings County Application for Conditional Use Permit**

3. **Billings County Weed Control Plan**

BILLINGS COUNTY — APPLICATION FOR BUILDING & ZONING CERTIFICATE

TAX EQUALIZATION & ZONING OFFICE
PHONE: (701) 623.4810 • FAX: (701) 623.4761
495 4TH STREET • PO BOX 247 - MEDORA, ND 58645-0247
stswanson@nd.gov jpemberton@nd.gov

APPLICATION:_____

DATE ISSUED:_____ EXPIRES:_____

REVISED 5/2015

INSTRUCTIONS:

1. For new buildings and additions to existing buildings, complete entire form
2. Include all necessary drawings in the space provided and attach any house plans, surveys, etc. to the application
3. Return completed application and fees to the Tax Equalization & Zoning Office before proposed upcoming zoning meeting which is posted at http://www.billingscountynd.gov/BillingsCountyZoning.htm

CERTIFICATE FEES, CHECK ALL THAT APPLY:

- [X] $ 750 ..... Zoning Application Fee*
- [X] $ 250 ..... Conditional Use Permit*
- [ ] $ 200.00..... Temporary Use Permit
- [ ] $ 200.00..... Variance
- [■] $ 200.00.....Change in Zoning District

$ 1200 Total ☐ Paid Receipt: _____

*Fees vary by Zoning District. See Billings County Fee Structure for Planning & Zoning Applications.

Make Check Payable to: Billings County

LOCATION OF PROPOSED STRUCTURE:

■ Rural Billings County
Address: **See attached Exhibit F**

APPLICANT INFORMATION*:

Name: Meridian Energy Group, Inc. - Executive Vice President Tom Williams
Mailing Address: 151 Kalmus Drive Suite E-140
City, State Zip: Costa Mesa, CA 92626
Phone Number: 949-207-3815 Cell: 707-299-0182
Email: twilliams@meridianenergygroupinc.com

*If applicant is not the owner of record, enclose a letter from the owner stating concurrence of this action for the proposed use of the property.

TYPE OF PERMIT:

- ■ Zoning Certificate
- ■ Zoning Change from Agricultural and Residential to Industrial
- ☐ Variance Requested.....A variance is needed if the building proposal does not meet ordinance requirements and cannot reasonably be changed to meet standards. See Billings County Ordinance 7.4
- ■ Conditional Use.....A conditional use is permitted in a district specifically permitting it, subject to the approval of the County Commission and only when the commission finds that such use meets all applicable, including but not limited to those contained in this ordinance. See Billings County Ordinance 7.3

ESTIMATED VALUE OF CONSTRUCTION AND IMPROVEMENTS: $ Up to $850 mm

LEGAL DESCRIPTION OF BUILDING SITE: * **See attached Exhibit F**

Lot: * _____ Block: * _____ Subdivision: * _____

Qtr/Qtr: * _____ Section: * _____ Township: * _____ Range: * _____

PARCEL NUMBER: _____ - _____ - _____ - _____

CONSTRUCTION WILL BEGIN BY: Third Quarter 2016 **AND BE FINISHED NO LATER THAN:** First Quarter 2018

DESCRIPTION OF LOT:

- ■ Acreage or Square Feet of Parcel: Approx. 708 acres.
- ■ Lot Depth: * Lot Width: *

***See Exhibit F**

PRESENT USE:

- ■ Residential
- ■ Agricultural
- ☐ Recreational
- ☐ Commercial
- ☐ Industrial
- ☐ Vacant

PRESENT STRUCTURES, CHECK THAT APPLY: **SIZE:**

Greg Kessel:

- ■ Residence 5,300 sq. ft.
- ☐ Garage
- ■ Shop 29,000 sq. ft.
- ☐ Storage Shed
- ■ Barn/Ag Outbuildings 256 sq. ft.
- ■ Other Grain Storage Silos 432 sq. ft.

TOTAL NUMBER OF STRUCTURES:

Existing Farmstead Approx. 23 structures

Bonnie L. and Donald Heiser:

Residence: 2,240 sq. ft.
Barn: 3,200 sq. ft.
Shed: 576 sq. ft.
Trailer: 1,056 sq. ft.

TOPOGRAPHY:

- ☐ Flat
- ■ Moderate Slope
- ☐ Hilly
- ☐ Steep Slope/Badlands

PREDOMINANT SOIL TYPE: Varies, primarily Lean Clay.

SEWAGE DISPOSAL:*

- ☐ No Plumbing
- ■ Septic Tank with Drain Field*
- ■ Holding Tank

* Septic and Holding Tanks require a permit from the Southwestern District Health Unit.
Address: 2869 3rd Ave W
Dickinson, ND 58601
Phone: (701) 483-0171
Toll Free: 1-800-697-3145

WATER:*

- ☐ No Plumbing
- ☐ City Water
- ☐ Southwest Water
- ☐ Existing Well
- ■ Drilling New Well

*Attach a copy of approval from SW District Health and/or Southwest Water

CURRENT ZONING:

- ☐ Agricultural
- ☐ Recreational
- ☒ Residential
- ☒ Commercial
- ☐ Industrial
- ☐ Hillside & Ridgeline Overlay District*

*See Section 5.6 of Billings County Zoning Ordinance for Hillside & Ridgeline Overlay District

BILLINGS COUNTY **APPLICATION FOR BUILDING & ZONING CERTIFICATE**

PROPOSED ACTION:

☒ New Construction ☐ Addition to Existing Structure ☐ Move-In Structure ☐ Shelterbelt

PROPOSED USE: PLEASE CHECK ALL THAT APPLY

☐ Residential ☐ Commercial ☐ Storage ☐ Recreational
☐ Garage ☐ Mobile Home Park ☐ Agricultural ☒ Industrial
☐ RV Park

PROPOSED INTENDED ACTION WILL BE USED BY:

☒ Owner ☐ Immediate Family Member of Owner
☐ Hired Hand ☐ Leased or Rented by the owner to: _____
☐ Other, please explain: _____

Note: If the intended use of this property changes, you are required to notify the Zoning Administrator and may need to rezone to comply with the change.

CONSTRUCTION TYPE:

☐ Wood Frame
☐ Wood Pole Frame
☒ Steel Frame
☒ Masonry or Concrete
☐ Dirt Floor ☐ Concrete Floor
☐ Mobile Home: Year:_____Make & Model: _____
Serial #: _____

APPLICANT COMMENTS OR FURTHER INFORMATION:

Complete industrial facility - 27,500 barrels per day initial phase, 55,000 barrels per day final phase, crude oil refinery and associated buildings and structures.

DIMENSIONS OF STRUCTURE(S): ***See attached Exhibit I**

USE: * _____ * _____ X * _____ **NUMBER OF STORIES:** *_____ **WALL HEIGHT:** *_____

USE: * _____ * _____ X * _____ **NUMBER OF STORIES:** *_____ **WALL HEIGHT:** *_____

SIDING TYPE: * _____ **INSULATION:** ☐ Yes ☐ No

ROOF COVERING: * _____ **INSULATION:** ☐ Yes ☐ No

FOUNDATION TYPE: * _____ **DEPTH:** ☐ 8 Feet ☐ 4 Feet ☐ Concrete Slab

BASEMENT: ☐ Yes ☐ No **TOTAL BASEMENT SQUARE FOOTAGE:** * _____ **FINISHED SQ FT:** * _____

ELECTRICITY: ☐ Yes ☐ No

HEATING SYSTEM: ☐ Yes ☐ No **TYPE:** * _____

AIR CONDITIONING: ☐ Yes ☐ No **TYPE:** * _____

NOTE ON RESIDENTIAL DEVELOPMENT:

No lot shall contain more than one principal single family residential building, and no dwelling unit shall be built on a lot which does not abut a dedicated public right-of-way.

HIGHWAY & LOT LINE SETBACK REQUIREMENTS:

All buildings or structures shall adhere to the following public road or highway setback requirements:

1) The minimum setback for buildings from the centerline of all section lines and the center line of county roads shall be one hundred three (103) feet.
2) The minimum setback for buildings from the centerline of all state highways shall be two hundred fifty (250) feet.
3) The minimum setback for tree plantings from all section lines and the centerline of county roads shall be one hundred three (103) feet.

AGRICULTURAL DISTRICT: **MINIMUM LOT SIZE:** 5 acres **FRONT:** 75 feet **SIDE:** 25 feet **REAR:** 25 feet

RESIDENTIAL DISTRICT SETBACKS: **FRONT:** 75 feet **SIDE:** 10 feet **REAR:** 25 feet

Note: Accessory buildings shall be smaller than the principal building and shall be limited to fifteen (15) feet in height and be located at least ten (10) feet from all lot lines.

APPLICABILITY OF HILLSIDE AND RIDGELINE GUIDELINES

The provisions of this section (according to 5.6.1 of the Billings County Zoning Ordinance) shall apply to any application for a land use permit or subdivision on land that meets either of the following two conditions:

(1) Any portion of the building envelope that includes slopes in excess of fifteen (15) percent;
(2) Land that is located on or within fifty (50) vertical feet of the elevation of any prominent ridgeline. Lands that meet either of these two provisions are herein referred to as hillside land or ridgeline land, respectively.

Prominent Ridgeline Defined

A prominent ridgeline shall be defined as any ridgeline, as viewed from any point along a designated major roadway corridor which create a silhouette with the sky. The currently designated roadway corridors are Interstate 94, including all business loops and US Highway 85, and all county roadways. Other potential major roadway corridors from which to identify prominent ridgelines, whether existing or proposed at the time a subdivision or land use permit application is submitted, may be designated by the Planning and Zoning Board during the development review process. These new major roadway corridors shall then establish view points from which to identify prominent ridgelines.

APPLICANT COMMENTS/FURTHER INFORMATION: (ATTACH SHEET IF NEEDED)

For additional information, see attached maps, surveys, and reports.

I the undersigned applicant for a permit do hereby attest that the information contained in this application is truthful and correct to the best of my ability. I further agree to comply with all building codes and standards as regulated by the State of North Dakota, and the requirements and conditions of this permit, and the zoning ordinance of Billings County.

I understand that any inappropriate use of this permit may cause me to be required to pay a penalty.

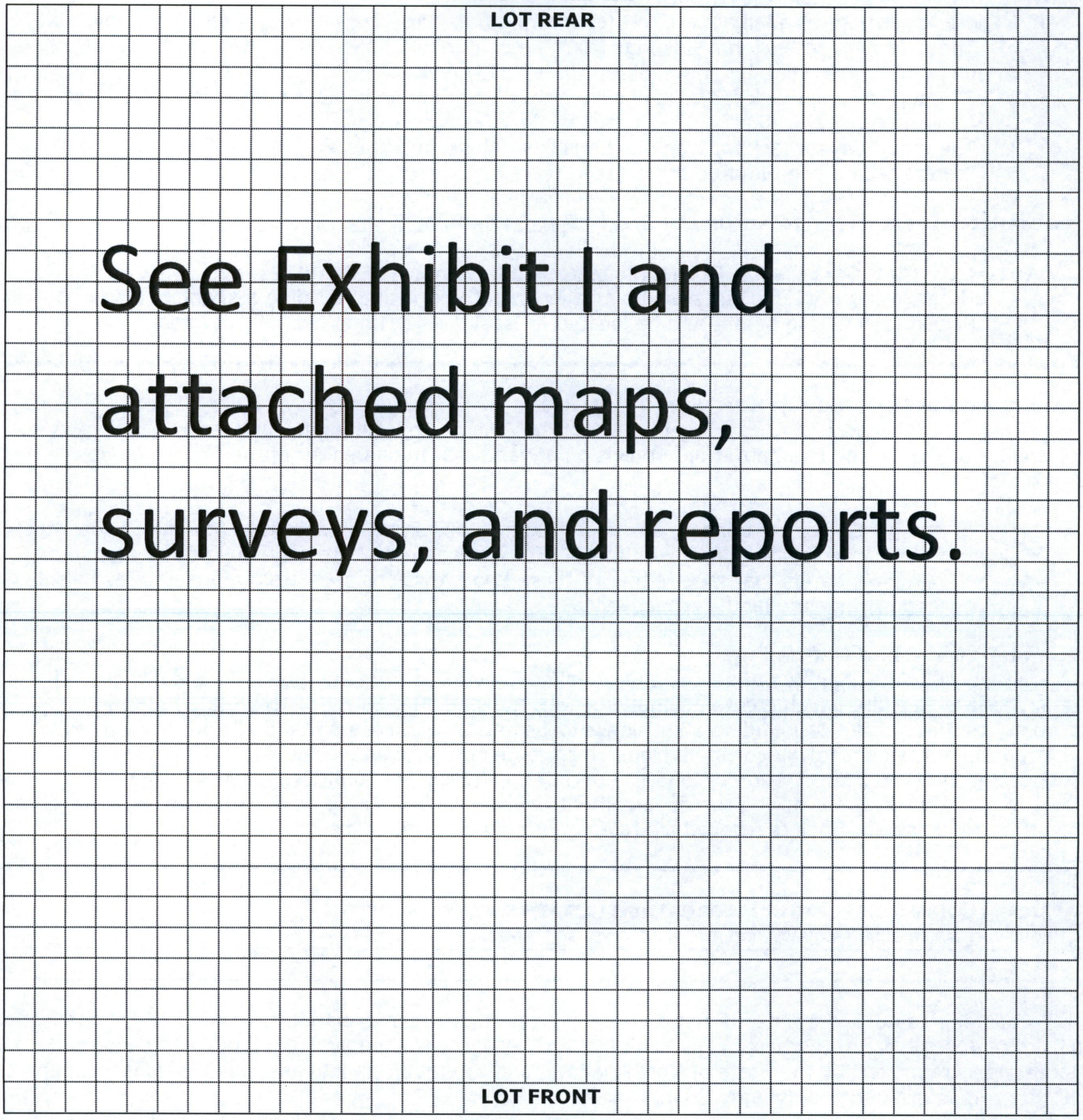
I certify that I am the ■ Property Owner ☐ Construction Contractor hired by the owner.

Tom Williams — Tom Williams — March 22, 2016

Signature of Applicant — Printed Name of Applicant — Date

A Scale Drawing must be submitted showing the dimensions of all structures on lot & distance from lot lines & setback requirements. Attach additional sheets if needed. Also include photocopies of all existing floor plans, site plans, surveys, etc with the application.

PLOT PLAN



Information Needed on the Plot Plan: In order to help your permit process go as quickly as possible, the following information must be clearly shown on your Plot Plan, even if it is not to scale:

- ☒ North Arrow
- ☒ Adjacent Streets & Approach
- ☐ Setbacks
- ☒ Easements
- ☒ Proposed Structure(s), with Dimensions
- ☐ Existing Structure(s), with Dimensions
- ☒ Septic tank, drainfield, & distance from structures
- ☒ Water well or SW water line

- ☐ Show the distance from the proposed structure to your property line in all four directions.
- ☐ Also include photocopies of all existing floor plans, site plans, surveys, etc with the application.

BILLINGS COUNTY APPLICATION:_____

APPLICATION FOR CONDITIONAL USE PERMIT ISSUED:_____ EXPIRES:_____

REQUIREMENTS OF ORDINANCE 7.3 REVISED 07/2015

Applications will be reviewed by the Zoning Director, followed by a public hearing before the Zoning Board and final action will be made by the Billings County Board of Commissioners. **Fee: $_____** Paid: _____

APPLICANT*: Name: Meridian Energy Group, Inc. - Executive Vice President Tom Williams

Mailing Address: 151 Kalmus Drive Suite E-140

City, State Zip: Costa Mesa, CA 92626

Phone: 949-207-3814 Cell: 707-299-0182 Email: twilliams@meridianenergygro

*If applicant is not the owner of record, enclose a letter from the owner stating concurrence of this action for the proposed use of the property.

OWNER: ☐ Same as above Name: Greg Kessel ; Bonnie L. and Donald Heiser

LEGAL DESCRIPTION OF PROPERTY: * See attached Exhibit F

Lot:* _____ Block:* _____ Subdivision:* _____

Qtr/Qtr:* _____ Section:* _____ Township:* _____ Range:* _____

Parcel Number: _____ - _____ - _____ - _____ Acreage:* _____

CURRENT ZONING:

☒ Agricultural ☒ Residential ☐ Recreational ☐ Commercial ☐ Industrial

Current Use: Existing Farmstead

Proposed Use: Crude oil refinery and associated structures.

The proposed use is Conditionally Permitted in the following Zoning District under Section _____

☐ Agricultural ☐ Residential ☐ Recreational ☐ Commercial ☒ Industrial

Please state in detail the reason for applying for this Conditional Use Permit (attach additional sheets if needed):

See attached documents.

I the undersigned applicant for a permit do hereby attest that the information contained in this application is truthful and correct to the best of my ability. I further agree to comply with all building codes and standards as regulated by the State of North Dakota, and the requirements and conditions of this permit, and the zoning ordinance of Billings County.

I understand that any inappropriate use of this permit may cause me to be required to pay a penalty.

Tom Williams — Tom Williams — March 22, 2016

Signature of Applicant | Printed Name of Applicant | Date

March 22nd 2013

Stacy Swanson
Director, Tax & Zoning
Billings County Planning and Zoning Department
Billings County Courthouse
495 4th Street, P.O. Box 247
Medora, North Dakota 58645

Dear Ms. Swanson:

I hereby give my authorization and concurrence to Billings County Planning and Zoning Department for any re-zoning, conditional use permits or building permits applied for by my land optionee, Middletown Farm & Cattle, Co., LLC, or its nominees or assignees.

This authorization and concurrence extends to the parcels of my land currently under option for any of the following projects or uses applied for and ultimately permitted by Billings County Planning and Zoning, and by any of the various State of North Dakota governmental agencies having jurisdiction;

- Oil Field Services & Storage
- Oil Field Transportation Facility
- Railway Transload Facility
- Crude Oil Refinery
- Natural Gas-to-Liquids Refinery

Sincerely,

Greg Kessel

March 13, 2016

Stacey Swanson
Director, Tax & Zoning
Billings County Planning and Zoning Department
Billings County Courthouse
495 4th Street, P.O. Box 247
Medora, North Dakota 58645

Dear Ms. Swanson:

I hereby give my authorization and concurrence to Billings County Planning and Zoning Department for any re-zoning, conditional use permits or building permits applied for by my land optionee, Meridian Energy Group, LLP., or its nominees or assignees.

This authorization and concurrence extends to the parcels of my land currently under option for any of the following projects or uses applied for and ultimately permitted by Billings County Planning and Zoning, and by any of the various State of North Dakota governmental agencies having jurisdiction;

- Oil Field Services & Storage
- Oil Field Transportation Facility
- Railway Crude-by-Rail Transload Facility
- Rail Car and Truck Maintenance & Repair
- Crude Oil Refinery
- Natural Gas-to-Liquids Refinery

Sincerely,

Bonnie L. Heiser

Bonnie L. Heiser

Donald Heiser

Donald Heiser

APPLICATION:_____

CONDITIONAL USE PERMIT REVIEW

BILLINGS COUNTY ORDINANCE DEFINITION OF CONDITIONAL USE: The development and administration of this Ordinance is based on the division of the County into districts within which the uses as land and buildings are mutually compatible. However, there are certain uses which, because of their unique characteristics cannot be classified as unrestricted permitted uses in any particular district or districts without consideration in each particular case of the impact of those uses upon adjoining lands or public facilities. Such uses nevertheless, may be necessary or desirable in a particular district provided that due consideration is given to location, development and operation of such uses.

No conditional use permit shall be recommended by the Planning and Zoning Board or approved by the Commission unless the applicant shall have met all the following criteria:

1. Is proposed conditional use detrimental to or does it endanger the public health, safety, comfort or general welfare?_____ If yes, please explain.

_____

_____

2. Does the proposed conditional use substantially impair or diminish the value and enjoyment of other property in the area?_____ If yes, please explain why and who opposes.

_____

_____

3. Does the proposed conditional use impede the normal orderly development of the surrounding property?_____ If yes, please explain.

_____

_____

4. Are adequate utilities, access roads, drainage or other necessary site improvements being provided?_____ If no, please explain.

_____

_____

5. Have adequate measures been taken to provide ingress and egress to the property without adverse effects on the adjoining properties and traffic congestion in the public street?_____ If no, please explain.

_____

_____

6. Does the proposed conditional use conform to all applicable regulations of the district within which it is located? _____ If no, please explain.

_____

_____

RECOMMENDATION TO THE PLANNING & ZONING BOARD FROM THE ZONING DIRECTOR

☐ Approve ☐ Deny ☐ Modify ☐ Conditions Imposed Date of Public Hearing: _____

_____

_____

_____

_____

APPLICATION:_____

ACTION AND RECOMMENDATION BY THE COUNTY PLANNING & ZONING BOARD

☐ Approve ☐ Deny ☐ Modify ☐ Conditions Imposed Date of Public Hearing: _____

Modifications:

1. * _____
2. * _____
3. _____

Conditions:

1. _____
2. _____
3. _____

ACTION BY THE BOARD OF COUNTY COMMISSIONERS

☐ Approve ☐ Deny ☐ Modify ☐ Conditions Imposed Date: _____

Modifications:

1. _____
2. _____
3. _____

Conditions:

1. _____
2. _____
3. _____

WEED CONTROL PLAN

TO BE SUBMITTED WITH ZONING APPLICATION: _____

BILLINGS COUNTY WEED CONTROL BOARD
PO BOX 168 - MEDORA, ND 58645-0168
PHONE: (701) 575.2215
Website: www.bcwcb.com Email: bcweed09@live.com

INSTRUCTIONS:
Include photos or a map of the property
Contact the BCWCB for approval of plan

APPLICANT: Name: Meridian Energy Group, Inc. - Executive Vice President Tom Williams

Phone: 949-207-3814 Cell: 707-299-0182 Email: twilliams@meridianenergygroupinc.com

OWNER: ☐ Same as above Name: Greg Kessel ; *Bonnie L. and Donald Heiser*

LEGAL DESCRIPTION OF PROPERTY: Parcel Number: _____-_____-_____-_____

Lot:* _____ Block:* _____ Subdivision:* _____ Acreage:* _____

Qtr/Qtr:* _____ Section:* _____ Township:* _____ Range:* _____

Existing Land Use: ____ _____ Proposed Land Use: _____ * See attached Exhibit F

The applicant and all interested parties will cooperate to monitor and control the following invasive and noxious weeds as prescribed by the ND Century Code and Billings County:

- Canada Thistle
- Diffuse Knapweed
- Leafy Spurge
- Musk Thistle
- Purple Loosestrife (Lythrum)
- Russian Knapweed
- Spotted Knapweed
- Yellow Toadflax
- Absinth Wormwood (American or common wormwood, mugwort, madderwort, or wormwood sage)
- Dalmatian Toadflax
- Salt Cedar
- Hoary Cress (white top)
- Field Bindweed (creeping jenny)
- Houndstongue
- Black Henbane
- Common Burdock (wild rhubarb)

Method of Control: ■ Mechanical ■ Chemical _____ (Herbicide) ☐ Biological ☐ Other _____
(Check all that apply)

Area(s) of Concern & Type of Weeds:	Acreage	Method of Control	Date Treated

Tom Williams
Signature of Applicant

March 22, 2016
Date

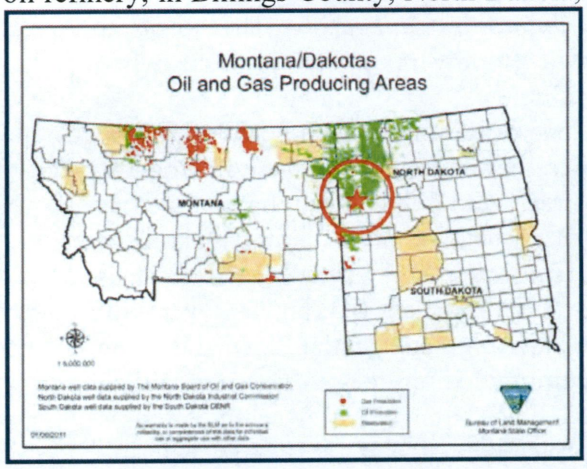
_____
Signature of BCWCB Officer

_____
Date

Exhibit B – Overall Project Description

The Davis Refinery Project

Meridian Energy Group, Inc. ***("Meridian" or the "Company")*** is a closely-held South Dakota corporation formed to build and operate the Davis Refinery ***("Davis" or the "Refinery")***, a phased approximately 55,000 bpd high conversion crude oil refinery, in Billings County, North Dakota, in the heart of the Bakken Formation (see maps below). The majority of the oil being produced in the Bakken is transported to distant refineries, and products consumed in the area are imported all the way back. By building the Refinery near the source of crude oil, the Company can take advantage of low-cost sources of crude oil as feedstock and natural gas as refinery fuel. The Refinery will also benefit from a transportation cost advantage for its refined products.



Meridian will build and operate the Refinery on a 708-acre site in Billings County, North Dakota, just west of the town of Belfield ***(the "Site")***. The Site was selected because it is close to the major oil and gas producing operations of the Bakken, is in close proximity to major north-south and east-west highways, adjacent to oil and gas pipeline gathering systems and to the Burlington Northern Santa Fe ***("BNSF")*** primary rail line that runs through the property.

Meridian is designing and building the Refinery in two phases. Phase 1 will be an approximately 27,500 bpd facility focusing on the production of Jet Fuel and Auto Diesel using a combination of local crudes as feedstock. In Phase 2, Meridian will increase the capacity of the Refinery to 55,000 bpd at a higher complexity, producing a full slate of refined products including LPG, Gasoline, Jet Fuel, Auto Diesel and Fuel Oil.

Project Impacts

As expected in the case of any substantial industrial facility, the Refinery will have a number of impacts on the surrounding community and environment. These impacts, the Company's planned mitigation measures, and the relevant documents included herein, can be summarized as follows:

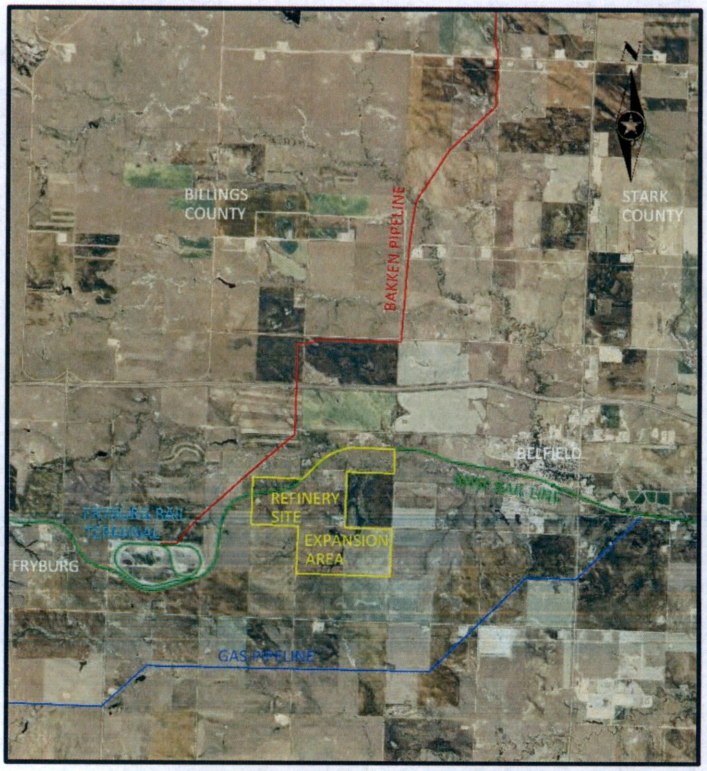
Air Emissions – Phase 1 of the Refinery will be a Minor Source of air emissions. The Company is preparing its application for a Permit to Construct for submittal to the State of North Dakota, Department of Health, and expects to submit that application during April 2016. A copy of that permit application will be provided to Billings County when submitted.

Water Consumption – The Facility is expected to utilize less than 100 gallons per minute of water, and is exploring a number of different sources, including the use of local municipal wastewater for process makeup water. Once the design of the Refinery and the discussions with various potential

sources of water have been completed, Meridian may be submitting a water allocation application with the appropriate Agency.

Wastewater Discharge – The Refinery will treat its wastewater and will be complying with all applicable regulations regarding discharge. The Refinery will be applying for the appropriate wastewater permits from the State of North Dakota Department of Health.

Community Impacts – The Refinery will employ up to 200 persons when completed. As indicated in the documentation included as Exhibit K hereto, a multiple of total employment to direct employment can be as high as 12:1, meaning total employment as a result of the Refinery will be as much as 2,400 (see also Exhibit J). This will result in substantial demands on community services in the area. When Meridian first began working on this project, the oil and gas boom was in full swing, and housing and community services were sorely pressed. Meridian has been informed, and believes it to be true, that since drilling activity has been reduced over the past two years this situation has been reversed, and in fact additional employment and fuller use of community services would be welcome in the area.



Construction Period Impacts – During construction, approximately 400 to 500 workers will be employed at the site, and will require local housing, but current hotel and apartment vacancies in the area indicate that there is sufficient availability to accommodate the work force. Other construction impacts include those associated with activities at the site, including dust and noise. The construction impact mitigation measures that will be implemented at the Refinery are typically addressed in detail as specific construction permits are obtained, but have been outlined in general in Exhibit J hereto.

Visual Impacts – Meridian is aware of the sensitive nature of the area in which the proposed Project is to be located, including the proximity of the Theodore Roosevelt National Park, and has taken steps to reduce visual impact to a minor level. This includes the use of minimal plant lighting at night (but within applicable safety standards), and the proposed installation of an agricultural buffer consisting of berms and trees placed around the North and West sides of the Project process areas. With respect to this Buffer, Meridian has requested that North Dakota State University develop a plan for developing detail plans for the buffer and assistance in implementing and

maintaining this feature of the Project. As shown in Exhibit G hereto, the Project will not be visible from the Park.

Public Health, Safety, Comfort, General Welfare – Meridian has taken steps, as described herein, to substantially mitigate the adverse impacts of the Project on the surrounding area, including air quality (permit application for Permit to Construct from North Dakota Department of Health will be submitted within 30 days), typical construction period impacts (dust, noise, weed control, traffic), water quality and visual impacts. In addition, the overall socioeconomic impact of the Project should be a positive one, with substantial job creation to promote the general welfare of the surrounding community.

Value and Enjoyment of Other Property in the Area – The Project can be expected to increase the value of other property in the area by providing more general rail, power and other utility access to other commercial and industrial uses, and by attracting compatible industrial process units. For example, Meridian has received inquiries from agricultural chemicals firms, brewing companies, and others interested in locating facilities nearby once the Project is in operation.

Impede Orderly Development of Surrounding Property – As described above, the Project should promote the value of surrounding properties and promote additional development in specialty agricultural, commercial and industrial uses.

Adequacy of Utilities, Access Roads, Drainage, Other Site Improvements – The Project will be entering into a tariff arrangement with Roughrider Electric Cooperative, Inc. for the supply of electric power to the Project, with Montana-Dakota Utilities for the supply of natural gas to the Project, and will be entering into other arrangements (including wastewater treatment arrangements with local communities) for the supply of water. Drainage from the site will be fully contained and controlled and will be established early during on-site activities, and local access roads will be improved and maintained to avoid road damage and traffic problems during construction and operations.

Ingress and Egress to Property Without Adverse Impact to Surrounding Properties – The Project is planning on paving and otherwise improving the surrounding roads that provide access to the Property, and to collaborate with Billings County, Stark County, and the City of Belfield on traffic studies and requirements for employee ingress and egress. Truck traffic associated with the supply of crude oil and transportation of refined products will be minimized in favor of rail and pipeline transportation.

Conditional Use Conformance to Applicable Regulations of District – The Project complies with the relevant regulations of the district, including, but not limited to, the following: (a) as a refinery, it is a permitted use in an industrial district; (b) the Project complies with such regulations as parking regulations, and such performance standards as incorporating a buffer strip, and having no open storage within 100 feet of residential units; (c) the lot area is well over five (5) acres; (d) the Project complies with all setbacks and other layout requirements; and, (e) the property boundary enclosing the Project is well over 1,250 feet away from any residential districts (Belfield city limits).

Exhibit C – Refinery Process and Operations Description

Once it is fully constructed and operational, the Refinery will utilize conventional distillation and high-conversion technology to process feedstock crude oils into a full slate of refined products. Meridian intends to install and operate the Refinery in phases, with the initial phase designed to process up to 27,500 bpd of crude oil feedstock to produce primarily Jet Fuel and Auto Diesel. The Refinery will be brought to full capacity in the second phase, at which time it will process up to 55,000 bpd of crude feedstock into a full slate of refined products including LPG, Gasoline, Jet Fuel, Auto Diesel, and Fuel Oil. The process for the full 55,000 bpd Refinery is described below.

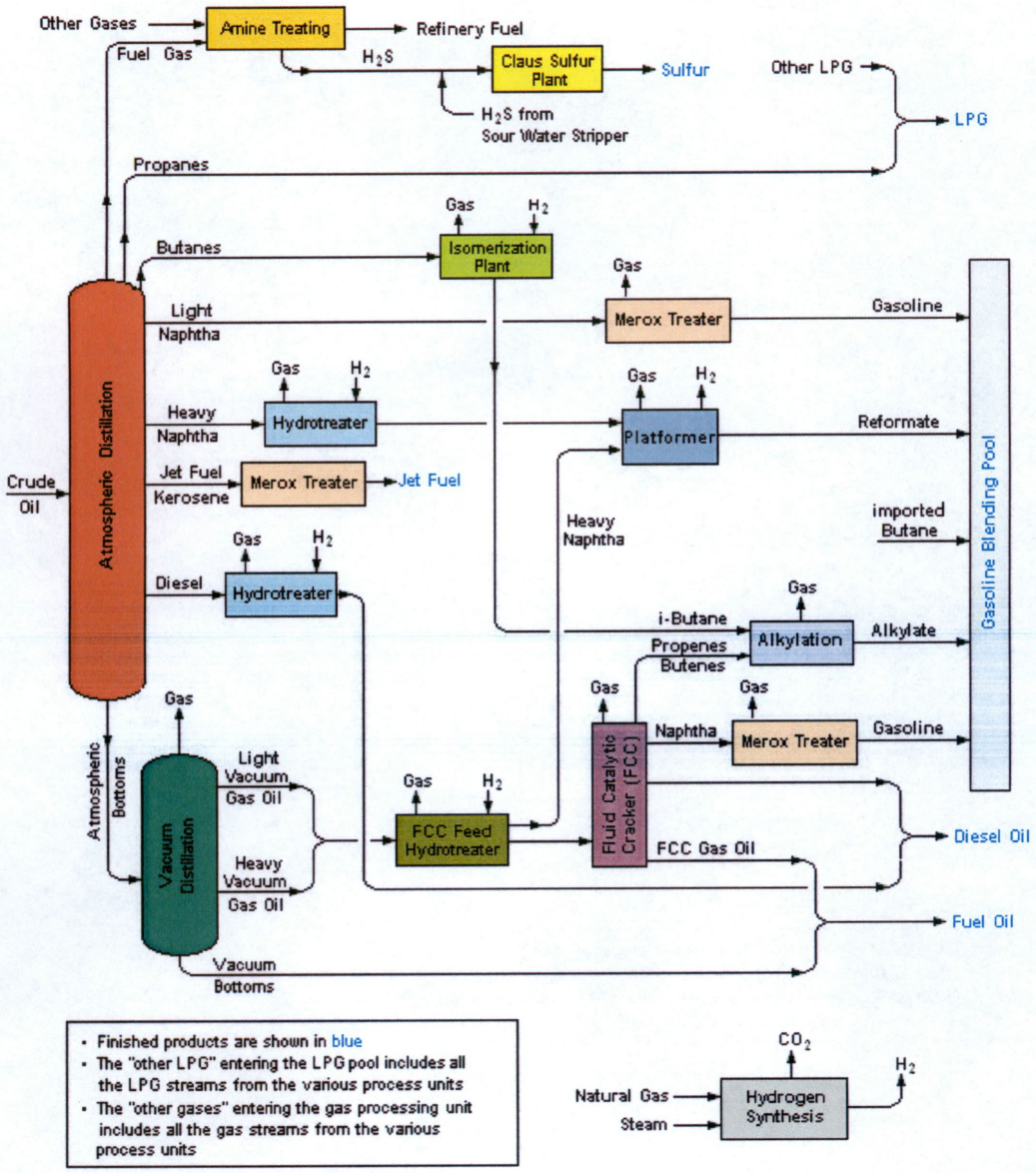
Feedstock to the refinery will be delivered via a combination of pipeline and rail and pumped into storage tanks. From the storage tanks crude oil will be fed to Crude Atmospheric Distillation Units to separate feedstock into Naphtha, Kerosene and Diesel which will be sent to other units for further processing. From the overhead hydrocarbon liquid product of the atmospheric units Fuel Gas, Propane and Butane will be obtained. Butanes from the atmospheric distillation units will undergo further processing in the Isomerization and Alkylation units to obtain alkylate for the gasoline blending stock. Crude residues from the atmospheric distillation units will be sent to a vacuum distillation unit for further fractionation.

Intermediates from the vacuum distillation are sent to a Hydrotreating and a Fluid Catalytic Cracking (FCC) Units for conversion into lighter products such as LPG, gasolines, light cycle oil, and decant oil. Gasoline from the FCC Unit will be further treated in a Merox Unit prior to being sent to the gasoline blending stock.

Light Naphtha from the atmospheric distillation units will undergo further processing through a Merox unit to meet gasoline blending specifications. Heavy Naphtha from the atmospheric distillation units will pass through a Hydrotreater prior to being combined with heavy napthas produced in the FCC Hydrotreater. The combined naphtha streams will be fed to two Platformer Units that will process the low-octane components to obtain higher octane reformate to be used in gasoline blending. The Kerosene cut from the atmospheric distillation unit will be further processed in the Jet/Kerosene Merox Unit to meet Jet Fuel product specifications. The Diesel cut will be sent through a middle distillate Hydrotreating Unit where sulfur and nitrogen are removed to produce finished product.

To support the plant's main processes an amine unit will remove H_2S from plant offgas streams, a hydrogen unit will process amine-treated offgases to generate high purity hydrogen, and a sulfur recovery unit will convert removed H_2S to elemental sulfur. Ancillary equipment for the refinery will include utilities such as Fresh Water, Fire Water, Cooling Water, Demineralized Water, Steam Generation, Condensate, Plant Air, Instrument Air, Electrical Distribution and Emergency Power Generation, Stormwater and Waste Water Treatment. A tank farm will include incoming feedstock tankage as well as refined product storage. Loading facilities will include accommodations for both truck and rail transportation. Refinery buildings will include the main control room, administrative offices, and maintenance shop and warehousing.

Simplified Block Diagram for Full Refinery Buildout



Simplified Block Diagram for Phase 1 Davis Refinery

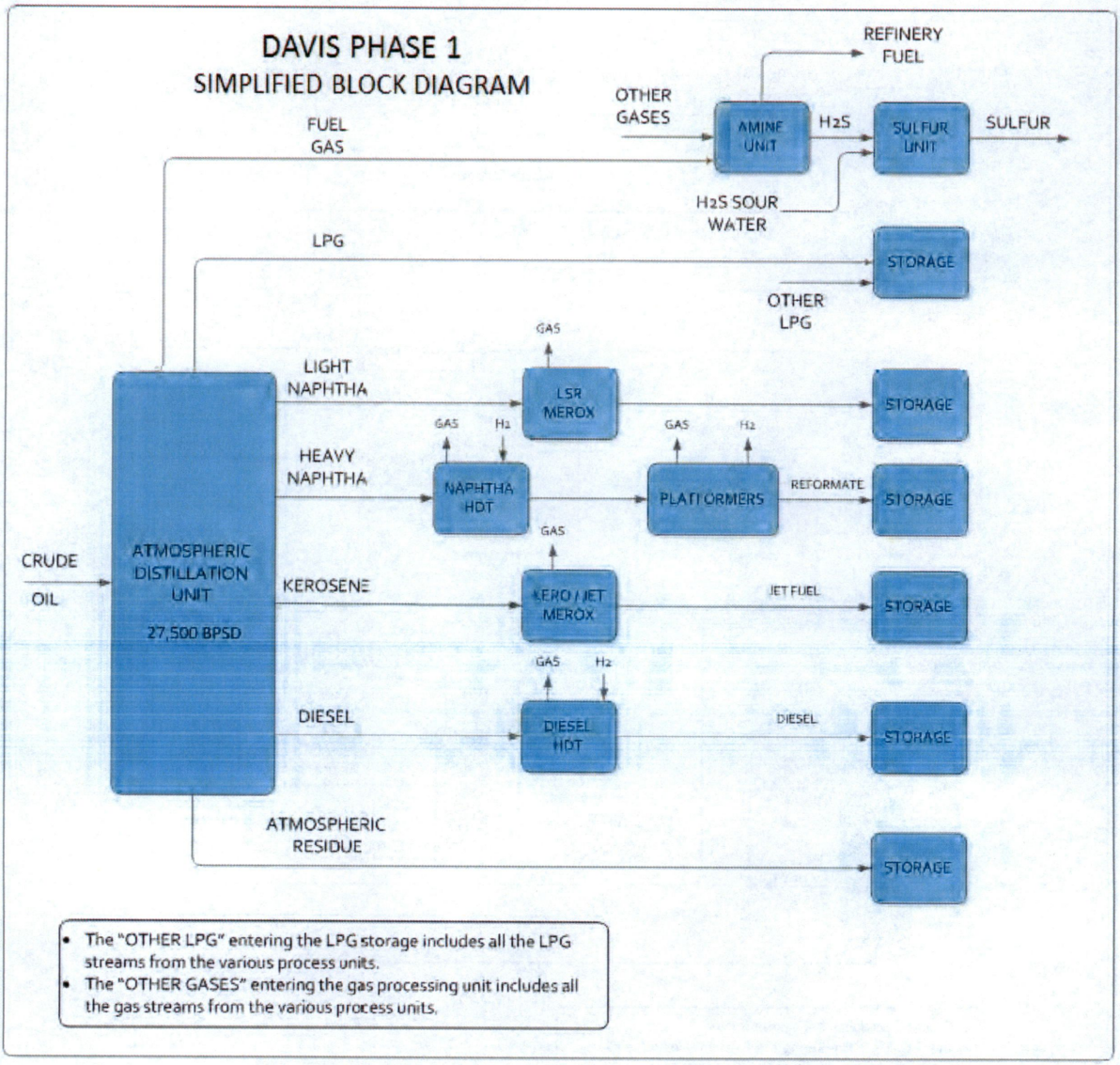
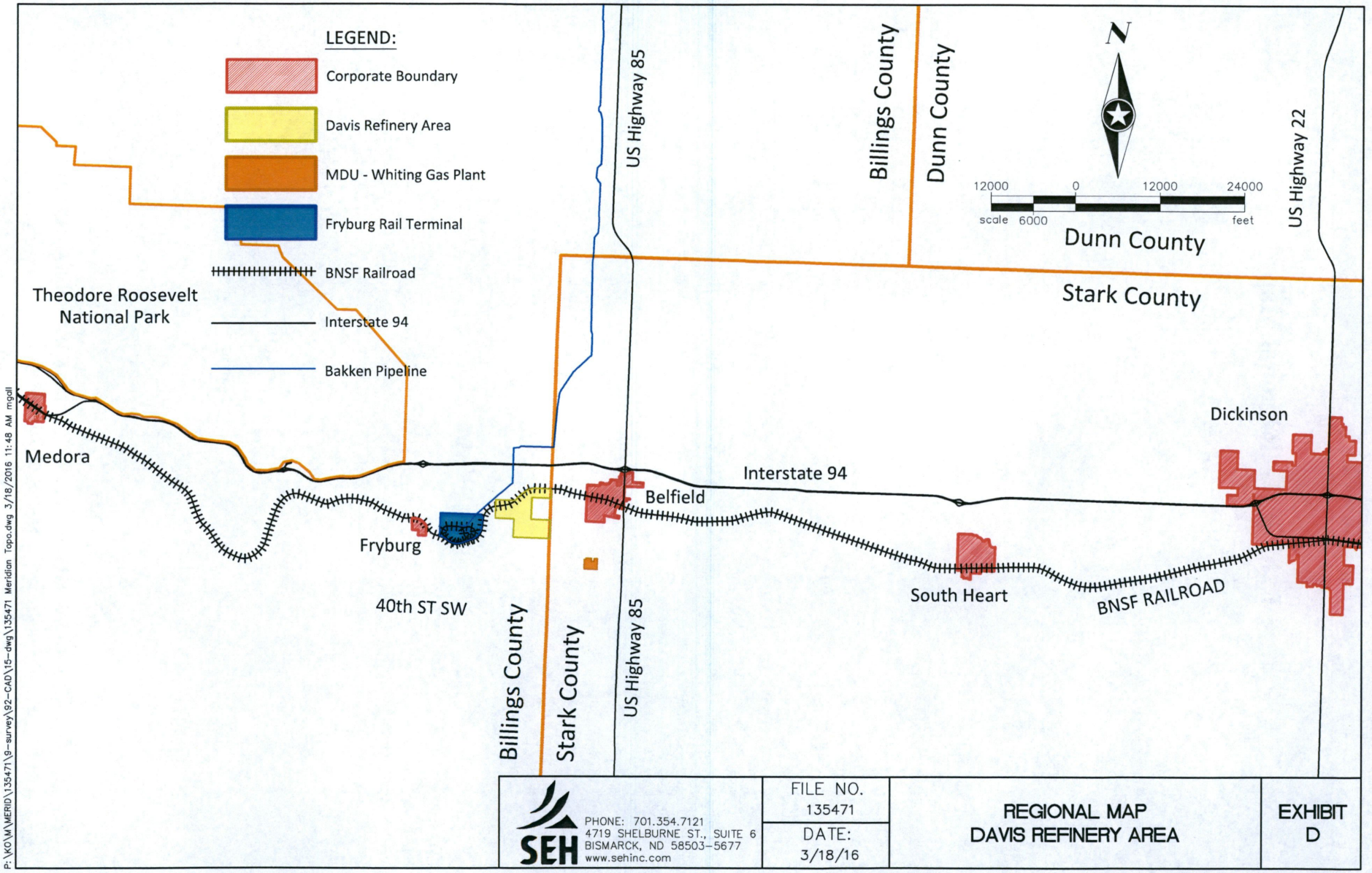


Exhibit D – Regional Map



P:\KO\M\MERID\135471\9-survey\92-CAD\15-dwg\135471 Meridian Topo.dwg 3/18/2016 11:48 AM mgall

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BISMARCK, ND 58503-5677
www.sehinc.com

FILE NO. 135471

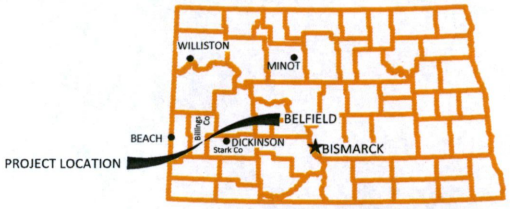
DATE: 3/18/16

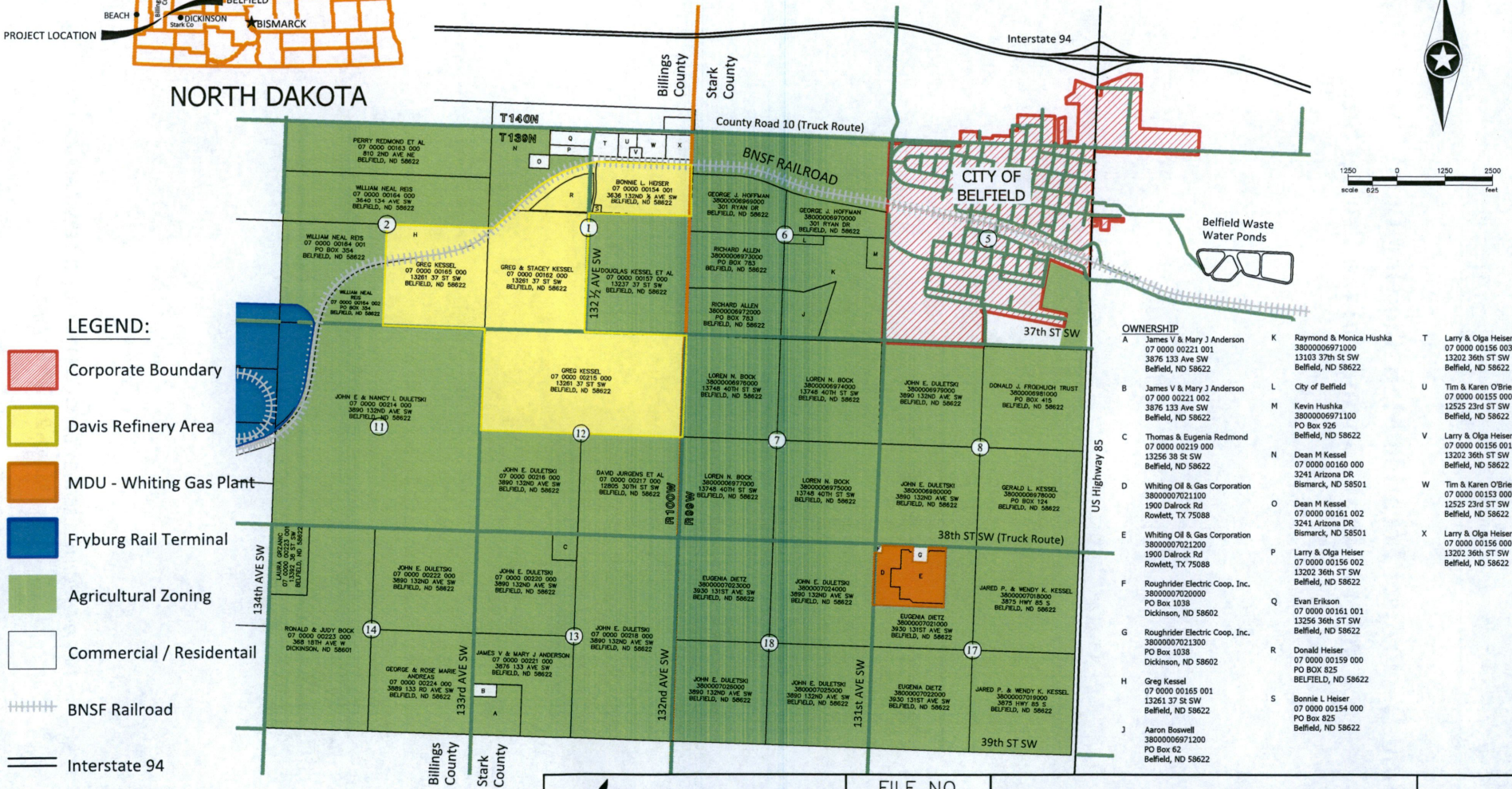
REGIONAL MAP
DAVIS REFINERY AREA

EXHIBIT D

Exhibit E – Project Location Map Showing Land Ownership and Land Use in the Vicinity of the Project Site

LOCAL OWNERSHIP MAP





LEGEND:

- Corporate Boundary
- Davis Refinery Area
- MDU - Whiting Gas Plant
- Fryburg Rail Terminal
- Agricultural Zoning
- Commercial / Residentail
- BNSF Railroad
- Interstate 94
- County Roads

OWNERSHIP

- A James V & Mary J Anderson 07 0000 00221 001 3876 133 Ave SW Belfield, ND 58622
- B James V & Mary J Anderson 07 000 00221 002 3876 133 Ave SW Belfield, ND 58622
- C Thomas & Eugenia Redmond 07 0000 00219 000 13256 38 St SW Belfield, ND 58622
- D Whiting Oil & Gas Corporation 38000007021100 1900 Dalrock Rd Rowlett, TX 75088
- E Whiting Oil & Gas Corporation 38000007021200 1900 Dalrock Rd Rowlett, TX 75088
- F Roughrider Electric Coop. Inc. 38000007020000 PO Box 1038 Dickinson, ND 58602
- G Roughrider Electric Coop. Inc. 38000007021300 PO Box 1038 Dickinson, ND 58602
- H Greg Kessel 07 0000 00165 001 13261 37 St SW Belfield, ND 58622
- J Aaron Boswell 38000006971200 PO Box 62 Belfield, ND 58622
- K Raymond & Monica Hushka 38000006971000 13103 37th St SW Belfield, ND 58622
- L City of Belfield
- M Kevin Hushka 38000006971100 PO Box 926 Belfield, ND 58622
- N Dean M Kessel 07 0000 00160 000 3241 Arizona DR Bismarck, ND 58501
- O Dean M Kessel 07 0000 00161 002 3241 Arizona DR Bismarck, ND 58501
- P Larry & Olga Heiser 07 0000 00156 002 13202 36th ST SW Belfield, ND 58622
- Q Evan Erikson 07 0000 00161 001 13256 36th ST SW Belfield, ND 58622
- R Donald Heiser 07 0000 00159 000 PO BOX 825 BELFIELD, ND 58622
- S Bonnie L Heiser 07 0000 00154 000 PO Box 825 Belfield, ND 58622
- T Larry & Olga Heiser 07 0000 00156 003 13202 36th ST SW Belfield, ND 58622
- U Tim & Karen O'Brien 07 0000 00155 000 12525 23rd ST SW Belfield, ND 58622
- V Larry & Olga Heiser 07 0000 00156 001 13202 36th ST SW Belfield, ND 58622
- W Tim & Karen O'Brien 07 0000 00153 000 12525 23rd ST SW Belfield, ND 58622
- X Larry & Olga Heiser 07 0000 00156 000 13202 36th ST SW Belfield, ND 58622

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FILE NO. 135471

DATE: 3/18/16

OWNERSHIP AND LAND USE MAP
DAVIS REFINERY AREA

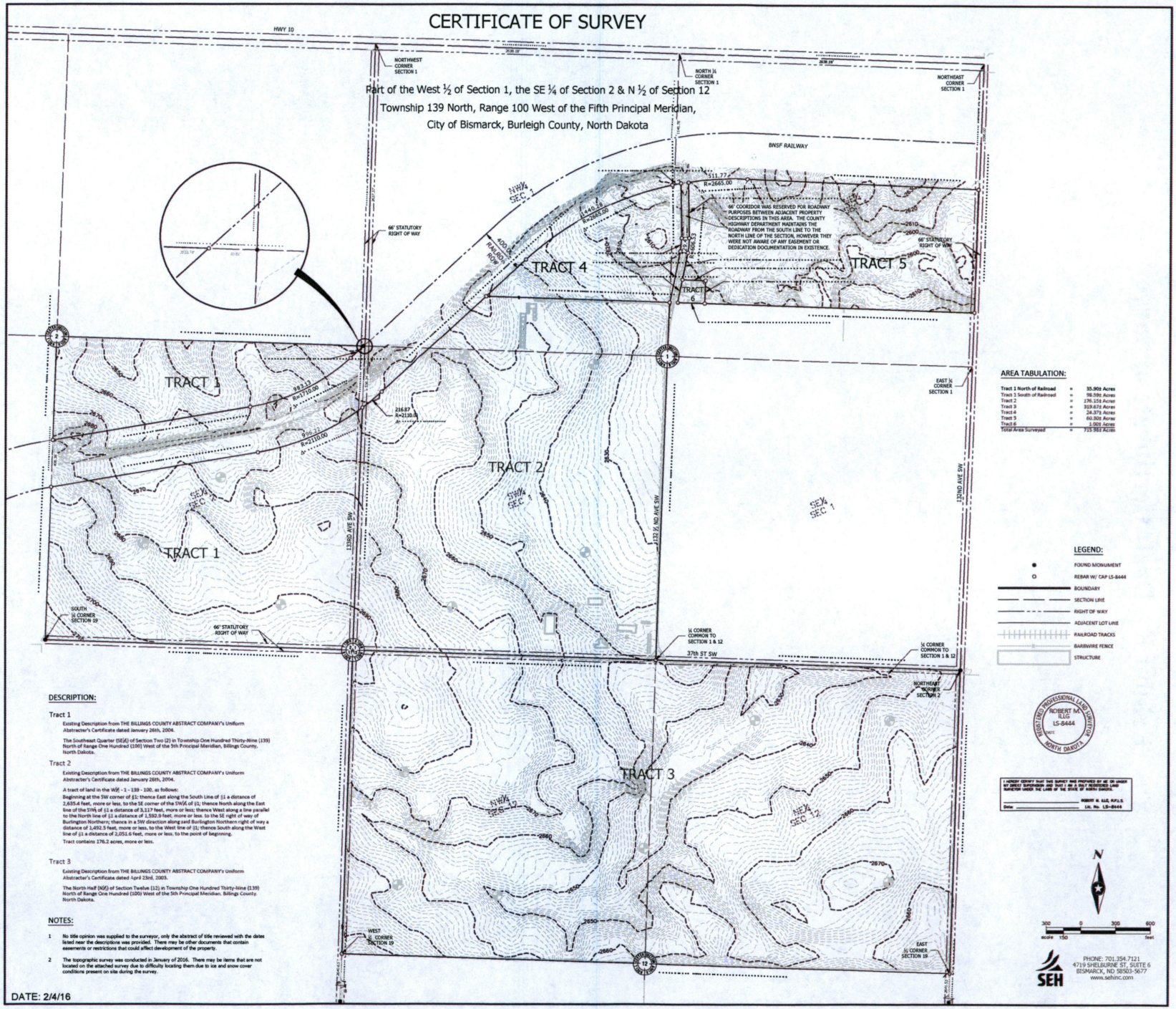
EXHIBIT E

P:\KOM\MERID\135471\9-survey\92-CAD\15-dwg\135471 Meridian Topo.dwg 3/18/2016 8:07 AM mgoll

Exhibit F – Draft Certificate of Survey

CERTIFICATE OF SURVEY

Part of the West ½ of Section 1, the SE ¼ of Section 2 & N ½ of Section 12
Township 139 North, Range 100 West of the Fifth Principal Meridian,
City of Bismarck, Burleigh County, North Dakota



AREA TABULATION:

Tract 1 North of Railroad	=	35.90± Acres
Tract 1 South of Railroad	=	98.59± Acres
Tract 2	=	176.15± Acres
Tract 3	=	319.67± Acres
Tract 4	=	24.37± Acres
Tract 5	=	60.30± Acres
Tract 6	=	1.00± Acres
Total Area Surveyed	=	715.98± Acres

LEGEND:

- FOUND MONUMENT
- REBAR W/ CAP LS-8444
- BOUNDARY
- SECTION LINE
- RIGHT OF WAY
- ADJACENT LOT LINE
- RAILROAD TRACKS
- BARBWIRE FENCE
- STRUCTURE

REGISTERED PROFESSIONAL LAND SURVEYOR
ROBERT M. ILLG
LS-8444
NORTH DAKOTA

I HEREBY CERTIFY THAT THIS SURVEY WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED LAND SURVEYOR UNDER THE LAWS OF THE STATE OF NORTH DAKOTA.

ROBERT M. ILLG, R.P.L.S.
Date: _____ Lic. No. LS-8444

DESCRIPTION:

Tract 1

Existing Description from THE BILLINGS COUNTY ABSTRACT COMPANY's Uniform Abstracter's Certificate dated January 26th, 2004.

The Southeast Quarter (SE¼) of Section Two (2) in Township One Hundred Thirty-Nine (139) North of Range One Hundred (100) West of the 5th Principal Meridian, Billings County, North Dakota.

Tract 2

Existing Description from THE BILLINGS COUNTY ABSTRACT COMPANY's Uniform Abstracter's Certificate dated January 26th, 2004.

A tract of land in the W½ - 1 - 139 - 100, as follows:

Beginning at the SW corner of §1; thence East along the South Line of §1 a distance of 2,635.4 feet, more or less, to the SE corner of the SW¼ of §1; thence North along the East line of the SW¼ of §1 a distance of 3,117 feet, more or less; thence West along a line parallel to the North line of §1 a distance of 1,592.9 feet, more or less, to the SE right of way of Burlington Northern; thence in a SW direction along said Burlington Northern right of way a distance of 1,492.5 feet, more or less, to the West line of §1; thence South along the West line of §1 a distance of 2,051.6 feet, more or less, to the point of beginning.

Tract contains 176.2 acres, more or less.

Tract 3

Existing Description from THE BILLINGS COUNTY ABSTRACT COMPANY's Uniform Abstracter's Certificate dated April 23rd, 2003.

The North Half (N½) of Section Twelve (12) in Township One Hundred Thirty-Nine (139) North of Range One Hundred (100) West of the 5th Principal Meridian, Billings County, North Dakota.

NOTES:

1. No title opinion was supplied to the surveyor, only the abstract of title reviewed with the dates listed near the descriptions was provided. There may be other documents that contain easements or restrictions that could affect development of the property.
2. The topographic survey was conducted in January of 2016. There may be items that are not located on the attached survey due to difficulty locating them due to ice and snow cover conditions present on site during the survey.

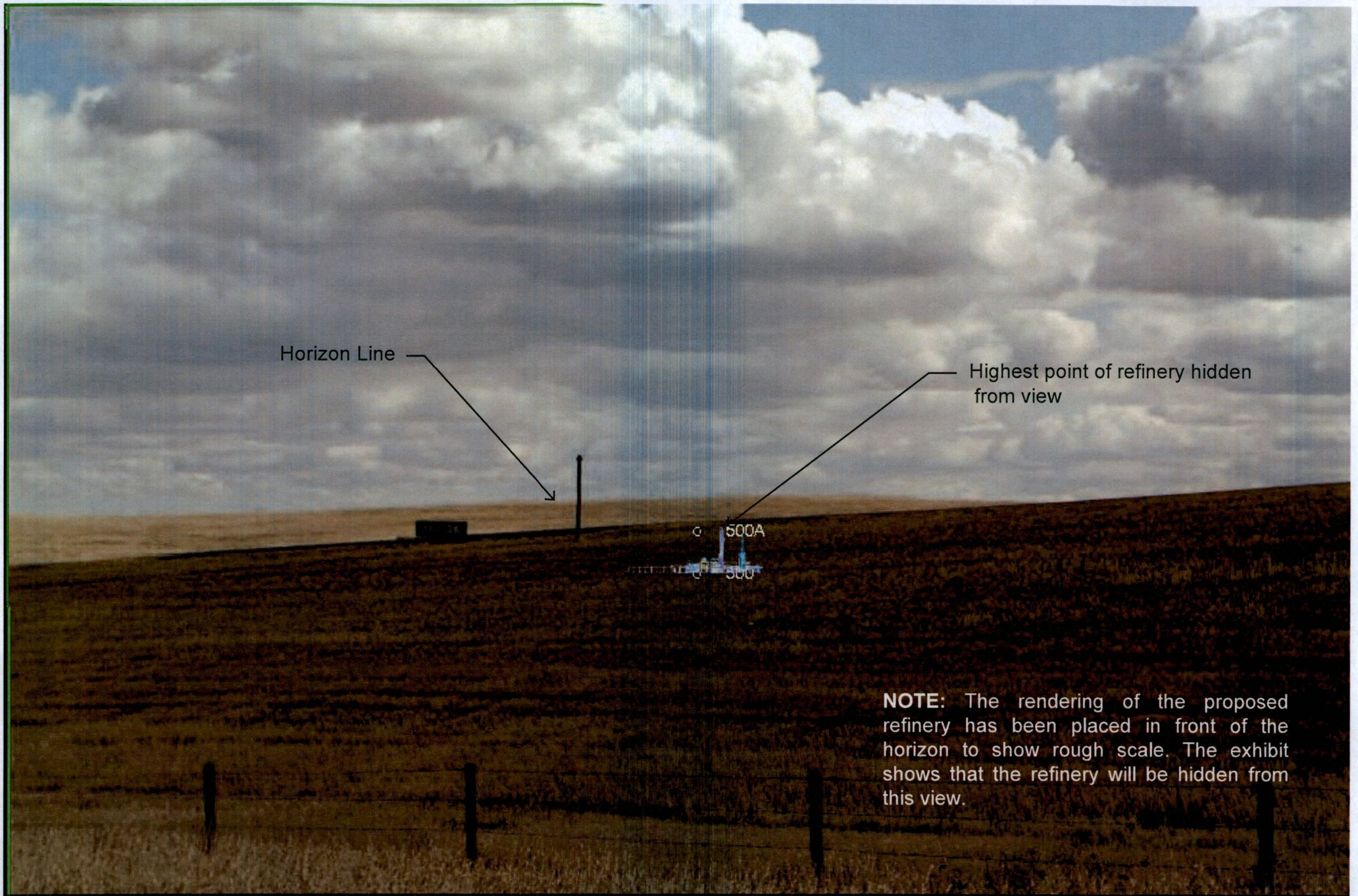
DATE: 2/4/16

N

300 0 300 600
scale 150 feet

SEH
PHONE: 701.354.7121
4719 SHELBURNE ST, SUITE 6
BISMARCK, ND 58503-5677
www.sehinc.com

Exhibit G – Elevation View of the Project and Vicinity from Theodore Roosevelt National Park (Northwest to Southeast)



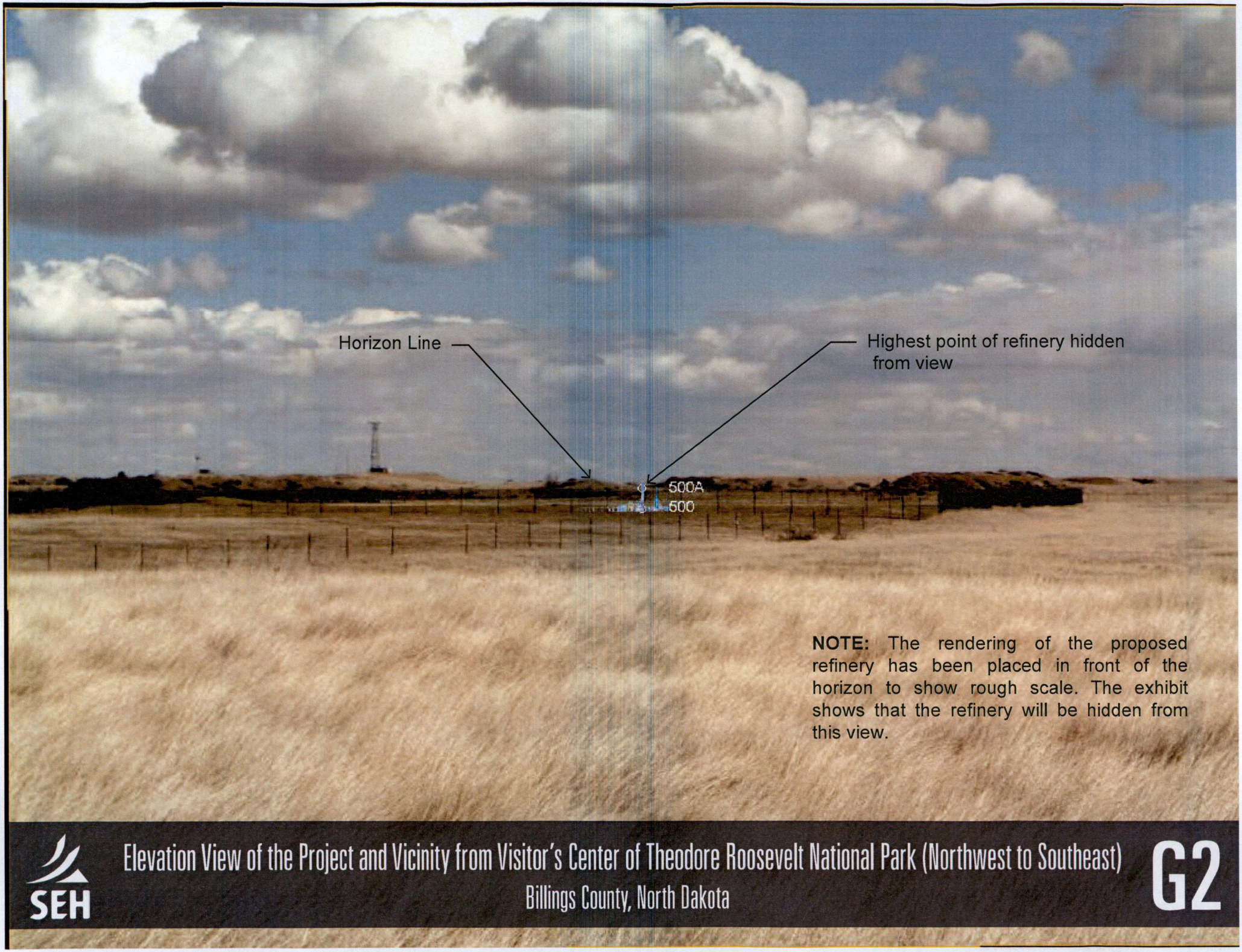
NOTE: The rendering of the proposed refinery has been placed in front of the horizon to show rough scale. The exhibit shows that the refinery will be hidden from this view.

SEH

Elevation View of the Project and Vicinity from SE Corner of Theodore Roosevelt National Park (Northwest to Southeast)

Billings County, North Dakota

G1



NOTE: The rendering of the proposed refinery has been placed in front of the horizon to show rough scale. The exhibit shows that the refinery will be hidden from this view.

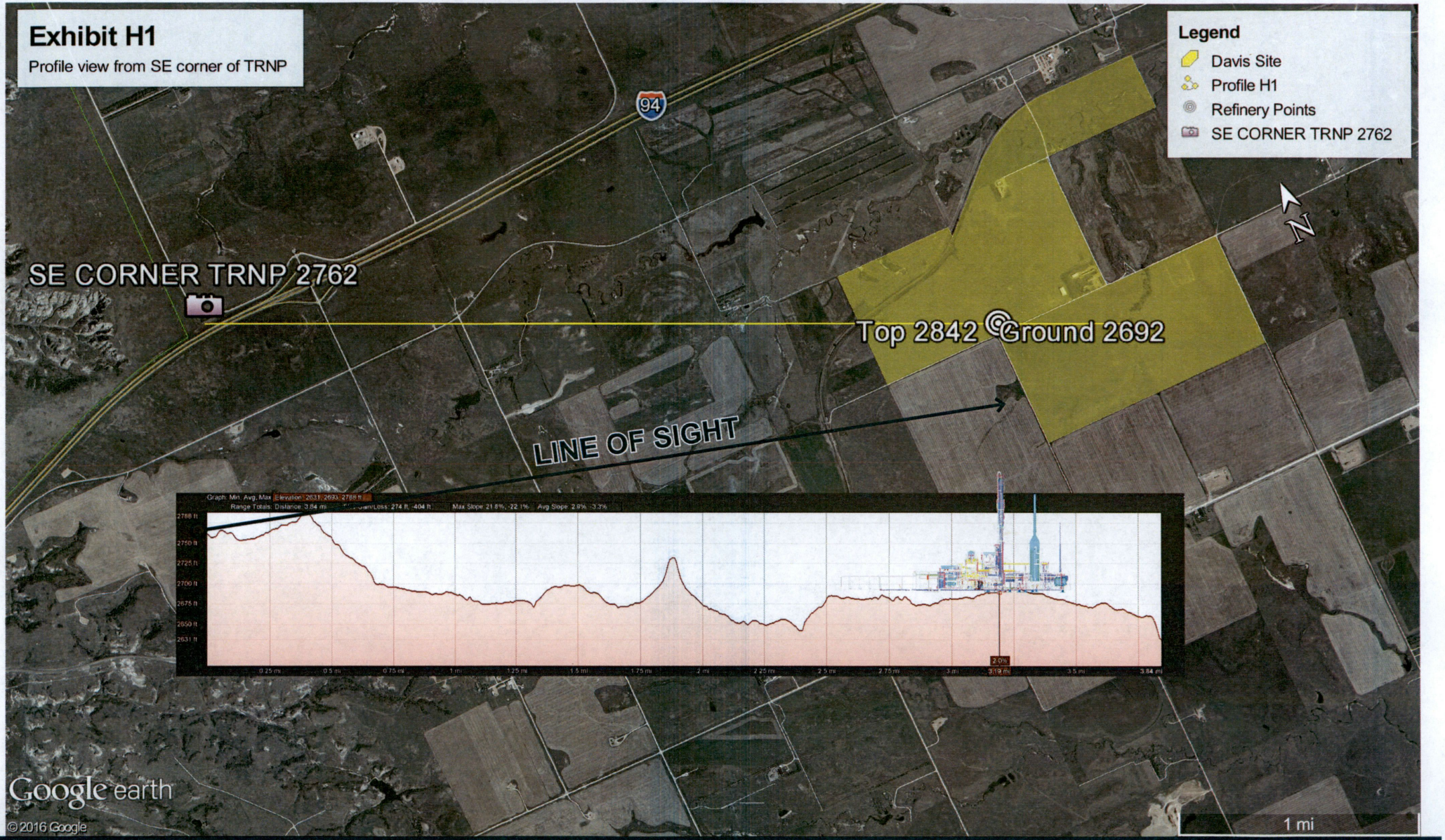
SEH

Elevation View of the Project and Vicinity from Visitor's Center of Theodore Roosevelt National Park (Northwest to Southeast)

Billings County, North Dakota

G2

Exhibit H – Profile View of the Line-of-Sight from the Nearest Point in the Theodore Roosevelt National Park Across the Project Site



SEH

Profile View of the Line-of-Sight from the Nearest Point in SE Corner of Theodore Roosevelt National Park Across the Project Site

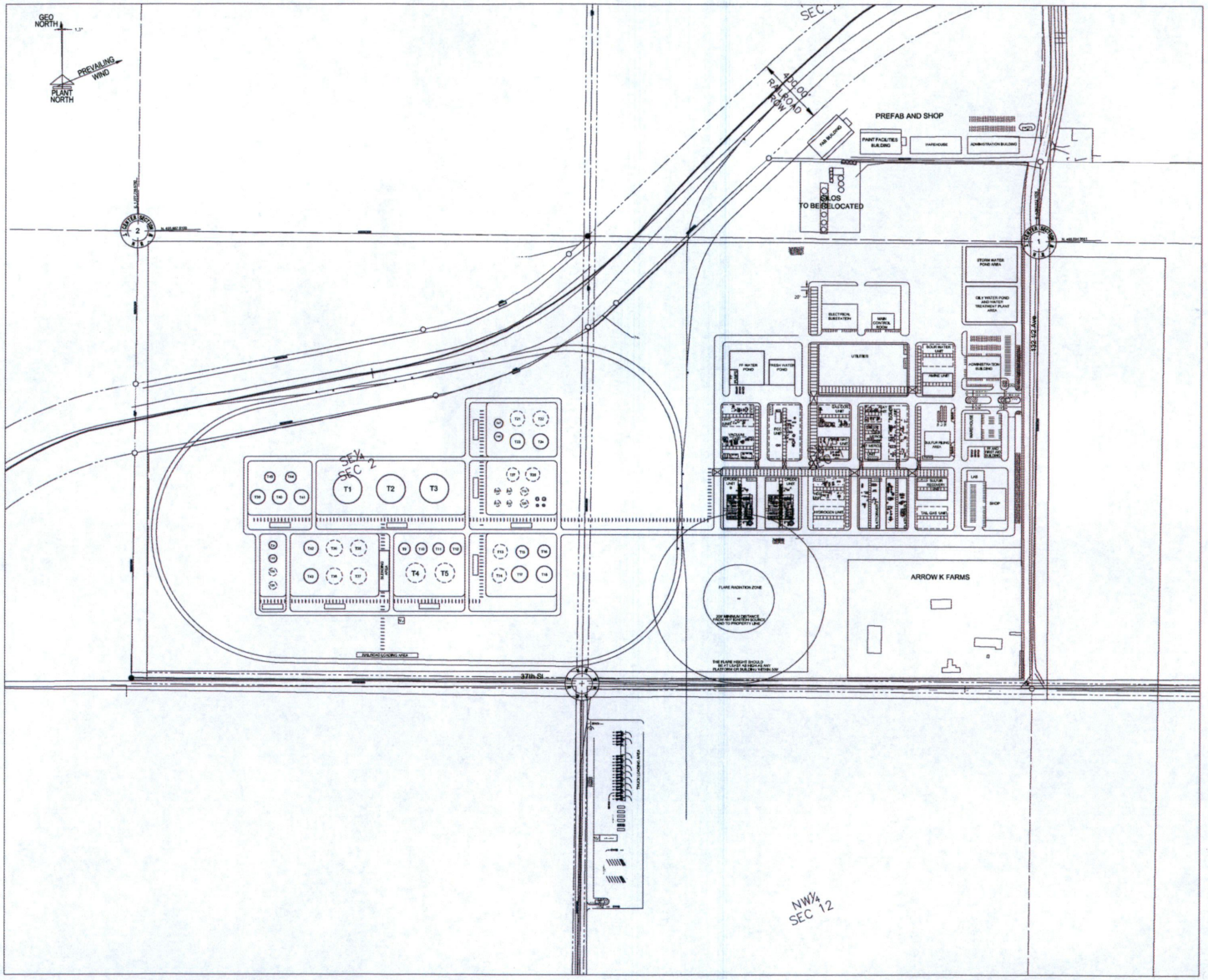
H1

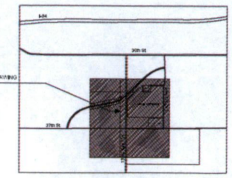
SEH

Profile View of the Line-of-Sight from the Visitor's Center of Theodore Roosevelt National Park Across the Project Site

H2

Exhibit I – Project Site Plan and General Plot Plan





VECINITY MAP
BILLINGS COUNTY, ND

FOR PERMIT PURPOSES ONLY

NOTES:

1. THE REFERENCE POINT INDICATED ON THIS DRAWING IS THE CENTROID OF SECTION 1 OF THE PUBLIC LAND SURVEY SYSTEM IN TOWNSHIP ONE HUNDRED THIRTY NINE (139) NORTH OF RANGE ONE HUNDRED (100) WEST OF THE 5TH PRINCIPAL MERIDIAN, BILLINGS COUNTY, NORTH DAKOTA. THE COORDINATES VALUES ARE IN ACCORDANCE WITH STATE MAP SYSTEM US SURVEY FT.

SYMBOLOGY:

PHASE 1
PHASE 2

(IN FEET)
GRAPHIC SCALE
1 inch = 100 ft.

Meridian Energy Group Inc.
vepica USA

PROCESS STUDY FOR THE 55,000 BPSD
DAVIS REFINERY IN BILLINGS COUNTY, ND

EXHIBIT I
SITE PLAN AND GENERAL PLOT PLAN

REFERENCE DRAWINGS			REFERENCE DRAWINGS		
REFERENCE DRAWING. No.	DESCRIPTION	REV.	REFERENCE DRAWING. No.	DESCRIPTION	REV.
n/a	CERTIFICATE OF SURVEY				

REVISION					
No.	DATE	DESCRIPTION	BY	CHK	APP.
A	12/2016	ISSUE FOR COMMENTS	PC	CG	RL
B	12/16/16	ISSUE FOR APPROVAL	PC	CG	RL

REVISION					
No.	DATE	DESCRIPTION	BY	CHK	APP.

ENGINEER'S RECORD			
	NAME	SIGNATURE	DATE
DRAWN	P. CASTRILLON		12/2016
DESIGNED	P. CASTRILLON		12/2016
CHECKED	C.GARCIA		12/2016
VEPICA APP.	R. LEAL		12/2016
CLIENT APP.	K. O'NEILL		
FILE NAME	P-5715043-00-001-12101-P001_B.dwg		

THE TECHNICAL INFORMATION INCLUDED IN THIS DRAWING IS PROPRIETARY TO VEPICA (PROPERTY) ITS USE AND REPRODUCTION WITHOUT PREVIOUS WRITTEN AUTHORIZATION IS FORBIDDEN

VEPICA PROJECT NO.	P-5715043
CLIENT PROJECT NO.	TBD
VEPICA DRAWING NO.	P-5715043-00-001-12101-P001
CLIENT DRAWING NO.	TBD
SCALE	1/16" = 1'
SHEET	1
OF	1
REV	B

ARCH E 48" x 36"

1.1 DAVIS PHASE 1

BUILDING	ESTIMATED AREA PER BUILDING (SF)	QTY
CONTROL ROOM	1,500.00	1
MCC	600.00	1

1.2 DAVIS REFINERY

BUILDING	ESTIMATED AREA PER BUILDING (SF)	QTY
ELECTRICAL SUBESTATION	31,500.00	1
ADMINISTRATION BUILDING	25,500.00	1
SHOP	22,000.00	1
WAREHOUSE	15,300.00	1
MAIN CONTROL ROOM	12,500.00	1
FIREFIGHTING AND FIRST AID BUILDING	6,500.00	1
LABORATORY	6,500.00	1
DRIVERS ROOM	3,500.00	2
SECURITY OFFICE	1,065.00	2
DISPATCH ROOM	1,300.00	2
SATELLITE MCC	1,200.00	6*
SATELLITE SCR	1,200.00	6*

(*) One Satellite MCC and one Satellite SCR to be built during Davis Phase 1.

Exhibit J – Environmental Impact Reports

SEH

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MEMORANDUM

TO: William C. Prentice
Meridian Energy Group, Inc.

FROM: Scott A. Lange, PE

DATE: March 18, 2016

RE: 2016 Davis Refinery
Management of the Construction Environment
SEH No. MERID 135471 14.00

This memo outlines our project management approach to minimize impact of the construction on the neighboring property and the environment. Each of the items below will be planned in detail throughout the design process. These plans will be forwarded for review by the governing agencies prior to construction.

- Soils and Site Geology:
  - American Engineering and Testing, Inc. (AET) completed a preliminary soils investigation in February 2016. AET placed 14 borings across the site to determine the nature of the soils and their suitability for construction. In general, the soils are as expected in the region, with 6" of clayey sand topsoil over mostly lean clay. These soils are conducive to supporting typical project foundations and construction loads. The project site does have some softer clays, with silt, lignite, and sandstone. These are poor soils from a construction standpoint, but of lesser quantity and can be removed from key foundation areas. The lignite specifically, where found, will be removed from the foundation areas and placed elsewhere on site and covered with an earthen cap.
  - Few borings indicated ground water, only those in the lowest area of the site. Overall, this site is suitable for the proposed construction and ground water will not be a factor.

- Site Stormwater Management:
  - This site generally drains from the southwest (elevation 2,710) to the northeast (elevation 2,610), towards the Heart River. The change in elevation keeps this site free from significant flood concerns. The plan for drainage of the proposed project will follow the same general direction.
  - The storm water will be managed through a series of ponds located throughout the site. These ponds are sized to limit the discharge rates from rain events to be no more than that which runs off the site in the current agricultural use. In addition, the ponds provide water treatment, including sediment capture, prior to the water reaching the Heart River.

- Site Management During Construction:
  - Erosion Control:
    - Erosion control and construction storm water management are major elements to good site housekeeping. The site will require a NPDES Construction Storm Water permit and a Storm Water Pollution Prevention Plan (SWPPP) to control site erosion and ensure the quality of the water leaving the site. Elements of the SWPPP and Storm Water Permit include use of silt fence, construction storm basins (prior to the construction of the permanent ponds), rock construction entrances to reduce sediment leaving the site, and inspections of all erosion control management features weekly and after each rain event to insure they are functioning properly.
  - Dust Control:
    - Dust control on the site during construction will be managed by use of water trucks to keep fugitive dust under control during construction. This often includes several applications per day during active grading operations.
  - Weed Control:
    - During the construction period, the agricultural operations of previous years will end. However, if there are segments of the site that will not have ground broken during the growing season, they may remain in Ag production. For those areas not in Ag production, where there is no active excavation, weed control will be managed by mowing or seeding a cover crop. In western North Dakota, control of noxious weeds and tumble weeds is very important to prevent impacts on adjacent properties.

- Site Access:
  - The active construction site will be closed to all but authorized personnel. Prior to construction, a security plan will be developed to manage access to the site. In addition, emergency access and response will be reviewed with the County Emergency Management Director to ensure there is required coverage for emergency services.
  - Materials brought to the site will be delivered by both truck and rail. The split between truck and rail will be more towards truck early, and then be supported by rail as the site track is constructed. Access to the site will be from the truck route of 38th Street. At this point, 133rd Avenue is the likely route from 38th Street to the site. A truck access plan will be coordinated with the Billings County Highway Superintendent, to ensure addressing area concerns. Dust control will be a topic of the access plan.

- Site Final Treatments:
  - Storm Water Management:
    - Upon completion the storm water ponds will provide the water quality treatment and rate control of storm water runoff. Maintenance of the ponds will be included as part of the site management standard operating procedures.
  - Landscaping:
    - With completion of grading operations of a segment of the site, permanent seed is placed for establishment of permanent erosion control. The seed will include recommended native grass varieties. Blending the site into the environment will be a site design consideration. This will include construction of berms and plantings of native tree species to aid in site screening.
  - Weed management:
    - As part of site management and standard operating procedures, weed management is a component. This will involve a combination of mowing and herbicide treatments, developed to maintain the native landscapes and prevent weed impacts on neighboring properties.

- Final Emergency Management Plan:
  - During the course of the project design, the final emergency management plan is developed. County Emergency Management Director, and others as needed, will be included in the plans development.
- Traffic:
  - Traffic to a new industrial facility is always an important design consideration. As the project design is further refined, a more detailed analysis of the traffic generated by the facility can be reviewed. A guiding principal will be primary access to the site will be from 38th Street, as it is a designated truck route. County Road 10, north of the facility, is not a truck route and will not be relied upon for site access.

sal/mrb
c: Tom Williams, Meridian Energy Group, Inc.
Dan Hedrington, SEH
p:\ko\m\merid\135471\1-genl\14-corr\m owner construction site management - 031816.docx

Davis Refinery

Natural Resources Review

Merdian Energy Group, Inc.

BILLINGS COUNTY, NORTH DAKOTA

SEH No. MERID 135471 30.90

March 18, 2016

SEH

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for All of Us®

Engineers | Architects | Planners | Scientists

Natural Resources Review
Davis Refinery
Merdian Energy Group, Inc.
Billings County, North Dakota

SEH No. MERID 135471

March 18, 2016

I hereby certify that this Wetland Permit Application was prepared by me. The procedures and field methods used to delineation wetlands within the area of interest constitute an official wetland delineation in accordance with the 1987 U.S. Army Corps of Engineers *Wetlands Delineation Manual* and applicable *Regional Supplement*.

Prepared by: _____ 03/18/16
Joel Asp, Biologist — Date

Reviewed by: _____ 03/18/16
Deric Deuschle, Senior Biologist — Date

Short Elliott Hendrickson Inc.
1200 25th Avenue South
P.O. Box 1717
St. Cloud, MN 56302-1717
320.229.4300

SEH

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Certification
Table of Contents

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3.3 North Dakota Natural Resources Conservation Service (NRCS) 3
3.4 U.S. Army Corps of Engineers 3
3.4.1 Wetlands Definition and Delineation Methodology 3
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- The proposed project site is not listed as prime farmland. 4

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Appendix B Hydric Soils Map
Appendix C Beaver Creek Archeaology Survey Letter

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SEH is a registered trademark of Short Elliott Hendrickson Inc.

March 2016

Natural Resources Review

Davis Refinery

Prepared for Merdian Energy Group, Inc.

1.0 Introduction

The purpose of this report is to identify potential regulatory jurisdictional and permitting/approval needs related to the proposed development of a new refinery by Meridian Energy Group, Inc. The refinery, and its associated infrastructure, will be privately funded.

The purpose of the refinery is to process Bakken crude oil locally. The refinery will be built in a phased manner. The primary derivative of the first phase will be jet fuel, diesel fuel and additional distillate products, which will be primarily utilized locally, while the second phase will focus on a complete slate of refined products and specialty chemicals, which will have a broader regional market. Recent crude oil production in the Bakken exceeded one million barrels per day, yet greater than 95% is shipped to out of state refineries for processing. The majority, upwards of two-thirds, of the crude oil that is extracted is transferred by truck to local transfer stations. The process of trucking large quantities of crude oil requires many trucks, which operate using diesel fuel. Because the crude oil processing occurs at distant refineries, there is great cost to deliver the diesel fuel that is needed locally. This need, and distant processing, has led to local diesel shortages, which has the potential to affect the transport capacity of the raw crude oil to the transfer stations, in addition to having a much greater cost to purchase the fuel. Because of the high demand for diesel fuel, and the shortages under the current distribution system, a local refinery is required, and would contribute to the economic well-being of local crude oil producers through greater competitive choices. This refinery will provide fuels locally, eliminating the need to ship raw materials, process them, and return a finished product.

1.1 Project Location

The project is located near the City of Belfield, ND in Township 139 North, Range 100 West, Sections 1 (SW ¼), 2 (SE ¼), and 12 (N ½) as shown in **Figure 1**. The project area is detailed in **Figure 2**.

2.0 Project Description

The proposed project is the development of the Davis Refinery. The refinery is being designed to be highly efficient and converting crude into liquid fuels. The new refinery will be capable of producing very low sulfur-content diesel and jet fuels, which are anticipated to be new standards under recently authorized mandates by the Environmental Protection Agency. The refinery will utilize natural gas to provide energy for operations. The use of natural gas provides many advantages, including reduced operating costs, lower emissions than other base energy sources, and fewer air emission permitting requirements.

The Davis Refinery will be privately funded. In addition to the refinery itself, the project seeks to address needs for improved infrastructure housing shortages, commercial business diversity, industrial space availability, and basic utility distributions.

2.1 Existing Conditions

The proposed refinery, and ancillary support infrastructure, encompass approximately 720 acres. The current land use can be divided into two separate categories. The northern most parcel (~100 acres) is primarily used as pasture. The Heart River meanders throughout this parcel with remnant oxbows present, and likely wetland habitat associated with the oxbows. There appears to be one active farm site in this northern parcel.

The remaining 620 acres appear to be agricultural row crops (wheat). The landscape is rolling hills with approximately 20 feet of relief over the site. There are two farm sites within the southern parcel. Both sites have grain bins, equipment, and storage sheds. A residential home is present on the southernmost farm site (Intersection of 37th Street SW and 132 ½ Avenue).

3.0 Potential Regulatory Agencies

3.1 U.S. Fish and Wildlife Services

The U.S. Fish and Wildlife Service (USFWS) has primary oversight of threatened and endangered species. North Dakota has eleven (11) species listed via the Endangered Species Act. Generally, these species need larger tracks of land with the proper habitat present. The best potential of any of these threatened or endangered species utilizing the site is in or near the Heart River. It is unlikely that this parcel is large enough to provide the critical habitats these species require. The project area is located east of larger tracts of land that have been dedicated for wildlife (**Figure 3**) and while may provide temporary habitat, it is unlikely this project would have long term impacts on the threatened or endangered species of North Dakota.

3.2 North Dakota Game and Fish Department

North Dakota Game and Fish Department (G&FD) reviews proposed projects for Species of Conservation Priority and for the presence of Private Land Open to Sportsmen (PLOTS) program land. The State Wildlife Action Plan (SWAP) is the guiding document for this review. The SWAP identifies 115 species (47 birds, 2 amphibians, 9 reptiles, 21 mammals, 22 fish, 10 mussels, and 4 insects) and the critical habitats that should be conserved when possible in the state of North Dakota. Critical habitats are generally described as non-disturbed areas comprised of native vegetative species.

The proposed project area can be divided into two separate habitat types. **Figure 4** shows the Gap Analysis Program (GAP) land use from 2010. The northern 100 acre portion encompasses the Heart River, utilized as cattle pasture, and the remaining 620 acres that has a long crop history. The northern 100 acre parcel has potential for native vegetation to be present within the project area. The Heart River meanders throughout this parcel, with potential of wetland habitat at the toe of the hillsides and adjacent to the river. This area appears to have been utilized as cattle pasture for an extended period of time. Traditionally, areas used as cattle pasture are dominated by non-native pasture grass, but may contain remnant pockets of native vegetation either on the peaks of the hills or in the low areas adjacent to the streams. Species included in the SWAP could potentially to use this area, but due to its relatively small size and long history of cattle use it is not likely classified as critical habitat. South of the Heart River is the remainder of the proposed project area. The majority of this 620 acres has a long crop history. A tributary of the Heart River does extend into a

portion of the southern project area (see Figure 2), which may have some associated wetland habitats and tree species. While the potential that one or more of the species listed in the SWAP may occasionally use the project area, it is unlikely the proposed project will have any direct impacts for species listed in the SWAP.

Review the PLOTS Guide map shown on the G&FD website indicates PLOTS land are not present in or adjacent to this proposed project.

3.3 North Dakota Natural Resources Conservation Service (NRCS)

One of the responsibilities of the NRCS is soil health and management of state farmlands. A soils map showing the soil types and their "Farmland" classification are shown in **Appendix A**. The vast majority of the soils is listed as non-prime farmland with two small area mapped as prime farmland if drained.

3.4 U.S. Army Corps of Engineers

3.4.1 Wetlands Definition and Delineation Methodology

Wetlands are defined in federal Executive Order 11990 as *"areas that are inundated or saturated by surface water or ground water at a frequency and duration sufficient to support, and that under normal circumstances, do support a prevalence of vegetation or aquatic life typically adapted for saturated soil conditions."*

The project area will be delineated in the spring of 2016 for any areas meeting the wetland criteria in accordance with the U.S. Army Corps of Engineers *Wetland Delineation Manual* (USACE 1987) and *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Great Plains Region* (USACE 2010). One positive indicator (except in certain situations) from each of three elements must be present in order to make a positive wetland determination, which are as follows:

- Greater than 50 percent dominance of hydrophytic plant species.
- Presence of hydric soil.
- The area is either permanently or periodically inundated, or soil is saturated to the surface during the growing season of the dominant vegetation.

Topographic maps **(Figure 5)**, the National Wetlands Inventory (NWI) map **(Figure 6)**, the Soil Survey, and the hydric soil (**Appendix B**) list will be reviewed prior to the field delineation to locate potential wetland habitat. These sources showed wetland areas that were investigated in greater detail during the field delineation.

Field notes, samples, and photographs will be taken at representative locations in each wetland basin and the information transferred to Wetland Determination Data Forms.

Wetland plant species nomenclature follows the *National Wetland Plant List* (USACE 2014). Identification was aided when necessary with field guides for the region.

Wetland boundaries will be located and mapped. **Figure 7** is a desktop delineation to provide guidance of where the expected wetland habitat will be present. These boundaries will be adjusted when an "in the field" delineation is completed.

3.5 State Historical Society

A Class I survey was completed for the proposed project area by Beaver Creek Archaeology. The survey was completed for Sections 1, 2, and 12. The review identified six isolated finds (considered ineligible to the National Register of Historic Properties) within these sections. One of these isolated finds was within the refinery property, but was outside on any proposed construction zones. **Figure 8** shows the proposed project layout.

3.6 Future Tasks

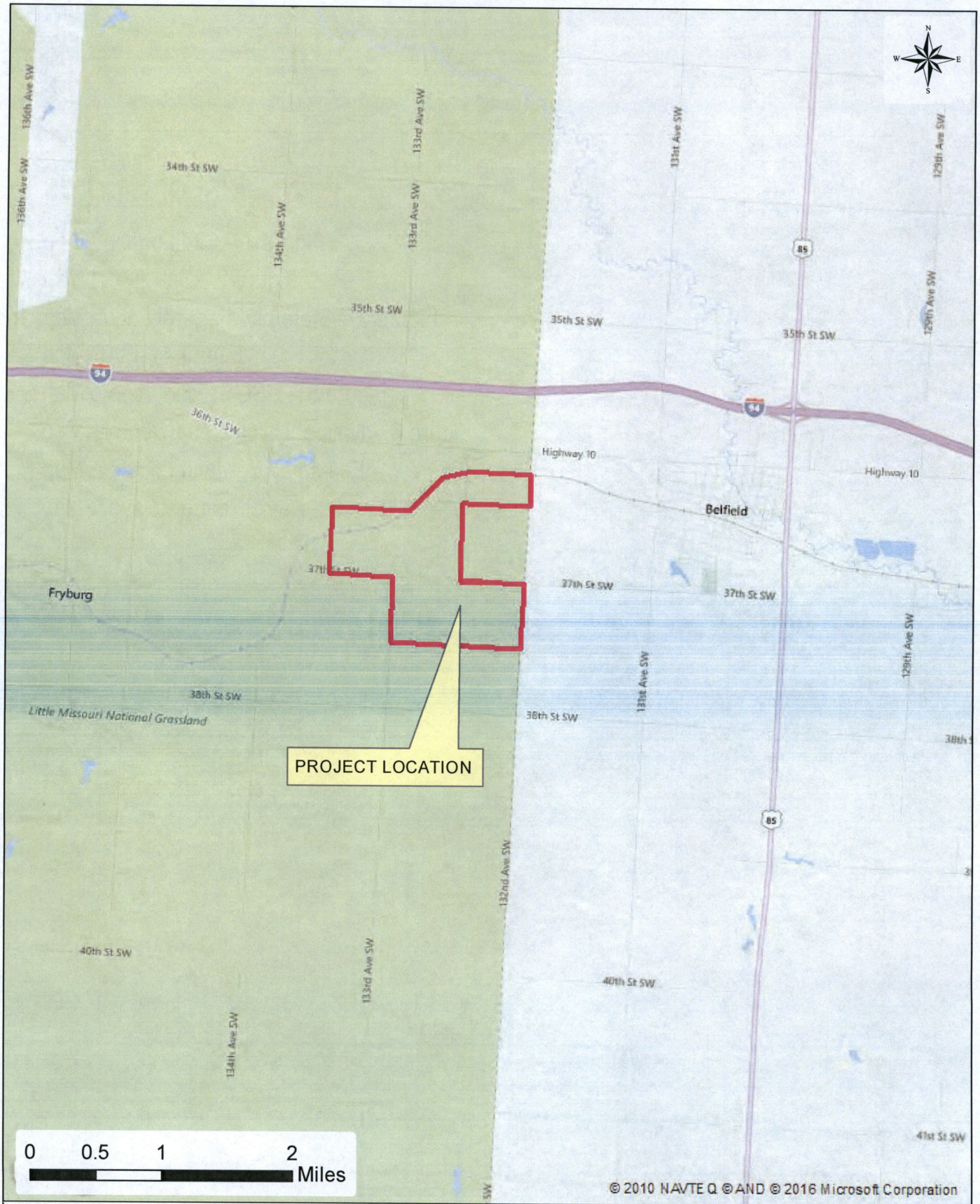
1) During the growing season, on-site visits will be completed to document the natural resources and habitats present on-site will occur. The primary activity will be the completion of a wetland delineation to survey and map the presence of wetland habitat. During this visit, the areas around the Heart River will be observed and habitat types confirmed.
2) Each of the agencies listed above will be contacted and provided opportunity to review and comment on methodology and conclusions of this report.

4.0 Conclusions

- The proposed project is not expected to have direct impacts on endangered or threatened species.
- The proposed project site is not listed as prime farmland.
- The cultural resources review did not reveal any significant previously recorded cultural resources within the proposed construction boundaries of the refinery. One ineligible isolated find was within the projects property boundaries, but is not located near the potential construction zone.
- The potential wetland habitat, as determined in the desktop study, can be worked into the site design, or if impacted, there are options for mitigation. Final confirmation of the wetland locations is pending a spring delineation process.

List of Figures

Figure 1 – Site Location Map
Figure 2 – Site Aerial Map
Figure 3 – State and Federal Lands Map
Figure 4 – GAP Map
Figure 5 – USGS Topographic Map
Figure 6 – National Wetlands Inventory Map
Figure 7 – Estimated Wetland Location Map
Figure 8 – Davis Refinery Layout Map



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SEH

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www.sehinc.com

Project: MERID 135471
Print Date: 3/14/2016

Map by: jasp
Projection: UTM 14N
Source: BING, NDGIS HUB & SEH

PROJECT LOCATION

DAVIS REFINERY
BILLINGS COUNTY, NORTH DAKOTA

Figure 1

This map is neither a legally recorded map nor a survey map and is not intended to be used as one. This map is a compilation of records, information, and data gathered from various sources listed on this map and is to be used for reference purposes only. SEH does not warrant that the Geographic Information System (GIS) Data used to prepare this map are error free, and SEH does not represent that the GIS Data can be used for navigational, tracking, or any other purpose requiring exacting measurement of distance or direction or precision in the depiction of geographic features. The user of this map acknowledges that SEH shall not be liable for any damages which arise out of the user's access or use of data provided.

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PROJECT AERIAL

DAVIS REFINERY
BILLINGS COUNTY, NORTH DAKOTA

Figure 2

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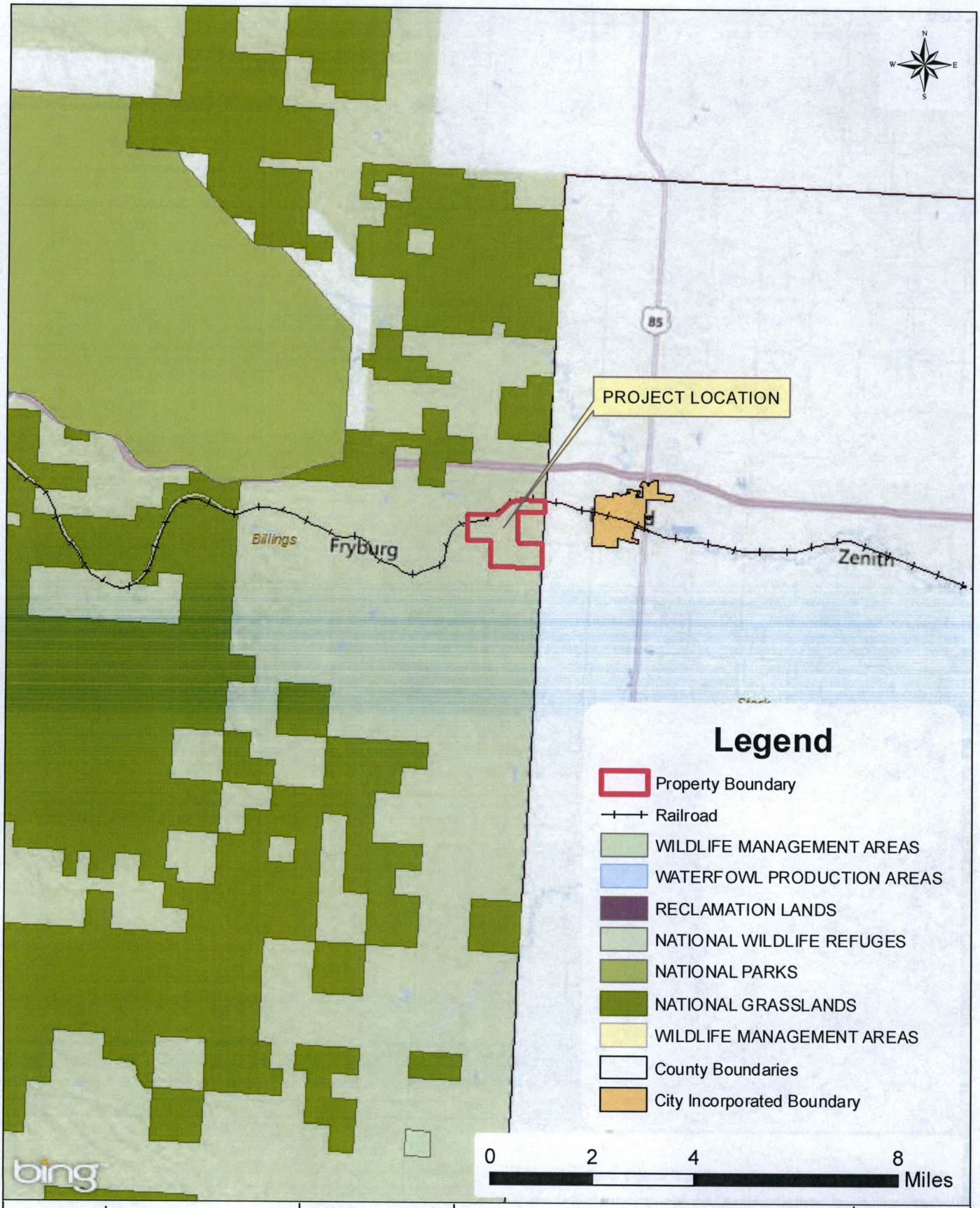

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STATE AND FEDERAL LANDS

DAVIS REFINERY
BILLINGS COUNTY, NORTH DAKOTA

Figure 3

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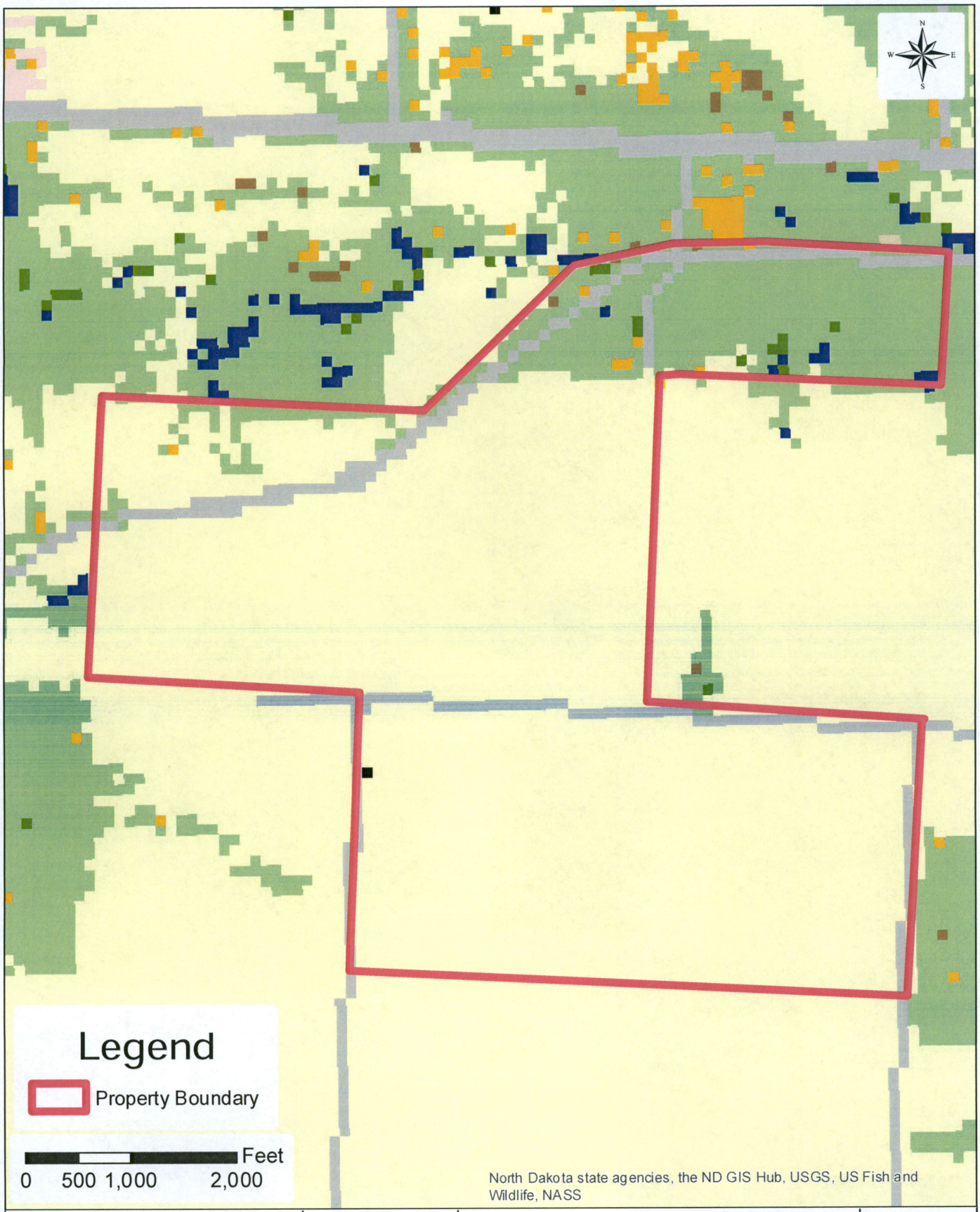

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2010 GAP LAND USE

DAVIS REFINERY
BILLINGS COUNTY, NORTH DAKOTA

Figure 4

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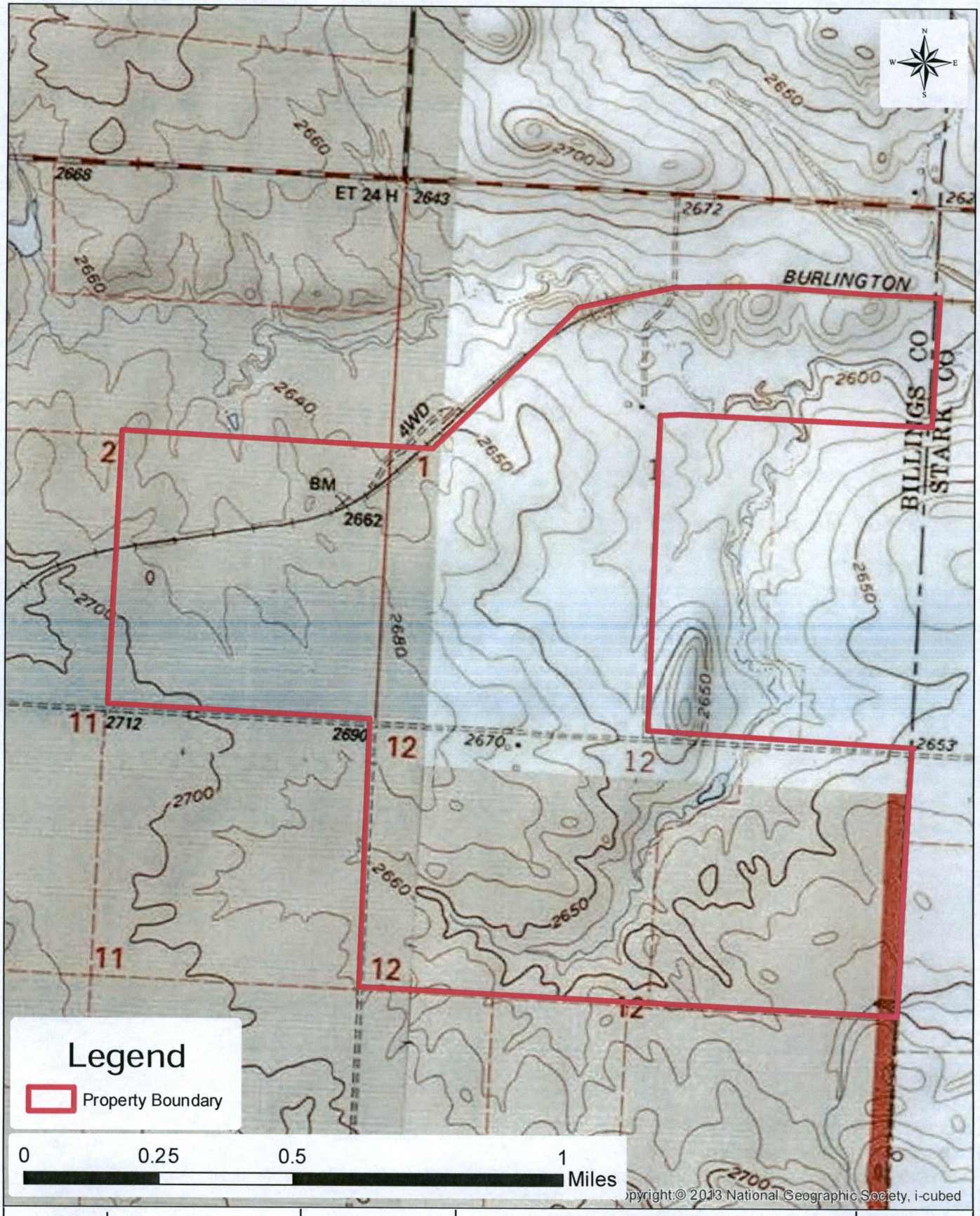

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TOPOGRAPHIC MAP

DAVIS REFINERY
BILLINGS COUNTY, NORTH DAKOTA

Figure 5

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Path: P:\KOM\MERID\135471\5-final-dsgn\51-drawings\90-GIS\DAVIS REFINERY SITE\FIG 6_NWI WETLAND MAP_031416.mxd

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Projection: UTM 14N
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NWI WETLAND MAP

DAVIS REFINERY
BILLINGS COUNTY, NORTH DAKOTA

Figure 6

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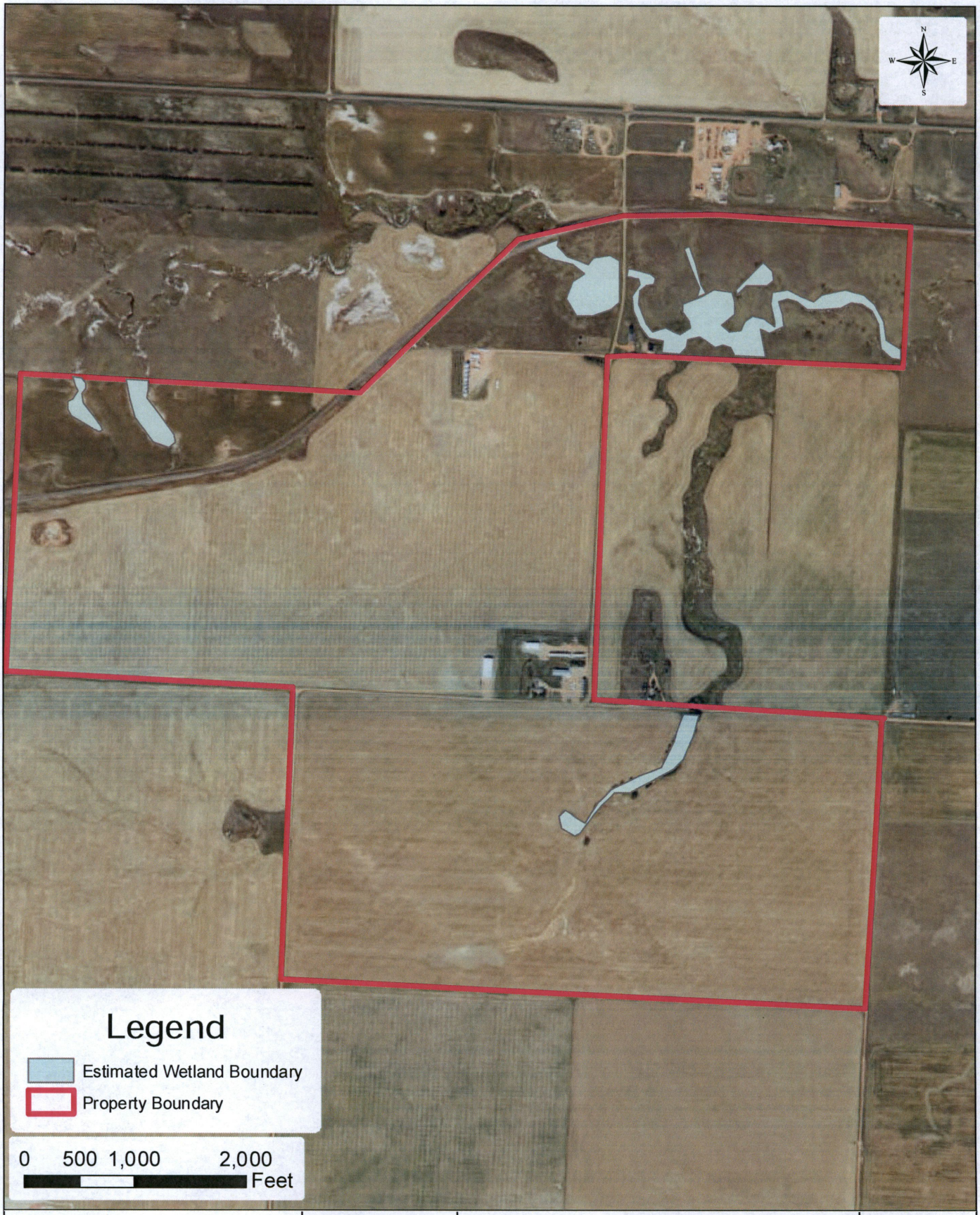

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POTENTIAL WETLAND AREAS

DAVIS REFINERY
BILLINGS COUNTY, NORTH DAKOTA

Figure 7

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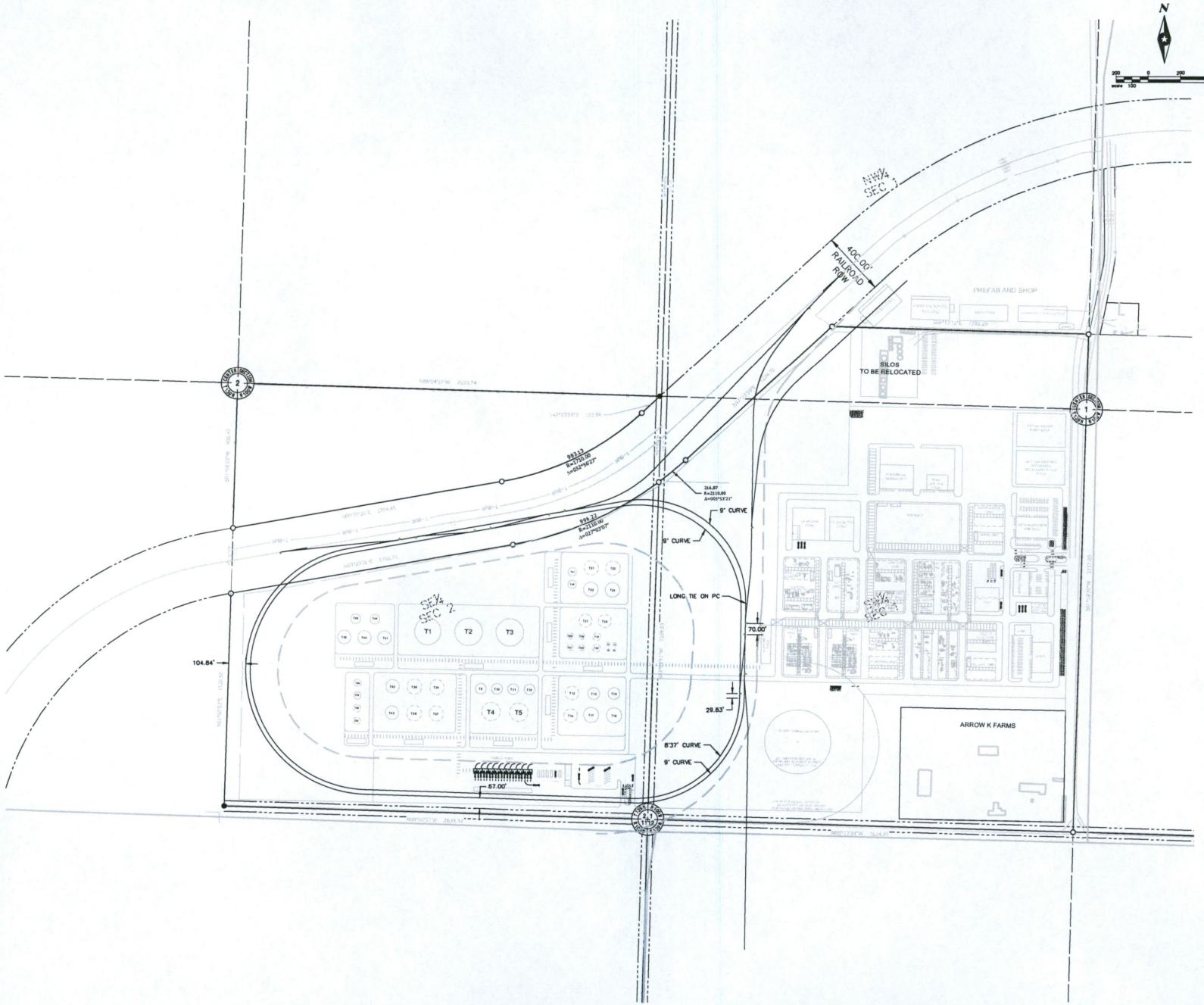

Figure 8 - Site Layout

REFERENCE DRAWINGS			REFERENCE DRAWINGS			REVISION						REVISION						ENGINEER'S RECORD			
REFERENCE DRAWING. No.	DESCRIPTION	REV.	REFERENCE DRAWING. No.	DESCRIPTION	REV.	No.	DATE	DESCRIPTION	BY	CHK	APP.	No.	DATE	DESCRIPTION	BY	CHK	APP.		NAME	SIGNATURE	DATE
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Meridian Energy Group Inc. | vepica USA

PROCESS STUDY FOR THE 55,000 BPSD DAVIS REFINERY IN BILLINGS COUNTY, ND

OVERALL PLOT PLAN OPTION 3

VEPICA PROJECT No.	VEPICA DRAWING No.
–	–

CLIENT PROJECT No.	SCALE	CLIENT DRAWING No.	SHEET	OF	REV.
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ARCH E 48" x 36"

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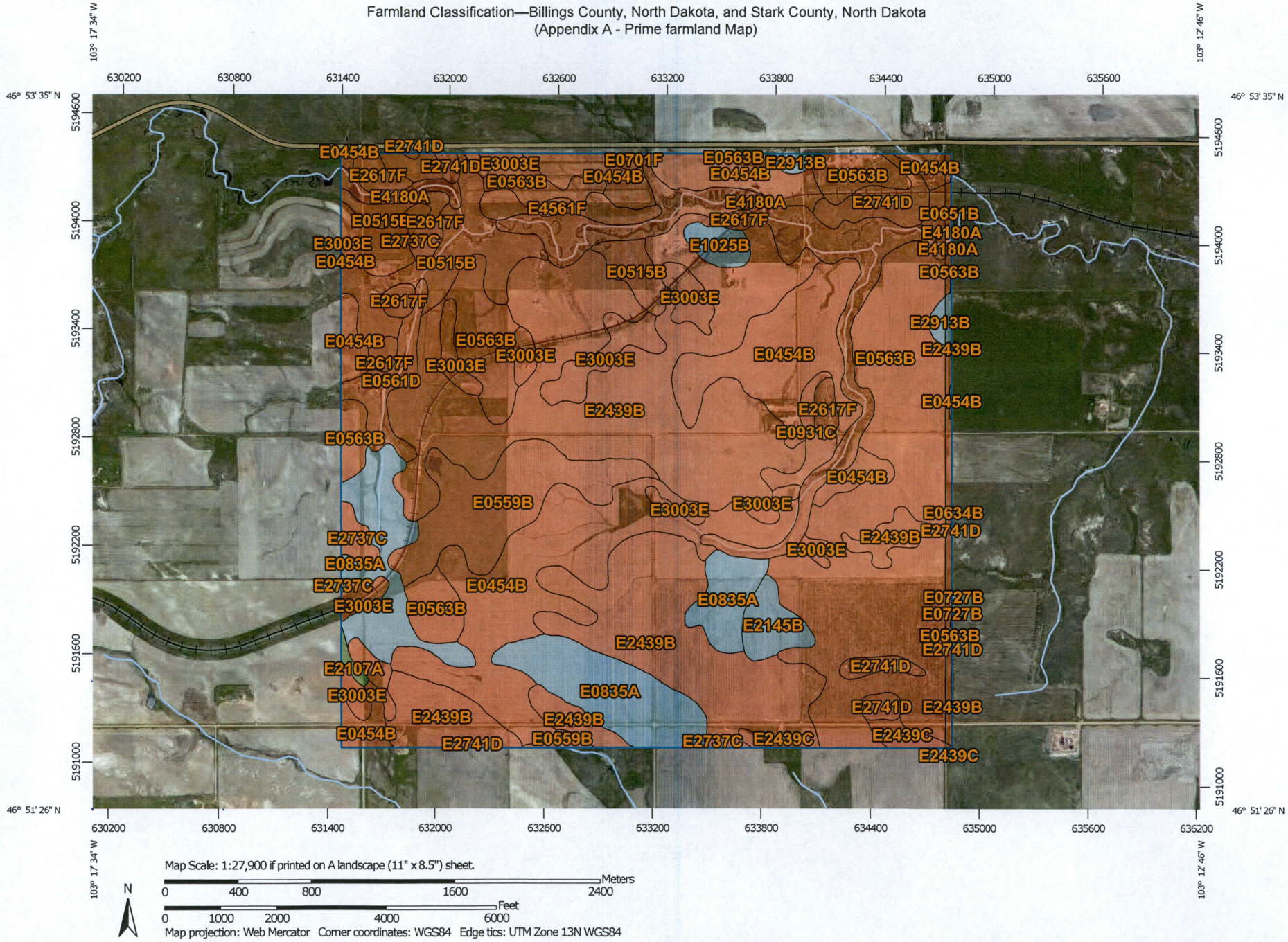
Appendix A

Farmland Classification Map

Farmland Classification—Billings County, North Dakota, and Stark County, North Dakota
(Appendix A - Prime farmland Map)



MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- Not prime farmland
- All areas are prime farmland
- Prime farmland if drained
- Prime farmland if protected from flooding or not frequently flooded during the growing season
- Prime farmland if irrigated
- Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season
- Prime farmland if irrigated and drained
- Prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season
- Prime farmland if subsoiled, completely removing the root inhibiting soil layer
- Prime farmland if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60
- Prime farmland if irrigated and reclaimed of excess salts and sodium
- Farmland of statewide importance
- Farmland of local importance
- Farmland of unique importance
- Not rated or not available

Soil Rating Lines

- Not prime farmland
- All areas are prime farmland
- Prime farmland if drained
- Prime farmland if protected from flooding or not frequently flooded during the growing season
- Prime farmland if irrigated
- Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season
- Prime farmland if irrigated and drained
- Prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season
- Prime farmland if subsoiled, completely removing the root inhibiting soil layer
- Prime farmland if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60
- Prime farmland if irrigated and reclaimed of excess salts and sodium
- Farmland of statewide importance
- Farmland of local importance
- Farmland of unique importance
- Not rated or not available

Soil Rating Points

- Not prime farmland
- All areas are prime farmland
- Prime farmland if drained
- Prime farmland if protected from flooding or not frequently flooded during the growing season
- Prime farmland if irrigated
- Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season
- Prime farmland if irrigated and drained
- Prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season
- Prime farmland if subsoiled, completely removing the root inhibiting soil layer
- Prime farmland if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60
- Prime farmland if irrigated and reclaimed of excess salts and sodium
- Farmland of statewide importance
- Farmland of local importance
- Farmland of unique importance
- Not rated or not available

Water Features

MAP INFORMATION

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

The soil surveys that comprise your AOI were mapped at scales ranging from 1:20,000 to 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Billings County, North Dakota
Survey Area Data: Version 18, Sep 24, 2015

Soil Survey Area: Stark County, North Dakota
Survey Area Data: Version 15, Sep 25, 2015

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 3, 2011—Jun 6, 2011

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Farmland Classification

Farmland Classification— Summary by Map Unit — Billings County, North Dakota (ND007)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
E0454B	Daglum-Rhoades complex, 0 to 6 percent slopes	Not prime farmland	455.2	16.5%
E0515B	Rhoades-Daglum complex, 0 to 6 percent slopes	Not prime farmland	123.5	4.5%
E0559B	Dogtooth-Janesburg silt loams, 0 to 6 percent slopes	Not prime farmland	122.5	4.4%
E0561D	Dogtooth-Janesburg complex, 6 to 15 percent slopes	Not prime farmland	36.3	1.3%
E0563B	Janesburg-Dogtooth silt loams, 0 to 6 percent slopes	Not prime farmland	513.6	18.6%
E0651B	Regent-Janesburg complex, 3 to 6 percent slopes	Not prime farmland	7.1	0.3%
E0701F	Dogtooth-Janesburg-Cabba complex, 6 to 35 percent slopes	Not prime farmland	4.1	0.2%
E0835A	Savage-Grail silty clay loams, 0 to 2 percent slopes	Farmland of statewide importance	208.0	7.5%
E0931C	Wayden-Moreau silty clays, 3 to 9 percent slopes	Not prime farmland	18.4	0.7%
E1025B	Regent-Savage silty clay loams, 3 to 6 percent slopes	Farmland of statewide importance	16.7	0.6%
E2107A	Arnegard loam, 0 to 2 percent slopes	All areas are prime farmland	3.9	0.1%
E2145B	Shambo loam, 2 to 6 percent slopes	Farmland of statewide importance	27.4	1.0%
E2439B	Sen-Janesburg silt loams, 3 to 6 percent slopes	Not prime farmland	723.4	26.2%
E2439C	Sen-Janesburg silt loams, 6 to 9 percent slopes	Not prime farmland	13.1	0.5%
E2617F	Cabba-Chama-Shambo loams, 9 to 50 percent slopes	Not prime farmland	51.6	1.9%
E2737C	Chama-Cabba-Sen silt loams, 6 to 9 percent slopes	Not prime farmland	41.7	1.5%

Farmland Classification— Summary by Map Unit — Billings County, North Dakota (ND007)				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
E2741D	Cabba-Chama-Sen silt loams, 9 to 15 percent slopes	Not prime farmland	52.3	1.9%
E2913B	Chama-Sen-Cabba silt loams, 3 to 6 percent slopes	Farmland of statewide importance	9.8	0.4%
E3003E	Amor-Brandenburg complex, 3 to 25 percent slopes	Not prime farmland	115.3	4.2%
E4180A	Korell-Daglum-Fluvaquents complex, channeled, 0 to 2 percent slopes, frequently flooded	Not prime farmland	163.0	5.9%
E4561F	Manning-Schaller-Wabek complex, 6 to 35 percent slopes	Not prime farmland	25.0	0.9%
Subtotals for Soil Survey Area			**2,732.0**	**99.0%**
Totals for Area of Interest			**2,760.0**	**100.0%**

Farmland Classification— Summary by Map Unit — Stark County, North Dakota (ND089)				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
E0454B	Daglum-Rhoades complex, 0 to 6 percent slopes	Not prime farmland	1.9	0.1%
E0563B	Janesburg-Dogtooth silt loams, 0 to 6 percent slopes	Not prime farmland	19.1	0.7%
E0634B	Lawther-Daglum complex, 2 to 6 percent slopes	Not prime farmland	0.0	0.0%
E0651B	Regent-Janesburg complex, 3 to 6 percent slopes	Not prime farmland	2.9	0.1%
E0727B	Barkof-Janesburg complex, 3 to 6 percent slopes	Not prime farmland	0.2	0.0%
E2439B	Sen-Janesburg silt loams, 3 to 6 percent slopes	Not prime farmland	0.2	0.0%
E2439C	Sen-Janesburg silt loams, 6 to 9 percent slopes	Not prime farmland	0.1	0.0%
E2741D	Cabba-Chama-Sen silt loams, 9 to 15 percent slopes	Not prime farmland	0.6	0.0%
E2913B	Chama-Sen-Cabba silt loams, 3 to 6 percent slopes	Farmland of statewide importance	2.5	0.1%

Farmland Classification— Summary by Map Unit — Stark County, North Dakota (ND089)				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
E4180A	Korell-Daglum-Fluvaquents complex, channeled, 0 to 2 percent slopes, frequently flooded	Not prime farmland	0.4	0.0%
Subtotals for Soil Survey Area			**28.0**	**1.0%**
Totals for Area of Interest			**2,760.0**	**100.0%**

Description

Farmland classification identifies map units as prime farmland, farmland of statewide importance, farmland of local importance, or unique farmland. It identifies the location and extent of the soils that are best suited to food, feed, fiber, forage, and oilseed crops. NRCS policy and procedures on prime and unique farmlands are published in the "Federal Register," Vol. 43, No. 21, January 31, 1978.

Rating Options

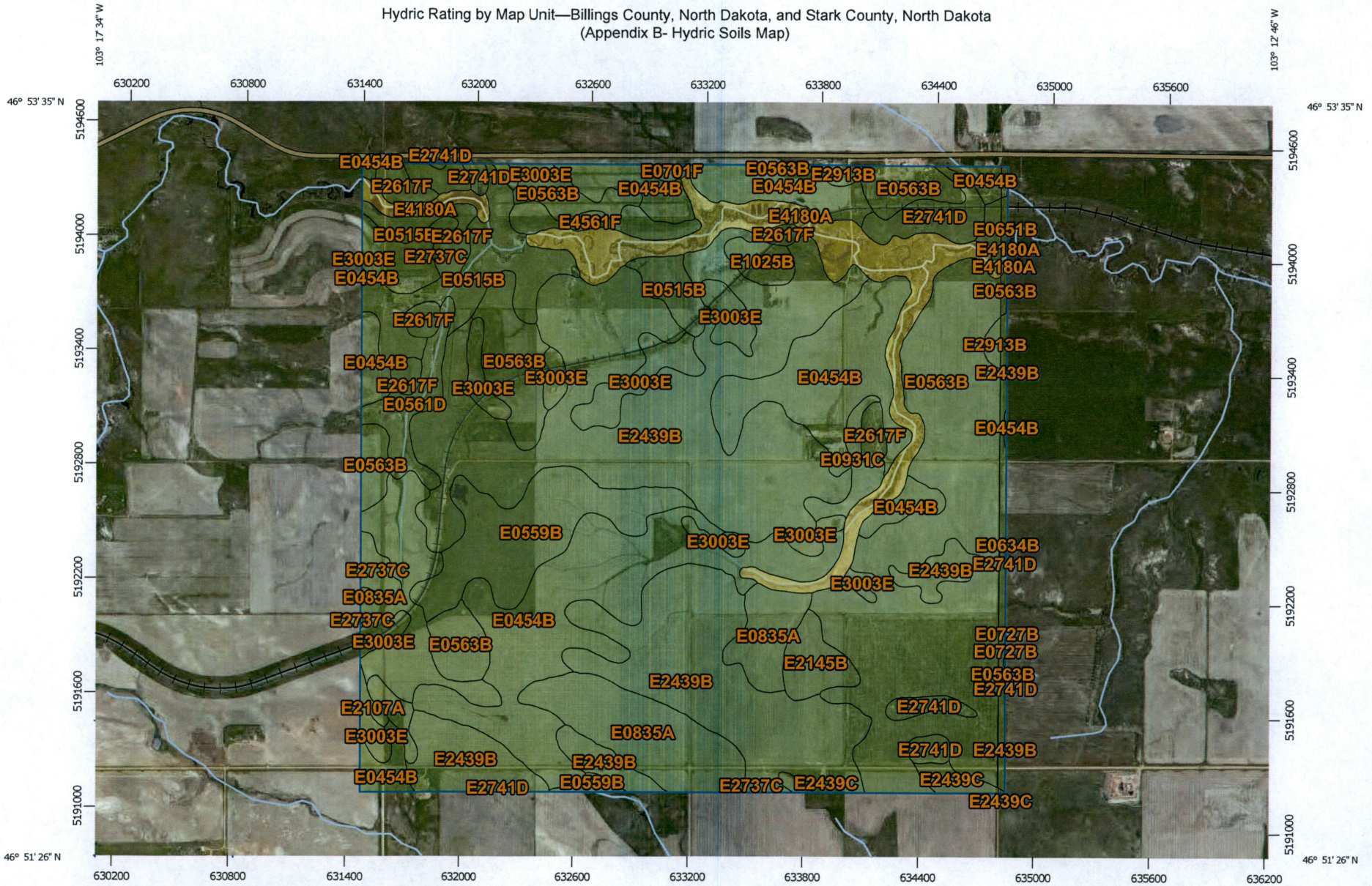
Aggregation Method: No Aggregation Necessary

Tie-break Rule: Lower

Appendix B

Hydric Soils Map

Hydric Rating by Map Unit—Billings County, North Dakota, and Stark County, North Dakota
(Appendix B- Hydric Soils Map)



Map Scale: 1:27,900 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 400 800 1600 2400

Feet: 0 1000 2000 4000 6000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- Hydric (100%)
- Hydric (66 to 99%)
- Hydric (33 to 65%)
- Hydric (1 to 32%)
- Not Hydric (0%)
- Not rated or not available

Soil Rating Lines
- Hydric (100%)
- Hydric (66 to 99%)
- Hydric (33 to 65%)
- Hydric (1 to 32%)
- Not Hydric (0%)
- Not rated or not available

Soil Rating Points
- Hydric (100%)
- Hydric (66 to 99%)
- Hydric (33 to 65%)
- Hydric (1 to 32%)
- Not Hydric (0%)
- Not rated or not available

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at scales ranging from 1:20,000 to 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Billings County, North Dakota
Survey Area Data: Version 18, Sep 24, 2015

Soil Survey Area: Stark County, North Dakota
Survey Area Data: Version 15, Sep 25, 2015

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 3, 2011—Jun 6, 2011

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydric Rating by Map Unit

Hydric Rating by Map Unit— Summary by Map Unit — Billings County, North Dakota (ND007)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
E0454B	Daglum-Rhoades complex, 0 to 6 percent slopes	0	455.2	16.5%
E0515B	Rhoades-Daglum complex, 0 to 6 percent slopes	0	123.5	4.5%
E0559B	Dogtooth-Janesburg silt loams, 0 to 6 percent slopes	0	122.5	4.4%
E0561D	Dogtooth-Janesburg complex, 6 to 15 percent slopes	0	36.3	1.3%
E0563B	Janesburg-Dogtooth silt loams, 0 to 6 percent slopes	0	513.6	18.6%
E0651B	Regent-Janesburg complex, 3 to 6 percent slopes	0	7.1	0.3%
E0701F	Dogtooth-Janesburg-Cabba complex, 6 to 35 percent slopes	3	4.1	0.2%
E0835A	Savage-Grail silty clay loams, 0 to 2 percent slopes	0	208.0	7.5%
E0931C	Wayden-Moreau silty clays, 3 to 9 percent slopes	0	18.4	0.7%
E1025B	Regent-Savage silty clay loams, 3 to 6 percent slopes	0	16.7	0.6%
E2107A	Arnegard loam, 0 to 2 percent slopes	0	3.9	0.1%
E2145B	Shambo loam, 2 to 6 percent slopes	0	27.4	1.0%
E2439B	Sen-Janesburg silt loams, 3 to 6 percent slopes	0	723.4	26.2%
E2439C	Sen-Janesburg silt loams, 6 to 9 percent slopes	0	13.1	0.5%
E2617F	Cabba-Chama-Shambo loams, 9 to 50 percent slopes	0	51.6	1.9%
E2737C	Chama-Cabba-Sen silt loams, 6 to 9 percent slopes	0	41.7	1.5%

Hydric Rating by Map Unit— Summary by Map Unit — Billings County, North Dakota (ND007)				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
E2741D	Cabba-Chama-Sen silt loams, 9 to 15 percent slopes	0	52.3	1.9%
E2913B	Chama-Sen-Cabba silt loams, 3 to 6 percent slopes	0	9.8	0.4%
E3003E	Amor-Brandenburg complex, 3 to 25 percent slopes	0	115.3	4.2%
E4180A	Korell-Daglum-Fluvaquents complex, channeled, 0 to 2 percent slopes, frequently flooded	42	163.0	5.9%
E4561F	Manning-Schaller-Wabek complex, 6 to 35 percent slopes	0	25.0	0.9%
Subtotals for Soil Survey Area			**2,732.0**	**99.0%**
Totals for Area of Interest			**2,760.0**	**100.0%**

Hydric Rating by Map Unit— Summary by Map Unit — Stark County, North Dakota (ND089)				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
E0454B	Daglum-Rhoades complex, 0 to 6 percent slopes	0	1.9	0.1%
E0563B	Janesburg-Dogtooth silt loams, 0 to 6 percent slopes	0	19.1	0.7%
E0634B	Lawther-Daglum complex, 2 to 6 percent slopes	0	0.0	0.0%
E0651B	Regent-Janesburg complex, 3 to 6 percent slopes	0	2.9	0.1%
E0727B	Barkof-Janesburg complex, 3 to 6 percent slopes	0	0.2	0.0%
E2439B	Sen-Janesburg silt loams, 3 to 6 percent slopes	0	0.2	0.0%
E2439C	Sen-Janesburg silt loams, 6 to 9 percent slopes	0	0.1	0.0%
E2741D	Cabba-Chama-Sen silt loams, 9 to 15 percent slopes	0	0.6	0.0%
E2913B	Chama-Sen-Cabba silt loams, 3 to 6 percent slopes	0	2.5	0.1%

Hydric Rating by Map Unit— Summary by Map Unit — Stark County, North Dakota (ND089)				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
E4180A	Korell-Daglum-Fluvaquents complex, channeled, 0 to 2 percent slopes, frequently flooded	42	0.4	0.0%
Subtotals for Soil Survey Area			**28.0**	**1.0%**
Totals for Area of Interest			**2,760.0**	**100.0%**

Description

This rating indicates the percentage of map units that meets the criteria for hydric soils. Map units are composed of one or more map unit components or soil types, each of which is rated as hydric soil or not hydric. Map units that are made up dominantly of hydric soils may have small areas of minor nonhydric components in the higher positions on the landform, and map units that are made up dominantly of nonhydric soils may have small areas of minor hydric components in the lower positions on the landform. Each map unit is rated based on its respective components and the percentage of each component within the map unit.

The thematic map is color coded based on the composition of hydric components. The five color classes are separated as 100 percent hydric components, 66 to 99 percent hydric components, 33 to 65 percent hydric components, 1 to 32 percent hydric components, and less than one percent hydric components.

In Web Soil Survey, the Summary by Map Unit table that is displayed below the map pane contains a column named 'Rating'. In this column the percentage of each map unit that is classified as hydric is displayed.

Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (Federal Register, 1994). Under natural conditions, these soils are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.

The NTCHS definition identifies general soil properties that are associated with wetness. In order to determine whether a specific soil is a hydric soil or nonhydric soil, however, more specific information, such as information about the depth and duration of the water table, is needed. Thus, criteria that identify those estimated soil properties unique to hydric soils have been established (Federal Register, 2002). These criteria are used to identify map unit components that normally are associated with wetlands. The criteria used are selected estimated soil properties that are described in "Soil Taxonomy" (Soil Survey Staff, 1999) and "Keys to Soil Taxonomy" (Soil Survey Staff, 2006) and in the "Soil Survey Manual" (Soil Survey Division Staff, 1993).

If soils are wet enough for a long enough period of time to be considered hydric, they should exhibit certain properties that can be easily observed in the field. These visible properties are indicators of hydric soils. The indicators used to make onsite determinations of hydric soils are specified in "Field Indicators of Hydric Soils in the United States" (Hurt and Vasilas, 2006).

References:

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18.

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service. U.S. Department of Agriculture Handbook 436.

Soil Survey Staff. 2006. Keys to soil taxonomy. 10th edition. U.S. Department of Agriculture, Natural Resources Conservation Service.

Rating Options

Aggregation Method: Percent Present

Component Percent Cutoff: *None Specified*

Tie-break Rule: Lower

Appendix C

Beaver Creek Archaeology Survey Letter

Joel D. Asp
Restoration Ecologist
SEH
1200 25th Avenue South
P.O. Box 1717
St. Cloud, MN 56302-1717

3/14/2016

Dear Mr. Asp,

As requested, a file search was done by Beaver Creek Archaeology (BCA) at the North Dakota State Historic Preservation Office (NDSHPO). The area(s) searched were Sections 1, 2, and 12 of T139N R100W located in Billings County, North Dakota. The search of records at the NDSHPO revealed the following results: No sites are on file within Section 12. Six isolated finds (isolated finds are considered ineligible to the National Register of Historic Properties (NRHP)) on file within Section 2. One isolated find and one architectural site are located within Section 1.

The specific quarter sections in question did not reveal any significant previously recorded cultural resources within their boundaries. Specifically, SW ¼ of Section 1 in T139N R100W, SE ¼ of Section 2 in T139N R100W, and the N ½ of Section 12 in T139N R100W are all clear of any known location of cultural properties. The S ½ N ½ of Section 1 in T139N R100W did reveal one ineligible isolated find. The search was completed on Friday, March 11, 2016.

Please contact us with any questions, concerns, or clarifications you may have.

Sincerely,

Raina Hanley
Chief Operating Officer

Beaver Creek
ARCHAEOLOGY

WHERE PROGRESS MEETS PRESERVATION
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Exhibit K – Socioeconomic Impacts and Job Creation Report

The principal socio-economic impact from the Refinery will be the creation of up to 2,400 local jobs (up to 200 directly employed with a multiple of 12:1). Among other things, this increased level of employment will result in an increased demand for community services, and an offsetting level of tax revenues for state and local government.

The attached Economic Profile report published in December, 2014 by the ***Washington Research Council*** calculates the number of "indirect" and "induced" jobs created by each full time refinery worker in 2013. On page 2 of the report, Table 2.1 *Summary of Multipliers and Economic Impacts* indicates that the multiplier is 12.88 indirect and induced jobs created in the state of Washington in 2013 by each full time refinery worker.

Based upon this report, since the Davis Refinery is expected to employ between 150 and 200 full time refinery workers, it is anticipated that between 1900 and 2500 indirect and induced jobs can be created in the Billings County and Stark County area. On page 14 of the attached report, it is stated that indirect jobs are defined as including suppliers of crude oil and other materials, construction companies and contract workers used for maintenance and repair, and office product and equipment suppliers. The report also states that induced jobs will include employees of firms in industries that supply consumables such as food, dry cleaning, banking and other service industries.

Washington Research Council

Economic Profile

December 2014

The Economic Contribution of Washington State's Petroleum Refining Industry in 2013

ACKNOWLEDGEMENTS

Washington Research Council has produced this report with funding from the Western States Petroleum Association. Washington state's economy is simulated using the Washington Research Council-Regional Economic Models, Inc. (WRC-REMI) model, based on a detailed survey of the five oil refiners operating in Washington. The results of this analysis are the sole responsibility of the Washington Research Council, a nonprofit organization committed to objective analysis of economic and public policy issues in Washington state.

1. Report Overview

This report quantifies the impact of Washington's five major petroleum refiners on the state's economy in 2013.

In 2013, the refiners directly provided 2,024 full-time jobs, paying an annual average wage of $121,114. In addition, the refiners employed, at high wages, 2,727 contract workers on an average day, doing maintenance, capital repair and capital replacement. The refiners indirectly created additional Washington state jobs in industries from which they purchased goods and services, including transportation, construction, utilities and business services. Spending of the income earned in these direct and indirect jobs created even more jobs.

The sum of all these effects was more than 26,060 jobs and almost $1.8 billion in personal income for Washington state in 2013. From this activity, state and local governments received $53.4 million in sales and use taxes and $124.9 million in business and occupation taxes.

Also, downstream industries, which distributed refined petroleum products, paid $428 million in wages to 16,044 workers in 2013. Excise taxes collected by the state from these industries exceeded $236 million in 2013.

Because of Washington's unique tax structure, a Washington refinery's state and local tax burden in 2013 was almost three times higher than the state and local tax burden of a comparable refinery located in California.

The report updates the economic impact analyses of petroleum refining for 2003, 2005, 2007, 2009 and 2011 previously prepared by the Washington Research Council (WRC 2004, 2006, 2009, 2010 and 2012), drawing upon a survey of Washington refiners conducted by the Council in 2014 (Appendix A) and the WRC-REMI model of the Washington state economy (Appendix C).

2. Summary of Findings

Washington's five refineries provide 3.4 percent of the United States' refining capacity. In 2013 they processed 572,300 barrels of crude oil per day. Gasoline, diesel oil, and jet

Formatting fixed 12/29/14

Table 2.1: Summary of Multipliers and Economic Impacts

Refining Jobs	Multiplier	Indirect and Induced Economic Effect	Major Petroleum Refiners Total Economic Impact
2,024 jobs	12.88	24,036 jobs	26,060 jobs
	$880,142	$1,445,719,917 personal income	$1,781,406,866 personal income
	$26,324	$43,239,183 sales and use taxes	$53,380,261 sales and use taxes
	$61,696	$14,844,634 B&O taxes	$124,873,001 B&O taxes

Source: 2014 Re ner Survey, WRC-REMI Model

fuel are the largest finished product categories, representing 42 percent, 26 percent, and 14 percent, respectively, of total production, with gasoline production averaging 257,100 barrels per day.

According to the refiners survey, the five major refineries employed 2,024 workers in 2013, paying them an average annual wage of $121,114—more than twice the Washington state average.

As illustrated in Table 2.1, these jobs have a total employment multiplier of 12.88, meaning that each direct refining job generates an additional 11.88 jobs in the state, for a total employment impact of 26,060 jobs resulting from the five refineries.

Petroleum refining's extraordinarily high capital intensity, high wages and extensive use of highly paid contract labor are the major reasons for its high jobs multiplier. The WRC-REMI model, which is used here to determine the economic impact of the industry, calculates that each petroleum job adds $880,000 of state personal income, a total income contribution of nearly $1.8 billion to the state economy.

The industry is highly taxed and regulated, producing a bounty of tax and fee revenues for state and local government.

The five refiners paid $268.6 million in state and local taxes in 2013. This total included $110.0 million in business and occupation (B&O) tax, $116.7 million in hazardous substance tax, $24.3 million in property tax and $5.9 million in sales and use taxes (Table 7.2).

In addition, the refiners $12.7 million in regulatory fees in 2013 (Table 7.3).

Including the indirect and induced effects, the refining industry generated $53 million in sales and use and $125 million in B&O taxes (Table 2.1)

Calculations of state and local taxes paid by hypothetical 160,000 barrels-per-day refineries located in Washington and California indicate that the tax burden on refineries in Washington is almost three times greater than that in California (Table 8.1).

Finally, refiners contribute generously to the communities in which they are located. The five refiners and their employees contributed $1.7 million to various community causes in 2013. The firms themselves contributed about 47 percent of this, with the balance provided by firm-sponsored employee giving (Appendix A, Table A.11).

Table 3.1: Washington Refineries

Firm	Year Constructed	Location	Major Products	Capacity (barrels/day)
BP Cherry Point (formerly ARCO)	1971	Whatcom County, northwest of Ferndale	Gasoline, diesel oil, jet fuel, calcinated coke	234,000
Phillips 66 Ferndale (formerly ConocoPhillips Tosco, BP Oil and Mobil Oil)	Mid-1950s by General Petroleum (subsidiary of Socony-Mobil)	Whatcom County, west of Ferndale	Gasoline, diesel oil, jet fuel, liquid petroleum, residual fuel oil	107,500
Shell Oil (formerly Equilon Enterprises and Texaco)	1957	Skagit County, five miles east of Anacortes	Gasoline, diesel oil, jet fuel, propane, coke, sulfur	149,000
Tesoro (formerly Tesoro Northwest and Shell Oil)	1955	Skagit County, on March Point	Gasoline, diesel oil, turbine & jet fuel, liquid petroleum gas, residual fuel oil	125,000
U.S. Oil	1957	Pierce County, Tacoma Tideflats	Gasoline, diesel oil, jet fuel, marine fuel, gas oils, emulsified & road asphalt	42,000

3. Oil Refining in Washington State

Building and development of the industry. The oil refining industry in Washington state began in the mid-1950s with construction of refineries by Shell in Anacortes (Skagit County) and Mobil west of Ferndale on the Strait of Georgia (Whatcom County). Following closely in 1957, Texaco built in Anacortes, and U.S. Oil constructed its refinery on the Tacoma Tideflats. In the early 1970s, in anticipation of the crude oil that would begin flowing from Alaska's North Slope, Atlantic Richfield (Arco) built its refinery at Cherry Point. Now owned by BP, this plant remains one of the nation's newest refineries.

Ownership of all these facilities has been fluid over the years, but today Washington's refining activity is concentrated at the four major plants in Whatcom and Skagit counties and the U.S. Oil plant in Tacoma. (See Table 3.1.)

Federal restrictions. Oil companies invest tremendous sums in their facilities in order to maintain their assets, to increase refining capacities, and to remain viable in a highly competitive global industry. In the 1970s, Washington's older oil refineries embarked on major plant modifications in anticipation of the Alaskan crude. Plans for new port facilities on Puget Sound to receive su-

persized tankers and new pipelines to carry Alaskan oil on to the Midwest were debated. But in 1977, before these plans could be finalized, the Marine Mammal Protection Act came up for reauthorization in Congress. Washington's then-senior senator, Warren Magnuson, preempted these plans by attaching an amendment to the reauthorization bill prohibiting construction of new ports east of Port Angeles.

Geographic isolation. This decision sealed Washington's isolation from the rest of the country's petroleum supplies by preempting pipeline construction to the upper Midwest that would have provided the Northwest with easier access to Eastern and Midwestern distribution systems.

Today, Washington's five refineries make up 3.4 percent of the nation's total refining capacity (EIA 2014a).With this state accounting for 2.1 percent of national petroleum consumption, in-state refineries produce quantities more than sufficient for Washington's needs (EIA 2014b).

Dependence on in-state refining. Other areas of the country—the Midwest and the East—are connected to a larger distribution system that allows their short-term petroleum supply disruptions to be accommodated more easily than those in the West. which are not connected to the Gulf Coast and Midwest pipeline systems. West Coast consumers are supplied primarily from refineries in California and Washington.

Geographically, the three most important sources of crude oil for Washington refineries are Alaska's North Slope , the Canadian province of Alberta and the Bakken oil field of North Dakota.

Nationally, plant obsolescence and federal and state regulations requiring cleaner products and production processes have resulted in a reduction in the number of operable U.S. petroleum refineries from 301 in 1982 to 142 at the beginning of 2014. Those refineries that remain, however, are more efficient, with slightly more refining capacity available today than in 1982.

Over the decade prior to the 2001–03 recession, the increased demands of a growing population and economy and an increasing array of "boutique" fuels required by federal and state regulations strained capacities, with price effects felt throughout the country. The 2001–03 recession provided a respite, but capacity constraints returned at mid-decade as the economy recovered. The situation was exacerbated by hurricane damage to refineries along the Gulf Coast. During 2008–09, high crude oil prices followed by financial crisis induced demand reductions severely squeezed refinery margins. More recently, margins rebounded as increased crude oil production in the U.S. lowered refinery costs, while global product prices remained high.

The constrained supply-demand relationship combines with the West Coast's isolation to produce an economy in Washington that is unusually dependent on its in-state refining capacity. It is this industry and its relationship with the larger Washington state economy that are described in the sections that follow.

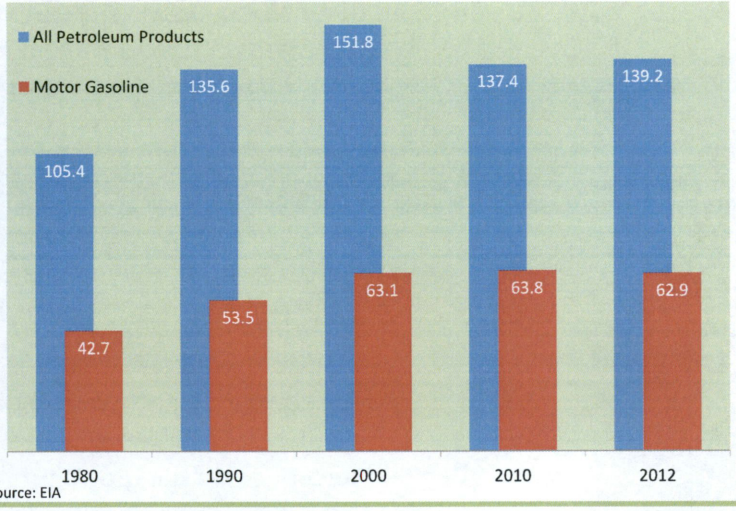
4. Industry Impact Analysis

To quantify the impact of Washington State's refineries on its economy, we use the WRC-REMI model to simulate a permanent increase in refin-

ery employment of roughly 8 percent and measure the resulting changes in total state employment, personal income, and gross product. Dividing these resulting changes by the change in refinery employment gives "multipliers" that are then applied to the industry's total employment to calculate total economic impact. For example, in 2013 the five refineries had 2,024 employees. With a multiplier of 12.88 the total impact of the refineries was 26,060 jobs. Similarly, the refinery activities resulted in $880,142 of state personal income for every direct job, or a total statewide $1.78 billion in personal income.

The economic impacts of petroleum refining in Washington, however, are broader than those of most other sectors of the economy. If petroleum prices go up, the effects are felt in the price of food and other essential consumer goods, the costs of commuting, and the cost of moving goods to market for businesses throughout the economy. And, unlike products from other sectors, alternative petroleum supplies or substitute products are not readily available in the case of an emergency. In order to fully appreciate the economic value of the petroleum refining industry in Washington, the dire economic consequences possible in a catastrophic scenario must be acknowledged. Foreign product would have to be imported, increased dock and terminal capability would be required, product prices would increase in response to diminished supply availability and stability, and these increases would be felt throughout the economy.

Figure 5.1: Washington State Petroleum Product Consumption
(millions of barrels)



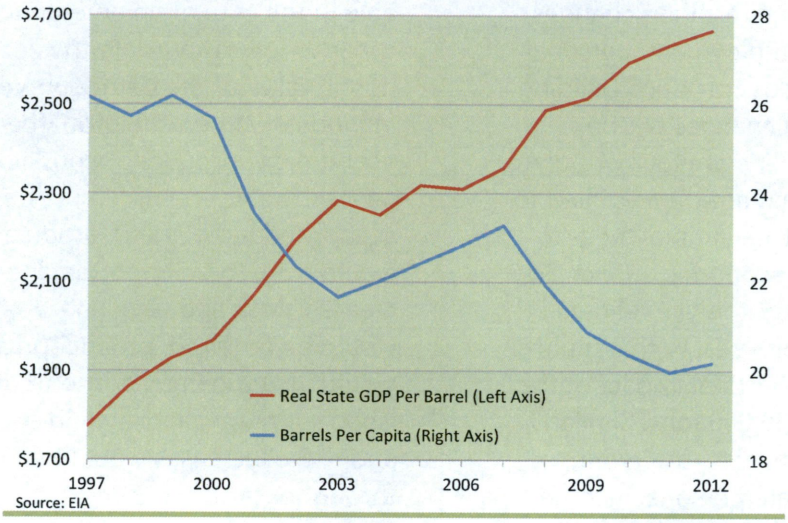
Source: EIA

In the sections that follow, Washington's petroleum refining industry is described under equilibrium conditions by summarizing consumption (Section 5), production (Section 6), and the direct purchases of the five major industry refiners (Section 7). Based on these data, the WRC-REMI model calculates the effect of the five refineries on jobs, income, retail sales and use, and B&O taxes statewide (Section 9).

Section 8 presents a comparison of taxes paid by hypothetical 160,000 barrels-per-day refineries located in Washington and California.

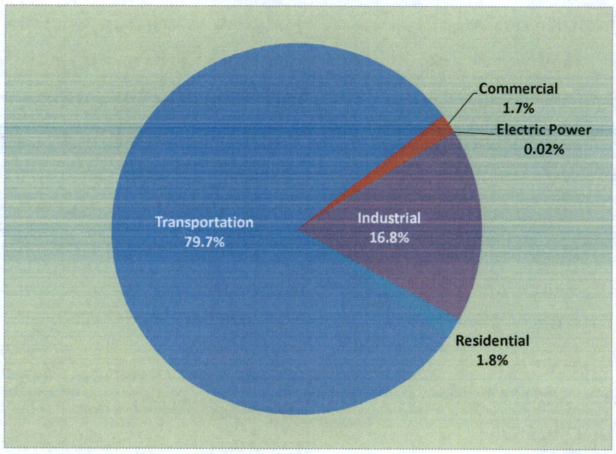
Finally, in Section 10 we provide employment, wage, and tax contribution information on the portions of the transportation, wholesaling, and retailing sectors that operate downstream of the refining process. These petroleum-related activities combine to assure that petroleum products get to their markets in Washington state and beyond. Although they would exist regardless of the presence of in-state refining, their inclusion here helps to give a complete picture of the petroleum industry in Washington state.

Figure 5.2: Washington Petroleum Consumption Trends



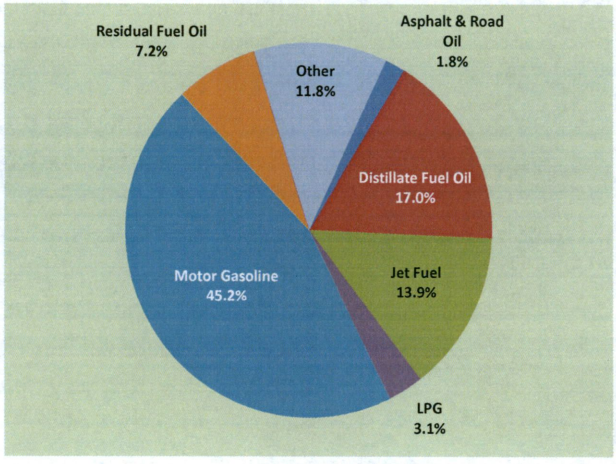
Source: EIA

Figure 5.3: 2012 Consumption By Sector



Source: EIA

Figure 5.4: 2012 Consumption By Product (Volume in Barrels)



Source: EIA

5. Petroleum Product Consumption in Washington

Washington households and businesses consumed a bit more than 139 million barrels of finished petroleum products in 2012, up 32 percent from 1980, according to the Energy Information Administration (EIA). (See Figure 5.1.) Washington's 2012 consumption was 2.1 percent of the U.S. total and about 15 percent of EIA's western Petroleum Administration for Defense (PAD) District V, which encompasses Washington, Oregon, California, Nevada, Alaska, and Hawaii. PAD District V represented 14 percent of total U.S. consumption in 2012 (EIA 2014b).

As a result of increasing fuel efficiency, petroleum product consumption in Washington declined by 6 percent from 1997 to 2012. Over the period the state's population grew by 22 percent and the output of the state economy (as measured by real gross state product) grew by 41 percent. As a result, per-capita consumption declined by 23 percent, while gross state product per barrel of petroleum increased by 50 percent. (See Figure 5.2)

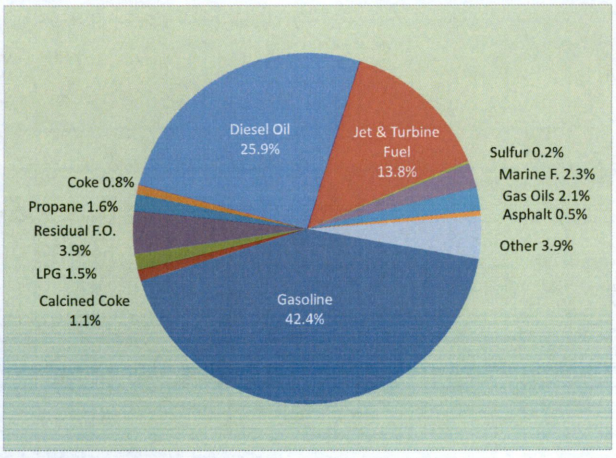
The several broad classes of customers who purchase petroleum products help to explain the state's consumption patterns. Demand for petroleum products from transportation, industrial and residential customers decreased over the fifteen-year period by 3 percent, 17 percent and 41 percent, respectively. Commercial customer demand increased by 33 percent over the period (EIA 2014b).

As shown in Figure 5.3, commercial customers accounted for less than 2 percent of Washington's total petro-

leum product consumption; transportation and industrial customers together accounted for more than 96 percent.

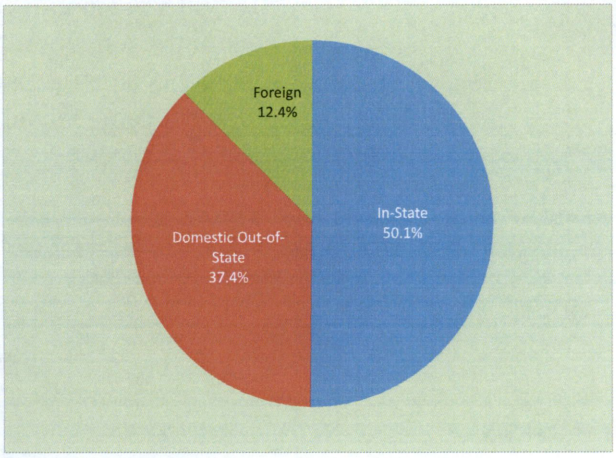
By far, motor gasoline was the largest category of product consumed, at 46.2 percent of the total. (See Figure 5.4)

Figure 6.1: 2013 Washington Production By Product (Volume in Barrels)



Source: 2014 Re ners Survey

Figure 6.2: 2013 Washington Production By Destination (Volume in Barrels)



Source: 2014 Re ners Survey

6. Refinery Production in Washington

The data that follow in Sections 6, 7, and 8, unless otherwise indicated, are the aggregated results of our survey of Washington's five major refiners (Appendix A).

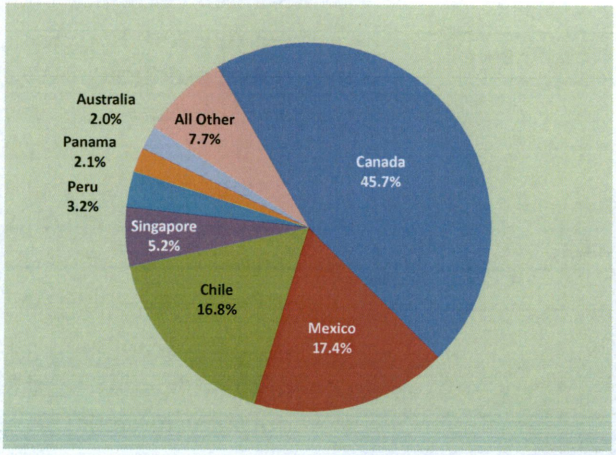
Finished products. Washington's refineries produced 606,200 barrels per day and more than a dozen different products in 2013. Gasoline, 257,100 barrels per day in 2013, is by far the largest product category, accounting for 42.4 percent of the total. Diesel oil and jet fuel are the next largest at 25.9 percent and 13.8 percent, respectively. (See Figure 6.1.)

Gasoline accounted for 45.0 percent of the refineries' total $25.1 billion in output value in 2013. Again, diesel oil and jet fuel are next, accounting for 28.6 percent and 15.1 percent, respectively.

Markets. In 2013, 50.1 percent of Washington refined product was sold within the state; 37.4 percent of total product was sold domestically outside Washington; and the remaining 12.4 percent was delivered to foreign buyers. (See Figure 6.2.)

The World Institute for Strategic Economic Research (WISER) provides data on the destination of foreign exports of petroleum products from Washington. In 2013, the $4.8 billion of petroleum products exported from the state amounted to 5.8 percent of Washington's foreign exports. Almost 46 percent of the dollar value of petroleum product exports went to Canada. Mexico was the second most important export market, followed by Chile, Singapore, Peru, Panama and Australia. (See Figure 6.3; Appendix B provides com-

Figure 6.3: Top Export Markets in 2013



Source: WISER

plete listings of export destinations for 2012 and 2013.)

Product transport. Finally, 47.8 percent of all products refined in Washington was shipped by pipeline in 2013, primarily to Seattle and Tacoma markets and on to Portland. Of the remaining product, 39.1 percent was shipped by water, to Portland and other destinations along the Columbia River as well as to foreign customers; 10.2 percent went by truck; and 2.9 percent went by rail.

7. Washington Refiners: Inputs

Washington refiners spent $23.5 billion on feedstocks and other inputs in 2013. This section describes their main areas of expenditure.

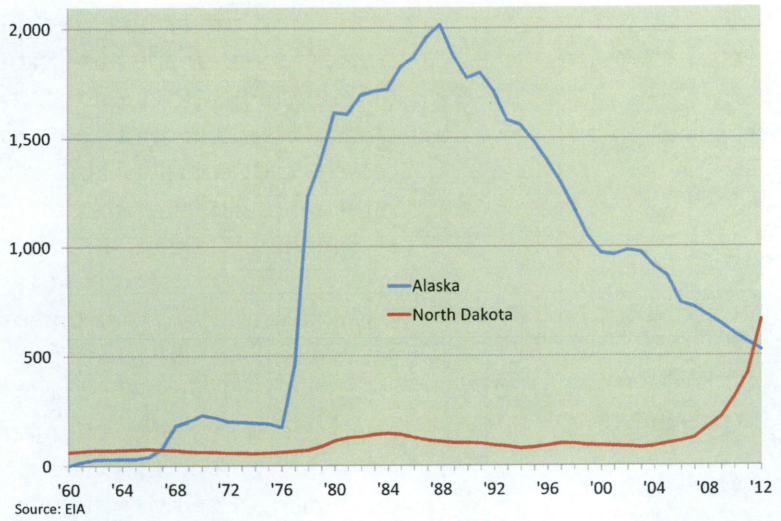
Feedstock. Washington's petroleum refineries received 591,300 barrels per day of crude oil and other feedstock inputs (e.g., butane, isobutene, and cat feed) in 2013. The total volume of feedstock in 2013 was 8.9 percent greater than 2012. The value of 2013 feedstocks was $22.5 billion, up 8.8 percent from 2012. (See Table 7.1.)

In 2013, 60.5 percent of crude oil came into the refineries by water, 27.2 percent came by pipeline; and 12.3 percent came by rail. Of the

Table 7.1: Quantity and Value of Feedstock Inputs

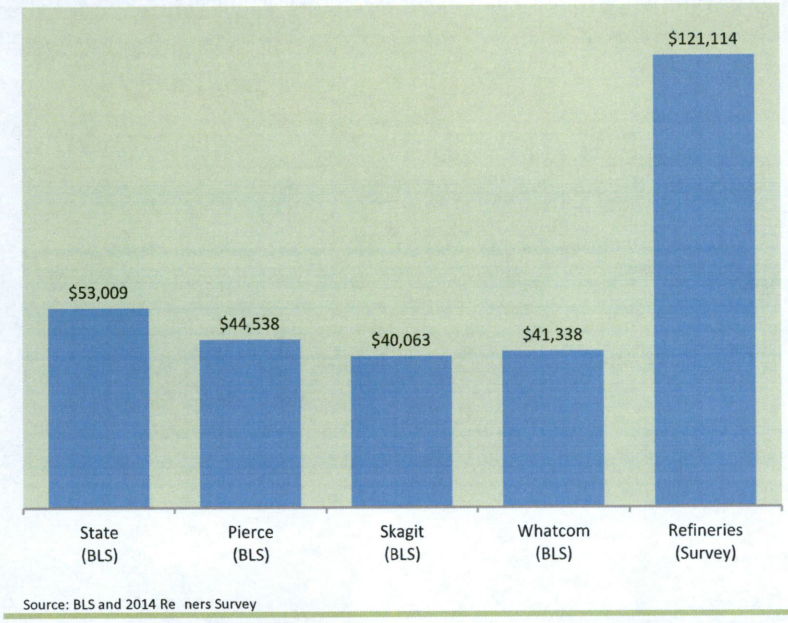
	2012	2013
Total Feedstock Inputs (thousands of barrels/day)	542.9	591.3
Crude Oil	528.4	572.3
Other	14.5	19.0
Total Value of Feedstock Inputs (millions of dollars)	20,673.0	22,494.4
Crude Oil	20,296.5	22,012.1
Other	376.5	482.3

Figure 7.1: Crude Oil Production, Alaska and North Dakota,(1,000 BBL/D)



crude oil, 46.2 percent was Alaskan, 18.4 percent was Canadian from conventional sources, 8.7 percent was Canadian from oil sands and 13.9 percent was from North Dakota. The remaining 12.8 percent came from a number of other places.

Figure 7.2: Average Annual wages



This represents a noteworthy change from 2003 when 90.4 percent of crude came by water from Alaska and no crude came to Washington by rail from North Dakota. Driving this change was the precipitous decline of crude oil production in Alaska and growth of production in North Dakota, as shown in Figure 7.1.

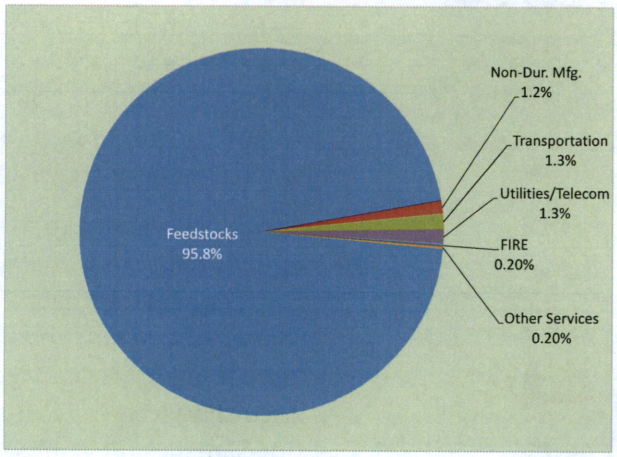
Labor. Washington's five oil refiners employed 2,024 workers in 2013 and paid them extraordinarily well. The refiner survey puts the 2013 average annual refinery wage at $121,114. According to the U.S, Bureau of Labor Statistics (BLS), the overall statewide average wage was $53,009 in 2013, less than half of the refinery average wage. (See Figure 7.2.)

This contrast is even more pronounced when comparing refining wages with average annual wages in Whatcom and Skagit counties where the four largest refineries are located. The average annual wage in Whatcom County in 2013 was $41,338 while in Skagit County it was $40,063 (BLS 2014).

Refinery payrolls totaled nearly a quarter of a billion dollars in 2013. Worker benefits totaled more than $90 million, and average total compensation per employee was $165,870.

Contract labor. Washington's petroleum refiners regularly rely on contract workers to clean and service various parts of their plant facilities and equipment, as well as to conduct scheduled major repairs and upgrades. The number of workers varies from year to year—2,843 in 2012 and 2,727 in 2013—and represents a significant part of the employment base, especially in Whatcom and Skagit counties.

Figure 7.3: 2013 Non-Labor Operating Expenses



Source: 2014 Re ners Survey

In 2013 refiners paid $412.9 million for contract workers, an average of $151,417 per worker.

Forty-one percent of contract workers in 2013 (1,128 workers) were engaged in capital repair and replacement, at a cost of $91.7 million. In addition to this contract labor, the refiners made $100.5 million in construction and other capital expenditures. Purposes included safety and environmental compliance, efficiency improvements and capacity expansion.

Non-labor operating expenditures. Non-labor operating expenditures are mostly for feedstocks—crude oil—and intermediate processed crude (which will be refined further into higher grade products) and chemicals and catalysts to be applied to the crude to produce various final products. These purchases show up in two categories: feedstocks and nondurable manufactured goods (primarily intermediate petroleum products and chemicals). Combined, these two categories account for more than 97 percent of all non-labor operating expenditures.

Significant amounts are also spent on utilities and transportation, which together accounted for $609.1 million in 2013. Utilities expenditures, including electricity, gas and communications, totaled $294.6 million in 2013, and transportation totaled $314.5 million. Transportation expenditures were primarily for waterborne transport of inbound and outbound product (Appendix A, Table A.7).

Taxes. The five refiners contributed $268.6 million in state and local taxes in 2013 (See Table 7.2).

Table 7.2: Taxes Paid by Refiners in 2013

	(Millions)	% of Total
Retail sales and use tax	$5.9	2.2%
Business and occupation tax	$110.0	41.0%
Property tax	$24.3	9.0%
Unemployment compensation tax (state only)	$1.1	0.4%
Hazardous substance tax	$116.7	43.5%
Oil spill tax	$8.3	3.1%
Petroleum Products Tax	-	-
Motor vehicle fuel tax	$0.5	0.2%
Other	$1.7	0.6%
Total	$268.6	

Source: 2014 Re ners Survey

Table 7.3: Regulatory Fees Paid by Refiners in 2012 (dollars)

Air operating registration and permit fees	2,061,000	16.4%
Waste disposal fees	1,330,000	10.6%
Wastewater discharge fees	820,600	6.5%
Building Inspection Fees	8,344,913	66.3%
Building permit fees	35,000	0.3%
Other	109,000	0.9%
Total	12,700,513	

Source: 2014 Re ners Survey

The state hazardous substance tax—$116.7 million—comprised the largest share of total taxes paid, 43.5 percent of the total. The rate on this tax is 0.7 percent of wholesale value. Petroleum products constitute a large portion of the products subject to the tax.

Ranking a close second was the business and occupation tax, $110.0 million, 41.0 percent of the total. Refineries are subject to this tax under either the manufacturing or wholesaling categories, at the rate of 0.484 percent.

Next in line was the property tax, $24.3 million and 9.0 percent of the total tax bill.

The fourth most costly tax in 2013, $8.3 million, was the oil spill tax. It is a tax of 5 cents per barrel on crude oil or petroleum products that are transported by ship or barge in Washington waters and offloaded at an in-state marine terminal. Of the proceeds, 4 cents are paid into the oil spill administration account and 1 cent into the oil spill response account. When (as is currently the case) the oil spill response account is fully funded, the 1 cent tax is suspended; when the account is short of funds, the tax is resumed. The 1 cent response tax was last collected during the 3-month period from January 1 to March 31, 2013. Through a credit, the tax is effectively eliminated for crude oil or petroleum products exported from the state.

The petroleum products tax is another tax unique to the petroleum industries. Revenues from this tax are dedicated to the pollution liability insurance program, which assists owners of underground storage tanks in obtaining insurance for upgrading and replacing tanks and preventing leaks. This tax is suspended when the pollution liability insurance program account balance exceeds a trigger value. The trust fund balance reached the trigger in the first quarter of 2010. The tax was suspended on April 1 of that year and remains suspended today.

The refineries reported paying $5.9 million in sales and use taxes in 2013. Currently the sales and use tax rate paid by the two Skagit County refineries and the two Whatcom County refineries is 8.5 percent, while the rate paid by the Tacoma refinery is 9.5 percent.

Fees. In addition, the refiners paid $12.7 million in regulatory fees in 2013. These included their air operating registration and permit fees ($2.1 million, 16.4 percent), waste disposal fees $1.3 million, 10.6 percent), and building inspection fees

($8.3 million, 66.3 percent). (See Table 7.3.)

8. Comparison with Taxation of a California Refinery

Table 8.1 compares the taxation of hypothetical refineries that processed 160,000 barrels of crude oil per-day in Washington and California in 2013.

We focus on six major taxes. One of these taxes—the corporate income tax—is levied in California but not in Washington. Two of these taxes—the business and occupation tax and the hazardous substance tax—are levied in Washington but not in California. The remaining three taxes—the sales and use tax, the property tax and the oil spill tax—are levied in both states.

The overall 2013 tax burden in Washington, $75.8 million, is almost three times the burden in California, $26.3 million. This is largely due to the fact that the Washington refinery pays considerably more in B&O and hazardous substance taxes than the California refinery pays in corporate income tax.

Corporate income tax. California's primary business tax is a corporate income tax. To avoid the complications inherent in state-level income taxation of multi-state businesses, we assume that the corporation owning the refinery does business only in California. California's corporate income tax rate is 8.84 percent. Based on financial information from Tesoro Corporation's 2013 Form 10-K filed with the U.S. Securities and Exchange Commission, we estimate the taxable income for a 160,000 barrels-per-day refinery to be $161.7 million and the corporate income tax due to be $14.3 million.

B&O tax. The B&O tax is Washington's primary business tax. It is a tax on a business's gross receipts. Our 160,000 barrel per day refinery has refined product sales of $6.78 billion. This results in a B&O tax obligation of $32.8 million at the manufacturing/wholesaling rate of 0.484 percent. This is more than twice the corresponding obligation under the California income tax.

The B&O tax is a tax on gross income, without any deductions for the costs of making the goods or services sold, while the corporate income tax is a tax on net income, after deduction of these costs. The B&O tax tends to be more burdensome than a corporate income tax for low margin businesses such as refining.

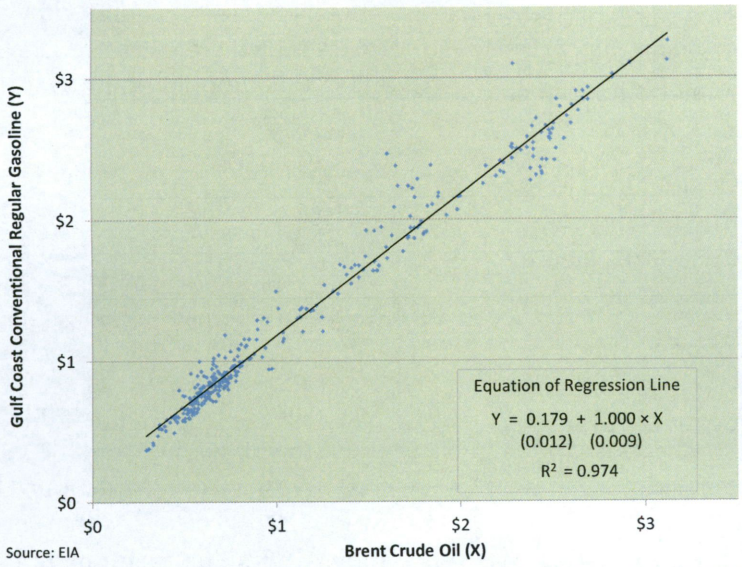
Refinery margins are particularly low when crude oil prices are high. In the

Table 8.1: Taxes on a 160,000 Barrels per Day Refinery, 2013
(millions of dollars)

	Washington	California
Corporate Profits Tax		$ 14.3
Business & Occupation Tax	$ 32.8	
Hazardous Substance Tax	$ 34.8	
Property Tax	$ 5.4	$ 6.6
Sales & Use Tax	$ 1.6	$ 1.6
Oil Spill Tax	$ 1.2	$ 3.8
	$ 75.8	$ 26.3

Source: WRC calcula ons

Figure 8.1: Monthly Average Spot Prices May 1987 – August 2014
Gulf Coast Conventional Regular Gasoline vs. Brent Crude Oil
2009 Dollars Per Gallon



Source: EIA

long run, the prices refiners pay for crude oil passes directly through to the prices they receive for products, as Figure 8.1 illustrates. On the figure we have plotted the monthly average U.S. Gulf Coast spot price of conventional regular gasoline against the monthly average spot price of the benchmark European Brent crude oil from May 1987 to August 2014. The slope of the regression line through the data points is almost exactly equal to one.

Hazardous substance tax. Returning to the taxes listed in Table 8.1, the hazardous substance tax is a second gross receipts tax levied by Washington state. Applying an effective rate of 0.513 percent to gross receipts of $6.78 billion gives a $34.8 million hazardous substance tax obligation for the 160,000 barrel per day Washington refinery. (Based on our survey, we use the 0.513 percent effective rate rather than the statutory 0.7 percent rate to account for various deductions and credits including the credit for product shipped out-of-state in vehicle fuel tanks.)

Property tax. We assume that the Washington refinery is located in the city of Anacortes and that the California refinery is in the city of Martinez. (Shell and Tesoro have refineries in both of these cities.) Based on the taxes paid by the Shell and Tesoro refineries in Anacortes, we estimate that the taxes that would be paid by a 160,000 bbl./day refinery in Anacortes to be $5.4 million. Based on the difference in property tax rates between Anacortes and Martinez, we estimate that such a refinery in Martinez would pay $6.6 million in property taxes.

Sales and use tax. In 2013, the combined state and local sales tax rates was 8.5 percent in both Anacortes and Martinez. Based on the survey of Washington refineries , we estimate transactions subject to the sales and use tax to be $18.8 million and the amount paid to be $1.6 million.

Oil spill tax. Both states impose an oil spill tax. The rate in Washington is 5 cents per barrel. As we noted above, in Washington, 1 cent of the 5 cents is sometimes suspended, and the full 5 cents was only collected in the first three months of 2013. We assume an effective rate of 2.125 percent to account for the credit for product exported from the state. The oil spill tax rate in California is 6.5 cents per barrel, with no credit for exported product. We assume that for both refineries, 58.4 million barrels crude oil are subject to the tax. The oil spill tax burden is $1.2 million in Washington and $3.8 million in California.

9. Petroleum Refining Industry Direct, Indirect and Induced Economic Impacts

The economic impact of refineries on the state's economy can be divided into three primary categories: direct, indirect, and induced effects:

- The **direct** effects are those in the industry itself—the refinery jobs and payroll, and the taxes paid by the refiners.
- The **indirect** economic effects include the jobs, wages, and taxes of upstream suppliers of the refineries—not only the suppliers of crude oil, but also the construction companies and contract workers used for plant maintenance and repair and the office product and equipment suppliers, for example. These figures were captured in the survey completed by the five refiners. The indirect economic effects also include the jobs, wages, and taxes of suppliers' suppliers; of the suppliers' suppliers' suppliers; and so on up the supply chain.
- Finally, the **induced** effects are the jobs, income, and taxes contributed by firms in industries that supply daily consumables and services—e.g., food, dry cleaning, banking—to workers holding the direct and indirect jobs.

The relationship between the direct jobs, income, and tax effects in an industry and their indirect and induced effects are captured by multipliers, which are calculated using the WRC-REMI model of the Washington state economy.

The employment multiplier for the petroleum refining industry is 12.88. Applying this multiplier to the 2,024 direct refinery jobs in 2013 gives a total state employment impact of 24,036 jobs.

This is an unusually large employment multiplier. In comparison, the 2007 Washington state Input-Output Study (2014) calculates that the employment multiplier for manufacturing/construction overall is 2.65. Much of this difference arises because the WRC-REMI model incorporates a number of significant behavioral responses to changes in prices and costs that are not picked up by a simple input-output model: The wage rate depends on the supply and demand for labor, migration and labor force participation rates respond to changes in wage rates, and consumer purchases of specific goods and services respond to changes in relative prices and personal income. In addition, producers substitute among production factors in response to changes in relative factor costs, market shares respond to changes in regional production

Table 9.1: Impact of a 160,000 Barrel Per Day Refinery

565 Direct Jobs	
	+6,915 Additional Jobs Elsewhere in the State Economy
$92.2 Million Direct Compensation	
	+$399.5 Million Additional Personal Income Elsewhere in the Economy
$73.7 Million Direct Taxes	
	+$4.3 Million Additional Sales, Use and B&O Taxes Elsewhere in the Economy

Source: WRC

costs, and investment rises in response to increases in output. When we run the WRC-REMI model with these channels turned off so as to approximate an input-output model, the employment multiplier for petroleum refining is reduced to 4.84. When we run such a WRC-REMI simulation for the larger petroleum and coal products manufacturing sector (the "three-digit" sub-sector of manufacturing that contains the petroleum refining industry) the employment multiplier is 4.05. This is actually less than the 6.80 multiplier that the Washington Input-Output Model gives for petroleum and coal products manufacturing. (This 6.80 is the highest employment multiplier found by the 2007 Input-Output Study.)

Several additional factors contribute to the petroleum refining industry's large multiplier. First, petroleum refiners pay high wages. As a result, the employment induced by refinery employee spending is relatively great. Second, the petroleum industry ranks high in the ratio of in-state supplied intermediate inputs (including contract labor) to employee income. For this reason, indirect employment is relatively high. And some of these indirect jobs (contract labor, in particular) pay unusually high wages.

The WRC-REMI model calculates that each refining job results in an additional $880,142 of state personal income. At 2013 employment levels, the industry adds $1.8 billion to state personal income.

In 2013 state and local sales and use taxes averaged $0.0270 for each dollar of state personal income. With the income multiplier of $880,142, each petroleum refining job results in $26,324 in state and local sales taxes or a total of $53.4 million.

The refiners directly paid $105.1 million in B&O taxes in 2013. In 2009 state B&O taxes averaged $0.00106 for each dollar of personal income. Multiplying this rate into $1,452.9 million—the increase in state personal income we ascribe to the 1,986 refinery jobs net of the wages and benefits of the refinery workers—gives $15.4 million additional induced and indirect B&O tax revenue, for a total of $120.5 million, or $60,691 per direct job.

These impacts can be expressed in terms of the hypothetical Washington refinery producing 160,000 barrels of product a day that was analyzed in Section 8. In 2013, this refinery would have provided 565 jobs, and these workers would have received $68.4 million in wages and salaries and $25.3 million in benefits. In addition to the direct jobs and income, the refinery would generate 6,915 jobs and $399.5 million in personal income elsewhere in the state's economy. The refinery itself would pay $73.7 million in state and local taxes. In addition to these direct taxes, the indirect and induced activities generated by the refinery would provide $4.3 million in sales, use and B&O tax revenue. (See Table 9.1.)

10. Washington Petroleum Industry: Downstream Activities

Washington's petroleum refiners rely on a number of industries to distribute their product to consumers. These include transportation (pipelines, barges, trucks, and rail) and transportation support facilities (terminals, stockyards, and bulk stations), wholesalers, and retailers

Table 10.1: Employment and Wages by Industry, 2013

Industry (NAICS Code)	Firms	Total Wages Paid	Average Employment	Average Annual Wage
Petroleum Bulk Stations and Terminals (424710)	38	$45,169,000	716	$63,092
Other Petroleum Merchant Wholesalers (424720)	94	$63,632,000	1,085	$58,661
Gasoline Stations With Convenience Store (447110)	1,730	$230,081,000	12,109	$19,001
Other Gasoline Stations (447190)	112	$24,395,000	958	$25,455
Fuel Dealers (45431)	120	$49,627,000	1,038	$47,799
Refined petroleum product pipelines (48691)	7	$14,979,000	138	$108,346
Crude Oil Pipelines (48611)	D	D	D	D

Source: BLS

D: Value not disclosed

(gasoline stations and fuel oil dealers).

These downstream industries exist as a result of petroleum product consumption in our economy, not as a result of petroleum refining. Presumably, if the refineries were gone or if they had never existed in Washington, finished petroleum products would be imported to terminal and stockyard facilities, transported to retail destinations within the state, and sold to consumers through systems much like those that currently exist, together with similar job, wage, and tax effects. Even so, their direct economic contribution is substantial and their role in the larger petroleum industry is crucial. This section describes the employment, wages, and taxes associated with these industries.

Of the total finished products produced by Washington's refineries, 48 percent leaves through pipeline to markets in Seattle and Tacoma and beyond. Another 39 percent goes by water to Seattle, Portland, or elsewhere with the remaining 13 percent of product shipped by rail or truck. About 50 percent of product is delivered to retailers for consumer sales within the state of Washington (Appendix A).

Jobs and wages. According to detailed data reported to the BLS for 2013, the most recent year for which such data are available, there were about 2,100 employers in these downstream industries. Together, they paid $428 million in wages to 16,044 workers. These are all workers covered by unemployment insurance in these industries, so the number includes both full-time and part-time workers. Table 10.1 shows these data for each industrial classification with its corresponding North American Industrial Classification System (NAICS) code.

Among the downstream industries there are three broad tiers of employment and pay:

- Refined petroleum product pipelines employ a few highly paid workers—138 workers made $108,346 (plus benefits) on average in 2013.
- Bulk stations and terminals, wholesalers, and fuel oil dealers employ about 2,839 workers who earned on average $55,804 in 2013.
- Gasoline stations generate a large wage bill with a lot of lower-wage and part-time jobs. In 2013, this industry's 1,842 employers paid

total wages of $254.6 million to 13,067 workers.

Taxes. The state Department of Revenue (DOR) reports excise tax data on these same industries (DOR 2014a, 2014b).

As shown in Table 10.2, total excise taxes due from the downstream industries equaled $236.2 million in 2013. Gasoline stations paid $156.7 million in excise taxes. Wholesalers paid $59.9 million; fuel dealers, $19.6 million.

Table 10.2: Taxable Income and Taxes Due by Industry, 2013 (millions of dollars)

Industry (NAICS Code)	Gross	Taxable	B&O Tax	Other Excise	Total
Petroleum Products Wholesaling (4247)	7,667.4	6,079.4	29.9	30.0	59.9
Gasoline Stations (4471)	12,015.1	9,907.2	47.9	108.8	156.7
Fuel Dealers (45431)	540.5	510.3	2.5	17.1	19.6
Refined petroleum product pipelines (48691)	D	D	D	D	D
Crude Oil Pipelines (48611)	D	D	D	D	D

Source: DOR

D: Value not disclosed by DOR

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Appendix A

A.1: Quantity and Value of Feedstock Inputs	2012	2013
Feedstock Quantity (KBBLS/Day)		
Crude Oil	528.4	572.3
Other	14.5	19.0
Total	542.9	591.3
Feedstock Value ($K)		
Crude Oil	20,296,503	22,012,122
Other	376,451	482,324
Total	20,672,954	22,494,447

A.2: Quantity and Value of Output	2012	2013
Output Quantity (KBBLS/Day)		
Gasoline	244.0	257.1
Diesel Oil	123.0	156.8
Jet and Turbine Fuel	77.6	83.7
Calcined Coke	5.0	6.5
LPG	6.2	9.0
Residual Fuel Oil	25.6	23.7
Propane	8.7	9.8
Coke	5.5	4.9
Sulfur	0.9	1.1
Marine Fuels	18.7	13.9
Gas Oils	17.0	13.0
Emulsified and Road Asphalt	3.0	3.0
Other	19.6	23.8
Total	554.8	606.2
Output Value ($K)		
Gasoline	11,131,333	11,283,582
Diesel Oil	5,925,518	7,180,577
Jet and Turbine Fuel	3,607,739	3,776,891
Calcined Coke	240,571	274,427
LPG	147,581	186,164
Residual Fuel Oil	954,440	761,980
Propane	110,292	143,743
Coke	46,945	46,263
Sulfur	10,802	7,245
Marine Fuels	732,733	486,125
Gas Oils	492,609	369,691
Emulsified and Road Asphalt	108,848	88,554
Other	404,719	460,997
Total	23,914,129	25,066,238

A.3: Origin of Inputs 2013 (KBBLS/Day)	Crude Oil	Other
Alaska	264.4	2.9
Canada (Conventional)	105.4	-
Canada (Oil Sands)	49.6	-
Bakken	79.3	-
All Other Origins	73.7	16.1

A.4: Destination of Output 2013 (KBBLS/Day)	Washington	Other U.S.	Foreign	Total
Gasoline	118.7	116.6	21.8	257.1
Diesel Oil	77.2	57.8	21.8	156.8
Jet and Turbine Fuel	47.6	15.4	20.8	83.7
Calcined Coke	-	-	6.5	6.5
LPG	8.6	0.3	-	9.0
Residual Fuel Oil	12.9	3.2	7.6	23.7
Propane	8.3	1.5	-	9.8
Coke	3.0	2.0	-	4.9
Sulfur	1.0	0.0	-	1.1
Marine Fuels	12.1	1.8	-	13.9
Gas Oils	2.0	11.0	-	13.0
Emulsified and Road Asphalt	2.0	1.0	-	3.0
Other	3.8	20.0	-	23.8

A.5: Mode of Transport 2013	Pipeline	Water	Truck	Rail
Feedstocks (KBBLS/Day)				
Crude Oil	155.7	346.1	0.1	70.4
Other	1.8	8.0	0.2	9.1
Outputs (KBBLS/Day)				
Gasoline	159.2	77.6	20.3	-
Diesel Oil	77.4	63.7	15.6	0.1
Jet and Turbine Fuel	37.6	33.0	13.2	-
Calcined Coke	-	-	0.2	6.3
LPG	5.7	-	-	3.3
Residual Fuel Oil	-	23.7	-	-
Propane	0.1	-	7.2	2.4
Coke	-	2.0	-	3.0
Sulfur	-	-	1.1	-
Marine Fuels	-	13.9	-	-
Gas Oils	-	13.0	-	-
Emulsified and Road Asphalt	-	-	2.0	1.0
Other	-	16.7	-	7.1

A.6: Employment and Contract Labor	2012	2013
On-Site Employment		
Number of FTE Employees	1,996	2,024
Total Payroll ($K)	248,408	245,134
Total Employee Benefits ($K)	91,579	90,586
Contract Labor		
Expenditure ($K)		
Service and Maintenance	517,015	321,197
Capital Repair and Replacement	80,889	91,709
Total	597,903	412,906
Number of Contract Workers (FTE)		
Service and Maintenance	1,790	1,599
Capital Repair and Replacement	1,053	1,128
Total	2,843	2,727
% of Contract Labor from Outside WA State		
Service and Maintenance	19%	10%
Capital Repair and Replacement	25%	50%

A.7: Operating Expenditures Other than Labor or Feedstock ($K)	2012	2013
Non-Durable Manufactured Goods		
Petroleum Products	240,056	234,633
Other Non-Durable Goods	42,544	40,235
Total	282,600	274,868
Durable Manufacturing	-	-
Construction	178,368	75,900
Transportation		
Rail	27,188	61,653
Trucking	8,557	4,956
Automobiles	9,479	5,360
Waterborne	216,837	223,115
Air	-	-
Other	17,123	19,419
Total Transportation	279,185	314,503
Utilities and Communications		
Electricity	48,745	64,952
Gas	140,716	211,872
Other	14,450	17,824
Total U&C	203,911	294,647
Finance, Insurance and Real Estate	8,029	45,858
Business Services	6,213	6,109
Other Services	37,067	40,076

A.8:. Non-Labor Capital Expenditures	2012	2013
Equipment ($K)	95,261	139,241
Materials and Supplies ($K)	53,451	121,808
Total	148,712	261,050
A.9: Taxes and Fees		
Taxes ($K)		
Retail Sales and Use tax	3,182	5,919
Business and Occupation Tax	101,517	110,028
Property Tax	23,371	24,270
Unemployment Compensation Tax	934	1,067
Hazardous Substance Tax	109,339	116,746
Oil Spill Tax	7,943	8,343
Petroleum Products Tax	-	-
Motor Vehicle Fuel Tax	530	514
Special Fuel Tax	52	33
Other	1,586	1,662
Regulatory Fees ($K)		
Air Operating Registration and Permit Fees	1,957	2,061
Waste Disposal Fees	2,126	1,330
Wastewater Discharge Fees	794	821
Building Inspection Fees	3,879	8,345
Building Permit Fees	30	35
Other	40	109
Industrial Insurance Premium ($K)	9,210	6,966
A.10: Estimated Services and Retail Trade		
Food Services ($K)		
Associated with Contract Labor	372	415
Associated with Business Visitors	505	579
Total	877	994
Hotel and Motels ($K)		
Associated with Contract Labor	634	653
Associated with Business Visitors	695	665
Total	1,329	1,318
Other Trade and Services ($K)		
Associated with Contract Labor	25	25
Associated with Business Visitors	61	70
Total	86	95
A.11: Contributions ($K)		
Corporate	755	807
Firm-Sponsored Employee Giving	860	908
A.12:. Other ($K)		
Estimated Business visitors from outside Washington	3,050	2,450

Appendix B

Petroleum Product Exports from Washington State

	2013		2012	
Canada	$2,177,833,636	1	$1,781,345,720	1
Mexico	$829,871,226	2	$1,082,484,856	2
Chile	$799,600,716	3	$321,653,747	3
Singapore	$246,697,826	4	$244,062,973	4
Peru	$151,040,493	5	$439,895	19
Panama	$101,230,413	6	$497,533	18
Australia	$96,604,700	7	$138,680,487	5
Guatemala	$95,946,791	8	$38,177,596	9
China	$71,483,403	9	$67,575,139	6
Brazil	$64,440,635	10	$64,750,640	7
New Zealand	$40,964,163	11	$52,736,383	8
Thailand	$17,846,188	12	$233,353	21
United Arab Emirates	$14,671,853	13	$7,409,777	13
Ecuador	$9,773,181	14	$34,457,684	10
Colombia	$9,348,212	15	$213,812	22
Indonesia	$8,461,078	16	$8,180,664	12
India	$8,244,201	17	$2,023,767	16
Belgium	$8,000,000	18	$16,142	32
Japan	$7,325,684	19	$5,377,778	14
Taiwan	$3,650,060	20	$3,471,180	15
Russia	$3,484,204	21	$621,938	17
Malaysia	$549,305	22	$10,705,014	11
Philippines	$394,911	23	$364,487	20
Dominican Republic	$167,947	24	$172,401	23
Costa Rica	$137,888	25	$125,102	24
Germany	$110,370	26	$49,032	27
Nicaragua	$96,226	27	$19,487	31
Kazakhstan	$94,789	28	$14,120	34
Vietnam	$40,451	29	$116,818	25
Guadeloupe	$31,109	30	$0	-
Saudi Arabia	$25,242	31	$0	-
Uruguay	$21,101	32	$0	-
Trinidad And Tobago	$17,531	33	$11,195	37
French Polynesia	$16,802	34	$8,401	39
Fiji	$9,444	35	$0	-
Barbados	$8,483	36	$4,448	42
United Kingdom	$5,535	37	$26,097	28
Czech Republic	$5,440	38	$7,400	40
New Caledonia	$5,260	39	$0	-
Korea, Republic Of	$4,607	40	$26,033	29
Switzerland	$3,996	41	$0	-
Hong Kong	$3,561	42	$88,040	26
Netherlands	$3,480	43	$0	-
Norway	$2,886	44	$0	-
Spain	$2,613	45	$5,280	41
Haiti	$2,580	46	$13,960	35
Jamaica	$0	-	$23,234	30
Maldive Islands	$0	-	$15,196	33
Denmark	$0	-	$12,000	36
Austria	$0	-	$8,799	38
France	$0	-	$2,559	43
Total All Countries	$4,768,280,220		$3,866,230,167	

Source: WISERTrade

Appendix C

The Washington Research Council uses a model of the Washington state economy constructed especially for WRC by Regional Economic Models, Inc. Because it allows supply and demand to respond to changes in prices and wages, and permits substitution among factors of production, the WRC-REMI model is more elaborate than the standard input-output models commonly employed to estimate regional economic impacts (Treyz 1993).

The standard input-output model fails to model the numerous capacity constraints within the economy, the processes that set prices for goods and services and the responses of consumers and producers to changes in these prices. In the input-output model, industry and labor supply are perfectly elastic—so prices and wage rates do not matter.

Prices and wages do matter in the WRC-REMI model. The model divides the state into two sub-regions: The Seattle Metropolitan District (King and Snohomish Counties) and the balance of the state. There are 66 private industrial sectors within each sub-region, as well as four governmental sectors. Within each sub-region the model tracks inter-industry transactions, much as an input-output model would.

Unlike an input-output model, however, the WRC-REMI model incorporates a number of significant behavioral responses to changes in prices and costs: The wage rate depends on the supply and demand for labor, migration and labor force participation rates respond to changes in wage rates, and consumer purchases of specific goods and services respond to changes in relative prices and personal income. In addition, producers substitute among production factors in response to changes in relative factor costs, market shares respond to changes in regional production costs, and investment rises in response to increases in output.

This report uses version PI+ 1.5.2 of the WRC-REMI model.

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SEH

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MEMORANDUM

TO: Kimberly Fischer, Hydrologist
North Dakota State Water Commission

FROM: Scott A. Lange, PE
Project Manager

DATE: January 26, 2017

RE: Meridian Energy Group Water Appropriation Public Informational Meeting Questions
SEH No. MERID 135471 14.00

SEH received your December 22, 2016 email which condensed the comments and concerns provided to the State Water Commission during the public comment period for the Meridian Energy Group (Meridian) Water Appropriation Permit Application No. 6858. SEH has taken your questions and numbered them for quicker reference. Below are responses provided by Meridian to all questions, while noting that some of the items are not explicitly related to the Water Appropriations Permit Application and will not become a topic during the February 8, 2017 Information Meeting to be held in Medora, North Dakota.

1) **How will the water be used in the refinery?**
Water drawn from the Dakota Formation will be treated to provide water with the quality required for make up to the cooling system, boiler feed water system, process water, and utility water needs of the refinery. Additionally, the use of surface water run-off as a possible source of raw water is being considered to reduce the overall cost of raw water treatment.
   - Cooling System. The refinery design is maximizing the use of air cooling in order to keep to a minimum the water requirements for cooling purposes. In addition, as long as water quality is suitable, water used by the cooling system will be recycled to minimize make up water requirements.
   - Steam Generation: Onsite processes will use heat integration as much as possible to minimize steam for heating needs. As with the cooling system, the intent is to recover any condensation in the system to be reused for steam generation and minimize make up water needs to the steam generation system.
   - Process Water: The main process water user is the desalter within the atmospheric distillation unit. The refinery design includes recycling of treated wastewater back to the refinery processes to minimize the raw water make up needs.

2) **Provide an overview of how water will be used starting with the formation and details on how the water will be treated.**
Water will be drawn from the formation, treated with a Reverse Osmosis (RO) unit to provide plant process/cooling/steam water.

3) **Will the refinery use a wet or dry scrubber and how will it affect the water quantity needed?**
The current refinery design does not include the use of either a wet or dry scrubber to control air emissions.

4) **Will a plume be created by the refinery?**
A visible plume may be created from the cooling water towers. Since the refinery will maximize the use of air cooling, and the cooling towers will be designed with drift eliminators, Meridian anticipates any visible plume from the cooling water towers to be minimal.

5) **What waste products will be created and how will they be handled?**
The waste product from the treatment of brine water drawn from the Dakota Formation will be the reject from the RO process. It is currently estimated that RO reject will account for about 40% of the refinery water demand. Management of the RO reject is currently under evaluation with several possible methods being considered, which include:
   - Onsite injection back into the Dakota Formation via a permitted underground injection well.
   - Offsite injection.
   - Onsite evaporation.

6) **Will an onsite injection well be drilled or will waste travel by pipeline or truck to an offsite injection well?**
See item number 5.

7) **Onsite waste storage?**
At this time, Meridian does not anticipate that onsite waste storage will be required to handle RO reject. This will be finalized once test wells are drilled and management of RO reject is fully defined. The exact details of handling the treatment water brine are yet to be determined. If the disposal process is with onsite wells, evaporation, or offsite piping; there will be little to no storage as the disposal will happen in real time. If trucking is involved with the disposal process, some tanked storage will be needed.

8) **Is the water volume requested for both Phase 1 and 2?**
Yes.

9) **What is the timing for the phases?**
It is anticipated it will take one to five years to transition from Phase 1 to Phase 2.

10) **Concern about how much water is actually needed.**
Water need was calculated based on the make-up water demand and making some assumptions on the level of loss during raw water treatment and the amount of treated wastewater than can be recycled. The make-up water demand will be in the order of 150 to 300 gallons per minute. The treated water recovery rate through the RO system is anticipated in the 40- to 60% rate, and will be confirmed once test well(s) are drilled. Based on these assumptions, we settled on a request of 400 gpm from the formation.

11) **The originally stated projections of water requirements appear to be four times less that the volume included in the application.**
See item number 10.

12) **The volume of water requested is significantly less that the water volume used by the Tesoro Refinery in Mandan.**
The Davis Refinery design includes plans to recycle treated wastewater, to the extent feasible, as raw water for plant processes in order to minimize the draw of water from the Dakota Formation as well as the need for wastewater disposal. Additionally, the Tesoro Refinery is located near ample water sources and can use other cooling methods in their process.

13) **Concern about the water quality in the Dakota aquifer, and impact of any release to the air.**
Based on available groundwater data and because the intended treatment for the water drawn from the Dakota Formation is through a closed system which will not vent to the atmosphere, no impacts to air are anticipated.

14) **Is the water quality from the Dakota aquifer safe for industrial use?**
This is a suggested source of water for industrial purposes by the North Dakota Energy and Environmental Research Center at UND.

MRL/djg
c: William C. Prentice, Meridian Energy Group, Inc.
Tom Williams, Meridian Energy Group, Inc.
Dan Hedrington, SEH

NORTH DAKOTA
DEPARTMENT *of* HEALTH

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September 16, 2016

Mr. Tom Williams
Meridian Energy Group, Inc.
2070 Business Center Drive, St 160
Irvine, CA 92612

Re: Draft Modeling Protocol

Dear Mr. Williams:

The North Dakota Department of Health (Department) received a draft modeling protocol for the Meridian Energy Group, Inc. (Meridian) Davis Refinery in August 2016. While most of the information provided in the draft modeling protocol is in line with the *NDDoH Air Quality Dispersion Modeling Analysis Guide* and the *Site Specific Modeling Guidance*, a few points have been clarified below. The *Site Specific Modeling Guidance* was intended to be a broad outline of modeling requirements required by the Department; however, the facility must make some modeling determinations due to the specific equipment to be at the facility. All modeling must comply with EPA guidance documents and Department policy. Any questions related to a specific modeling parameter or guidance should be directed to the Department.

It is noted that the draft modeling protocol includes draft emissions estimates. While the Department recognizes that the emissions estimates are preliminary, the Department has significant concerns regarding the estimated emissions which are outlined in Section 3.3 below. We advise Meridian to ensure that any emission rates relied on when completing the permit application are based on guaranteed emission rates which have been demonstrated in practice on a similar source on a long-term basis.

Section 1.0 Projected Background

Short range impacts are 20 km (not 10 km) as outlined in *NDDoH Air Quality Dispersion Modeling Analysis Guide*.

Section 2.0 Project Description

This modeling protocol will apply if the facilities' emissions are less than PSD major source thresholds for Petroleum Refineries. Should emissions exceed the PSD major source threshold, a new protocol will need to be submitted and approved prior to conducting the modeling analysis.

Section 3.2 Plant Stack Data

Flare stacks are not included in Table 2—Preliminary Plant Stack Parameters. The Department utilizes a November 10, 2010 Guidance Document *Model Input Parameters for Flares* for how to model emissions from flares.

Section 3.3 Plant Emissions Data

Meridian has stated the project will be a synthetic minor source, to be verified by the Department upon receipt of a completed Permit to Construct application. The Department will review emission calculations and equipment specifications when submitted; however, the emission values submitted in the draft modeling protocol are very low and may not be achievable. Given this uncertainty, total emissions must be carefully considered and PSD applicability must be determined prior to application submittal. If the emissions exceed PSD major source thresholds, then Meridian should consult with the Department and the Federal Land Managers (FLMs) regarding PSD modeling requirements. The Department has provided information under the assumption that this facility will not be a major PSD source. Should the Davis Refinery be a major PSD source, the Site Specific Modeling Guidance document issued to Meridian will become invalid.

Preliminary potential emissions estimates from the facility are shown in Table 4 of the draft protocol. The Department recognizes that the emissions shown are preliminary estimates and more detailed emissions estimates (along with the emissions calculations) will be provided with the application for a Permit to Construct. However, based on the preliminary information in Table 4, the Department has the following comments:

1. When preparing emissions calculations and proposing limits for the facility's emissions units, the Department requires that the technology proposed has been demonstrated effective at an existing facility. To streamline the review, Merdian should provide the respective documentation indicating the technology has been demonstrated in practice.

2. Regarding the preliminary potential VOC emissions, the Department has the following comments:

    a. The State of California has some of the strictest VOC emissions regulations in the United States and several refineries operate in the state. A list of refineries operating in the state can be found at: http://energyalmanac.ca.gov/petroleum/refineries.html. The Department reviewed the 2014 VOC emissions data for four refineries and the information is summarized below:

Refinery	Capacity (bpd)	2014 VOC Emissions (tons)	Emission Factor (lb VOC / bbl)*
Kern Oil and Refining	26,000	71.6	0.015
San Joaquin Refining	15,000	65.1	0.024
Greka Energy, Santa Maria	9,500	41.5	0.024
Phillips 66, San Francisco	78,000	403	0.028

* The emission factor is calculated assuming that the facility operated 365 days per year at maximum capacity, which is a highly conservative assumption. Using actual crude oil throughput for the facility would result in a higher emission factor.

  Table 4 of the draft protocol estimates potential VOC emissions of approximately 81 tons/year, which equates to approximately 0.0081 lb VOC / bbl (assuming the facility operates 365 days/year at 55,000 barrels per day). The preliminary VOC emissions estimates for the Meridian facility are approximately two to three times lower (on a lb VOC / bbl basis) than those from refineries operating in California (which, as indicated previously, has very strict regulations regarding VOC emissions). Assuming that VOC emissions from the Meridian facility will be controlled as well as the above-referenced refineries, VOC emissions from the Meridian facility would be expected to be approximately 150-280 tons/year. This level of VOC emissions is above the PSD major source threshold of 100 tons/year.

b. VOC emissions from the FCCU, catalytic reforming unit and the vacuum systems are listed as 0.00 tons/year. It is unclear why no VOC emissions are estimated from these units.

c. VOC emissions from storage tanks are listed as approximately 4.4 tons/year. This number appears to be very low for a facility with a 55,000 barrel per day crude oil throughput, especially considering that crude oil from the Bakken formation has a relatively high Reid Vapor Pressure (RVP). The Department generally accepts a RVP of 10-12 for use in calculating emissions of facilities storing or transmitting Bakken crude oil.

   Additionally, the Department will require details on the proposed vapor recovery system for the tanks. Currently, the Department is unaware of any facilities where a vapor recovery system is installed on the entirety of the tank farm at a petroleum refinery.

d. VOC emissions from leaks are listed as approximately 34.1 tons/year. This number appears to be very low for a full-scale refinery with a capacity of 55,000 barrels per day.

3. Regarding the preliminary potential NO_x emissions, the Department has the following comments:

   a. NOx emissions from the stationary combustion sources are listed as approximately 35.2 tons/year. This NO_x emissions estimate for combustion sources appears to be very low for a full-scale petroleum refinery with a capacity of 55,000 barrels per day.

      Based on the VOC emissions from the stationary combustion sources and using the AP-42 VOC emission factor for natural gas combustion, the Department back calculated the estimated fuel usage at the facility. Using this number, paired with the NSPS Ja standard for NO_x, the facility would be over 100 tons/year just from the combustion sources. Assuming SCR injection on the largest units (or the few

largest boilers/process heaters) will still amount to emissions near 100 tons/year from combustion sources alone.

b. NO_x emissions from the flares are listed as approximately 0.46 tons/year. This NO_x emissions estimate for flaring appears to be very low for a full-scale petroleum refinery with a capacity of 55,000 barrels per day.

c. NO_x emissions from the FCCU are listed at 3.37 tpy. As indicated in the protocol, the NO_x control efficiency is assumed to be 98%. This is not consistent with the Department's understanding of typical FCCU NO_x emissions.

4. Regarding the preliminary potential CO emissions, the Department has the following comments:

a. CO emissions from the stationary combustion sources are listed as approximately 0.03 tons/year. This CO emissions estimate for combustion sources appears to be very low for a full-scale petroleum refinery with a capacity of 55,000 barrels per day. For example, 99.99% control on CO with "burner adjustments" with no additional CO control is not known to be achievable.

b. CO emissions from the flares are listed as approximately 2.1 tons/year. This CO emissions estimate for flaring appears to be very low for a full-scale petroleum refinery with a capacity of 55,000 barrels per day.

c. CO emissions from the FCCU are listed at 0.00 tpy. As indicated in the protocol, it is assumed that the CO control efficiency is 100%. This is not consistent with the Department's understanding of this units operation. For example, operating under the assumption the CO boiler will destroy all CO from the FCC regenerator is not a reasonable assumption as CO is still produced as a result of supplemental fuel gas combustion within the boiler. A realistic CO emission rate will need to be established for this source.

5. Regarding the preliminary potential HAP emissions, the Department has the following comments:

a. HAP emissions from leaks are listed at 0.00 tons/year. The Department is not aware of any technology that will result in zero HAP emissions from equipment leaks at a petroleum refinery.

b. HAP emissions from stationary combustion sources are listed at approximately 0.02 tons/year. This HAP emissions estimate for combustion sources appears to be very low for a full-scale petroleum refinery with a capacity of 55,000 barrels per day.

c. HAP emissions from the FCCU, catalytic reforming unit and the vacuum systems are listed as 0.33, 0.00 and 0.00 tons/year, respectively. It is unclear why no HAP

emissions are estimated from the catalytic reforming unit and the vacuum systems; in addition, the HAP emissions from the FCCU appear to be very low.

d. HAP emissions from product loading are listed as 0.0 tons/year. The Department is not aware of any technology that will result in zero HAP emissions from product loading at a petroleum refinery.

6. Filterable PM_{10} emissions from stationary combustion sources are estimated at 0.00 tons/year; however, filterable $PM_{2.5}$ emissions from the stationary combustion sources are shown at 15.98 tons/year. PM_{10} emissions include $PM_{2.5}$ emissions and as such PM_{10} emissions should be equal to or greater than $PM_{2.5}$ emissions.

In general, based on the Table 4 PM emissions (PM_{10}, $PM_{2.5}$, and PM_{cond}), there appear to be several errors with the emissions calculations for PM.

As indicated above, many of the emissions estimates included in the draft protocol appear to be very low for a full-scale petroleum refinery with a capacity of 55,000 barrels per day. Emissions calculations and documentation of the basis for all emissions estimates must be submitted with a permit application for the Meridian facility. Documentation of an emission rate must clearly demonstrate that the emission rate has been achieved in practice on a long-term basis at a similar source before the Department will accept that the emission rate is an accurate representation of expected emissions from the facility.

Section 4.1 General Requirements

Table 5—Summary of NAAQS Significant Impact Levels for Preliminary Screening Analysis. The Department has our own PM_{10} Class I SIL of 0.2 $\mu g/m^3$ (24-hour) and 0.1 $\mu g/m^3$ (annual) as listed in *NDDoH Air Quality Dispersion Modeling Analysis Guide*. This SIL should be used along with the federal SILs.

Meridian should also model all SILs in accordance with EPA guidance for modeling SILs as clarified since the $PM_{2.5}$ SIL was challenged.

The protocol discusses the use of AERMOD in SCREEN mode. While our *Air Quality Dispersion Modeling Analysis Guide* does allow for possible exemption from further refined modeling if SCREEN modeling shows maximum concentration below the SILs, the Department urges caution in using this due to the facility's proximity to a Class I area and the limited ability of AERSREEN in modeling complex facilities such as a refinery. If AERSCREEN modeling results show values under the SILs, the Department may still require refined modeling of NAAQS, NDAAQS, and/or other modeling to be conducted.

Section 4.2 PSD Increments

For PSD increments plant fence line shall be used as the ambient air boundary, as it limits public access to the facility. In the event there is no fence or other means of restricting access, the buildings are considered the ambient air boundary. The means of restricting public access should be specified.

Table 6—Prevention of Significant Deterioration (PSD) Class II Increments omits the $PM_{2.5}$ increment of 9 $\mu g/m^3$ (annual) and 4 $\mu g/m^3$ (24-hour).

Section 4.3 NAAQS Standards

For NAAQS/NDAAQS increments plant fence line shall be used as the ambient air boundary, as it limits public access to the facility. In the event there is no fence or other means of restricting access, the buildings are considered the ambient air boundary. The means of restricting public access should be specified.

Table 7—National and Oregon Ambient Air Quality Standards (NAAQS & OAAQS). Use North Dakota Ambient Air Quality Standards (NDAAQS), including the H_2S ambient standard. NDAAQS can be found in NDAC 33-15-02.

NAAQS and NDAAQS must be met at all locations within the model domain, not just at the plant boundary or fence line. New sources can not violate AAQS on their own or *contribute* to a violation of an AAQS when emissions combine with other sources.

The table also omits the new 1-hour NO_2 and SO_2 NAAQs and NDAAQS. Also note that on October 26, 2015 the EPA revised its NAAQS ozone standards.

Section 5.1 Model Options

The use of a 75% (0.75) in-stack NO_x to NO_2 ratio for annual averages is acceptable; however 80% (0.8) is the allowable NO_x to NO_2 ratio allowed for one-hour averages without further justification. If Meridian wishes to use a value other than 80% for one-hour averages the alternate value will need to be adequately justified based on vendor specification and consultation with the Department before use.

The use of MAKEMET is allowable for AERSCREEN. Please note that the Department prefers the use of 1-minute data and AERMINUTE for AERMOD use; which may be required if refined modeling is required.

Modeling tanks, loading stations, and leaks (fugitives) as area sources is acceptable. If an emission point would be better modeled as a point or line source the Department is not limiting tanks, loading station, and leaks to only area source modeling, but explain the choice of point, area, or line for each emission point.

Flare sources should be modeled according to NDDoH's *Model Input Parameters for Flares* policy.

The use of flat terrain for AERSCREEN is allowable for preliminary model testing; however, it will not be accepted for purposes of the final modeling analysis. DEM or NED data processed in AERMAP should be conducted.

Section 5.2 Ambient Conditions

Meridian should use the standard background as listed in *NDDoH Air Quality Dispersion Modeling Analysis Guide* for any SCREEN modeling and use the Painted Canyon and Dunn Center monitoring site data for refined modeling.

Section 5.4 Receptors

Nested Cartesian receptor grids are specified in the *NDDoH Air Dispersion Modeling Guide*. Receptors should be 25 m along the fence line, 100 m spacing for 1- 5 km, and 250 m spacing for 5-10 km, and 500 m spacing for 10-20+ km from fence line. Any part of the property that is not within a fence limiting access must be included in the receptor grid. Any portion of the property with a fence line and not accessible by the public is not considered ambient air and may be excluded from the receptor grid.

Maximum grid extent depends on the buoyancy (plume height) of the source. Meridian should include a discussion on grid extent and domain in their modeling analysis, though the Department requires a 20 km domain at minimum.

More compacted grid spacing should be utilized in areas where a maximum modeled impact occurs in a coarse portion of the primary receptor grid.

Section 5.5 Increment Consuming and Interactive Sources

Along with Dakota Prairie Refinery to be included as a nearby source in all modeling, if refined modeling using non-standard background (i.e. monitoring site data as background) then Whiting Oil and Gas Corp.'s Belfield Gas Plant will be included as a nearby source. Meridian may contact the Department for emission rates from this source if refined modeling is needed.

Section 5.7 Good Engineering Practices (GEP) Stack Height Analysis

While the Department does allow GEP stacks to be exempt from down-wash impacts, it is recommended that Meridian model for down-wash on all stacks due to the complex terrain/wind of the location and the impact of other stacks or buildings that may not be readily identified as having impacts on stacks.

Section 5.8 NAAQS Attainment Demonstration

The use of H_2S short term value and peak annual values are acceptable for PSD increments and older NAAQS; however, they should not be used for newer NAAQS. Follow the averaging times and percentile values as established in NAAQS & NDAAQS.

Section 6.1

The draft modeling protocol references the FLAG 2000 document, the newer 2010 revision should be used.

Table 8—Class I Areas PSD Increments and Significant Impact Levels are missing the $PM_{2.5}$ levels (see discussion in Section 4.2 PSD Increments).

Section 6.2

At the time the *Site Specific Modeling Guidance* was issued for Meridian, the NPS did not have a specified grid for use within the park; consultation with the Park Service on receptor grid may be advisable.

Past Class I modeling conducted by the NDDoH has included a 2000 m grid within the Class I boundaries; it is anticipated that given the proximity of the Davis Refinery to the Theodore Roosevelt NP-South Unit, that the standard receptor grid will be of finer resolution than the 2000 m standard Class I grid. Should Meridian's receptor grid end before covering the Class I areas or be of a coarser resolution than 2000 m, Meridian should use 2000 m or finer grid with in the Class I boundaries.

For ozone and ammonia background Meridian should contact the Department for those background values, rather than the FLM. Meridian may contact the FLM about the modeling protocol if it so chooses; however the Department prefers that questions be directed to us first for us to contact the FLM. This is to streamline the process and avoid conflicting answers to questions. Often time issues that arise during source modeling have come up before and the FLM and Department have resolved the issue/question.

Section 6.3 Visibility Impactions Modeling Using VISCREEN

Plume-rise (plume-blight) visibility models will be required if wet cooling towers are to be used at the facility. Modeling AQRVs in accordance with FLAG (2010) is also recommended. The FLAG document has procedures for modeling diffused/uniform haze.

Other

The protocol does not discuss how compliance with the *Policy For The Control Of Hazardous Air Pollutant Emissions In North Dakota (Air Toxics Policy)* will be demonstrated. Petroleum refineries are known to emit hazardous air pollutants and modeling for compliance with the *Air Toxics Policy* is required for a completed permit application. It is our understanding that selective catalytic reduction (SCR) will be used to control NOx emissions from certain heaters at the facility. Ammonia slip is inevitable when using SCR; therefore, ammonia emissions must be quantified and assessed in the air toxics modeling analysis.

Secondary impacts for $PM_{2.5}$ should also be considered; specifically Case 3—Primary and Secondary Impactions of the May 20, 2014 EPA Guidance for $PM_{2.5}$ Permit Modeling by Stephen Page.

As mentioned to you previously, in addition to air quality issues the Department has significant concerns regarding the ability of Meridian to obtain an adequate water supply to operate a full-

scale refinery at the proposed location. We advise you to contact the appropriate agencies including the Division of Water Quality as soon as possible to address this issue.

Summary

Potential emissions from the proposed facility appear to be very low for a full-scale refinery with a capacity of 55,000 barrels per day. Although minimizing emissions is a goal of the Department, we have concerns as to whether the facility can achieve and maintain emissions at a minor source level. Prior to continuing with a modeling analysis of the Davis Refinery, it is highly recommended that Meridian re-evaluate the emissions estimates to verify that the emissions from the facility will be able to remain below PSD major source thresholds. All emissions estimates must be guaranteed and all technologies must have been successfully demonstrated in practice on a long-term basis. These steps will help ensure proper permitting of the facility and compliant operations.

Questions regarding dispersion modeling can be directed to Rheanna Kautzman at 701-328-5188 or rkautzman@nd.gov. Questions regarding emissions estimates can be directed to David Stroh at 701-328-5188 or destroh@nd.gov. Any other questions can be directed to me at 701-328-5188 or cthorstenson@nd.gov.

Sincerely,

Craig D. Thorstenson
Environmental Engineer
Permitting Supervisor
Division of Air Quality

CDT/RK/DES:saj
xc: David Glatt, Chief, Environmental Health Section
Karl Rockeman, Director, Division of Water Quality

Fahn, Patrick J.

From: Fedorchak, Julie L.
Sent: Friday, February 17, 2017 3:07 PM
To: Fahn, Patrick J.
Subject: FW: PSC and siting of refineries

Hi Pat -- I would like to send Jan a copy of the correspondence we have had with the company on this subject, both our letters and the company's response. Can you direct me to such. THANKS!
Julie

-----Original Message-----
From: Jan Swenson [mailto:bcajan@bis.midco.net]
Sent: Thursday, February 16, 2017 9:20 AM
To: Fedorchak, Julie L.
Subject: Re: PSC and siting of refineries

***** CAUTION: This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****

Thank you, Julie.
Jan

On 2/16/2017 9:13 AM, Fedorchak, Julie L. wrote:
> Hi Jan -- Good to hear from you. The information you received about the 55,000 threshold for siting is correct. We have been in touch with Meridian several times regarding their plans and are continually told that they are not permitting at our level. I will follow up again. Thanks for the heads up.
> Julie
> -----Original Message-----
> From: Jan Swenson [mailto:bcajan@bis.midco.net]
> Sent: Wednesday, February 15, 2017 4:18 PM
> To: Fedorchak, Julie L.
> Subject: PSC and siting of refineries
>
> ***** CAUTION: This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****
>
> Commissioner Fedorchak,
>
> I am trying to confirm whether or not the PSC has any role in siting of a refinery. Specifically, here, Meridian's proposed Davis Refinery within 2.5 miles of the South Unit of Theodore Roosevelt National Park.
> BCA is not opposed to the refinery per se, but as you might guess, we are opposed to the location.
>
> I attended the State Water Commission's informational hearing in Medora on the 8th and their staff suggested that the PSC is involved if the refinery is 55,000 BBLs per day or more. That is the figure projected by Meridian. While Meridian is planning to come on line in two phases, so far Billings County, the SWC and the DOH are holding them to the entire project when considering applications.
>
> I did a search of the PSC webpage and could not find my answer so thanks much for clarifying this for me.
>

> Best,
> Jan
>
> Jan Swenson, ED
> Badlands Conservation Alliance
> bcajan@bis.midco.net
> 701-255-4958
>
>
>
> _____
> This transmission, email and any files transmitted with it, may be: (1) subject to the Attorney-Client Privilege, (2) an attorney work product, or (3) strictly confidential under federal or state law. If you are not the intended recipient of this message, you may not use, disclose, print, copy or disseminate this information. If you have received this transmission in error, notify the sender (only) and delete the message. This message may also be subject to disclosure under the North Dakota Open Records Laws.
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> -----
> No virus found in this message.
> Checked by AVG - www.avg.com
> Version: 2016.0.7752 / Virus Database: 4756/13957 - Release Date: 02/15/17

Fintan L. Dooley Attorney at Law

ND Bar 03270 & WI Bar 1057322
218 North 4th Street
Bismarck, ND 58501
414-731-0520 cell
701-557-1618 fax
701-212-1000 office
Email: findooley@gmail.com

Garland Erbele, P.E., State Engineer
900 E. Boulevard
Bismarck, ND 58505-0850

October 27, 2016

David Glatt, Chief of Environmental Health Section
918 E. Divide Ave
Bismarck, ND 58501-1947

Julie Fedorchak, Chair of ND Public Service Commission
PO Box 2422
Bismarck, ND 58502-2422

Carline Fine, Executive Director and Secretary of ND Industrial Commission
600 E. Boulevard Ave #14
Bismarck, ND 58505

Re: Meridian Refinery, Proposed for Freiburg ND,
North Dakota Water Conservation Commission Application 6858.
AKA the Davis Refinery Project in Billings County, just west of Belfield.

Dear Messers Erbele and Glatt & Madams Fedorchak and Fine,

On behalf of clients of mine who have formed an association of Concerned Citizens of Billings County, I ask that I be a *Designated Part,* or put onto a subscriber list, entitled to copies of all communications to and from your agencies regarding the Meridian Refinery no matter what its name. This letter is intended to arrive before the November 7th deadline which closes the comment period on Application 6858. This letter is an open record request,

I propose to address all of you simultaneously on the matter of the Davis Refinery water permit application as well as the application by Meridian Energy Group Inc. Permit Application for Air Contaminant Sources. This request to receive all copies should be read to apply to future applications to any of your agencies for the authority to manage and dispose of the refinery's hazardous wastes.

My effort to be efficient is appropriate because we believe you share Trust Responsibilities. We request you form an interagency task force and integrate your analysis of the risks presented. By use of the word risk, I refer to your duties to manage North Dakota's Public Trust Property, namely its water and the formations in which water exists.

As elected officials, I add that you have trust responsibilities that derive from the management of that water, so that its appropriation and contamination does not damage either the interests of

prior users or preempt future beneficial uses. Responsible management must anticipate that salt, water, and water contaminated by industrial chemicals imperils private property.

We anticipate that Davis Refinery will eventually require approximately 90% more water than it has currently applied for. To explain these insights, I provide nine pages of documents and reference you to the March 22nd letter from Meridian Energy Group Inc.'s Tom Williams, Executive Vice President, Planning & Permitting, and the September 2nd letter from Daniel N. Hedrington, Principal Client Service Manager/Sr. Project Manager for SEH, aka as Short Elliott Hendrickson, Meridian Engineering Group Inc.'s agent. It is sufficient to note that the explanations in these letters attempted to educate interested Billings County citizens about the Refinery Water Flow Chart and the quantities of water likely to be used to desalinate oil.

This we understand that item number 6858 is the fourth application assigned for review by hydrologist, Kimberly Fischer. Please clarify; does that number designate all the applications relevant to the Meridian Refinery?

We note that the Billings County Pioneer has published instructions that comments should be filed before the 7th of November. Did this notice relate to all the applications or the most recent iteration of their application? We wonder, whether we ought to comment on a series of applications or a final application?

North Dakota Constitution and Law impose a trust upon all waters of the state. The Public Trust Doctrine requires a comprehensive management of water by the entire set of state trustees including those elected, those appointed and staff members with unique expertise.

This view of the duties imposed on Public Trustees is apparent in the opinion written by Justice Peterson in the case entitled, United Plainsmen Ass'n v. North Dakota State Water Conservation Commission 247 N.W.2d 457 (N.D. 1976). Your agencies and the Attorney General have issued administrative decisions and opinions that have made these propositions even more clear.

All four of your agencies should anticipate future involvement with waters appropriated from the Dakota Formation and thereafter contaminated by the Meridian Refinery's operations. Draws from and disposal wells into the Dakota Formation are one of our groups concerns. Nearby wells may be at risk.

By North Dakota Constitution, statute, rule, and decisional law you share responsibilities to protect public and private property. We contend that responsible management can only occur if there be interagency collaboration. To my knowledge, there is no interagency task force or interagency exchange of information. We deem that a failure breach of trust responsibility.

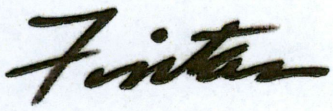
The familiar answer from the Water Commission staff is that we appropriate water if the application proposes a use which matches one of the constitutionally permitted uses. To that I respond, hydrogeology has come a long way from the 1890s, and merely appropriating water to an industrial use cannot be a responsible performance of your agencies' integrated trust duties.

Please confirm that this is true. Only the Water Conversation Commission has hydrologists on staff. Please tell how your agencies will evaluate the hydrological questions raised in our list of concerns. Will the Water Commission task its hydrologists to serve the Health Department, the Public Service Commission, or the North Dakota Industrial Commission?

I have attached a list of concerns which are intended to be an introduction to our concerns. We will add our other concerns later after the hearing is held.

I conclude with a request that all the hearings on Meridian Applications be held in Billings County, where prior appropriators may conveniently appear and pose questions to your hydrologists and engineers.

Sincerely,



On behalf of the Concerned Citizens of Billings County

From the desk of Fintan Dooley
218 N. 4th St,
Bismarck, ND 58501

October 27th, 2016

Re: Meridian Refinery, Proposed for Freiburg ND,
North Dakota Water Conservation Commission Application 6858.
AKA the Davis Refinery Project in Billings County, just west of Belfield.

This list of concerns is intended to arrive before the November 7th deadline which closes the comment period on Application 6858.

1. There is no evidence of interagency cooperation. The agencies and staff specialists which ought to cooperate include:

   ND Water Conversation Commission;
   ND Health Department and its Environmental Health Section;
   ND Public Service Commission; and
   ND Industrial Commission.

2. The application for water appears to be the second, third, or perhaps fourth iteration.

   At hearings in Medora and on webpages once posted by the refinery's promoters, documents were presented which disclosed a Refinery Water Flow Chart. See page three in the enclosed packet covered by a letter with the date March 22nd, 2016.

   Other documents in the packet indicate that the actual requirement for desalinating the oil may require as much as ten times the quantity of water, 645.2 acre ft which was requested in the application dated August 18th, 2016. Of course we are not engineers, but we did read pages five, six, and seven of the attachment. The question arises whether or not a ratio of water and desalinated oil will be 1.5 gal/gal.

   The Tesoro Refinery uses fresh water from the Missouri.

   The Meridian Refinery will use salted water from the Dakota Formation.

   Prompted by these concerns, we ask that the hearing be reset after these questions are answered. Answers ought to include how the Meridian Refinery will desalinate oil with salted water.

3. After conferences with Steve Tillotson , Manager of the Solid Waste Program, and his agency neighbors Curtis Erickson, Manager of Hazardous Waste Program, and Dale Patrick, Manager of Radon and Radiation Control Program, the following concerns appear:

A. Meridian's plans to modify the Dakota Formation Water by an osmatic process will create either a more concentrated brine or a solid waste.
B. Even the Tesoro Refinery, which uses fresh water, generates solid wastes.
C. Bakken oil does contain salt and heavy metals.

4. Use of the Dakota Formation Water will release heat. We understand that the Dakota Formation Water is at or above the boiling point of water.

5. Withdrawals from and disposal into the Dakota Formation are one of our group's concerns. Nearby wells may be at risk. Hydrogeological; question should be studied by an interagency task force.

Conclusion

As written in the cover letter to this list of concerns, we ask for the creation of an interagency task force to address our questions and identify concerns more apparent to your staff of experts.

America's energy independence, if properly accomplished, can provide jobs and wealth for North Dakota.

We compliment the Meridian Refinery proponents and hold them to their commitment to create a state of the art refinery that respects the class one air quality in which it is to be located. We find it difficult to believe, but are willing to be persuaded, that the refinery can be a minor source of air pollution. The proof obviously requires an evaluation of the complexities we have attempted to identify.

March 22, 2016

Ms. Stacey Swanson
Tax and Zoning Director
Billings County Planning and Zoning Department
Tax Equalization & Zoning Office
Billings County Courthouse
495 4th Street
Post Office Box 247
Medora, North Dakota 58645

Dear Ms. Swanson:

Meridian Energy Group, Inc. is pleased to submit the attached **Application for Building & Zoning Certificate** and the **Application for Conditional Use Permit** for the proposed Davis Refinery Project near Belfield, North Dakota. Meridian is seeking an Industrial Zoning Certificate and a Conditional Use Permit to construct the Davis Refinery, an approximately 55,000 barrel per day petroleum refinery. The Refinery will be constructed in two phases, with the initial design capacity of the Refinery being 27,500 bpd capacity.

The Applications have been prepared in accordance with the information requirements outlined within the Billings County Comprehensive Plan, Section B, paragraph ii – The Energy Industry, and Section C – Future Growth in Billings County, and Billings County Zoning Ordinance Article V: Zoning District Regulations, Section 5.5 Industrial District Purpose, and Section 5.5.2 - Conditionally Permitted Uses, Subsection e), and Article VII: Administration and Enforcement, Section 7.3 – Conditional Use Permits. In this regard, the attached Survey, Site and Location Maps were prepared by SEH Engineers Inc., Bismarck, North Dakota, (www.sehinc.com) and the Site Plan and General Plot Plan were prepared by the Houston offices of Vepica USA, Inc. (www.vepica.com/home/en), on behalf of Meridian.

Using state-of-the-art operating and controls technology, the proposed Davis Refinery will refine, once fully installed, approximately 55,000 barrels per day of a variety of locally produced crude oils brought to the facility by pipeline, truck and rail. Refined products include gasoline, diesel, jet fuel, heating oil, as well as lesser-known products such as lubricants, asphalt base, ethane for plastics, waxes and other specialty chemicals. The initial phase of the Refinery will focus on the production of jet fuel, diesel fuel and other distillate products, primarily for local markets.

The Applications' attachments in Exhibit J include environmental review reports from SEH Engineers (1) to assess the suitability of the Project site from a soils, geologic hazards, and flooding perspective, (2) to assess the impact on biological resources in the vicinity of the Project site, including potential environmental impacts from constructing and operating the refinery, (3) to assess cultural and

MERIDIAN ENERGY GROUP, INC.
Thomas Williams – Executive Vice President, Planning and Permitting
151 Kalmus Drive, Suite E-140, Costa Mesa, California 92626
707.299.0182 (c) - 949.207.3815 (o) - 949.207.6550 (f)
twilliams@meridianenergygroupinc.com
www.meridianenergygroupinc.com

paleontological resources and wetlands, and (4) visual impact mitigation attainment. These reviews will be used in the design phase of the refinery to minimize environmental impacts, including noise, light, and so forth. Exhibit J also includes a Memorandum from SEH that addresses the manner in which Meridian will mitigate construction period impacts.

The Refinery will employ up to 500 people at the peak of the construction period, and full-time permanent employment is expected to be approximately 150 – 200 people. A refinery job creation report from the state of Washington is attached as Exhibit K which concludes refinery employment creates total permanent employment, including indirect and induced jobs, equal to over twelve for each direct refinery employee. Pursuant to the Billings County Comprehensive Plan, "maintaining the energy industry in Billings County is of utmost importance to the citizens of the County and the County itself."

State-of-the-art refinery safety equipment and technology will be utilized during construction and operation of the refinery. During construction, all local, state and federal construction site requirements will be met, such as, but not limited to, storm-water runoff control, erosion and sediment control, wash water control (concrete, tools, equipment), wastewater control (portable toilets) and dust and weed control, and site safety and security.

Meridian is requesting that Billings County provide, as part of its approval of the permits and approvals requested herein, the ability of Meridian to begin limited site work on the Project so that the Project does not lose this coming summer as part of the construction schedule for the Project. The work that would be initiated this summer would include grading and earthwork, work on rail sidings and switches, and construction of the agricultural visual buffer that Meridian will be designing with help from a local University. We have learned from Craig Thorstenson, Environmental Engineer for the North Dakota Department of Health, Division of Air Quality that all sources requiring an air quality permit can begin grading and site construction prior to receiving the air quality permit.

Meridian has entered into an agreement with BASIC Equipment, Inc. (www.basic-equipment.com), a Houston based turnkey engineering, procurement and construction firm to serve as its contractor for the refinery, and Vepica USA will continue as the Project's engineer

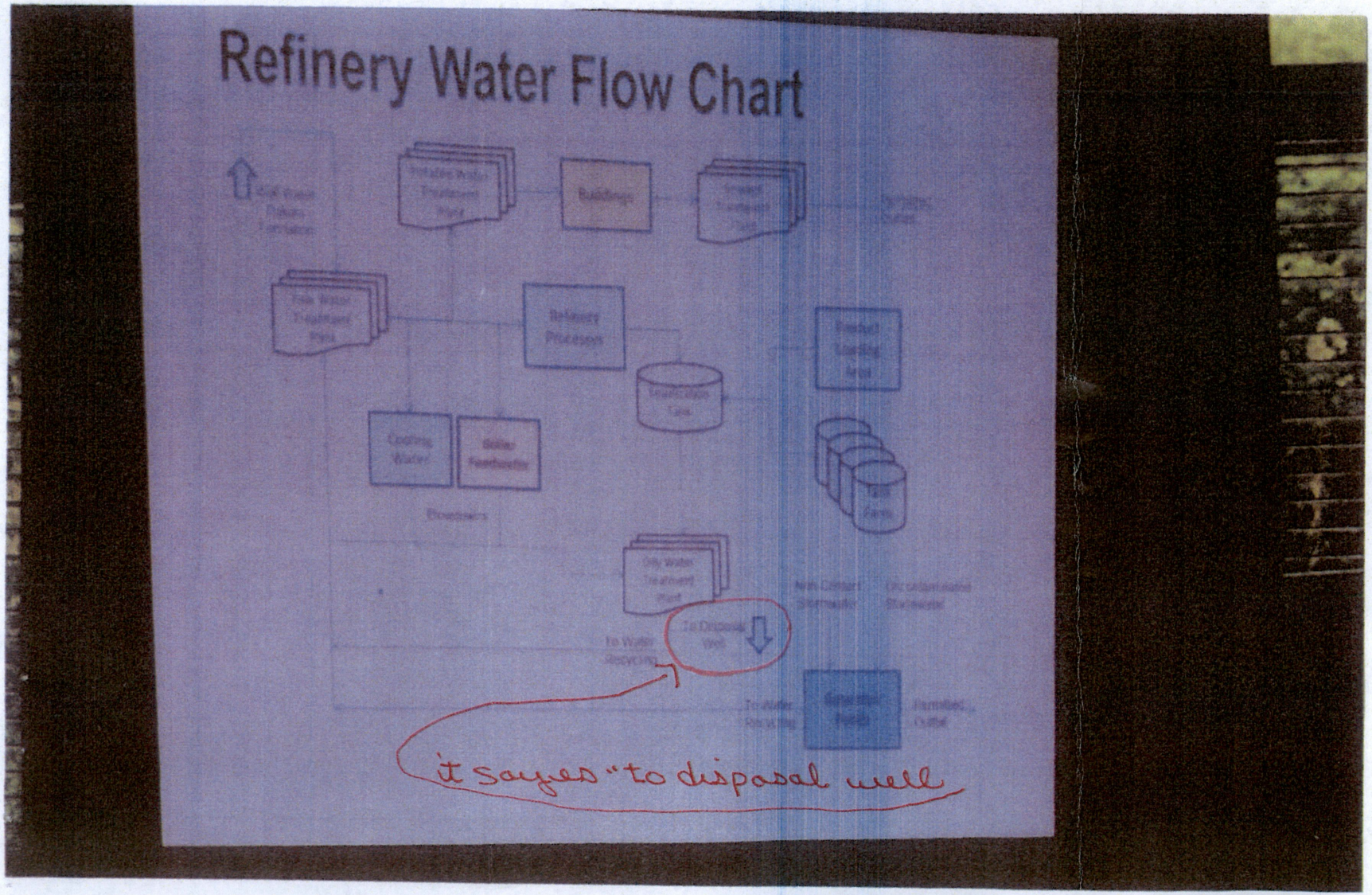
Meridian would like to arrange to meet with you in the near future to discuss the Project in greater detail and address any questions concerning the Project that you may have based upon your review of the Applications. Please call me if you have any questions or comments in the interim.

Sincerely,

MERIDIAN ENERGY GROUP, INC.

Tom Williams
Executive Vice President, Planning & Permitting

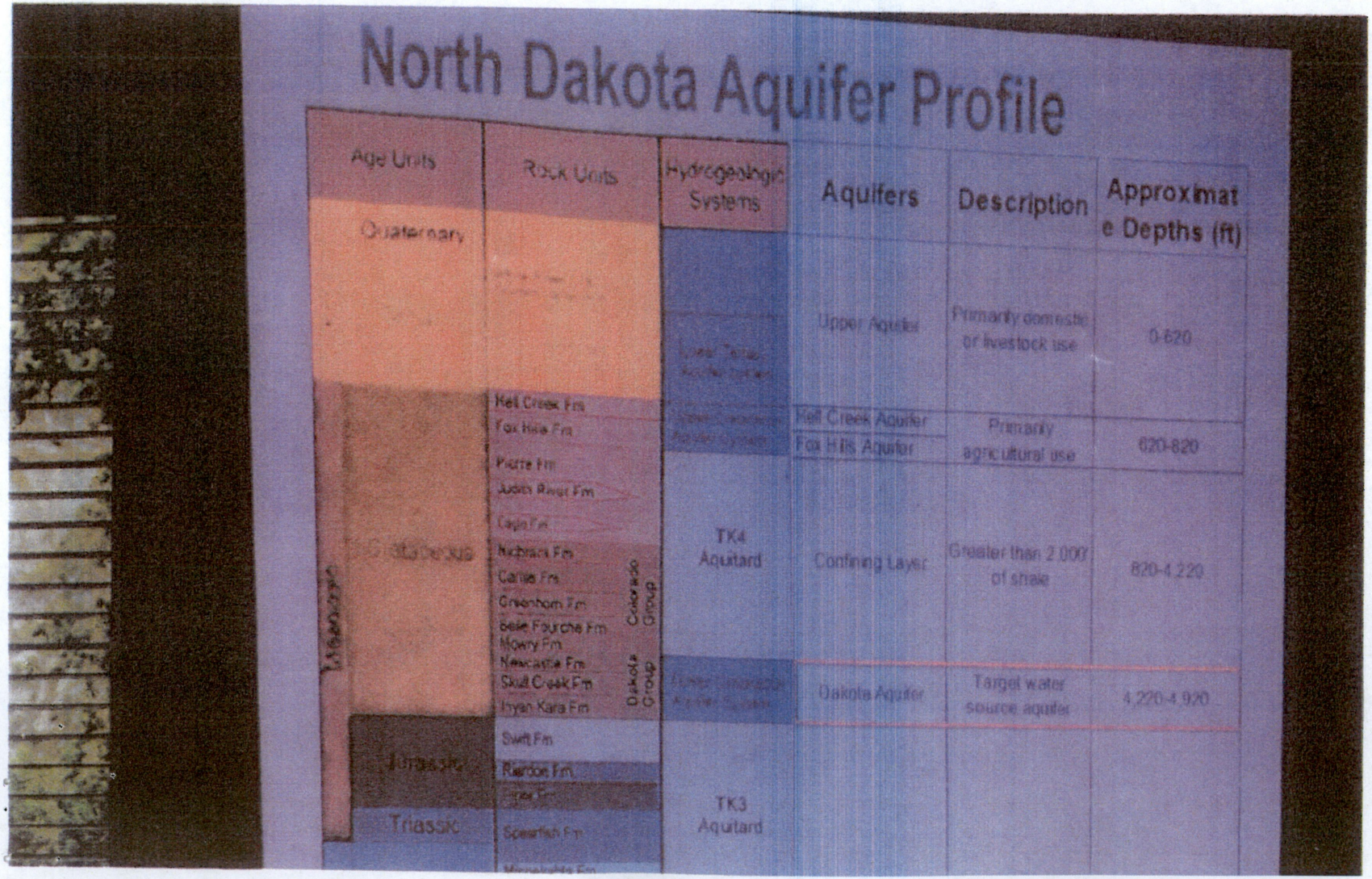
disposal well - will they: drill their own well
truck waste water
pipe waste water
} they will have to have storage tanks



Our water well is 780 ft deep

Lindbo's (in Fryburg) well is 1140 ft deep.

Fryburg school well is 1700 ft deep



SEH

Building a Better World for All of Us.

September 22, 2016

RE: Meridian Energy
Appropriation of Water Clarification Letter
to Nearby Property Owners
SEH No. MERID 135471 14.00

Dear Property Owner:

Please note that Meridian Energy Group, Inc has submitted an application to the North Dakota State Water Commission for pursuing an appropriation for water. Please find enclosed the Notice of Application for Appropriation of Water provided to Meridian Energy by the North Dakota State Water Commission and sent to the necessary property owners per the requirements of the State of North Dakota.

The actual application referred to in the letter is for an appropriation of water from the Dakota Formation. The Dakota Formation is located at an approximate depth of 3,500 to 5,000 feet and the ground water within this formation is known to be "brackish" or in other words "salty". This letter is to notify you that the application was submitted and to offer an opportunity to provide comment or to request an informational hearing. ask for hearing in Medora not Bismarck

The refinery will not access any of the existing ground water sources from which potable water is currently drawn by neighboring residences, farms, ranches, or municipalities. Meridian Energy will treat the water received from the Dakota Formation by removing the salts to provide the refinery process water.

Please feel free to contact me if you have any questions or comments at 715-559-3012 or 715-720-6254.

Sincerely,

Daniel Hedrington

Daniel N. Hedrington, Principal
Client Service Manager/Sr. Project Manager

ch
Enclosure
c: Meridian Energy
Scott Lange, PE – SEH

y:\ko\m\merid\135471\1-genl\14-corr\water appropriation permit mailings\9-22-16 letter to nearby property owners\letter to nearby property owners 9.22.16.docx

(5)

ND SWC This is from No Dakota state water commission
Water Appropriation Requirements –
2010 Summary
Prepared by W.M. Schuh

incorporated into the permitting application process in late 2009. The requirement adds additional time delays in the permitting process.

- In May 2010, the U.S. Army Corps of Engineers announced that a three-to seven-year storage availability study would be required before any additional water access permits could be approved from Lake Sakakawea. If the study indicates storage is available, the Corps plans to levy "surplus water" storage fees for all industrial water users withdrawing water from Lake Sakakawea. As of July, 2010, the Corps indicates that the permitting process for four water permit applications currently before the Corps (which includes an 18,000 acre-feet application from the International Western Company) will be processed simultaneously with the storage availability study and a study to determine "surplus water" storage fees. No timeline for permit completion has been provided by the Corps.

- Currently, the North Dakota State Water Commission has approved 55 water permit applications to divert water from Lake Sakakawea for irrigation purposes. Some of these permits holders would like to temporarily forego irrigation and divert water for industrial (water depot) use for oil well fracing. The Water Appropriation Division of the State Water Commission has developed an internal policy to accommodate this change in purpose of use with the authorization of a temporary water permit. As of July 2010, this request is under study by the Corps with regard to their permitting process.

Petroleum Refining: The U.S. Department of Energy has estimated that unit water use for oil refining is about 1.5 gal/gal. There is currently only one oil refinery operating in North Dakota, the Mandan Tesoro Refinery, which processes about 60,000 barrels of crude oil per day (bpd). There are currently proposals for three new refineries: Northwest Refining at Williston (for 100,000 bpd), Dakota Oil Processing at Trenton (for 20,000 bpd), and the Three Affiliated Tribes Refinery at Makoti (for 15,000 bpd). There is also a proposal for expanding the Tesoro Refinery to produce low-sulfur diesel fuel from coal. now 74,000

- The Tesoro Refinery uses about 1.5 million gallons of water per day from the Missouri River. About a million gallons are consumed, mainly through evaporation. The rest is returned to the stream.

- The approximate use distribution is: boiler water (10-15%), desalting crude oil (30-40%), and cooling water (approx. 35%).

- Since Tesoro replaced British Petroleum as the owner and operator of the refinery in 2003, the median water withdrawal (through 2008) has been 2,100 acre-feet per year, and median water consumption has been 1,275 acre-feet per year.

(D) 7

Consumptive water use has ranged narrowly from 0.46 to 0.53 gal/gal liquid product, with a median of 0.48 gal/gal. Total water withdrawal has ranged narrowly from 0.78 to 0.85 gal/gal liquid product with a median of 0.8 gal/gal. Estimated unit water use is low by national standards.

- If an additional 137,000 barrels were to be refined, at a range of 1 to 2 gallons of water per gallon of refined product, additional water use of 6,900 to 13,800 acre-feet would be required – for a total of 8,200 to 15,100 acre-feet per year.

Coal-Fed Syngas and Liquid Fuels Synthesis: The extraction of synthesis gas (syngas) from coal or methane can be used to produce several different energy fuels, from hydrogen to natural gas and diesel fuel. Syngas production, or planned production in North Dakota, uses lignite exclusively as a carbon and hydrogen feedstock. The Dakota Gasification plant at Beulah uses lignite to produce methane. A proposed synfuels plant at South Heart plans to produce hydrogen gas to directly fuel thermoelectric power generation. A joint venture between Tesoro and an area utility has been proposed to use coal from the Falkirk mine with steam from the Tesoro refinery at a facility managed with the Tesoro refinery, to produce aircraft fuel or diesel fuel using the Fischer-Tropsch process. American Lignite Energy is also planning another coal-to-liquid facility for future construction.

The U.S. Department of Energy (USDOE 2006) has estimated unit water use at 4.6 to 6.9 gal/gal of liquid Fischer-Tropsch product, depending on the coal used. Other authors have presented a range of 1.5 gal/gal for a zero-discharge, air-cooled plant, to 5 to 7 gal/gal for a plant with water cooling and less recycled use of waste heat. Unit water use for production of hydrogen gas from methane has been estimated at about 4.5 gal/kg hydrogen produced.

- Eight-year unit water by Dakota Gasification was estimated at 0.049 gallons per standard cubic foot of methane gas. Efficiencies in water use are enhanced by the production of additional products, including anhydrous ammonia, ammonium sulfate, and various organic compounds.

- The proposed South Heart Energy Facility currently plans to produce syngas (hydrogen gas) from coal. The syngas will be used to power an integrated gas combined cycle power plant to produce electricity. The combined turbines will produce about 285 MW, of which about 118 MW is parasitic, leaving about 167 MW net power produced for sale. A CO_2 byproduct will be used for enhanced oil recovery in the Williston Basin. An average of 650 gallons per minute of raw water will be supplied by the Southwest Pipeline Project (SWPP), via an interconnect just upstream of the Dickinson Water Treatment Plant. Power plant cooling will be a combined air and water-cooled system so that water supplementation for cooling will be needed mainly in the summer. South Heart

This was sent to people who (live / have land) in that 1 mile radius.

NOTICE OF APPLICATION
FOR APPROPRIATION OF WATER

Application No. 6858

TAKE NOTICE that **Meridian Energy Group – Costa Mesa, CA** has made application to the State Engineer of North Dakota for a permit to divert and appropriate water from: **Ground Water.**

The application is for a permit to divert and appropriate water from a point or points on the land described as follows:

The SW1/4 of Section 01, in Township 139 N., Range 100 W.

The application requests an average approximate rate of **400** gallons per minute of water during the operating season for each year said permit may remain in force, with an annual appropriation of **645.2** acre-feet, for the purpose of:

Industrial use.

Notice of Application will be published in the:

Billings County Pioneer – Medora, ND

The published Notice of Application will give a date by which written comments regarding this proposed water permit application must be filed with the State Engineer, State Office Building, 900 East Boulevard, Bismarck, North Dakota 58505-0850. Written comments must include the name and address of individual filing said comments. Any person providing written comments may also request an informational hearing. The State Engineer will consider all written comments and prepare a recommended decision, which will be provided to the applicant and persons submitting written comments. Those persons may provide additional information, request an adjudicative proceeding, or both.

Dated this 18th day of August, 2016.

[signature] V.P.

Applicant

Meridian Energy Group, Inc

SWC Notice of Application Form

(8)

Refinery update

Fri, Oct 07, 2016 12:11 PM

Called the Water Commission to see if there have been any updates to the application process. Here is the information I've gathered:

Application # 6858 / no permit has been issued yet

Public notice was published in the Billings Co. Pioneer on Thurs. 10/06/2016. Another notice will be published on 10/13/2016

The person I have been in contact with is Kimberly Fischer (hydrologist / water appropriations) 701-328-2796
* She said that Meridian is the 4th applicaiton on her list to review
* She does not foresee any hydrological problems with using the Dakota Aquifer

Process from now:
* Public comment can be submitted to the state engineer until Nov. 7th**
*The state engineer will reach a recommended decision and that decision will be sent out to all of those that submitted a comment.
* An additional 30 day comment period will begin after that.

File public comment to: Garland Erbele, P.E., State Engineer

State Engineer, State Office Building, 900 East Boulevard, Bismarck, North Dakota 58505-0850

slocken@nd.gov

Action Items:
*Submit public comment: Ask the questions that you want answers to. Voice your concerns.

*LTE: Let people know what part of the process the permit is at and for them to get involved.

Let me know if there is something else I could assist with at this time!
Hope you all are doing well and that I will get to see you at the annual meeting coming up. Take care.

--
Cecilia Montesdeoca
Field Organizer | Dakota Resource Council
1200 Missouri Ave, Ste 201
Bismarck, ND 58504
cecilia@drcinfo.com
O: (701) 224-8587
C: (309) 212-1978

Hamre, John G.

From: Fahn, Patrick J.
Sent: Tuesday, February 28, 2017 11:59 AM
To: Christmann, Randel D.; Fedorchak, Julie L.
Cc: Jeffcoat-Sacco, Illona; Hamre, John G.
Subject: FW: Davis refinery information
Attachments: 4881_001[1].pdf; M ND State Water Commission Water Appropriation Response to Public Comments for Info Meeting 012617[2].pdf

I received this information from the State Water Commission.

John, please docket in the I-case.

Patrick Fahn
Director, Public Utilities Division
North Dakota Public Service Commission
600 E Boulevard, Dept 408, Bismarck, ND 58505-0480
701-328-4077
pfahn@nd.gov

From: Fischer, Kimberly J.
Sent: Tuesday, February 28, 2017 11:50 AM
To: Fahn, Patrick J. <pfahn@nd.gov>
Subject: Davis refinery information

Patrick,

Attached are the memo and handout provided by Meridian for the Davis refinery at our February 8th informational hearing for their water permit application. If you have further questions, please let me know.

Kimberly Fischer, Hydrologist
ND State Water Commission
Water Appropriations Division
Phone: (701)328-2796
Email: kfischer@nd.gov

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Meridian Energy Group Inc.

- **Building a state-of-the-art 55,000 bpd High Conversion Refinery in Belfield**
- **Scheduled to be fully operational first quarter of 2018**
- **Utilizing the Best Available Control Technology to create a near zero emission gold standard in the refining industry**
- **Creating 2,5000 indirect and induced jobs in the Bakken**
- **"Locals First" & "Military First" hiring policy**

Meridian CEO, William C. Prentice on the Davis Refinery:

"We are excited to take this next step in the process, as we continue to elevate and re-define the standards of a modern oil refinery. Our innovative design, equipment and the manner in which we have comprehensively integrated Best Available Control Technology will ensure that the Davis Refinery meets the strict air quality regulations put forth, and will remain compliant for years to come. Our state and our community should expect and accept nothing less."

Davis Refinery

Meridian's Davis Refinery Promises To:

- **Create Permanent Jobs in North Dakota**
- **Remedy the Shortage of Diesel Fuel in the Bakken**
- **Aggressively Reduce the Impact of the Industry on the Environment**

Eddie Martinez, President and CEO of Zia Environmental Engineers on the Davis Refinery:

"Meridian has shown a steadfast commitment to make this the most environmentally sustainable refinery ever built. The way the plant is designed and the level of controls incorporated show a project that is dedicated to aggressively reducing its impact on the environment. It makes it easy working with a company like Meridian who is so willing to support and pursue making this as environmentally clean a project we have ever worked on. This project will undoubtedly create a standard within the industry how companies will effectively control emissions."

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North Dakota Grain Growers Association

North Dakota Petroleum Council MEMBER

GNDC Greater North Dakota Chamber

Dickinson Area Chamber of Commerce

BESTFRIENDS

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MEMORANDUM

TO: Kimberly Fischer, Hydrologist
North Dakota State Water Commission

FROM: Scott A. Lange, PE
Project Manager

DATE: January 26, 2017

RE: Meridian Energy Group Water Appropriation Public Informational Meeting Questions
SEH No. MERID 135471 14.00

SEH received your December 22, 2016 email which condensed the comments and concerns provided to the State Water Commission during the public comment period for the Meridian Energy Group (Meridian) Water Appropriation Permit Application No. 6858. SEH has taken your questions and numbered them for quicker reference. Below are responses provided by Meridian to all questions, while noting that some of the items are not explicitly related to the Water Appropriations Permit Application and will not become a topic during the February 8, 2017 Information Meeting to be held in Medora, North Dakota.

1) **How will the water be used in the refinery?**
Water drawn from the Dakota Formation will be treated to provide water with the quality required for make up to the cooling system, boiler feed water system, process water, and utility water needs of the refinery. Additionally, the use of surface water run-off as a possible source of raw water is being considered to reduce the overall cost of raw water treatment.
   - Cooling System. The refinery design is maximizing the use of air cooling in order to keep to a minimum the water requirements for cooling purposes. In addition, as long as water quality is suitable, water used by the cooling system will be recycled to minimize make up water requirements.
   - Steam Generation: Onsite processes will use heat integration as much as possible to minimize steam for heating needs. As with the cooling system, the intent is to recover any condensation in the system to be reused for steam generation and minimize make up water needs to the steam generation system.
   - Process Water: The main process water user is the desalter within the atmospheric distillation unit. The refinery design includes recycling of treated wastewater back to the refinery processes to minimize the raw water make up needs.

2) **Provide an overview of how water will be used starting with the formation and details on how the water will be treated.**
Water will be drawn from the formation, treated with a Reverse Osmosis (RO) unit to provide plant process/cooling/steam water.

3) **Will the refinery use a wet or dry scrubber and how will it affect the water quantity needed?**
The current refinery design does not include the use of either a wet or dry scrubber to control air emissions.

4) **Will a plume be created by the refinery?**
A visible plume may be created from the cooling water towers. Since the refinery will maximize the use of air cooling, and the cooling towers will be designed with drift eliminators, Meridian anticipates any visible plume from the cooling water towers to be minimal.

5) **What waste products will be created and how will they be handled?**
The waste product from the treatment of brine water drawn from the Dakota Formation will be the reject from the RO process. It is currently estimated that RO reject will account for about 40% of the refinery water demand. Management of the RO reject is currently under evaluation with several possible methods being considered, which include:
- Onsite injection back into the Dakota Formation via a permitted underground injection well.
- Offsite injection.
- Onsite evaporation.

6) **Will an onsite injection well be drilled or will waste travel by pipeline or truck to an offsite injection well?**
See item number 5.

7) **Onsite waste storage?**
At this time, Meridian does not anticipate that onsite waste storage will be required to handle RO reject. This will be finalized once test wells are drilled and management of RO reject is fully defined. The exact details of handling the treatment water brine are yet to be determined. If the disposal process is with onsite wells, evaporation, or offsite piping; there will be little to no storage as the disposal will happen in real time. If trucking is involved with the disposal process, some tanked storage will be needed.

8) **Is the water volume requested for both Phase 1 and 2?**
Yes.

9) **What is the timing for the phases?**
It is anticipated it will take one to five years to transition from Phase 1 to Phase 2.

10) **Concern about how much water is actually needed.**
Water need was calculated based on the make-up water demand and making some assumptions on the level of loss during raw water treatment and the amount of treated wastewater than can be recycled. The make-up water demand will be in the order of 150 to 300 gallons per minute. The treated water recovery rate through the RO system is anticipated in the 40- to 60% rate, and will be confirmed once test well(s) are drilled. Based on these assumptions, we settled on a request of 400 gpm from the formation.

11) **The originally stated projections of water requirements appear to be four times less that the volume included in the application.**
See item number 10.

12) **The volume of water requested is significantly less that the water volume used by the Tesoro Refinery in Mandan.**
The Davis Refinery design includes plans to recycle treated wastewater, to the extent feasible, as raw water for plant processes in order to minimize the draw of water from the Dakota Formation as well as the need for wastewater disposal. Additionally, the Tesoro Refinery is located near ample water sources and can use other cooling methods in their process.

13) **Concern about the water quality in the Dakota aquifer, and impact of any release to the air.**
Based on available groundwater data and because the intended treatment for the water drawn from the Dakota Formation is through a closed system which will not vent to the atmosphere, no impacts to air are anticipated.

14) **Is the water quality from the Dakota aquifer safe for industrial use?**
This is a suggested source of water for industrial purposes by the North Dakota Energy and Environmental Research Center at UND.

MRL/djg
c: William C. Prentice, Meridian Energy Group, Inc.
Tom Williams, Meridian Energy Group, Inc.
Dan Hedrington, SEH

Hamre, John G.

From: Fahn, Patrick J.
Sent: Tuesday, February 28, 2017 4:13 PM
To: Christmann, Randel D.; Fedorchak, Julie L.
Cc: Schuh, John M.; Jeffcoat-Sacco, Illona; Hamre, John G.
Subject: FW: Meridian Davis Refinery Info
Attachments: DavisRefineryPTCApplication.pdf

I received this information from the Department of Health regarding the proposed Davis Refinery.

John, please docket in the I-case.

Patrick Fahn
Director, Public Utilities Division
North Dakota Public Service Commission
600 E Boulevard, Dept 408, Bismarck, ND 58505-0480
701-328-4077
pfahn@nd.gov

From: Kautzman, Rheanna M.
Sent: Tuesday, February 28, 2017 3:37 PM
To: Fahn, Patrick J. <pfahn@nd.gov>
Cc: Thorstenson, Craig D. <cthorstenson@nd.gov>
Subject: Meridian Davis Refinery Info

Hi Patrick,

Here (https://www3.epa.gov/ttn/atw/pte/june13_89.pdf) is an EPS guidance document where they have set policy/clarified rule regarding several Prevention of Significant Deterioration (PSD) topics (See Pages 12 -15). PSD is a higher level of pre-construction review than for smaller, non-PSD subject, sources. For Refineries, if they emit over 100 tons per year of any of the criteria pollutants (PM, CO, NOx, SO2, VOC, …), they would be subject to the PSD review process.

Since Meridian has stated that they intend to build in two phases, up to a 55,000 bbl/day refinery, they needed to submit an air preconstruction application for the full project for Department review. They are applying under a synthetic minor permit to stay under 100 tons per year and out of PSD review—a situation which is discussed in the guidance document.

I hope this answers your question, if you have any more questions please let me or Craig know.

Rheanna Kautzman
Environmental Scientist
Division of Air Quality
ND Department of Health
|p: (701) 328-5188|

|e: rkautzman@nd.gov|
|web: http://www.ndhealth.gov/AQ/|

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October 6, 2016

Mr. Terry L. O'Clair, P.E.
Director, Division of Air Quality
North Dakota Department of Health
918 East Divide Avenue
Bismarck, North Dakota 58501

Dear Mr. O'Clair:

On behalf of Meridian Energy Group, Inc., I am pleased to submit the attached Permit Application for Air Contaminant Sources pursuant to obtaining a Permit to Construct for the proposed Davis Refinery Project in Billings County, just west of Belfield, North Dakota. This application and related documents includes our estimate of federally enforceable limits of CO, NOx, PM10, PM2.5, O3 (as VOCs), SO_2 and HAPs, for the proposed facility.

The Application and supporting documentation has been prepared by Vepica USA, Inc. and Zia Engineering and Environmental Consultants, LLC in accordance with requirements outlined within the Division of Air Quality's stationary source category designation in Section 33-15-14-01 and related National Ambient Air Quality Standards (NAAQS) for new sources. The process description information provided is based on the engineering design presently being developed by Vepica specifically for the complex, high-conversion crude oil refinery system proposed for the Project. The estimated Emissions Inventory for the Project was calculated in accordance with Environmental Protection Agency (EPA) guidelines, and EPA's Emission Estimation Protocol for Petroleum Refineries, Version 3, utilizing the Emission Factors compiled in AP-42, Fifth Edition, Volume I: Stationary Point and Area Sources, including applicable published updates and supplements. The physical and operational design of the proposed Davis Refinery is reflected in the emissions inventory and in the selection of related control technologies and operational constraints proposed for the project. These add-on pollution control technologies and operational constraints result in emissions levels that allow the facility to qualify as a Synthetic Minor Source in accordance with the Division of Air Quality's requirements.

The emissions modeling and air quality impact analysis will follow under separate cover and will be contained in Exhibit D. The modeling was conducted by Vepica/ZIA on behalf of Meridian. The modeling was conducted in accordance with the Division of Air Quality Criteria Pollutant Modeling Requirements for a Permit to Construct, Site Specific Guidance issued by the Department for the Davis Refinery and other Departments and EPA guidance and policy

MERIDIAN ENERGY GROUP, INC.
Thomas Williams, Executive Vice President, Planning and Permitting
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documents, and the pre-application dispersion modeling protocol dated August 2016 and related comments of the Department received in memo dated September, 16, 2016. In conducting their analysis, Vepica/ZIA used EPA approved computer models appropriate for the type of source, projected emissions, and local area topography and meteorology to determine the ambient air quality impact consistent with the Department's guidance. The modeling results indicate that the potential Project emissions do not exceed significance levels for impacts to adjacent properties and will therefore not cause an exceedance of the Ambient Air Quality Standards (AAQS) or the PSD Class I increment levels and Air Quality Related Values (AQRVs) for the Theodore Roosevelt Memorial National Park.

Meridian Energy Group has on several occasions discussed the proposed Project with representatives of the Division of Air Quality prior to submitting this Application. The information and advice received during each of those discussions has been extremely helpful, and has been incorporated into this Application and its exhibits. Meridian plans to continue to work closely with your Agency during your review of this Application. Meridian will be coordinating with NDDoH personnel this week regarding the transfer of electronic files of calculation notes and airshed modeling. A digital master disk of the entire Application (including Exhibit D) will be delivered to the Department under separate cover.

It is Meridian's intention to meet with you and other members of your staff, at your convenience, in the near future to discuss the Project in greater detail and address any questions concerning the Project that you may have based upon your review of the Application. Please call if you have any questions or comments in the interim.

Sincerely,
MERIDIAN ENERGY GROUP, INC.

Tom Williams
Vice President, Planning & Permitting

MERIDIAN ENERGY GROUP, INC.

submits the

PERMIT TO CONSTRUCT APPLICATION
&
PERMIT APPLICATION FOR AIR CONTAMINANT SOURCES

for the

DAVIS REFINERY PROJECT

SUBMITTED TO THE NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY

Permit to Construct Application for
Davis Refinery

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1 INTRODUCTION

Meridian Energy Group, Inc. ***("Meridian")*** is requesting approval from the North Dakota Department of Health ***("NDDH")***, Division of Air Quality, for the construction of a new crude oil refinery, the Davis Refinery, with a nominal processing capacity of 55,000 barrels per day, located west of Belfield, ND in Billings County. The proposed refinery is being designed to produce refined products including gasoline, diesel fuel, jet fuel and fuel oil, as well as liquefied petroleum gas ***("LPG")***.

After careful evaluation of applicable emission thresholds and conducting design optimization of the proposed Davis Refinery, Meridian has concluded that under applicable regulations, the proposed Davis Refinery, as it is being engineered and designed, will require a Synthetic Minor Permit to Construct ***("PTC")*** prior to beginning construction. Design optimization conducted during the early phases of engineering has been aimed at the reduction of air emissions through process technology choices and definition of operating conditions, in conjunction with, the selection of the proper emission controls after a pollutant-by-pollutant analysis of available control technologies. The PTC subject to this permit action application therefore includes federally enforceable limits of regulated air contaminants from the proposed facilities, to effectively limit emissions from the proposed Davis Refinery to below Major Source thresholds.

This application for a Synthetic Minor PTC was prepared in accordance with North Dakota's Permit to Construct requirements in NDAC Chapter 33-15-14-02, the NDDH's Criteria Pollutant Modeling Requirements for a Permit to Construct, Site Specific Guidance issued by the Department for the Davis Refinery and other Department's guidance and policy documents, including the pre-application dispersion modeling protocol developed in consultation with the Department. Therefore, Meridian is presenting a complete Air Pollution Permit Application (AP 100) and a HAP Permit Application (AP-117) for the proposed Davis Refinery, in order to request approval from the NDDH for the installation of a 55,000 BPD Oil Refining Facility near the town of Belfied in the western part of North Dakota. Meridian will submit any additional information needed by the NDDH to evaluate the potential risk to human health or the environment from HAP emissions.

2 OVERALL PROJECT DESCRIPTION

2.1 THE COMPANY

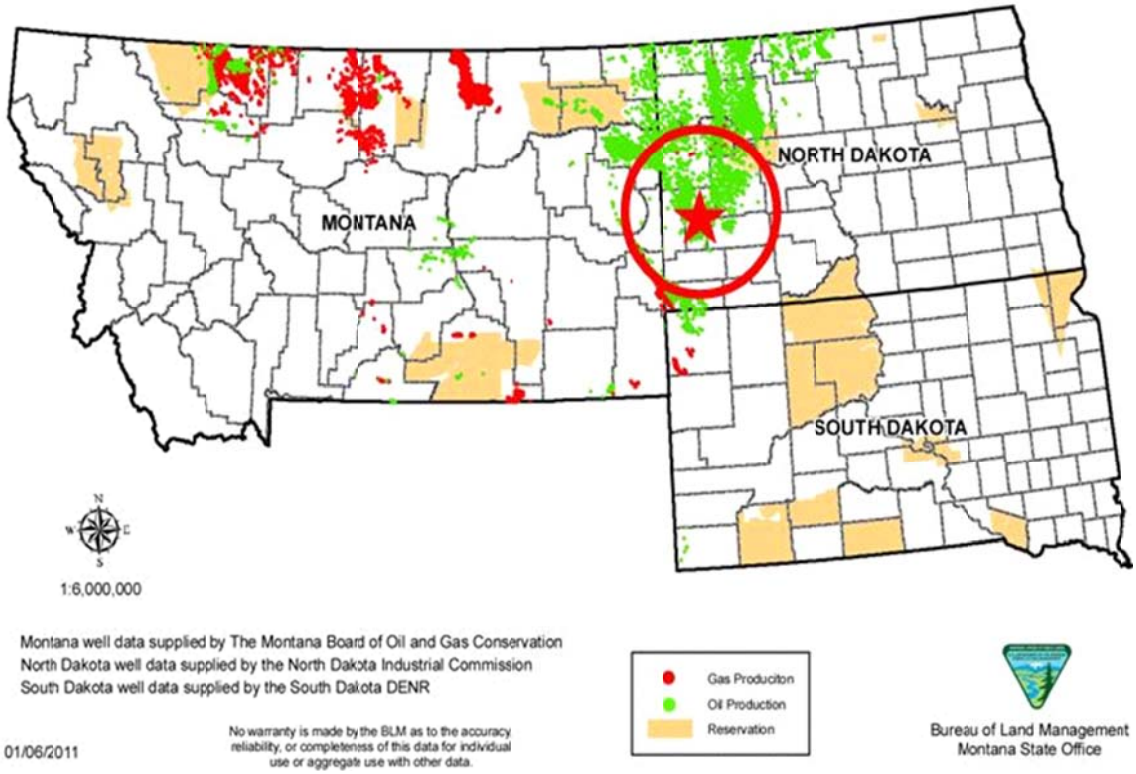


Figure 1. Montana/Dakota Oil Gas Producing Areas.

Meridian Energy Group, Inc. ***("Meridian" or the "Company")*** is a closely-held South Dakota corporation formed to build and operate the Davis Refinery ***(also "Davis" or the "Refinery")***, a 55,000 bpd high conversion crude oil refinery, in Billings County, North Dakota, in the heart of the Bakken Formation (see Figure 1 and Figure 2). The vast majority of the oil being produced in the Bakken is transported to distant refineries, and refined products consumed in the North Dakota markets are transported back for distribution. By building the Refinery near the source of crude oil, the Company can take advantage of low-cost sources of crude oil as feedstock and natural gas as refinery fuel. The Refinery will also benefit from a transportation cost advantage for its refined products.

Meridian will build and operate the Refinery on a 620-acre site in Billings County, North Dakota, just west of the town of Belfield ***(the "Site")***. The Site is located near the major oil and gas producing operations of the Bakken, is in close proximity to major north-south and

east-west highways, adjacent to oil & gas pipeline systems and the Burlington Northern Santa Fe ***("BNSF")*** main rail line that runs through the property. The Site will benefit from straightforward local and state permitting requirements and a favorable job-creation policy expressed by local and state governmental agencies. Meridian is designing the Refinery to be a 55,000 bpd high-conversion facility, having a 7.5 - 8.5 Nelson Complexity Index and producing a complete product slate including gasoline, diesel, jet fuel, fuel oil and LPG.

The Davis Refinery will be built near the source of Bakken crude oil production, where the Company can take advantage of low-cost sources of crude oil as feedstock and natural gas as refinery fuel. Abundant low-cost natural gas in the Bakken allows the Refinery to operate at low emissions levels and maximize efficient usage of crude feedstock. The Refinery also benefits from a transportation cost advantage that will be enjoyed by its refined products. Crude oil refineries can be configured to produce a wide variety of petroleum based products, from those commonly known like gasoline, jet and diesel fuels, to lubricants, asphalt base, plastics, waxes and lesser known specialty chemicals. The Refinery design will take full advantage of the particular nature of the Bakken Crude, which is a light-sweet crude, to produce a complete product slate responsive to the market and the needs of its tolling partners.

2.2 INDUSTRY AND MARKET

Shale oil was first discovered in the area of western North Dakota known as the Bakken formation several decades ago. However, until recently, oil and gas E&P companies found it cost prohibitive to produce. In 2007, companies returned to the Bakken with new techniques and began to produce significant amounts of crude oil from the shale formations, and by 2009, a full-blown oil boom was underway. North Dakota became a major U.S. domestic producer, forever changing the dynamics of the oil & gas industry. In recent years, North Dakota surpassed both Alaska and California to become the nation's second largest oil producing state. Over 1.1 million barrels per day of crude oil are produced in the Bakken, and most oil is shipped out of state for refining. Crude oil in its raw state is not a useful product. Refineries separate the crude oil into several categories of useful products through fractional distillation. These products are typically grouped into

three categories: Light Distillates such as gasoline and naphtha; Middle Distillates, such as diesel fuel and kerosene used as jet fuel; and, Heavy Distillates such as lubricants, fuel oil, wax and asphalt. Transportation fuels are the primary product category produced by refineries in the U.S. In 2013, according to the U.S. Energy Information Administration ***("EIA")***, one 42-gallon barrel of crude oil is converted by reporting refineries into 19 gallons of gasoline and 14 gallons of diesel fuel.

2.3 THE DAVIS REFINERY

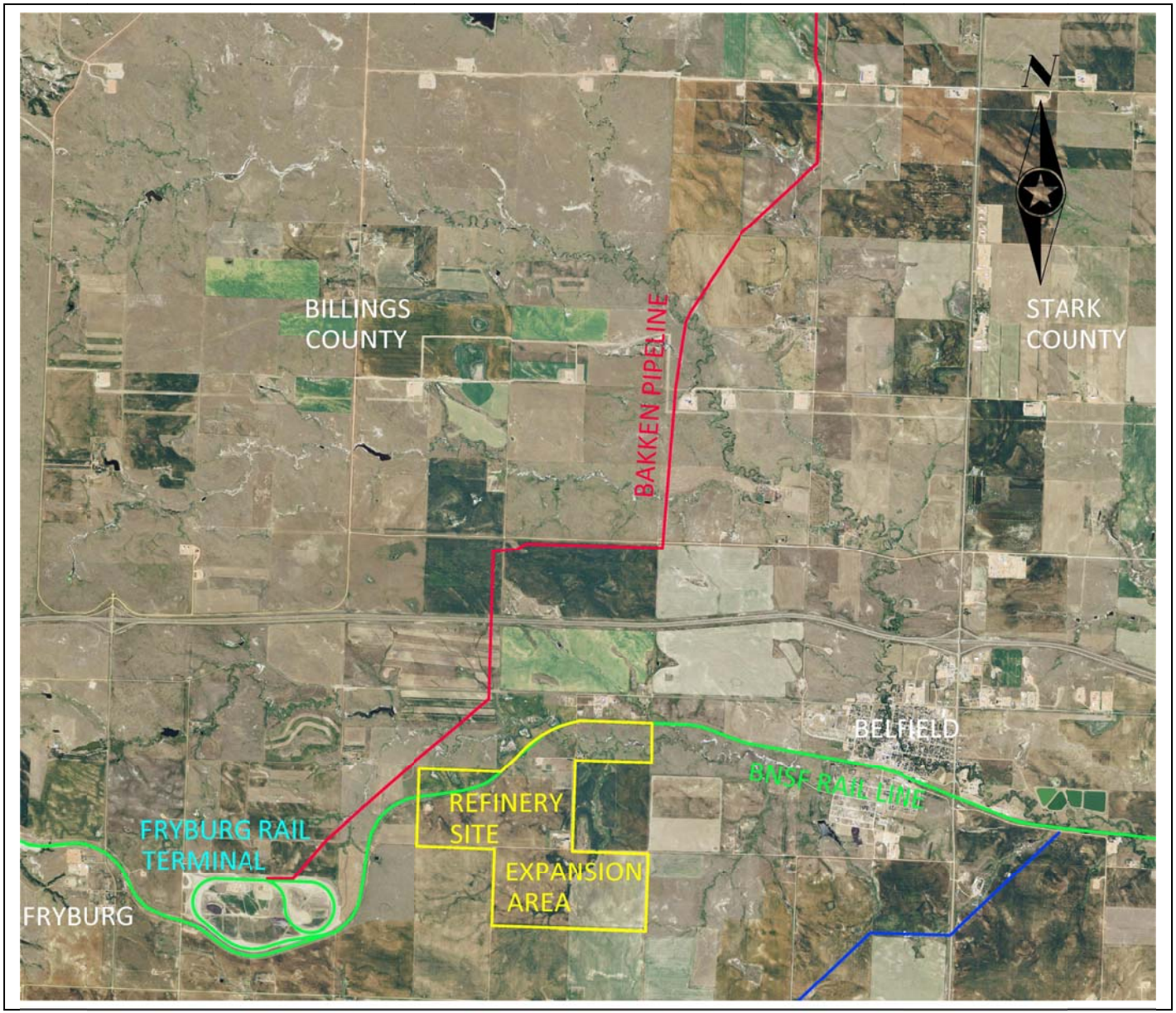
The Company will build and operate the Davis Refinery on a 620-acre site in Billings County, North Dakota (*see Figure 2)* ***(the "Site")*** where the Company has entered into an option-purchase agreement with the owner. As of July 5th, 2016 the Billings County Board of Commissioners unanimously approved a rezoning permit to industrial use that will allow the construction of the Davis Refinery on this property. The Site is located near the major oil and gas producing operations of the Bakken, the Site is in close proximity to major north-south and east-west highways, to oil and gas pipeline systems, the Burlington Northern Santa Fe ***("BNSF")*** primary rail line runs through the property, and the site is adjacent to the BakkenLink pipeline and rail terminal.

2.4 THE REFINERY

The Davis Refinery will be an approximately 55,000 barrels per standard day ***("bpsd")*** high-conversion crude refinery that will produce a full slate of refined products and specialty chemicals. Meridian has initiated engineering plans and the Refinery design is based upon the availability of process equipment that will shorten the schedule and reduce costs while ensuring environmental compliance.

2.5 OVERALL PROGRAM SCHEDULE

The Company has initiated engineering and detailed design will proceed in parallel with the project financing activities, which Meridian hopes to result in financial closing on or about the end of the third quarter of 2016. If that schedule is maintained, the initial phase of the Refinery will achieve Mechanical Completion in late 2017 or early 2018. A detailed project schedule is being developed by Vepica, and will be available in several weeks.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BAKKEN PIPELINE
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COUNTY
BELFIELD
BNSF RAIL LINE
REFINERY
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AREA
FRYBURG RAIL
TERMINAL
FRYBURG

3 REFINERY OVERVIEW

The proposed refinery scheme when fully installed will utilize conventional distillation and high-conversion technology to process up to 55,000 bpd of feedstock crude oils into a full slate of refined products including LPG, Gasoline, Jet Fuel, Auto Diesel, and Fuel Oil.

Feedstock to the refinery will be delivered via a combination of pipeline and rail and pumped into storage tanks. From the storage tanks crude oil will be fed to the Crude ADUs to separate feedstock into Naphtha, Kerosene and Diesel which will be sent to other units for further processing. Propane and Butane will be obtained from the overhead hydrocarbon liquid product of the atmospheric units Fuel Gas. Butanes from the ADUs will undergo further processing in the Isomerization and Alkylation units to obtain alkylate for the gasoline blending stock. Crude residues from the ADUs will be sent to a vacuum distillation unit for further fractionation.

Intermediates from the vacuum distillation are sent to a Fluid Catalytic Cracking ***("FCC")*** Unit for conversion into lighter products such as LPG, gasolines, light cycle oil, and decant oil. Naphtha from the FCC Unit will be further treated prior to being sent to the gasoline blending stock.

Light and Heavy Naphtha from the ADUs will undergo desulphurization prior to feeding the Catalytic Reforming Units ***("CRUs")*** that will process the low-octane components to obtain higher octane reformate to meet gasoline blending specifications. The Kerosene cut from the ADUs will be further processed to meet Jet Fuel product specifications. The Diesel cut will be sent through a desulphurization unit to produce Ultra Low Sulfur Diesel ***("ULSD")***.

To support the plant's main processes, a sulfur recovery system will remove H_2S from plant off-gas streams that can be used as refinery fuel gas, while converting removed H_2S to elemental sulfur. Ancillary equipment for the refinery will include utilities such as Raw Water Treatment, Fire Water, Cooling Water, Steam Generation, Condensate, Plant Air, Instrument Air, Electrical Distribution and Emergency Power Generation, and Waste Water Treatment.

A tank farm will include storage for incoming feedstock as well as refined products. Loading facilities will include accommodations for both truck and rail transportation. Refinery buildings will include the main control room, administrative offices, and maintenance shop and warehousing.

4 PROCESS DESCRIPTION

4.1 OVERVIEW

The proposed refinery scheme at full capacity includes a conventional distillation unit, naphtha hydrotreater, catalytic reforming units, kerosene hydrotreater, diesel hydrotreater, iC4 desulphurization, isomerization, alkylation, vacuum distillation, fluid catalytic cracking unit, gasoline desulphurization, and C3/C4 desulphurization to process up to 55,000 BPD of Bakken crude oil into a full slate of refined products including LPG, low and mid-grade Gasolines, Jet Fuel, Ultra Low Sulfur Diesel, Heating Diesel, and Fuel Oil.

The selected configuration for the Davis Refinery corresponds to a cracking refinery (see Davis Refinery Block Flow Diagram in Exhibit E) having substantial capability for yield and quality improvement, but at the same time producing heavy residual fuel oil. Product sulfur levels are controlled by various desulphurization methods to meet sulfur product specifications.

Feedstock to the refinery will be delivered via a combination of pipeline and rail and pumped into storage tanks. From the storage tanks crude oil will be fed to two Crude Atmospheric Distillation Units ***("ADUs")*** to separate feedstock into Overhead Gas plus Naphtha, Kerosene and Diesel cuts which will be sent to other units for further processing. To increase the production of high-value petroleum products, atmospheric residue will be run through a Vacuum Distillation Unit ***("VDU")*** to further refining.

Heavy and Light Naphtha from the Gas Plant is fed to the corresponding Naphtha Hydrotreater to remove sulfur and nitrogen, among others impurities, that would otherwise poison the catalyst used in the downstream catalytic reforming processes. Hydrotreated Naphtha is fed to two Catalytic Reforming Units that convert the low-octane components into higher octane reformate to be used in gasoline blending. As a byproduct, hydrogen rich gas is produced to supply the requirements of the hydrotreater units.

Straight kerosene from crude ADUs is sent to the Kerosene Hydrotreater unit where sulfur and nitrogen are removed to meet product specifications for jet fuel during summer operations or for blending into winter diesel to meet required cold flow properties. The

diesel cut from the ADUs is sent through the Diesel Hydrotreater Unit where sulfur and nitrogen are removed to produce ultra-low sulfur diesel.

Combined gasoil feed from the VDU, are combined and fed to the FCC Unit for conversion into lighter products such as LPG, catalytic naphtha, light cycle oil, and heavy cycle oil. Cracking of large hydrocarbon molecules into smaller molecular hydrocarbons take place in this unit under the presence of the catalyst. The rich olefins light ends from the FCC gas concentration unit and isobutenes from upstream processes are treated in the FCC LPG Sweetening Unit to remove mercaptans before being sent to the alkylation unit for further processing. The catalytic naphtha is further treated in a Hydrotreater Unit prior to being blended in the gasoline pool. Light cycle oil and heavy cycle oil produced in the FCC are blended with the residual fuel oil from the VDU.

The Alkylation Unit converts treated isobutane and olefins through an aliphatic alkylation processing to alkylate, a branched paraffin gasoline blending stock. The resulting high branched product is low vapor pressure and high octane blendstock for the gasoline pool. Since the ADUs do not produce enough isobutene for the alkylation process, an Isomerization Unit will convert feedstock normal butane into isobutene upstream of the Alkylation unit.

To support the plant's main processes, plant sour off-gas streams and acid gas from the sour water stripper will be routed to an adsorber for H_2S removal. The resulting sweet gas is sent to the fuel gas system. A sulfur recovery unit will convert removed H_2S to elemental sulfur.

The refinery includes utilities such as process water, fire water, cooling water, demineralized water, steam generation, condensate, plant air, instrument air, power distribution and emergency power generation, storm water, and waste water treatment.

The tank farm includes incoming feedstock tankage and intermediate and refined product storage. Loading facilities will include accommodations for both truck and rail transportation. Refinery buildings will include the main control room, administrative offices, maintenance shop, first aid services, and warehousing.

4.2 ATMOSPHERIC DISTILLATION UNITS (ADUS)

The ADUs separate the lighter hydrocarbons from the heavier hydrocarbons based on the differences in their boiling point. As lighter products are boiled off, the heavier parts, called residue, remain at the bottom.

Overhead vapors plus Naphtha from the ADUs will be sent to the Gas Plant. Kerosene and Diesel cuts from the ADUs will be sent to other units for further processing into specific products. To increase the production of high-value petroleum products, atmospheric residues will be run through a vacuum distillation column for further refining.

A single stage desalter will be included in the design of the ADU to reduce salts, suspended solids and other water soluble compounds to reduce heat exchangers and fractionator fouling and plugging due to salt deposition and reduced rate of corrosion in the overhead system. The effluent from the desalter will be sent to the oily water treatment system.

Emission point sources associated with the Atmospheric Distillation Unit include the refinery fuel gas fired heaters 101-H-0101 and 102-H-0201.

4.3 GAS PLANT

Overhead vapors and naphtha from the ADUs, are sent to the Gas Plant to separate them into fuel gas, propane, butane, and C5+.

The naphtha liquids coming off the ADUs will be routed to the debutanizer column, which will serve to stabilize the naphtha liquids. The stabilized naphtha will be fed to the Naphtha Hydrotreater and the overhead distillate from the debutanizer will be treated for mercaptans removal, heated and fed to a depropanizer column. The overhead stream of the depropanizer will be recovered as propane and the bottom product as butane. Additional butane shall be imported to meet the requirements of the gasoline pool.

Butanes from the Gas Plant undergo further processing in the Isomerization and Alkylation units to obtain alkylate for the gasoline blending stock.

There are no emission point sources associated with the Gas Plant.

4.4 HEAVY NAPHTHA HYDROTREATER

The Heavy Naphtha Hydrotreater will pretreat heavy naphtha to reduce sulfur (less than 1 weight ppm) and nitrogen contents, among other impurities, that would otherwise degrade the catalyst used in the downstream catalytic reforming process. Catalyst degradation would lead to excessive coking and rapid deactivation of the reformer catalyst.

The feed to the heavy naphtha hydrotreater will be preheated with the reactor effluent, mixed with recycle hydrogen and then brought to reactor inlet temperature by a refinery fuel gas fired charge heater. The reactor effluent goes through a separator from where the liquid phase flows to the product stripper to be stabilized and sent to the catalytic reformer. Vapors from a refinery fuel gas fired reboiler are used as the stripping medium in order to minimize water consumption and reduce sour water process. The off gas from the stripper is routed to the fuel gas system.

Emission point sources associated with the Heavy Naphtha Hydrotreater Unit include the refinery fuel gas fired heater 105-H-0501 and stripper reboiler. 105-H-0502

4.5 LIGHT NAPHTHA HYDROTREATER

The Light Naphtha Hydrotreater will treat the light naphtha from the Gas Plant to remove sulfur to produce a blendstock for the gasoline pool with less than 10 ppm sulfur content.

The feed to the light naphtha hydrotreater will be preheated with the reactor effluent, mixed with recycle hydrogen and then brought to reactor inlet temperature by a refinery fuel gas fired charge heater. The reactor effluent goes through a separator from where the liquid phase stream flows to the product stripper where direct steam injection is used as the stripping medium. Stabilized Naphtha from the product stripper is sent to the storage area. The off gas from the stripper is routed to the fuel gas system.

Emission point sources associated with the Light Naphtha Hydrotreater Unit include a refinery fuel gas fired heater 110-H-1101.

4.6 CATALYTIC REFORMING UNITS

Hydrotreated heavy naphtha is fed to two Catalytic Reforming Units (CRUs) that convert the low-octane components into higher octane reformate to be used in gasoline blending.

As a byproduct, hydrogen rich gas is produced to supply the requirements of the refinery's hydrotreater units.

The reaction section of each CRU consists of three heaters and three reactors. The feed to the CRU initial reactor is preheated with the reactors effluent and further heated to the reactor inlet temperature in a refinery fuel gas fired heater. The reforming reaction is endothermic therefore the effluent of each reactor is reheated in a fired heater before it passing through to the subsequent reactor.

The reactors effluent is cooled and separated into recycled gas and liquid which is further stabilized and separated into fuel gas, LPG and stabilized reformate with an octane of 98 RON.

Emission point sources associated with the CRUs include the refinery fuel gas fired heaters 106-H-0601 and 107-H-0701.

4.7 BENZENE SATURATION UNIT

In the CRUs, benzene precursors in the reformer feed are partially converted to benzene. The light reformate stream from the reformer splitter contains essentially all of the benzene generated in the CRUs.

The Benzene Saturation Unit processes the light reformate stream from the CRUs to convert the benzene into cyclohexane and achieve a maximum gasoline specification of 0.62 vol. % benzene. The unit utilizes a highly active catalyst that is operated in the liquid phase under mild conditions. The reactor effluent is stabilized in a stripper column and sent to the gasoline blending pool storage.

There are no emission point sources associated with the Benzene Saturation Unit.

4.8 KEROSENE SWEETENING

During the initial phase of the proposed Davis Refinery, the Kerosene fraction from the ADU is sent through a sweetening unit in order to be prewashed with caustic, water washed and filtered in order to dry and remove remaining impurities and adjust acidity to achieve the required jet fuel product specification. The treated kerosene is sent to the jet fuel blending storage.

There are no emissions point sources associated with the Phase 1 Kerosene Sweetening Unit.

4.9 KEROSENE HYDROTREATER

During Phase 2, the kerosene fraction will be treated in the Kerosene Hydrotreater Unit and the Kerosene Sweetening Unit will be repurposed. The Kerosene Hydrotreater will produce a final product with a sulfur content of 15 wppm which can be sent to jet fuel blending storage for summer stock production or to the low sulfur diesel blending pool to meet the cold flow properties of the product diesel during winter stock production.

The feed to the Kerosene Hydrotreater will be preheated with the reactor effluent, mixed with recycle hydrogen and then brought to reactor inlet temperature by a refinery fuel gas fired charge heater. The reactor effluent goes through a separator from where the liquid phase stream flows to the product stripper where direct steam injection is used as the stripping medium. Treated kerosene is sent to the storage and Wild Naphtha is sent to the Naphtha Hydrotreater. The off gas from the stripper is routed to a low pressure gas recovery system and sent to the fuel gas system.

Emission point sources associated with the Kerosene Hydrotreater Unit include the refinery fuel gas fired heater 125-H-2501.

4.10 DIESEL HYDROTREATER

In order to produce Ultra Low Sulfur Diesel, hydrotreating and dewaxing of intermediate distillates from the ADUs is needed. The Diesel cut is sent through the Diesel Hydrotreater Unit where sulfur, nitrogen and waxes are removed to produce low sulfur diesel with a final product sulfur content of 15 wppm.

The feed to the Diesel Hydrotreater will be preheated with the reactor effluent, mixed with recycle hydrogen and then brought to reactor inlet temperature by a refinery fuel gas fired charge heater. The reactor effluent goes through a separator from where the liquid phase stream flows to the product stripper where direct steam injection is used as the stripping medium. Treated diesel is sent to ULSD blending storage and Wild Naphtha is sent to the Naphtha Hydrotreater. The off gas from the stripper is routed to the fuel gas system.

Emission point sources associated with the Diesel Hydrotreater Unit include the refinery fuel gas fired heater 111-H-1101.

4.11 VACUUM DISTILLATION UNIT (VDU)

Crude residue from the ADUs is sent to the VDU for further fractionation. The crude residue is preheated through heat exchange with the gas oil products and finally brought to the vacuum distillation column inlet temperature by a refinery fuel gas fired heater. The column separates the vacuum gas oils under vacuum pressure to avoid product cracking and degradation at high temperature.

Light and Heavy vacuum gas oils are produced in the vacuum distillation unit, cooled and combined to feed the FCC Unit. Cooled residue from the VDU is sent to fuel oil storage.

Emission point sources associated with the VDU include the refinery fuel gas fired heaters 103-H-0301 and 103-H-0302.

4.12 FLUID CATALYTIC CRACKING UNIT

Light vacuum gas oil ***("LVGO")*** and Heavy vacuum gas oil ***("HVGO")*** from the VDU are combined and fed to the FCC Unit for conversion into lighter products. This feed is heated in a refinery fuel gas fired heater before entering the Fluid Catalytic Cracking reactor. In the reactor, the cracking of gas oils occurs immediately after vaporizing through contacting with the hot catalyst from the regenerator. The cracked products continue through a vapor line from the reactor to the FCC fractionator. Coke produced by the cracking reaction is deposited on the circulating catalyst in the reactor. The spent catalyst is circulated to the regenerator where coke is burned off by oxidation.

In the fractionation section, the hot reactor vapors are cooled and separated into wet gas unstabilized gasoline, light cracked gasoil ***("LCCO")*** and decant oil. Gasoline and gas are pumped and compressed into the FCC Gas Concentration Plant for further processing.

Emission point sources associated with the FCCU include the refinery fuel gas fired heater 112-H-1201 and flue gas from catalyst regeneration 112-VS-1201. Flue gas from the regenerator will be treated in a Wet Gas Scrubber to meet permissible emission limits.

4.13 ISOMERIZATION UNIT

The isomerization unit catalytically converts butane into isobutene for feed to the Alkylation Unit. Imported butane and butane rich gas and liquid streams from the refinery are initially fed to a depropanizer to remove light ends which are sent to the fuel gas system. Butane from the depropanizer is dried and fed to a deisobutanizer where separation of isobutene and normal butane occurs.

The normal butane stream from the deisobutanizer is converted to isobutene in a series of fixed bed reactors in the presence of hydrogen. Reactor effluent is cooled, separated from the hydrogen rich recycle gas and fed to the stabilizer from where butanes are recycled back to the deisobutanizer and the lighter ends are sent to the fuel gas system. The overhead isobutene stream from the deisobutanizer is sent for further sweetening together with olefins from the FCC prior to being fed to the Alkylation Unit.

Emission point sources associated with the Isomerization Unit include refinery fuel gas fired heaters 117-H-1701 and 117-H-1702.

4.14 FCC LPG SWEETENING UNIT

During Phase 2, the Kerosene Sweetening unit will be repurposed for FCC olefins and isobutane sweetening service involving the liquid/liquid extraction of the mercaptans in the feed stream. The combined flows from the FCC olefins and isobutanes from the isomerization unit are sent through the repurposed Phase 1 sweetening unit in order to be prewashed with caustic, water washed and filtered in order to dry and remove remaining impurities and adjust acidity. The mercaptide-rich caustic solution is regenerated by oxidation in the presence of a liquid catalyst, and the extracted mercaptans are oxidized to disulfides ***("RSSR")***. The disulfide oil and caustic solution are separated in the disulfide separator. Caustic is circulated back to the extractor and the disulfide oil is sent to the slop tank for reprocessing.

There are no emissions point sources associated with the FCC LPG Sweetening Unit.

4.15 ALKYLATION UNIT

The Alkylation Unit combines isobutene from the isomerization unit with olefins from the FCC Unit in the presence of an acid. The olefin feed is initially combined with the recycle

isobutene, cooled with the net effluent stream, dried and fed to the contactor reactor where olefins are essentially converted to alkylate. The resulting high branched paraffin gasoline blending stock has high RON and MON, low RVP, low sulfur content, and good drivability index.

Emission point sources associated with the Alkylation Unit include refinery fuel gas fired heater 118-H-1801.

4.16 FCC NAPHTHA HYDROTREATER UNIT

The FCC Naphtha Hydrotreater will treat naphtha produced in the FCC to remove sulfur and produce a blendstock for the gasoline pool with less than 10 ppm sulfur content and minimum octane loss.

The feed to the FCC naphtha hydrotreater will be preheated with the reactor effluent, mixed with recycle hydrogen and then brought to reactor inlet temperature by a refinery fuel gas fired charge heater. The reactor effluent goes through a separator from where the liquid phase stream flows to the product stripper where direct steam injection is used as the stripping medium. Treated FCC naphtha is sent to gasoline blending pool storage and the off gas from the stripper is routed to the fuel gas system.

Emission point sources associated with the FCC Naphtha Hydrotreater Unit include refinery fuel gas fired heater 114-H-1401.

4.17 SOUR WATER STRIPPER

The Sour Water Stripper will remove sour gases from sour water sources at the refinery. Sour water is produced from ADUs and Hydrotreating Units. During normal operation the sour water from the ADUs is recycled without treatment to the desalter but there is also the possibility to route this stream to the sour water stripper if treatment is required.

The treated water product is primarily used as wash water to the desalter system in the ADUs and the Hydrotreating Units. Any excess stripped water will be sent to WWTP. The resultant sulfur-laden sour gas is processed at the sulfur recovery unit.

There are no emissions point sources associated with the Sour Gas Unit.

4.18 SULFUR RECOVERY UNIT (SRU)

To handle the sulfur recovery needs of the proposed Davis Refinery the estimated required capacity of the SRU is 8 LTPD. At this level of sulfur recovery neither scavengers (effective for < 0.1 ton/day), nor Claus units (effective for >20 tons/day), are viable options. Treatment options that involve iron-redox are proven, effective sulfur recovery technologies for sulfur recovery needs in the intermediate (0.1-20 tons/day) range.

For the Davis Refinery, Meridian has chosen Merichem's LO-CAT technology for sulfur recovery. This patented liquid-redox system uses a proprietary chelated iron solution catalyst to convert H_2S to innocuous, elemental sulfur slurry inside an oxidizer vessel. The slurry passes through a sulfur filter to produce an elemental sulfur cake which is loaded onto trucks for offsite reuse or disposal. No hazardous waste byproducts are produced. The environmentally safe catalyst is continuously regenerated in the process. The Direct LO-CAT process allows 100% turndown in gas flow and H_2S concentrations and has an H_2S Removal efficiency of 99.9 %.

Emission point sources associated with the SRU include, a thermal oxidizer (122-H-2201) for complete combustion of tail gases from the LO-CAT oxidizer.

4.19 UTILITIES AND INDUSTRIAL SERVICES

The Davis Refinery will be designed to be a self-sufficient complex responsible for generating all the utilities and industrial services required except natural gas and electrical power.

4.19.1 Storage

The Storage Facilities are designed to store crude feedstock as well as, finished products, component blend stocks and intermediate stocks. The feedstocks and products handled in the Storage Area include:

Feedstock:	Bakken Crude
Intermediate products:	Light Naphtha
	Heavy naphtha
	Kerosene
	Diesel

	Light Slop
	Heavy Slop
	Vacuum Gasoil
	FCC Naphtha
Blend stocks:	Reformate
	Hydrotreated FCC Naphtha
	Butane
Final Products:	LPG
	Regular Gasoline
	Jet-Fuel
	ULSD
	Fuel Oil

Crude, Naphtha, Reformate and Gasoline storage tanks will be Internal Floating Roof type. Diesel, fuel oil and slop oil tanks will be cone roof. Butane and LPG will be stored in bullet type tanks. A vapor recovery system is contemplated to ensure emissions from the tank farm area do not exceed permissible levels.

4.19.2 Loading / Unloading Facilities

The Bakken crude will be initially shipped to the Davis Refinery by rail. Direct access from the refinery to the BNSF rail system, will allow the shipment or receipt of products or raw materials via rail tank car. To supply the local market with refined products, and accommodate raw material receipt from the nearby areas, the refinery will also have a tanker truck loading/unloading facility. During Phase II, a product pipeline system could be available to move product into common carrier pipeline systems in the Midwest.

Rail Loading/Unloading

A Rail Loading/Unloading Facility will be required for crude, gasoline, jet fuel, diesel and fuel oil. The loading/unloading rack is designed as a multispot area for the loading and unloading system.

The crude oil transfer station, designed to unload 55,000 BPSD of Bakken Crude, would include the rail car unloading rack, vent headers, a containment area, drain connections and

collection header, and tank car grounding. Two pumps, operating in parallel, would pump the crude oil from the unloading rack header to the Crude Tanks.

Gasoline, jet fuel, diesel and fuel oil would be shipped out via rail to markets in the Midwest and gulf coast. The products will be transferred from tanks to the loading rack using two loading pumps, operating in parallel, for each product.

Tanker Truck Loading/Unloading Facility

A Tank Truck Loading Facility will be required to ship LPG, gasoline, jet and diesel. Tank trucks will be loaded at island-type racks, equipped with several islands, each of which will have loading positions equipped with several product loading arms. A vapor recovery connection will be provided at each loading island for VOC control.

4.19.3 Fuel Gas System

The Davis Refinery heaters, boilers and thermal oxidizers will be designed to burn refinery fuel gas only. The fuel gas system will operate under pressure control and will be designed to collect light ends from the gas plant and off gases from the refinery processes and distribute treated fuel gas to low pressure consumers. Before being routed to the fuel gas distribution system, sour gas streams will be treated to remove H_2S. The totality of the fuel gas will be treated to meet hydrocarbon and water dew point required by the consumers.

All fuel gas streams will be sent to a central collection drum to dampen the effect of fluctuations in stream composition and thermal content. The drum is the pressure control point for the system. It provides volume to reduce pressure fluctuations and to disengage entrained liquid.

There are no emissions point sources associated with the Fuel Gas System. The H_2S removed from the fuel gas stream will be recovered as elemental sulfur in the Sulfur Recovery Unit.

4.19.4 Raw and potable water system

The main source of raw water for the Davis Refinery will be brackish groundwater from wells drawing from the Dakota formation located at a depth of approximately 5000 ft. Other potential source of water could be a treated effluent for industrial reuse.

The Raw Water Treatment System will be composed of two separate treatment trains: the Demineralized Water System ***("DWS")*** and the Service Water System ***("SWT")***. This segregation is to prevent mixing brine water with low salinity water with oil traces.

The SWS will receive recycled water from the Wastewater Treatment Plant and blowdowns from the cooling and boiler system and will provide water with the quality required by the cooling system and the process and utility water needs of the refinery. The DWS will receive water from the water wells and will provide water with the quality required by the Boiler Feed Water System. There are no emissions point sources associated with the Raw Water Treatment System.

4.19.5 Fire water system

The requirements for fire water are intermittent, but constitute a very large instantaneous flow. Raw water and/or stormwater collected from non-process areas will be used as a source for the plant's fire water system. Depending on the confirmed quality of the water source, it will be routed to the fire water tank with minimal treatment. Total fire water pump capacity requirements will be provided by three pumps, driven by 600-hp diesel engines. It is anticipated that diesel engines will be tested once a month to ensure operability of the firewater system. Annual hours of operation are not expected to exceed 100 hours. A jockey pump, installed in parallel with the main fire pumps, pressurizes the system when the latter are not in use.

4.19.6 Cooling Water System

The use of cooling water at the Davis Refinery will be minimized considering that water is scarce in this particular region. Air cooling will be the preferred cooling method in order to reduce the global import of raw water. Any requirement of cooling water will be supplied in a closed loop circuit.

The cooling water system will consist of multiple cooling water cells, cooling water pumps, chemical dosing packages, side stream filtration, blowdown facilities and distribution network. The system will be a recirculating type where the warm water returns to the cooling water system and is cooled in the cooling water towers. The system will have a continuous make-up and blowdown. The makeup is controlled by the cooling tower basin

liquid level to balance losses by evaporation, drift, blowdown and others. The blowdown controls the concentration of impurities and could be recycled to the RWTP if quality becomes an issue, it will be discharged to the waste water treatment facility. These towers are induced mechanical draft type with counter flow arrangement and drift eliminators (0.005% drift rate) built into the media.

The cooling water system will have three 50% capacity cells (215-C-1501A, 215-C-1501B and 215-C-1501C), two in operation and one stand-by, which are the emission point sources associated with the Cooling Water System.

4.19.7 Steam Generation and Boiler Feed Water Treatment

Onsite processes will use heat integration as much as possible to minimize steam requirements due to heating needs. Medium pressure steam will still be required at processing units to satisfy other needs such as stripping, purging, etc. To minimize steam tracing due to the limited water supply in the refinery site area electrical heat tracing will be maximized.

The steam needs of the refinery processing units beyond those that can be satisfied through heat integration/heat recovery will be generated in three standard package gas boilers () and through heat recovery in process units. To supply the operation needs of the refinery, two boilers will be in operation and one will be kept in hot stand-by. The system design will include condensate treatment for direct use as feed to the boiler system and will include bypass to the oily water treatment system in case of oil contamination.

Emission point sources associated with the Steam Generation and Boiler Feed Water Treatment include refinery fuel gas fired boilers 202-B-0201A, 202-B-0201B and 202-B-0201C.

4.19.8 Instrument Air System

Instrument and Plant Air to cover the refinery service and maintenance activities requirements for dry oil-free air service to operate pneumatic instruments, control valves, ESD valves and utility stations at the required temperature, pressure and water dew point will be supplied by two electrical motor driven Air Compressors. A Back Up Air

Compressor and a HP Air Receiver will comprise the backup system that will supply 20 minutes of instrument air in case of emergency.

There are no emissions units associated with the Instrument Air System.

4.19.9 Nitrogen System

The proposed Davis Refinery will use nitrogen for inerting equipment to prevent flammable atmospheres, blanketing tanks to prevent the ingress of air and snuffing fired heaters, preparing piping and equipment for maintenance by purging out hydrocarbons, and removing air/oxygen in equipment before startup. Nitrogen supply will be contracted out as a utility service. Liquid nitrogen will be stored in a liquid storage system.

There are no emissions units associated with the Nitrogen System.

4.19.10 Oily Water Treatment System

The oily water treatment system collects and treats oily wastewater generated in the refinery processes which contains oil, emulsified oil, or other hydrocarbons. Oily wastewater streams are generated mainly in the desalter units, process oily water drains, and from tanks bottom draws. Potentially oil-contaminated drainage will also be treated through the oily water treatment system. This will include precipitation runoff that falls directly on refinery areas that have a high potential for contact with oil, products and byproducts produced during refining operations. Potentially oil-contaminated drainage also includes other runoff generated during other routine and non-routine activities foreseen during design (e.g. maintenance, firewater).

This oily wastewater treatment system will include treatment to remove both free and emulsified oil from the water. The final treatment scheme will be dependent on the final reuse, recycle or disposal method of treated water. Following treatment, water will be recycled back as raw water to the refinery processes.

The Oily Water Treatment System is considered an area source of air emissions. To minimize emissions, the system will include tightly covered treatment units, blanketing gas and/or vapor recovery.

4.19.11 Blowdown and Flare System

The refinery will operate a vapor recovery system to capture vapors and return to product/processes instead of releasing through stacks or via flaring during normal operations. Flaring will be on an intermittent and as-needed basis.

To safely combust hydrocarbon relief flows during process upsets, and other times as needed during startups, shutdowns, or malfunctions the refinery will have a flare system comprised of a combination of an enclosed flare and elevated flares. The elevated flares will only operate during emergency cases in which the capacity of the enclosed flare is exceeded. A separate system with an elevated flare to handle acid gases in cases of SRU unavailability will be provided.

4.19.12 Emergency Power Generation

The proposed refinery design includes an emergency generator driven by a 4700 hp diesel engine. The emergency generator will operate in cases of complete blackout only, and normally it will operate less than 100 hours per year to account for monthly maintenance checks.

4.20 OPERATING SCENARIOS

The initial construction phase (Phase 1) of the proposed Davis Refinery corresponds to a 27,500 BPD Hydroskimming refinery (see Davis Refinery Phase 1 Block Flow Diagram in Exhibit E). The Phase 1 configuration will include one ADU and associated Gas Plant, a single Naphtha HDT, a single CRU and Benzene Saturation Unit to produce gasoline, a Kerosene Sweetening Unit to produce Jet Fuel, and a Diesel HDT, to produce ULSD. Additional distillation, hydrotreatment and conversion units will be added during subsequent construction in order to increase the crude feedstock processing capacity to 55,000 BPSD to augment the gasoline and middle distillates yields and reduce fuel oil production.

The ADU to be installed during Phase 1 will be designed to operate with only kerosene and intermediate distillate side streams while the heavy gasoil cut will be recovered through the atmospheric residue stream. Provisions for a future heavy gasoil side stream will incorporated into the design.

During Phase 1, the Benzene Saturation Unit and Diesel HDT will operate at reduced capacities to handle the Phase 1 gasoline pool and diesel production. At full refinery processing capacity, the Kerosene Sweetening Unit installed in Phase 1 will be repurposed into FCC LPG and isobutane sweetening service, the Diesel HDT Unit installed in Phase 1 will be repurposed into Kerosene HDT service to process the Kerosene cut and a new Diesel Hydrotreater will be installed to process the Diesel cut at full production.

During Phase 1, the full range naphtha produced in the Gas Plant associated with the Phase 1 ADU will be fed to the Naphtha Hydrotreater which will be operating at nameplate capacity to achieve a sulfur specification of less than 10 ppm in the gasoline product. At full refinery capacity, naphtha from both ADUs will be fractionated into Light and Heavy Naphtha streams. These streams will be hydrotreated in two separate hydrotreaters, the Naphtha HT installed during Phase 1 which will treat the heavy naphtha stream and the Light Naphtha HT which will treat the light naphtha required by the gasoline pool.

Winter Operations

Distillates from Bakken crude have high paraffin content and therefore poor cold-flow properties. For this reason, the kerosene and diesel cuts will be blended during wintertime fuel production, to produce ULSD with good cold flow operability at the expense of Jet Fuel production. In addition, the RVP of the gasoline produced by the proposed Davis Refinery will also be adjusted seasonally to meet market specifications during wintertime and summertime fuel production.

5 SUMMARY OF AIR POLLUTANT EMISSIONS

A detailed emissions inventory of the Emission Units associated with the refinery operations was prepared to assess the Potential to Emit ***("PTE")*** of air contaminants *"subject to regulation"* or *"regulated air contaminants"*, also known as *"regulated NSR pollutants"*.

"Emissions Unit" in accordance with NDAC 33-15-14-06 *"means any part or activity of a stationary source that emits or has the potential to emit any regulated air contaminant or any contaminant listed under section 112(b) of the Federal Clean Air Act."*

"Potential to emit" has the meaning given to it in NDAC 33-15-14-06: *"the maximum capacity of a stationary source to emit any air contaminant under its physical and operational design. Any physical or operational limitation on the capacity of a source to emit an air contaminant, including air pollution control equipment and restrictions on hours of operation or on the type or amount of material combusted, stored, or processed, shall be treated as part of its design if the limitation is enforceable by the administrator of the United States environmental protection agency and the department."* For a petroleum refinery, quantifiable fugitive emissions must also be included with point source emissions in the facility-wide PTE calculation.

"Fugitive emissions" as per NDAC 33-15-14-06 *"are those emissions which could not reasonably pass through a stack, chimney, vent, or other functionally equivalent opening."*

"Regulated air contaminant" has the meaning given to it in NDAC 33-15-14-06:

"(1) Nitrogen oxides or any volatile organic compounds.
(2) Any contaminant for which a national ambient air quality standard has been promulgated.
(3) Any contaminant that is subject to any standard promulgated under section 111 of the Federal Clean Air Act.
(4) Any class I or II substance subject to a standard promulgated under or established by title VI of the Federal Clean Air Act.

(5) Any contaminant subject to a standard promulgated under section 112 or other requirements established under section 112 of the Federal Clean Air Act, including sections 112(g), (j), and (r) of the Federal Clean Air Act, including the following:
(a) Any contaminant subject to requirements under section 112(j) of the Federal Clean Air Act. If the administrator fails to promulgate a standard by the date established pursuant to section 112(e) of the Federal Clean Air Act, any contaminant for which a subject source would be major shall be considered to be regulated on the date eighteen months after the applicable date established pursuant to section 112(e) of the Federal Clean Air Act; and
(b) Any contaminant for which the requirements of section 112(g)(2) of the Federal Clean Air Act have been met, but only with respect to the individual source subject to section 112(g)(2) of the Federal Clean Air Act requirement.

Regulated NSR Pollutant is defined at 40 CFR 51.166(b)(49) as:

"(i) Any pollutant for which a national ambient air quality standard has been promulgated and any constituents or precursors for such pollutants identified by the Administrator (e.g., volatile organic compounds are precursors for ozone); (ii) Any pollutant that is subject to any standard promulgated under section 111 of the Act; (iii) Any Class I or II substance subject to a standard promulgated under or established by title VI of the Act; or (iv) Any pollutant that otherwise is subject to regulation under the Act; except that any or all hazardous air pollutants either listed in section 112 of the Act or added to the list pursuant to section 112(b)(2) of the Act, which have not been delisted pursuant to section 112(b)(3) of the Act, are not regulated NSR pollutants unless the listed hazardous air pollutant is also regulated as a constituent or precursor of a general pollutant listed under section 108 of the Act.". *"Regulated NSR pollutant"*, in accordance NDAC 33-15-15 and 33-15-16, does not include greenhouse gases as defined in 40 CFR 86.1818-12. Regulated NSR pollutants for petroleum refineries include particulate matter (PM), particulate matter with a diameter of 10 microns or less (PM_{10}), particulate matter with a diameter of 2.5 microns or less ($PM_{2.5}$), sulfur dioxide (SO_2), nitrogen oxides (NOx), carbon monoxide (CO), ozone (as VOCs), lead (Pb), hydrogen sulphide (H_2S) and reduced sulfur compounds.

5.1 DAVIS REFINERY EMISSION UNITS

Identification of the Emission Units of the proposed Davis Refinery was made based on the review of engineering data from process units, specifically: block and process flow diagrams ***("BFD" & "PFDs")***, process descriptions and engineering calculations. The main Emission Units and associated equipment of the proposed Davis Refinery which have the PTE regulated air contaminants through direct discharges to the atmosphere include the following:

Process Units

1. ADUs: heaters.
2. VDU: heaters.
3. Light Naphtha Hydrotreater: heaters.
4. Heavy Naphtha Hydrotreater: heaters.
5. Kerosene Hydrotreater Unit: heaters.
6. Diesel Hydrotreater Unit: heaters.
7. CRUs: heaters and regenerator vents.
8. FCCU (including gas concentrator): heaters and regenerator vent.
9. Isomerization Unit: heaters.
10. Alkylation Unit: heaters.
11. SRU: thermal oxidizer.
12. Tank Farm.
13. Flare System.

Main Utilities

14. Waste Water Treatment.
15. Cooling Water System: drift loss in cooling tower.
16. Product loading operations: Truck and Rail Loading stations
17. Fire water system: diesel engine driven back-up firewater pumps.
18. Emergency Power Generation: internal diesel combustion engine.

5.2 DAVIS REFINERY EMISSIONS INVENTORY

Emissions of regulated air contaminants were estimated using the Emission Factors presented in the EPA Emissions Estimation Protocol for Petroleum Refineries, unless noted otherwise. Where applicable, EPA AP-42 Compilation of Air Pollutant Emission Factors. Volume 1: Stationary Point and Area Sources, Fifth Edition, was consulted for specific criteria pollutant emission factors. As part of the development of the emissions inventory, a Controls Technology Review was conducted and efficiencies of selected controls were included in the controlled PTE calculations when the controls were proposed as part of design of the Davis Refinery. The detailed emissions inventory including assumptions, methodologies, and calculation are included Exhibit B.

Table 1 summarizes the Emissions Units of the proposed Davis Refinery at full capacity including emission controls that are inherent part of the equipment design (i.e. low NOx burners, floating roofs, etc.). Table 2 summarizes the Davis Refinery inventory of emissions at full capacity without considering add-on emissions controls. Table 3 summarizes the air emissions control technology proposed as part of the design of the Emission Units including proposed emissions controls efficiencies. Table 4 summarizes the Davis Refinery PTE at full capacity including the effect of add-on pollution controls. Table 5 summarizes the Davis Refinery PTE after construction of the Phase 1 of the Davis Refinery (27,500 BPD). Results summarized in Table 5 assume the installation of proposed add-on pollution controls for NOx or PM in heaters and boilers would be delayed until construction of the Phase 2 of the refinery to increase slate of refined products and refining capacity to 55,000 BPD.

Table 1. Davis Refinery Emissions Units

Unit Number	Unit Description	Emission Unit Description	TAG	Air Pollution Control Equipment
101	Atmospheric Distillation Unit #1	ADU #1 heater rated 72.00 MMBTU/h and fired on refinery fuel gas	101-H-0101	Best combustion practices. Ultra Low NOx Burner
102	Atmospheric Distillation Unit #2	ADU #2 heater rated 72.00 MMBTU/h and fired on refinery fuel gas	102-H-0201	Best combustion practices. Ultra Low NOx Burner
103	Vacuum Distillation Unit	VDU heater #1 rated 76.47 MMBTU/h and fired on refinery fuel gas	103-H-0301	Best combustion practices. Ultra Low NOx Burner
		VDU heater #2 rated 57.65 MMBTU/h and fired on refinery fuel gas	103-H-0302	Best combustion practices. Ultra Low NOx Burner
105	Heavy Naphtha Hydrotreater	HNHT heater #1 rated 13.75 MMBTU/h and fired on refinery fuel gas	105-H-0501	Best combustion practices. Ultra Low NOx Burner
		HNHT heater #2 rated 16.25 MMBTU/h and fired on refinery fuel gas	105-H-0502	Best combustion practices. Ultra Low NOx Burner
106	Catalytic Reformer Unit #2	CRU #2 heater with a combined rating of 41.73 MMBTU/h and fired on refinery fuel gas	106-H-0601	Best combustion practices. Ultra Low NOx Burner
107	Catalytic Reformer Unit #1	CRU #1 heater with a combined rating of 92.50 MMBTU/h and fired on refinery fuel gas	107-H-0701	Best combustion practices. Ultra Low NOx Burner
110	Diesel Hydrotreater	Diesel HDT heater rated 16.25 MMBTU/h and fired on refinery fuel gas	110-H-1001	Best combustion practices. Ultra Low NOx Burner
111	Light Naphtha Hydrotreater	LNHT heater rated 13.90MMBTU/h and fired on refinery fuel gas	111-H-1101	Best combustion practices. Ultra Low NOx Burner
112	Fluid Catalytic Cracking (FCC) Unit	Regenerator vent stack	112-VS-1201	Complete carbon burn regenerator design
		FCCU heater rated 28.35 MMBTU/h and fired on refinery fuel gas	112-H-1201	Best combustion practices. Ultra Low NOx Burner

Unit Number	Unit Description	Emission Unit Description	TAG	Air Pollution Control Equipment
114	FCC Naphtha Hydrotreater	FCC Naphtha HDT heater rated 17.48 MMBTU/h and fired on refinery fuel gas	114-H-1401	Best combustion practices. Ultra Low NOx Burner
117	Isomerization Unit	Isomerization heater #1 rated 1.65 MMBTU/h and fired on refinery fuel gas	117-H-1701	Best combustion practices. Ultra Low NOx Burner
		Isomerization heater #2 rated 3.75 MMBTU/h and fired on refinery fuel gas	117-H-1702	Best combustion practices. Ultra Low NOx Burner
118	Alkylation Unit	Alkylation heater rated 84.19 MMBTU/h and fired on refinery fuel gas	118-H-1801	Best combustion practices. Ultra Low NOx Burner
122	SRU Thermal Oxidizer	Thermal Oxidizer with a rated capacity of 1.58 MMBTU/h	122-H-2201	Two SRUs sized for the full refinery capacity. Emissions from both SRUs will be routed to a common Thermal Oxidizer.
125	Kerosene Hydrotreater	Kerosene HDT heater rated 12.50 MMBTU/h and fired on refinery fuel gas	125-H-2501	Best combustion practices. Ultra Low NOx Burner
202	Boiler 1	Boiler with a rated capacity of 60 MMBTU	202-B-0201A	Under normal operations 2 Boilers in service 1 in hot standby
202	Boiler 2	Boiler with a rated capacity of 60 MMBTU	202-B-0201B	
202	Boiler 3	Boiler with a rated capacity of 60 MMBTU	202-B-0201C	
203	Crude oil tank #1	Bakken crude oil storage tank #1 with a nominal 110,999 bbl capacity	203-T-0001	Dome with IFR (Internal Floating Roof) and Submerged Fill Pipe
203	Crude oil tank #2	Bakken crude oil storage tank #2 with a nominal 110,999 bbl capacity	203-T-0002	Dome with IFR (Internal Floating Roof) and Submerged Fill Pipe
203	Crude oil tank #3	Bakken crude oil storage tank #3 with a nominal 110,999 bbl capacity	203-T-0003	Dome with IFR (Internal Floating Roof) and Submerged Fill Pipe
203	Desulfurized Heavy Naphtha tank #1	Heavy Naphtha storage tank #1 with a nominal 64,996 bbl capacity	203-T-0005	Dome with IFR (Internal Floating Roof) and Submerged Fill Pipe

Unit Number	Unit Description	Emission Unit Description	TAG	Air Pollution Control Equipment
203	Reformate tank #1	Reformate storage tank #1 with a nominal 33,312 bbl capacity	203-T-0006	Dome with IFR (Internal Floating Roof) and Submerged Fill Pipe
203	Reformate tank #2	Reformate storage tank #2 with a nominal 33,312 bbl capacity	203-T-0007	Dome with IFR (Internal Floating Roof) and Submerged Fill Pipe
203	Gasoline tank #1	Regular Gasoline tank #1 with a nominal 64,996 bbl capacity	203-T-0008	Dome with IFR (Internal Floating Roof) and Submerged Fill Pipe
203	Gasoline tank #2	Regular Gasoline tank #2 with a nominal 64,996 bbl capacity	203-T-0009	Dome with IFR (Internal Floating Roof) and Submerged Fill Pipe
203	Mid Gasoline tank #1	Mid Gasoline tank #1 with a nominal 64,996 bbl capacity	203-T-0010	Dome with IFR (Internal Floating Roof) and Submerged Fill Pipe
203	Jet Fuel tank #1	Jet Fuel tank #1 with a nominal 33,312 bbl capacity	203-T-0011	Dome with IFR (Internal Floating Roof) and Submerged Fill Pipe
203	Jet Fuel tank #2	Jet Fuel tank #2 with a nominal 33,312 bbl capacity	203-T-0012	Dome with IFR (Internal Floating Roof) and Submerged Fill Pipe
203	Undesulphurized Diesel tank #1	Undesulphurized Diesel storage tank #1 with a nominal 33,312 bbl capacity	203-T-0013	Cone Roof, Submerged Fill Pipe
203	Undesulphurized Diesel tank #2	Undesulphurized Diesel storage tank #2 with a nominal 33,312 bbl capacity	203-T-0014	Cone Roof, Submerged Fill Pipe
203	Desulphurized Diesel tank #1	Desulphurized Diesel storage tank #1 with a nominal 64,996 bbl capacity	203-T-0015	Cone Roof, Submerged Fill Pipe
203	Desulphurized Diesel tank #2	Desulphurized Diesel storage tank #2 with a nominal 64,996 bbl capacity	203-T-0016	Cone Roof, Submerged Fill Pipe

Unit Number	Unit Description	Emission Unit Description	TAG	Air Pollution Control Equipment
203	UVGO tank	UVGO storage tank with a nominal 33,312 bbl capacity	203-T-0017	Cone Roof, Submerged Fill Pipe
203	FCC Naphtha tank #1	FCC naphtha storage tank #1 with a nominal 33,312 bbl capacity	203-T-0018	Dome with IFR (Internal Floating Roof) and Submerged Fill Pipe
203	FCC Naphtha tank #2	FCC naphtha storage tank #2 with a nominal 33,312 bbl capacity	203-T-0019	Dome with IFR (Internal Floating Roof) and Submerged Fill Pipe
203	Alkylate tank #1	Alkylate storage tank #1 with a nominal 33,312 bbl capacity	203-T-0020	Dome with IFR (Internal Floating Roof) and Submerged Fill Pipe
203	Alkylate tank #2	Alkylate storage tank #2 with a nominal 33,312 bbl capacity	203-T-0021	Dome with IFR (Internal Floating Roof) and Submerged Fill Pipe
203	Diluent tank	Diluent tank with a nominal 33,312 bbl capacity	203-T-0022	Cone Roof, Submerged Fill Pipe
203	Fuel Oil tank #1	Fuel Oil tank #1 with a nominal 64,996 bbl capacity	203-T-0023	Cone Roof, Submerged Fill Pipe
203	Fuel Oil tank #2	Fuel Oil tank #2 with a nominal 64,996 bbl capacity	203-T-0024	Cone Roof, Submerged Fill Pipe
203	Light Naphtha tank #1	Light Naphtha tank #1 with a nominal 33,312 bbl capacity	203-T-0031	Dome with IFR (Internal Floating Roof) and Submerged Fill Pipe
203	Light Naphtha tank #2	Light Naphtha tank #2 with a nominal 33,312 bbl capacity	203-T-0032	Dome with IFR (Internal Floating Roof) and Submerged Fill Pipe
203	Light Slops tank	Light slops tank with a nominal 2,620 bbl capacity	203-T-0033	Cone Roof, Submerged Fill Pipe
203	Heavy Slops tank	Heavy slops tank with a nominal 2,620 bbl capacity	203-T-0034	Cone Roof, Submerged Fill Pipe

Unit Number	Unit Description	Emission Unit Description	TAG	Air Pollution Control Equipment
206	Wastewater treatment plant	Oil/Separator Inlet from Benzene Waste Operations NESHAP (BWON) Compliant plant with a design capacity of 155,000 gal/d**	-	Wastewater treatment plant must comply with the design requirements of 40 CFR 60 Subpart QQQ
207	Enclosed HC Operating Flare	Enclosed flare with pilot at 100 SCFH average of fuel gas, for handling up to 24.4 MMSCFD (including purges and fuel gas blowdown)	207-FL-1701	High temperature, optimal balance between air flow, gas/pollutant loading and low heating value
207	Acid Flare	Acid gas flare with pilot at 100 SCFH average of fuel gas, for handling up to 15.8 MMSCFD of gas.	207-FL-1702	High temperature, optimal balance between air flow, gas/pollutant loading and low heating value
207	HC Emergency Flare #1	HC Emergency Flare at 100 SCFH average of fuel gas, for handling up to 74.6 MMSCFD (including purges and fuel gas blowdown)	207-FL-1703	High temperature, optimal balance between air flow, gas/pollutant loading and low heating value
207	HC Emergency Flare #2	HC Emergency Flare at 100 SCFH average of fuel gas, for handling up to 88.8 MMSCFD (including purges and fuel gas blowdown)	207-FL-1704	High temperature, optimal balance between air flow, gas/pollutant loading and low heating value
208	Truck Loading-Unloading System	Dedicated normal service of loading/unloading refinery products (Gasoline, Jet Kerosene, Diesel and Fuel Oil).	-	Submerged Loading and dedicated service.
209	Rail Loading-Unloading System	Dedicated normal service of loading/unloading refinery products (Gasoline, Jet Kerosene, Diesel and Fuel Oil).	-	Submerged Loading and dedicated service
212	Firewater Diesel Pumps	Combustion gases (flue gas) from 600 HP x2 diesel firewater pump.	212-P-1201A/B/C	Firewater pumps. Normal operation less than 100 hours per year
215	Cooling Tower	Induced draft - counter flow Cooling Tower. Design Cooling Water Circulation Rate: 1,500 gpm	215-CT-1501A/B/C	Drift Eliminators Inherent to Design. Under normal operations 2 in service 1 in standby

Unit Number	Unit Description	Emission Unit Description	TAG	Air Pollution Control Equipment
216	Diesel/Natural gas-fired emergency generator set***	Combustion gases (flue gas) from 4700-HP emergency generator stack.	216-EG-1601A/B/C	Operating for less than 100 hours per year. The engines shall be certified to emissions standards as outlined under 40 CFR 60, Subparts IIII and JJJ. The engines shall be manufactured with the appropriate control equipment to meet these emissions standards
FUGITIVE	Process equipment leaks in VOC and Natural Gas service	Fugitive (leaks) emissions from process units throughout the refinery.	-	Leak Detection and Repair (LDAR) Program Screen level at 500 ppm

Taken from Table 1, Exhibit B - EMISSIONS INVENTORY FOR DAVIS REFINERY.
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Table 2. Davis Refinery Summary of Emissions without Add-on Controls

	Criteria Pollutants										HAPs
Emissions Unit	CO	Pb	PM<10	Filerable PM <10	PM <2.5	Filterable PM <2.5	Condensable PM	NO_X (as NO_2)	SO_2	VOC	Total HAPs
Leaks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	243.72	40.35
Tanks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	21.79	14.95
Stationary Combustion Sources	91.42	1.60E-03	13.06	3.26	13.06	3.26	9.79	97.95	1.92	17.61	6.41
Fluid Catalytic Cracking Unit	0.00	2.03E-03	50.14	33.16	45.65	28.67	16.98	186.28	664.88	577.20	5.39
Catalytic Reforming Unit	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.79
Sulfur Recovery Plant	2.15	0.00	0.00	0.00	0.00	0.00	0.00	0.47	0.20	1.50	0.00
Vacuum Systems	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Blowdown System	0.83	0.00	0.01	0.01	0.01	0.01	0.00	3.66	5.20	0.15	0.00
Flares	0.25	4.38E-06	0.04	0.01	0.04	0.01	0.03	0.27	0.005	0.05	0.00
Wastewater	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	210.41	23.28
Cooling Towers	0.00	0.00	24.83	0.00	0.00	0.00	0.00	0.00	0.00	4.73	0.00
Rail Product Loading	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1,713.49	0.00
Truck Product Loading	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	366.76	0.00
Fugitive Dust	0.00	0.00	1.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total STPY	**94.65**	**0.004**	**89.40**	**36.44**	**58.75**	**31.95**	**26.80**	**288.62**	**672.20**	**3,157.45**	**91.17**

Taken from Table 2, Exhibit B- EMISSIONS INVENTORY FOR DAVIS REFINERY. VEPICA, 2016. Doc. N° P-5715043-01-001-18042-I001.

Table 3. Davis Refinery Summary of Proposed Emission Controls

Source/Unit	Target Pollutant	Pollution Control Technologies Used	Assumed % Control
Leaks (Fugitive Emissions)	VOC	LDAR (Leak, Detection and Repair) program with 500 ppmv leak definition, and including differential light absorption and ranging (DIAL) or optical gas imaging (OGI) technology.	97% (valves), 93% pumps, 97% flanges, 97% sample points, (30% heavies). Program baseline of 500 ppm
Tanks	VOC	Double Seal and Wipers on IFR Tanks (NESHAP std). Vapor Recovery to product recycle on select fixed roof tanks	95%
Stationary Combustion Sources (Heater and Boilers)	CO NOx VOC HAPs PM SO_2	CO – Best Comb. Practices w/ Ultra Low NOx Burners NOx – SCR's w/ Ultra Low NOx Burners VOC / HAPs – Best Comb. Practices with Ultra Low NOx Burners PM – Venturi Scrubbers on larger heaters	CO – 96% NOx – 75% VOCs / HAPs – 75% PM – 70%
Fluidized Catalytic Cracking (FCC) Regeneration Vent	CO NOx. SO_2	CO– Best Comb. Practices / complete carbon burn regenerator design NOx – COP-NP Combustion Promotor OR Tri-Mer SO_2 – Wet Scrubber OR Dri-Sorb Catalyst	CO – 100% NOx – 98% SO2 – 99%
Catalytic Reforming Unit	HAPs	NA – minor emissions levels	NA
Sulfur Recovery Plants	SO_2	Lo-CAT with vent gases routed to thermal oxidizer Other pollutants are considered minor	SO2 – 99.9%
Blowdown System	CO NOx SO_2	Vapor recovery to product capture and emergency flaring only for upsets	99.8%
Flares	CO NOx VOC HAPs	Lower heating value of feed gases, requirements specified by EPA and NDDoH regulations. Flares will only be used during upset conditions.	98% +
Wastewater Treatment System	VOC HAPs	Covered API/CPI oil/water separators and induced/dissolved air flotation units Equalization tanks instead of open ponds. Vapor Recovery System	VOC – 95% HAPs – 55%
Product Loading	VOC	Vapor recovery to product recycle with upsets to emergency flares	98%
Fugitive (on-site vehicular) emissions	PM	Paving of areas of routine vehicle traffic. Maintain vehicle speeds to < 15 mph	$PM_{2.5}$ - 0.00054 lb/vmt PM_{10} - 0.0022 lb/vmt Silt load = 2.15E-02
Spent Catalyst	PM	De-minimus	NA – de-minimus

Taken from Exhibit C - EMISSIONS INVENTORY – CONTROLS TECHNOLOGY REVIEW FOR DAVIS REFINERY. VEPICA, 2016. Doc. N° P-5715043-01-001-18035-I001.

Table 4. Davis Refinery Summary of Potential to Emit

	Criteria Pollutants										HAPs
Emissions Unit	CO	Pb	PM<10	Filerable PM <10	PM <2.5	Filterable PM <2.5	Condensable PM	NO_x (as NO_2)	SO_2	VOC	Total HAPs
Leaks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	21.06	2.39
Tanks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.17	4.48
Stationary Combustion Sources	91.42	1.60E-03	8.00	2.00	8.00	2.00	6.00	46.40	1.92	17.61	1.62
Fluid Catalytic Cracking Unit	0.00	2.03E-05	1.00	0.66	0.91	0.57	0.34	3.73	6.65	5.77	0.87
Catalytic Reforming Unit	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.79
Sulfur Recovery Plant	2.15	0.00	0.00	0.00	0.00	0.00	0.00	0.47	0.20	1.50	0.00
Vacuum Systems	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Blowdown System	0.83	0.00	0.01	0.01	0.01	0.01	0.00	3.66	5.20	0.15	0.00
Flares	0.25	4.38E-06	0.04	0.01	0.04	0.01	0.03	0.27	0.005	0.05	0.00
Wastewater	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.52	0.52
Cooling Towers	0.00	0.00	1.86	0.00	0.00	0.00	0.00	0.00	0.00	0.35	0.00
Rail Product Loading	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.81	0.00
Truck Product Loading	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.73	0.00
Fugitive Dust	0.00	0.00	1.33	0.00	5.65E-04	0.00	0.00	0.00	0.00	0.00	0.00
Total STPY	**94.65**	**1.62E-03**	**12.24**	**2.68**	**8.96**	**2.59**	**6.37**	**54.53**	**13.97**	**69.78**	**10.67**

Taken from Table 4, Exhibit B- EMISSIONS INVENTORY. VEPICA, 2016. Doc. N° P-5715043-01-001-18042-I001.

Table 5. Davis Refinery Phase 1 Summary of Potential to Emit

	Criteria Pollutants										HAPs
Emissions Unit	CO	Pb	PM<10	Filerable PM <10	PM <2.5	Filterable PM <2.5	Condensable PM	NO_X (as NO_2)	SO_2	VOC	Total HAPs
Leaks	0.00	0.0000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.24	0.37
Tanks	0.00	0.0000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.32	2.24
Stationary Combustion Sources	33.82	0.0006	4.83	1.21	4.83	1.21	3.62	36.23	0.71	6.51	0.60
Fluid Catalytic Cracking Unit	0.00	0.0000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Catalytic Reforming Unit	0.00	0.0000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.55
Sulfur Recovery Plant	2.15	0.0000	0.00	0.00	0.00	0.00	0.00	0.47	0.20	0.64	0.00
Vacuum Systems	0.00	0.0000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Blowdown System	0.41	0.0000	0.00	0.00	0.00	0.00	0.00	1.83	2.60	0.08	0.00
Flares	0.21	3.72E-06	0.03	0.01	0.03	0.01	0.02	0.23	0.004	0.04	0.00
Wastewater	0.00	0.0000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.23	0.26
Cooling Towers	0.00	0.0000	0.93	0.00	0.00	0.00	0.00	0.00	0.00	0.18	0.00
Rail Product Loading	0.00	0.0000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.17	0.00
Truck Product Loading	0.00	0.0000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.28	0.00
Fugitive Dust	0.00	0.0000	0.00	0.00	3.13E-04	0.00	0.00	0.00	0.00	0.00	0.00
Total STPY	**36.59**	**0.0006**	**5.80**	**1.22**	**4.86**	**1.22**	**3.65**	**38.76**	**3.51**	**27.72**	**4.01**

6 CRITERIA POLLUTANTS –AMBIENT AIR QUALITY STANDARDS

The Clean Air Act ***("CAA")*** requires states to develop a general plan to attain and maintain the National Ambient Air Quality Standards ***("NAAQS")*** in all areas of the country and a specific plan to attain the standards for each area designated nonattainment for a NAAQS. The EPA has established in 40 CFR 50, the NAAQS for *"criteria pollutants"*: nitrogen dioxide (NO_2), CO, sulfur dioxide (SO_2), particles finer than 10 microns in size (PM_{10}), particles finer than 2.5 microns in size ($PM_{2.5}$), ozone (of which VOCs are a precursor) and airborne lead (Pb). The EPA has approved North Dakota's State Implementation Plan ***("SIP")***, and has delegated the authority for approval of permits for new stationary sources of air contaminants subject to regulation under the CAA to the NDDH.

The North Dakota SIP identifies the emissions control requirements the state will rely upon to attain and/or maintain the primary and secondary NAAQS. Consequently, the NDDH has adopted in NDAC 33-15-02, as mandated by North Dakota Century Code 23-25-03.2 and 23-25-03-3, Ambient Air Quality Standards affecting petroleum refineries which are equivalent to federal rules or standards under the CAA.

North Dakota and National Ambient Air Quality Standards (AAQS) Criteria Pollutants (µg/m^3)

Averaging Period	Sulfur Dioxide (SO_2) µg/m^3	Hydrogen Sulfide (H_2S) µg/m^3	Particulates (PM_{10}) µg/m^3	Particulates (PM_{10}) µg/m^3	Carbon Monoxide (CO) µg/m^3	Nitrogen Dioxide (NO_2)µg/m^3	Ozone[2] (O_3) µg/m^3
Annual	80	-	50	12	-	100	-
24-hour	365[1]	140	150[1]	35	-	-	-
8-hour	-	-	-	-	10,000[1]	-	147
3-hour	1,300[1]	-	-	-	-	-	-
1-hour	196	280	-	-	40,000[1]	188	235

[1] One exceedance per year is permitted.
[2] VOCs are a precursor.

The proposed Davis Refinery is a *"designated air contaminant source"* under NDAC 33-15-14-01; therefore, it is subject to the permitting requirements and emission limitations for new stationary source of air contaminants subject to regulation, also known as *"criteria pollutants"* or *"regulated NSR pollutants"*, to ensure compliance with North

Dakota's SIP. North Dakota's SIP classifies sources of regulated NSR pollutants in accordance with Section 112 of the CAA.

Major Sources are defined in NDAC 33-15-14-06 as:

"(1) A major source under section 112 of the Federal Clean Air Act, and (2) A major stationary source of air contaminants, that directly emits or has the potential to emit, one hundred tons [90.68 metric tons] per year or more of any air contaminant subject to regulation (including any major source of fugitive emissions of any such contaminant, as determined by rule by the administrator of the United States environmental protection agency). For purposes of this definition, air contaminant subject to regulation does not include greenhouse gases as defined in title 40, Code of Federal Regulations, 86.1818-12(a)."

As allowed under the provisions of 33-15-14-06, minor sources of NSR regulated pollutants are those that do not exceed the major source thresholds for criteria pollutants under their physical and operational design, including the effect of add-on pollution controls or restrictions on hours of operation that are proposed as part of the design.

Based on the PTE of regulated NSR pollutants from the proposed facilities, summarized in Section 5 above, the proposed Davis Refinery qualifies as a Minor Synthetic Source of regulated NSR pollutants.

7 HAZARDOUS AIR POLLUTANTS AND THE AIR TOXICS POLICY

Under the EPA approved North Dakota SIP, codified in the North Dakota Air Pollution Control Rules, the NDDH has authority to establish limits of HAP emissions in accordance with section 33-15-02-04(3) which states, *"The ambient air shall not contain air contaminants in concentrations that would be injurious to human health or well-being or unreasonably interfere with the enjoyment of property or that would injure plant or animal life. The Department may establish, on a case-by-case basis, specific limits of concentration for these contaminants."*

North Dakota's Air Toxics Policy delineates the NDDH policy with respect to the control of routine releases of HAPs. The Air Toxics Policy is compliant with the residual risk provisions of the Clean Air Act and is applicable to all new or modified air contaminant sources, as designated in NDAC 33-15-14-01 of the North Dakota Air Pollution Control Rules, which are required to submit an application for a PTC under NDAC 33-15-14-02.

The North Dakota Air Pollution Control Rules adopt in whole or in part the Federal standards that regulate for both large and small sources of HAPs, under the authority of Title I, part A, Section 112 of the CAA. As with the standards for criteria pollutant, the EPA has developed national requirements for emissions of HAPs known as "National Emission Standards for Hazardous Air Pollutants ***("NESHAP")***" codified in 40 CFR Part 61, and requirements for specific categories of HAP emitting stationary sources codified in 40 CFR Part 63 "National Emission Standards for Hazardous Air Pollutants for Source Categories", also known as Maximum Achievable Control Technology ***("MACT")*** standards. NDAC 33-15-13 identifies the applicable requirements of 40 CFR 61, and NDAC 33-15-22 identifies the applicable requirements of 40 CFR 63, that have been adopted by the State of North Dakota.

As with sources of air contaminants, North Dakota's SIP classifies sources of HAPs in accordance with Section 112 of the CAA. Major sources of HAPs are those stationary sources with a PTE any single HAP in excess of 10 TPY or combined HAPs in excess of 25 TPY. Minor sources of HAPs, also called "area sources" are those that do not exceed the major source thresholds under their physical and operational design.

Based on the PTE of HAPs from the proposed facilities, the proposed Davis Refinery qualifies as an Area Source of HAPs.

7.1 STATE AIR TOXICS POLICY

The Policy for the Control of Hazardous Air Pollutants in North Dakota (Air Toxics Policy) is applicable to the proposed Davis Refinery and must be followed to ascertain the health-related risks represented by proposed new source of HAP emissions. In order to determine compliance with the NDDH *"Policy for the Control of Hazardous Air Pollutant Emissions in North Dakota"*, dispersion modeling is used to determine the maximum off-property, ground-level ambient concentration of each HAP emitted.

HAP emissions are classified into one of three categories:

1. known human carcinogens,
2. suspected or reasonably anticipated human carcinogen, and
3. noncarcinogen or substance lacking sufficient data to determine carcinogenicity.

These classifications are identified as Group 1, Group 2, and Group 3 HAP emissions, respectively. The NDDH recommends a three-tiered approach of decreasing conservatism to calculate the maximum off-property, ground-level ambient concentration of each HAP. Three tiers of analyses are not required if compliance with the Maximum Individual Carcinogenic Risk ***("MICR")*** and Maximum Acceptable Ambient Levels ***("MAAL")*** can be shown through Tier I and/or II. Since modeling for compliance with Significant Impact Levels for Class I and Class II areas was undertaken by Meridian, we completed a Tier III analysis, for combined HAPs and utilized the weighted concentration of the HAP emissions to compare to MICR and MAAL results. Results of this analysis are included in the detailed Modeling Analysis Report for Meridian which is submitted under separate cover.

8 PREVENTION OF SIGNIFICANT DETERIORATION (PSD) APPLICABILITY (40 CFR 52) - NEW SOURCE REVIEW (NSR)

According to 40 CFR 81.335, Billings County in North Dakota is an attainment or unclassifiable area for all criteria pollutants. New sources of emissions located in an attainment or unclassifiable area must be reviewed for applicability under an EPA-approved Prevention of Significant Deterioration ***("PSD")*** program. North Dakota implements an EPA-approved PSD program in accordance with the provisions of NDAC 33-15-15 which adopt in whole or in part the Federal PSD regulations (40 CFR 52). Ambient impacts analyses specified by the PSD rules are required if the source is classified as a *"major stationary source"* under the rules.

Petroleum refineries are a listed source category in the PSD rules. For listed sources categories, like refineries, fugitive emissions must be counted toward major source applicability. The proposed Davis Refinery is a new stationary source, thus, the PSD applicability analysis herein focuses on the new source provisions of the North Dakota PSD program as they may apply to the facility.

Specifically, the facility-wide PTE of a pollutant is considered "significant" if it exceeds the annual emission rates known as significant impact levels ***("SILs")***. If emissions of all regulated NSR pollutants are less than the SILs, PSD review is not required.

Summary of Class I and Class II Significant Impact Levels ($\mu g/m^3$)

	1-hour		3-hour		8-hour		24-hour		Annual	
Pollutant	**Class I**	**Class II**	**Class I**	**Class II**	**Class I**	**Class II**	**Class I**	**Class II**	**Class I**	**Class II**
SO_2	--	7.8	1.0	25	--	--	0.2	5	0.1	1
NO_2	--	7.5	--	--	--	--	--	--	0.1	1
PM_{10}	--	--	--	--	--	--	0.2	5	0.1	1
$PM_{2.5}$	--	--	--	--	--	--	0.07	1.2	0.06	0.3
CO		2,000	--	--	--	500	--	--	--	--

The SIP also identifies the allowable increments in air pollution at Class I, and Class II areas. PSD increments prevent the air quality in clean areas from deteriorating to the level set by the AAQS. The AAQS is a maximum allowable concentration or *"ceiling,"* while a PSD increment, on the other hand, is the maximum allowable increase in concentration that is allowed to occur above a baseline concentration for a pollutant. Significant deterioration is said to occur when the amount of new pollution would exceed the applicable PSD increment.

North Dakota / National Prevention of Significant Deterioration (PSD)
Class II Increments Criteria Pollutants (µg/m^3)

Averaging Period	Sulfur Dioxide (SO_2) µg/m^3	Hydrogen Sulfide (H_2S) µg/m^3	Particulates (PM_{10}) µg/m^3	Particulates (PM_{10}) µg/m^3	Carbon Monoxide (CO) µg/m^3	Nitrogen Dioxide (NO_2)µg/m^3	Ozone[2] (O_3) µg/m^3
Annual	80	-	50	12	-	100	-
24-hour	365[1]	140	150[1]	35	-	-	-
8-hour	-	-	-	-	10,000[1]	-	147
3-hour	1,300[1]	-	-	-	-	-	-
1-hour	196	280	-	-	40,000[1]	188	235

[1] One exceedance per year is permitted.
[2] VOCs are a precursor.

North Dakota / National Prevention of Significant Deterioration (PSD)
Class I Areas PSD Increments and Significant Impact Levels (µg/m^3)

Pollutant / Averaging Time	Significant Impact Level (µg/m^3)	PSD Increment (µg/m^3)
PM_{10}; Annual	0.1/0.2[1]	4
PM_{10}; 24 hour	0.2/0.3[1]	8
SO_2; Annual	0.1	2
SO_2; 24 hour	0.2	5
SO_2; 3 hour	1.0	25
NO_2; Annual	0.1	2.5

[1] North Dakota vs. National

In accordance with NDAC 33-15-15, *"the Prevention of Significant Deterioration (PSD) program means a major source preconstruction permit program administered by the department that has been approved by the administrator of the United States environmental protection agency and incorporated into the state implementation plan*

pursuant to 40 CFR 51.166 to implement the requirements of that section. Any permit issued by the department under the program is a major NSR permit."

The requirements of the PSD program only apply to Major Sources. Based on the PTE of the proposed facilities under their physical and operational design, including the effect of add-on pollution controls, the proposed Davis Refinery qualifies as a Synthetic Minor Source.

Even though PSD review is not triggered for minor sources of air pollution, the PTE of all regulated NSR pollutants by the proposed Davis Refinery were reviewed to determine if the facility-wide PTE of any pollutant is considered "significant". The results of the airshed modeling conducted for the proposed Davis Refinery, in accordance with NDDH approved modeling protocols, indicates that emissions of all regulated NSR pollutants are less than the PSD significant emission rates; confirming that complete PSD review is not required for the proposed Davis Refinery. As a Synthetic Minor Source the facility is not subject to the ambient impacts analysis requirements of the PSD program.

8.1 NORTH DAKOTA AIR QUALITY CONSTRUCTION PERMITS

The provisions of NDAC 33-15-14 prohibits the construction, installation or establishment of a new stationary source unless the owner or operator has filed an application for and received a Permit to Construct in accordance this chapter. A Permit to Construct from the NDDH Air Quality Section is required for any new stationary source, or modification to an existing source, within a source category designated in Section 33-15-14-01. The proposed Davis Refinery is a "designated air contaminant source" under NDAC 33-15-14-01; therefore, it requires a Permit to Construct.

Construction Permitting is based on the facility's PTE for Criteria Pollutants (CO, Pb, NOx, PM_{10}, $PM_{2.5}$, O_3, SO_2) and HAPs. PTE also includes the effect of add-on emission control technology, if enforceable by permit. The level of PTE determines what type of permit a facility falls under.

North Dakota's Permits to Construct fall into two main groups: minor sources and major (Title V) sources. Within minor sources are true minor sources with no federally enforceable limits and synthetic minor sources where a source accepts a federally

enforceable operating limit to stay under major source limits. Within major sources there are those subject to the additional requirements of North Dakota's PSD program. The table below summarizes permit types with their corresponding PTE limits.

Permit Types and PTE Limits

Permit Type	Criteria Air Pollutant Limit [1]	Combined Hazardous Air Pollutant (HAP) Limit [2]	Single HAP Limit	Federally Enforceable Limits (Y/N)
Minor Source	<100 tons/yr	< 25 tons/yr	< 10 tons/yr	No
Synthetic Minor Source [3]	**<100 tons/yr**	**< 25 tons/yr**	**< 10 tons/yr**	**Yes**
Major (Title V) Source [4]	≥100 tons/yr	≥ 25 tons/yr	≥ 10 tons/yr	Yes
PSD Major (Title V) Source [4]	≥250 tons/yr	≥ 25 tons/yr	≥ 10 tons/yr	Yes

[1]Criteria Pollutant Criteria Air Pollutant limit applies to each individual pollutant and is not a combined total amount.

[2] List of Hazardous Air Pollutants

[3] Sources that have the potential to emit 100 ton/yr or greater of a criteria pollutant, 10 ton/yr or greater of any hazardous air pollutant, or 25 ton/yr or greater of any combination of hazardous air pollutants, and the permittee accepts a federally enforceable limit in the Permit to Operate that limits the potential to emit to the same criteria specified for a minor source.

[4] In addition, some sources will require a Title V permit because of applicability under the Prevention of Significant Deterioration (PSD) program; PSD levels apply to construction permits not to operating permits.

NDDH may impose any reasonable conditions upon a permit to construct, including:

a. Sampling, testing, and monitoring of the facilities or the ambient air or both.
b. Trial operation and performance testing.
c. Prevention and abatement of nuisance conditions caused by operation of the facility.
d. Recordkeeping and reporting.
e. Compliance with applicable rules and regulations in accordance with a compliance schedule.
f. Limitation on hours of operation, production rate, processing rate, or fuel usage when necessary to assure compliance with this NDAC 33-15-14.

In accordance with the allowable provisions of 33-15-14, and based on the PTE of regulated NSR pollutants from the proposed Davis Refinery, under its physical and operational design and including the effect of add-on air pollution control equipment, the

proposed facility can qualify as a Synthetic Minor Source. The proposed emissions controls to limit air contaminant emissions to levels below Major Source thresholds are proven technologies that have been successfully implemented at other refineries. Emissions controls will include but not be limited to Low NOx burner design and Selective Catalytic Reduction for gas fired equipment, selected tanks with internal floating roof, vapor recovery on certain tanks and at truck and rail loading facilities, automated leak detection systems, and continuous emissions monitoring on select equipment to ensure that there are no exceedances of "Emissions allowable under the permit".

"Emissions allowable under the permit" have the meaning given in NDAC 33-15-14-06 and "*means a federally enforceable permit term or condition determined at issuance to be required by an applicable requirement that establishes an emissions limit (including a work practice standard) or a federally enforceable emissions cap that the source has assumed to avoid an applicable requirement to which the source would otherwise be subject.*"

Meridian will accept federally enforceable limits in the Permit to Construct subject to this permit action, limiting the facility-wide PTE of CO, NOx, PM_{10}, $PM_{2.5}$, O_3 (as VOCs), SO_2 and HAPs to the proposed limits specified in Table 4 of Section 5 in order to ensure compliance with Ambient Air Quality Standards and the Air Toxics Policy.

9 TITLE V APPLICABILITY

The provisions of 40 CFR 70 provides for the establishment of comprehensive State air quality permitting programs consistent with the requirements of Title V of the 1990 Clean Air Act Amendments (CAAA): North Dakota's federally-approved Part 70 permit program is codified in NDAC 33-15-14-06.

The proposed Davis Refinery qualifies as a Synthetic Minor Source and as such requires a PTC under NDAC 33-15-14-02. The PTC subject to this permit action application, includes federally enforceable limits of CO, NOx, PM10, PM2.5, O3 (as VOCs), SO_2 and HAPs, from the proposed facilities, to effectively limit emissions from the proposed Davis Refinery to below Major Source thresholds. Therefore, the proposed Davis Refinery is not subject to Title V of the 1990 Clean Air Act.

In accordance with the Minor Source Permit to Operate provisions of NDAC 33-15-14-03: *"no person may operate or cause the routine operation of an installation or source designated in section 33-15-14-01 without applying for and obtaining, in accordance with this section, a permit to operate. Application for a permit to operate a new installation or source must be made at least thirty days prior to startup of routine operation. Those sources that received a permit to construct under section 33-15-14-02, need only submit a thirty-day prior notice of proposed startup to satisfy the requirement to apply for a permit to operate under this subdivision."*

A Minor Source Permit to Operate for sources that received a permit to construct under section 33-15-14-02, will only be granted by NDDH after *"the applicant can show to the satisfaction of the department that the source is in compliance…"* Compliance is demonstrated through performance testing, and the dates and periods of trial operation for the purpose of performance or emission testing must be approved in advance by NDDH. Once the permit to construct is granted, and in accordance with the provisions of 33-15-14-03, Meridian will apply for a Permit to Operate the proposed Davis Refinery at least thirty days prior to the start-up of routine operations. In order to satisfy the Minor Source Permit to Operate application requirements, Meridian need only submit a thirty-day prior notice of proposed startup and ensure performance testing is completed in accordance with NDDH requirements.

10 REGULATORY FRAMEWORK

This section summarizes the primary applicable air quality regulations for the proposed refinery. In this section, a comprehensive analysis of the regulatory framework applicable to the proposed Davis Refinery is presented, as well as the justification of the type of permit Meridian will be applying for the facility.

10.1 SUMMARY OF STATE AND FEDERAL RULE APPLICABILITY:

The table below summarizes the state and federal regulations applicability for the proposed project.

Summary of State and Federal Regulations Applicability

Program / Standard	Code	Applicability
NORTH DAKOTA AIR POLLUTION CONTROL RULES	NDAC 33-15	Yes
General Provisions	NDAC 33-15-01	Yes
Ambient Air Quality Standards	NDAC 33-15-02	Yes
Restriction of Emission of Visible Air Contaminants	NDAC 33-15-03	Yes
Emissions of Particulate Matter Restricted	NDAC 33-15-05	Yes
Emission of Sulfur Compounds Restricted	NDAC 33-15-06	No
Control of Organic Compounds Emissions	NDAC 33-15-07	Yes
Control of Air Pollution from Vehicles and Other Internal Combustion Engines	NDAC 33-15-08	Yes
Prevention of Air Pollution Emergency Episodes	NDAC 33-15-11	Yes
Standards of Performance for New Stationary Sources	NDAC 33-15-12	Yes
Emission Standards for Hazardous Air Pollutants	NDAC 33-15-13	Yes
Designated Air Contaminant Sources, **Permit to Construct,** Minor Source Permit to Operate, Title V Permit to Operate	NDAC 33-15-14	Yes
Prevention of Significant Deterioration (PSD) of Air Quality	NDAC 33-15-15	Yes
Restriction of Odorous Air Contaminants	NDAC 33-15-16	Yes
Restriction of Fugitive Emissions	NDAC 33-15-17	Yes
Stack Heights	NDAC 33-15-18	Yes
Visibility Protection	NDAC 33-15-19	No
Acid Rain Program	NDAC 33-15-21	No
Emission Standards for HAP for Source Cateogories	NDAC 33-15-22	Yes
Fees	NDAC 33-15-23	Yes
Standards for Lead-based Paint Activities	NDAC 33-15-24	No
Regional Haze Requirements	NDAC 33-15-25	No

Program / Standard	Code	Applicability
NATIONAL AMBIENT AIR QUALITY STANDARDS (NAAQS)	40 CFR 50	Yes
NEW SOURCE REVIEW (NSR)	40 CFR 52	Yes
STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES, known as New Source Performance Standards (NSPS)	40 CFR 60	Yes
SUBPART A - General Provisions	40 CFR 60	Yes
SUBPART Db — Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units (§§ 60.40c - 60.48c)	40 CFR 60	No
SUBPART Dc — Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units (§§ 60.40c - 60.48c)	40 CFR 60	Yes
SUBPART Ja — Standards of Performance for Petroleum Refineries for Which Construction, Reconstruction, or Modification Commenced After May 14, 2007 (§§ 60.100a - 60.109a)	40 CFR 60	Yes
SUBPART Kb – Standards of Performance for Volatile Organic Liquid (VOL) Storage Vessels (Including Petroleum Liquid Storage Vessels) for which Construction, Reconstruction or Modification Commenced after July 23, 1984 (§§ 60.110a - 60.115a)	40 CFR 60	Yes
SUBPART VVa - Standards of Performance for Equipment Leaks of VOC in the Synthetic Organic Chemicals Manufacturing Industry for Which Construction, Reconstruction or Modification Commenced After November 7, 2006 (§§ 60.480a - 60.489a)	40 CFR 60	Yes[1]
SUBPART GGGa — Standards of Performance for Equipment Leaks of VOC in Petroleum Refineries for Which Construction, Reconstruction, or Modification Commenced After November 7, 2006 (§§ 60.590a - 60.593a)	40 CFR 60	Yes
SUBPART IIII – Standards of Performance for Stationary Compression Ignition Internal Combustion Engines	40 CFR 60	Yes
SUBPART NNN – Standards of Performance for Volatile Organic Compound (VOC) Emissions From Synthetic Organic Chemical Manufacturing Industry (SOCMI) Distillation Operations	40 CFR 60	Yes[2]
SUBPART QQQ — Standards of Performance for VOC Emissions From Petroleum Refinery Wastewater Systems (§§ 60.690 - 60.699)	40 CFR 60	Yes
NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS (NESHAPs)	40 CFR 61	Yes
SUBPART A - General Provisions	40 CFR 61	Yes
SUBPART J — National Emission Standard for Equipment Leaks (Fugitive Emission Sources) of Benzene (§§ 61.110 - 61.112)	40 CFR 61	Yes
SUBPART V — National Emission Standard for Equipment Leaks (Fugitive Emission Sources) (§§ 61.240 - 61.247)	40 CFR 61	Yes
SUBPART FF — National Emission Standard for Benzene Waste Operations (§§ 61.340 - 61.359)	40 CFR 61	Yes
NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS FOR SOURCE CATEGORIES (also known as Maximum Achievable Control Technology -MACT- standards and Generally Available Control Technology -GACT- standards)	40 CFR 63	Yes[3]

Program / Standard	Code	Applicability
SUBPART A - General Provisions	40 CFR 63	Yes
SUBPART ZZZZ -National Emission Standards for Hazardous Air Pollutants for Reciprocating Internal Combustion Engines	40 CFR 63	No[4]
SUBPART BBBBBB - National Emission Standards for Hazardous Air Pollutants for Source Category: Gasoline Distribution Bulk Terminal, Bulk Plant and Pipeline Facilities	40 CFR 63	Yes
SUBPART JJJJJJ -National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers at Area Sources	40 CFR 63	No[5]
Risk Management Programs for Chemical Accidental Release Prevention	40 CFR 68	Yes
Title V Operating Permit	40 CFR 70	No
Compliance Assurance Monitoring	40 CFR 64	No
Acid Rain Requirements	40 CFR 72	No
Stratospheric Ozone Protection Requirements	40 CFR 82	No
Mandatory Greenhouse Gas Reporting	40 CFR 98	Yes

[1] Applicable portions referenced in 40 CFR 60 Subpart GGGa .

[2] Applicable to process units in which LPG, light Naphtha and Gasoline range compounds are generated as a product, co-product, by-product or intermediate.

[3] Only those Subparts applicable to Area Sources of HAPs.

[4] NDAC 33-15-22 has only adopted those provisions applicable to major sources of HAPs. The proposed Davis Refinery qualifies as an Area Source of HAPs.

[5] NDAC 33-15-22 has only adopted those provisions applicable boilers with a heat input of ten million Btu per hour or more.

10.2 STATE OF NORTH DAKOTA AIR QUALITY RULES

This section details the applicability to the proposed Davis Refinery of the State of North Dakota Air Pollution Control Rules codified in NDAC Chapters 33-15-01 through 33-15-25. Refer to Section 11 of this permit application for compliance demonstration for the North Dakota Air Pollution Control Rules.

10.2.1 General Provisions (33-15-01)

The general provisions of chapter 33-15-01 addresses the following: entry onto premises, authority, variances, circumvention, severability, land use plans and zoning regulations, measurement of air contaminants, shutdown and malfunction of an installation, requirements for notification, time schedule for compliance, prohibition of air pollution, “confidentiality" of records, enforcement, and compliance certifications. Meridian will be subject to the provisions of this chapter and will comply with the provisions of the chapter after construction of the proposed Davis Refinery.

10.2.2 Ambient Air Quality Standards (33-15-02)

The purpose of the State of North Dakota Ambient Air Quality Standards ***("AAQS")*** is to establish levels of air quality for the maintenance of public health and welfare and to provide guidance to governmental and other parties interested in abating air pollution. The North Dakota SIP identifies the emissions control requirements the state will rely upon to attain and/or maintain the primary and secondary NAAQS. Consequently, NDDH has adopted in NDAC 33-15-02, as mandated by North Dakota Century Code 23-25-03.2 and 23-25-03-3, Ambient Air Quality Standards affecting petroleum refineries which are equal to NAAQS under the CAA.

10.2.3 Restriction of Emission of Visible Air Contaminants (33-15-03)

The provisions of this chapter prohibit new sources from producing visible emissions of greater than 20 percent opacity, with the exception that 40 percent opacity is permissible for not more than one 6-minute period per hour. As a new source, the proposed Davis Refinery is subject to the restrictions of 33-15-03.

10.2.4 Emissions of Particulate Matter Restricted (33-15-05)

The provisions of 33-15-05-01 regulate particulate matter from "*any operation, process, or activity from which particulate matter is emitted except the burning of fuel for indirect heating in which the products of combustion do not come into direct contact with process materials."* The FCC reactor, catalyst handling and regeneration at the CRUs, elemental sulfur handling from the SRU, thermal oxidizer and flares, as well as the emergency diesel generator and the diesel engine driven backup firewater pumps will be subject to the provisions of 33-15-05-01.

The provisions of 33-15-05-02 regulate particulate matter from indirect heating equipment *"in which fuel, including any products or byproducts of the manufacturing process, is burned for the primary purpose of producing steam, hot water, hot air, or other indirect heating of liquids, gases, or solids and, in the course of doing so, the products of combustion do not come into direct contact with process materials."* However, it exempts fuel burning equipment in which a gaseous fuel is burned alone or in combination with other gaseous fuels. At the proposed Davis Refinery, the process heaters and boilers, meet

the definition of indirect heating units, however, since they are fired on refinery fuel gas, are exempt from the provisions of 33-15-05-02.

10.2.5 Emissions of Sulfur Compounds Restricted (33-15-06)

This chapter applies to any installation in which fuel is burned, in which the SO_2 emissions are substantial due to the sulfur content of the fuel burned, and in which the fuel is burned primarily to produce heat. This chapter is not applicable to installations which are subject to a SO_2 emission limit under Chapter 33-15-12, Standards of Performance for New Stationary Sources. The proposed Davis Refinery is subject to the requirements of 40 CFR 60 Subpart Ja at its process heaters, boilers, flares, thermal oxidizers, refinery process vents and sulfur recovery units, and the requirements of 40 CFR 60 Subpart IIII at its emergency diesel generator and firewater diesel backup pumps, therefore, it is not subject to the provisions of this chapter.

10.2.6 Control of Organic Compounds Emissions (33-15-07)

The provisions of this chapter establish requirements for the construction of facilities that generate organic compounds and vapors and the manner of organic compounds and vapors disposal. The proposed Davis refinery will be subject to requirements outlined this chapter for water treatment facilities, tanks, loading facilities, pumps and compressors, organic vapors and H_2S emission control (via vapor recovery or flaring).

10.2.7 Control of Air Pollution from Internal Combustion Engines (33-15-08)

The provisions of this chapter prohibit the operation of any internal combustion engine from any source which emits *"any unreasonable and excessive smoke, obnoxious or noxious gases, fumes or vapor"*. The emergency diesel generator and the firewater diesel backup pumps will be driven by internal combustion engines which are subject to compliance with this chapter.

10.2.8 Prevention of Air Pollution Emergency Episodes (33-15-11)

The provisions of this chapter pertain to the NDDH declaring an air pollution emergency and its effect on the operations of sources of regulated air contaminants. When an air pollution emergency episode is declared by the Department, Meridian shall comply with the requirements contained in this chapter.

10.2.9 Standards of Performance for New Stationary Sources (33-15-12)

The North Dakota Standards of Performance for New Stationary Sources adopt in whole or in part the Federal NSPS regulations in 40 CFR 60. NDAC 33-15-12 identifies the applicable requirements of the Federal NSPS regulations adopted by the State. Consequently, the proposed Davis Refinery will be subject to the following provisions of NSPS:

Subpart Dc – Standards of Performance for Small _Industrial-Commercial-Institutional Steam Generating Units

Subpart Ja – Standards of Performance for Petroleum Refineries

Subpart Kb – Standards of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced After July 23, 1984

Subpart GGGa – Standards of Performance for Equipment Leaks of VOC Emissions in Petroleum Refineries

Subpart IIII – Standards of Performance for Stationary Compression Ignition Internal Combustion Engines

Subpart QQQ – Standards of Performance for VOC Emissions from Petroleum Refinery Wastewater Systems.

10.2.10 Emission Standards for Hazardous Air Pollutants (33-15-13)

The North Dakota Emission Standards of Hazardous Air Pollutants adopt in whole or in part the Federal NESHAPs in 40 CFR 61. NDAC 33-15-13 identifies the applicable requirements of the Federal NESHAP regulations adopted by the State. Consequently, the proposed Davis Refinery will be subject to the following provisions of 40 CFR 61:

Subpart J – National Emissions Standards for Equipment Leaks (Fugitive Emission Sources) of Benzene

Subpart V – National Emissions Standards for Equipment Leaks (Fugitive Emission Sources)

Subpart FF – National Emissions Standards for Benzene Waste Operations

10.2.11 Designated Air Contaminant Sources, Permit to Construct, Minor Source Permit to Operate, Title V Permit to Operate (33-15-14)

The Davis Refinery is a *"designated air contaminant source"* under NDAC 33-15-14-01; therefore, a permit to construct a new stationary source of air contaminants subject to regulation or "regulated NSR pollutants". Major sources are defined in accordance with Section 112 of the Federal Clean Air Act as those with a PTE any air contaminant subject to regulation in excess of 100 TPY, or any single HAP in excess of 10 TPY or combined HAPs in excess of 25 TPY. In accordance with the definitions of 33-15-14-06, air contaminant subject to regulation does not include greenhouse gases as defined in 40 CFR 86.1818-12(a). As allowed under the provisions of 33-15-14-06 minor sources are those that do not exceed the major source thresholds under their physical and operational design, including the effect of add-on pollution controls.

In accordance with the allowable provisions of 33-15-14, and based on the PTE of regulated NSR pollutants from the proposed Davis Refinery, under its physical and operational design and including the effect of add-on air pollution control equipment, Meridian is pursuing a PTC for the proposed Davis Refinery which includes proposed synthetic minor emission limits for regulated air contaminants.

Once the permit to construct is granted, and in accordance with the provisions of 33-15-14-03, Meridian must apply for a permit to operate the proposed Davis Refinery at least thirty days prior to the start-up of routine operations. In order to satisfy this requirement, Meridian need only submit a thirty-day prior notice of proposed startup and satisfy compliance requirements for a Minor Source Permit to Operate.

10.2.12 Prevention of Significant Deterioration of Air Quality (33-15-15)

The North Dakota Prevention of Significant Deterioration ***("PSD")*** regulations adopt in whole or in part the Federal PSD regulations. NDAC 33-15-15 identifies the applicable requirements of the Federal PSD regulations adopted by the State. As previously discussed, the proposed Davis Refinery qualifies as a Synthetic Minor Source and thus the facility is not subject to the ambient impacts analysis requirements of the PSD program.

10.2.13 Restriction of Odorous Air Contaminants (33-15-16)

In areas located outside a city or outside the area over which a city has exercised extraterritorial zoning as defined in ND Century Code 40-47-01.1, a person may not discharge into the ambient air any objectionable odorous air contaminant that measures seven odor concentration units or higher outside the property boundary where the discharge is occurring. The Davis Refinery is subject to the provisions of chapter 33-15-07 for controls of organic compound and H2S emissions and furthermore is required to be well-controlled for emissions to meet the Minor Synthetic Source levels provisions of chapter 33-15-14, so odorous emissions from the proposed Davis Refinery are not anticipated.

10.2.14 Restriction of Fugitive Emissions (33-15-17)

This chapter restricts fugitive emissions from any source without taking reasonable precautions to prevent such emissions from causing air pollution. The proposed Davis Refinery is a designated source of air pollution, and as such, quantifiable fugitive emissions must be accounted for in the refinery-wide PTE estimation and must be controlled to ensure the proposed synthetic minor emission limits for CO, SO2, NOx, VOCs and HAPs are met.

10.2.15 Stack Heights (33-15-18)

The general provisions of this chapter restrict the use of stack heights above good engineering practices (GEP) as well as other dispersion techniques to affect the concentration of a pollutant in the ambient air. Stack heights at the proposed Davis Refinery will not exceed GEP or use other dispersion techniques described in 33-15-18-01 to affect the degree of emission limitation required.

10.2.16 Visibility Protection (33-15-19)

New major sources as defined in Chapter 33-15-15 are required to demonstrate to NDDH that the actual emissions of visibility-impairing pollutants from the source, including fugitive emissions, will not cause or contribute to adverse impact on visibility within any federal Class I area if such pollutants are emitted in significant quantities. The proposed

Davis Refinery qualifies as a Minor Synthetic Source and as such not subject to the provisions of this chapter.

10.2.17 Acid Rain Program (33-15-21)

The proposed Davis Refinery is not subject to the Acid Rain Program provisions of 40 CFR Part 72-28, and consequently, not subject to the provisions of North Dakota's Acid Rain Program.

10.2.18 Emissions Standards for Hazardous Air Pollutants for Source Categories (33-15-22)

The North Dakota Emission Standards for Hazardous Air Pollutants for Source Categories adopt in whole or in part the Federal MACT regulations in 40 CFR 63. NDAC 33-15-17 identifies the applicable requirements of the Federal MACT regulations adopted by the State. Considering the proposed Davis Refinery qualifies as a Minor Synthetic Source it will only be subject to the applicable Area Source provisions of 40 CFR 63:

BBBBBB – National Emission Standards for Hazardous Air Pollutants for Source Category: Gasoline Distribution Bulk Terminals, Bulk Plants, and Pipeline Facilities

10.2.19 Fees (33-15-23)

Meridian is responsible for a $350 filing fee for construction permit applications, plus any additional fees based on actual processing costs.

10.2.20 Standards for Lead-Based Paint Activities (33-15-24)

This chapter specifies requirements for activities related to lead -based paint. The proposed Davis Refinery does not include any lead-based paint activities and thus is not subject to these requirements.

10.2.21 Regional Haze Requirements (33-15-25)

This chapter contains requirements for Best Available Retrofit Technology ***("BART")***-eligible sources, namely, fossil-fuel-fired steam electric plants. The proposed Davis Refinery is not a BART-eligible source and therefore not subject to the requirements of this chapter.

10.3 CODE OF FEDERAL REGULATIONS

10.3.1 National Ambient Air Quality Standards

Primary NAAQS define levels of air quality that the US EPA deems necessary to protect the public health. Secondary NAAQS define levels of air quality that the US EPA judges necessary to protect the public welfare (i.e., wildlife, national monuments, vegetation, visibility, and property values) from any known, or anticipated adverse effects of a pollutant.

As part of the PSD analysis, major sources or modifications of air pollution are required to demonstrate compliance with the NAAQS for pollutants emitted in a significant amount. The proposed Davis Refinery the PTE for NSR pollutants is less than SERs, further analysis -is unnecessary.

10.3.2 New Source Performance Standards

An NSPS is applicable to certain categories of affected facilities that are constructed, modified, or reconstructed and that meet other applicability criteria on or after a compliance date upon which a relevant subpart applies. The following sections provide a summary of NSPS applicability and emission limits for petroleum refineries. Refer to Section 11 of this permit application for compliance demonstration for NSPS.

Subpart A – General Provisions

If an individual NSPS subpart is applicable to a project, the general provisions of NSPS Subpart A also apply.

Subpart Db – Standards of Performance for Industrial-Commercial- Institutional Steam Generating Units

No individual steam generating combustion unit at the proposed refinery will have a heat input capacity of 100 MMBtu/hr or greater; therefore, 40 CFR 60 Subpart Db does not apply.

Subpart Dc – Standards of Performance for Small Industrial-Commercial- Institutional Steam Generating Units

This subpart is only applicable to steam generating units that have a heat input capacity of 10-100 million Btu/hr and commence construction after June 9, 1989. The units subject to Subpart Dc include the refinery's Utility Steam Boilers.

Subpart Ja – Standards of Performance for Petroleum Refineries for Which Construction, Reconstruction, or Modification Commenced after May 14, 2007

This subpart applies to fuel gas combustion devices at petroleum refineries. Subpart Ja defines "petroleum refinery" as *"any facility engaged in producing gasoline, kerosene, distillate fuel oils, residual fuel oils, lubricants, asphalt (bitumen) or other products through distillation of petroleum or through redistillation, cracking, or reforming of unfinished petroleum derivatives."* Since the facility produces products through distillation of petroleum, it is subject to this subpart. The units subject to regulation under this subpart include refining units (ADUs, VDU, Hydrotreaters, CRUs, Isomerization, Alkylation) process heaters, flares, fluid catalytic cracking unit and the thermal oxidizer of the sulfur recovery unit.

Subpart Kb – Standards of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced After July 23, 1984

This subpart applies to each storage tank with a capacity greater than 75 cubic meters (approximately 19,800 gallons) used to store volatile organic liquids, except that the subpart does not apply to storage tanks with a capacity greater than or equal to 151 cubic meters (approximately 39,890 gallons) storing a liquid with a maximum true vapor pressure less than 3.5 kilopascals (kPa) or with a capacity greater than or equal to 75 cubic meters but less than 151 cubic meters storing a liquid with a maximum true vapor pressure less than 15.0 kPa. Based upon these criteria, tanks storing Crude Oil, are subject to Subpart Kb. Tanks associated with the Gasoline blending pool are regulated in accordance with 40 CFR 63 Subpart BBBBBB.

Subpart GGGa – Standards of Performance for Equipment Leaks of VOC in Petroleum Refineries for Which Construction, Reconstruction, or Modification Commences after November 7, 2006

Subpart GGGa applies to valves, pumps, pressure relief devices, etc. in VOC service at petroleum refineries. Therefore, equipment at the facility will be subject to this subpart. The subpart establishes standards for equipment as well as leak detection and repair requirements and references requirements in 40 CFR 60, Subpart VVa – Standards of Performance for Equipment Leaks of VOC in the Synthetic Organic Chemicals Manufacturing Industry for Which Construction, Reconstruction or Modification Commenced After November 7, 2006.

Subpart IIII – Standards of Performance for Stationary Compression Ignition Internal Combustion Engines

The provisions of this subpart are applicable to owners, and operators of stationary compression ignition ***("CI")*** internal combustion engines ***("ICE")***. The emergency generator engine and backup firewater pump engines are subject to the requirements of this subpart.

Subpart NNN – Standards of Performance for Volatile Organic Compound (VOC) Emissions From Synthetic Organic Chemical Manufacturing Industry (SOCMI) Distillation Operations

Subpart NNN applies to distillation units part of process units, that produce any of the chemicals listed in § 60.667 (e.g., Butanes, Pentanes, Benzene, Hexanes, Toluenes, Xylenes) as a product, co-product, by-product, or intermediate, for which construction, modification, or reconstruction commenced after December 30, 1983.

Distillation Unit has the meaning given is 40 CFR 60.661 *"device or vessel in which distillation operations occur, including all associated internals (such as trays or packing) and accessories (such as reboiler, condenser, vacuum pump, steam jet, etc.), plus any associated recovery system."*

Process unit has the meaning given is 40 CFR 60.661 *"equipment assembled and connected by pipes or ducts to produce, as intermediates or final products, one or more of*

the chemicals in 60.667. A process unit can operate independently if supplied with sufficient fuel or raw materials and sufficient product storage facilities."

This subpart establishes standards that limit the emissions from vent streams associated with the operation of the subject process units and include requirements for the monitoring of emissions. The process units within the proposed Davis Refinery which are associated with the generation of LPG, light naphtha and gasoline range compounds as a product, co-product, by-product, or intermediate, are subject to the applicable provisions of this subpart. These process units include Atmospheric and Vacuum Distillation, Hydrotreating, FCCU, CRU & Benzene Saturation, Isomerization and Alkylation.

Supbart QQQ – Standards of Performance for VOC Emissions from Petroleum Refinery Wastewater Systems

Subpart QQQ applies to wastewater systems at petroleum refineries for which construction, modification, or reconstruction is commenced after May 4, 1987. The affected facilities of the Davis Refinery to which Subpart QQQ applies are individual drain systems and oil-water separators. Each oil-water separator tank, slop oil tank, storage Stormwater sewer systems and wastewater treatment system ancillary equipment that does not come in contact with or store oily wastewater, is not subject to these requirements.

10.3.3 National Emission Standards for Hazardous Air Pollutants (40 CFR 61)

The National Emission Standards for Hazardous Air Pollutants (NESHAPs) are contained within 40 CFR 61. Part 61 applies to owners or operators of stationary sources for which a standard is prescribed under this part. Refer to Section 11 of this permit application for compliance demonstration with NESHAPs.

Subpart J – National Emissions Standards for Equipment Leaks (Fugitive Emission Sources) of Benzene

The provisions of this subpart apply to each of the following sources that are intended to operate in benzene service: pumps, compressors, pressure relief devices, sampling connection systems, open-ended valves or lines, valves, connectors, surge control vessels, bottoms receivers, and control devices or systems required by this subpart.

Subpart V – National Emissions Standards for Equipment Leaks (Fugitive Emission Sources)

The provisions of this subpart apply to each of the following sources that are intended to operate in volatile hazardous air pollutant (VHAP) service: pumps, compressors, pressure relief devices, sampling connection systems, open-ended valves or lines, valves, connectors, surge control vessels, bottoms receivers, and control devices or systems required by this subpart.

Subpart FF – National Emissions Standards for Benzene Waste Operations

Subpart FF applies to petroleum refineries and certain other industrial facilities and prescribes waste and water quality management to reduce benzene emissions from waste streams. The provisions of this subpart apply to individual drain systems used to convey process wastewater from a process unit, product storage tank, or waste management unit to a waste management unit. Individual drain systems include all process drains and common junction boxes, together with their associated sewer lines and other junction boxes, down to the receiving wastewater treatment system. Waste that is contained in a segregated stormwater sewer system and any gaseous stream from a waste management unit, treatment process, or wastewater treatment system routed to a fuel gas system, are exempt from compliance with the provisions of this subpart. The proposed wastewater treatment system is subject to these requirements.

10.3.4 National Emission Standards for Hazardous Air Pollutants for Source Categories (40 CFR 63)

40 CFR 63 establishes national emission standards for source categories that emit HAPs above major source thresholds. It also establishes national emission standards for area source which are defined as *"any stationary source of hazardous air pollutants that is not a major source as defined in this part"*. 40 CFR 63 is also known as Maximum Achievable Control Technology (MACT) standards for Major Sources and Generally Available Control Technology (GACT) standards for Area Sources. The major source thresholds are 10 TPY for any single HAP and/or 25 TPY of all combined HAPs. Based on its PTE the Davis Refinery qualifies as an area source of HAPs and thus only applicable GACT

standards have been reviewed. Refer to Section 11 of this permit application for compliance demonstration with GACT standards:

Subpart ZZZZ – National Emission Standards for Hazardous Air Pollutants for Reciprocating Internal Combustion Engines (RICE)

The RICE NESHAP requirements for an engine depend on whether the facility is a major source or an area source of HAP. The requirements also depend on factors including the engine size and type, construction date, and application (non-emergency or emergency). However, the State of North Dakota has only adopted in their Air Pollution Control Rules (NDAC Chapter 15) the requirements that are applicable to major sources of HAPs. Because the emergency generator and backup firewater pump will be driven by new emergency engines located at an Area Source of HAPs, the proposed Davis Refinery is not subject to the provisions of 40 CFR 63 Subpart ZZZZ.

Subpart BBBBBB – National Emission Standards for Hazardous Air Pollutants for Gasoline Distribution Bulk Terminals, Bulk Plants, and Pipeline Facilities

This subpart establishes national emission limitations and management practices for HAPs emitted from area source gasoline distribution bulk terminals, bulk plants, and pipeline facilities. This subpart also establishes requirements to demonstrate compliance with the gasoline handling facilities emission limitations and management practices. The proposed refinery is subject to 40 CFR 63 Subpart BBBBBB because the facility includes a gasoline bulk terminal.

Subpart JJJJJJ – National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers at Area Sources

The provisions of this subpart apply to industrial, commercial, or institutional boiler as defined in § 63.11237, that is located at, or is part of, an area source of hazardous air pollutants (HAP). Only the requirements that are applicable to boilers with a heat input of ten million BTU per hour or more have been adopted by the State of North Dakota in its Emission Standards for HAPs for Source Categories (NDAC 33-15-22). Gas boilers are specifically excluded from the requirements of Subpart JJJJJJ. Since the boilers at the

proposed Davis Refinery are fired on gas (either refinery gas or natural gas), the requirements of this subpart are not applicable.

10.3.5 Chemical Accident Prevention Provisions (40 CFR Part 68)

The Risk Management Program (RMP) for Chemical Accidental Release Prevention applies to facilities that produce, process, store, or use any regulated toxic or flammable substance in excess of the thresholds listed in 40 CFR 68.130. The Davis Refinery will produce, process and store of LPG, gasoline and RMP-regulated flammable substances in amounts above threshold quantities. Meridian will comply with the provisions RMP applicable to the facility.

10.3.6 Compliance Assurance Monitoring (40 CFR Part 68)

The North Dakota Compliance Assurance Monitoring ("***CAM***") provisions adopt in whole or in part the Federal CAM requirements of 40 CFR 64. NDAC 33-15-14 applies to individual emission units located at major sources, on a pollutant by pollutant basis, termed pollutant specific emissions unit ("***PSEU***"). The CAM rule exempts the permittee from the additional monitoring requirements in situations in which continuous compliance monitoring is already specified in an operating permit.

In general, CAM applies to emission units meeting the following criteria:

- The emission unit is subject to an emission limit or standard (including limits and standards contained in the SIP) for an air pollutant regulated by Part 70;
- Compliance with the applicable limit or standard is achieved through the use of add-on control equipment; and
- The emission unit has pre-controlled potential emissions of the applicable regulated air pollutant that are equal to or greater than 100 percent of the Part 70 major source level for that pollutant.

While the proposed Davis Refinery would not be a Major Source, some PSEUs at the proposed refinery meet the three criteria subjecting an emission unit to the CAM provisions of 40 CFR Part 64. This includes the storage facilities, loading facilities and the FCCU. NSPS Subpart Ja already requires compliance monitoring of the FCCU

emissions, and 40 CFR 63 Subpart BBBBBB requires compliance monitoring of storage and loading facilities.

10.3.7 Acid Rain provisions (40 CFR PARTS 72-78)

The acid rain provisions of the Clean Air Act are applicable to utilities and other facilities that combust fossil fuel to generate electricity for wholesale or retail sale. The proposed Davis Refinery will not generate electricity for wholesale or retail sale, therefore the acid rain provisions are not applicable to the proposed facility.

10.3.8 Mandatory Greenhouse Gas Reporting (40 CFR 98)

A facility that contains any source category that is listed in Table A-3 of this subpart in any calendar year starting in 2010. For these facilities, the annual GHG report must cover stationary fuel combustion sources (40 CFR 98 Subpart C), miscellaneous use of carbonates (40 CFR 98 Subpart U), and all applicable source categories listed in Table A-3 and Table A-4 of this subpart.

Petroleum refineries are a source category subject to the Mandatory Greenhouse Gas Reporting rule regardless of the quantity of actual GHG emissions from the source. In accordance with 40 CFR Part 98.2, the proposed Davis Refinery will be subject to the monitoring, recordkeeping, and reporting requirements of actual CHG emissions from the FCC; the CRUs; blowdown systems; storage tanks; process equipment components (compressors, pumps, valves, pressure relief devices, flanges, and connectors) in gas service; tanker truck, and rail loading operations; flares; and sulfur recovery plants; as defined in 40 CFR Part 98, Subpart Y – Petroleum Refineries; in addition to the monitoring, recordkeeping, and reporting requirements of actual CHG emissions for General Stationary Fuel Combustion Sources (40 CFR Part 98 Subpart C), Industrial Wastewater Treatment (40 CFR Part 98, Subpart I), and Suppliers of Petroleum Products (40 CFR Part 98, Subpart MM).

11 COMPLIANCE WITH THE AIR TOXICS POLICY

The Air Toxics Policy is compliant with the residual risk provisions of the Clean Air Act and is applicable to all new or modified air contaminant sources, as designated in NDAC 33-15-14-01 of the North Dakota Air Pollution Control Rules, which are required to submit an application for a PTC under NDAC 33-15-14-02.

As detailed in Section 10 of this permit application, the proposed Davis Refinery is subject to certain State regulations and Federal regulations, as adopted by the State of North Dakota, that impose emission standards and operational limits from the refinery's processing units and equipment. The following sections detail the applicable emission standards and operational limit requirements and details Meridian's intended demonstration of compliance with the applicable regulations. Therefore, only the emissions standards of the applicable regulatory requirements are addressed in this section.

11.1 AMBIENT AIR QUALITY STANDARDS (33-15-02)

To determine compliance with AAQSs, air dispersion modeling of the emission sources associated to the proposed Davis Refinery was conducted. The modeling was conducted in accordance with the Division of Air Quality Criteria Pollutant Modeling Requirements for a Permit to Construct, Site Specific Guidance issued in June 2016 by the Department for the Davis Refinery and other Departments and EPA guidance and policy documents, and the pre-application dispersion modeling protocol dated August 2016 and related comments of the Department received in a memo dated September 16, 2016. The of the the Air Dispersion Modeling indicate that the potential emissions from the proposed Davis Refinery do not exceed significance levels for impacts to adjacent properties and will therefore not cause an exceedance of either the AAQS or the PSD Class I increment levels and Air Quality Related Values for the Theodore Roosevelt Memorial National Park. The results of the Air Dispersion Modeling are summarized in Section 12 of this permit application.

11.2 OPACITY LIMITS (NDAC 33-15-03)

Opacity limitations are provided for in State regulations through NDAC 33-15-03 which restricts emissions of visible air contaminants. It is expected that the proposed Davis Refinery will be compliant with the 20 percent opacity standard since emission units at will fire natural gas or refinery fuel gas, which are considered to not cause opacity concerns from combustion. Therefore, the proposed Davis Refinery will be considered to operate in compliance with the opacity standard, unless otherwise noted by visual observation.

In any case, Meridian will demonstrate compliance with the above State regulations by ensuring emission units at the proposed Davis Refinery are designed to meet the limitations imposed in NDAC 33-15-03, which apply at all times, except as allowed by NDAC 33-15-03-04. All non-flare sources will comply with an opacity limit of 20% except for one six-minute period per hour when 40% opacity is permissible. The refinery flares will comply with an opacity limit of 20% except for one six-minute period per hour when 60% opacity is permissible.

11.3 PARTICULATE MATTER RESTRICTIONS (CHAPTER 33-15-05)

Only the provisions of NDAC 33-15-05-01 are applicable to the proposed Davis Refinery. The FCC reactor, catalyst handling and regeneration at the CRUs, elemental sulfur handling from the SRU, thermal oxidizer and flares, as well as the emergency diesel generator and the diesel engine driven backup firewater pumps are subject to the emission limitations in Table 3 of NDAC 33-15-05-01. The equipment affected by these provisions will be designed to meet the most stringent limitations between NDAC 33-15-05-01 and the provisions of NSPS Subpart Ja.

11.4 SULFUR COMPOUNDS RESTRICTIONS (CHAPTER 33-15-06)

This chapter is not applicable to installations which are subject to an $S0_2$ emission limit under Chapter 33-15-12, Standards for Performance for New Stationary Sources, or to installations which burn pipeline quality natural gas. Refineries have $S0_2$ emission limits under 40 CFR Part 60 Subpart NSPS Ja; therefore, the proposed Davis Refinery is exempt from compliance with Chapter 33-15-06.

11.5 CONTROL OF AIR POLLUTION FROM VEHICLES AND OTHER INTERNAL COMBUSTION ENGINES (CHAPTER 33-15-08)

This chapter restricts the operation of internal combustion engines which emit from any source unreasonable and excessive smoke, obnoxious or noxious gas, fumes or vapor. The emergency generator and backup firewater pump engines are subject to this chapter's requirements, and will demonstrate compliance through designs compliant with the requirements of 40 CFR Part 60 Subpart NSPS IIII.

11.6 CONTROL OF ORGANIC COMPOUNDS EMISSIONS (33-15-07)

The provisions of this chapter establish requirements for organic compound facilities and the disposal of organic compounds. The proposed Davis refinery will be subject to requirements outlined this chapter for water treatment facilities, tanks, loading facilities, pumps and compressors, and emission control of organic vapors and H_2S (via vapor recovery or flaring). Meridian will comply with the provisions of this chapter through:

- Oily water treatment system compliant with 40 CFR 60 Subpart QQQ and 40 CFR 61 Subpart FF.
- Storage tanks meeting or exceeding the requirements of 40 CFR 60 Subpart Kb, even if not subject to the requirements of this subpart. Gasoline pool will be IFR tanks meeting the requirements of 40 CFR 63 Subpart BBBBBB. Crude oil, gasoline pool and jet fuel tanks will be IFR tanks fitted with double seals, and gasketed fittings, with access hatches that will be bolted down when closed. Fixed roof tanks storing diesel and light and heavy slops, will be connected to a closed vent system and control device to control emissions in accordance with §60.112b(3), even though diesel tanks and heavy slops are not subject to the provisions of Subpart Kb. All storage tanks with be fitted with and filled through a submerged fill pipe.
- Tank car and truck loading facilities compliant with 40 CFR 63 Subpart BBBBBB.
- Rotating pumps and compressors in VOC service compliant with 40 CFR 60 Subparts GGGa and VVa, and 40 CFR 61 Subparts J and V.
- Blowdown and flare system compliant with 40 CFR 60.18.

11.7 NEW SOURCE PERFORMANCE STANDARDS (NDAC 33-15-12)

As discussed in Section 10.3.2, the proposed Davis Refinery will be subject to NSPS. This section details compliance demonstration for NSPS that are applicable to the proposed Davis Refinery. Meridian will comply with all general provisions of NSPS (Subpart A), including all applicable recordkeeping and notifications requirements.

11.7.1 Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units (40 CFR 60 Subpart Dc)

Subpart Dc applies to each steam generating unit, defined as a device that combusts any fuel or byproduct/waste and produces steam or heats any heat transfer medium, that commences construction, reconstruction, or modification after June 9, 1989, and has a heat input capacity of 100 MMBtu or less, but greater than or equal to 10 MMBtu/hr. The proposed Davis Refinery steam generation boilers (202-PK-0201A, 202-PK-0201B, 202-PK-0201C) will fire exclusively on refinery fuel gas. Therefore, only the recordkeeping requirements of Subpart Dc apply. Meridian will demonstrate compliance with the NSPS by using fuel certification records and maintaining records of the amount of fuel combusted by the steam boilers during each calendar month. No other emission standards of apply to these units.

11.7.2 Standards of Performance for Equipment Leaks of VOC in Petroleum Refineries for Which Construction, Reconstruction, or Modification Commences after November 7, 2006 (40 CFR Subpart GGGa)

Subpart GGGa applies to valves, pumps, pressure relief devices, etc. in VOC service at petroleum refineries. The subpart establishes standards for equipment as well as leak detection and repair requirements and references requirements in 40 CFR 60, Subpart VVa – Standards of Performance for Equipment Leaks of VOC in the Synthetic Organic Chemicals Manufacturing Industry. Meridian will demonstrate compliance with this subpart via implementation of pumps in VOC service with double mechanical seals, enhanced valve packing, no open ended lines and connection of pressure relief devices, sampling connecting systems, surge control vessels and bottoms receivers to closed-vent systems routed to fuel gas or flare in accordance with this subpart and 40 CFR 61 Subparts

J and V. Further, in order to meet or exceed the requirements of 40 CFR 60 Subpart VVa, and those of 40 CFR 61 Subparts J and V, Meridian has elected to comply with the more stringent leak definitions of 40 CFR 63 Subpart H through the implementation of an LDAR program with a screen value of 500 ppm as currently recommended by EPA instead of the 2,000 to 10,000 ppmv leak definitions of NSPS.

In EPA's estimations the implementation of a facility LDAR program can reduce emissions by at least 63% at Petroleum Refineries[1]. The implementation of any LDAR program is expected to alter not only the prevalence of leaks, but the relative magnitude of leaks above the action level. Furthermore, the lower the leak action level an LDAR program uses, the relative magnitude and number of leaks is expected to be much less than for facilities that use a higher screening level or do not have an LDAR program.

Meridian's proposed LDAR program assumes monitoring and directed maintenance with a maximum leak definition of 500 ppmv for all components other than compressors. Meridian's facility integrity management system for the Davis Refinery will include the use of advanced monitoring methods such as differential light absorption and ranging (DIAL) or optical gas imaging (OGI) technology that can visualize gas leaks using ultra-sensitive passive infrared sensing technology, as part of, and complementing, its proposed LDAR program to improve operational and safety practices so that leaks can be identified more efficiently and fixed soon as practicable.

Based on the level of LDAR program proposed for the Davis Refinery; the frequence of monitoring and the lower the leak action level, Meridian's proposed LDAR should achieve fugitive emissions reductions equivalent to those attainable under the Texas Commission on Environmental Quality (TCEQ) approved 28LAER program. Fugitive emissions control efficiencies under the TCEQ 28LAER program and leak detection thresholds are summarized in the following table.

[1] EPA's Leak Detection and Repair: A Best Practices Guide, October 2007. EPA-305-D-07-001

		LDAR Program equivalent to TCEQ 28LAER	Leak Threshold (ppmv/h)
Valves	Gas	97%	500
	Light Liquid	97%	500
	Heavy Liquid	0%	500
Pumps	Light Liquid	85%	500
	Heavy Liquid	85%	500
Compressors		85%	10000
Pressure Relief Gas Valves		97%	500
Flanges	Gas	97%	500
	Light Liquid	97%	500
	Heavy Liquid	30%	500
Sampling Connections		97%	500

11.7.3 Standards of Performance for Petroleum Refineries for Which Construction, Reconstruction, or Modification Commenced After May 14, 2007 (40 CFR 60 Subpart Ja)

Subpart Ja applies to fuel gas combustion devices at petroleum refineries. In the case of the proposed Davis Refinery, this subpart applies to:

- Fuel Gas Combustion Devices (process heaters from ADUs, VDU, Hydrotreaters, CRUs, Isomerization, Alkylation)
- SRU (process vents and thermal oxidizer)
- FCCU (process vents)
- Flares

A summary of requirements of NSPS Subpart Ja which will apply to the proposed Davis Refinery and the compliance demonstration methods proposed are included in the table below, and are further described in the text section that follows.

40 CFR 60 Subpart Ja Applicable Requirements

Source	Regulatory Citation	Emission/Work Practice Standard	Average Period	Compliance Demonstration
Fuel Gas Combustion Devices	40 CFR 60.102a(g)(1)	RSC: 20 ppmvd @ 0% O_2 or H_2S: 162 ppmv[1]	3-hour rolling average basis	Operation of CEMS[1] per §60.107a(a) and methods/procedures per §60.104a(i)&(j)
		RSC: 8 ppmvd @ 0% O_2 or H_2S: 60 ppmv[1]	365 successive calendar day rolling average basis	
	40 CFR 60.102a(g)(2)[2]	NOx[3]: 40 ppmvd @ 0% O_2 or 0.040 lb/MMBtu HHV basis	30-day rolling average basis	Biennial performance testing and methods/procedures per §60.104a(i)(6)&(7)
		NOx[4]: 60 ppmvd @ 0% O_2 or 0.060 lb/MMBtu HHV basis		
	40 CFR 60.103a(c)(2)	Root Cause Analysis / Corrective Action Analysis	N/A	40 CFR 60.103a(d)&(e)
Sulfur Recovery Unit	40 CFR 60.102a(f)(2)(i)	RSC: 2,500 ppmvd @ 0% O_2	12-hr rolling average basis	Operation of RSC CEMS per §60.106a(a)(1) and methods/procedures per 60.104a(h)
	40 CFR 60.103a(c)(3)	Root Cause Analysis / Corrective Action Analysis	N/A	40 CFR 60.103a(d)&(e)
Flares	40 CFR 60.103a(h)	H_2S: 162 ppmv[5]	3-hour rolling average basis	Operation of CEMS[1] per §60.107a(e) and methods/procedures per §60.104a(j)
	40 CFR 60.103a(c)-(e)	Flow Monitoring	N/A	§60.107a(f)
	40 CFR: 60.103a(a)	Flare Monitoring Plan	N/A	40 CFR 60.103a(b)
	40 CFR 60.103a(c)(1)	Root Cause Analysis / Corrective Action Analysis	N/A	40 CFR 60.103a(d)&(e)

Source	Regulatory Citation	Emission/Work Practice Standard	Average Period	Compliance Demonstration
Fluid Catalytic Cracking Unit	40 CFR 60.102a(b)(1)	PM: 0.020 gr/dscf if a PM CEMS is used		Operation of PM CEMS per §60.105a(d)
		PM: 0.5 lb/1,000 lb coke burn-off @ 0% 0_2 if a CPMS and CO2 CEMS are used		Operation of CPMS and CO_2 CEMS per per §60.105a(b)(1)&(2)
	40 CFR 60.102a(b)(2)	NOx: 80 ppmvd @ 0% 0_2	7-day rolling average basis	Operation of NOx CEMS per §60.105a(f)
	40 CFR 60.102a(b)(3)	SO_2: 50 ppmvd @ 0% 0_2	7-day rolling average basis	Operation of NOx CEMS per §60.105a(f)
		SO_2: 25 ppmvd @ 0% 0_2	365-day rolling average basis	Operation of SO_2 CEMS per §60.105a(g)
	40 CFR 60.102a(b)(4)	CO: 500 ppmvd @ 0% 0_2	Hourly basis	Operation of CO CEMS per §60.105a(h)
	40 CFR 60.103a(c)	Root Cause Analysis / Corrective Action Analysis	*NIA*	40 CFR 60.103a(d)&(e)

1. Rule provides for different methods of CEMS, to be decided during detailed engineering.
2. Fuel Gas Combustion Devices greater than 40 MMBtu/hr
3. NOx limits for natural draft process heaters
4. NOx limits for forced draft process heaters
5. Process upset gases or fuel gas released to flare are exempt from this limit.

Fuel Gas Combustion Devices excluding Flares

For each fuel gas combustion device excluding flares, Meridian shall comply with all applicable limits established by 40 CFR 60.102a(g)(l). To this effect, Meridian will comply with either provision below.

a. Not discharge or cause the discharge of any gases into the atmosphere that contain $S0_2$ in excess of 20 ppmv (dry basis, corrected to zero percent excess air) determined on a 3-hour rolling average basis and $S0_2$ in excess of 8 ppmv (dry basis, corrected to zero percent excess air), determined on a 365-day successive calendar day rolling average basis; or

c. Not burn in any fuel gas combustion device any fuel gas that contains H_2S in excess of 162 ppmv determined hourly on a 3-hour rolling average basis and H_2S in excess of 60 ppmv determined daily on a 365 successive calendar day rolling average basis.

For each fuel gas combustion device excluding flares, with a capacity greater than 40 MMBtu/hr, Meridian shall comply with all applicable limits established by 40 CFR 60.102a(g)(l). To this effect, Meridian will comply with either provision below.

a. For natural draft process heaters:
   - Not discharge to the atmosphere any emissions of NOx in excess of 40 ppmv (dry basis, corrected to zero percent excess air) determined daily on a 30-day rolling average basis
   - Not discharge to the atmosphere any emissions of NOx in excess of 0.040 pounds per million British thermal units (lb/MMBtu) higher heating value basis determined daily on a 30-day rolling average basis.

b. For forced draft process heaters:
   - Not discharge to the atmosphere any emissions of NOx in excess of 60 ppmv (dry basis, corrected to zero percent excess air) determined daily on a 30-day rolling average basis
   - Not discharge to the atmosphere any emissions of NOx in excess of 0.060 pounds per million British thermal units (lb/MMBtu) higher heating value basis determined daily on a 30-day rolling average basis.

Meridian will comply with the following fuel fired heaters emission monitoring requirements of 40 CFR 60 Subpart Ja, including the applicable requirements of 40 CFR 60.107a(a) and (c):

a. Install, operate, calibrate and maintain an instrument for continuously monitoring and recording the concentration by volume (dry basis, zero percent excess air) of NOx emissions into the atmosphere. The monitor must include an 0_2 monitor for correcting the data for excess air. Monitoring of NOx emissions must also meet all applicable requirements of 40 CFR 60.107a(c)

b. For each fuel gas combustion device subject to an $S0_2$ or H_2S limit, Meridian will comply with either provision below.

- Install, operate, calibrate and maintain an instrument for continuously monitoring and recording the concentration (dry basis, zero percent excess air) of sulfur dioxide emissions into the atmosphere. The monitor must include an oxygen monitor for correcting the data for excess air. Monitoring of sulfur dioxide emissions must also meet all applicable requirements of 40 CFR 60 Subpart Ja, including the applicable requirements of 40 CFR 60.107a(a)(1).

- Install, operate, calibrate and maintain an instrument for continuously monitoring and recording the concentration by volume (dry basis) of hydrogen sulfide in the fuel gases before being burned in any fuel gas combustion device. Monitoring of hydrogen sulfide emissions must also meet all applicable requirements of 40 CFR 60 Subpart Ja, including the applicable requirements of 40 CFR 60.107a(a)(2).

Sulfur Recovery Unit

The SRU at the proposed Davis Refinery will be an affected facility and subject to Subpart Ja. The rated capacity of the SRU is approximately 10 long ton/day. For the purpose of applicability determination of the provisions of Subpart Ja, the SRU is considered to be a sulfur recovery plant with a capacity less than 20 long tons/day with a reduction control system followed by incineration. Therefore, Meridian shall comply with all applicable limits established by 40 CFR 60.102a(f)(2)(i) which require that the SRU not discharge or cause the discharge of any gases into the atmosphere in excess of 2,500 ppm by volume of reduced sulfur compounds calculated as ppm SO_2 by volume (dry basis) at zero percent excess air, determined on a 12-hour rolling average basis. In addition, Meridian will install, operate, calibrate, and maintain an instrument for continuously monitoring and recording the concentration (dry basis, zero percent excess air) of any SO_2 emissions into the atmosphere. The monitor will include an O_2 monitor for correcting the data for excess air.

Flare System

The proposed Davis Refinery Flare system will be designed and operated in accordance with the requirements of NDAC 33-15-12-02, and 40 CFR 60.18 (NSPS Subpart A).

a. The flares shall be operated with a flame present at all times when emissions may be vented to the flare. The presence of a flame will be monitored using a thermocouple or any other equivalent device approved by NDDH.

b. The flares shall be operated with no visible emissions except for periods not to exceed a total of five minutes during any two consecutive hours. Reference Method 22 of 40 CFR 60, Appendix A will be used to determine compliance with the visible emissions provision.

c. The flare system (enclosed flare 207-FL-0701, and emergency elevated flares 207-FL-0703 and 207-FL-0704) shall not bum any fuel gas that contains H_2S in excess of 162 ppmv determined hourly on a 3-hour rolling average basis. The combustion in a flare of process upset gases released to the flare as a result of relief valve leakage or other emergency malfunctions is exempt from this limit. Natural gas will be provided to the flare pilots to ensure H_2S limitations are met at any other time.

d. Emergency acid gas flare 207-FL0702 is being proposed to manage process upset gases or fuel gas that is released to the flare system as a result of relief valve leakage or other emergency malfunctions from the sour water unit and sulfur recovery unit. Since the intended operation of the sour gas flare meets the exemption requirements, it is exempt from the H_2S limit 162 ppmv determined hourly on a 3-hour rolling average basis. Natural gas will be provided to the flare pilots to ensure H_2S limitations are met at any other time.

For enclosed flare 207-FL-0701 and emergency acid flare 207-FL-0702 Meridian will comply with the emission monitoring requirements of 40 CFR 60 Subpart Ja, including the applicable requirements of 40 CFR 60.107a(e) and (f):

a. Install, operate, calibrate a continuous parameter monitoring system to measure and record the flow rate of gas discharged to the flare. Flare gas flow monitoring must

also meet all applicable requirements of 40 CFR 60 Subpart Ja, including the applicable requirements of 40 CFR 60.107a(f).

b. Install, operate, calibrate, and maintain an instrument for continuously monitoring and recording the concentration of H_2S in gas discharged flare according to the requirements of 40 CFR 60.107a(e)(2)(i) through (iii) and collect and analyze samples of the gas and calculate total sulfur concentrations as specified in 40 CFR 60.107a(e)(2)(iv) through (ix).

c. Install, operate, calibrate and maintain an instrument for continuously monitoring and recording the concentration of total reduced sulfur in gas discharged to the flare in 40 CFR 60.107a(e) for assessing the root cause analysis threshold for the flare.

In accordance with the emission monitoring requirements of 40 CFR 60 Subpart Ja flares 207-FL-0703 and 207-FL-0704 which are classified as secondary emergency flares are not required to be fitted with continuous flow monitors. Instead, Meridian will install, operate, calibrate and maintain, a CPMS to measure and record the pressure in the flare gas header between the knock-out pot and water seal and to measure and record the water seal liquid level in accordance with the emission monitoring provisions of 40 CFR 60.107a(g).

Meridian will develop and implement a written flare management plan upon startup of the proposed Davis Refinery listing all refinery process units, ancillary equipment, and fuel gas systems connected to each flare. The flare management plan will include a flare minimization assessment that at a minimum will consider the minimization alternatives in 40 CFR 60.103a(a)(2) and/or the procedures in 40 CFR 60.103a(a)(5) though (a)(7), with the exception of those that cannot reasonably be implemented by the start-up date, and which will be implement in accordance with a proposed schedule provided in the flare management plan. Additionally, the plan will include the information described in 40 CFR 60.103a(a)(l) through (a)(7).

In addition to work practice standards including a flare management plan and a root cause analysis and corrective action analysis for certain discharges, the flare system will be subject to an H_2S limit of 162 ppm (3-hr rolling avg. basis). The PTE calculation provided in this application are based on this standard.

Root Cause Analysis and Corrective Action Analysis

Each fuel gas combustion device, flare, and sulfur recovery plant shall conduct a root cause analysis and corrective action analysis for each of the conditions specified in 40 CFR 60.103a(c)(l) through (c)(3). The root cause analysis and corrective action analysis must be completed by the schedule provided in 40 CFR 60.103a(d) and shall implement the corrective actions in accordance with 40 CFR 60.103a(e).

The rated capacity of the SRU is approximately 10 long ton/day. For the purpose of applicability determination of the provisions of Subpart Ja, the SRU is considered to be a sulfur recovery plant with a capacity less than 20 long tons/day with a reduction control system followed by incineration. Therefore, Meridian shall comply with all applicable limits established by 40 CFR 60.102a(f)(2)(i) which require that the SRU not discharge or cause the discharge of any gases into the atmosphere in excess of 2,500 ppm by volume of reduced sulfur compounds calculated as ppm SO_2 by volume (dry basis) at zero percent excess air, determined on a 12-hour rolling average basis. In addition, Meridian will install, operate, calibrate, and maintain an instrument for continuously monitoring and recording the concentration (dry basis, zero percent excess air) of any SO_2 emissions into the atmosphere. The monitor will include an O_2 monitor for correcting the data for excess air.

Fluid Catalytic Cracking Unit

The FCCU at the proposed Davis Refinery will be an affected facility and subject to the emission limitations of Subpart Ja:

Citation	Summary of Requirement
§60.102a(b)(1)(ii)	Particulate Matter limit of 0.5 gram per kilogram (g/kg) of coke burn-off (0.5 lb PM/1,000 lb coke burn-off) or, if a PM CEMS is used, 0.020 gr/dscf corrected to 0 percent excess air .
§60.102a(b)(2)	Nitrogen oxides limit of 80 parts per million by volume (ppmv), dry basis corrected to 0 percent excess air, on a 7-day rolling average basis.
§60.102a(b)(3)	Sulfur dioxide limit of 50 ppmv dry basis corrected to 0

	percent excess air, on a 7-day rolling average basis and 25 ppmv, dry basis corrected to 0 percent excess air, on a 365-day rolling average basis.
§60.102a(b)(4)	Carbon monoxide limit of 500 ppmv, dry basis corrected to 0 percent excess air, on an hourly average basis.

For the FCCU Meridian shall comply with all applicable limits established by 40 CFR 60.102a(b)(1) through (4). To this effect, Meridian will comply with the monitoring provisions below:

a. For PM monitoring:

- Install, operate, calibrate, and maintain an instrument for continuously monitoring and recording the concentration (0 percent excess air) of PM in the exhaust gases prior to release to the atmosphere in accordance with the applicable requirements of 40 CFR 60.105a(d). The monitor must include an O_2 monitor for correcting the data for excess air.

Or,

- Install, operate and maintain continuous parameter monitor systems (CPMS) to measure and record operating parameters for each control device in accordance with the applicable requirements of 40 CFR 60.105a(b)(1), and
- Install, operate, calibrate, and maintain an instrument for continuously monitoring the concentrations of CO2, O2 (dry basis), for use in determining the coke burn-off rate of the FCCU in accordance with the provisions of 40 CFR 60.105a(b)(2)

b. For NOx monitoring, install, operate, calibrate, and maintain an instrument for continuously monitoring and recording the concentration by volume (dry basis, 0 percent excess air) of NOx emissions into the atmosphere in accordance with the applicable requirements of 40 CFR 60.105a(f). The monitor must include an O_2 monitor for correcting the data for excess air.

d. For SO2 monitoring, install, operate, calibrate, and maintain an instrument for continuously monitoring and recording the concentration by volume (dry basis, corrected to 0 percent excess air) of SO2 emissions into the atmosphere in accordance with the applicable requirements of 40 CFR 60.105a(g). The monitor shall include an O_2 monitor for correcting the data for excess air.

e. For CO monitoring, install, operate, calibrate, and maintain an instrument for continuously monitoring and recording the concentration by volume (dry basis, corrected to 0 percent excess air) of CO emissions into the atmosphere in accordance with the applicable requirements of 40 CFR 60.105a(h). The monitor shall include an O_2 monitor for correcting the data for excess air.

NSPS- Subpart Ja - Emissions Testing

The initial performance tests required by 40 CFR 60.8 for Subpart Ja limits will be conducted within 60 days after achieving the maximum production rate at which the affected facility will be operated, but no later than 180 days after start-up of each affected facility.

11.7.4 Standards of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction or Modification Commenced After July 23, 1984 (40 CFR 60 Subpart Kb)

Meridian will have new storage vessels subject to Subpart Kb as follows:

"storage vessel either with a design capacity greater than or equal to 151 m 3 containing a [volatile organic liquid] VOL that, as stored, has a maximum true vapor pressure equal to or greater than 5.2 kPa but less than 76.6 kPa or with a design capacity greater than or equal to 75 m 3 but less than 151 m 3 containing a VOL that, as stored, has a maximum true vapor pressure equal to or greater than 27.6 kPa but less than 76.6 kPa. This subpart does not apply to storage vessels with a capacity greater than or equal to 151 m 3 storing a liquid with a maximum true vapor pressure less than 3.5 kilopascals (kPa) or with a capacity greater than or equal to 75 m^3 but less than 151 m^3 storing a liquid with a maximum true vapor pressure less than 15.0 kPa"

Only the storage tanks in crude oil service and light slops, are subject to the provisions of this subpart. Storage tanks in gasoline pool/naphtha service are subject to the provisions of 40 CFR 63 Subpart BBBBBB – Emission Standards for Hazardous Air Pollutants for Gasoline Distribution Bulk Terminals, Bulk Plants, and Pipeline Facilities. Other storage vessels will either have a capacity less than the applicability threshold or will serve a material that has a maximum true vapor pressure (TVP) less than the applicability threshold are therefore not subject to the requirements of this subpart. Regardless of the applicability of 40 CFR Subpart Kb to the storage tanks of the proposed Davis Refinery, tank emissions from crude oil, gasoline pool, jet fuel, diesel and slop tanks will be well controlled in order to ensure the proposed synthetic minor emission limits for VOCs and VHAPs are met.

To demonstrate compliance with 40 CFR 60 Subpart Kb, Meridian has elected to comply, although not subject to the standard, with the more stringent design, operating, inspection, record keeping and reporting requirements of IFR tanks in accordance with 40 CFR 63 Subpart WW – National Emission Standards for Storage Vessels – Control Level 2. The IFR tanks, not in gasoline pool service, at the proposed Davis Refinery include: crude oil tanks, and jet fuel tanks. IFR tanks will be fitted with double seal and wiper design, with both primary and secondary seals being liquid-mounted, deck fittings will be gasketed, and access hatches will be designed to be bolted or fastened when closed.

Similarly, Meridian has elected to connect fixed roof tanks storing diesel and light and heavy slops, to a closed vent system and control device to emissions of total organic TOCs or HAPs by 95 weight-percent in accordance with §60.112b(3), even though diesel tanks and heavy slops are not subject to the provisions of Subpart Kb. Vacuum Gas Oil, Diluent (heavy FCC product) and Fuel Oil tanks will be the only fixed roof tanks with atmospheric vents at the proposed Davis Refinery. For fixed roof tanks, Meridian will comply with the inspection procedures of §60.113b, reporting and recordkeeping requirements of §60.115b and monitoring requirements of §60.116.

11.7.5 Standards of Performance for VOC Emissions from Petroleum Refinery Wastewater Systems (40 CFR 60 Subpart QQQ)

The proposed Davis Refinery is subject to the provisions of Subpart QQQ. Affected facilities include individual drain systems (40 CFR 60.692-2) and oil-water separators (40 CFR 60.692-3). Meridian will design a wastewater system that will meet the standards and include the necessary control methods specified in this subpart to demonstrate compliance with the proposed synthetic minor source limits for VOCs and HAPs. A summary of the key Subpart QQQ provisions which Meridian will comply with are provided below:

Citation	Summary
§60.692-2(a)	All process drains shall be equipped with water seal controls, inspected monthly for low water levels
§60.692-2(b)	All junction boxes shall be equipped with a tight seal cover and an open vent pipe and shall be inspected semi- annually to assure cover is in place and seal is tight.
§60.692-2(c)	Unburied sewer lines shall be enclosed to not have any visual gaps or cracks, and should be inspected semi-annually.
§60.692-3(a-b)	Oil-water separators shall be installed with a fixed roof that completely covers the separator tank, is equipped and operated with a closed vent system and control device, and shall by inspected semi-annually.
§60.692-5(b-e)	Vapor recovery system shall be designed and operated to recover the VOC emissions with an efficiency of 95 percent or greater.

11.7.6 Standards of Performance for Stationary Compression Ignition Internal Combustion Engines (40 CFR 60 Subpart IIII)

The emergency generator and backup firewater pumps will be new diesel-fired emergency compression ignition internal combustion engine constructed after the applicable trigger dates established in NSPS Subpart IIII, and therefore are subject to the provisions of this

subpart. Meridian will comply with NSPS Subpart IIII by purchasing compression ignition internal combustion engines which comply with the applicable emission standards for of NSPS Subpart IIII for the intended service.

11.8 RESTRICTION OF HAZARDOUS AIR POLLUTANTS EMISSIONS (CHAPTER 33-15-13)

As discussed in Section 10.3.3, the proposed Davis Refinery will be subject to NESHAPs adopted by the State of North Dakota. This section details compliance demonstration for NESHAPs that are applicable to the proposed Davis Refinery.

11.8.1 National Emissions Standards for Equipment Leaks (Fugitive Emission Sources) of Benzene (40 CFR 61 Subpart J)

This subpart establishes standards that limit fugitive emissions and include requirements for the monitoring of emissions from vent streams associated with the operation of the process units which could be potential sources of fugitive emissions of Benzene. The process units within the proposed Davis Refinery subject to this subpart include those associated with the generation of light naphtha and gasoline range compounds. Meridian will demonstrate compliance with this subpart by compliance with Subpart V – National Emissions Standards for Equipment Leaks (Fugitive Emission Sources)

11.8.2 National Emissions Standards for Equipment Leaks (Fugitive Emission Sources) (40 CFR 61 Subpart V)

The provisions of this subpart apply to each of the following sources that are intended to operate in volatile hazardous air pollutant ***("VHAP")*** service: pumps, compressors, pressure relief devices, sampling connection systems, open-ended valves or lines, valves, connectors, surge control vessels, bottoms receivers, and control devices or systems required by this subpart. Meridian will demonstrate compliance with this subpart via implementation of pumps in VOC service with double mechanical seals, as well as by connection of pressure relief devices, sampling connecting systems, surge control vessels and bottoms receivers to closed-vent systems routed to fuel gas or flare in accordance with this subpart, and implementation of an automated LDAR as described in Section 11.7.2 above.

11.8.3 National Emissions Standards for Benzene Waste Operations (40 CFR 61 Subpart FF)

The proposed oily water treatment system and individual drain lines that convey process waste water to the oily water treatment system are subject to these requirements. Process wastewater means water which comes in contact with benzene during manufacturing or processing operations conducted within a process unit. Process wastewater is not organic wastes, process fluids, product tank drawdown, cooling tower blowdown, steam trap condensate, or landfill leachate. Waste that is contained in a segregated stormwater sewer system and any gaseous stream from a waste management unit, treatment process, or wastewater treatment system routed to a fuel gas system, are exempt from compliance with the provisions of this subpart.

Meridian will demonstrate compliance with this subpart via segregation of stormwater systems from process wastewater streams, individual closed-drain systems to convey process wastewater from the process units to the oily water treatment system, and covered oily water tanks and separators in compliance with the most stringent requirements of NSPS Subpart QQQ, and those of this subpart to order to ensure the proposed synthetic minor emission limits for VOCs and VHAPs are met by the proposed Davis Refinery.

A summary of the key Subpart FF definitions is provided below:

Closed-vent system means a system that is not open to the atmosphere and is composed of piping, ductwork, connections, and, if necessary, flow inducing devices that transport gas or vapor from an emission source to a control device.

Control device means an enclosed combustion device, vapor recovery system, or flare.

Cover means a device or system which is placed on or over a waste placed in a waste management unit so that the entire waste surface area is enclosed and sealed to minimize air emissions. A cover may have openings necessary for operation, inspection, and maintenance of the waste management unit

Fuel gas system means the offsite and onsite piping and control system that gathers gaseous streams generated by facility operations, may blend them with sources of gas, if available, and transports the blended gaseous fuel at suitable pressures for use as fuel in

heaters, furnaces, boilers, incinerators, gas turbines, and other combustion devices located within or outside the facility. The fuel is piped directly to each individual combustion device, and the system typically operates at pressures over atmospheric.

Oil-water separator means a waste management unit, generally a tank or surface impoundment, used to separate oil from water. An oil-water separator consists of not only the separation unit but also the forebay and other separator basins, skimmers, weirs, grit chambers, sludge hoppers, and bar screens that are located directly after the individual drain system and prior to additional treatment units such as an air flotation unit, clarifier, or biological treatment unit. Examples of an oil-water separator include an API separator, parallel-plate interceptor, and corrugated-plate interceptor with the associated ancillary equipment.

No detectable emissions means less than 500 parts per million by volume (ppmv) above background levels, as measured by a detection instrument reading in accordance with the procedures specified in § 61.355(h) of this subpart.

Segregated stormwater sewer system means a drain and collection system designed and operated for the sole purpose of collecting rainfall runoff at a facility, and which is segregated from all other individual drain systems.

A summary of the key Subpart FF provisions which Meridian will comply with are provided below:

Citation	Summary
§61.342(c)(1)	For each waste stream that contains benzene, remove or destroy the benzene contained in the waste using a treatment process or wastewater treatment system that complies with the standards of this subpart.
§61.342(d)(2)	Process wastewater shall be treated to achieve a total annual benzene quantity from facility process wastewater less than 1 Mg/yr (1.1 ton/yr).
§ 61.343(a)(1)	For each tank in which the waste stream is placed install, operate, and maintain a fixed-roof and closed-vent system

	that routes all organic vapors vented from the tank to a control device.
§ 61.346	For individual drain systems install, operate, and maintain on each drain system opening a cover and closed-vent system that routes all organic vapors vented from the drain system to a control device.
§ 61.347	For each oil-water separator install, operate, and maintain a fixed-roof and closed-vent system that routes all organic vapors vented from the tank to a control device.
§ 61.348	The treatment process must either remove benzene from the waste stream to less than 10 ppmw, or has a 99% mass basis benzene removal efficiency, or a destroys benzene in the waste stream by incinerating the waste in a combustion unit with a 99% efficiency.
§ 61.349(a)(1)	For each closed-vent system and control device install, operate, and maintain a closed-vent system designed to operate with no detectable emissions.
§ 61.349(a)(2)	For each closed-vent system and control device install, operate, and maintain a control device in the form of either: an enclosed combustion device or a vapor recovery system designed to destroy, recover or control VOCs with an efficiency of 95 weight percent or greater, or a flare system designed in accordance with the provisions of 40 CFR 60.18.
§ 61.349(b)	Each closed-vent system and control device shall be operated at all times when waste is placed in the waste management unit vented to the control device.

11.9 PERMITTING REQUIREMENTS (CHAPTER 33-15-14)

This chapter requires the facility to obtain a Permit to Construct and a Permit to Operate. In accordance with the allowable provisions of 33-15-14, and based on the PTE of regulated NSR pollutants from the proposed Davis Refinery, under its physical and operational design and including the effect of add-on air pollution control equipment, Meridian is pursuing a Permit to Construct for the proposed Davis Refinery which includes proposed synthetic minor emission limits for regulated air contaminants.

Once the permit to construct is granted, and in accordance with the provisions of 33-15-14-03, Meridian must apply for a permit to operate the proposed Davis Refinery at least thirty days prior to the start-up of routine operations. In order to satisfy this requirement, Meridian need only submit a thirty-day prior notice of proposed startup and satisfy compliance requirements for a Minor Source Permit to Operate.

11.10 RESTRICTION OF ODOROUS AIR CONTAMINANT EMISSIONS (CHAPTER 33-15-16)

The Davis Refinery is subject to the provisions of chapter 33-15-07 for controls of organic compound and H_2S emissions. The proposed Davis Refinery will demonstrate compliance with this chapter through compliance with the NSPS and NESHAPs applicable to the Davis Refinery which require the emission units to be well controlled to meet the proposed synthetic minor emission limits for regulated air contaminants contained in this permit application.

11.11 RESTRICTION OF FUGITIVE EMISSIONS (CHAPTER 33-15-17)

The proposed Davis Refinery is a designated source of air pollution, and as such, quantifiable fugitive emissions are accounted for in the refinery-wide PTE estimation. In order to ensure the proposed synthetic minor emission limits for CO, SO2, NOx, VOCs and HAPs are met fugitive emissions must be controlled. Meridian will comply with this regulation via compliance with NSPS Subparts GGGa and VVa, NESHAP Subparts J and V, and MACT Standards Subpart BBBBBB, to prevent/limit the release of fugitive gaseous and particulate matter emissions from the refining processes, and by taking

reasonable precautions for abating and preventing fugitive particulate emissions from roads within the facilities via speed controls and pavement in heavy traffic areas.

11.12 RESTRICTION OF HAZARDOUS AIR POLLUTANTS EMISSIONS FROM SOURCE CATEGORIES (CHAPTER 33-15-22)

As discussed in Section 10.3.4, the proposed Davis Refinery is a designated source of air pollution subject to MACT Standards applicable to Area Sources. This section details compliance demonstration for MACT Standards that are applicable to the proposed Davis Refinery. Meridian will comply with the applicable portions of the general provisions of the MACT Standards (Subpart A), as directed by each subpart applicable to the proposed Davis Refinery.

11.12.1 Emission Standards for Hazardous Air Pollutants for Gasoline Distribution Bulk Terminals, Bulk Plants, and Pipeline Facilities (40 CFR 63 Subpart BBBBBB)

The proposed Davis Refinery includes a gasoline bulk terminal which is subject to the provisions of Subpart BBBBBB. This subpart establishes gasoline handling facilities emission limitations, management practices, monitoring, reporting and recordkeeping requirements. Meridian will demonstrate compliance with the provisions of this subpart by operating and maintaining at all times, the loading facilities, including associated air pollution control equipment and monitoring equipment, in a manner consistent with safety and good air pollution control practices for minimizing emissions.

In particular, Meridian will design, install and operate:

- Gasoline pool storage tanks (i.e. naphtha, reformate, gasoline, alkylate) compliant with 40 CFR 63.1063 standard that Meridian has elected to comply with, although not subject to it, in order to ensure proposed synthetic minor source levels of VOCs can be met. The gasoline pool storage tanks will be IFR tanks fitted with double seal and wiper design, with both primary and secondary seals being liquid-mounted, deck fittings will be gasketed, and access hatches will be designed to be bolted or fastened when closed.
- Tank truck and railcar gasoline loading facilities compliant with 40 CFR 63.11085. The loading racks will be designed for submerged filling and with a vapor collection

system to ensure TOC emissions during gasoline loading operations do not exceed 80 mg/l of gasoline loaded.

Citation	Summary
§63.11088(a)	Loading rack with a vapor collection system designed to collect the TOC vapors displaced from cargo tanks during product loading and prevent them from passing to another loading rack and to the atmosphere. Reduce emissions of TOC to less than or equal to 80 mg/l of gasoline loaded into gasoline cargo tanks at the loading rack. Limit the loading of gasoline into gasoline cargo tanks that are vapor tight
§63.11089	Perform a monthly leak inspection of all equipment in gasoline service.

11.13 SHUTDOWN/MALFUNCTION AND/OR DEVIATION FROM PERMIT REQUIREMENTS (NDAC 33-15-01-13.2 & 3)

To comply with the notification requirements of NDAC 33-15-01-13.2 for maintenance shutdowns of air pollution control equipment Meridian will give NDDH at least 24-hour notice of its intent to shut down such equipment in cases in which the air contaminating source will continue operating while the control equipment is not in service. Such prior notice will identify the specific facility to be taken out of service, the expected length of time of air pollution control equipment shutdown, nature and estimated quantity of emissions of air pollutants likely to be emitted, measures to minimize the length of the shutdown, and the reasons that it would be impossible or impractical to shut down the source operation during the maintenance period. This notification does not exempt Meridian from compliance with emissions allowable under the permit.

To comply with the notification requirements of NDAC 33-15-01-13.2 for malfunctions requirements that can be expected to last longer than 24 hours and cause the emission of air contaminants in violation of permit requirements or any other applicable rules and regulations, Meridian will notify the Department as soon as possible during normal working hours. The notification must contain a statement giving all pertinent facts,

including the estimated duration of the breakdown, if applicable. NDDH Air Quality Division shall be notified when the condition causing the malfunction has been corrected. Furthermore, when excess emissions result from an unavoidable malfunction, a written report providing sufficient information to demonstrate that an unavoidable equipment malfunction occurred, will be submitted to NDDH within 30 days of the calendar quarter in which the malfunction occurred or within thirty days of a written request by the NDDH, whichever is sooner.

When a failure of a CEMS occurs, an alternative method for measuring or estimating emissions is required. The facility will, as soon as practicable, resolve the failure of a CEMS, and conduct timely repairs. To comply with the requirements of NDAC 33-15-01-13.3, Meridian will rely upon an arithmetical average of the available historic data at similar load levels to substitute data for the period of CEMS data unavailability.

11.14 RECORDKEEPING (NDAC 33-15-14)

All records required by the PTC object of this permit application, including specific requirements of NSPS, NESHAP and MACT standards applicable to the proposed Davis Refinery, will be kept on file for a minimum period of five years. The records will be available for inspection by NDDH upon request. The following records will be maintained:

- Performance test records and supporting information
- Monitoring data and supporting information as required by the permit and applicable regulations. Supporting information includes calibration and maintenance records and original data recordings for continuous monitoring systems.
- Results of all visible emissions observations and any corrective actions taken.
- Stack test results if required including field data, laboratory analysis data, and quality assurance data.
- Records of the occurrence and duration of any startup, shutdown, or malfunction in the operation of the regulated facilities; any malfunction of the air pollution control equipment; or any periods during which a continuous monitoring system or monitoring device is inoperative.
- Reports as required by the Permit to Construct or by the Permit to Operate.

11.15 REPORTING (NDAC 33-15-14)

Upon start of operations of the proposed Davis Refinery annual emission inventory reports will be submitted to the NDDH, following NDDH guidelines and approved formats, to comply with the various reporting requirements applicable under NSPS. These reports will include, but not be limited to, process information regarding the hours of operation and the amount and type of air contaminants emitted during the monitoring period, including excess emissions and monitoring systems performance report. Annual reporting will be submitted on January 30th of each year, covering the preceding 12-month reporting period. In addition, semi-annual reports will be submitted for reporting of continuous monitoring data in accordance with 40 CFR 60.7(c). Semi-annual reporting will be included with the annual report for the preceding 6-month reporting period from July through December, and on as a separate report on July 30 for the preceding 6-month reporting period from January through June.

11.16 FEES (NDAC 33-15-23)

Meridian will pay fees of $325 in accordance with NDAC 33-15-23. A check for the $325 filing fee is included with this application.

12 DISPERSION MODELING REQUIREMENTS FOR CRITERIA POLLUTANTS AND AIR TOXICS

12.1 SUMMARY OF CRITERIA POLLUTANT MODELING ANALYSIS

A statement addressing any dispersion modeling requirements for Criteria Pollutants or Air Toxics and the inclusion of any required modeling analysis with a complete method description in accordance with the State Air Quality Analysis Guide or Department guidance.

Modeling is often required for major sources dependent on the amount and types of pollutants emitted by the source. Some source types may be exempt from modeling if they meet the criteria for exemption. Based on the level of emissions that Meridian will emit, modeling typically would not be required to be conducted since the facility qualifies as a synthetic minor source under NDDoH regulations. However due to the high level of public interest in this project as well as due to the proximity of the site to the Theodore Roosevelt National Park which is a federal Class I airshed, the NDDoH has indicated that modeling is required to determine compliance with NDDoH and federal National Ambient Air Quality Standards (NAAQS).

Below are a few of the modeling policies that apply to construction permits:

- Air Dispersion Modeling Emergency Engines/Flares
- Criteria Pollutant Modeling Requirements for a Permit to Construct
- Dispersion Modeling Requirements for Compressor Engines and Glycol Dehydration Units
- Policy for the Control of Hazardous Air Pollutant Emissions in ND (Air Toxic Policy)

The main purpose of the air quality analysis is to demonstrate that new emissions emitted from a proposed stationary source or major modification, in conjunction with other applicable emissions increases and decreases from existing sources, will not cause or contribute to a violation of any applicable NAAQS or PSD increment.

Generally, the analysis will involve (1) an assessment of existing air quality, which may include ambient monitoring data and air quality dispersion modeling results, and (2)

predictions, using dispersion modeling, of ambient concentrations that will result from the applicant's proposed project and future growth associated with the project related to impacts to Class I and Class II areas as well as for compliance with PSD and NAAQS standards.

Class I areas are areas of special national or regional natural, scenic, recreational, or historic value for which the PSD regulations provide special protection. One way in which air quality degradation is limited in all Class I areas is by stringent limits defined by the Class I increments for sulfur dioxides, particulate matter and nitrogen dioxide. In addition, the Federal Land Manager (FLM) of each Class I area is charged with the affirmative responsibility to protect that area's unique attributes, expressed generically as air quality related values (AQRV's)/ Class II areas are essentially all other areas accessible to the public that are not formally defined as Class I areas.

As previously noted, based on its location near a Class I area, as well as the general level of public interest, the NDDoH required at least screen modeling analysis for both Class I and Class II National Ambient Air Quality Standards (NAAQS) Significant Impact Levels (SILs). Class I and Class II SIL modeling was conducted using the US EPA AERMOD model with results compared to SIL levels noted above. The modeling included analysis and results for both the Base Operating Scenario (full project build-out) as well as for the Alternative Operating Scenario (Phase I build-out only). The modeling results for both the Base and Alternative Operating Scenarios showed that all impacts were below Class I and Class II SILs. Therefore, under NDDoH and EPA guidelines, further dispersion modeling will not be required. The detailed modeling analysis and discussion are included in Exhibit D, the Modeling Analysis Report which is submitted under separate cover.

12.2 SUMMARY OF TOXICS ANALYSIS

The NDDoH Policy for the Control of Hazardous Air Pollutant Emissions in North Dakota (Air Toxics Policy) was used to estimate maximum off-property, ground- level ambient concentrations for HAPs normalized to 1 g/s. The normalized maximum concentrations were multiplied by the g/s emission rate of each HAP from each non-emergency point source.

Per the NDDoH Air Toxics Policy, a Tier III analysis is not specifically required unless results show impacts above MAAL or MICR results. However, since modeling for compliance with Significant Impact Levels for Class I and Class II areas was undertaken by Meridian, we completed a Tier III analysis, for combined HAPs and utilized the weighted concentration of the HAP emissions to compare to MICR and MAAL results. Results of the maximum off-property, ground-level ambient concentration of any air pollutant shows a MICR or hazard index below the maximum threshold values of 1.0 E-05 and 1.0, respectively. Detailed results of this analysis and related discussion is included in the Modeling Analysis Report for Meridian which is submitted under separate cover.

Exhibit A: Application Forms

PERMIT APPLICATION FOR AIR CONTAMINANT SOURCES

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8516 (06-13)

SECTION A – FACILITY INFORMATION

Name of Firm or Organization ***Meridian Energy Group – Davis Refinery***		
Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number ***(409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***
Applicant´s Name ***Tom Williams***		
Title ***VP of Planning & Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***
Facility Address (Street & No.) ***37th Street***		
City ***Belfield***	State ***ND***	ZIP Code ***58622***

Country ***USA***	Latitude (Nearest Second) ***46°52'45"N***	Longitude (Nearest Second) ***103°14'55"W***

Legal Description of Facility Site ***Property ID 07 0000 00165 000 in the SE 1/4 of Section 2, Twp 139N, Range 100W and Property ID: 07 0000 00162 000 in the NW1/4 and SW 1/4 of Section 1, Twp 139N, Range 100W***	Land Area at Facility Site ***261 Acres***	MSL Elevation at Facility ***2,685 feet***

SECTION B – GENERAL NATURE OF BUSINESS

Describe Nature of Business	North American Industry Classification System Number	Standard Industrial Classification Number (SIC)
Petroleum Refining	***324110***	***2911***
Petroleum Bulk Stations & Terminals	***42710***	***5171***

SECTION C – GENERAL PERMIT INFORMATION

Type of Permit?	Permit to Construct (PTC) ☒ Permit to Operate ☐
If application is for a Permit to Construct, please provide the following data:	
Planned Start Construction Date ***April 2016***	Planned End Construction Date ***December 2016 (Phase 1)***

SECTION D – SOURCE IDENTIFICATION AND CATEGORY OF EACH SOURCE INCLUDED ON THIS PERMIT APPLICATION

		Permit to Construct				Minor Source Permit to Operate						
Your Source ID Number	Source or Unit (Equipment, Machines, Devices, Boilers, Processes, Incinerators, Etc.)	New Source	Existing Source Modification	Existing Source Expansion	Existing Source Change of Location	New Source	Existing Source Initial Application	Existing Source After Modification	Existing Source After Expansion	Existing Source After Change of Location	Existing Source After Change of Ownership	Other
101-H-0101	***Atmospheric Distillation Unit #1 heater***	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
102-H-0201	***Atmospheric Distillation Unit #2 heater***	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
103-H-0301	***Vacuum Distillation Unit heater #1***	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
103-H-0302	***Vacuum Distillation Unit heater #2***	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
105-H-0501	***Heavy Naphtha Hydrotreater heater #1***	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
105-H-0502	***Heavy Naphtha Hydrotreater heater #2***	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
106-H-0601	***Catalytic Reformer Unit #2 heater***	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
107-H-0701	***Catalytic Reformer Unit #1 heater***	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
110-H-1001	***Diesel Hydrotreater heater***	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

		Permit to Construct				Minor Source Permit to Operate						
Your Source ID Number	Source or Unit (Equipment, Machines, Devices, Boilers, Processes, Incinerators, Etc.)	New Source	Existing Source Modification	Existing Source Expansion	Existing Source Change of Location	New Source	Existing Source Initial Application	Existing Source After Modification	Existing Source After Expansion	Existing Source After Change of Location	Existing Source After Change of Ownership	Other
111-H-1101	***Light Naphtha Hydrotreater heater***	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
112-VS-1201	***Regenerator vent stack***	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
112-H-1201	***Fluid Catalytic Cracking Unit (FCCU) heater***	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
114-H-1401	***FCC Naphtha Hydrotreater heater***	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
117-H-1701	***Isomerization heater #1***	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
117-H-1702	***Isomerization heater #2***	☒	☐	☐	☐	☐	☐	☐	☒	☐	☐	☐
118-H-1801	***Alkylation heater***	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
122-H-2201	***Thermal Oxidizer***	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
125-H-2501	***Kerosene Hydrotreater heater***	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
202-PK-0201A	***Utility Boiler 1***	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
202-PK-0201B	***Utility Boiler 2***	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
202-PK-0201C	***Utility Boiler 3***	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

		Permit to Construct				Minor Source Permit to Operate						
Your Source ID Number	Source or Unit (Equipment, Machines, Devices, Boilers, Processes, Incinerators, Etc.)	New Source	Existing Source Modification	Existing Source Expansion	Existing Source Change of Location	New Source	Existing Source Initial Application	Existing Source After Modification	Existing Source After Expansion	Existing Source After Change of Location	Existing Source After Change of Ownership	Other
203-T-0001	***Crude oil tank #1***	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
203-T-0002	***Crude oil tank #2***	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
203-T-0003	***Crude oil tank #3***	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
203-T-0005	***Desulfurized Heavy Naphtha tank #1***	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
203-T-0006	***Reformate tank #1***	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
203-T-0007	***Reformate tank #2***	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
203-T-0008	***Gasoline tank #1***	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
203-T-0009	***Gasoline tank #2***	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
203-T-0010	***Mid Gasoline tank #1***	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
203-T-0011	***Jet Fuel tank #1***	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
203-T-0012	***Jet Fuel tank #2***	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
203-T-0013	***Undesulphurized Diesel tank #1***	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
203-T-0014	***Undesulphurized Diesel tank #2***	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
203-T-0015	***Desulphurized Diesel tank #1***	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
203-T-0016	***Desulphurized Diesel tank #2***	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

		Permit to Construct				Minor Source Permit to Operate						
Your Source ID Number	Source or Unit (Equipment, Machines, Devices, Boilers, Processes, Incinerators, Etc.)	New Source	Existing Source Modification	Existing Source Expansion	Existing Source Change of Location	New Source	Existing Source Initial Application	Existing Source After Modification	Existing Source After Expansion	Existing Source After Change of Location	Existing Source After Change of Ownership	Other
203-T-0017	***UVGO tank***	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
203-T-0018	***FCC Naphtha tank #1***	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
203-T-0019	***FCC Naphtha tank #2***	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
203-T-0020	***Alkylate tank #1***	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
203-T-0021	***Alkylate tank #2***	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
203-T-0022	***Diluent tank***	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
203-T-0023	***Fuel Oil tank #1***	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
203-T-0024	***Fuel Oil tank #2***	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
203-T-0031	***Light Naphtha tank #1***	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
203-T-0032	***Light Naphtha tank #2***	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
203-T-0033	***Light Slops tank***	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
203-T-0034	***Heavy Slops tank***	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
206WWT (Fugitive)	***Wastewater treatment plant***	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
207-FL-1701	***Enclosed HC Operating Flare***	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
207-FL-1702	***Acid Flare***	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

		Permit to Construct				Minor Source Permit to Operate						
Your Source ID Number	Source or Unit (Equipment, Machines, Devices, Boilers, Processes, Incinerators, Etc.)	New Source	Existing Source Modification	Existing Source Expansion	Existing Source Change of Location	New Source	Existing Source Initial Application	Existing Source After Modification	Existing Source After Expansion	Existing Source After Change of Location	Existing Source After Change of Ownership	Other
207-FL-1703	***HC Emergency Flare #1***	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
207-FL-1704	***HC Emergency Flare #2***	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
208TL	***Truck Loading-Unloading System***	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
209RL	***Rail Loading-Unloading System***	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
212-P-1201 A/B/C	***Firewater Diesel Pump***	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
215-CT-1501A	***Cooling Tower A***	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
215-CT-1501B	***Cooling Tower B***	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
215-CT-1501C	***Cooling Tower C***	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
216-EG-1601 A/B/C	***Diesel/Natural gas-fired emergency generator set***	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
FUG-1	***Process equipment leaks in VOC and Natural Gas service***	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

SECTION E-IDENTIFICATION OF AIR CONTAMINANTS

Check all which are emitted in measurable quantities into the atmosphere from any operation at facility			
☐Arsenic	☒Chlorine Compounds	☒Sulfur Compounds	☐Radioisotopes
☐Asbestos	☐Chromium Compounds	☒Hydrogen Sulfide	☒Visible Emissions
☐Beryllium	☐Fluoride Compounds	☒Odors	☒Particulates (specify)
☐Cadmium	☒Volatile Organic Compounds	☒Carbon Monoxide	☒Dust
☒Lead	☒Other Organic Compounds	☒Nitrogen Compounds	☐Silica
☒Mercury	☒Greenhouse Gases (CO_2e)	☐Pesticides	☒Other (specify)

Hazardous Air Pollutants (HAPs): Acetaldehyde, Acetone, Acrolein, Benzene, Biphenyl, Bromomethane, 1,3-Butadiene, Cumene, Dichlorobenzene, Ethylbenzene, Formaldehyde, Hexane, Methylene chloride, Methyl tertiary-butyl ether, Phenol, Styrene, Toluene, Trichlorofluoromethane, 2,2,4- Trimethylpentane, Xylene, Naphthalene, PAHs, Carbon disulfide, Hydrogen chloride, Hydrogen cyanide, Chlorine, Antimony, Arsenic, Beryllium, Cadmium, Chromium, Cobalt, Manganese, Mercury, Nickel, Selenium.

Has Source Testing Been Done at the Facility? ☐Yes ☒No	Last Date when a Testing Program was Completed	If Program is Continuous, Give Approximate Testing Frequency

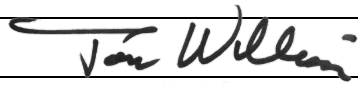
SECTION F1- ADDITIONAL FORMS

Indicate which of the following forms are attached and made part of the application	
☒Air Pollution Control Equipment (SFN 8532)	☒Fuel Burning Equipment Used for Indirect Heating (SFN 8518)
☐Construct/Operate Incinerators (SFN 8522)	☒Hazardous Air Pollutant (HAP) Sources (SFN 8329)
☐Natural Gas Processing Plants (SFN 11408)	☒Manufacturing or Processing Equipment (SFN 8520)
☐Glycol Dehydration Units (SFN 58923)	☒Volatile Organic Compounds Storage Tank (SFN 8535)
☒Flares (SFN 59652)	☒Internal Combustion Engines and Turbines (SFN 8891)
☐Rock, Sand, and Gravel Plants (SFN 8530)	☐Oil/Gas Production Facility Registration (SFN 14334)
☐Asphalt Concrete Plants (SFN 8526)	☐Grain, Feed, and Fertilizer Operations (SFN 8524)

SECTION F2 – OTHER ATTACHMENTS INCLUDED AS PART OF THIS APPLICATION

1.	***Supporting Emission Calculations (Emissions Inventory and BACT Analysis). Exhibits B and C***	4.	***Equipment Data Available from Vendors. (Part of Exhibit B)***
2.	***Tanks 4.09D Output files (Part of Exhibit B)***	5.	
3.	***Plot Plan and Block Flow Diagram. Exhibit E and F***	6.	

I, the undersigned applicant, am fully aware that statements made in this application and the attached exhibits and statements constitute the application for Permit(s) to Construct and/or Operate Air Contaminant sources from the North Dakota Department of Health and certify that the information in this application is true, correct and complete to the best of my knowledge and belief. Further, I agree to comply with the provisions of Chapter 23-25 of the North Dakota Century Code and all rules and regulations of the Department, or revisions thereof. I also understand the permit is nontransferable and, if granted a permit, I will promptly notify the Department upon sale or legal transfer of this permitted establishment.

Signature of Applicant	Date
	09/26/2016

PERMIT APPLICATION FOR MANUFACTURING OR PROCESSING EQUIPMENT

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8520 (09-12)

SECTION A – GENERAL INFORMATION

Equipment items operating as a functional unit may be grouped as one application		
Name of Firm or Organization ***Meridian Energy Group - Davis Refinery***		
Applicant's Name ***Tom Williams***		
Title ***VP of Planning &Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***

SECTION B - FACILITY INFORMATION

Facility Name ***Davis Refinery***			
ND Air Pollution Control Permit No. (If Applicable) ***N/A***			
Contact Person for Air Pollution Matters ***Tom Johnson***			
Title ***Vice President of Operations***	Telephone Number ***(409)795-0792***	E-mail Address ***tjohnson@meridianenergygrou***	
Facility Address (Street & No.) ***37th Street***			
City ***Belfield***	State ***ND***	ZIP Code ***58622***	
County ***Billings***	Latitude (Nearest Second) ***46°52'45"N***	Longitude (Nearest Second) ***103°14'55" W***	
Legal Description of Facility Site ***Property ID 07 0000 00165 000 in the SE 1/4 of Section 2, Twp 139N, Range 100W and Property ID: 07 0000 00162 000 in the NW1/4 and SW 1/4 of Section 1, Twp 139N, Range 100W***	MSL Elevation at Facility ***2,685 feet***	Ref. Datum	

SECTION C – EQUIPMENT INFORMATION

Type of Unit or Process (rotary dryer, cupola furnace, crusher, pelletizer, etc.) ***Catalytic Reforming Unit (CRU) #1***		
Make ***N/A***	Model ***N/A***	Date Installed ***TBD***
Capacity (manufacturer's or designer's guaranteed maximum) ***8,760 bbl/d***	Operating Capacity (specific units) ***8,760 bbl/d***	
Brief description of operation of unit or process: ***Fluid Catalytic Cracking Unit (FCCU) – Unit 107 with emission point 107-H-0701 for heater and regeneration emissions. It is expected four weeks of catalyst regeneration per reactor per year.***		

SECTION D – NORMAL OPERATING SCHEDULE

Hours Per Day	Days Per Week	Weeks Per Year	Peak Production Season (if any)	Dates of Annual Shutdown
24	***7***	***52***	***N/A***	***TBD***

SECTION E – RAW MATERIALS INTRODUCED INTO UNIT OR PROCESS

Include solid fuels such as coke or coal. *Exclude* indirect heat exchangers from this section
For indirect heat exchangers, complete form SFN 8518

Material	Hourly Process Weight (Pounds Per Hour)			Average Annual (Specify Units)	Intermittent Operation Only (Average Hours Per Week)
	Average	Maximum	Minimum		
Hydrotreated Naphtha	***8,760 bbl/d***	***TBD***	***TBD***	***3,197,400 bbl/d***	***TBD***

SECTION F – PRODUCTS OF UNIT OR PROCESS

Include all, even those not usable because they do not meet specifications

Material	Hourly Process Weight (Pounds Per Hour)			Average Annual (Specify Units)	Intermittent Operation Only (Average Hours Per Week)
	Average	Maximum	Minimum		
LPG	***TBD***	***TBD***	***TBD***	***TBD***	***TBD***
Reformate	***TBD***	***TBD***	***TBD***	***TBD***	***TBD***
Hydrogen	***TBD***	***TBD***	***TBD***	***TBD***	***TBD***
Off gas	***TBD***	***TBD***	***TBD***	***TBD***	***TBD***

SECTION G – FUELS USED

Coal (Tons/Yr)	% Sulfur	% Ash	Oil (Gal/Yr)	% Sulfur	Grade No.
N/A					
Natural Gas (Thousand CF/Yr)		LP Gas (Gal/Yr)		Other (Specify)	
N/A		***N/A***		***Refinery fuel gas: 3,354 lb/h***	

SECTION H – EMISSION POINTS

List each point separately, number each and locate on attached flow chart

Number	Stack Height (ft)	Stack Diameter (ft at top)	Gas Volume (ACFM)	Exit Temp (°F)	Gas Velocity (fps)
107-H-0701	***42***	***6***	***46,194.8***	***787.7***	***27.2***

SECTION I – AIR CONTAMINANTS EMITTED

Known or Suspected - Use same identification number as above

Number	Pollutant	Amount		Basis of Estimate
		Pounds/Hr	Tons/Yr	
107-H-0701	***CO***	***1.02E-03***	***4.47E-03***	***Emission factors from Table 1.4-2. AP 42, Chapter 1: External Combustion Sources. See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"***
107-H-0701	***Pb***	***4.53E-05***	***1.99E-04***	

SECTION I – AIR CONTAMINANTS EMITTED (CONT.)

Known or Suspected - Use same identification number as above				
		Amoun		
Number	***Pollutant***	***Pounds/Hr***	***Tons/Yr***	***Basis of Estimate***
107-H-0701	***PM 10 Total***	***6.89E-01***	***3.02E+00***	***Emission factors from Table 1.4-2. AP 42, Chapter 1: External Combustion Sources. See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"***
107-H-0701	***PM 10 Filterable***	***1.72E-01***	***7.55E-01***	
107-H-0701	***PM 2.5 Total***	***6.89E-01***	***3.02E+00***	
107-H-0701	***PM 2.5 Filterable***	***1.72E-01***	***7.55E-01***	
107-H-0701	***PM 2.5 Condensable***	***5.17E-01***	***2.26E+00***	
107-H-0701	***NOx***	***4.53E+00***	***4.97E+00***	
107-H-0701	***SO_2***	***5.44E-02***	***2.38E-01***	
107-H-0701	***VOC***	***4.99E-01***	***2.18E+00***	
107-H-0701	***Metal HAPs***	***6.76E-04***	***2.96E-03***	
107-H-0701	***Organic HAPs***	***1.81E-01***	***7.92E-01***	
107-H-0701	***Organic HAPs (regenerator)***	***1.62E+00***	***5.46E-01***	****See Form SFN 8329 for 107-H-0701 Regenerator HAPs emissions***

SECTION J – VOLATILE ORGANIC COMPOUNDS

Are any volatile organic compounds (VOCs) stored on premises? ☒ No ☐Yes – List Below See 40 CFR 51.100(s) for classes of compounds covered		
Material Stored	Size Tank (Gallons)	Vapor Control Device

SECTION K – ORGANIC SOLVENTS

Are any organic solvents used or produced? ☒ No (None or less than 50 gal/yr) ☐Yes – List Below

Type	Principal Use	Gallons/Yr Consumed	Gallons/Yr Produced

SECTION L – AIR POLLUTION CONTROL EQUIPMENT

Is any air pollution control equipment installed on this unit or process? ☒ No ☐ Yes
If 'Yes' attach form SFN 8532

SECTION M – MATERIAL STORAGE

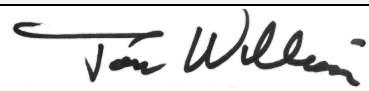
Does the input material or product from this process contain finely divided material which could become airborne? ☒No ☐Yes

Describe storage methods used:

Storage Piles	Type of Material	Particle Diameter (Avg. or Screen Size)	Pile Size Average Tons	Pile Wetted	Pile Covered

Describe any fugitive dust problems:

Attach additional sheets if needed to explain any answers. Use separate form for each contaminant emitting process

Signature of Applicant	Date
	09/26/2016

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of Health
Division of Air Quality
918 E Divide Ave., 2nd Floor
Bismarck, ND 58501-1947
(701) 328-5188

PERMIT APPLICATION FOR MANUFACTURING OR PROCESSING EQUIPMENT

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8520 (09-12)

SECTION A – GENERAL INFORMATION

Equipment items operating as a functional unit may be grouped as one application		
Name of Firm or Organization ***Meridian Energy Group - Davis Refinery***		
Applicant's Name ***Tom Williams***		
Title ***VP of Planning &Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***

SECTION B - FACILITY INFORMATION

Facility Name ***Davis Refinery***		
ND Air Pollution Control Permit No. (If Applicable) ***N/A***		
Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number ***(409)795-0792***	E-mail Address ***tjohnson@meridianenergygrou***
Facility Address (Street & No.) ***37th Street***		
City ***Belfield***	State ***ND***	ZIP Code ***58622***

County ***Billings***	Latitude (Nearest Second) ***46°52'45"N***	Longitude (Nearest Second) ***103°14'55" W***

Legal Description of Facility Site ***Property ID 07 0000 00165 000 in the SE 1/4 of Section 2, Twp 139N, Range 100W and Property ID: 07 0000 00162 000 in the NW1/4 and SW 1/4 of Section 1, Twp 139N, Range 100W***	MSL Elevation at Facility ***2,685 feet***	Ref. Datum

SECTION C – EQUIPMENT INFORMATION

Type of Unit or Process (rotary dryer, cupola furnace, crusher, pelletizer, etc.) ***Catalytic Reforming Unit (CRU) #2***		
Make ***N/A***	Model ***N/A***	Date Installed ***TBD***
Capacity (manufacturer's or designer's guaranteed maximum) ***3,960 bbl/d***	Operating Capacity (specific units) ***3,960 bbl/d***	
Brief description of operation of unit or process: ***Fluid Catalytic Cracking Unit (FCCU) – Unit 106 with emission point 106-H-0601 for heater and regeneration emissions. It is expected four weeks of catalyst regeneration per reactor per year.***		

SECTION D – NORMAL OPERATING SCHEDULE

Hours Per Day	Days Per Week	Weeks Per Year	Peak Production Season (if any)	Dates of Annual Shutdown
24	***7***	***52***	***N/A***	***TBD***

SECTION E – RAW MATERIALS INTRODUCED INTO UNIT OR PROCESS

Include solid fuels such as coke or coal. *Exclude* indirect heat exchangers from this section
For indirect heat exchangers, complete form SFN 8518

Material	Hourly Process Weight (Pounds Per Hour)			Average Annual (Specify Units)	Intermittent Operation Only (Average Hours Per Week)
	Average	Maximum	Minimum		
Hydrotreated Naphtha	***3,960 bbl/d***	***TBD***	***TBD***	***1,445,400 bbl/d***	***TBD***

SECTION F – PRODUCTS OF UNIT OR PROCESS

Include all, even those not usable because they do not meet specifications

Material	Hourly Process Weight (Pounds Per Hour)			Average Annual (Specify Units)	Intermittent Operation Only (Average Hours Per Week)
	Average	Maximum	Minimum		
LPG	***TBD***	***TBD***	***TBD***	***TBD***	***TBD***
Reformate	***TBD***	***TBD***	***TBD***	***TBD***	***TBD***
Hydrogen	***TBD***	***TBD***	***TBD***	***TBD***	***TBD***
Off gas	***TBD***	***TBD***	***TBD***	***TBD***	***TBD***

SECTION G – FUELS USED

Coal (Tons/Yr)	% Sulfur	% Ash	Oil (Gal/Yr)	% Sulfur	Grade No.
N/A					
Natural Gas (Thousand CF/Yr)		LP Gas (Gal/Yr)		Other (Specify)	
N/A		***N/A***		***Refinery fuel gas: 1,513 lb/h***	

SECTION H – EMISSION POINTS

List each point separately, number each and locate on attached flow chart

Number	Stack Height (ft)	Stack Diameter (ft at top)	Gas Volume (ACFM)	Exit Temp (°F)	Gas Velocity (fps)
106-H-0601	***42***	***4***	***20,769.9***	***786.2***	***27.5***

SECTION I – AIR CONTAMINANTS EMITTED

Known or Suspected - Use same identification number as above

Number	Pollutant	Amount		Basis of Estimate
		Pounds/Hr	Tons/Yr	
106-H-0601	***CO***	***4.60E-04***	***2.02E-03***	***Emission factors from Table 1.4-2. AP 42, Chapter 1: External Combustion Sources. See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"***
106-H-0601	***Pb***	***2.04E-05***	***8.96E-05***	

SECTION I – AIR CONTAMINANTS EMITTED (CONT.)

Known or Suspected - Use same identification number as above				
Number	***Pollutant***	***Amoun*** ***Pounds/Hr***	***Tons/Yr***	***Basis of Estimate***
106-H-0601	***PM 10 Total***	***3.11E-01***	***1.36E+00***	***Emission factors from Table 1.4-2. AP 42, Chapter 1: External Combustion Sources. See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"***
106-H-0601	***PM 10 Filterable***	***7.77E-02***	***3.40E-01***	
106-H-0601	***PM 2.5 Total***	***3.11E-01***	***1.36E+00***	
106-H-0601	***PM 2.5 Filterable***	***7.77E-02***	***3.40E-01***	
106-H-0601	***PM 2.5 Condensable***	***2.33E-01***	***1.02E+00***	
106-H-0601	***NOx***	***2.05E+00***	***2.24E+00***	
106-H-0601	***SO_2***	***2.45E-02***	***1.08E-01***	
106-H-0601	***VOC***	***2.25E-01***	***9.86E-01***	
106-H-0601	***Metal HAPs***	***3.05E-04***	***1.34E-03***	
106-H-0601	***Organic HAPs***	***8.16E-02***	***3.57E-01***	
106-H-0601	***Organic HAPs (regenerator)***	***7.34E-01***	***2.47E-01***	****See Form SFN 8329 for 106-H-0601 Regenerator HAPs emissions***

SECTION J – VOLATILE ORGANIC COMPOUNDS

Are any volatile organic compounds (VOCs) stored on premises? ☒ No ☐Yes – List Below See 40 CFR 51.100(s) for classes of compounds covered		
Material Stored	Size Tank (Gallons)	Vapor Control Device

SECTION K – ORGANIC SOLVENTS

Are any organic solvents used or produced? ☒ No (None or less than 50 gal/yr) ☐Yes – List Below

Type	Principal Use	Gallons/Yr Consumed	Gallons/Yr Produced

SECTION L – AIR POLLUTION CONTROL EQUIPMENT

Is any air pollution control equipment installed on this unit or process? ☒ No ☐ Yes
If 'Yes' attach form SFN 8532

SECTION M – MATERIAL STORAGE

Does the input material or product from this process contain finely divided material which could become airborne? ☒No ☐Yes

Describe storage methods used:

Storage Piles	Type of Material	Particle Diameter (Avg. or Screen Size)	Pile Size Average Tons	Pile Wetted	Pile Covered

Describe any fugitive dust problems:

Attach additional sheets if needed to explain any answers. Use separate form for each contaminant emitting process

Signature of Applicant	Date
	09/26/2016

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of Health
Division of Air Quality
918 E Divide Ave., 2nd Floor
Bismarck, ND 58501-1947
(701) 328-5188

PERMIT APPLICATION FOR MANUFACTURING OR PROCESSING EQUIPMENT

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8520 (09-12)

SECTION A – GENERAL INFORMATION

Equipment items operating as a functional unit may be grouped as one application		
Name of Firm or Organization ***Meridian Energy Group - Davis Refinery***		
Applicant's Name ***Tom Williams***		
Title ***VP of Planning &Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***

SECTION B - FACILITY INFORMATION

Facility Name ***Davis Refinery***		
ND Air Pollution Control Permit No. (If Applicable) ***N/A***		
Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number ***(409)795-0792***	E-mail Address ***tjohnson@meridianenergygrou***
Facility Address (Street & No.) ***37th Street***		
City ***Belfield***	State ***ND***	ZIP Code ***58622***

County ***Billings***	Latitude (Nearest Second) ***46°52'45"N***	Longitude (Nearest Second) ***103°14'55" W***

Legal Description of Facility Site	MSL Elevation at Facility	Ref. Datum
Property ID 07 0000 00165 000 in the SE 1/4 of Section 2, Twp 139N, Range 100W and Property ID: 07 0000 00162 000 in the NW1/4 and SW 1/4 of Section 1, Twp 139N, Range 100W	***2,685 feet***	

SECTION C – EQUIPMENT INFORMATION

Type of Unit or Process (rotary dryer, cupola furnace, crusher, pelletizer, etc.) ***Fluid Catalytic Cracking Unit (FCCU)***		
Make ***N/A***	Model ***N/A***	Date Installed ***TBD***
Capacity (manufacturer's or designer's guaranteed maximum) ***14,377 bbl/d, with a max. operating Coke Burn-off rate of 8,614 lb/h***	Operating Capacity (specific units) ***14,377 bbl/d***	
Brief description of operation of unit or process: ***Fluid Catalytic Cracking Unit (FCCU) – Unit 112 with two emission points, 112-H-1201 and 112-VS-1201, equipped with emission control devices***		

SECTION D – NORMAL OPERATING SCHEDULE

Hours Per Day	Days Per Week	Weeks Per Year	Peak Production Season (if any)	Dates of Annual Shutdown
24	***7***	***52***	***N/A***	***TBD***

SECTION E – RAW MATERIALS INTRODUCED INTO UNIT OR PROCESS

Include solid fuels such as coke or coal. *Exclude* indirect heat exchangers from this section
For indirect heat exchangers, complete form SFN 8518

Material	Hourly Process Weight (Pounds Per Hour)			Average Annual (Specify Units)	Intermittent Operation Only (Average Hours Per Week)
	Average	Maximum	Minimum		
VGO (FCCU Feed)	***14,377 bbl/d***	***TBD***	***TBD***	***5,247,605 bbl/d***	***TBD***

SECTION F – PRODUCTS OF UNIT OR PROCESS

Include all, even those not usable because they do not meet specifications

Material	Hourly Process Weight (Pounds Per Hour)			Average Annual (Specify Units)	Intermittent Operation Only (Average Hours Per Week)
	Average	Maximum	Minimum		
C3/C4	***TBD***	***TBD***	***TBD***	***TBD***	***TBD***
FCC Naphtha	***TBD***	***TBD***	***TBD***	***TBD***	***TBD***
HCGO	***TBD***	***TBD***	***TBD***	***TBD***	***TBD***

SECTION G – FUELS USED

Coal (Tons/Yr)	% Sulfur	% Ash	Oil (Gal/Yr)	% Sulfur	Grade No.
N/A					
Natural Gas (Thousand CF/Yr)		LP Gas (Gal/Yr)		Other (Specify)	
N/A		***N/A***		***Refinery fuel gas: 1,028 lb/h***	

SECTION H – EMISSION POINTS

List each point separately, number each and locate on attached flow chart

Number	Stack Height (ft)	Stack Diameter (ft at top)	Gas Volume (ACFM)	Exit Temp (°F)	Gas Velocity (fps)
112-H-1201	***72***	***5.5***	***14,110.5***	***785***	***9.9***
112-VS-1201	***120***	***4***	***28,110***	***480***	***64.8***

SECTION I – AIR CONTAMINANTS EMITTED

Known or Suspected - Use same identification number as above

Number	Pollutant	Amount		Basis of Estimate
		Pounds/Hr	Tons/Yr	
112-H-1201	***CO***	***3.13E-04***	***1.37E-03***	***Emission factors from Table 1.4-2. AP 42, Chapter 1: External Combustion Sources. See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"***
112-H-1201	***Pb***	***1.39E-05***	***6.08E-05***	

SECTION I – AIR CONTAMINANTS EMITTED (CONT.)

Known or Suspected - Use same identification number as above				
		Amount		
Number	Pollutant	Pounds/Hr	Tons/Yr	Basis of Estimate
112-H-1201	***PM 10 Total***	***2.11E-01***	***9.25E-01***	***Emission factors from Table 1.4-2. AP 42, Chapter 1: External Combustion Sources. See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"***
112-H-1201	***PM 10 Filterable***	***5.28E-02***	***2.31E-01***	
112-H-1201	***PM 2.5 Total***	***2.11E-01***	***9.25E-01***	
112-H-1201	***PM 2.5 Filterable***	***5.28E-02***	***2.31E-01***	
112-H-1201	***PM 2.5 Condensable***	***1.58E-01***	***6.94E-01***	
112-H-1201	***NOx***	***1.39E+00***	***1.52E+00***	
112-H-1201	***SO_2***	***1.67E-02***	***7.30E-02***	
112-H-1201	***VOC***	***1.53E-01***	***6.70E-01***	
112-H-1201	***Metal HAPs***	***2.07E-04***	***9.08E-04***	***See Form SFN 8329 for 112-H-1201 HAPs emissions***
112-H-1201	***Organic HAPs***	***5,54E-02***	***2,43E-01***	
112-VS-1201	***CO***	***0***	***0***	***Emission factors from Table 5-4 of the Emissions Estimation Protocol for Petroleum Refineries. See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"***
112-VS-1201	***Pb***	***5.02E-06***	***2.20E-05***	
112-VS-1201	***PM 10 Total***	***0.25***	***1.09***	
112-VS-1201	***PM 10 Filterable***	***0.16***	***0.72***	
112-VS-1201	***PM 2.5 Total***	***0.23***	***0.99***	
112-VS-1201	***PM 2.5 Filterable***	***0.14***	***0.62***	
112-VS-1201	***PM 2.5 Condensable***	***0.08***	***0.37***	

SECTION I – AIR CONTAMINANTS EMITTED (CONT.)

Known or Suspected - Use same identification number as above

Number	Pollutant	Amount		Basis of Estimate
		Pounds/Hr	Tons/Yr	
112-VS-1201	***NOx***	***0.851***	***3.73***	***Emission factors from Table 5-4 of the Emissions Estimation Protocol for Petroleum Refineries. See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"***
112-VS-1201	***SO_2***	***2.95***	***12.93***	
112-VS-1201	***VOC***	***1.32***	***5.77***	
112-VS-1201	***Total HAPs***	***2.93E-01***	***0.94***	***See Form SFN 8329 for 112-VS-1201 HAPs emissions***

SECTION J – VOLATILE ORGANIC COMPOUNDS

Are any volatile organic compounds (VOCs) stored on premises? ☒ No ☐Yes – List Below See 40 CFR 51.100(s) for classes of compounds covered

Material Stored	Size Tank (Gallons)	Vapor Control Device

SECTION K – ORGANIC SOLVENTS

Are any organic solvents used or produced? ☒ No (None or less than 50 gal/yr) ☐Yes – List Below

Type	Principal Use	Gallons/Yr Consumed	Gallons/Yr Produced

SECTION L – AIR POLLUTION CONTROL EQUIPMENT

Is any air pollution control equipment installed on this unit or process? ☐ No ☒ Yes
If 'Yes' attach form SFN 8532

SECTION M – MATERIAL STORAGE

Does the input material or product from this process contain finely divided material which could become airborne? ☐No ☒Yes

Describe storage methods used: ***Enclosed bins for storage of spent catalyst.***

Storage Piles	Type of Material	Particle Diameter (Avg. or Screen Size)	Pile Size Average Tons	Pile Wetted	Pile Covered
N/A	***Spent catalyst***	***<2.5 μm***	***N/A***	***N/A***	***N/A***

Describe any fugitive dust problems: ***The particulate matter generated by the displacement of air within the bin as it fills, which will be controlled by a filter bag (sock).***
Attach additional sheets if needed to explain any answers. Use separate form for each contaminant emitting process

Signature of Applicant	Date 09/26/2016

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of Health
Division of Air Quality
918 E Divide Ave., 2nd Floor
Bismarck, ND 58501-1947
(701) 328-5188

PERMIT APPLICATION FOR MANUFACTURING OR PROCESSING EQUIPMENT

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8520 (09-12)

SECTION A – GENERAL INFORMATION

Equipment items operating as a functional unit may be grouped as one application		
Name of Firm or Organization ***Meridian Energy Group - Davis Refinery***		
Applicant's Name ***Tom Williams***		
Title ***VP of Planning &Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***

SECTION B - FACILITY INFORMATION

Facility Name ***Davis Refinery***		
ND Air Pollution Control Permit No. (If Applicable) ***N/A***		
Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number ***(409)795-0792***	E-mail Address ***tjohnson@meridianenergygrou***
Facility Address (Street & No.) ***37th Street***		
City ***Belfield***	State ***ND***	ZIP Code ***58622***
County ***Billings***	Latitude (Nearest Second) ***46°52'45"N***	Longitude (Nearest Second) ***103°14'55" W***
Legal Description of Facility Site ***Property ID 07 0000 00165 000 in the SE 1/4 of Section 2, Twp 139N, Range 100W and Property ID: 07 0000 00162 000 in the NW1/4 and SW 1/4 of Section 1, Twp 139N, Range 100W***	MSL Elevation at Facility ***2,685 feet***	Ref. Datum

SECTION C – EQUIPMENT INFORMATION

Type of Unit or Process (rotary dryer, cupola furnace, crusher, pelletizer, etc.) ***Sulfur Recovery Unit (SRU)***		
Make ***N/A***	Model ***N/A***	Date Installed ***TBD***
Capacity (manufacturer's or designer's guaranteed maximum) ***10.14 ltons of sulphur / day***	Operating Capacity (specific units) ***10.14 ltons of Sulphur / day***	
Brief description of operation of unit or process: ***LO-CAT® Sulfur Recovery technology (Unit 122), with two vents (from oxidizer and flash drum units), directed to a Thermal Oxidizer for one emission point: 122-H-2201.***		

SECTION D – NORMAL OPERATING SCHEDULE

Hours Per Day	Days Per Week	Weeks Per Year	Peak Production Season (if any)	Dates of Annual Shutdown
24	***7***	***52***	***N/A***	***N/A***

SECTION E – RAW MATERIALS INTRODUCED INTO UNIT OR PROCESS

Include solid fuels such as coke or coal. *Exclude* indirect heat exchangers from this section
For indirect heat exchangers, complete form SFN 8518

Material	Hourly Process Weight (Pounds Per Hour)			Average Annual (Specify Units)	Intermittent Operation Only (Average Hours Per Week)
	Average	Maximum	Minimum		
Acid and Sour Gas	***9.4 MMSCFD***	***TBD***	***TBD***	***3,431 MMSCF***	***N/A***

SECTION F – PRODUCTS OF UNIT OR PROCESS

Include all, even those not usable because they do not meet specifications

Material	Hourly Process Weight (Pounds Per Hour)			Average Annual (Specify Units)	Intermittent Operation Only (Average Hours Per Week)
	Average	Maximum	Minimum		
Elemental Sulphur	***946,4***	***TBD***	***TBD***	***3,701.1 lton***	***N/A***
Treated flue gas	***16,081***	***TBD***	***TBD***	***140,869,560 lb (3,410.8 MMACF)***	***N/A***

SECTION G – FUELS USED

Coal (Tons/Yr)	% Sulfur	% Ash	Oil (Gal/Yr)	% Sulfur	Grade No.
N/A					
Natural Gas (Thousand CF/Yr) ***N/A***		LP Gas (Gal/Yr) ***N/A***		Other (Specify)	

SECTION H – EMISSION POINTS

List each point separately, number each and locate on attached flow chart

Number	Stack Height (ft)	Stack Diameter (ft at top)	Gas Volume (ACFM)	Exit Temp (°F)	Gas Velocity (fps)
122-H-2201	***60***	***1.7***	***6,489.5 ACFM***	***414.5***	***50***

SECTION I – AIR CONTAMINANTS EMITTED

Known or Suspected - Use same identification number as above

Number	Pollutant	Amount		Basis of Estimate
		Pounds/Hr	Tons/Yr	
122-H-2201	***VOC***	***0.34***	***1.50***	***Engineering data from vendor and Table 6-2 from Emissions Estimation Protocol for Petroleum Refineries. See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"***
122-H-2201	***SO_2***	***0.04***	***0.20***	

SECTION I – AIR CONTAMINANTS EMITTED (CONT.)

Known or Suspected - Use same identification number as above				
		Amount		
Number	Pollutant	Pounds/Hr	Tons/Yr	Basis of Estimate
122-H-2201	***CO***	***0.49***	***2.15***	***Engineering data from vendor and Table 6-2 from Emissions Estimation Protocol for Petroleum Refineries. See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"***
122-H-2201	***NOx***	***0.11***	***0.47***	

SECTION J – VOLATILE ORGANIC COMPOUNDS

Are any volatile organic compounds (VOCs) stored on premises? ☒ No ☐Yes – List Below See 40 CFR 51.100(s) for classes of compounds covered

Material Stored	Size Tank (Gallons)	Vapor Control Device

SECTION K – ORGANIC SOLVENTS

Are any organic solvents used or produced? ☒ No (None or less than 50 gal/yr) ☐Yes – List Below

Type	Principal Use	Gallons/Yr Consumed	Gallons/Yr Produced

SECTION L – AIR POLLUTION CONTROL EQUIPMENT

Is any air pollution control equipment installed on this unit or process? ☐ No ☒ Yes
If 'Yes' attach form SFN 8532

SECTION M – MATERIAL STORAGE

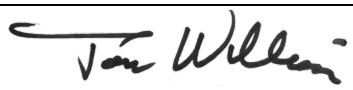
Does the input material or product from this process contain finely divided material which could become airborne? ☒No ☐Yes

Describe storage methods used:

Storage Piles	Type of Material	Particle Diameter (Avg. or Screen	Pile Size Average Tons	Pile Wetted	Pile Covered

Describe any fugitive dust problems:

Attach additional sheets if needed to explain any answers. Use separate form for each contaminant emitting process

Signature of Applicant	Date
	09/26/2016

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of Health
Division of Air Quality
918 E Divide Ave., 2nd Floor
Bismarck, ND 58501-1947
(701) 328-5188

PERMIT APPLICATION FOR MANUFACTURING OR PROCESSING EQUIPMENT

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8520 (09-12)

SECTION A – GENERAL INFORMATION

Equipment items operating as a functional unit may be grouped as one application		
Name of Firm or Organization ***Meridian Energy Group - Davis Refinery***		
Applicant's Name ***Tom Williams***		
Title ***VP of Planning &Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***

SECTION B - FACILITY INFORMATION

Facility Name ***Davis Refinery***		
ND Air Pollution Control Permit No. (If Applicable) ***N/A***		
Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number ***(409)795-0792***	E-mail Address ***tjohnson@meridianenergygrou***
Facility Address (Street & No.) ***37th Street***		
City ***Belfield***	State ***ND***	ZIP Code ***58622***
County ***Billings***	Latitude (Nearest Second) ***46°52'45"N***	Longitude (Nearest Second) ***103°14'55" W***

Legal Description of Facility Site	MSL Elevation at Facility	Ref. Datum
Property ID 07 0000 00165 000 in the SE 1/4 of Section 2, Twp 139N, Range 100W and Property ID: 07 0000 00162 000 in the NW1/4 and SW 1/4 of Section 1, Twp 139N, Range 100W	***2,685 feet***	

SECTION C – EQUIPMENT INFORMATION

Type of Unit or Process (rotary dryer, cupola furnace, crusher, pelletizer, etc.) ***Process equipment leaks in VOC and Natural Gas service***		
Make ***N/A***	Model ***N/A***	Date Installed ***N/A***
Capacity (manufacturer's or designer's guaranteed maximum) ***N/A***	Operating Capacity (specific units) ***N/A***	
Brief description of operation of unit or process: ***VOC leaks (fugitive) from process equipment throughout the Refinery, emission point FUG-1, controlled by a Leak Detection and Repair (LDAR) Program with a threshold of 500 ppmv for leak detection, that includes imaging technology, and directed corrective action.***		

SECTION D – NORMAL OPERATING SCHEDULE

Hours Per Day	Days Per Week	Weeks Per Year	Peak Production Season (if any)	Dates of Annual Shutdown
24	***7***	***52***	***N/A***	***N/A***

SECTION E – RAW MATERIALS INTRODUCED INTO UNIT OR PROCESS

Include solid fuels such as coke or coal. *Exclude* indirect heat exchangers from this section
For indirect heat exchangers, complete form SFN 8518

Material	Hourly Process Weight (Pounds Per Hour)			Average Annual (Specify Units)	Intermittent Operation Only (Average Hours Per Week)
	Average	Maximum	Minimum		
N/A	***N/A***	***N/A***	***N/A***	***N/A***	***N/A***

SECTION F – PRODUCTS OF UNIT OR PROCESS

Include all, even those not usable because they do not meet specifications

Material	Hourly Process Weight (Pounds Per Hour)			Average Annual (Specify Units)	Intermittent Operation Only (Average Hours Per Week)
	Average	Maximum	Minimum		
N/A	***N/A***	***N/A***	***N/A***	***N/A***	***N/A***

SECTION G – FUELS USED

Coal (Tons/Yr)	% Sulfur	% Ash	Oil (Gal/Yr)	% Sulfur	Grade No.
N/A					
Natural Gas (Thousand CF/Yr)		LP Gas (Gal/Yr)		Other (Specify)	
N/A		***N/A***		***N/A***	

SECTION H – EMISSION POINTS

List each point separately, number each and locate on attached flow chart

Number	Stack Height (ft)	Stack Diameter (ft at top)	Gas Volume (ACFM)	Exit Temp (°F)	Gas Velocity (fps)
FUG-1	***N/A***	***N/A***	***N/A***	***N/A***	***N/A***

SECTION I – AIR CONTAMINANTS EMITTED

Known or Suspected - Use same identification number as above

Number	Pollutant	Amount		Basis of Estimate
		Pounds/Hr	Tons/Yr	
FUG-1	***VOC***	***4.81***	***21.06***	***Emission factors from Tables 2-5, 2-6 and 2-7 of the Emissions Estimation Protocol for Petroleum Refineries. See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"***
FUG-1	***HAPs***	***0.55***	***2.39***	

SECTION J – VOLATILE ORGANIC COMPOUNDS

Are any volatile organic compounds (VOCs) stored on premises? ☒ No ☐Yes – List Below See 40 CFR 51.100(s) for classes of compounds covered

Material Stored	Size Tank (Gallons)	Vapor Control Device

SECTION K – ORGANIC SOLVENTS

Are any organic solvents used or produced? ☒ No (None or less than 50 gal/yr) ☐Yes – List Below

Type	Principal Use	Gallons/Yr Consumed	Gallons/Yr Produced

SECTION L – AIR POLLUTION CONTROL EQUIPMENT

Is any air pollution control equipment installed on this unit or process? ☒ No ☐ Yes
If 'Yes' attach form SFN 8532

SECTION M – MATERIAL STORAGE

Does the input material or product from this process contain finely divided material which could become airborne? ☒No ☐Yes

Describe storage methods used:

Storage Piles	Type of Material	Particle Diameter (Avg. or Screen	Pile Size Average Tons	Pile Wetted	Pile Covered

Describe any fugitive dust problems:

Attach additional sheets if needed to explain any answers. Use separate form for each contaminant emitting process

Signature of Applicant	Date
Jon Wilson	09/26/2016

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of Health
Division of Air Quality
918 E Divide Ave., 2nd Floor
Bismarck, ND 58501-1947
(701) 328-5188

PERMIT APPLICATION FOR MANUFACTURING OR PROCESSING EQUIPMENT

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8520 (09-12)

SECTION A – GENERAL INFORMATION

Equipment items operating as a functional unit may be grouped as one application		
Name of Firm or Organization ***Meridian Energy Group - Davis Refinery***		
Applicant's Name ***Tom Williams***		
Title ***VP of Planning &Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***

SECTION B - FACILITY INFORMATION

Facility Name ***Davis Refinery***			
ND Air Pollution Control Permit No. (If Applicable) ***N/A***			
Contact Person for Air Pollution Matters ***Tom Johnson***			
Title ***Vice President of Operations***	Telephone Number ***(409)795-0792***	E-mail Address ***tjohnson@meridianenergygrou***	
Facility Address (Street & No.) ***37th Street***			
City ***Belfield***	State ***ND***	ZIP Code ***58622***	
County ***Billings***	Latitude (Nearest Second) ***46°52'45"N***	Longitude (Nearest Second) ***103°14'55" W***	
Legal Description of Facility Site ***Property ID 07 0000 00165 000 in the SE 1/4 of Section 2, Twp 139N, Range 100W and Property ID: 07 0000 00162 000 in the NW1/4 and SW 1/4 of Section 1, Twp 139N, Range 100W***	MSL Elevation at Facility ***2,685 feet***	Ref. Datum	

SECTION C – EQUIPMENT INFORMATION

Type of Unit or Process (rotary dryer, cupola furnace, crusher, pelletizer, etc.) ***Rail Loading-Unloading System***		
Make ***N/A***	Model ***N/A***	Date Installed ***TBD***
Capacity (manufacturer's or designer's guaranteed maximum) ***TBD***	Operating Capacity (specific units) ***TBD***	
Brief description of operation of unit or process: ***Rail Loading-Unloading Operations, emission point 209RL, equipped with vapor recovery or dedicated flare for vapor control.***		

SECTION D – NORMAL OPERATING SCHEDULE

Hours Per Day	Days Per Week	Weeks Per Year	Peak Production Season (if any)	Dates of Annual Shutdown
24	***7***	***52***	***N/A***	***N/A***

SECTION E – RAW MATERIALS INTRODUCED INTO UNIT OR PROCESS

Include solid fuels such as coke or coal. *Exclude* indirect heat exchangers from this section
For indirect heat exchangers, complete form SFN 8518

Material	Hourly Process Weight (Pounds Per Hour)			Average Annual (Specify Units)	Intermittent Operation Only (Average Hours Per Week)
	Average	Maximum	Minimum		
Crude Oil	***55,000 bbl/d***	***55,000 bbl/d***	***55,000 bbl/d***	***20,075,000 bbl***	***N/A***

SECTION F – PRODUCTS OF UNIT OR PROCESS

Include all, even those not usable because they do not meet specifications

Material	Hourly Process Weight (Pounds Per Hour)			Average Annual (Specify Units)	Intermittent Operation Only (Average Hours Per Week)
	Average	Maximum	Minimum		
Gasoline	***22,666 bbl/d***	***22,666 bbl/d***	***22,666 bbl/d***	***8,272,998 bbl***	***N/A***
Jet Fuel	***6,349 bbl/d***	***6,349 bbl/d***	***6,349 bbl/d***	***2,317,294 bbl***	***N/A***
Diesel	***8,327 bbl/d***	***8,327 bbl/d***	***8,327 bbl/d***	***3,039,446 bbl***	***N/A***
Fuel Oil	***3,797 bbl/d***	***3,797 bbl/d***	***3,797 bbl/d***	***1,385,905 bbl***	***N/A***

SECTION G – FUELS USED

Coal (Tons/Yr)	% Sulfur	% Ash	Oil (Gal/Yr)	% Sulfur	Grade No.
N/A					
Natural Gas (Thousand CF/Yr) ***N/A***		LP Gas (Gal/Yr) ***N/A***		Other (Specify) ***N/A***	

SECTION H – EMISSION POINTS

List each point separately, number each and locate on attached flow chart

Number	Stack Height (ft)	Stack Diameter (ft at top)	Gas Volume (ACFM)	Exit Temp (°F)	Gas Velocity (fps)
209RL	***N/A***	***N/A***	***N/A***	***N/A***	***N/A***

SECTION I – AIR CONTAMINANTS EMITTED

Known or Suspected - Use same identification number as above

Number	Pollutant	Amount		Basis of Estimate
		Pounds/Hr	Tons/Yr	
209RL	***VOC***	***0.7***	***3.0***	***Emission factors from AP-42 Chapter 5, Table 5.2-5. See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"***

SECTION J – VOLATILE ORGANIC COMPOUNDS

Are any volatile organic compounds (VOCs) stored on premises? ☒ No ☐Yes – List Below See 40 CFR 51.100(s) for classes of compounds covered

Material Stored	Size Tank (Gallons)	Vapor Control Device

SECTION K – ORGANIC SOLVENTS

Are any organic solvents used or produced? ☒ No (None or less than 50 gal/yr) ☐Yes – List Below

Type	Principal Use	Gallons/Yr Consumed	Gallons/Yr Produced

SECTION L – AIR POLLUTION CONTROL EQUIPMENT

Is any air pollution control equipment installed on this unit or process? ☒ No ☐ Yes
If 'Yes' attach form SFN 8532

SECTION M – MATERIAL STORAGE

Does the input material or product from this process contain finely divided material which could become airborne? ☒No ☐Yes

Describe storage methods used:

Storage Piles	Type of Material	Particle Diameter (Avg. or Screen	Pile Size Average Tons	Pile Wetted	Pile Covered

Describe any fugitive dust problems:

Attach additional sheets if needed to explain any answers. Use separate form for each contaminant emitting process

Signature of Applicant	Date
Tom Williams	09/26/2016

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of Health
Division of Air Quality
918 E Divide Ave., 2nd Floor
Bismarck, ND 58501-1947
(701) 328-5188

PERMIT APPLICATION FOR MANUFACTURING OR PROCESSING EQUIPMENT

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8520 (09-12)

SECTION A – GENERAL INFORMATION

Equipment items operating as a functional unit may be grouped as one application		
Name of Firm or Organization ***Meridian Energy Group - Davis Refinery***		
Applicant's Name ***Tom Williams***		
Title ***VP of Planning &Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***

SECTION B - FACILITY INFORMATION

Facility Name ***Davis Refinery***			
ND Air Pollution Control Permit No. (If Applicable) ***N/A***			
Contact Person for Air Pollution Matters ***Tom Johnson***			
Title ***Vice President of Operations***	Telephone Number ***(409)795-0792***	E-mail Address ***tjohnson@meridianenergygrou***	
Facility Address (Street & No.) ***37th Street***			
City ***Belfield***	State ***ND***	ZIP Code ***58622***	
County ***Billings***	Latitude (Nearest Second) ***46°52'45"N***	Longitude (Nearest Second) ***103°14'55" W***	
Legal Description of Facility Site ***Property ID 07 0000 00165 000 in the SE 1/4 of Section 2, Twp 139N, Range 100W and Property ID: 07 0000 00162 000 in the NW1/4 and SW 1/4 of Section 1, Twp 139N, Range 100W***	MSL Elevation at Facility ***2,685 feet***	Ref. Datum	

SECTION C – EQUIPMENT INFORMATION

Type of Unit or Process (rotary dryer, cupola furnace, crusher, pelletizer, etc.) ***Truck Loading-Unloading System***		
Make ***N/A***	Model ***N/A***	Date Installed ***TBD***
Capacity (manufacturer's or designer's guaranteed maximum) ***TBD***	Operating Capacity (specific units) ***TBD***	
Brief description of operation of unit or process: ***Truck Loading-Unloading Operations, emission point 208TL, equipped with vapor recovery or a dedicated flare for vapor control.***		

SECTION D – NORMAL OPERATING SCHEDULE

Hours Per Day	Days Per Week	Weeks Per Year	Peak Production Season (if any)	Dates of Annual Shutdown
24	***7***	***52***	***N/A***	***N/A***

SECTION E – RAW MATERIALS INTRODUCED INTO UNIT OR PROCESS

Include solid fuels such as coke or coal. *Exclude* indirect heat exchangers from this section
For indirect heat exchangers, complete form SFN 8518

Material	Hourly Process Weight (Pounds Per Hour)			Average Annual (Specify Units)	Intermittent Operation Only (Average Hours Per Week)
	Average	Maximum	Minimum		
Butane	***2,000 bbl***	***2,000 bbl***	***2,000 bbl***	***730,000 bbl***	***N/A***

SECTION F – PRODUCTS OF UNIT OR PROCESS

Include all, even those not usable because they do not meet specifications

Material	Hourly Process Weight (Pounds Per Hour)			Average Annual (Specify Units)	Intermittent Operation Only (Average Hours Per Week)
	Average	Maximum	Minimum		
Gasoline	***7,555 bbl/d***	***7,555 bbl/d***	***7,555 bbl/d***	***2,757,666 bbl***	***N/A***
Jet Fuel	***2,116 bbl/d***	***2,116 bbl/d***	***2,116 bbl/d***	***772,431 bbl***	***N/A***
Diesel	***2,776 bbl/d***	***2,776 bbl/d***	***2,776 bbl/d***	***1,013,149 bbl***	***N/A***

SECTION G – FUELS USED

Coal (Tons/Yr)	% Sulfur	% Ash	Oil (Gal/Yr)	% Sulfur	Grade No.
N/A					
Natural Gas (Thousand CF/Yr) ***N/A***		LP Gas (Gal/Yr) ***N/A***		Other (Specify) ***N/A***	

SECTION H – EMISSION POINTS

List each point separately, number each and locate on attached flow chart

Number	Stack Height (ft)	Stack Diameter (ft at top)	Gas Volume (ACFM)	Exit Temp (°F)	Gas Velocity (fps)
208TL	***N/A***	***N/A***	***N/A***	***N/A***	***N/A***

SECTION I – AIR CONTAMINANTS EMITTED

Known or Suspected - Use same identification number as above

Number	Pollutant	Amount		Basis of Estimate
		Pounds/Hr	Tons/Yr	
208TL	***VOC***	***0.3***	***1.1***	***Emission factors from AP-42 Chapter 5, Table 5.2-5. See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"***

SECTION J – VOLATILE ORGANIC COMPOUNDS

Are any volatile organic compounds (VOCs) stored on premises? ☒ No ☐Yes – List Below See 40 CFR 51.100(s) for classes of compounds covered

Material Stored	Size Tank (Gallons)	Vapor Control Device

SECTION K – ORGANIC SOLVENTS

Are any organic solvents used or produced? ☒ No (None or less than 50 gal/yr) ☐Yes – List Below

Type	Principal Use	Gallons/Yr Consumed	Gallons/Yr Produced

SECTION L – AIR POLLUTION CONTROL EQUIPMENT

Is any air pollution control equipment installed on this unit or process? ☒ No ☐ Yes
If 'Yes' attach form SFN 8532

SECTION M – MATERIAL STORAGE

Does the input material or product from this process contain finely divided material which could become airborne? ☒No ☐Yes

Describe storage methods used:

Storage Piles	Type of Material	Particle Diameter (Avg. or Screen	Pile Size Average Tons	Pile Wetted	Pile Covered

Describe any fugitive dust problems:

Attach additional sheets if needed to explain any answers. Use separate form for each contaminant emitting process

Signature of Applicant	Date
	09/26/2016

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of Health
Division of Air Quality
918 E Divide Ave., 2nd Floor
Bismarck, ND 58501-1947
(701) 328-5188

PERMIT APPLICATION FOR MANUFACTURING OR PROCESSING EQUIPMENT

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8520 (09-12)

SECTION A – GENERAL INFORMATION

Equipment items operating as a functional unit may be grouped as one application		
Name of Firm or Organization ***Meridian Energy Group - Davis Refinery***		
Applicant's Name ***Tom Williams***		
Title ***VP of Planning &Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***

SECTION B - FACILITY INFORMATION

Facility Name ***Davis Refinery***		
ND Air Pollution Control Permit No. (If Applicable) ***N/A***		
Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number ***(409)795-0792***	E-mail Address ***tjohnson@meridianenergygrou***
Facility Address (Street & No.) ***37th Street***		
City ***Belfield***	State ***ND***	ZIP Code ***58622***
County ***Billings***	Latitude (Nearest Second) ***46°52'45"N***	Longitude (Nearest Second) ***103°14'55" W***

Legal Description of Facility Site ***Property ID 07 0000 00165 000 in the SE 1/4 of Section 2, Twp 139N, Range 100W and Property ID: 07 0000 00162 000 in the NW1/4 and SW 1/4 of Section 1, Twp 139N, Range 100W***	MSL Elevation at Facility ***2,685 feet***	Ref. Datum

SECTION C – EQUIPMENT INFORMATION

Type of Unit or Process (rotary dryer, cupola furnace, crusher, pelletizer, etc.) ***Wastewater Treatment Plant***		
Make ***N/A***	Model ***N/A***	Date Installed ***TBD***
Capacity (manufacturer's or designer's guaranteed maximum) ***128 gpm***	Operating Capacity (specific units) ***107 gpm***	
Brief description of operation of unit or process: ***Wastewater Treatment Plant - 206WWT (Fugitive), BWON compliant***		

SECTION D – NORMAL OPERATING SCHEDULE

Hours Per Day	Days Per Week	Weeks Per Year	Peak Production Season (if any)	Dates of Annual Shutdown
24	***7***	***52***	***N/A***	***N/A***

SECTION E – RAW MATERIALS INTRODUCED INTO UNIT OR PROCESS

Include solid fuels such as coke or coal. *Exclude* indirect heat exchangers from this section
For indirect heat exchangers, complete form SFN 8518

Material	Hourly Process Weight (Pounds Per Hour)			Average Annual (Specify Units)	Intermittent Operation Only (Average Hours Per Week)
	Average	Maximum	Minimum		
Refinery wastewater (oily effluents)	***71,343.11***	***84,011.51***	***71,343.11***	***107 gpm***	***N/A***

SECTION F – PRODUCTS OF UNIT OR PROCESS

Include all, even those not usable because they do not meet specifications

Material	Hourly Process Weight (Pounds Per Hour)			Average Annual (Specify Units)	Intermittent Operation Only (Average Hours Per Week)
	Average	Maximum	Minimum		
Treated wastewater	***3,075.59***	***3,612.49***	***3,075.59***	***4.61 gpm***	***N/A***

SECTION G – FUELS USED

Coal (Tons/Yr)	% Sulfur	% Ash	Oil (Gal/Yr)	% Sulfur	Grade No.
N/A					
Natural Gas (Thousand CF/Yr)		LP Gas (Gal/Yr)		Other (Specify)	
N/A		***N/A***		***N/A***	

SECTION H – EMISSION POINTS

List each point separately, number each and locate on attached flow chart

Number	Stack Height (ft)	Stack Diameter (ft at top)	Gas Volume (ACFM)	Exit Temp (°F)	Gas Velocity (fps)
206WWT (Fugitive)	***N/A***	***N/A***	***N/A***	***N/A***	***N/A***

SECTION I – AIR CONTAMINANTS EMITTED

Known or Suspected - Use same identification number as above

Number	Pollutant	Amount		Basis of Estimate
		Pounds/Hr	Tons/Yr	
206WWT (Fugitive)	***VOC***	***2.40***	***10.52***	***Engineering data and * Table 7-8. Table 7-9. and Table 7-10 from the Emissions Estimation Protocol for Petroleum Refineries. See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"***
206WWT (Fugitive)	***HAPs***	***1.2E-01***	***5.24E-01***	

SECTION J – VOLATILE ORGANIC COMPOUNDS

Are any volatile organic compounds (VOCs) stored on premises? ☒ No ☐Yes – List Below See 40 CFR 51.100(s) for classes of compounds covered

Material Stored	Size Tank (Gallons)	Vapor Control Device

SECTION K – ORGANIC SOLVENTS

Are any organic solvents used or produced? ☒ No (None or less than 50 gal/yr) ☐Yes – List Below

Type	Principal Use	Gallons/Yr Consumed	Gallons/Yr Produced

SECTION L – AIR POLLUTION CONTROL EQUIPMENT

Is any air pollution control equipment installed on this unit or process? ☒ No ☐ Yes
If 'Yes' attach form SFN 8532

SECTION M – MATERIAL STORAGE

Does the input material or product from this process contain finely divided material which could become airborne? ☒No ☐Yes

Describe storage methods used:

Storage Piles	Type of Material	Particle Diameter (Avg. or Screen	Pile Size Average Tons	Pile Wetted	Pile Covered

Describe any fugitive dust problems:

Attach additional sheets if needed to explain any answers. Use separate form for each contaminant emitting process

Signature of Applicant	Date
	09/26/2016

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of Health
Division of Air Quality
918 E Divide Ave., 2nd Floor
Bismarck, ND 58501-1947
(701) 328-5188

PERMIT APPLICATION FOR MANUFACTURING OR PROCESSING EQUIPMENT

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8520 (09-12)

SECTION A – GENERAL INFORMATION

Equipment items operating as a functional unit may be grouped as one application		
Name of Firm or Organization ***Meridian Energy Group - Davis Refinery***		
Applicant's Name ***Tom Williams***		
Title ***VP of Planning &Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***

SECTION B - FACILITY INFORMATION

Facility Name ***Davis Refinery***		
ND Air Pollution Control Permit No. (If Applicable) ***N/A***		
Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number ***(409)795-0792***	E-mail Address ***tjohnson@meridianenergygrou***
Facility Address (Street & No.) ***37th Street***		
City ***Belfield***	State ***ND***	ZIP Code ***58622***
County ***Billings***	Latitude (Nearest Second) ***46°52'45"N***	Longitude (Nearest Second) ***103°14'55" W***

Legal Description of Facility Site ***Property ID 07 0000 00165 000 in the SE 1/4 of Section 2, Twp 139N, Range 100W and Property ID: 07 0000 00162 000 in the NW1/4 and SW 1/4 of Section 1, Twp 139N, Range 100W***	MSL Elevation at Facility ***2,685 feet***	Ref. Datum

SECTION C – EQUIPMENT INFORMATION

Type of Unit or Process (rotary dryer, cupola furnace, crusher, pelletizer, etc.) ***Cooling Tower A***		
Make ***N/A***	Model ***New Series 3000 - XES3E-1424-07N***	Date Installed ***TBD***
Capacity (manufacturer's or designer's guaranteed maximum) ***1,500 gpm***	Operating Capacity (specific units) ***1,500 gpm***	
Brief description of operation of unit or process: ***Water cooling tower, 1,500 gpm capacity, three cells in total, two operating one on standby, equipped with drift eliminators for a drift rate of 0.005%. Emission point 215-CT-1501A.***		

SECTION D – NORMAL OPERATING SCHEDULE

Hours Per Day	Days Per Week	Weeks Per Year	Peak Production Season (if any)	Dates of Annual Shutdown
24	***7***	***52***	***N/A***	***N/A***

SECTION E – RAW MATERIALS INTRODUCED INTO UNIT OR PROCESS

Include solid fuels such as coke or coal. *Exclude* indirect heat exchangers from this section
For indirect heat exchangers, complete form SFN 8518

Material	Hourly Process Weight (Pounds Per Hour)			Average Annual (Specify Units)	Intermittent Operation Only (Average Hours Per Week)
	Average	Maximum	Minimum		
Warm water from various processes	***750,000***	***750,000***	***750,000***	***788,400,000 gal***	***N/A***

SECTION F – PRODUCTS OF UNIT OR PROCESS

Include all, even those not usable because they do not meet specifications

Material	Hourly Process Weight (Pounds Per Hour)			Average Annual (Specify Units)	Intermittent Operation Only (Average Hours Per Week)
	Average	Maximum	Minimum		
N/A	***N/A***	***N/A***	***N/A***	***N/A***	***N/A***

SECTION G – FUELS USED

Coal (Tons/Yr)	% Sulfur	% Ash	Oil (Gal/Yr)	% Sulfur	Grade No.
N/A					
Natural Gas (Thousand CF/Yr) ***N/A***		LP Gas (Gal/Yr) ***N/A***		Other (Specify) ***N/A***	

SECTION H – EMISSION POINTS

List each point separately, number each and locate on attached flow chart

Number	Stack Height (ft)	Stack Diameter (ft at top)	Gas Volume (ACFM)	Exit Temp (°F)	Gas Velocity (fps)
215-CT-1501A	***12***	***N/A***	***N/A***	***N/A***	***N/A***

SECTION I – AIR CONTAMINANTS EMITTED

Known or Suspected - Use same identification number as above

Number	Pollutant	Amount		Basis of Estimate
		Pounds/Hr	Tons/Yr	
215-CT-1501A	***VOC***	***0.13***	***0.55***	***Engineering data from vendor, and emission factors from Table 8-5 of the Emissions Estimation Protocol for Petroleum Refineries. See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"***
215-CT-1501A	***PM 10***	***0.0012***	***0.01***	

SECTION J – VOLATILE ORGANIC COMPOUNDS

Are any volatile organic compounds (VOCs) stored on premises? ☒ No ☐Yes – List Below See 40 CFR 51.100(s) for classes of compounds covered

Material Stored	Size Tank (Gallons)	Vapor Control Device

SECTION K – ORGANIC SOLVENTS

Are any organic solvents used or produced? ☒ No (None or less than 50 gal/yr) ☐Yes – List Below

Type	Principal Use	Gallons/Yr Consumed	Gallons/Yr Produced

SECTION L – AIR POLLUTION CONTROL EQUIPMENT

Is any air pollution control equipment installed on this unit or process? ☒ No ☐ Yes
If 'Yes' attach form SFN 8532

SECTION M – MATERIAL STORAGE

Does the input material or product from this process contain finely divided material which could become airborne? ☒No ☐Yes

Describe storage methods used:

Storage Piles	Type of Material	Particle Diameter (Avg. or Screen	Pile Size Average Tons	Pile Wetted	Pile Covered

Describe any fugitive dust problems:

Attach additional sheets if needed to explain any answers. Use separate form for each contaminant emitting process

Signature of Applicant	Date
	09/26/2016

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of Health
Division of Air Quality
918 E Divide Ave., 2nd Floor
Bismarck, ND 58501-1947
(701) 328-5188

PERMIT APPLICATION FOR MANUFACTURING OR PROCESSING EQUIPMENT

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8520 (09-12)

SECTION A – GENERAL INFORMATION

Equipment items operating as a functional unit may be grouped as one application		
Name of Firm or Organization ***Meridian Energy Group - Davis Refinery***		
Applicant's Name ***Tom Williams***		
Title ***VP of Planning &Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***

SECTION B - FACILITY INFORMATION

Facility Name ***Davis Refinery***		
ND Air Pollution Control Permit No. (If Applicable) ***N/A***		
Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number ***(409)795-0792***	E-mail Address ***tjohnson@meridianenergygrou***
Facility Address (Street & No.) ***37th Street***		
City ***Belfield***	State ***ND***	ZIP Code ***58622***
County ***Billings***	Latitude (Nearest Second) ***46°52'45"N***	Longitude (Nearest Second) ***103°14'55" W***

Legal Description of Facility Site ***Property ID 07 0000 00165 000 in the SE 1/4 of Section 2, Twp 139N, Range 100W and Property ID: 07 0000 00162 000 in the NW1/4 and SW 1/4 of Section 1, Twp 139N, Range 100W***	MSL Elevation at Facility ***2,685 feet***	Ref. Datum

SECTION C – EQUIPMENT INFORMATION

Type of Unit or Process (rotary dryer, cupola furnace, crusher, pelletizer, etc.) ***Cooling Tower A***		
Make ***N/A***	Model ***New Series 3000 - XES3E-1424-07N***	Date Installed ***TBD***
Capacity (manufacturer's or designer's guaranteed maximum) ***1,500 gpm***	Operating Capacity (specific units) ***1,500 gpm***	
Brief description of operation of unit or process: ***Water cooling tower, 1,500 gpm capacity, three cells in total, two operating one on standby, equipped with drift eliminators for a drift rate of 0.005%. Emission point 215-CT-1501B.***		

SECTION D – NORMAL OPERATING SCHEDULE

Hours Per Day	Days Per Week	Weeks Per Year	Peak Production Season (if any)	Dates of Annual Shutdown
24	***7***	***52***	***N/A***	***N/A***

SECTION E – RAW MATERIALS INTRODUCED INTO UNIT OR PROCESS

Include solid fuels such as coke or coal. *Exclude* indirect heat exchangers from this section
For indirect heat exchangers, complete form SFN 8518

Material	Hourly Process Weight (Pounds Per Hour)			Average Annual (Specify Units)	Intermittent Operation Only (Average Hours Per Week)
	Average	Maximum	Minimum		
Warm water from various processes	***750,000***	***750,000***	***750,000***	***788,400,000 gal***	***N/A***

SECTION F – PRODUCTS OF UNIT OR PROCESS

Include all, even those not usable because they do not meet specifications

Material	Hourly Process Weight (Pounds Per Hour)			Average Annual (Specify Units)	Intermittent Operation Only (Average Hours Per Week)
	Average	Maximum	Minimum		
N/A	***N/A***	***N/A***	***N/A***	***N/A***	***N/A***

SECTION G – FUELS USED

Coal (Tons/Yr)	% Sulfur	% Ash	Oil (Gal/Yr)	% Sulfur	Grade No.
N/A					
Natural Gas (Thousand CF/Yr) ***N/A***		LP Gas (Gal/Yr) ***N/A***		Other (Specify) ***N/A***	

SECTION H – EMISSION POINTS

List each point separately, number each and locate on attached flow chart

Number	Stack Height (ft)	Stack Diameter (ft at top)	Gas Volume (ACFM)	Exit Temp (°F)	Gas Velocity (fps)
215-CT-1501B	***12***	***N/A***	***N/A***	***N/A***	***N/A***

SECTION I – AIR CONTAMINANTS EMITTED

Known or Suspected - Use same identification number as above

Number	Pollutant	Amount		Basis of Estimate
		Pounds/Hr	Tons/Yr	
215-CT-1501B	***VOC***	***0.13***	***0.55***	***Engineering data from vendor, and emission factors from Table 8-5 of the Emissions Estimation Protocol for Petroleum Refineries. See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"***
215-CT-1501B	***PM 10***	***0.0012***	***0.01***	

SECTION J – VOLATILE ORGANIC COMPOUNDS

Are any volatile organic compounds (VOCs) stored on premises? ☒ No ☐Yes – List Below See 40 CFR 51.100(s) for classes of compounds covered		
Material Stored	Size Tank (Gallons)	Vapor Control Device

SECTION K – ORGANIC SOLVENTS

Are any organic solvents used or produced? ☒ No (None or less than 50 gal/yr) ☐Yes – List Below			
Type	Principal Use	Gallons/Yr Consumed	Gallons/Yr Produced

SECTION L – AIR POLLUTION CONTROL EQUIPMENT

Is any air pollution control equipment installed on this unit or process? ☒ No ☐ Yes
If 'Yes' attach form SFN 8532

SECTION M – MATERIAL STORAGE

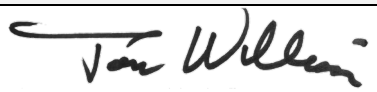
Does the input material or product from this process contain finely divided material which could become airborne? ☒No ☐Yes

Describe storage methods used:

Storage Piles	Type of Material	Particle Diameter (Avg. or Screen	Pile Size Average Tons	Pile Wetted	Pile Covered

Describe any fugitive dust problems:

Attach additional sheets if needed to explain any answers. Use separate form for each contaminant emitting process

Signature of Applicant	Date
	09/26/2016

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of Health
Division of Air Quality
918 E Divide Ave., 2nd Floor
Bismarck, ND 58501-1947
(701) 328-5188

PERMIT APPLICATION FOR MANUFACTURING OR PROCESSING EQUIPMENT

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8520 (09-12)

SECTION A – GENERAL INFORMATION

Equipment items operating as a functional unit may be grouped as one application		
Name of Firm or Organization ***Meridian Energy Group - Davis Refinery***		
Applicant's Name ***Tom Williams***		
Title ***VP of Planning &Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***

SECTION B - FACILITY INFORMATION

Facility Name ***Davis Refinery***		
ND Air Pollution Control Permit No. (If Applicable) ***N/A***		
Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number ***(409)795-0792***	E-mail Address ***tjohnson@meridianenergygrou***
Facility Address (Street & No.) ***37th Street***		
City ***Belfield***	State ***ND***	ZIP Code ***58622***
County ***Billings***	Latitude (Nearest Second) ***46°52'45"N***	Longitude (Nearest Second) ***103°14'55" W***

Legal Description of Facility Site ***Property ID 07 0000 00165 000 in the SE 1/4 of Section 2, Twp 139N, Range 100W and Property ID: 07 0000 00162 000 in the NW1/4 and SW 1/4 of Section 1, Twp 139N, Range 100W***	MSL Elevation at Facility ***2,685 feet***	Ref. Datum

SECTION C – EQUIPMENT INFORMATION

Type of Unit or Process (rotary dryer, cupola furnace, crusher, pelletizer, etc.) ***Cooling Tower A***		
Make ***N/A***	Model ***New Series 3000 - XES3E-1424-07N***	Date Installed ***TBD***
Capacity (manufacturer's or designer's guaranteed maximum) ***1,500 gpm***	Operating Capacity (specific units) ***1,500 gpm***	
Brief description of operation of unit or process: ***Water cooling tower, 1,500 gpm capacity, three cells in total, two operating one on standby, equipped with drift eliminators for a drift rate of 0.005%. Emission point 215-CT-1501C.***		

SECTION D – NORMAL OPERATING SCHEDULE

Hours Per Day	Days Per Week	Weeks Per Year	Peak Production Season (if any)	Dates of Annual Shutdown
24	***7***	***52***	***N/A***	***N/A***

SECTION E – RAW MATERIALS INTRODUCED INTO UNIT OR PROCESS

Include solid fuels such as coke or coal. *Exclude* indirect heat exchangers from this section
For indirect heat exchangers, complete form SFN 8518

Material	Hourly Process Weight (Pounds Per Hour)			Average Annual (Specify Units)	Intermittent Operation Only (Average Hours Per Week)
	Average	Maximum	Minimum		
Warm water from various processes	***750,000***	***750,000***	***750,000***	***788,400,000 gal***	***N/A***

SECTION F – PRODUCTS OF UNIT OR PROCESS

Include all, even those not usable because they do not meet specifications

Material	Hourly Process Weight (Pounds Per Hour)			Average Annual (Specify Units)	Intermittent Operation Only (Average Hours Per Week)
	Average	Maximum	Minimum		
N/A	***N/A***	***N/A***	***N/A***	***N/A***	***N/A***

SECTION G – FUELS USED

Coal (Tons/Yr)	% Sulfur	% Ash	Oil (Gal/Yr)	% Sulfur	Grade No.
N/A					
Natural Gas (Thousand CF/Yr) ***N/A***		LP Gas (Gal/Yr) ***N/A***		Other (Specify) ***N/A***	

SECTION H – EMISSION POINTS

List each point separately, number each and locate on attached flow chart

Number	Stack Height (ft)	Stack Diameter (ft at top)	Gas Volume (ACFM)	Exit Temp (°F)	Gas Velocity (fps)
215-CT-1501C	***12***	***N/A***	***N/A***	***N/A***	***N/A***

SECTION I – AIR CONTAMINANTS EMITTED

Known or Suspected - Use same identification number as above

Number	Pollutant	Amount		Basis of Estimate
		Pounds/Hr	Tons/Yr	
215-CT-1501C	***VOC***	***0.13***	***0.55***	***Engineering data from vendor, and emission factors from Table 8-5 of the Emissions Estimation Protocol for Petroleum Refineries. See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"***
215-CT-1501C	***PM 10***	***0.0012***	***0.01***	

SECTION J – VOLATILE ORGANIC COMPOUNDS

Are any volatile organic compounds (VOCs) stored on premises? ☒ No ☐Yes – List Below See 40 CFR 51.100(s) for classes of compounds covered

Material Stored	Size Tank (Gallons)	Vapor Control Device

SECTION K – ORGANIC SOLVENTS

Are any organic solvents used or produced? ☒ No (None or less than 50 gal/yr) ☐Yes – List Below

Type	Principal Use	Gallons/Yr Consumed	Gallons/Yr Produced

SECTION L – AIR POLLUTION CONTROL EQUIPMENT

Is any air pollution control equipment installed on this unit or process? ☒ No ☐ Yes
If 'Yes' attach form SFN 8532

SECTION M – MATERIAL STORAGE

Does the input material or product from this process contain finely divided material which could become airborne? ☒No ☐Yes

Describe storage methods used:

Storage Piles	Type of Material	Particle Diameter (Avg. or Screen	Pile Size Average Tons	Pile Wetted	Pile Covered

Describe any fugitive dust problems:

Attach additional sheets if needed to explain any answers. Use separate form for each contaminant emitting process

Signature of Applicant	Date
	09/26/2016

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of Health
Division of Air Quality
918 E Divide Ave., 2nd Floor
Bismarck, ND 58501-1947
(701) 328-5188

PERMIT APPLICATION FOR
FUEL BURNING EQUIPMENT FOR INDIRECT HEATING

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8518 (09-12)

SECTION A – FACILITY INFORMATION

Name of Firm or Organization ***Meridian Energy Group – Davis Refinery***		
Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number (***409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***
Applicant´s Name ***Tom Williams***		
Title ***VP of Planning & Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		

City ***Irvine***	State ***CA***	ZIP Code ***92612***
Facility Address (Street & No.) ***37th Street***		
City ***Belfield***	State ***ND***	ZIP Code ***58622***

County ***Billings***	Latitude (Nearest Second) ***46°52'45"N***	Longitude (Nearest Second) ***103°14'55" W***

Legal Description of Facility Site ***Property ID 07 0000 00165 000 in the SE 1/4 of Section 2, Twp 139N, Range 100W and Property ID: 07 0000 00162 000 in the NW1/4 and SW 1/4 of Section 1, Twp 139N, Range 100W***	Land Area at Facility Site ***261 Acres***	MSL Elevation at Facility ***2,685 feet***

SECTION B – EQUIPMENT

Source ID No. (From form SFN 8516) ***101-H-0101***	Name of Manufacturer ***TBD***
Rated Capacity/Maximum Input ***TBD***	Model Number ***TBD***
Purpose Space Heat _____% Process Heat ***100*** %	Power Generation _____% Other (Specify % if Multi Purpose) _____%

SECTION C – TYPE OF COMBUSTION UNIT AND FUEL FEEDING METHOD

Coal (If other solid fuel, specify here) ☐Pulverized ☐General ☐Dry Bottom ☐Wet Bottom with Fly Ash Reinjection ☐Wet Bottom without Fly Ash Reinjection ☐Other – Specify:	 ☐Spreader Stoker with Fly Ash Reinjection ☐Spreader Stoker without Fly Ash Reinjection ☐Fluidized Bed ☐Cyclone ☐Hand-Fired
Fuel Oil ☐Horizontally Fired ☐Tangentially Fired ☐Other – Specify:	Gas ☐Horizontally Fired ☐Tangentially Fired ☐Other – Specify: ***TBD***

SECTION D – NORMAL SCHEDULE OF OPERATION

Hours Per Day	Days Per Week	Weeks Per Year	Hours Per Year Total	Peak Season (Specify Months)
24	***7***	***52***	***8760***	***N/A***

SECTION E – FUEL USE EXPECTED IN A CALENDAR YEAR

Year ***2017-2018***

Primary Fuels			Standby Fuels		
Type ***Fuel Gas***			Type ***none***		
Quantity Per Year ***22,869,732***	Units of Measure ***lb/yr***		Quantity Per Year	Units of Measure	
Percent Ash (Solid Fuels Only)					
Minimum	Maximum	Average	Minimum	Maximum	Average
Percent Sulfur					
Minimum ***0***	Maximum ***0***	Average ***0***	Minimum	Maximum	Average
Btu Per Unit of Measure (e.g. lb, gal, etc. - Specify)					
Minimum ***TBD***	Maximum ***TBD***	Average ***27,578.81***	Minimum	Maximum	Average

Describe Fuel Transport and Storage Methods:
N/A, fuel gas to be generated within the refinery

SECTION F – COMBUSTION AIR

☐Natural Draft ☐Induced ☐Forced ☐Other – Specify: ***TBD***

SECTION G – STACK DATA

Inside Diameter (ft) ***6.3***	Height Above Grade (ft) ***127.6***
Gas Temperature at Exit (Avg. °F) ***787.7***	Gas Velocity at Exit (Avg. ft/sec) ***20.1***
Are Emission Control Devices in Place? If YES – Complete SFN 8532 ☒ Yes ☐No	
Stack Exit Gas Flow Rate	
Average (ACFM) ***37,427.14***	Average (DSCFM) ***TBD***
Maximum (ACFM) ***TBD***	Maximum (DSCFM) ***TBD***
Are sampling ports available? ☐No ☒ Yes – Describe:	

SECTION H – NEARBY BUILDINGS

Attach drawings which show the plan and elevation views of any nearby buildings including the building that houses the fuel-fired equipment.
Plant layout drawings attached to this permit application.

SECTION I – AIR CONTAMINANTS EMITTED

Pollutant	Maximum Pounds Per Hour	Tons Per Year
PM_{10} Total	***2,88E-01***	***1,26E+00***
PM_{10} Filterable	***7,20E-02***	***3,15E-01***
$PM_{2.5}$ Total	***2,88E-01***	***1,26E+00***
$PM_{2.5}$ Filterable	***7,20E-02***	***3,15E-01***
$PM_{2.5}$ Condensable	***2,16E-01***	***9,46E-01***
Sulfur Dioxide	***4,24E-02***	***1,86E-01***
Nitrogen Oxides	***4,54E-01***	***1,99E+00***
Carbon Monoxide	***2,02E+00***	***8,83E+00***
Greenhouse Gases (CO2e)	***N/A***	
Other – Specify		
Lead	***3,53E-05***	***1,55E-04***
Metal HAP (Total)	***5,26E-04***	***2,31E-03***
Organic HAPs (Total)	***3,52E-02***	***1,54E-01***
VOC	***3,88E-01***	***1,70E+00***

Basis and Calculations for Quantities:
Engineering data and Emission factors from Table 1.4-2. AP 42, Chapter 1: External Combustion Sources. See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"

Signature of Applicant	Date
	9/26/2016

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of Health
Division of Air Quality
918 E Divide Ave., 2nd Floor
Bismarck, ND 58501-1947
(701) 328-5188

PERMIT APPLICATION FOR
FUEL BURNING EQUIPMENT FOR INDIRECT HEATING

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8518 (09-12)

SECTION A – FACILITY INFORMATION

Name of Firm or Organization ***Meridian Energy Group – Davis Refinery***		
Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number (***409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***
Applicant´s Name ***Tom Williams***		
Title ***VP of Planning & Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***
Facility Address (Street & No.) ***37th Street***		
City ***Belfield***	State ***ND***	ZIP Code ***58622***

County ***Billings***	Latitude (Nearest Second) ***46°52'45"N***	Longitude (Nearest Second) ***103°14'55" W***

Legal Description of Facility Site ***Property ID 07 0000 00165 000 in the SE 1/4 of Section 2, Twp 139N, Range 100W and Property ID: 07 0000 00162 000 in the NW1/4 and SW 1/4 of Section 1, Twp 139N, Range 100W***	Land Area at Facility Site ***261 Acres***	MSL Elevation at Facility ***2,685 feet***

SECTION B – EQUIPMENT

Source ID No. (From form SFN 8516) ***102-H-0201***	Name of Manufacturer ***TBD***
Rated Capacity/Maximum Input ***TBD***	Model Number ***TBD***
Purpose Space Heat _____% Process Heat ***100*** %	Power Generation _____% Other (Specify % if Multi Purpose) _____%

SECTION C – TYPE OF COMBUSTION UNIT AND FUEL FEEDING METHOD

Coal (If other solid fuel, specify here)	
☐Pulverized	☐Spreader Stoker with Fly Ash Reinjection
☐General	☐Spreader Stoker without Fly Ash Reinjection
☐Dry Bottom	☐Fluidized Bed
☐Wet Bottom with Fly Ash Reinjection	☐Cyclone
☐Wet Bottom without Fly Ash Reinjection	☐Hand-Fired
☐Other – Specify:	
Fuel Oil	Gas
☐Horizontally Fired	☐Horizontally Fired
☐Tangentially Fired	☐Tangentially Fired
☐Other – Specify:	☐Other – Specify: ***TBD***

SECTION D – NORMAL SCHEDULE OF OPERATION

Hours Per Day	Days Per Week	Weeks Per Year	Hours Per Year Total	Peak Season (Specify Months)
24	***7***	***52***	***8760***	***N/A***

SECTION E – FUEL USE EXPECTED IN A CALENDAR YEAR

Year ***2017-2018***					
Primary Fuels			Standby Fuels		
Type ***Fuel Gas***			Type ***none***		
Quantity Per Year ***22,869,732***	Units of Measure ***lb/yr***		Quantity Per Year	Units of Measure	
Percent Ash (Solid Fuels Only)					
Minimum	Maximum	Average	Minimum	Maximum	Average
Percent Sulfur					
Minimum ***0***	Maximum ***0***	Average ***0***	Minimum	Maximum	Average
Btu Per Unit of Measure (e.g. lb, gal, etc. - Specify)					
Minimum ***TBD***	Maximum ***TBD***	Average ***27,578.81***	Minimum	Maximum	Average
Describe Fuel Transport and Storage Methods: ***N/A, fuel gas to be generated within the refinery***					

SECTION F – COMBUSTION AIR

☐Natural Draft ☐Induced ☐Forced ☐Other – Specify: ***TBD***

SECTION G – STACK DATA

Inside Diameter (ft) ***6.3***	Height Above Grade (ft) ***127.6***
Gas Temperature at Exit (Avg. °F) ***787.7***	Gas Velocity at Exit (Avg. ft/sec) ***20.1***
Are Emission Control Devices in Place? If YES – Complete SFN 8532 ☒ Yes ☐No	
Stack Exit Gas Flow Rate	
Average (ACFM) ***37,427.14***	Average (DSCFM) ***TBD***
Maximum (ACFM) ***TBD***	Maximum (DSCFM) ***TBD***
Are sampling ports available? ☐No ☒ Yes – Describe:	

SECTION H – NEARBY BUILDINGS

Attach drawings which show the plan and elevation views of any nearby buildings including the building that houses the fuel-fired equipment.
Plant layout drawings attached to this permit application.

SECTION I – AIR CONTAMINANTS EMITTED

Pollutant	Maximum Pounds Per Hour	Tons Per Year
PM_{10} Total	***2,88E-01***	***1,26E+00***
PM_{10} Filterable	***7,20E-02***	***3,15E-01***
$PM_{2.5}$ Total	***2,88E-01***	***1,26E+00***
$PM_{2.5}$ Filterable	***7,20E-02***	***3,15E-01***
$PM_{2.5}$ Condensable	***2,16E-01***	***9,46E-01***
Sulfur Dioxide	***4,24E-02***	***1,86E-01***
Nitrogen Oxides	***4,54E-01***	***1,99E+00***
Carbon Monoxide	***2,02E+00***	***8,83E+00***
Greenhouse Gases (CO2e)	***N/A***	
Other – Specify		
Lead	***3,53E-05***	***1,55E-04***
Metal HAP (Total)	***5,26E-04***	***2,31E-03***
Organic HAPs (Total)	***3,52E-02***	***1,54E-01***
VOC	***3,88E-01***	***1,70E+00***

Basis and Calculations for Quantities:
Engineering data and Emission factors from Table 1.4-2. AP 42, Chapter 1: External Combustion Sources. See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"

Signature of Applicant	Date
	9/26/2016

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Bismarck, ND 58501-1947
(701) 328-5188

PERMIT APPLICATION FOR
FUEL BURNING EQUIPMENT FOR INDIRECT HEATING

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8518 (09-12)

SECTION A – FACILITY INFORMATION

Name of Firm or Organization ***Meridian Energy Group – Davis Refinery***		
Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number (***409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***
Applicant´s Name ***Tom Williams***		
Title ***VP of Planning & Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***
Facility Address (Street & No.) ***37th Street***		
City ***Belfield***	State ***ND***	ZIP Code ***58622***

County ***Billings***	Latitude (Nearest Second) ***46°52'45"N***	Longitude (Nearest Second) ***103°14'55" W***

Legal Description of Facility Site ***Property ID 07 0000 00165 000 in the SE 1/4 of Section 2, Twp 139N, Range 100W and Property ID: 07 0000 00162 000 in the NW1/4 and SW 1/4 of Section 1, Twp 139N, Range 100W***	Land Area at Facility Site ***261 Acres***	MSL Elevation at Facility ***2,685 feet***

SECTION B – EQUIPMENT

Source ID No. (From form SFN 8516) ***103-H-0301***	Name of Manufacturer ***TBD***
Rated Capacity/Maximum Input ***TBD***	Model Number ***TBD***
Purpose Space Heat _____% Process Heat ***100*** %	Power Generation _____% Other (Specify % if Multi Purpose) _____%

SECTION C – TYPE OF COMBUSTION UNIT AND FUEL FEEDING METHOD

Coal (If other solid fuel, specify here)	
☐Pulverized	☐Spreader Stoker with Fly Ash Reinjection
☐General	☐Spreader Stoker without Fly Ash Reinjection
☐Dry Bottom	☐Fluidized Bed
☐Wet Bottom with Fly Ash Reinjection	☐Cyclone
☐Wet Bottom without Fly Ash Reinjection	☐Hand-Fired
☐Other – Specify:	
Fuel Oil	Gas
☐Horizontally Fired	☐Horizontally Fired
☐Tangentially Fired	☐Tangentially Fired
☐Other – Specify:	☐Other – Specify: ***TBD***

SECTION D – NORMAL SCHEDULE OF OPERATION

Hours Per Day	Days Per Week	Weeks Per Year	Hours Per Year Total	Peak Season (Specify Months)
24	***7***	***52***	***8760***	***N/A***

SECTION E – FUEL USE EXPECTED IN A CALENDAR YEAR

Year ***2017-2018***					
Primary Fuels			Standby Fuels		
Type ***Fuel Gas***			Type ***None***		
Quantity Per Year ***24,295,860***	Units of Measure ***lb/yr***		Quantity Per Year	Units of Measure	
Percent Ash (Solid Fuels Only)					
Minimum	Maximum	Average	Minimum	Maximum	Average
Percent Sulfur					
Minimum ***0***	Maximum ***0***	Average ***0***	Minimum	Maximum	Average
Btu Per Unit of Measure (e.g. lb, gal, etc. - Specify)					
Minimum ***TBD***	Maximum ***TBD***	Average ***27,571.66***	Minimum	Maximum	Average
Describe Fuel Transport and Storage Methods: ***N/A, fuel gas to be generated within the refinery***					

SECTION F – COMBUSTION AIR

☐Natural Draft ☐Induced ☐Forced ☐Other – Specify: ***TBD***

SECTION G – STACK DATA

Inside Diameter (ft) ***6.5***	Height Above Grade (ft) ***125***
Gas Temperature at Exit (Avg. °F) ***600.4***	Gas Velocity at Exit (Avg. ft/sec) ***16.9***
Are Emission Control Devices in Place? If YES – Complete SFN 8532 ☒ Yes ☐No	
Stack Exit Gas Flow Rate	
Average (ACFM) ***33,610.60***	Average (DSCFM) ***TBD***
Maximum (ACFM) ***TBD***	Maximum (DSCFM) ***TBD***
Are sampling ports available? ☐No ☒ Yes – Describe:	

SECTION H – NEARBY BUILDINGS

Attach drawings which show the plan and elevation views of any nearby buildings including the building that houses the fuel-fired equipment.
Plant layout drawings attached to this permit application.

SECTION I – AIR CONTAMINANTS EMITTED

Pollutant	Maximum Pounds Per Hour	Tons Per Year
PM_{10} Total	***3,06E-01***	***1,34E+00***
PM_{10} Filterable	***7,65E-02***	***3,35E-01***
$PM_{2.5}$ Total	***3,06E-01***	***1,34E+00***
$PM_{2.5}$ Filterable	***7,65E-02***	***3,35E-01***
$PM_{2.5}$ Condensable	***2,29E-01***	***1,00E+00***
Sulfur Dioxide	***4,50E-02***	***1,97E-01***
Nitrogen Oxides	***4,82E-01***	***2,11E+00***
Carbon Monoxide	***2,14E+00***	***9,38E+00***
Greenhouse Gases (CO2e)	***N/A***	
Other – Specify		
Lead	***3,75E-05***	***1,64E-04***
Metal HAP (Total)	***5,59E-04***	***2,45E-03***
Organic HAPs (Total)	***3,74E-02***	***1,64E-01***
VOC	***4,12E-01***	***1,81E+00***

Basis and Calculations for Quantities:
Engineering data and Emission factors from Table 1.4-2. AP 42, Chapter 1: External Combustion Sources. See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"

Signature of Applicant	Date
	09/26/2016

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

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FUEL BURNING EQUIPMENT FOR INDIRECT HEATING

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8518 (09-12)

SECTION A – FACILITY INFORMATION

Name of Firm or Organization ***Meridian Energy Group – Davis Refinery***		
Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number (***409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***
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Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***
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County ***Billings***	Latitude (Nearest Second) ***46°52'45"N***	Longitude (Nearest Second) ***103°14'55" W***

Legal Description of Facility Site ***Property ID 07 0000 00165 000 in the SE 1/4 of Section 2, Twp 139N, Range 100W and Property ID: 07 0000 00162 000 in the NW1/4 and SW 1/4 of Section 1, Twp 139N, Range 100W***	Land Area at Facility Site ***261 Acres***	MSL Elevation at Facility ***2,685 feet***

SECTION B – EQUIPMENT

Source ID No. (From form SFN 8516) ***103-H-0302***	Name of Manufacturer ***TBD***
Rated Capacity/Maximum Input ***TBD***	Model Number ***TBD***
Purpose Space Heat _____% Process Heat ***100*** %	Power Generation _____% Other (Specify % if Multi Purpose) _____%

SECTION C – TYPE OF COMBUSTION UNIT AND FUEL FEEDING METHOD

Coal (If other solid fuel, specify here)	
☐Pulverized	☐Spreader Stoker with Fly Ash Reinjection
☐General	☐Spreader Stoker without Fly Ash Reinjection
☐Dry Bottom	☐Fluidized Bed
☐Wet Bottom with Fly Ash Reinjection	☐Cyclone
☐Wet Bottom without Fly Ash Reinjection	☐Hand-Fired
☐Other – Specify:	
Fuel Oil	Gas
☐Horizontally Fired	☐Horizontally Fired
☐Tangentially Fired	☐Tangentially Fired
☐Other – Specify:	☐Other – Specify: ***TBD***

SECTION D – NORMAL SCHEDULE OF OPERATION

Hours Per Day	Days Per Week	Weeks Per Year	Hours Per Year Total	Peak Season (Specify Months)
24	***7***	***52***	***8760***	***N/A***

SECTION E – FUEL USE EXPECTED IN A CALENDAR YEAR

Year ***2017-2018***

Primary Fuels			Standby Fuels		
Type ***Fuel Gas***			Type ***None***		
Quantity Per Year ***18,313,656***	Units of Measure ***lb/yr***		Quantity Per Year	Units of Measure	
Percent Ash (Solid Fuels Only)					
Minimum	Maximum	Average	Minimum	Maximum	Average
Percent Sulfur					
Minimum ***0***	Maximum ***0***	Average ***0***	Minimum	Maximum	Average
Btu Per Unit of Measure (e.g. lb, gal, etc. - Specify)					
Minimum ***TBD***	Maximum ***TBD***	Average ***27,575.82***	Minimum	Maximum	Average

Describe Fuel Transport and Storage Methods:
N/A, fuel gas to be generated within the refinery

SECTION F – COMBUSTION AIR

☐Natural Draft ☐Induced ☐Forced ☐Other – Specify: ***TBD***

SECTION G – STACK DATA

Inside Diameter (ft) ***5.1***	Height Above Grade (ft) ***120***
Gas Temperature at Exit (Avg. °F) ***600.1***	Gas Velocity at Exit (Avg. ft/sec) ***20.8***
Are Emission Control Devices in Place? If YES – Complete SFN 8532 ☒ Yes ☐No	
Stack Exit Gas Flow Rate	
Average (ACFM) ***25,334.29***	Average (DSCFM) ***TBD***
Maximum (ACFM) ***TBD***	Maximum (DSCFM) ***TBD***
Are sampling ports available? ☐No ☒ Yes – Describe:	

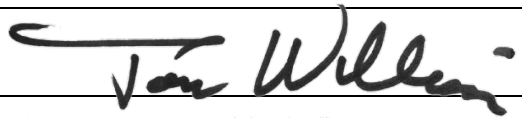
SECTION H – NEARBY BUILDINGS

Attach drawings which show the plan and elevation views of any nearby buildings including the building that houses the fuel-fired equipment.
Plant layout drawings attached to this permit application.

SECTION I – AIR CONTAMINANTS EMITTED

Pollutant	Maximum Pounds Per Hour	Tons Per Year
PM_{10} Total	***2,31E-01***	***1,01E+00***
PM_{10} Filterable	***5,77E-02***	***2,53E-01***
$PM_{2.5}$ Total	***2,31E-01***	***1,01E+00***
$PM_{2.5}$ Filterable	***5,77E-02***	***2,53E-01***
$PM_{2.5}$ Condensable	***1,73E-01***	***7,58E-01***
Sulfur Dioxide	***3,39E-02***	***1,49E-01***
Nitrogen Oxides	***3,63E-01***	***1,59E+00***
Carbon Monoxide	***1,61E+00***	***7,07E+00***
Greenhouse Gases (CO2e)	***N/A***	
Other – Specify		
Lead	***2,82E-05***	***1,24E-04***
Metal HAP (Total)	***4,22E-04***	***1,85E-03***
Organic HAPs (Total)	***2,82E-02***	***1,23E-01***
VOC	***3,11E-01***	***1,36E+00***

Basis and Calculations for Quantities:
Engineering data and Emission factors from Table 1.4-2. AP 42, Chapter 1: External Combustion Sources. See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"

Signature of Applicant	Date
	09/26/2016

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of Health
Division of Air Quality
918 E Divide Ave., 2nd Floor
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(701) 328-5188

PERMIT APPLICATION FOR
FUEL BURNING EQUIPMENT FOR INDIRECT HEATING

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8518 (09-12)

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Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number (***409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***
Applicant´s Name ***Tom Williams***		
Title ***VP of Planning & Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
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SECTION B – EQUIPMENT

Source ID No. (From form SFN 8516) ***105-H-0501***	Name of Manufacturer ***TBD***
Rated Capacity/Maximum Input ***TBD***	Model Number ***TBD***
Purpose Space Heat _____% Process Heat ***100*** %	Power Generation _____% Other (Specify % if Multi Purpose) _____%

SECTION C – TYPE OF COMBUSTION UNIT AND FUEL FEEDING METHOD

Coal (If other solid fuel, specify here)	
☐Pulverized	☐Spreader Stoker with Fly Ash Reinjection
☐General	☐Spreader Stoker without Fly Ash Reinjection
☐Dry Bottom	☐Fluidized Bed
☐Wet Bottom with Fly Ash Reinjection	☐Cyclone
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☐Other – Specify:	
Fuel Oil	Gas
☐Horizontally Fired	☐Horizontally Fired
☐Tangentially Fired	☐Tangentially Fired
☐Other – Specify:	☐Other – Specify: ***TBD***

SECTION D – NORMAL SCHEDULE OF OPERATION

Hours Per Day	Days Per Week	Weeks Per Year	Hours Per Year Total	Peak Season (Specify Months)
24	***7***	***52***	***8760***	***N/A***

SECTION E – FUEL USE EXPECTED IN A CALENDAR YEAR

Year ***2017-2018***

Primary Fuels		Standby Fuels	
Type ***Fuel Gas***		Type ***None***	
Quantity Per Year ***4,366,860***	Units of Measure ***lb/yr***	Quantity Per Year	Units of Measure

Percent Ash (Solid Fuels Only)					
Minimum	Maximum	Average	Minimum	Maximum	Average

Percent Sulfur					
Minimum ***0***	Maximum ***0***	Average ***0***	Minimum	Maximum	Average

Btu Per Unit of Measure (e.g. lb, gal, etc. - Specify)					
Minimum ***TBD***	Maximum ***TBD***	Average ***27,582.75***	Minimum	Maximum	Average

Describe Fuel Transport and Storage Methods:
N/A, fuel gas to be generated within the refinery

SECTION F – COMBUSTION AIR

☐Natural Draft ☐Induced ☐Forced ☐Other – Specify: ***TBD***

SECTION G – STACK DATA

Inside Diameter (ft) ***3***	Height Above Grade (ft) ***91***
Gas Temperature at Exit (Avg. °F) ***787.7***	Gas Velocity at Exit (Avg. ft/sec) ***16.2***
Are Emission Control Devices in Place? If YES – Complete SFN 8532 ☒ Yes ☐No	
Stack Exit Gas Flow Rate	
Average (ACFM) ***6,866.55***	Average (DSCFM) ***TBD***
Maximum (ACFM) ***TBD***	Maximum (DSCFM) ***TBD***
Are sampling ports available? ☐No ☒ Yes – Describe:	

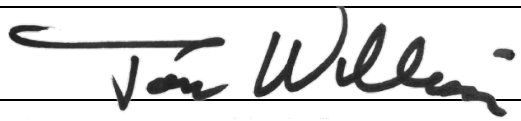
SECTION H – NEARBY BUILDINGS

Attach drawings which show the plan and elevation views of any nearby buildings including the building that houses the fuel-fired equipment.
Plant layout drawings attached to this permit application.

SECTION I – AIR CONTAMINANTS EMITTED

Pollutant	Maximum Pounds Per Hour	Tons Per Year
PM_{10} Total	***5,50E-02***	***2,41E-01***
PM_{10} Filterable	***1,38E-02***	***6,02E-02***
$PM_{2.5}$ Total	***5,50E-02***	***2,41E-01***
$PM_{2.5}$ Filterable	***1,38E-02***	***6,02E-02***
$PM_{2.5}$ Condensable	***4,13E-02***	***1,81E-01***
Sulfur Dioxide	***8,09E-03***	***3,54E-02***
Nitrogen Oxides	***4,13E-01***	***1,81E+00***
Carbon Monoxide	***3,85E-01***	***1,69E+00***
Greenhouse Gases (CO2e)	***N/A***	
Other – Specify		
Lead	***6,74E-06***	***2,95E-05***
Metal HAP (Total)	***1,01E-04***	***4,40E-04***
Organic HAPs (Total)	***6,72E-03***	***2,94E-02***
VOC	***7,41E-02***	***3,25E-01***

Basis and Calculations for Quantities:
Engineering data and Emission factors from Table 1.4-2. AP 42, Chapter 1: External Combustion Sources. See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"

Signature of Applicant	Date
	09/26/2016

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of Health
Division of Air Quality
918 E Divide Ave., 2nd Floor
Bismarck, ND 58501-1947
(701) 328-5188

PERMIT APPLICATION FOR
FUEL BURNING EQUIPMENT FOR INDIRECT HEATING

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8518 (09-12)

SECTION A – FACILITY INFORMATION

Name of Firm or Organization ***Meridian Energy Group – Davis Refinery***		
Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number (***409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***
Applicant´s Name ***Tom Williams***		
Title ***VP of Planning & Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***
Facility Address (Street & No.) ***37th Street***		
City ***Belfield***	State ***ND***	ZIP Code ***58622***

County ***Billings***	Latitude (Nearest Second) ***46°52'45"N***	Longitude (Nearest Second) ***103°14'55" W***

Legal Description of Facility Site ***Property ID 07 0000 00165 000 in the SE 1/4 of Section 2, Twp 139N, Range 100W and Property ID: 07 0000 00162 000 in the NW1/4 and SW 1/4 of Section 1, Twp 139N, Range 100W***	Land Area at Facility Site ***261 Acres***	MSL Elevation at Facility ***2,685 feet***

SECTION B – EQUIPMENT

Source ID No. (From form SFN 8516) ***105-H-0502***	Name of Manufacturer ***TBD***
Rated Capacity/Maximum Input ***TBD***	Model Number ***TBD***
Purpose Space Heat _____% Process Heat ***100*** %	Power Generation _____% Other (Specify % if Multi Purpose) _____%

SECTION C – TYPE OF COMBUSTION UNIT AND FUEL FEEDING METHOD

Coal (If other solid fuel, specify here)	
☐Pulverized	☐Spreader Stoker with Fly Ash Reinjection
☐General	☐Spreader Stoker without Fly Ash Reinjection
☐Dry Bottom	☐Fluidized Bed
☐Wet Bottom with Fly Ash Reinjection	☐Cyclone
☐Wet Bottom without Fly Ash Reinjection	☐Hand-Fired
☐Other – Specify:	
Fuel Oil	Gas
☐Horizontally Fired	☐Horizontally Fired
☐Tangentially Fired	☐Tangentially Fired
☐Other – Specify:	☐Other – Specify: ***TBD***

SECTION D – NORMAL SCHEDULE OF OPERATION

Hours Per Day	Days Per Week	Weeks Per Year	Hours Per Year Total	Peak Season (Specify Months)
24	***7***	***52***	***8760***	***N/A***

SECTION E – FUEL USE EXPECTED IN A CALENDAR YEAR

Year ***2017-2018***

Primary Fuels		Standby Fuels	
Type ***Fuel Gas***		Type ***None***	
Quantity Per Year ***5,161,392***	Units of Measure ***lb/yr***	Quantity Per Year	Units of Measure

Percent Ash (Solid Fuels Only)					
Minimum	Maximum	Average	Minimum	Maximum	Average

Percent Sulfur					
Minimum ***0***	Maximum ***0***	Average ***0***	Minimum	Maximum	Average

Btu Per Unit of Measure (e.g. lb, gal, etc. - Specify)					
Minimum ***TBD***	Maximum ***TBD***	Average ***27,579.77***	Minimum	Maximum	Average

Describe Fuel Transport and Storage Methods:
N/A, fuel gas to be generated within the refinery

SECTION F – COMBUSTION AIR

☐Natural Draft ☐Induced ☐Forced ☐Other – Specify: ***TBD***

SECTION G – STACK DATA

Inside Diameter (ft) ***3***	Height Above Grade (ft) ***91***
Gas Temperature at Exit (Avg. °F) ***787.7***	Gas Velocity at Exit (Avg. ft/sec) ***19.1***
Are Emission Control Devices in Place? If YES – Complete SFN 8532 ☒ Yes ☐No	
Stack Exit Gas Flow Rate	
Average (ACFM) ***8,115.32***	Average (DSCFM) ***TBD***
Maximum (ACFM) ***TBD***	Maximum (DSCFM) ***TBD***
Are sampling ports available? ☐No ☒ Yes – Describe:	

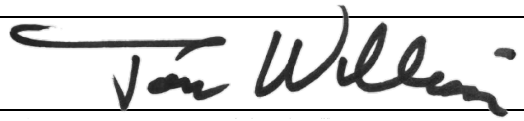
SECTION H – NEARBY BUILDINGS

Attach drawings which show the plan and elevation views of any nearby buildings including the building that houses the fuel-fired equipment.
Plant layout drawings attached to this permit application.

SECTION I – AIR CONTAMINANTS EMITTED

Pollutant	Maximum Pounds Per Hour	Tons Per Year
PM_{10} Total	***6,50E-02***	***2,85E-01***
PM_{10} Filterable	***1,63E-02***	***7,12E-02***
$PM_{2.5}$ Total	***6,50E-02***	***2,85E-01***
$PM_{2.5}$ Filterable	***1,63E-02***	***7,12E-02***
$PM_{2.5}$ Condensable	***4,88E-02***	***2,14E-01***
Sulfur Dioxide	***9,56E-03***	***4,19E-02***
Nitrogen Oxides	***4,88E-01***	***2,14E+00***
Carbon Monoxide	***4,55E-01***	***1,99E+00***
Greenhouse Gases (CO2e)	***N/A***	
Other – Specify		
Lead	***7,96E-06***	***3,49E-05***
Metal HAP (Total)	***1,19E-04***	***5,20E-04***
Organic HAPs (Total)	***7,94E-03***	***3,48E-02***
VOC	***8,76E-02***	***3,84E-01***

Basis and Calculations for Quantities:
Engineering data and Emission factors from Table 1.4-2. AP 42, Chapter 1: External Combustion Sources. See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"

Signature of Applicant	Date
	09/26/2016

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

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Division of Air Quality
918 E Divide Ave., 2nd Floor
Bismarck, ND 58501-1947
(701) 328-5188

PERMIT APPLICATION FOR
FUEL BURNING EQUIPMENT FOR INDIRECT HEATING

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8518 (09-12)

SECTION A – FACILITY INFORMATION

Name of Firm or Organization ***Meridian Energy Group – Davis Refinery***		
Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number (***409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***
Applicant´s Name ***Tom Williams***		
Title ***VP of Planning & Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		

City ***Irvine***	State ***CA***	ZIP Code ***92612***
Facility Address (Street & No.) ***37th Street***		
City ***Belfield***	State ***ND***	ZIP Code ***58622***

County ***Billings***	Latitude (Nearest Second) ***46°52'45"N***	Longitude (Nearest Second) ***103°14'55" W***

Legal Description of Facility Site ***Property ID 07 0000 00165 000 in the SE 1/4 of Section 2, Twp 139N, Range 100W and Property ID: 07 0000 00162 000 in the NW1/4 and SW 1/4 of Section 1, Twp 139N, Range 100W***	Land Area at Facility Site ***261 Acres***	MSL Elevation at Facility ***2,685 feet***

SECTION B – EQUIPMENT

Source ID No. (From form SFN 8516) ***106-H-0601***	Name of Manufacturer ***TBD***
Rated Capacity/Maximum Input ***TBD***	Model Number ***TBD***
Purpose Space Heat _____% Process Heat ***100*** %	Power Generation _____% Other (Specify % if Multi Purpose) _____%

SECTION C – TYPE OF COMBUSTION UNIT AND FUEL FEEDING METHOD

Coal (If other solid fuel, specify here)	
☐Pulverized	☐Spreader Stoker with Fly Ash Reinjection
☐General	☐Spreader Stoker without Fly Ash Reinjection
☐Dry Bottom	☐Fluidized Bed
☐Wet Bottom with Fly Ash Reinjection	☐Cyclone
☐Wet Bottom without Fly Ash Reinjection	☐Hand-Fired
☐Other – Specify:	
Fuel Oil	Gas
☐Horizontally Fired	☐Horizontally Fired
☐Tangentially Fired	☐Tangentially Fired
☐Other – Specify:	☐Other – Specify: ***TBD***

SECTION D – NORMAL SCHEDULE OF OPERATION

Hours Per Day	Days Per Week	Weeks Per Year	Hours Per Year Total	Peak Season (Specify Months)
24	***7***	***52***	***8760***	***N/A***

SECTION E – FUEL USE EXPECTED IN A CALENDAR YEAR

Year ***2017-2018***

Primary Fuels		Standby Fuels	
Type ***Fuel Gas***		Type ***none***	
Quantity Per Year ***13,253,880***	Units of Measure ***lb/yr***	Quantity Per Year	Units of Measure

Percent Ash (Solid Fuels Only)					
Minimum	Maximum	Average	Minimum	Maximum	Average

Percent Sulfur					
Minimum ***0***	Maximum ***0***	Average ***0***	Minimum	Maximum	Average

Btu Per Unit of Measure (e.g. lb, gal, etc. - Specify)					
Minimum ***TBD***	Maximum ***TBD***	Average ***27,580.96***	Minimum	Maximum	Average

Describe Fuel Transport and Storage Methods:
N/A, fuel gas to be generated within the refinery

SECTION F – COMBUSTION AIR

☐Natural Draft ☐Induced ☐Forced ☐Other – Specify: ***TBD***

SECTION G – STACK DATA

Inside Diameter (ft)	Height Above Grade (ft)
4	***42***
Gas Temperature at Exit (Avg. °F) ***786.2***	Gas Velocity at Exit (Avg. ft/sec) ***27.5***
Are Emission Control Devices in Place? If YES – Complete SFN 8532 ☒ Yes ☐No	
Stack Exit Gas Flow Rate	
Average (ACFM) ***20,769.92***	Average (DSCFM) ***TBD***
Maximum (ACFM) ***TBD***	Maximum (DSCFM) ***TBD***
Are sampling ports available? ☐No ☒ Yes – Describe:	

SECTION H – NEARBY BUILDINGS

Attach drawings which show the plan and elevation views of any nearby buildings including the building that houses the fuel-fired equipment.
Plant layout drawings attached to this permit application.

SECTION I – AIR CONTAMINANTS EMITTED

Pollutant	Maximum Pounds Per Hour	Tons Per Year
PM_{10} Total	***1,67E-01***	***7,31E-01***
PM_{10} Filterable	***4,17E-02***	***1,83E-01***
$PM_{2.5}$ Total	***1,67E-01***	***7,31E-01***
$PM_{2.5}$ Filterable	***4,17E-02***	***1,83E-01***
$PM_{2.5}$ Condensable	***1,25E-01***	***5,48E-01***
Sulfur Dioxide	***2,45E-02***	***1,08E-01***
Nitrogen Oxides	***2,63E-01***	***1,15E+00***
Carbon Monoxide	***1,17E+00***	***5,12E+00***
Greenhouse Gases (CO2e)	***N/A***	
Other – Specify		
Lead	***2,04E-05***	***8,96E-05***
Metal HAP (Total)	***3,05E-04***	***1,34E-03***
Organic HAPs (Total)	***2,04E-02***	***8,94E-02***
VOC	***2,25E-01***	***9,86E-01***

Basis and Calculations for Quantities:
Engineering data and Emission factors from Table 1.4-2. AP 42, Chapter 1: External Combustion Sources. See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"

Signature of Applicant	Date
	09/26/2016

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FUEL BURNING EQUIPMENT FOR INDIRECT HEATING

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8518 (09-12)

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Title ***Vice President of Operations***	Telephone Number (***409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***
Applicant´s Name ***Tom Williams***		
Title ***VP of Planning & Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		

City ***Irvine***	State ***CA***	ZIP Code ***92612***
Facility Address (Street & No.) ***37th Street***		
City ***Belfield***	State ***ND***	ZIP Code ***58622***

County ***Billings***	Latitude (Nearest Second) ***46°52'45"N***	Longitude (Nearest Second) ***103°14'55" W***

Legal Description of Facility Site ***Property ID 07 0000 00165 000 in the SE 1/4 of Section 2, Twp 139N, Range 100W and Property ID: 07 0000 00162 000 in the NW1/4 and SW 1/4 of Section 1, Twp 139N, Range 100W***	Land Area at Facility Site ***261 Acres***	MSL Elevation at Facility ***2,685 feet***

SECTION B – EQUIPMENT

Source ID No. (From form SFN 8516) ***107-H-0701***	Name of Manufacturer ***TBD***
Rated Capacity/Maximum Input ***TBD***	Model Number ***TBD***
Purpose Space Heat _____% Process Heat ____***100***____%	Power Generation _____% Other (Specify % if Multi Purpose) _____%

SECTION C – TYPE OF COMBUSTION UNIT AND FUEL FEEDING METHOD

Coal (If other solid fuel, specify here)	
☐Pulverized	☐Spreader Stoker with Fly Ash Reinjection
☐General	☐Spreader Stoker without Fly Ash Reinjection
☐Dry Bottom	☐Fluidized Bed
☐Wet Bottom with Fly Ash Reinjection	☐Cyclone
☐Wet Bottom without Fly Ash Reinjection	☐Hand-Fired
☐Other – Specify:	
Fuel Oil	Gas
☐Horizontally Fired	☐Horizontally Fired
☐Tangentially Fired	☐Tangentially Fired
☐Other – Specify:	☐Other – Specify: ***TBD***

SECTION D – NORMAL SCHEDULE OF OPERATION

Hours Per Day	Days Per Week	Weeks Per Year	Hours Per Year Total	Peak Season (Specify Months)
24	***7***	***52***	***8760***	***N/A***

SECTION E – FUEL USE EXPECTED IN A CALENDAR YEAR

Year ***2017-2018***

Primary Fuels			Standby Fuels		
Type ***Fuel Gas***			Type ***None***		
Quantity Per Year ***29,381,040***	Units of Measure ***lb/yr***		Quantity Per Year	Units of Measure	
Percent Ash (Solid Fuels Only)					
Minimum	Maximum	Average	Minimum	Maximum	Average
Percent Sulfur					
Minimum ***0***	Maximum ***0***	Average ***0***	Minimum	Maximum	Average
Btu Per Unit of Measure (e.g. lb, gal, etc. - Specify)					
Minimum ***TBD***	Maximum ***TBD***	Average ***27,579.01***	Minimum	Maximum	Average

Describe Fuel Transport and Storage Methods:
N/A, fuel gas to be generated within the refinery

SECTION F – COMBUSTION AIR

☐Natural Draft ☐Induced ☐Forced ☐Other – Specify: ***TBD***

SECTION G – STACK DATA

Inside Diameter (ft) ***6***	Height Above Grade (ft) ***120***
Gas Temperature at Exit (Avg. °F) ***787.7***	Gas Velocity at Exit (Avg. ft/sec) ***27.2***
Are Emission Control Devices in Place? If YES – Complete SFN 8532 ☒ Yes ☐No	
Stack Exit Gas Flow Rate	
Average (ACFM) ***46,194.82***	Average (DSCFM) ***TBD***
Maximum (ACFM) ***TBD***	Maximum (DSCFM) ***TBD***
Are sampling ports available? ☐No ☒ Yes – Describe:	

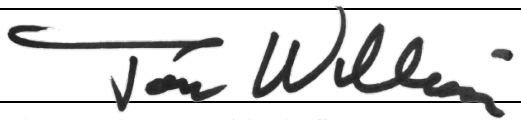
SECTION H – NEARBY BUILDINGS

Attach drawings which show the plan and elevation views of any nearby buildings including the building that houses the fuel-fired equipment.
Plant layout drawings attached to this permit application.

SECTION I – AIR CONTAMINANTS EMITTED

Pollutant	Maximum Pounds Per Hour	Tons Per Year
PM_{10} Total	***3,70E-01***	***1,62E+00***
PM_{10} Filterable	***9,25E-02***	***4,05E-01***
$PM_{2.5}$ Total	***3,70E-01***	***1,62E+00***
$PM_{2.5}$ Filterable	***9,25E-02***	***4,05E-01***
$PM_{2.5}$ Condensable	***2,78E-01***	***1,22E+00***
Sulfur Dioxide	***5,44E-02***	***2,38E-01***
Nitrogen Oxides	***5,83E-01***	***2,55E+00***
Carbon Monoxide	***2,59E+00***	***1,13E+01***
Greenhouse Gases (CO2e)	***N/A***	
Other – Specify		
Lead	***4,53E-05***	***1,99E-04***
Metal HAP (Total)	***6,76E-04***	***2,96E-03***
Organic HAPs (Total)	***4,52E-02***	***1,98E-01***
VOC	***4,99E-01***	***2,18E+00***

Basis and Calculations for Quantities:
Engineering data and Emission factors from Table 1.4-2. AP 42, Chapter 1: External Combustion Sources. See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"

Signature of Applicant	Date
	09/26/2016

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SFN 8518 (09-12)

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County ***Billings***	Latitude (Nearest Second) ***46°52'45"N***	Longitude (Nearest Second) ***103°14'55" W***

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SECTION B – EQUIPMENT

Source ID No. (From form SFN 8516) ***110-H-1001***	Name of Manufacturer ***TBD***
Rated Capacity/Maximum Input ***TBD***	Model Number ***TBD***
Purpose Space Heat _____% Process Heat ***100*** %	Power Generation _____% Other (Specify % if Multi Purpose) _____%

SECTION C – TYPE OF COMBUSTION UNIT AND FUEL FEEDING METHOD

Coal (If other solid fuel, specify here)	
☐Pulverized	☐Spreader Stoker with Fly Ash Reinjection
☐General	☐Spreader Stoker without Fly Ash Reinjection
☐Dry Bottom	☐Fluidized Bed
☐Wet Bottom with Fly Ash Reinjection	☐Cyclone
☐Wet Bottom without Fly Ash Reinjection	☐Hand-Fired
☐Other – Specify:	
Fuel Oil	Gas
☐Horizontally Fired	☐Horizontally Fired
☐Tangentially Fired	☐Tangentially Fired
☐Other – Specify:	☐Other – Specify: ***TBD***

SECTION D – NORMAL SCHEDULE OF OPERATION

Hours Per Day	Days Per Week	Weeks Per Year	Hours Per Year Total	Peak Season (Specify Months)
24	***7***	***52***	***8760***	***N/A***

SECTION E – FUEL USE EXPECTED IN A CALENDAR YEAR

Year ***2017-2018***

Primary Fuels		Standby Fuels	
Type ***Fuel Gas***		Type ***none***	
Quantity Per Year ***6,902,880***	Units of Measure ***lb/yr***	Quantity Per Year	Units of Measure

Percent Ash (Solid Fuels Only)					
Minimum	Maximum	Average	Minimum	Maximum	Average

Percent Sulfur					
Minimum ***0***	Maximum ***0***	Average ***0***	Minimum	Maximum	Average

Btu Per Unit of Measure (e.g. lb, gal, etc. - Specify)					
Minimum ***TBD***	Maximum ***TBD***	Average ***20,621.83***	Minimum	Maximum	Average

Describe Fuel Transport and Storage Methods:
N/A, fuel gas to be generated within the refinery

SECTION F – COMBUSTION AIR

☐Natural Draft ☐Induced ☐Forced ☐Other – Specify: ***TBD***

SECTION G – STACK DATA

Inside Diameter (ft) ***2.5***	Height Above Grade (ft) ***96***
Gas Temperature at Exit (Avg. °F) ***764.3***	Gas Velocity at Exit (Avg. ft/sec) ***28.4***
Are Emission Control Devices in Place? If YES – Complete SFN 8532 ☒ Yes ☐No	
Stack Exit Gas Flow Rate	
Average (ACFM) ***8,091.77***	Average (DSCFM) ***TBD***
Maximum (ACFM) ***TBD***	Maximum (DSCFM) ***TBD***
Are sampling ports available? ☐No ☒ Yes – Describe:	

SECTION H – NEARBY BUILDINGS

Attach drawings which show the plan and elevation views of any nearby buildings including the building that houses the fuel-fired equipment.
Plant layout drawings attached to this permit application.

SECTION I – AIR CONTAMINANTS EMITTED

Pollutant	Maximum Pounds Per Hour	Tons Per Year
PM_{10} Total	***6,50E-02***	***2,85E-01***
PM_{10} Filterable	***1,63E-02***	***7,12E-02***
$PM_{2.5}$ Total	***6,50E-02***	***2,85E-01***
$PM_{2.5}$ Filterable	***1,63E-02***	***7,12E-02***
$PM_{2.5}$ Condensable	***4,88E-02***	***2,14E-01***
Sulfur Dioxide	***9,56E-03***	***4,19E-02***
Nitrogen Oxides	***4,88E-01***	***2,14E+00***
Carbon Monoxide	***4,55E-01***	***1,99E+00***
Greenhouse Gases (CO2e)	***N/A***	
Other – Specify		
Lead	***7,96E-06***	***3,49E-05***
Metal HAP (Total)	***1,19E-04***	***5,20E-04***
Organic HAPs (Total)	***7,94E-03***	***3,48E-02***
VOC	***8,76E-02***	***3,84E-01***

Basis and Calculations for Quantities:
Engineering data and Emission factors from Table 1.4-2. AP 42, Chapter 1: External Combustion Sources. See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"

Signature of Applicant	Date
	09/26/2016

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of Health
Division of Air Quality
918 E Divide Ave., 2nd Floor
Bismarck, ND 58501-1947
(701) 328-5188

PERMIT APPLICATION FOR
FUEL BURNING EQUIPMENT FOR INDIRECT HEATING

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8518 (09-12)

SECTION A – FACILITY INFORMATION

Name of Firm or Organization ***Meridian Energy Group – Davis Refinery***		
Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number (***409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***
Applicant´s Name ***Tom Williams***		
Title ***VP of Planning & Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***
Facility Address (Street & No.) ***37th Street***		
City ***Belfield***	State ***ND***	ZIP Code ***58622***

County ***Billings***	Latitude (Nearest Second) ***46°52'45"N***	Longitude (Nearest Second) ***103°14'55" W***

Legal Description of Facility Site ***Property ID 07 0000 00165 000 in the SE 1/4 of Section 2, Twp 139N, Range 100W and Property ID: 07 0000 00162 000 in the NW1/4 and SW 1/4 of Section 1, Twp 139N, Range 100W***	Land Area at Facility Site ***261 Acres***	MSL Elevation at Facility ***2,685 feet***

SECTION B – EQUIPMENT

Source ID No. (From form SFN 8516) ***111-H-1101***	Name of Manufacturer ***TBD***
Rated Capacity/Maximum Input ***TBD***	Model Number ***TBD***
Purpose Space Heat _____% Process Heat ***100*** %	Power Generation _____% Other (Specify % if Multi Purpose) _____%

SECTION C – TYPE OF COMBUSTION UNIT AND FUEL FEEDING METHOD

Coal (If other solid fuel, specify here)	
☐Pulverized	☐Spreader Stoker with Fly Ash Reinjection
☐General	☐Spreader Stoker without Fly Ash Reinjection
☐Dry Bottom	☐Fluidized Bed
☐Wet Bottom with Fly Ash Reinjection	☐Cyclone
☐Wet Bottom without Fly Ash Reinjection	☐Hand-Fired
☐Other – Specify:	
Fuel Oil	Gas
☐Horizontally Fired	☐Horizontally Fired
☐Tangentially Fired	☐Tangentially Fired
☐Other – Specify:	☐Other – Specify: ***TBD***

SECTION D – NORMAL SCHEDULE OF OPERATION

Hours Per Day	Days Per Week	Weeks Per Year	Hours Per Year Total	Peak Season (Specify Months)
24	***7***	***52***	***8760***	***N/A***

SECTION E – FUEL USE EXPECTED IN A CALENDAR YEAR

Year ***2017-2018***					
Primary Fuels			Standby Fuels		
Type ***Fuel Gas***			Type ***None***		
Quantity Per Year ***4,415,040***	Units of Measure ***lb/yr***		Quantity Per Year	Units of Measure	
Percent Ash (Solid Fuels Only)					
Minimum	Maximum	Average	Minimum	Maximum	Average
Percent Sulfur					
Minimum ***0***	Maximum ***0***	Average ***0***	Minimum	Maximum	Average
Btu Per Unit of Measure (e.g. lb, gal, etc. - Specify)					
Minimum ***TBD***	Maximum ***TBD***	Average ***27,579.37***	Minimum	Maximum	Average
Describe Fuel Transport and Storage Methods: ***N/A, fuel gas to be generated within the refinery***					

SECTION F – COMBUSTION AIR

☐Natural Draft ☐Induced ☐Forced ☐Other – Specify: ***TBD***

SECTION G – STACK DATA

Inside Diameter (ft) ***3.5***	Height Above Grade (ft) ***170***
Gas Temperature at Exit (Avg. °F) ***793.1***	Gas Velocity at Exit (Avg. ft/sec) ***12.1***
Are Emission Control Devices in Place? If YES – Complete SFN 8532 ☒ Yes ☐No	
Stack Exit Gas Flow Rate	
Average (ACFM) ***6,964.97***	Average (DSCFM) ***TBD***
Maximum (ACFM) ***TBD***	Maximum (DSCFM) ***TBD***
Are sampling ports available? ☐No ☒ Yes – Describe:	

SECTION H – NEARBY BUILDINGS

Attach drawings which show the plan and elevation views of any nearby buildings including the building that houses the fuel-fired equipment.
Plant layout drawings attached to this permit application.

SECTION I – AIR CONTAMINANTS EMITTED

Pollutant	Maximum Pounds Per Hour	Tons Per Year
PM_{10} Total	***5,56E-02***	***2,44E-01***
PM_{10} Filterable	***1,39E-02***	***6,09E-02***
$PM_{2.5}$ Total	***5,56E-02***	***2,44E-01***
$PM_{2.5}$ Filterable	***1,39E-02***	***6,09E-02***
$PM_{2.5}$ Condensable	***4,17E-02***	***1,83E-01***
Sulfur Dioxide	***8,18E-03***	***3,58E-02***
Nitrogen Oxides	***4,17E-01***	***1,83E+00***
Carbon Monoxide	***3,89E-01***	***1,70E+00***
Greenhouse Gases (CO2e)	***N/A***	
Other – Specify		
Lead	***6,81E-06***	***2,98E-05***
Metal HAP (Total)	***1,02E-04***	***4,45E-04***
Organic HAPs (Total)	***6,80E-03***	***2,98E-02***
VOC	***7,50E-02***	***3,28E-01***

Basis and Calculations for Quantities:
Engineering data and Emission factors from Table 1.4-2. AP 42, Chapter 1: External Combustion Sources. See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"

Signature of Applicant	Date
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NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8518 (09-12)

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Name of Firm or Organization ***Meridian Energy Group – Davis Refinery***		
Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number (***409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***
Applicant´s Name ***Tom Williams***		
Title ***VP of Planning & Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		

City ***Irvine***	State ***CA***	ZIP Code ***92612***
Facility Address (Street & No.) ***37th Street***		
City ***Belfield***	State ***ND***	ZIP Code ***58622***

County ***Billings***	Latitude (Nearest Second) ***46°52'45"N***	Longitude (Nearest Second) ***103°14'55" W***

Legal Description of Facility Site ***Property ID 07 0000 00165 000 in the SE 1/4 of Section 2, Twp 139N, Range 100W and Property ID: 07 0000 00162 000 in the NW1/4 and SW 1/4 of Section 1, Twp 139N, Range 100W***	Land Area at Facility Site ***261 Acres***	MSL Elevation at Facility ***2,685 feet***

SECTION B – EQUIPMENT

Source ID No. (From form SFN 8516) ***112-H-1201***	Name of Manufacturer ***TBD***
Rated Capacity/Maximum Input ***TBD***	Model Number ***TBD***
Purpose Space Heat _____% Process Heat ***100*** %	Power Generation _____% Other (Specify % if Multi Purpose) _____%

SECTION C – TYPE OF COMBUSTION UNIT AND FUEL FEEDING METHOD

Coal (If other solid fuel, specify here)	
☐Pulverized	☐Spreader Stoker with Fly Ash Reinjection
☐General	☐Spreader Stoker without Fly Ash Reinjection
☐Dry Bottom	☐Fluidized Bed
☐Wet Bottom with Fly Ash Reinjection	☐Cyclone
☐Wet Bottom without Fly Ash Reinjection	☐Hand-Fired
☐Other – Specify:	
Fuel Oil	Gas
☐Horizontally Fired	☐Horizontally Fired
☐Tangentially Fired	☐Tangentially Fired
☐Other – Specify:	☐Other – Specify: ***TBD***

SECTION D – NORMAL SCHEDULE OF OPERATION

Hours Per Day	Days Per Week	Weeks Per Year	Hours Per Year Total	Peak Season (Specify Months)
24	***7***	***52***	***8760***	***N/A***

SECTION E – FUEL USE EXPECTED IN A CALENDAR YEAR

Year ***2017-2018***

Primary Fuels			Standby Fuels		
Type ***Fuel Gas***			Type ***none***		
Quantity Per Year ***9,005,280***	Units of Measure ***lb/yr***		Quantity Per Year	Units of Measure	
Percent Ash (Solid Fuels Only)					
Minimum	Maximum	Average	Minimum	Maximum	Average
Percent Sulfur					
Minimum ***0***	Maximum ***0***	Average ***0***	Minimum	Maximum	Average
Btu Per Unit of Measure (e.g. lb, gal, etc. - Specify)					
Minimum ***TBD***	Maximum ***TBD***	Average ***27,577.82***	Minimum	Maximum	Average

Describe Fuel Transport and Storage Methods:
N/A, fuel gas to be generated within the refinery

SECTION F – COMBUSTION AIR

☐Natural Draft ☐Induced ☐Forced ☐Other – Specify: ***TBD***

SECTION G – STACK DATA

Inside Diameter (ft) ***5.5***	Height Above Grade (ft) ***72***
Gas Temperature at Exit (Avg. °F) ***785***	Gas Velocity at Exit (Avg. ft/sec) ***9.9***
Are Emission Control Devices in Place? If YES – Complete SFN 8532 ☒ Yes ☐No	
Stack Exit Gas Flow Rate	
Average (ACFM) ***14,110.55***	Average (DSCFM) ***TBD***
Maximum (ACFM) ***TBD***	Maximum (DSCFM) ***TBD***
Are sampling ports available? ☐No ☒ Yes – Describe:	

SECTION H – NEARBY BUILDINGS

Attach drawings which show the plan and elevation views of any nearby buildings including the building that houses the fuel-fired equipment.
Plant layout drawings attached to this permit application.

SECTION I – AIR CONTAMINANTS EMITTED

Pollutant	Maximum Pounds Per Hour	Tons Per Year
PM_{10} Total	***1,13E-01***	***4,97E-01***
PM_{10} Filterable	***2,84E-02***	***1,24E-01***
$PM_{2.5}$ Total	***1,13E-01***	***4,97E-01***
$PM_{2.5}$ Filterable	***2,84E-02***	***1,24E-01***
$PM_{2.5}$ Condensable	***8,51E-02***	***3,73E-01***
Sulfur Dioxide	***1,67E-02***	***7,30E-02***
Nitrogen Oxides	***8,51E-01***	***3,73E+00***
Carbon Monoxide	***7,94E-01***	***3,48E+00***
Greenhouse Gases (CO2e)	***N/A***	
Other – Specify		
Lead	***1,39E-05***	***6,08E-05***
Metal HAP (Total)	***2,07E-04***	***9,08E-04***
Organic HAPs (Total)	***1,39E-02***	***6,07E-02***
VOC	***1,53E-01***	***6,70E-01***

Basis and Calculations for Quantities:
Engineering data and Emission factors from Table 1.4-2. AP 42, Chapter 1: External Combustion Sources. See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"

Signature of Applicant	Date
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NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8518 (09-12)

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Name of Firm or Organization ***Meridian Energy Group – Davis Refinery***		
Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number (***409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***
Applicant´s Name ***Tom Williams***		
Title ***VP of Planning & Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***
Facility Address (Street & No.) ***37th Street***		
City ***Belfield***	State ***ND***	ZIP Code ***58622***

County ***Billings***	Latitude (Nearest Second) ***46°52'45"N***	Longitude (Nearest Second) ***103°14'55" W***

Legal Description of Facility Site ***Property ID 07 0000 00165 000 in the SE 1/4 of Section 2, Twp 139N, Range 100W and Property ID: 07 0000 00162 000 in the NW1/4 and SW 1/4 of Section 1, Twp 139N, Range 100W***	Land Area at Facility Site ***261 Acres***	MSL Elevation at Facility ***2,685 feet***

SECTION B – EQUIPMENT

Source ID No. (From form SFN 8516) ***114-H-1401***	Name of Manufacturer ***TBD***
Rated Capacity/Maximum Input ***TBD***	Model Number ***TBD***
Purpose Space Heat _____% Process Heat ***100*** %	Power Generation _____% Other (Specify % if Multi Purpose) _____%

SECTION C – TYPE OF COMBUSTION UNIT AND FUEL FEEDING METHOD

Coal (If other solid fuel, specify here)	
☐Pulverized	☐Spreader Stoker with Fly Ash Reinjection
☐General	☐Spreader Stoker without Fly Ash Reinjection
☐Dry Bottom	☐Fluidized Bed
☐Wet Bottom with Fly Ash Reinjection	☐Cyclone
☐Wet Bottom without Fly Ash Reinjection	☐Hand-Fired
☐Other – Specify:	
Fuel Oil	Gas
☐Horizontally Fired	☐Horizontally Fired
☐Tangentially Fired	☐Tangentially Fired
☐Other – Specify:	☐Other – Specify: ***TBD***

SECTION D – NORMAL SCHEDULE OF OPERATION

Hours Per Day	Days Per Week	Weeks Per Year	Hours Per Year Total	Peak Season (Specify Months)
24	***7***	***52***	***8760***	***N/A***

SECTION E – FUEL USE EXPECTED IN A CALENDAR YEAR

Year ***2017-2018***					
Primary Fuels			Standby Fuels		
Type ***Fuel Gas***			Type ***None***		
Quantity Per Year ***5,545,080***	Units of Measure ***lb/yr***		Quantity Per Year	Units of Measure	
Percent Ash (Solid Fuels Only)					
Minimum	Maximum	Average	Minimum	Maximum	Average
Percent Sulfur					
Minimum ***0***	Maximum ***0***	Average ***0***	Minimum	Maximum	Average
Btu Per Unit of Measure (e.g. lb, gal, etc. - Specify)					
Minimum ***TBD***	Maximum ***TBD***	Average ***27,614.53***	Minimum	Maximum	Average
Describe Fuel Transport and Storage Methods: ***N/A, fuel gas to be generated within the refinery***					

SECTION F – COMBUSTION AIR

☐Natural Draft ☐Induced ☐Forced ☐Other – Specify: ***TBD***

SECTION G – STACK DATA

Inside Diameter (ft) ***3***	Height Above Grade (ft) ***91***
Gas Temperature at Exit (Avg. °F) ***784.3***	Gas Velocity at Exit (Avg. ft/sec) ***20.5***
Are Emission Control Devices in Place? If YES – Complete SFN 8532 ☒ Yes ☐No	
Stack Exit Gas Flow Rate	
Average (ACFM) ***8,699.78***	Average (DSCFM) ***TBD***
Maximum (ACFM) ***TBD***	Maximum (DSCFM) ***TBD***
Are sampling ports available? ☐No ☒ Yes – Describe:	

SECTION H – NEARBY BUILDINGS

Attach drawings which show the plan and elevation views of any nearby buildings including the building that houses the fuel-fired equipment.
Plant layout drawings attached to this permit application.

SECTION I – AIR CONTAMINANTS EMITTED

Pollutant	Maximum Pounds Per Hour	Tons Per Year
PM_{10} Total	***6,99E-02***	***3,06E-01***
PM_{10} Filterable	***1,75E-02***	***7,66E-02***
$PM_{2.5}$ Total	***6,99E-02***	***3,06E-01***
$PM_{2.5}$ Filterable	***1,75E-02***	***7,66E-02***
$PM_{2.5}$ Condensable	***5,24E-02***	***2,30E-01***
Sulfur Dioxide	***1,03E-02***	***4,50E-02***
Nitrogen Oxides	***5,24E-01***	***2,30E+00***
Carbon Monoxide	***4,89E-01***	***2,14E+00***
Greenhouse Gases (CO2e)	***N/A***	
Other – Specify		
Lead	***8,57E-06***	***3,75E-05***
Metal HAP (Total)	***1,28E-04***	***5,60E-04***
Organic HAPs (Total)	***8,55E-03***	***3,74E-02***
VOC	***9,43E-02***	***4,13E-01***

Basis and Calculations for Quantities:
Engineering data and Emission factors from Table 1.4-2. AP 42, Chapter 1: External Combustion Sources. See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"

Signature of Applicant	Date
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Title ***Vice President of Operations***	Telephone Number (***409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***
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City ***Irvine***	State ***CA***	ZIP Code ***92612***
Facility Address (Street & No.) ***37th Street***		
City ***Belfield***	State ***ND***	ZIP Code ***58622***

Country ***USA***	Latitude (Nearest Second) ***46°52'45"N***	Longitude (Nearest Second) ***103°14'55" W***

Legal Description of Facility Site ***Property ID 07 0000 00165 000 in the SE 1/4 of Section 2, Twp 139N, Range 100W and Property ID: 07 0000 00162 000 in the NW1/4 and SW 1/4 of Section 1, Twp 139N, Range 100W***	Land Area at Facility Site ***261 Acres***	MSL Elevation at Facility ***2,685 feet***

SECTION B – EQUIPMENT

Source ID No. (From form SFN 8516) ***117-H-1701***	Name of Manufacturer ***TBD***
Rated Capacity/Maximum Input ***TBD***	Model Number ***TBD***
Purpose Space Heat _____% Process Heat ***100*** %	Power Generation _____% Other (Specify % if Multi Purpose) _____%

SECTION C – TYPE OF COMBUSTION UNIT AND FUEL FEEDING METHOD

Coal (If other solid fuel, specify here)	
☐Pulverized	☐Spreader Stoker with Fly Ash Reinjection
☐General	☐Spreader Stoker without Fly Ash Reinjection
☐Dry Bottom	☐Fluidized Bed
☐Wet Bottom with Fly Ash Reinjection	☐Cyclone
☐Wet Bottom without Fly Ash Reinjection	☐Hand-Fired
☐Other – Specify:	
Fuel Oil	Gas
☐Horizontally Fired	☐Horizontally Fired
☐Tangentially Fired	☐Tangentially Fired
☐Other – Specify:	☐Other – Specify: ***TBD***

SECTION D – NORMAL SCHEDULE OF OPERATION

Hours Per Day	Days Per Week	Weeks Per Year	Hours Per Year Total	Peak Season (Specify Months)
24	***7***	***52***	***8760***	***N/A***

SECTION E – FUEL USE EXPECTED IN A CALENDAR YEAR

Year ***2017-2018***

Primary Fuels			Standby Fuels		
Type ***Fuel Gas***			Type ***none***		
Quantity Per Year ***523,848***	Units of Measure ***lb/yr***		Quantity Per Year	Units of Measure	
Percent Ash (Solid Fuels Only)					
Minimum	Maximum	Average	Minimum	Maximum	Average
Percent Sulfur					
Minimum ***0***	Maximum ***0***	Average ***0***	Minimum	Maximum	Average
Btu Per Unit of Measure (e.g. lb, gal, etc. - Specify)					
Minimum ***TBD***	Maximum ***TBD***	Average ***27,591.97***	Minimum	Maximum	Average

Describe Fuel Transport and Storage Methods:
N/A, fuel gas to be generated within the refinery

SECTION F – COMBUSTION AIR

☐Natural Draft ☐Induced ☐Forced ☐Other – Specify: ***TBD***

SECTION G – STACK DATA

Inside Diameter (ft) ***2.7***	Height Above Grade (ft) ***36***
Gas Temperature at Exit (Avg. °F) ***823.8***	Gas Velocity at Exit (Avg. ft/sec) ***2.5***
Are Emission Control Devices in Place? If YES – Complete SFN 8532 ☒ Yes ☐No	
Stack Exit Gas Flow Rate	
Average (ACFM) ***852.56***	Average (DSCFM) ***TBD***
Maximum (ACFM) ***TBD***	Maximum (DSCFM) ***TBD***
Are sampling ports available? ☐No ☒ Yes – Describe:	

SECTION H – NEARBY BUILDINGS

Attach drawings which show the plan and elevation views of any nearby buildings including the building that houses the fuel-fired equipment.
Plant layout drawings attached to this permit application.

SECTION I – AIR CONTAMINANTS EMITTED

Pollutant	Maximum Pounds Per Hour	Tons Per Year
PM_{10} Total	***6,60E-03***	***2,89E-02***
PM_{10} Filterable	***1,65E-03***	***7,23E-03***
$PM_{2.5}$ Total	***6,60E-03***	***2,89E-02***
$PM_{2.5}$ Filterable	***1,65E-03***	***7,23E-03***
$PM_{2.5}$ Condensable	***4,95E-03***	***2,17E-02***
Sulfur Dioxide	***9,71E-04***	***4,25E-03***
Nitrogen Oxides	***4,95E-02***	***2,17E-01***
Carbon Monoxide	***4,62E-02***	***2,02E-01***
Greenhouse Gases (CO2e)	***N/A***	
Other – Specify		
Lead	***8,09E-07***	***3,54E-06***
Metal HAP (Total)	***1,21E-05***	***5,28E-05***
Organic HAPs (Total)	***8,07E-04***	***3,53E-03***
VOC	***8,90E-03***	***3,90E-02***

Basis and Calculations for Quantities:
Engineering data and Emission factors from Table 1.4-2. AP 42, Chapter 1: External Combustion Sources. See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"

Signature of Applicant	Date
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SECTION B – EQUIPMENT

Source ID No. (From form SFN 8516) ***117-H-1702***	Name of Manufacturer ***TBD***
Rated Capacity/Maximum Input ***TBD***	Model Number ***TBD***
Purpose Space Heat _____% Process Heat ***100*** %	Power Generation _____% Other (Specify % if Multi Purpose) _____%

SECTION C – TYPE OF COMBUSTION UNIT AND FUEL FEEDING METHOD

Coal (If other solid fuel, specify here)	
☐Pulverized	☐Spreader Stoker with Fly Ash Reinjection
☐General	☐Spreader Stoker without Fly Ash Reinjection
☐Dry Bottom	☐Fluidized Bed
☐Wet Bottom with Fly Ash Reinjection	☐Cyclone
☐Wet Bottom without Fly Ash Reinjection	☐Hand-Fired
☐Other – Specify:	
Fuel Oil	Gas
☐Horizontally Fired	☐Horizontally Fired
☐Tangentially Fired	☐Tangentially Fired
☐Other – Specify:	☐Other – Specify: ***TBD***

SECTION D – NORMAL SCHEDULE OF OPERATION

Hours Per Day	Days Per Week	Weeks Per Year	Hours Per Year Total	Peak Season (Specify Months)
24	***7***	***52***	***8760***	***N/A***

SECTION E – FUEL USE EXPECTED IN A CALENDAR YEAR

Year ***2017-2018***					
Primary Fuels			Standby Fuels		
Type ***Fuel Gas***			Type ***None***		
Quantity Per Year ***1,191,360***	Units of Measure ***lb/yr***		Quantity Per Year	Units of Measure	
Percent Ash (Solid Fuels Only)					
Minimum	Maximum	Average	Minimum	Maximum	Average
Percent Sulfur					
Minimum ***0***	Maximum ***0***	Average ***0***	Minimum	Maximum	Average
Btu Per Unit of Measure (e.g. lb, gal, etc. - Specify)					
Minimum ***TBD***	Maximum ***TBD***	Average ***27,573.53***	Minimum	Maximum	Average
Describe Fuel Transport and Storage Methods: ***N/A, fuel gas to be generated within the refinery***					

SECTION F – COMBUSTION AIR

☐Natural Draft ☐Induced ☐Forced ☐Other – Specify: ***TBD***

SECTION G – STACK DATA

Inside Diameter (ft) ***4.6***	Height Above Grade (ft) ***46***
Gas Temperature at Exit (Avg. °F) ***787.7***	Gas Velocity at Exit (Avg. ft/sec) ***1.9***
Are Emission Control Devices in Place? If YES – Complete SFN 8532 ☒ Yes ☐No	
Stack Exit Gas Flow Rate	
Average (ACFM) ***1,872.75***	Average (DSCFM) ***TBD***
Maximum (ACFM) ***TBD***	Maximum (DSCFM) ***TBD***
Are sampling ports available? ☐No ☒ Yes – Describe:	

SECTION H – NEARBY BUILDINGS

Attach drawings which show the plan and elevation views of any nearby buildings including the building that houses the fuel-fired equipment.
Plant layout drawings attached to this permit application.

SECTION I – AIR CONTAMINANTS EMITTED

Pollutant	Maximum Pounds Per Hour	Tons Per Year
PM_{10} Total	***1,50E-02***	***6,57E-02***
PM_{10} Filterable	***3,75E-03***	***1,64E-02***
$PM_{2.5}$ Total	***1,50E-02***	***6,57E-02***
$PM_{2.5}$ Filterable	***3,75E-03***	***1,64E-02***
$PM_{2.5}$ Condensable	***1,13E-02***	***4,93E-02***
Sulfur Dioxide	***2,21E-03***	***9,66E-03***
Nitrogen Oxides	***1,13E-01***	***4,93E-01***
Carbon Monoxide	***1,05E-01***	***4,60E-01***
Greenhouse Gases (CO2e)	***N/A***	
Other – Specify		
Lead	***1,84E-06***	***8,05E-06***
Metal HAP (Total)	***2,74E-05***	***1,20E-04***
Organic HAPs (Total)	***1,83E-03***	***8,03E-03***
VOC	***2,02E-02***	***8,86E-02***

Basis and Calculations for Quantities:
Engineering data and Emission factors from Table 1.4-2. AP 42, Chapter 1: External Combustion Sources. See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"

Signature of Applicant	Date
	09/26/2016

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of Health
Division of Air Quality
918 E Divide Ave., 2nd Floor
Bismarck, ND 58501-1947
(701) 328-5188

PERMIT APPLICATION FOR
FUEL BURNING EQUIPMENT FOR INDIRECT HEATING

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8518 (09-12)

SECTION A – FACILITY INFORMATION

Name of Firm or Organization ***Meridian Energy Group – Davis Refinery***		
Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number (***409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***
Applicant´s Name ***Tom Williams***		
Title ***VP of Planning & Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		

City ***Irvine***	State ***CA***	ZIP Code ***92612***
Facility Address (Street & No.) ***37th Street***		
City ***Belfield***	State ***ND***	ZIP Code ***58622***

County ***Billings***	Latitude (Nearest Second) ***46°52'45"N***	Longitude (Nearest Second) ***103°14'55" W***

Legal Description of Facility Site ***Property ID 07 0000 00165 000 in the SE 1/4 of Section 2, Twp 139N, Range 100W and Property ID: 07 0000 00162 000 in the NW1/4 and SW 1/4 of Section 1, Twp 139N, Range 100W***	Land Area at Facility Site ***261 Acres***	MSL Elevation at Facility ***2,685 feet***

SECTION B – EQUIPMENT

Source ID No. (From form SFN 8516) ***118-H-1801***	Name of Manufacturer ***TBD***
Rated Capacity/Maximum Input ***TBD***	Model Number ***TBD***
Purpose Space Heat _____% Process Heat ***100*** %	Power Generation _____% Other (Specify % if Multi Purpose) _____%

SECTION C – TYPE OF COMBUSTION UNIT AND FUEL FEEDING METHOD

Coal (If other solid fuel, specify here)	
☐Pulverized	☐Spreader Stoker with Fly Ash Reinjection
☐General	☐Spreader Stoker without Fly Ash Reinjection
☐Dry Bottom	☐Fluidized Bed
☐Wet Bottom with Fly Ash Reinjection	☐Cyclone
☐Wet Bottom without Fly Ash Reinjection	☐Hand-Fired
☐Other – Specify:	
Fuel Oil	Gas
☐Horizontally Fired	☐Horizontally Fired
☐Tangentially Fired	☐Tangentially Fired
☐Other – Specify:	☐Other – Specify: ***TBD***

SECTION D – NORMAL SCHEDULE OF OPERATION

Hours Per Day	Days Per Week	Weeks Per Year	Hours Per Year Total	Peak Season (Specify Months)
24	***7***	***52***	***8760***	***N/A***

SECTION E – FUEL USE EXPECTED IN A CALENDAR YEAR

Year ***2017-2018***

Primary Fuels			Standby Fuels		
Type ***Fuel Gas***			Type ***None***		
Quantity Per Year ***10,322,784***	Units of Measure ***lb/yr***		Quantity Per Year	Units of Measure	
Percent Ash (Solid Fuels Only)					
Minimum	Maximum	Average	Minimum	Maximum	Average
Percent Sulfur					
Minimum ***0***	Maximum ***0***	Average ***0***	Minimum	Maximum	Average
Btu Per Unit of Measure (e.g. lb, gal, etc. - Specify)					
Minimum ***TBD***	Maximum ***TBD***	Average ***71,444.33***	Minimum	Maximum	Average

Describe Fuel Transport and Storage Methods:
N/A, fuel gas to be generated within the refinery

SECTION F – COMBUSTION AIR

☐Natural Draft ☐Induced ☐Forced ☐Other – Specify: ***TBD***

SECTION G – STACK DATA

Inside Diameter (ft) ***4***	Height Above Grade (ft) ***95***
Gas Temperature at Exit (Avg. °F) ***785.5***	Gas Velocity at Exit (Avg. ft/sec) ***22.4***
Are Emission Control Devices in Place? If YES – Complete SFN 8532 ☒ Yes ☐No	
Stack Exit Gas Flow Rate	
Average (ACFM) ***16,894.20***	Average (DSCFM) ***TBD***
Maximum (ACFM) ***TBD***	Maximum (DSCFM) ***TBD***
Are sampling ports available? ☐No ☒ Yes – Describe:	

SECTION H – NEARBY BUILDINGS

Attach drawings which show the plan and elevation views of any nearby buildings including the building that houses the fuel-fired equipment.
Plant layout drawings attached to this permit application.

SECTION I – AIR CONTAMINANTS EMITTED

Pollutant	Maximum Pounds Per Hour	Tons Per Year
PM_{10} Total	***3,37E-01***	***1,48E+00***
PM_{10} Filterable	***8,42E-02***	***3,69E-01***
$PM_{2.5}$ Total	***3,37E-01***	***1,48E+00***
$PM_{2.5}$ Filterable	***8,42E-02***	***3,69E-01***
$PM_{2.5}$ Condensable	***2,53E-01***	***1,11E+00***
Sulfur Dioxide	***4,95E-02***	***2,17E-01***
Nitrogen Oxides	***5,30E-01***	***2,32E+00***
Carbon Monoxide	***2,36E+00***	***1,03E+01***
Greenhouse Gases (CO2e)	***N/A***	
Other – Specify		
Lead	***4,13E-05***	***1,81E-04***
Metal HAP (Total)	***6,16E-04***	***2,70E-03***
Organic HAPs (Total)	***4,12E-02***	***1,80E-01***
VOC	***4,54E-01***	***1,99E+00***

Basis and Calculations for Quantities:
Engineering data and Emission factors from Table 1.4-2. AP 42, Chapter 1: External Combustion Sources. See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"

Signature of Applicant	Date
	09/26/2016

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Division of Air Quality
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Bismarck, ND 58501-1947
(701) 328-5188

PERMIT APPLICATION FOR
FUEL BURNING EQUIPMENT FOR INDIRECT HEATING

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8518 (09-12)

SECTION A – FACILITY INFORMATION

Name of Firm or Organization ***Meridian Energy Group – Davis Refinery***		
Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number (***409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***
Applicant´s Name ***Tom Williams***		
Title ***VP of Planning & Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		

City ***Irvine***	State ***CA***	ZIP Code ***92612***
Facility Address (Street & No.) ***37th Street***		
City ***Belfield***	State ***ND***	ZIP Code ***58622***

County ***Billings***	Latitude (Nearest Second) ***46°52'45"N***	Longitude (Nearest Second) ***103°14'55" W***

Legal Description of Facility Site ***Property ID 07 0000 00165 000 in the SE 1/4 of Section 2, Twp 139N, Range 100W and Property ID: 07 0000 00162 000 in the NW1/4 and SW 1/4 of Section 1, Twp 139N, Range 100W***	Land Area at Facility Site ***261 Acres***	MSL Elevation at Facility ***2,685 feet***

SECTION B – EQUIPMENT

Source ID No. (From form SFN 8516) ***125-H-2501***	Name of Manufacturer ***TBD***
Rated Capacity/Maximum Input ***TBD***	Model Number ***TBD***
Purpose Space Heat _____% Process Heat ***100*** %	Power Generation _____% Other (Specify % if Multi Purpose) _____%

SECTION C – TYPE OF COMBUSTION UNIT AND FUEL FEEDING METHOD

Coal (If other solid fuel, specify here)	
☐Pulverized	☐Spreader Stoker with Fly Ash Reinjection
☐General	☐Spreader Stoker without Fly Ash Reinjection
☐Dry Bottom	☐Fluidized Bed
☐Wet Bottom with Fly Ash Reinjection	☐Cyclone
☐Wet Bottom without Fly Ash Reinjection	☐Hand-Fired
☐Other – Specify:	
Fuel Oil	Gas
☐Horizontally Fired	☐Horizontally Fired
☐Tangentially Fired	☐Tangentially Fired
☐Other – Specify:	☐Other – Specify: ***TBD***

SECTION D – NORMAL SCHEDULE OF OPERATION

Hours Per Day	Days Per Week	Weeks Per Year	Hours Per Year Total	Peak Season (Specify Months)
24	***7***	***52***	***8760***	***N/A***

SECTION E – FUEL USE EXPECTED IN A CALENDAR YEAR

Year ***2017-2018***					
Primary Fuels			Standby Fuels		
Type ***Fuel Gas***			Type ***None***		
Quantity Per Year ***5,317,320***	Units of Measure ***lb/yr***		Quantity Per Year	Units of Measure	
Percent Ash (Solid Fuels Only)					
Minimum	Maximum	Average	Minimum	Maximum	Average
Percent Sulfur					
Minimum ***0***	Maximum ***0***	Average ***0***	Minimum	Maximum	Average
Btu Per Unit of Measure (e.g. lb, gal, etc. - Specify)					
Minimum ***TBD***	Maximum ***TBD***	Average ***20,593.08***	Minimum	Maximum	Average
Describe Fuel Transport and Storage Methods: ***N/A, fuel gas to be generated within the refinery***					

SECTION F – COMBUSTION AIR

☐Natural Draft ☐Induced ☐Forced ☐Other – Specify: ***TBD***

SECTION G – STACK DATA

Inside Diameter (ft) ***2.5***	Height Above Grade (ft) ***96***
Gas Temperature at Exit (Avg. °F) ***764.3***	Gas Velocity at Exit (Avg. ft/sec) ***21.9***
Are Emission Control Devices in Place? If YES – Complete SFN 8532 ☒ Yes ☐No	
Stack Exit Gas Flow Rate	
Average (ACFM) ***6,224.68***	Average (DSCFM) ***TBD***
Maximum (ACFM) ***TBD***	Maximum (DSCFM) ***TBD***
Are sampling ports available? ☐No ☒ Yes – Describe:	

SECTION H – NEARBY BUILDINGS

Attach drawings which show the plan and elevation views of any nearby buildings including the building that houses the fuel-fired equipment.
Plant layout drawings attached to this permit application.

SECTION I – AIR CONTAMINANTS EMITTED

Pollutant	Maximum Pounds Per Hour	Tons Per Year
PM_{10} Total	***5,00E-02***	***2,19E-01***
PM_{10} Filterable	***1,25E-02***	***5,48E-02***
$PM_{2.5}$ Total	***5,00E-02***	***2,19E-01***
$PM_{2.5}$ Filterable	***1,25E-02***	***5,48E-02***
$PM_{2.5}$ Condensable	***3,75E-02***	***1,64E-01***
Sulfur Dioxide	***7,35E-03***	***3,22E-02***
Nitrogen Oxides	***3,75E-01***	***1,64E+00***
Carbon Monoxide	***3,50E-01***	***1,53E+00***
Greenhouse Gases (CO2e)	***N/A***	
Other – Specify		
Lead	***6,13E-06***	***2,68E-05***
Metal HAP (Total)	***9,14E-05***	***4,00E-04***
Organic HAPs (Total)	***6,11E-03***	***2,68E-02***
VOC	***6,74E-02***	***2,95E-01***

Basis and Calculations for Quantities:
Engineering data and Emission factors from Table 1.4-2. AP 42, Chapter 1: External Combustion Sources. See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"

Signature of Applicant	Date
	09/26/2016

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PERMIT APPLICATION FOR
FUEL BURNING EQUIPMENT FOR INDIRECT HEATING

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8518 (09-12)

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Name of Firm or Organization ***Meridian Energy Group – Davis Refinery***		
Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number (***409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***
Applicant´s Name ***Tom Williams***		
Title ***VP of Planning & Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
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Facility Address (Street & No.) ***37th Street***		
City ***Belfield***	State ***ND***	ZIP Code ***58622***

County ***Billings***	Latitude (Nearest Second) ***46°52'45"N***	Longitude (Nearest Second) ***103°14'55" W***

Legal Description of Facility Site ***Property ID 07 0000 00165 000 in the SE 1/4 of Section 2, Twp 139N, Range 100W and Property ID: 07 0000 00162 000 in the NW1/4 and SW 1/4 of Section 1, Twp 139N, Range 100W***	Land Area at Facility Site ***261 Acres***	MSL Elevation at Facility ***2,685 feet***

SECTION B – EQUIPMENT

Source ID No. (From form SFN 8516) ***202-PK-0201A***	Name of Manufacturer ***TBD***
Rated Capacity/Maximum Input ***TBD***	Model Number ***TBD***
Purpose Space Heat _____% Process Heat ***100*** %	Power Generation _____% Other (Specify % if Multi Purpose) _____%

SECTION C – TYPE OF COMBUSTION UNIT AND FUEL FEEDING METHOD

Coal (If other solid fuel, specify here)	
☐Pulverized	☐Spreader Stoker with Fly Ash Reinjection
☐General	☐Spreader Stoker without Fly Ash Reinjection
☐Dry Bottom	☐Fluidized Bed
☐Wet Bottom with Fly Ash Reinjection	☐Cyclone
☐Wet Bottom without Fly Ash Reinjection	☐Hand-Fired
☐Other – Specify:	
Fuel Oil	Gas
☐Horizontally Fired	☐Horizontally Fired
☐Tangentially Fired	☐Tangentially Fired
☐Other – Specify:	☐Other – Specify: ***TBD***

SECTION D – NORMAL SCHEDULE OF OPERATION

Hours Per Day	Days Per Week	Weeks Per Year	Hours Per Year Total	Peak Season (Specify Months)
24	***7***	***52***	***8760***	***N/A***

SECTION E – FUEL USE EXPECTED IN A CALENDAR YEAR

Year ***2017-2018***

Primary Fuels		Standby Fuels	
Type ***Fuel Gas***		Type ***None***	
Quantity Per Year ***20,144,496***	Units of Measure ***lb/yr***	Quantity Per Year	Units of Measure

Percent Ash (Solid Fuels Only)					
Minimum	Maximum	Average	Minimum	Maximum	Average

Percent Sulfur					
Minimum ***0***	Maximum ***0***	Average ***0***	Minimum	Maximum	Average

Btu Per Unit of Measure (e.g. lb, gal, etc. - Specify)					
Minimum ***TBD***	Maximum ***TBD***	Average ***26,091.49***	Minimum	Maximum	Average

Describe Fuel Transport and Storage Methods:
N/A, fuel gas to be generated within the refinery

SECTION F – COMBUSTION AIR

☐Natural Draft ☐Induced ☐Forced ☐Other – Specify: ***TBD***

SECTION G – STACK DATA

Inside Diameter (ft)	Height Above Grade (ft)
3	***100***
Gas Temperature at Exit (Avg. °F) ***294.2***	Gas Velocity at Exit (Avg. ft/sec) ***93.9***
Are Emission Control Devices in Place? If YES – Complete SFN 8532 ☒ Yes ☐No	
Stack Exit Gas Flow Rate	
Average (ACFM) ***19,914.80***	Average (DSCFM) ***TBD***
Maximum (ACFM) ***TBD***	Maximum (DSCFM) ***TBD***
Are sampling ports available? ☐No ☒ Yes – Describe:	

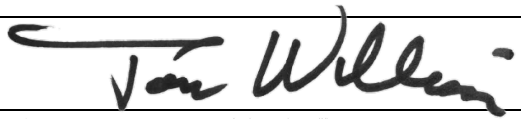
SECTION H – NEARBY BUILDINGS

Attach drawings which show the plan and elevation views of any nearby buildings including the building that houses the fuel-fired equipment.
Plant layout drawings attached to this permit application.

SECTION I – AIR CONTAMINANTS EMITTED

Pollutant	Maximum Pounds Per Hour	Tons Per Year
PM_{10} Total	***2,40E-01***	***1,05E+00***
PM_{10} Filterable	***6,00E-02***	***2,63E-01***
$PM_{2.5}$ Total	***2,40E-01***	***1,05E+00***
$PM_{2.5}$ Filterable	***6,00E-02***	***2,63E-01***
$PM_{2.5}$ Condensable	***1,80E-01***	***7,88E-01***
Sulfur Dioxide	***3,53E-02***	***1,55E-01***
Nitrogen Oxides	***1,80E+00***	***7,88E+00***
Carbon Monoxide	***1,68E+00***	***7,36E+00***
Greenhouse Gases (CO2e)	***N/A***	
Other – Specify		
Lead	***2,94E-05***	***1,29E-04***
Metal HAP (Total)	***4,39E-04***	***1,92E-03***
Organic HAPs (Total)	***2,93E-02***	***1,28E-01***
VOC	***3,24E-01***	***1,42E+00***

Basis and Calculations for Quantities:
Engineering data and Emission factors from Table 1.4-2. AP 42, Chapter 1: External Combustion Sources. See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"

Signature of Applicant	Date
	09/26/2016

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County ***Billings***	Latitude (Nearest Second) ***46°52'45"N***	Longitude (Nearest Second) ***103°14'55" W***

Legal Description of Facility Site ***Property ID 07 0000 00165 000 in the SE 1/4 of Section 2, Twp 139N, Range 100W and Property ID: 07 0000 00162 000 in the NW1/4 and SW 1/4 of Section 1, Twp 139N, Range 100W***	Land Area at Facility Site ***261 Acres***	MSL Elevation at Facility ***2,685 feet***

SECTION B – EQUIPMENT

Source ID No. (From form SFN 8516) ***202-PK-0201B***	Name of Manufacturer ***TBD***
Rated Capacity/Maximum Input ***TBD***	Model Number ***TBD***
Purpose Space Heat _____% Process Heat ***100*** %	Power Generation _____% Other (Specify % if Multi Purpose) _____%

SECTION C – TYPE OF COMBUSTION UNIT AND FUEL FEEDING METHOD

Coal (If other solid fuel, specify here)	
☐Pulverized	☐Spreader Stoker with Fly Ash Reinjection
☐General	☐Spreader Stoker without Fly Ash Reinjection
☐Dry Bottom	☐Fluidized Bed
☐Wet Bottom with Fly Ash Reinjection	☐Cyclone
☐Wet Bottom without Fly Ash Reinjection	☐Hand-Fired
☐Other – Specify:	
Fuel Oil	Gas
☐Horizontally Fired	☐Horizontally Fired
☐Tangentially Fired	☐Tangentially Fired
☐Other – Specify:	☐Other – Specify: ***TBD***

SECTION D – NORMAL SCHEDULE OF OPERATION

Hours Per Day	Days Per Week	Weeks Per Year	Hours Per Year Total	Peak Season (Specify Months)
24	***7***	***52***	***8760***	***N/A***

SECTION E – FUEL USE EXPECTED IN A CALENDAR YEAR

Year ***2017-2018***

Primary Fuels		Standby Fuels	
Type ***Fuel Gas***		Type ***None***	
Quantity Per Year ***20,144,496***	Units of Measure ***lb/yr***	Quantity Per Year	Units of Measure

Percent Ash (Solid Fuels Only)					
Minimum	Maximum	Average	Minimum	Maximum	Average

Percent Sulfur					
Minimum ***0***	Maximum ***0***	Average ***0***	Minimum	Maximum	Average

Btu Per Unit of Measure (e.g. lb, gal, etc. - Specify)					
Minimum ***TBD***	Maximum ***TBD***	Average ***26,091.49***	Minimum	Maximum	Average

Describe Fuel Transport and Storage Methods:
N/A, fuel gas to be generated within the refinery

SECTION F – COMBUSTION AIR

☐Natural Draft ☐Induced ☐Forced ☐Other – Specify: ***TBD***

SECTION G – STACK DATA

Inside Diameter (ft)	Height Above Grade (ft)
3	***100***
Gas Temperature at Exit (Avg. °F) ***294.2***	Gas Velocity at Exit (Avg. ft/sec) ***93.9***
Are Emission Control Devices in Place? If YES – Complete SFN 8532 ☒ Yes ☐No	
Stack Exit Gas Flow Rate	
Average (ACFM) ***19,914.80***	Average (DSCFM) ***TBD***
Maximum (ACFM) ***TBD***	Maximum (DSCFM) ***TBD***
Are sampling ports available? ☐No ☒ Yes – Describe:	

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Attach drawings which show the plan and elevation views of any nearby buildings including the building that houses the fuel-fired equipment.
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Pollutant	Maximum Pounds Per Hour	Tons Per Year
PM_{10} Total	***2,40E-01***	***1,05E+00***
PM_{10} Filterable	***6,00E-02***	***2,63E-01***
$PM_{2.5}$ Total	***2,40E-01***	***1,05E+00***
$PM_{2.5}$ Filterable	***6,00E-02***	***2,63E-01***
$PM_{2.5}$ Condensable	***1,80E-01***	***7,88E-01***
Sulfur Dioxide	***3,53E-02***	***1,55E-01***
Nitrogen Oxides	***1,80E+00***	***7,88E+00***
Carbon Monoxide	***1,68E+00***	***7,36E+00***
Greenhouse Gases (CO2e)	***N/A***	
Other – Specify		
Lead	***2,94E-05***	***1,29E-04***
Metal HAP (Total)	***4,39E-04***	***1,92E-03***
Organic HAPs (Total)	***2,93E-02***	***1,28E-01***
VOC	***3,24E-01***	***1,42E+00***

Basis and Calculations for Quantities:
Engineering data and Emission factors from Table 1.4-2. AP 42, Chapter 1: External Combustion Sources. See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"

Signature of Applicant	Date
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DIVISION OF AIR QUALITY
SFN 8518 (09-12)

SECTION A – FACILITY INFORMATION

Name of Firm or Organization ***Meridian Energy Group – Davis Refinery***		
Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number (***409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***
Applicant´s Name ***Tom Williams***		
Title ***VP of Planning & Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***
Facility Address (Street & No.) ***37th Street***		
City ***Belfield***	State ***ND***	ZIP Code ***58622***

County ***Billings***	Latitude (Nearest Second) ***46°52'45"N***	Longitude (Nearest Second) ***103°14'55" W***

Legal Description of Facility Site ***Property ID 07 0000 00165 000 in the SE 1/4 of Section 2, Twp 139N, Range 100W and Property ID: 07 0000 00162 000 in the NW1/4 and SW 1/4 of Section 1, Twp 139N, Range 100W***	Land Area at Facility Site ***261 Acres***	MSL Elevation at Facility ***2,685 feet***

SECTION B – EQUIPMENT

Source ID No. (From form SFN 8516) ***202-PK-0201C***	Name of Manufacturer ***TBD***
Rated Capacity/Maximum Input ***TBD***	Model Number ***TBD***
Purpose Space Heat _____% Process Heat ***100*** %	Power Generation _____% Other (Specify % if Multi Purpose) _____%

SECTION C – TYPE OF COMBUSTION UNIT AND FUEL FEEDING METHOD

Coal (If other solid fuel, specify here)	
☐Pulverized	☐Spreader Stoker with Fly Ash Reinjection
☐General	☐Spreader Stoker without Fly Ash Reinjection
☐Dry Bottom	☐Fluidized Bed
☐Wet Bottom with Fly Ash Reinjection	☐Cyclone
☐Wet Bottom without Fly Ash Reinjection	☐Hand-Fired
☐Other – Specify:	
Fuel Oil	Gas
☐Horizontally Fired	☐Horizontally Fired
☐Tangentially Fired	☐Tangentially Fired
☐Other – Specify:	☐Other – Specify: ***TBD***

SECTION D – NORMAL SCHEDULE OF OPERATION

Hours Per Day	Days Per Week	Weeks Per Year	Hours Per Year Total	Peak Season (Specify Months)
24	***7***	***52***	***8760***	***N/A***

SECTION E – FUEL USE EXPECTED IN A CALENDAR YEAR

Year ***2017-2018***

Primary Fuels		Standby Fuels	
Type ***Fuel Gas***		Type ***None***	
Quantity Per Year ***20,144,496***	Units of Measure ***lb/yr***	Quantity Per Year	Units of Measure

Percent Ash (Solid Fuels Only)					
Minimum	Maximum	Average	Minimum	Maximum	Average

Percent Sulfur					
Minimum ***0***	Maximum ***0***	Average ***0***	Minimum	Maximum	Average

Btu Per Unit of Measure (e.g. lb, gal, etc. - Specify)					
Minimum ***TBD***	Maximum ***TBD***	Average ***26,091.49***	Minimum	Maximum	Average

Describe Fuel Transport and Storage Methods:
N/A, fuel gas to be generated within the refinery

SECTION F – COMBUSTION AIR

☐Natural Draft ☐Induced ☐Forced ☐Other – Specify: ***TBD***

SECTION G – STACK DATA

Inside Diameter (ft)	Height Above Grade (ft)
3	***100***
Gas Temperature at Exit (Avg. °F) ***294.2***	Gas Velocity at Exit (Avg. ft/sec) ***93.9***
Are Emission Control Devices in Place? If YES – Complete SFN 8532 ☒ Yes ☐No	
Stack Exit Gas Flow Rate	
Average (ACFM) ***19,914.80***	Average (DSCFM) ***TBD***
Maximum (ACFM) ***TBD***	Maximum (DSCFM) ***TBD***
Are sampling ports available? ☐No ☒ Yes – Describe:	

SECTION H – NEARBY BUILDINGS

Attach drawings which show the plan and elevation views of any nearby buildings including the building that houses the fuel-fired equipment.
Plant layout drawings attached to this permit application.

SECTION I – AIR CONTAMINANTS EMITTED

Pollutant	Maximum Pounds Per Hour	Tons Per Year
PM_{10} Total	***2,40E-01***	***1,05E+00***
PM_{10} Filterable	***6,00E-02***	***2,63E-01***
$PM_{2.5}$ Total	***2,40E-01***	***1,05E+00***
$PM_{2.5}$ Filterable	***6,00E-02***	***2,63E-01***
$PM_{2.5}$ Condensable	***1,80E-01***	***7,88E-01***
Sulfur Dioxide	***3,53E-02***	***1,55E-01***
Nitrogen Oxides	***1,80E+00***	***7,88E+00***
Carbon Monoxide	***1,68E+00***	***7,36E+00***
Greenhouse Gases (CO2e)	***N/A***	
Other – Specify		
Lead	***2,94E-05***	***1,29E-04***
Metal HAP (Total)	***4,39E-04***	***1,92E-03***
Organic HAPs (Total)	***2,93E-02***	***1,28E-01***
VOC	***3,24E-01***	***1,42E+00***

Basis and Calculations for Quantities:
Engineering data and Emission factors from Table 1.4-2. AP 42, Chapter 1: External Combustion Sources. See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"

Signature of Applicant	Date
	09/26/2016

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of Health
Division of Air Quality
918 E Divide Ave., 2nd Floor
Bismarck, ND 58501-1947
(701) 328-5188

PERMIT APPLICATION FOR
HAZARDOUS AIR POLLUTANT (HAP) SOURCES

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8329 (09-12)

SECTION A1 - APPLICANT INFORMATION

Name of Firm or Organization ***Meridian Energy Group - Davis Refinery***		
Applicant's Name ***Tom Williams***		
Title ***VP of Planning &Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***

SECTION A2 - FACILITY INFORMATION

Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number ***(409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***
Facility Address (Street & No. or Lat/Long to Nearest Second) ***37th Street / 46°52'45"N/103°14'55" W***		
City ***Belfield***	State ***ND***	ZIP Code ***58622***
County ***Billings***	Number of Employees at Location ***TBD***	
Land Area at Plant Site ***261*** Acres (or) Sq. Ft.	MSL Elevation at Plant ***2,685 feet***	

Describe Nature of Business/Process

Petroleum Refining / Atmospheric Distillation Unit 1 / Crude Oil Heater

SECTION B – STACK DATA

Inside Diameter (ft) ***6.3***	Height Above Grade (ft) ***127.6***	
Gas Temperature at Exit (°F) ***787.7***	Gas Velocity at Exit (ft/sec) ***20.1***	Gas Volume (scfm) ***37,427.14***
Basis of any Estimates (attach separate sheet if necessary) ***Engineering data and Emission factors from Table 1.4-2. AP 42, Chapter 1: External Combustion Sources. See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"***		
Are Emission Control Devices in Place? If YES – Complete SFN 8532		Yes ☒ No ☐
Nearest Residences or Building ***Utility building***	Distance (ft) ***330.1 ft***	Direction ***South***
Nearest Property Line ***Fenceline***	Distance (ft) ***589 ft***	Direction ***Southeast***

SECTION C – EMISSION STREAM DATA

Source ID No. From SFN 8516 ***101-H-0101***	Mean Particle Diameter (μm) ***TBD***
Flow Rate (scfm) ***37,427.14***	Drift Velocity (ft/sec) ***20.1***
Stream Temperature (°F) ***787.7***	Particulate Concentration (gr/dscf) ***TBD***
Moisture Content (%) ***TBD***	Halogens or Metals Present? ***Metals***
Pressure (in. Hg) ***TBD***	Organic Content (ppmv) $***1.79x10^{-1}***$
Heat Content (Btu/scfm) ***TBD***	O_2 Content (%) ***N/A***

SECTION D – POLLUTANT SPECIFIC DATA (Complete One Box for Each Pollutant in Emission Stream)

Pollutant Emitted ***Acetaldehyde***	Chemical Abstract Services (CAS) Number ***75-07-0***
Proposed Emission Rate (lb/hr) $***2.16x10^{-4}***$	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic Vapor***
Concentration in Emission Stream (ppmv) $***1.99x10^{-3}***$	Vapor Pressure (in. Hg @ °F) ***35.51 in Hg @ 68°C***
Solubility $***1x10^{+6}$ mg/L in water @ 77°F***	Molecular Weight (lb/lb-mole) ***44.05***
Absorptive Properties -	

Pollutant Emitted ***Benzene***	Chemical Abstract Services (CAS) Number ***71-43-2***
Proposed Emission Rate (lb/hr) $***3.78x10^{-5}***$	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) $***1.96x10^{-4}***$	Vapor Pressure (in. Hg @ °F) ***3.73 in Hg @ 77 °F***
Solubility $***In water 1.79x10^{3} mg/L @ 77 °F***$	Molecular Weight (lb/lb-mole) ***78.11***
Absorptive Properties -	

Pollutant Emitted ***Dichlorobenzene***	Chemical Abstract Services (CAS) Number ***Varies***
Proposed Emission Rate (lb/hr) $***2.16x10^{-5}***$	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) $***5.97x10^{-5}***$	Vapor Pressure (in. Hg @ °F) ***Varies***
Solubility ***Varies***	Molecular Weight (lb/lb-mole) ***147.00***
Absorptive Properties -	

Pollutant Emitted ***Ethylbenzene***	Chemical Abstract Services (CAS) Number ***100-41-4***
Proposed Emission Rate (lb/hr) ***2.88x10^{-4}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***1.10x10^{-3}***	Vapor Pressure (in. Hg @ °F) ***0.37 in Hg @ 77°F***
Solubility ***In water 0.014 g/100mL @ 59 °F***	Molecular Weight (lb/lb-mole) ***106.17***
Absorptive Properties -	

Pollutant Emitted ***Formaldehyde***	Chemical Abstract Services (CAS) Number ***50-00-0***
Proposed Emission Rate (lb/hr) ***1.33x10^{-3}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***1.80x10^{-2}***	Vapor Pressure (in. Hg @ °F) ***0.15 in Hg @ 77 °F***
Solubility ***In water 4.00 x10^{5} mg/L @ 68°F***	Molecular Weight (lb/lb-mole) ***30.03***
Absorptive Properties -	

Pollutant Emitted ***Hexane***	Chemical Abstract Services (CAS) Number ***110-54-5***
Proposed Emission Rate (lb/hr) ***3.24x10^{-2}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***1.53x10^{-1}***	Vapor Pressure (in. Hg @ °F) ***5.90 in Hg @ 68 °F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***86.1***
Absorptive Properties -	

Pollutant Emitted ***Naphthalene***	Chemical Abstract Services (CAS) Number ***91-20-3***
Proposed Emission Rate (lb/hr) ***1.08x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***3.42x10^{-5}***	Vapor Pressure (in. Hg @ °F) ***0.003 in Hg @ 77 °F***
Solubility ***In water 31 mg/L @ 77 °F***	Molecular Weight (lb/lb-mole) ***128.17***
Absorptive Properties -	

Pollutant Emitted ***Toluene***	Chemical Abstract Services (CAS) Number ***108-88-3***
Proposed Emission Rate (lb/hr) ***5.94x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***2.62x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***1.12 in Hg @ 77°F***
Solubility ***In water 526 mg/L @ 77°F***	Molecular Weight (lb/lb-mole) ***92.14***
Absorptive Properties -	

Pollutant Emitted ***Xylene***	Chemical Abstract Services (CAS) Number ***95-47-6***
Proposed Emission Rate (lb/hr) ***4.50x10^{-4}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***1.72x10^{-3}***	Vapor Pressure (in. Hg @ °F) ***0.26 in Hg @ 77°F***
Solubility ***In water 178 mg/L @ 77°F***	Molecular Weight (lb/lb-mole) ***106.16***
Absorptive Properties -	

Pollutant Emitted ***PAH***	Chemical Abstract Services (CAS) Number ***N/A***
Proposed Emission Rate (lb/hr) ***7.67x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***3.19x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***N/A***
Solubility ***N/A***	Molecular Weight (lb/lb-mole) ***TBD***
Absorptive Properties -	

Pollutant Emitted ***Antimony***	Chemical Abstract Services (CAS) Number ***7740-36-0***
Proposed Emission Rate (lb/hr) ***3.74x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/particulate***
Concentration in Emission Stream (ppmv) ***1.25x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***121.76***
Absorptive Properties -	

Pollutant Emitted ***Arsenic***	Chemical Abstract Services (CAS) Number ***7440-38-2***
Proposed Emission Rate (lb/hr) ***1.44x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***7.80x10^{-5}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole)
Absorptive Properties -	

Pollutant Emitted ***Beryllium***	Chemical Abstract Services (CAS) Number ***7440-41-7***
Proposed Emission Rate (lb/hr) ***9.36x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***4.22x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***9.01***
Absorptive Properties -	

Pollutant Emitted ***Cadmium***	Chemical Abstract Services (CAS) Number ***7440-43-9***
Proposed Emission Rate (lb/hr) ***7.92x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***2.86x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg@ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole)
Absorptive Properties -	

Pollutant Emitted ***Chromium (hexavalent)***	Chemical Abstract Services (CAS) Number ***1333-82-0***
Proposed Emission Rate (lb/hr) ***2.02x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***1.57x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @77°F***
Solubility ***1,660 g/L in water @ 77°F***	Molecular Weight (lb/lb-mole) ***51.99***
Absorptive Properties -	

Pollutant Emitted ***Chromium***	Chemical Abstract Services (CAS) Number ***7440-47-3***
Proposed Emission Rate (lb/hr) ***1.01x10^{-4}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***7.87x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***51.99***
Absorptive Properties -	

Pollutant Emitted ***Cobalt***	Chemical Abstract Services (CAS) Number ***7440-48-4***
Proposed Emission Rate (lb/hr) ***5.90x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***4.07x10^{-5}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***58.93***
Absorptive Properties -	

Pollutant Emitted ***Manganese***	Chemical Abstract Services (CAS) Number
Proposed Emission Rate (lb/hr) ***2.66x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***1.97x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77 °F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***54.94***
Absorptive Properties -	

Pollutant Emitted ***Mercury***	Chemical Abstract Services (CAS) Number ***7439-97-6***
Proposed Emission Rate (lb/hr) ***1.80x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***3.64x10^{-5}***	Vapor Pressure (in. Hg @ °F) ***7.85x10^{-5} in Hg @ 77 °F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***200.59***
Absorptive Properties -	

Pollutant Emitted ***Nickel***	Chemical Abstract Services (CAS) Number ***7044-02-0***
Proposed Emission Rate (lb/hr) ***1.51x10^{-4}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***1.05x10^{-3}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg Q 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***58.69***
Absorptive Properties -	

Pollutant Emitted ***Selenium***	Chemical Abstract Services (CAS) Number ***7782-49-2***
Proposed Emission Rate (lb/hr) ***6.34x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***3.26x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0.29 in Hg @ 807***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***78.96***
Absorptive Properties -	

Signature of Applicant	Date 9/26/2016

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of
Health Division of Air Quality
918 E Divide Ave., 2nd Floor
Bismarck, ND 58501-1947
(701) 328-5188

PERMIT APPLICATION FOR
HAZARDOUS AIR POLLUTANT (HAP) SOURCES

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8329 (09-12)

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County ***Billings***	Number of Employees at Location ***TBD***	
Land Area at Plant Site ***261*** Acres (or) Sq. Ft.	MSL Elevation at Plant ***2,685 feet***	

Describe Nature of Business/Process

Petroleum Refining / Atmospheric Distillation Unit 2 / Crude Oil Heater

SECTION B – STACK DATA

Inside Diameter (ft) ***6.3***	Height Above Grade (ft) ***127.6***	
Gas Temperature at Exit (°F) ***787.7***	Gas Velocity at Exit (ft/sec) ***20.1***	Gas Volume (scfm) ***37,427.14***
Basis of any Estimates (attach separate sheet if necessary) ***Engineering data and Emission factors from Table 1.4-2. AP 42, Chapter 1: External Combustion Sources. See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"***		
Are Emission Control Devices in Place? If YES – Complete SFN 8532		Yes ☒ No ☐
Nearest Residences or Building ***Utility building***	Distance (ft) ***402 ft***	Direction ***South***
Nearest Property Line ***Fenceline***	Distance (ft) ***500 ft***	Direction ***Southeast***

SECTION C – EMISSION STREAM DATA

Source ID No. From SFN 8516 ***102-H-0201***	Mean Particle Diameter (μm) ***TBD***
Flow Rate (scfm) ***37,427.14***	Drift Velocity (ft/sec) ***20.1***
Stream Temperature (°F) ***787.7***	Particulate Concentration (gr/dscf) ***TBD***
Moisture Content (%) ***TBD***	Halogens or Metals Present? ***Metals***
Pressure (in. Hg) ***TBD***	Organic Content (ppmv) ***$1.79x10^{-1}$***
Heat Content (Btu/scfm) ***TBD***	O_2 Content (%) ***N/A***

SECTION D – POLLUTANT SPECIFIC DATA (Complete One Box for Each Pollutant in Emission Stream)

Pollutant Emitted ***Acetaldehyde***	Chemical Abstract Services (CAS) Number ***75-07-0***
Proposed Emission Rate (lb/hr) ***$2.16x10^{-4}$***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic Vapor***
Concentration in Emission Stream (ppmv) ***$1.99x10^{-3}$***	Vapor Pressure (in. Hg @ °F) ***35.51 in Hg @ 68°C***
Solubility ***$1x10^{+6}$ mg/L in water @ 77°F***	Molecular Weight (lb/lb-mole) ***44.05***
Absorptive Properties -	

Pollutant Emitted ***Benzene***	Chemical Abstract Services (CAS) Number ***71-43-2***
Proposed Emission Rate (lb/hr) ***$3.78x10^{-5}$***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***$1.96x10^{-4}$***	Vapor Pressure (in. Hg @ °F) ***3.73 in Hg @ 77 °F***
Solubility ***In water $1.79x10^{3}$ mg/L @ 77 °F***	Molecular Weight (lb/lb-mole) ***78.11***
Absorptive Properties -	

Pollutant Emitted ***Dichlorobenzene***	Chemical Abstract Services (CAS) Number ***Varies***
Proposed Emission Rate (lb/hr) ***$2.16x10^{-5}$***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***$5.97x10^{-5}$***	Vapor Pressure (in. Hg @ °F) ***Varies***
Solubility ***Varies***	Molecular Weight (lb/lb-mole) ***147.00***
Absorptive Properties -	

Pollutant Emitted ***Ethylbenzene***	Chemical Abstract Services (CAS) Number ***100-41-4***
Proposed Emission Rate (lb/hr) ***2.88x10^{-4}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***1.10x10^{-3}***	Vapor Pressure (in. Hg @ °F) ***0.37 in Hg @ 77°F***
Solubility ***In water 0.014 g/100mL @ 59 °F***	Molecular Weight (lb/lb-mole) ***106.17***
Absorptive Properties -	

Pollutant Emitted ***Formaldehyde***	Chemical Abstract Services (CAS) Number ***50-00-0***
Proposed Emission Rate (lb/hr) ***1.33x10^{-3}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***1.8x10^{-2}***	Vapor Pressure (in. Hg @ °F) ***0.15 in Hg @ 77 °F***
Solubility ***In water 4.00 x10^{5} mg/L @ 68°F***	Molecular Weight (lb/lb-mole) ***30.03***
Absorptive Properties -	

Pollutant Emitted ***Hexane***	Chemical Abstract Services (CAS) Number ***110-54-5***
Proposed Emission Rate (lb/hr) ***3.24x10^{-2}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***1.53x10^{-1}***	Vapor Pressure (in. Hg @ °F) ***5.90 in Hg @ 68 °F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***86.1***
Absorptive Properties -	

Pollutant Emitted ***Naphthalene***	Chemical Abstract Services (CAS) Number ***91-20-3***
Proposed Emission Rate (lb/hr) ***1.08x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***3.42x10^{-5}***	Vapor Pressure (in. Hg @ °F) ***0.003 in Hg @ 77 °F***
Solubility ***In water 31 mg/L @ 77 °F***	Molecular Weight (lb/lb-mole) ***128.17***
Absorptive Properties -	

Pollutant Emitted ***Toluene***	Chemical Abstract Services (CAS) Number ***108-88-3***
Proposed Emission Rate (lb/hr) ***5.94x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***2.62x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***1.12 in Hg @ 77°F***
Solubility ***In water 526 mg/L @ 77°F***	Molecular Weight (lb/lb-mole) ***92.14***
Absorptive Properties -	

Pollutant Emitted ***Xylene***	Chemical Abstract Services (CAS) Number ***95-47-6***
Proposed Emission Rate (lb/hr) ***4.50x10^{-4}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***1.72x10^{-3}***	Vapor Pressure (in. Hg @ °F) ***0.26 in Hg @ 77°F***
Solubility ***In water 178 mg/L @ 77°F***	Molecular Weight (lb/lb-mole) ***106.16***
Absorptive Properties -	

Pollutant Emitted ***PAH***	Chemical Abstract Services (CAS) Number ***N/A***
Proposed Emission Rate (lb/hr) ***7.67x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***3.19x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***N/A***
Solubility ***N/A***	Molecular Weight (lb/lb-mole) ***TBD***
Absorptive Properties -	

Pollutant Emitted ***Antimony***	Chemical Abstract Services (CAS) Number ***7740-36-0***
Proposed Emission Rate (lb/hr) ***3.74x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/particulate***
Concentration in Emission Stream (ppmv) ***1.25x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***121.76***
Absorptive Properties -	

Pollutant Emitted ***Arsenic***	Chemical Abstract Services (CAS) Number ***7440-38-2***
Proposed Emission Rate (lb/hr) ***1.44x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***7.80x10^{-5}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole)
Absorptive Properties -	

Pollutant Emitted ***Beryllium***	Chemical Abstract Services (CAS) Number ***7440-41-7***
Proposed Emission Rate (lb/hr) ***9.36x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***4.22x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***9.01***
Absorptive Properties -	

Pollutant Emitted ***Cadmium***	Chemical Abstract Services (CAS) Number ***7440-43-9***
Proposed Emission Rate (lb/hr) ***7.92x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***2.86x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg@ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole)
Absorptive Properties -	

Pollutant Emitted ***Chromium (hexavalent)***	Chemical Abstract Services (CAS) Number ***1333-82-0***
Proposed Emission Rate (lb/hr) ***2.02x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***1.57x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @77°F***
Solubility ***1,660 g/L in water @ 77°F***	Molecular Weight (lb/lb-mole) ***51.99***
Absorptive Properties -	

Pollutant Emitted ***Chromium***	Chemical Abstract Services (CAS) Number ***7440-47-3***
Proposed Emission Rate (lb/hr) ***1.01x10^{-4}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***7.87x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***51.99***
Absorptive Properties -	

Pollutant Emitted ***Cobalt***	Chemical Abstract Services (CAS) Number ***7440-48-4***
Proposed Emission Rate (lb/hr) ***5.90x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***4.07x10^{-5}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***58.93***
Absorptive Properties -	

Pollutant Emitted ***Manganese***	Chemical Abstract Services (CAS) Number
Proposed Emission Rate (lb/hr) ***2.66x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***1.97x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77 °F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***54.94***
Absorptive Properties -	

Pollutant Emitted ***Mercury***	Chemical Abstract Services (CAS) Number ***7439-97-6***
Proposed Emission Rate (lb/hr) ***1.80x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***3.64x10^{-5}***	Vapor Pressure (in. Hg @ °F) ***7.85x10^{-5} in Hg @ 77 °F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***200.59***
Absorptive Properties -	

Pollutant Emitted ***Nickel***	Chemical Abstract Services (CAS) Number ***7044-02-0***
Proposed Emission Rate (lb/hr) ***1.51x10^{-4}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***1.05x10^{-3}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg Q 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***58.69***
Absorptive Properties -	

Pollutant Emitted ***Selenium***	Chemical Abstract Services (CAS) Number ***7782-49-2***
Proposed Emission Rate (lb/hr) ***6.34x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***3.26x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0.29 in Hg @ 807***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***78.96***
Absorptive Properties -	

Signature of Applicant	Date 9/26/2016

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of
Health Division of Air Quality
918 E Divide Ave., 2nd Floor
Bismarck, ND 58501-1947
(701) 328-5188

PERMIT APPLICATION FOR
HAZARDOUS AIR POLLUTANT (HAP) SOURCES

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8329 (09-12)

SECTION A1 - APPLICANT INFORMATION

Name of Firm or Organization ***Meridian Energy Group - Davis Refinery***		
Applicant's Name ***Tom Williams***		
Title ***VP of Planning &Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***

SECTION A2 - FACILITY INFORMATION

Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number ***(409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***
Facility Address (Street & No. or Lat/Long to Nearest Second) ***37th Street / 46°52'45"N/103°14'55" W***		
City ***Belfield***	State ***ND***	ZIP Code ***58622***
County ***Billings***	Number of Employees at Location ***TBD***	
Land Area at Plant Site ***261*** Acres (or) Sq. Ft.	MSL Elevation at Plant ***2,685 feet***	

Describe Nature of Business/Process

Petroleum Refining / Vacuum Distillation Unit / Vacuum Heater 1

SECTION B – STACK DATA

Inside Diameter (ft) ***6.5***	Height Above Grade (ft) ***125***	
Gas Temperature at Exit (°F) ***600.4***	Gas Velocity at Exit (ft/sec) ***16.9***	Gas Volume (scfm) ***33,610.60***
Basis of any Estimates (attach separate sheet if necessary) ***Engineering data and Emission factors from Table 1.4-2. AP 42, Chapter 1: External Combustion Sources. See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"***		
Are Emission Control Devices in Place? If YES – Complete SFN 8532		Yes ☒ No ☐
Nearest Residences or Building ***Utility building***	Distance (ft) ***815ft***	Direction ***South***
Nearest Property Line ***Fenceline***	Distance (ft) ***905 ft***	Direction ***East***

SECTION C – EMISSION STREAM DATA

Source ID No. From SFN 8516 ***103-H-0301***	Mean Particle Diameter (μm) ***TBD***
Flow Rate (scfm) ***33,610.60***	Drift Velocity (ft/sec) ***16.9***
Stream Temperature (°F) ***600.4***	Particulate Concentration (gr/dscf) ***TBD***
Moisture Content (%) ***TBD***	Halogens or Metals Present? ***Metals***
Pressure (in. Hg) ***TBD***	Organic Content (ppmv) $***1.79x10^{-1}***$
Heat Content (Btu/scfm) ***TBD***	O_2 Content (%) ***N/A***

SECTION D – POLLUTANT SPECIFIC DATA (Complete One Box for Each Pollutant in Emission Stream)

Pollutant Emitted ***Acetaldehyde***	Chemical Abstract Services (CAS) Number ***75-07-0***
Proposed Emission Rate (lb/hr) $***2.29x10^{-4}***$	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic Vapor***
Concentration in Emission Stream (ppmv) $***2.0x10^{-3}***$	Vapor Pressure (in. Hg @ °F) ***35.51 in Hg @ 68°C***
Solubility $***1x10^{+6}$ mg/L in water @ 77°F***	Molecular Weight (lb/lb-mole) ***44.05***
Absorptive Properties -	

Pollutant Emitted ***Benzene***	Chemical Abstract Services (CAS) Number ***71-43-2***
Proposed Emission Rate (lb/hr) $***4.01x10^{-5}***$	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) $***1.97x10^{-4}***$	Vapor Pressure (in. Hg @ °F) ***3.73 in Hg @ 77 °F***
Solubility $***In water 1.79x10^{3} mg/L @ 77 °F***$	Molecular Weight (lb/lb-mole) ***78.11***
Absorptive Properties -	

Pollutant Emitted ***Dichlorobenzene***	Chemical Abstract Services (CAS) Number ***Varies***
Proposed Emission Rate (lb/hr) $***2.29x10^{-5}***$	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) $***6.00x10^{-5}***$	Vapor Pressure (in. Hg @ °F) ***Varies***
Solubility ***Varies***	Molecular Weight (lb/lb-mole) ***147.00***
Absorptive Properties -	

Pollutant Emitted ***Ethylbenzene***	Chemical Abstract Services (CAS) Number ***100-41-4***
Proposed Emission Rate (lb/hr) ***3.06x10^{-4}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***1.11x10^{-3}***	Vapor Pressure (in. Hg @ °F) ***0.37 in Hg @ 77°F***
Solubility ***In water 0.014 g/100mL @ 59 °F***	Molecular Weight (lb/lb-mole) ***106.17***
Absorptive Properties -	

Pollutant Emitted ***Formaldehyde***	Chemical Abstract Services (CAS) Number ***50-00-0***
Proposed Emission Rate (lb/hr) ***1.41x10^{-3}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***1.81x10^{-2}***	Vapor Pressure (in. Hg @ °F) ***0.15 in Hg @ 77 °F***
Solubility ***In water 4.00 x10^{5} mg/L @ 68°F***	Molecular Weight (lb/lb-mole) ***30.03***
Absorptive Properties -	

Pollutant Emitted ***Hexane***	Chemical Abstract Services (CAS) Number ***110-54-5***
Proposed Emission Rate (lb/hr) ***3.44x10^{-2}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***1.53x10^{-1}***	Vapor Pressure (in. Hg @ °F) ***5.90 in Hg @ 68 °F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***86.1***
Absorptive Properties -	

Pollutant Emitted ***Naphthalene***	Chemical Abstract Services (CAS) Number ***91-20-3***
Proposed Emission Rate (lb/hr) ***1.15x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***3.44x10^{-5}***	Vapor Pressure (in. Hg @ °F) ***0.003 in Hg @ 77 °F***
Solubility ***In water 31 mg/L @ 77 °F***	Molecular Weight (lb/lb-mole) ***128.17***
Absorptive Properties -	

Pollutant Emitted ***Toluene***	Chemical Abstract Services (CAS) Number ***108-88-3***
Proposed Emission Rate (lb/hr) ***6.31x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***2.63x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***1.12 in Hg @ 77°F***
Solubility ***In water 526 mg/L @ 77°F***	Molecular Weight (lb/lb-mole) ***92.14***
Absorptive Properties -	

Pollutant Emitted ***Xylene***	Chemical Abstract Services (CAS) Number ***95-47-6***
Proposed Emission Rate (lb/hr) ***4.78x10^{-4}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***1.73x10^{-3}***	Vapor Pressure (in. Hg @ °F) ***0.26 in Hg @ 77°F***
Solubility ***In water 178 mg/L @ 77°F***	Molecular Weight (lb/lb-mole) ***106.16***
Absorptive Properties -	

Pollutant Emitted ***PAH***	Chemical Abstract Services (CAS) Number ***N/A***
Proposed Emission Rate (lb/hr) ***8.14x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***3.21x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***N/A***
Solubility ***N/A***	Molecular Weight (lb/lb-mole) ***TBD***
Absorptive Properties -	

Pollutant Emitted ***Antimony***	Chemical Abstract Services (CAS) Number ***7740-36-0***
Proposed Emission Rate (lb/hr) ***3.98x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/particulate***
Concentration in Emission Stream (ppmv) ***1.25x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***121.76***
Absorptive Properties -	

Pollutant Emitted ***Arsenic***	Chemical Abstract Services (CAS) Number ***7440-38-2***
Proposed Emission Rate (lb/hr) ***1.53x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***7.84x10^{-5}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole)
Absorptive Properties -	

Pollutant Emitted ***Beryllium***	Chemical Abstract Services (CAS) Number ***7440-41-7***
Proposed Emission Rate (lb/hr) ***9.94x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***4.24x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***9.01***
Absorptive Properties -	

Pollutant Emitted ***Cadmium***	Chemical Abstract Services (CAS) Number ***7440-43-9***
Proposed Emission Rate (lb/hr) ***8.41x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***2.87x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg@ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole)
Absorptive Properties -	

Pollutant Emitted ***Chromium (hexavalent)***	Chemical Abstract Services (CAS) Number ***1333-82-0***
Proposed Emission Rate (lb/hr) ***2.14x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***1.58x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @77°F***
Solubility ***1,660 g/L in water @ 77°F***	Molecular Weight (lb/lb-mole) ***51.99***
Absorptive Properties -	

Pollutant Emitted ***Chromium***	Chemical Abstract Services (CAS) Number ***7440-47-3***
Proposed Emission Rate (lb/hr) ***1.07x10^{-4}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***7.91x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***51.99***
Absorptive Properties -	

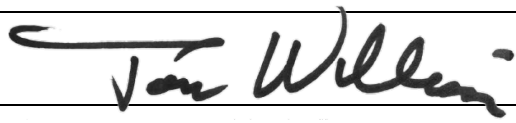
Pollutant Emitted ***Cobalt***	Chemical Abstract Services (CAS) Number ***7440-48-4***
Proposed Emission Rate (lb/hr) ***6.27x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***4.09x10^{-5}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***58.93***
Absorptive Properties -	

Pollutant Emitted ***Manganese***	Chemical Abstract Services (CAS) Number
Proposed Emission Rate (lb/hr) ***2.83x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***1.98x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77 °F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***54.94***
Absorptive Properties -	

Pollutant Emitted ***Mercury***	Chemical Abstract Services (CAS) Number ***7439-97-6***
Proposed Emission Rate (lb/hr) ***1.91x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***3.66x10^{-5}***	Vapor Pressure (in. Hg @ °F) ***7.85x10^{-5} in Hg @ 77 °F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***200.59***
Absorptive Properties -	

Pollutant Emitted ***Nickel***	Chemical Abstract Services (CAS) Number ***7044-02-0***
Proposed Emission Rate (lb/hr) ***1.61x10^{-4}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***1.05x10^{-3}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg Q 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***58.69***
Absorptive Properties -	

Pollutant Emitted ***Selenium***	Chemical Abstract Services (CAS) Number ***7782-49-2***
Proposed Emission Rate (lb/hr) ***6.73x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***3.27x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0.29 in Hg @ 807***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***78.96***
Absorptive Properties -	

Signature of Applicant 	Date 09/26/2016

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of
Health Division of Air Quality
918 E Divide Ave., 2nd Floor
Bismarck, ND 58501-1947
(701) 328-5188

PERMIT APPLICATION FOR
HAZARDOUS AIR POLLUTANT (HAP) SOURCES

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8329 (09-12)

SECTION A1 - APPLICANT INFORMATION

Name of Firm or Organization ***Meridian Energy Group - Davis Refinery***		
Applicant's Name ***Tom Williams***		
Title ***VP of Planning &Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***

SECTION A2 - FACILITY INFORMATION

Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number ***(409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***
Facility Address (Street & No. or Lat/Long to Nearest Second) ***37th Street / 46°52'45"N/103°14'55" W***		
City ***Belfield***	State ***ND***	ZIP Code ***58622***
County ***Billings***	Number of Employees at Location ***TBD***	
Land Area at Plant Site ***261*** Acres (or) Sq. Ft.	MSL Elevation at Plant ***2,685 feet***	

Describe Nature of Business/Process

Petroleum Refining / Vacuum Distillation Unit / Vacuum Heater 2

SECTION B – STACK DATA

Inside Diameter (ft) ***5.1***	Height Above Grade (ft) ***120***	
Gas Temperature at Exit (°F) ***600.1***	Gas Velocity at Exit (ft/sec) ***20.8***	Gas Volume (scfm) ***25,334.29***
Basis of any Estimates (attach separate sheet if necessary) ***Engineering data and Emission factors from Table 1.4-2. AP 42, Chapter 1: External Combustion Sources. See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"***		
Are Emission Control Devices in Place? If YES – Complete SFN 8532		Yes ☒ No ☐
Nearest Residences or Building ***Utility building***	Distance (ft) ***402 ft***	Direction ***South***
Nearest Property Line ***Fenceline***	Distance (ft) ***509 ft***	Direction ***Southeast***

SECTION C – EMISSION STREAM DATA

Source ID No. From SFN 8516 ***103-H-0302***	Mean Particle Diameter (μm) ***TBD***
Flow Rate (scfm) ***25,334.29***	Drift Velocity (ft/sec) ***20.8***
Stream Temperature (°F) ***600.1***	Particulate Concentration (gr/dscf) ***TBD***
Moisture Content (%) ***TBD***	Halogens or Metals Present? ***Metals***
Pressure (in. Hg) ***TBD***	Organic Content (ppmv) $***1.79x10^{-1}***$
Heat Content (Btu/scfm) ***TBD***	O_2 Content (%) ***N/A***

SECTION D – POLLUTANT SPECIFIC DATA (Complete One Box for Each Pollutant in Emission Stream)

Pollutant Emitted ***Acetaldehyde***	Chemical Abstract Services (CAS) Number ***75-07-0***
Proposed Emission Rate (lb/hr) $***1.73x10^{-4}***$	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic Vapor***
Concentration in Emission Stream (ppmv) $***2.00x10^{-3}***$	Vapor Pressure (in. Hg @ °F) ***35.51 in Hg @ 68°C***
Solubility $***1x10^{+6}$ mg/L in water @ 77°F***	Molecular Weight (lb/lb-mole) ***44.05***
Absorptive Properties -	

Pollutant Emitted ***Benzene***	Chemical Abstract Services (CAS) Number ***71-43-2***
Proposed Emission Rate (lb/hr) $***3.03x10^{-5}***$	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) $***1.97x10^{-4}***$	Vapor Pressure (in. Hg @ °F) ***3.73 in Hg @ 77 °F***
Solubility $***In water 1.79x10^{3}$ mg/L @ 77 °F***	Molecular Weight (lb/lb-mole) ***78.11***
Absorptive Properties -	

Pollutant Emitted ***Dichlorobenzene***	Chemical Abstract Services (CAS) Number ***Varies***
Proposed Emission Rate (lb/hr) $***1.73x10^{-5}***$	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) $***5.99x10^{-5}***$	Vapor Pressure (in. Hg @ °F) ***Varies***
Solubility ***Varies***	Molecular Weight (lb/lb-mole) ***147.00***
Absorptive Properties -	

Pollutant Emitted ***Ethylbenzene***	Chemical Abstract Services (CAS) Number ***100-41-4***
Proposed Emission Rate (lb/hr) ***2.31x10^{-4}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***1.11x10^{-3}***	Vapor Pressure (in. Hg @ °F) ***0.37 in Hg @ 77°F***
Solubility ***In water 0.014 g/100mL @ 59 °F***	Molecular Weight (lb/lb-mole) ***106.17***
Absorptive Properties -	

Pollutant Emitted ***Formaldehyde***	Chemical Abstract Services (CAS) Number ***50-00-0***
Proposed Emission Rate (lb/hr) ***1.07x10^{-3}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***1.81x10^{-2}***	Vapor Pressure (in. Hg @ °F) ***0.15 in Hg @ 77 °F***
Solubility ***In water 4.00 x10^{5} mg/L @ 68°F***	Molecular Weight (lb/lb-mole) ***30.03***
Absorptive Properties -	

Pollutant Emitted ***Hexane***	Chemical Abstract Services (CAS) Number ***110-54-5***
Proposed Emission Rate (lb/hr) ***2.59x10^{-2}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***1.53x10^{-1}***	Vapor Pressure (in. Hg @ °F) ***5.90 in Hg @ 68 °F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***86.1***
Absorptive Properties -	

Pollutant Emitted ***Naphthalene***	Chemical Abstract Services (CAS) Number ***91-20-3***
Proposed Emission Rate (lb/hr) ***8.65x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***3.44x10^{-5}***	Vapor Pressure (in. Hg @ °F) ***0.003 in Hg @ 77 °F***
Solubility ***In water 31 mg/L @ 77 °F***	Molecular Weight (lb/lb-mole) ***128.17***
Absorptive Properties -	

Pollutant Emitted ***Toluene***	Chemical Abstract Services (CAS) Number ***108-88-3***
Proposed Emission Rate (lb/hr) ***4.76 x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***2.63x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***1.12 in Hg @ 77°F***
Solubility ***In water 526 mg/L @ 77°F***	Molecular Weight (lb/lb-mole) ***92.14***
Absorptive Properties -	

Pollutant Emitted ***Xylene***	Chemical Abstract Services (CAS) Number ***95-47-6***
Proposed Emission Rate (lb/hr) ***3.60x10^{-4}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***1.73x10^{-3}***	Vapor Pressure (in. Hg @ °F) ***0.26 in Hg @ 77°F***
Solubility ***In water 178 mg/L @ 77°F***	Molecular Weight (lb/lb-mole) ***106.16***
Absorptive Properties -	

Pollutant Emitted ***PAH***	Chemical Abstract Services (CAS) Number ***N/A***
Proposed Emission Rate (lb/hr) ***6.14x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***3.21x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***N/A***
Solubility ***N/A***	Molecular Weight (lb/lb-mole) ***TBD***
Absorptive Properties -	

Pollutant Emitted ***Antimony***	Chemical Abstract Services (CAS) Number ***7740-36-0***
Proposed Emission Rate (lb/hr) ***3.00x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/particulate***
Concentration in Emission Stream (ppmv) ***1.25x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***121.76***
Absorptive Properties -	

Pollutant Emitted ***Arsenic***	Chemical Abstract Services (CAS) Number ***7440-38-2***
Proposed Emission Rate (lb/hr) ***1.15x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***7.84x10^{-5}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole)
Absorptive Properties -	

Pollutant Emitted ***Beryllium***	Chemical Abstract Services (CAS) Number ***7440-41-7***
Proposed Emission Rate (lb/hr) ***7.49x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***4.24x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***9.01***
Absorptive Properties -	

Pollutant Emitted ***Cadmium***	Chemical Abstract Services (CAS) Number ***7440-43-9***
Proposed Emission Rate (lb/hr) ***6.34x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***2.87x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg@ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole)
Absorptive Properties -	

Pollutant Emitted ***Chromium (hexavalent)***	Chemical Abstract Services (CAS) Number ***1333-82-0***
Proposed Emission Rate (lb/hr) ***1.61x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***1.58x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @77°F***
Solubility ***1,660 g/L in water @ 77°F***	Molecular Weight (lb/lb-mole) ***51.99***
Absorptive Properties -	

Pollutant Emitted ***Chromium***	Chemical Abstract Services (CAS) Number ***7440-47-3***
Proposed Emission Rate (lb/hr) ***8.07x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***7.91x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***51.99***
Absorptive Properties -	

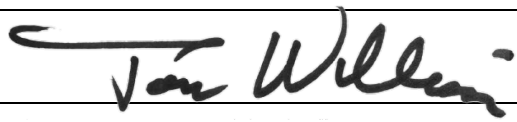
Pollutant Emitted ***Cobalt***	Chemical Abstract Services (CAS) Number ***7440-48-4***
Proposed Emission Rate (lb/hr) ***4.73x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***4.09x10^{-5}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***58.93***
Absorptive Properties -	

Pollutant Emitted ***Manganese***	Chemical Abstract Services (CAS) Number
Proposed Emission Rate (lb/hr) ***2.13x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***1.98x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77 °F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***54.94***
Absorptive Properties -	

Pollutant Emitted ***Mercury***	Chemical Abstract Services (CAS) Number ***7439-97-6***
Proposed Emission Rate (lb/hr) ***1.44x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***3.66x10^{-5}***	Vapor Pressure (in. Hg @ °F) ***7.85x10^{-5} in Hg @ 77 °F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***200.59***
Absorptive Properties -	

Pollutant Emitted ***Nickel***	Chemical Abstract Services (CAS) Number ***7044-02-0***
Proposed Emission Rate (lb/hr) ***1.21x10^{-4}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***1.05x10^{-3}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg Q 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***58.69***
Absorptive Properties -	

Pollutant Emitted ***Selenium***	Chemical Abstract Services (CAS) Number ***7782-49-2***
Proposed Emission Rate (lb/hr) ***5.07x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***3.27x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0.29 in Hg @ 807***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***78.96***
Absorptive Properties -	

Signature of Applicant 	Date 09/26/2016

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of
Health Division of Air Quality
918 E Divide Ave., 2nd Floor
Bismarck, ND 58501-1947
(701) 328-5188

PERMIT APPLICATION FOR
HAZARDOUS AIR POLLUTANT (HAP) SOURCES

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8329 (09-12)

SECTION A1 - APPLICANT INFORMATION

Name of Firm or Organization ***Meridian Energy Group - Davis Refinery***		
Applicant's Name ***Tom Williams***		
Title ***VP of Planning &Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***

SECTION A2 - FACILITY INFORMATION

Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number ***(409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***
Facility Address (Street & No. or Lat/Long to Nearest Second) ***37th Street / 46°52'45"N/103°14'55" W***		
City ***Belfield***	State ***ND***	ZIP Code ***58622***
County ***Billings***	Number of Employees at Location ***TBD***	
Land Area at Plant Site ***261*** Acres (or) Sq. Ft.	MSL Elevation at Plant ***2,685 feet***	

Describe Nature of Business/Process

Petroleum Refining / Heavy Naphtha Hydrotreater / Feed Heater

SECTION B – STACK DATA

Inside Diameter (ft) ***3.0***	Height Above Grade (ft) ***91.0***	
Gas Temperature at Exit (°F) ***787.7***	Gas Velocity at Exit (ft/sec) ***16.2***	Gas Volume (scfm) ***6,866.55***
Basis of any Estimates (attach separate sheet if necessary) ***Engineering data and Emission factors from Table 1.4-2. AP 42, Chapter 1: External Combustion Sources. See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"***		
Are Emission Control Devices in Place? If YES – Complete SFN 8532		Yes ☐ No ☒
Nearest Residences or Building ***Utility building***	Distance (ft) ***580 ft***	Direction ***South***
Nearest Property Line ***Fenceline***	Distance (ft) ***904 ft***	Direction ***Southwest***

SECTION C – EMISSION STREAM DATA

Source ID No. From SFN 8516 ***105-H-0501***	Mean Particle Diameter (μm) ***TBD***
Flow Rate (scfm) ***6,866.55***	Drift Velocity (ft/sec) ***16.2***
Stream Temperature (°F) ***787.7***	Particulate Concentration (gr/dscf) ***TBD***
Moisture Content (%) ***TBD***	Halogens or Metals Present? ***Metals***
Pressure (in. Hg) ***TBD***	Organic Content (ppmv) ***$1.24x10^{-2}$***
Heat Content (Btu/scfm) ***TBD***	O_2 Content (%) ***N/A***

SECTION D – POLLUTANT SPECIFIC DATA (Complete One Box for Each Pollutant in Emission Stream)

Pollutant Emitted ***Acetaldehyde***	Chemical Abstract Services (CAS) Number ***75-07-0***
Proposed Emission Rate (lb/hr) ***$4.13x10^{-5}$***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic Vapor***
Concentration in Emission Stream (ppmv) ***$2.07x10^{-3}$***	Vapor Pressure (in. Hg @ °F) ***35.51 in Hg @ 68°C***
Solubility ***$1x10^{+6}$ mg/L in water @ 77°F***	Molecular Weight (lb/lb-mole) ***44.05***
Absorptive Properties -	

Pollutant Emitted ***Benzene***	Chemical Abstract Services (CAS) Number ***71-43-2***
Proposed Emission Rate (lb/hr) ***$7.22x10^{-6}$***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***$2.04x10^{-4}$***	Vapor Pressure (in. Hg @ °F) ***3.73 in Hg @ 77 °F***
Solubility ***In water $1.79x10^{3}$ mg/L @ 77 °F***	Molecular Weight (lb/lb-mole) ***78.11***
Absorptive Properties -	

Pollutant Emitted ***Dichlorobenzene***	Chemical Abstract Services (CAS) Number ***Varies***
Proposed Emission Rate (lb/hr) ***$4.13x10^{-6}$***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***$6.21x10^{-5}$***	Vapor Pressure (in. Hg @ °F) ***Varies***
Solubility ***Varies***	Molecular Weight (lb/lb-mole) ***147.00***
Absorptive Properties -	

Pollutant Emitted ***Ethylbenzene***	Chemical Abstract Services (CAS) Number ***100-41-4***
Proposed Emission Rate (lb/hr) ***5.50x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***1.15x10^{-3}***	Vapor Pressure (in. Hg @ °F) ***0.37 in Hg @ 77°F***
Solubility ***In water 0.014 g/100mL @ 59 °F***	Molecular Weight (lb/lb-mole) ***106.17***
Absorptive Properties -	

Pollutant Emitted ***Formaldehyde***	Chemical Abstract Services (CAS) Number ***50-00-0***
Proposed Emission Rate (lb/hr) ***2.54x10^{-4}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***1.87x10^{-2}***	Vapor Pressure (in. Hg @ °F) ***0.15 in Hg @ 77 °F***
Solubility ***In water 4.00 x10^{5} mg/L @ 68°F***	Molecular Weight (lb/lb-mole) ***30.03***
Absorptive Properties -	

Pollutant Emitted ***Hexane***	Chemical Abstract Services (CAS) Number ***110-54-5***
Proposed Emission Rate (lb/hr) ***6.19x10^{-3}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***1.59x10^{-1}***	Vapor Pressure (in. Hg @ °F) ***5.90 in Hg @ 68 °F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***86.1***
Absorptive Properties -	

Pollutant Emitted ***Naphthalene***	Chemical Abstract Services (CAS) Number ***91-20-3***
Proposed Emission Rate (lb/hr) ***2.06x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***3.56x10^{-5}***	Vapor Pressure (in. Hg @ °F) ***0.003 in Hg @ 77 °F***
Solubility ***In water 31 mg/L @ 77 °F***	Molecular Weight (lb/lb-mole) ***128.17***
Absorptive Properties -	

Pollutant Emitted ***Toluene***	Chemical Abstract Services (CAS) Number ***108-88-3***
Proposed Emission Rate (lb/hr) ***1.13x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***2.72x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***1.12 in Hg @ 77°F***
Solubility ***In water 526 mg/L @ 77°F***	Molecular Weight (lb/lb-mole) ***92.14***
Absorptive Properties -	

Pollutant Emitted ***Xylene***	Chemical Abstract Services (CAS) Number ***95-47-6***
Proposed Emission Rate (lb/hr) ***8.59x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***1.79x10^{-3}***	Vapor Pressure (in. Hg @ °F) ***0.26 in Hg @ 77°F***
Solubility ***In water 178 mg/L @ 77°F***	Molecular Weight (lb/lb-mole) ***106.16***
Absorptive Properties -	

Pollutant Emitted ***PAH***	Chemical Abstract Services (CAS) Number ***N/A***
Proposed Emission Rate (lb/hr) ***1.46x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***3.32x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***N/A***
Solubility ***N/A***	Molecular Weight (lb/lb-mole) ***TBD***
Absorptive Properties -	

Pollutant Emitted ***Antimony***	Chemical Abstract Services (CAS) Number ***7740-36-0***
Proposed Emission Rate (lb/hr) ***7.15x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/particulate***
Concentration in Emission Stream (ppmv) ***1.30x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***121.76***
Absorptive Properties -	

Pollutant Emitted ***Arsenic***	Chemical Abstract Services (CAS) Number ***7440-38-2***
Proposed Emission Rate (lb/hr) ***$2.75x10^{-6}$***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***$8.12x10^{-5}$***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole)
Absorptive Properties -	

Pollutant Emitted ***Beryllium***	Chemical Abstract Services (CAS) Number ***7440-41-7***
Proposed Emission Rate (lb/hr) ***$1.79x10^{-6}$***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***$4.39x10^{-4}$***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***9.01***
Absorptive Properties -	

Pollutant Emitted ***Cadmium***	Chemical Abstract Services (CAS) Number ***7440-43-9***
Proposed Emission Rate (lb/hr) ***$1.51x10^{-5}$***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***$2.98x10^{-4}$***	Vapor Pressure (in. Hg @ °F) ***0 in Hg@ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole)
Absorptive Properties -	

Pollutant Emitted ***Chromium (hexavalent)***	Chemical Abstract Services (CAS) Number ***1333-82-0***
Proposed Emission Rate (lb/hr) ***$3.85x10^{-6}$***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***$1.64x10^{-4}$***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @77°F***
Solubility ***1,660 g/L in water @ 77°F***	Molecular Weight (lb/lb-mole) ***51.99***
Absorptive Properties -	

Pollutant Emitted ***Chromium***	Chemical Abstract Services (CAS) Number ***7440-47-3***
Proposed Emission Rate (lb/hr) ***1.93x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***8.19x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***51.99***
Absorptive Properties -	

Pollutant Emitted ***Cobalt***	Chemical Abstract Services (CAS) Number ***7440-48-4***
Proposed Emission Rate (lb/hr) ***1.13x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***4.23x10^{-5}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***58.93***
Absorptive Properties -	

Pollutant Emitted ***Manganese***	Chemical Abstract Services (CAS) Number
Proposed Emission Rate (lb/hr) ***5.09x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***2.05x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77 °F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***54.94***
Absorptive Properties -	

Pollutant Emitted ***Mercury***	Chemical Abstract Services (CAS) Number ***7439-97-6***
Proposed Emission Rate (lb/hr) ***3.44x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***3.79x10^{-5}***	Vapor Pressure (in. Hg @ °F) ***7.85x10^{-5} in Hg @ 77 °F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***200.59***
Absorptive Properties -	

Pollutant Emitted ***Nickel***	Chemical Abstract Services (CAS) Number ***7044-02-0***
Proposed Emission Rate (lb/hr) ***2.89x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***1.09x10^{-3}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg Q 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***58.69***
Absorptive Properties -	

Pollutant Emitted ***Selenium***	Chemical Abstract Services (CAS) Number ***7782-49-2***
Proposed Emission Rate (lb/hr) ***1.21x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***3.39x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0.29 in Hg @ 807***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***78.96***
Absorptive Properties -	

Signature of Applicant	Date 09/26/2016

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of
Health Division of Air Quality
918 E Divide Ave., 2nd Floor
Bismarck, ND 58501-1947
(701) 328-5188

PERMIT APPLICATION FOR
HAZARDOUS AIR POLLUTANT (HAP) SOURCES

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8329 (09-12)

SECTION A1 - APPLICANT INFORMATION

Name of Firm or Organization ***Meridian Energy Group - Davis Refinery***		
Applicant's Name ***Tom Williams***		
Title ***VP of Planning &Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***

SECTION A2 - FACILITY INFORMATION

Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number ***(409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***
Facility Address (Street & No. or Lat/Long to Nearest Second) ***37th Street / 46°52'45"N/103°14'55" W***		
City ***Belfield***	State ***ND***	ZIP Code ***58622***
County ***Billings***	Number of Employees at Location ***TBD***	
Land Area at Plant Site ***261*** Acres (or) Sq. Ft.	MSL Elevation at Plant ***2,685 feet***	

Describe Nature of Business/Process

Petroleum Refining / Heavy Naphtha Hydrotreater / Heater

SECTION B – STACK DATA

Inside Diameter (ft) ***3.0***	Height Above Grade (ft) ***91.0***	
Gas Temperature at Exit (°F) ***787.7***	Gas Velocity at Exit (ft/sec) ***19.1***	Gas Volume (scfm) ***8,115.32***
Basis of any Estimates (attach separate sheet if necessary) ***Engineering data and Emission factors from Table 1.4-2. AP 42, Chapter 1: External Combustion Sources. See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"***		
Are Emission Control Devices in Place? If YES – Complete SFN 8532		Yes ☐ No ☒
Nearest Residences or Building ***Utility building***	Distance (ft) ***580 ft***	Direction ***South***
Nearest Property Line ***Fenceline***	Distance (ft) ***843 ft***	Direction ***Southeast***

SECTION C – EMISSION STREAM DATA

Source ID No. From SFN 8516 ***105-H-0502***	Mean Particle Diameter (μm) ***TBD***
Flow Rate (scfm) ***8,115.32***	Drift Velocity (ft/sec) ***19.1***
Stream Temperature (°F) ***787.7***	Particulate Concentration (gr/dscf) ***TBD***
Moisture Content (%) ***TBD***	Halogens or Metals Present? ***Metals***
Pressure (in. Hg) ***TBD***	Organic Content (ppmv) $***3.71x10^{-1}***$
Heat Content (Btu/scfm) ***TBD***	O_2 Content (%) ***N/A***

SECTION D – POLLUTANT SPECIFIC DATA (Complete One Box for Each Pollutant in Emission Stream)

Pollutant Emitted ***Acetaldehyde***	Chemical Abstract Services (CAS) Number ***75-07-0***
Proposed Emission Rate (lb/hr) $***4.88x10^{-5}***$	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic Vapor***
Concentration in Emission Stream (ppmv) $***2.07x10^{-3}***$	Vapor Pressure (in. Hg @ °F) ***35.51 in Hg @ 68°C***
Solubility $***1x10^{+6}$ mg/L in water @ 77°F***	Molecular Weight (lb/lb-mole) ***44.05***
Absorptive Properties -	

Pollutant Emitted ***Benzene***	Chemical Abstract Services (CAS) Number ***71-43-2***
Proposed Emission Rate (lb/hr) $***8.53x10^{-6}***$	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) $***2.04x10^{-4}***$	Vapor Pressure (in. Hg @ °F) ***3.73 in Hg @ 77 °F***
Solubility $***In water 1.79x10^{3}$ mg/L @ 77 °F***	Molecular Weight (lb/lb-mole) ***78.11***
Absorptive Properties -	

Pollutant Emitted ***Dichlorobenzene***	Chemical Abstract Services (CAS) Number ***Varies***
Proposed Emission Rate (lb/hr) $***4.88x10^{-6}***$	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) $***6.21x10^{-5}***$	Vapor Pressure (in. Hg @ °F) ***Varies***
Solubility ***Varies***	Molecular Weight (lb/lb-mole) ***147.00***
Absorptive Properties -	

Pollutant Emitted ***Ethylbenzene***	Chemical Abstract Services (CAS) Number ***100-41-4***
Proposed Emission Rate (lb/hr) ***6.50x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***1.15x10^{-3}***	Vapor Pressure (in. Hg @ °F) ***0.37 in Hg @ 77°F***
Solubility ***In water 0.014 g/100mL @ 59 °F***	Molecular Weight (lb/lb-mole) ***106.17***
Absorptive Properties -	

Pollutant Emitted ***Formaldehyde***	Chemical Abstract Services (CAS) Number ***50-00-0***
Proposed Emission Rate (lb/hr) ***3.01x10^{-4}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***1.87x10^{-2}***	Vapor Pressure (in. Hg @ °F) ***0.15 in Hg @ 77 °F***
Solubility ***In water 4.00 x10^{5} mg/L @ 68°F***	Molecular Weight (lb/lb-mole) ***30.03***
Absorptive Properties -	

Pollutant Emitted ***Hexane***	Chemical Abstract Services (CAS) Number ***110-54-5***
Proposed Emission Rate (lb/hr) ***7.31x10^{-3}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***1.59x10^{-1}***	Vapor Pressure (in. Hg @ °F) ***5.90 in Hg @ 68 °F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***86.1***
Absorptive Properties -	

Pollutant Emitted ***Naphthalene***	Chemical Abstract Services (CAS) Number ***91-20-3***
Proposed Emission Rate (lb/hr) ***2.44x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***3.56x10^{-5}***	Vapor Pressure (in. Hg @ °F) ***0.003 in Hg @ 77 °F***
Solubility ***In water 31 mg/L @ 77 °F***	Molecular Weight (lb/lb-mole) ***128.17***
Absorptive Properties -	

Pollutant Emitted ***Toluene***	Chemical Abstract Services (CAS) Number ***108-88-3***
Proposed Emission Rate (lb/hr) ***1.34x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***2.72x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***1.12 in Hg @ 77°F***
Solubility ***In water 526 mg/L @ 77°F***	Molecular Weight (lb/lb-mole) ***92.14***
Absorptive Properties -	

Pollutant Emitted ***Xylene***	Chemical Abstract Services (CAS) Number ***95-47-6***
Proposed Emission Rate (lb/hr) ***1.02x10^{-4}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***1.79x10^{-3}***	Vapor Pressure (in. Hg @ °F) ***0.26 in Hg @ 77°F***
Solubility ***In water 178 mg/L @ 77°F***	Molecular Weight (lb/lb-mole) ***106.16***
Absorptive Properties -	

Pollutant Emitted ***PAH***	Chemical Abstract Services (CAS) Number ***N/A***
Proposed Emission Rate (lb/hr) ***1.73x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***3.32x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***N/A***
Solubility ***N/A***	Molecular Weight (lb/lb-mole) ***TBD***
Absorptive Properties -	

Pollutant Emitted ***Antimony***	Chemical Abstract Services (CAS) Number ***7740-36-0***
Proposed Emission Rate (lb/hr) ***8.45x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/particulate***
Concentration in Emission Stream (ppmv) ***1.30x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***121.76***
Absorptive Properties -	

Pollutant Emitted ***Arsenic***	Chemical Abstract Services (CAS) Number ***7440-38-2***
Proposed Emission Rate (lb/hr) ***3.25x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***8.12x10^{-5}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole)
Absorptive Properties -	

Pollutant Emitted ***Beryllium***	Chemical Abstract Services (CAS) Number ***7440-41-7***
Proposed Emission Rate (lb/hr) ***2.11x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***4.39x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***9.01***
Absorptive Properties -	

Pollutant Emitted ***Cadmium***	Chemical Abstract Services (CAS) Number ***7440-43-9***
Proposed Emission Rate (lb/hr) ***1.79x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***2.98x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg@ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole)
Absorptive Properties -	

Pollutant Emitted ***Chromium (hexavalent)***	Chemical Abstract Services (CAS) Number ***1333-82-0***
Proposed Emission Rate (lb/hr) ***4.55x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***1.64x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @77°F***
Solubility ***1,660 g/L in water @ 77°F***	Molecular Weight (lb/lb-mole) ***51.99***
Absorptive Properties -	

Pollutant Emitted ***Chromium***	Chemical Abstract Services (CAS) Number ***7440-47-3***
Proposed Emission Rate (lb/hr) ***2.28x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***8.19x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***51.99***
Absorptive Properties -	

Pollutant Emitted ***Cobalt***	Chemical Abstract Services (CAS) Number ***7440-48-4***
Proposed Emission Rate (lb/hr) ***1.33x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***4.23x10^{-5}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***58.93***
Absorptive Properties -	

Pollutant Emitted ***Manganese***	Chemical Abstract Services (CAS) Number
Proposed Emission Rate (lb/hr) ***6.01x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***2.05x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77 °F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***54.94***
Absorptive Properties -	

Pollutant Emitted ***Mercury***	Chemical Abstract Services (CAS) Number ***7439-97-6***
Proposed Emission Rate (lb/hr) ***4.06x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***3.79x10^{-5}***	Vapor Pressure (in. Hg @ °F) ***7.85x10^{-5} in Hg @ 77 °F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***200.59***
Absorptive Properties -	

Pollutant Emitted ***Nickel***	Chemical Abstract Services (CAS) Number ***7044-02-0***
Proposed Emission Rate (lb/hr) ***3.41x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***1.09x10^{-3}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg Q 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***58.69***
Absorptive Properties -	

Pollutant Emitted ***Selenium***	Chemical Abstract Services (CAS) Number ***7782-49-2***
Proposed Emission Rate (lb/hr) ***1.43x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***3.39x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0.29 in Hg @ 807***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***78.96***
Absorptive Properties -	

Signature of Applicant	Date 09/26/2016

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of
Health Division of Air Quality
918 E Divide Ave., 2nd Floor
Bismarck, ND 58501-1947
(701) 328-5188

PERMIT APPLICATION FOR
HAZARDOUS AIR POLLUTANT (HAP) SOURCES

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8329 (09-12)

SECTION A1 - APPLICANT INFORMATION

Name of Firm or Organization ***Meridian Energy Group - Davis Refinery***		
Applicant's Name ***Tom Williams***		
Title ***VP of Planning &Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***

SECTION A2 - FACILITY INFORMATION

Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number ***(409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***
Facility Address (Street & No. or Lat/Long to Nearest Second) ***37th Street / 46°52'45"N/103°14'55" W***		
City ***Belfield***	State ***ND***	ZIP Code ***58622***
County ***Billings***	Number of Employees at Location ***TBD***	
Land Area at Plant Site ***261*** Acres (or) Sq. Ft.	MSL Elevation at Plant ***2,685 feet***	

Describe Nature of Business/Process

Petroleum Refining / Catalytic Reformer Unit #2 heater

SECTION B – STACK DATA

Inside Diameter (ft) ***4.0***	Height Above Grade (ft) ***42.0***	
Gas Temperature at Exit (°F) ***786.2***	Gas Velocity at Exit (ft/sec) ***27.5***	Gas Volume (scfm) ***20,769.92***
Basis of any Estimates (attach separate sheet if necessary) ***Engineering data and Emission factors from Table 1.4-2. AP 42, Chapter 1: External Combustion Sources. See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"***		
Are Emission Control Devices in Place? If YES – Complete SFN 8532		Yes ☒ No ☐
Nearest Residences or Building ***Utility building***	Distance (ft) ***228 ft***	Direction ***South***
Nearest Property Line ***Fenceline***	Distance (ft) ***657 ft***	Direction ***Southeast***

SECTION C – EMISSION STREAM DATA

Source ID No. From SFN 8516 ***106-H-0601***	Mean Particle Diameter (μm) ***TBD***
Flow Rate (scfm) ***20,769.92***	Drift Velocity (ft/sec) ***27.5***
Stream Temperature (°F) ***786.2***	Particulate Concentration (gr/dscf) ***TBD***
Moisture Content (%) ***TBD***	Halogens or Metals Present? ***Metals***
Pressure (in. Hg) ***TBD***	Organic Content (ppmv) $***1.86x10^{-1}***$
Heat Content (Btu/scfm) ***TBD***	O_2 Content (%) ***N/A***

SECTION D – POLLUTANT SPECIFIC DATA (Complete One Box for Each Pollutant in Emission Stream)

Pollutant Emitted ***Acetaldehyde***	Chemical Abstract Services (CAS) Number ***75-07-0***
Proposed Emission Rate (lb/hr) $***1.25x10^{-4}***$	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic Vapor***
Concentration in Emission Stream (ppmv) $***2.08x10^{-3}***$	Vapor Pressure (in. Hg @ °F) ***35.51 in Hg @ 68°C***
Solubility $***1x10^{+6}$ mg/L in water @ 77°F***	Molecular Weight (lb/lb-mole) ***44.05***
Absorptive Properties -	

Pollutant Emitted ***Benzene***	Chemical Abstract Services (CAS) Number ***71-43-2***
Proposed Emission Rate (lb/hr) $***2.19x10^{-5}***$	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) $***2.05x10^{-4}***$	Vapor Pressure (in. Hg @ °F) ***3.73 in Hg @ 77 °F***
Solubility $***In water 1.79x10^{3} mg/L @ 77 °F***$	Molecular Weight (lb/lb-mole) ***78.11***
Absorptive Properties -	

Pollutant Emitted ***Dichlorobenzene***	Chemical Abstract Services (CAS) Number ***Varies***
Proposed Emission Rate (lb/hr) $***1.25x10^{-5}***$	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) $***6.22x10^{-5}***$	Vapor Pressure (in. Hg @ °F) ***Varies***
Solubility ***Varies***	Molecular Weight (lb/lb-mole) ***147.00***
Absorptive Properties -	

Pollutant Emitted ***Ethylbenzene***	Chemical Abstract Services (CAS) Number ***100-41-4***
Proposed Emission Rate (lb/hr) ***1.67x10^{-4}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***1.15x10^{-3}***	Vapor Pressure (in. Hg @ °F) ***0.37 in Hg @ 77°F***
Solubility ***In water 0.014 g/100mL @ 59 °F***	Molecular Weight (lb/lb-mole) ***106.17***
Absorptive Properties -	

Pollutant Emitted ***Formaldehyde***	Chemical Abstract Services (CAS) Number ***50-00-0***
Proposed Emission Rate (lb/hr) ***7.72x10^{-4}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***1.88x10^{-2}***	Vapor Pressure (in. Hg @ °F) ***0.15 in Hg @ 77 °F***
Solubility ***In water 4.00 x10^{5} mg/L @ 68°F***	Molecular Weight (lb/lb-mole) ***30.03***
Absorptive Properties -	

Pollutant Emitted ***Hexane***	Chemical Abstract Services (CAS) Number ***110-54-5***
Proposed Emission Rate (lb/hr) ***1.88x10^{-2}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***1.59x10^{-1}***	Vapor Pressure (in. Hg @ °F) ***5.90 in Hg @ 68 °F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***86.1***
Absorptive Properties -	

Pollutant Emitted ***Naphthalene***	Chemical Abstract Services (CAS) Number ***91-20-3***
Proposed Emission Rate (lb/hr) ***6.26x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***3.57x10^{-5}***	Vapor Pressure (in. Hg @ °F) ***0.003 in Hg @ 77 °F***
Solubility ***In water 31 mg/L @ 77 °F***	Molecular Weight (lb/lb-mole) ***128.17***
Absorptive Properties -	

Pollutant Emitted ***Toluene***	Chemical Abstract Services (CAS) Number ***108-88-3***
Proposed Emission Rate (lb/hr) ***3.44 x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***2.73x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***1.12 in Hg @ 77°F***
Solubility ***In water 526 mg/L @ 77°F***	Molecular Weight (lb/lb-mole) ***92.14***
Absorptive Properties -	

Pollutant Emitted ***Xylene***	Chemical Abstract Services (CAS) Number ***95-47-6***
Proposed Emission Rate (lb/hr) ***2.61x10^{-4}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***1.80x10^{-3}***	Vapor Pressure (in. Hg @ °F) ***0.26 in Hg @ 77°F***
Solubility ***In water 178 mg/L @ 77°F***	Molecular Weight (lb/lb-mole) ***106.16***
Absorptive Properties -	

Pollutant Emitted ***PAH***	Chemical Abstract Services (CAS) Number ***N/A***
Proposed Emission Rate (lb/hr) ***4.44x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***3.33x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***N/A***
Solubility ***N/A***	Molecular Weight (lb/lb-mole) ***TBD***
Absorptive Properties -	

Pollutant Emitted ***Antimony***	Chemical Abstract Services (CAS) Number ***7740-36-0***
Proposed Emission Rate (lb/hr) ***2.17x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/particulate***
Concentration in Emission Stream (ppmv) ***1.30x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***121.76***
Absorptive Properties -	

Pollutant Emitted ***Arsenic***	Chemical Abstract Services (CAS) Number ***7440-38-2***
Proposed Emission Rate (lb/hr) ***$8.35x10^{-6}$***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***$8.14x10^{-5}$***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole)
Absorptive Properties -	

Pollutant Emitted ***Beryllium***	Chemical Abstract Services (CAS) Number ***7440-41-7***
Proposed Emission Rate (lb/hr) ***$5.42x10^{-6}$***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***$4.40x10^{-4}$***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***9.01***
Absorptive Properties -	

Pollutant Emitted ***Cadmium***	Chemical Abstract Services (CAS) Number ***7440-43-9***
Proposed Emission Rate (lb/hr) ***$4.59x10^{-5}$***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***$2.98x10^{-4}$***	Vapor Pressure (in. Hg @ °F) ***0 in Hg@ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole)
Absorptive Properties -	

Pollutant Emitted ***Chromium (hexavalent)***	Chemical Abstract Services (CAS) Number ***1333-82-0***
Proposed Emission Rate (lb/hr) ***$1.17x10^{-5}$***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***$1.64x10^{-4}$***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @77°F***
Solubility ***1,660 g/L in water @ 77°F***	Molecular Weight (lb/lb-mole) ***51.99***
Absorptive Properties -	

Pollutant Emitted ***Chromium***	Chemical Abstract Services (CAS) Number ***7440-47-3***
Proposed Emission Rate (lb/hr) ***5.84x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***8.21x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***51.99***
Absorptive Properties -	

Pollutant Emitted ***Cobalt***	Chemical Abstract Services (CAS) Number ***7440-48-4***
Proposed Emission Rate (lb/hr) ***3.42x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***4.24x10^{-5}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***58.93***
Absorptive Properties -	

Pollutant Emitted ***Manganese***	Chemical Abstract Services (CAS) Number
Proposed Emission Rate (lb/hr) ***1.54x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***2.05x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77 °F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***54.94***
Absorptive Properties -	

Pollutant Emitted ***Mercury***	Chemical Abstract Services (CAS) Number ***7439-97-6***
Proposed Emission Rate (lb/hr) ***1.04x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***3.80x10^{-5}***	Vapor Pressure (in. Hg @ °F) ***7.85x10^{-5} in Hg @ 77 °F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***200.59***
Absorptive Properties -	

Pollutant Emitted ***Nickel***	Chemical Abstract Services (CAS) Number ***7044-02-0***
Proposed Emission Rate (lb/hr) ***$8.76x10^{-5}$***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***$1.09x10^{-3}$***	Vapor Pressure (in. Hg @ °F) ***0 in Hg Q 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***58.69***
Absorptive Properties -	

Pollutant Emitted ***Selenium***	Chemical Abstract Services (CAS) Number ***7782-49-2***
Proposed Emission Rate (lb/hr) ***$3.67x10^{-5}$***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***$3.40x10^{-4}$***	Vapor Pressure (in. Hg @ °F) ***0.29 in Hg @ 807***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***78.96***
Absorptive Properties -	

Signature of Applicant	Date 09/26/2016

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of
Health Division of Air Quality
918 E Divide Ave., 2nd Floor
Bismarck, ND 58501-1947
(701) 328-5188

PERMIT APPLICATION FOR
HAZARDOUS AIR POLLUTANT (HAP) SOURCES

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8329 (09-12)

SECTION A1 - APPLICANT INFORMATION

Name of Firm or Organization ***Meridian Energy Group - Davis Refinery***		
Applicant's Name ***Tom Williams***		
Title ***VP of Planning &Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***

SECTION A2 - FACILITY INFORMATION

Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number ***(409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***
Facility Address (Street & No. or Lat/Long to Nearest Second) ***37th Street / 46°52'45"N/103°14'55" W***		
City ***Belfield***	State ***ND***	ZIP Code ***58622***
County ***Billings***	Number of Employees at Location ***TBD***	
Land Area at Plant Site ***261*** Acres (or) Sq. Ft.	MSL Elevation at Plant ***2,685 feet***	

Describe Nature of Business/Process

Petroleum Refining / Catalytic Reformer Unit #1 heater

SECTION B – STACK DATA

Inside Diameter (ft) ***6.0***	Height Above Grade (ft) ***120.0***	
Gas Temperature at Exit (°F) ***787.7***	Gas Velocity at Exit (ft/sec) ***27.2***	Gas Volume (scfm) ***46,194.82***
Basis of any Estimates (attach separate sheet if necessary) ***Engineering data and Emission factors from Table 1.4-2. AP 42, Chapter 1: External Combustion Sources. See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"***		
Are Emission Control Devices in Place? If YES – Complete SFN 8532		Yes ☒ No ☐
Nearest Residences or Building ***Utility building***	Distance (ft) ***268.4 ft***	Direction ***South***
Nearest Property Line ***Fenceline***	Distance (ft) ***810 ft***	Direction ***Southeast***

SECTION C – EMISSION STREAM DATA

Source ID No. From SFN 8516 ***107-H-0701***	Mean Particle Diameter (μm) ***TBD***
Flow Rate (scfm) ***46,194.82***	Drift Velocity (ft/sec) ***27.2***
Stream Temperature (°F) ***787.7***	Particulate Concentration (gr/dscf) ***TBD***
Moisture Content (%) ***TBD***	Halogens or Metals Present? ***Metals***
Pressure (in. Hg) ***TBD***	Organic Content (ppmv) $***1.86x10^{-1}***$
Heat Content (Btu/scfm) ***TBD***	O_2 Content (%) ***N/A***

SECTION D – POLLUTANT SPECIFIC DATA (Complete One Box for Each Pollutant in Emission Stream)

Pollutant Emitted ***Acetaldehyde***	Chemical Abstract Services (CAS) Number ***75-07-0***
Proposed Emission Rate (lb/hr) $***2.78x10^{-4}***$	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic Vapor***
Concentration in Emission Stream (ppmv) $***2.07x10^{-3}***$	Vapor Pressure (in. Hg @ °F) ***35.51 in Hg @ 68°C***
Solubility $***1x10^{+6}$ mg/L in water @ 77°F***	Molecular Weight (lb/lb-mole) ***44.05***
Absorptive Properties -	

Pollutant Emitted ***Benzene***	Chemical Abstract Services (CAS) Number ***71-43-2***
Proposed Emission Rate (lb/hr) $***4.86x10^{-5}***$	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) $***2.04x10^{-4}***$	Vapor Pressure (in. Hg @ °F) ***3.73 in Hg @ 77 °F***
Solubility $***In water 1.79x10^{3} mg/L @ 77 °F***$	Molecular Weight (lb/lb-mole) ***78.11***
Absorptive Properties -	

Pollutant Emitted ***Dichlorobenzene***	Chemical Abstract Services (CAS) Number ***Varies***
Proposed Emission Rate (lb/hr) $***2.78x10^{-5}***$	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) $***6.21x10^{-5}***$	Vapor Pressure (in. Hg @ °F) ***Varies***
Solubility ***Varies***	Molecular Weight (lb/lb-mole) ***147.00***
Absorptive Properties -	

Pollutant Emitted ***Ethylbenzene***	Chemical Abstract Services (CAS) Number ***100-41-4***
Proposed Emission Rate (lb/hr) ***3.70x10^{-4}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***1.15x10^{-3}***	Vapor Pressure (in. Hg @ °F) ***0.37 in Hg @ 77°F***
Solubility ***In water 0.014 g/100mL @ 59 °F***	Molecular Weight (lb/lb-mole) ***106.17***
Absorptive Properties -	

Pollutant Emitted ***Formaldehyde***	Chemical Abstract Services (CAS) Number ***50-00-0***
Proposed Emission Rate (lb/hr) ***1.71x10^{-3}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***1.87x10^{-2}***	Vapor Pressure (in. Hg @ °F) ***0.15 in Hg @ 77 °F***
Solubility ***In water 4.00 x10^{5} mg/L @ 68°F***	Molecular Weight (lb/lb-mole) ***30.03***
Absorptive Properties -	

Pollutant Emitted ***Hexane***	Chemical Abstract Services (CAS) Number ***110-54-5***
Proposed Emission Rate (lb/hr) ***4.16x10^{-2}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***1.59x10^{-1}***	Vapor Pressure (in. Hg @ °F) ***5.90 in Hg @ 68 °F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***86.1***
Absorptive Properties -	

Pollutant Emitted ***Naphthalene***	Chemical Abstract Services (CAS) Number ***91-20-3***
Proposed Emission Rate (lb/hr) ***1.39x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***3.56x10^{-5}***	Vapor Pressure (in. Hg @ °F) ***0.003 in Hg @ 77 °F***
Solubility ***In water 31 mg/L @ 77 °F***	Molecular Weight (lb/lb-mole) ***128.17***
Absorptive Properties -	

Pollutant Emitted ***Toluene***	Chemical Abstract Services (CAS) Number ***108-88-3***
Proposed Emission Rate (lb/hr) ***7.63x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***2.72x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***1.12 in Hg @ 77°F***
Solubility ***In water 526 mg/L @ 77°F***	Molecular Weight (lb/lb-mole) ***92.14***
Absorptive Properties -	

Pollutant Emitted ***Xylene***	Chemical Abstract Services (CAS) Number ***95-47-6***
Proposed Emission Rate (lb/hr) ***5.78x10^{-4}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***1.79x10^{-3}***	Vapor Pressure (in. Hg @ °F) ***0.26 in Hg @ 77°F***
Solubility ***In water 178 mg/L @ 77°F***	Molecular Weight (lb/lb-mole) ***106.16***
Absorptive Properties -	

Pollutant Emitted ***PAH***	Chemical Abstract Services (CAS) Number ***N/A***
Proposed Emission Rate (lb/hr) ***9.85x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***3.32x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***N/A***
Solubility ***N/A***	Molecular Weight (lb/lb-mole) ***TBD***
Absorptive Properties -	

Pollutant Emitted ***Antimony***	Chemical Abstract Services (CAS) Number ***7740-36-0***
Proposed Emission Rate (lb/hr) ***4.81x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/particulate***
Concentration in Emission Stream (ppmv) ***1.30x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***121.76***
Absorptive Properties -	

Pollutant Emitted ***Arsenic***	Chemical Abstract Services (CAS) Number ***7440-38-2***
Proposed Emission Rate (lb/hr) ***1.85x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***8.12x10^{-5}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole)
Absorptive Properties -	

Pollutant Emitted ***Beryllium***	Chemical Abstract Services (CAS) Number ***7440-41-7***
Proposed Emission Rate (lb/hr) ***1.20x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***4.39x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***9.01***
Absorptive Properties -	

Pollutant Emitted ***Cadmium***	Chemical Abstract Services (CAS) Number ***7440-43-9***
Proposed Emission Rate (lb/hr) ***1.02x10^{-4}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***2.98x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg@ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole)
Absorptive Properties -	

Pollutant Emitted ***Chromium (hexavalent)***	Chemical Abstract Services (CAS) Number ***1333-82-0***
Proposed Emission Rate (lb/hr) ***2.59x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***1.64x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @77°F***
Solubility ***1,660 g/L in water @ 77°F***	Molecular Weight (lb/lb-mole) ***51.99***
Absorptive Properties -	

Pollutant Emitted ***Chromium***	Chemical Abstract Services (CAS) Number ***7440-47-3***
Proposed Emission Rate (lb/hr) ***1.30x10^{-4}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***8.19x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***51.99***
Absorptive Properties -	

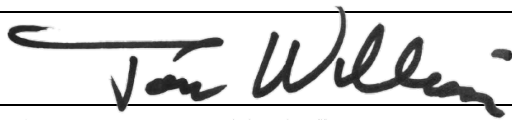
Pollutant Emitted ***Cobalt***	Chemical Abstract Services (CAS) Number ***7440-48-4***
Proposed Emission Rate (lb/hr) ***7.59x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***4.23x10^{-5}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***58.93***
Absorptive Properties -	

Pollutant Emitted ***Manganese***	Chemical Abstract Services (CAS) Number
Proposed Emission Rate (lb/hr) ***3.42x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***2.05x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77 °F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***54.94***
Absorptive Properties -	

Pollutant Emitted ***Mercury***	Chemical Abstract Services (CAS) Number ***7439-97-6***
Proposed Emission Rate (lb/hr) ***2.31x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***3.79x10^{-5}***	Vapor Pressure (in. Hg @ °F) ***7.85x10^{-5} in Hg @ 77 °F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***200.59***
Absorptive Properties -	

Pollutant Emitted ***Nickel***	Chemical Abstract Services (CAS) Number ***7044-02-0***
Proposed Emission Rate (lb/hr) ***1.94x10^{-4}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***1.09x10^{-3}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg Q 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***58.69***
Absorptive Properties -	

Pollutant Emitted ***Selenium***	Chemical Abstract Services (CAS) Number ***7782-49-2***
Proposed Emission Rate (lb/hr) ***8.14x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***3.39x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0.29 in Hg @ 807***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***78.96***
Absorptive Properties -	

Signature of Applicant 	Date 09/26/2016

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of
Health Division of Air Quality
918 E Divide Ave., 2nd Floor
Bismarck, ND 58501-1947
(701) 328-5188

PERMIT APPLICATION FOR
HAZARDOUS AIR POLLUTANT (HAP) SOURCES

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8329 (09-12)

SECTION A1 - APPLICANT INFORMATION

Name of Firm or Organization ***Meridian Energy Group - Davis Refinery***		
Applicant's Name ***Tom Williams***		
Title ***VP of Planning &Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***

SECTION A2 - FACILITY INFORMATION

Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number ***(409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***
Facility Address (Street & No. or Lat/Long to Nearest Second) ***37th Street / 46°52'45"N/103°14'55" W***		
City ***Belfield***	State ***ND***	ZIP Code ***58622***
County ***Billings***	Number of Employees at Location ***TBD***	
Land Area at Plant Site ***261*** Acres (or) Sq. Ft.	MSL Elevation at Plant ***2,685 feet***	

Describe Nature of Business/Process

Petroleum Refining / Diesel Hydrotreater / Reactor Charge Heater

SECTION B – STACK DATA

Inside Diameter (ft) ***2.5***	Height Above Grade (ft) ***96***	
Gas Temperature at Exit (°F) ***764.3***	Gas Velocity at Exit (ft/sec) ***28.4***	Gas Volume (scfm) ***8,091.77***
Basis of any Estimates (attach separate sheet if necessary) ***Engineering data and Emission factors from Table 1.4-2. AP 42, Chapter 1: External Combustion Sources. See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"***		
Are Emission Control Devices in Place? If YES – Complete SFN 8532		Yes ☐ No ☒
Nearest Residences or Building ***Utility building***	Distance (ft) ***768 ft***	Direction ***South***
Nearest Property Line ***Fenceline***	Distance (ft) ***1048 ft***	Direction ***East***

SECTION C – EMISSION STREAM DATA

Source ID No. From SFN 8516 ***110-H-1001***	Mean Particle Diameter (μm) ***TBD***
Flow Rate (scfm) ***8,091.77***	Drift Velocity (ft/sec) ***28.4***
Stream Temperature (°F) ***764.3***	Particulate Concentration (gr/dscf) ***TBD***
Moisture Content (%) ***TBD***	Halogens or Metals Present? ***Metals***
Pressure (in. Hg) ***TBD***	Organic Content (ppmv) $***1.83x10^{-1}***$
Heat Content (Btu/scfm) ***TBD***	O_2 Content (%) ***N/A***

SECTION D – POLLUTANT SPECIFIC DATA (Complete One Box for Each Pollutant in Emission Stream)

Pollutant Emitted ***Acetaldehyde***	Chemical Abstract Services (CAS) Number ***75-07-0***
Proposed Emission Rate (lb/hr) $***4.88x10^{-5}***$	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic Vapor***
Concentration in Emission Stream (ppmv) $***2.04x10^{-3}***$	Vapor Pressure (in. Hg @ °F) ***35.51 in Hg @ 68°C***
Solubility $***1x10^{+6}$ mg/L in water @ 77°F***	Molecular Weight (lb/lb-mole) ***44.05***
Absorptive Properties -	

Pollutant Emitted ***Benzene***	Chemical Abstract Services (CAS) Number ***71-43-2***
Proposed Emission Rate (lb/hr) $***8.53x10^{-6}***$	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) $***2.01x10^{-4}***$	Vapor Pressure (in. Hg @ °F) ***3.73 in Hg @ 77 °F***
Solubility $***In water 1.79x10^{3} mg/L @ 77 °F***$	Molecular Weight (lb/lb-mole) ***78.11***
Absorptive Properties -	

Pollutant Emitted ***Dichlorobenzene***	Chemical Abstract Services (CAS) Number ***Varies***
Proposed Emission Rate (lb/hr) $***4.88x10^{-6}***$	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) $***6.11x10^{-5}***$	Vapor Pressure (in. Hg @ °F) ***Varies***
Solubility ***Varies***	Molecular Weight (lb/lb-mole) ***147.00***
Absorptive Properties -	

Pollutant Emitted ***Ethylbenzene***	Chemical Abstract Services (CAS) Number ***100-41-4***
Proposed Emission Rate (lb/hr) ***6.50x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***1.13x10^{-3}***	Vapor Pressure (in. Hg @ °F) ***0.37 in Hg @ 77°F***
Solubility ***In water 0.014 g/100mL @ 59 °F***	Molecular Weight (lb/lb-mole) ***106.17***
Absorptive Properties -	

Pollutant Emitted ***Formaldehyde***	Chemical Abstract Services (CAS) Number ***50-00-0***
Proposed Emission Rate (lb/hr) ***3.01x10^{-4}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***1.84x10^{-2}***	Vapor Pressure (in. Hg @ °F) ***0.15 in Hg @ 77 °F***
Solubility ***In water 4.00 x10^{5} mg/L @ 68°F***	Molecular Weight (lb/lb-mole) ***30.03***
Absorptive Properties -	

Pollutant Emitted ***Hexane***	Chemical Abstract Services (CAS) Number ***110-54-5***
Proposed Emission Rate (lb/hr) ***7.31x10^{-3}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***1.56x10^{-1}***	Vapor Pressure (in. Hg @ °F) ***5.90 in Hg @ 68 °F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***86.1***
Absorptive Properties -	

Pollutant Emitted ***Naphthalene***	Chemical Abstract Services (CAS) Number ***91-20-3***
Proposed Emission Rate (lb/hr) ***2.44x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***3.50x10^{-5}***	Vapor Pressure (in. Hg @ °F) ***0.003 in Hg @ 77 °F***
Solubility ***In water 31 mg/L @ 77 °F***	Molecular Weight (lb/lb-mole) ***128.17***
Absorptive Properties -	

Pollutant Emitted ***Toluene***	Chemical Abstract Services (CAS) Number ***108-88-3***
Proposed Emission Rate (lb/hr) ***1.34x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***2.68x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***1.12 in Hg @ 77°F***
Solubility ***In water 526 mg/L @ 77°F***	Molecular Weight (lb/lb-mole) ***92.14***
Absorptive Properties -	

Pollutant Emitted ***Xylene***	Chemical Abstract Services (CAS) Number ***95-47-6***
Proposed Emission Rate (lb/hr) ***1.02x10^{-4}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***1.76x10^{-3}***	Vapor Pressure (in. Hg @ °F) ***0.26 in Hg @ 77°F***
Solubility ***In water 178 mg/L @ 77°F***	Molecular Weight (lb/lb-mole) ***106.16***
Absorptive Properties -	

Pollutant Emitted ***PAH***	Chemical Abstract Services (CAS) Number ***N/A***
Proposed Emission Rate (lb/hr) ***1.73x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***3.27x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***N/A***
Solubility ***N/A***	Molecular Weight (lb/lb-mole) ***TBD***
Absorptive Properties -	

Pollutant Emitted ***Antimony***	Chemical Abstract Services (CAS) Number ***7740-36-0***
Proposed Emission Rate (lb/hr) ***8.45x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/particulate***
Concentration in Emission Stream (ppmv) ***1.28x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***121.76***
Absorptive Properties -	

Pollutant Emitted ***Arsenic***	Chemical Abstract Services (CAS) Number ***7440-38-2***
Proposed Emission Rate (lb/hr) ***3.25x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***7.99x10^{-5}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole)
Absorptive Properties -	

Pollutant Emitted ***Beryllium***	Chemical Abstract Services (CAS) Number ***7440-41-7***
Proposed Emission Rate (lb/hr) ***2.11x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***4.32x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***9.01***
Absorptive Properties -	

Pollutant Emitted ***Cadmium***	Chemical Abstract Services (CAS) Number ***7440-43-9***
Proposed Emission Rate (lb/hr) ***1.79x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***2.93x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg@ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole)
Absorptive Properties -	

Pollutant Emitted ***Chromium (hexavalent)***	Chemical Abstract Services (CAS) Number ***1333-82-0***
Proposed Emission Rate (lb/hr) ***4.55x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***1.61x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @77°F***
Solubility ***1,660 g/L in water @ 77°F***	Molecular Weight (lb/lb-mole) ***51.99***
Absorptive Properties -	

Pollutant Emitted ***Chromium***	Chemical Abstract Services (CAS) Number ***7440-47-3***
Proposed Emission Rate (lb/hr) ***2.28x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***8.06x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***51.99***
Absorptive Properties -	

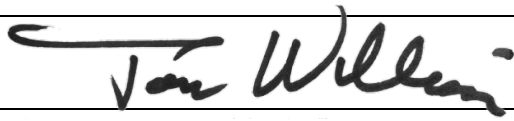
Pollutant Emitted ***Cobalt***	Chemical Abstract Services (CAS) Number ***7440-48-4***
Proposed Emission Rate (lb/hr) ***1.33x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***4.17x10^{-5}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***58.93***
Absorptive Properties -	

Pollutant Emitted ***Manganese***	Chemical Abstract Services (CAS) Number
Proposed Emission Rate (lb/hr) ***6.01x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***2.02x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77 °F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***54.94***
Absorptive Properties -	

Pollutant Emitted ***Mercury***	Chemical Abstract Services (CAS) Number ***7439-97-6***
Proposed Emission Rate (lb/hr) ***4.06x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***3.73x10^{-5}***	Vapor Pressure (in. Hg @ °F) ***7.85x10^{-5} in Hg @ 77 °F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***200.59***
Absorptive Properties -	

Pollutant Emitted ***Nickel***	Chemical Abstract Services (CAS) Number ***7044-02-0***
Proposed Emission Rate (lb/hr) ***3.41x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***1.07x10^{-3}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg Q 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***58.69***
Absorptive Properties -	

Pollutant Emitted ***Selenium***	Chemical Abstract Services (CAS) Number ***7782-49-2***
Proposed Emission Rate (lb/hr) ***1.43x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***3.34x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0.29 in Hg @ 807***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***78.96***
Absorptive Properties -	

Signature of Applicant	Date
	09/26/2016

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of
Health Division of Air Quality
918 E Divide Ave., 2nd Floor
Bismarck, ND 58501-1947
(701) 328-5188

PERMIT APPLICATION FOR
HAZARDOUS AIR POLLUTANT (HAP) SOURCES

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8329 (09-12)

SECTION A1 - APPLICANT INFORMATION

Name of Firm or Organization ***Meridian Energy Group - Davis Refinery***		
Applicant's Name ***Tom Williams***		
Title ***VP of Planning &Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***

SECTION A2 - FACILITY INFORMATION

Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number ***(409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***
Facility Address (Street & No. or Lat/Long to Nearest Second) ***37th Street / 46°52'45"N/103°14'55" W***		
City ***Belfield***	State ***ND***	ZIP Code ***58622***
County ***Billings***	Number of Employees at Location ***TBD***	
Land Area at Plant Site ***261*** Acres (or) Sq. Ft.	MSL Elevation at Plant ***2,685 feet***	

Describe Nature of Business/Process

Petroleum Refining / Light Naphtha Hydrotreater / Charge Heater

SECTION B – STACK DATA

Inside Diameter (ft) ***3.5***	Height Above Grade (ft) ***170***	
Gas Temperature at Exit (°F) ***793.1***	Gas Velocity at Exit (ft/sec) ***12.1***	Gas Volume (scfm) ***6,964.97***
Basis of any Estimates (attach separate sheet if necessary) ***Engineering data and Emission factors from Table 1.4-2. AP 42, Chapter 1: External Combustion Sources. See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"***		
Are Emission Control Devices in Place? If YES – Complete SFN 8532		Yes ☐ No ☒
Nearest Residences or Building ***Utility building***	Distance (ft) ***591 ft***	Direction ***South***
Nearest Property Line ***Fenceline***	Distance (ft) ***765 ft***	Direction ***Southwest***

SECTION C – EMISSION STREAM DATA

Source ID No. From SFN 8516 ***111-H-1101***	Mean Particle Diameter (μm) ***TBD***
Flow Rate (scfm) ***6,964.97***	Drift Velocity (ft/sec) ***12.1***
Stream Temperature (°F) ***787.7***	Particulate Concentration (gr/dscf) ***TBD***
Moisture Content (%) ***TBD***	Halogens or Metals Present? ***Metals***
Pressure (in. Hg) ***TBD***	Organic Content (ppmv) $***1.86x10^{-1}***$
Heat Content (Btu/scfm) ***TBD***	O_2 Content (%) ***N/A***

SECTION D – POLLUTANT SPECIFIC DATA (Complete One Box for Each Pollutant in Emission Stream)

Pollutant Emitted ***Acetaldehyde***	Chemical Abstract Services (CAS) Number ***75-07-0***
Proposed Emission Rate (lb/hr) $***4.17x10^{-5}***$	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic Vapor***
Concentration in Emission Stream (ppmv) $***2.07x10^{-3}***$	Vapor Pressure (in. Hg @ °F) ***35.51 in Hg @ 68°C***
Solubility $***1x10^{+6}$ mg/L in water @ 77°F***	Molecular Weight (lb/lb-mole) ***44.05***
Absorptive Properties -	

Pollutant Emitted ***Benzene***	Chemical Abstract Services (CAS) Number ***71-43-2***
Proposed Emission Rate (lb/hr) $***7.30x10^{-6}***$	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) $***2.05x10^{-4}***$	Vapor Pressure (in. Hg @ °F) ***3.73 in Hg @ 77 °F***
Solubility $***In water 1.79x10^{3} mg/L @ 77 °F***$	Molecular Weight (lb/lb-mole) ***78.11***
Absorptive Properties -	

Pollutant Emitted ***Dichlorobenzene***	Chemical Abstract Services (CAS) Number ***Varies***
Proposed Emission Rate (lb/hr) $***4.17x10^{-6}***$	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) $***6.21x10^{-5}***$	Vapor Pressure (in. Hg @ °F) ***Varies***
Solubility ***Varies***	Molecular Weight (lb/lb-mole) ***147.00***
Absorptive Properties -	

Pollutant Emitted ***Ethylbenzene***	Chemical Abstract Services (CAS) Number ***100-41-4***
Proposed Emission Rate (lb/hr) ***5.56x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***1.15x10^{-3}***	Vapor Pressure (in. Hg @ °F) ***0.37 in Hg @ 77°F***
Solubility ***In water 0.014 g/100mL @ 59 °F***	Molecular Weight (lb/lb-mole) ***106.17***
Absorptive Properties -	

Pollutant Emitted ***Formaldehyde***	Chemical Abstract Services (CAS) Number ***50-00-0***
Proposed Emission Rate (lb/hr) ***2.57x10^{-4}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***1.88x10^{-2}***	Vapor Pressure (in. Hg @ °F) ***0.15 in Hg @ 77 °F***
Solubility ***In water 4.00 x10^{5} mg/L @ 68°F***	Molecular Weight (lb/lb-mole) ***30.03***
Absorptive Properties -	

Pollutant Emitted ***Hexane***	Chemical Abstract Services (CAS) Number ***110-54-5***
Proposed Emission Rate (lb/hr) ***6.26x10^{-3}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***1.59x10^{-1}***	Vapor Pressure (in. Hg @ °F) ***5.90 in Hg @ 68 °F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***86.1***
Absorptive Properties -	

Pollutant Emitted ***Naphthalene***	Chemical Abstract Services (CAS) Number ***91-20-3***
Proposed Emission Rate (lb/hr) ***2.09x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***3.56x10^{-5}***	Vapor Pressure (in. Hg @ °F) ***0.003 in Hg @ 77 °F***
Solubility ***In water 31 mg/L @ 77 °F***	Molecular Weight (lb/lb-mole) ***128.17***
Absorptive Properties -	

Pollutant Emitted ***Toluene***	Chemical Abstract Services (CAS) Number ***108-88-3***
Proposed Emission Rate (lb/hr) ***1.15 x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***2.73x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***1.12 in Hg @ 77°F***
Solubility ***In water 526 mg/L @ 77°F***	Molecular Weight (lb/lb-mole) ***92.14***
Absorptive Properties -	

Pollutant Emitted ***Xylene***	Chemical Abstract Services (CAS) Number ***95-47-6***
Proposed Emission Rate (lb/hr) ***8.69x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***1.79x10^{-3}***	Vapor Pressure (in. Hg @ °F) ***0.26 in Hg @ 77°F***
Solubility ***In water 178 mg/L @ 77°F***	Molecular Weight (lb/lb-mole) ***106.16***
Absorptive Properties -	

Pollutant Emitted ***PAH***	Chemical Abstract Services (CAS) Number ***N/A***
Proposed Emission Rate (lb/hr) ***1.48x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***3.32x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***N/A***
Solubility ***N/A***	Molecular Weight (lb/lb-mole) ***TBD***
Absorptive Properties -	

Pollutant Emitted ***Antimony***	Chemical Abstract Services (CAS) Number ***7740-36-0***
Proposed Emission Rate (lb/hr) ***7.23x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/particulate***
Concentration in Emission Stream (ppmv) ***1.30x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***121.76***
Absorptive Properties -	

Pollutant Emitted ***Arsenic***	Chemical Abstract Services (CAS) Number ***7440-38-2***
Proposed Emission Rate (lb/hr) ***2.78x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***8.13x10^{-5}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole)
Absorptive Properties -	

Pollutant Emitted ***Beryllium***	Chemical Abstract Services (CAS) Number ***7440-41-7***
Proposed Emission Rate (lb/hr) ***1.81x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***4.39x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***9.01***
Absorptive Properties -	

Pollutant Emitted ***Cadmium***	Chemical Abstract Services (CAS) Number ***7440-43-9***
Proposed Emission Rate (lb/hr) ***1.53x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***2.98x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg@ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole)
Absorptive Properties -	

Pollutant Emitted ***Chromium (hexavalent)***	Chemical Abstract Services (CAS) Number ***1333-82-0***
Proposed Emission Rate (lb/hr) ***3.89x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***1.64x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @77°F***
Solubility ***1,660 g/L in water @ 77°F***	Molecular Weight (lb/lb-mole) ***51.99***
Absorptive Properties -	

Pollutant Emitted ***Chromium***	Chemical Abstract Services (CAS) Number ***7440-47-3***
Proposed Emission Rate (lb/hr) ***1.95x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***8.20x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***51.99***
Absorptive Properties -	

Pollutant Emitted ***Cobalt***	Chemical Abstract Services (CAS) Number ***7440-48-4***
Proposed Emission Rate (lb/hr) ***1.14x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***4.24x10^{-5}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***58.93***
Absorptive Properties -	

Pollutant Emitted ***Manganese***	Chemical Abstract Services (CAS) Number
Proposed Emission Rate (lb/hr) ***5.14x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***2.05x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77 °F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***54.94***
Absorptive Properties -	

Pollutant Emitted ***Mercury***	Chemical Abstract Services (CAS) Number ***7439-97-6***
Proposed Emission Rate (lb/hr) ***3.48x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***3.80x10^{-5}***	Vapor Pressure (in. Hg @ °F) ***7.85x10^{-5} in Hg @ 77 °F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***200.59***
Absorptive Properties -	

Pollutant Emitted ***Nickel***	Chemical Abstract Services (CAS) Number ***7044-02-0***
Proposed Emission Rate (lb/hr) ***2.92x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***1.09x10^{-3}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg Q 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***58.69***
Absorptive Properties -	

Pollutant Emitted ***Selenium***	Chemical Abstract Services (CAS) Number ***7782-49-2***
Proposed Emission Rate (lb/hr) ***1.22x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***3.39x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0.29 in Hg @ 807***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***78.96***
Absorptive Properties -	

Signature of Applicant	Date 09/26/2016

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of
Health Division of Air Quality
918 E Divide Ave., 2nd Floor
Bismarck, ND 58501-1947
(701) 328-5188

PERMIT APPLICATION FOR
HAZARDOUS AIR POLLUTANT (HAP) SOURCES

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8329 (09-12)

SECTION A1 - APPLICANT INFORMATION

Name of Firm or Organization ***Meridian Energy Group - Davis Refinery***		
Applicant's Name ***Tom Williams***		
Title ***VP of Planning &Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***

SECTION A2 - FACILITY INFORMATION

Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number ***(409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***
Facility Address (Street & No. or Lat/Long to Nearest Second) ***37th Street / 46°52'45"N/103°14'55" W***		
City ***Belfield***	State ***ND***	ZIP Code ***58622***
County ***Billings***	Number of Employees at Location ***TBD***	
Land Area at Plant Site ***261*** Acres (or) Sq. Ft.	MSL Elevation at Plant ***2,685 feet***	

Describe Nature of Business/Process

Petroleum Refining / Fluid Catalytic Cracking / Raw Charger Heater

SECTION B – STACK DATA

Inside Diameter (ft) ***5.5***	Height Above Grade (ft) ***72.0***	
Gas Temperature at Exit (°F) ***785.0***	Gas Velocity at Exit (ft/sec) ***9.9***	Gas Volume (scfm) ***14,110.55***
Basis of any Estimates (attach separate sheet if necessary) ***Engineering data and Emission factors from Table 1.4-2. AP 42, Chapter 1: External Combustion Sources. See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"***		
Are Emission Control Devices in Place? If YES – Complete SFN 8532		Yes ☐ No ☒
Nearest Residences or Building ***Utility building***	Distance (ft) ***718 ft***	Direction ***South***
Nearest Property Line ***Fenceline***	Distance (ft) ***460 ft***	Direction ***South***

SECTION C – EMISSION STREAM DATA

Source ID No. From SFN 8516 ***112-H-1201***	Mean Particle Diameter (μm) ***TBD***
Flow Rate (scfm) ***14,110.5***	Drift Velocity (ft/sec) ***9.9***
Stream Temperature (°F) ***785.0***	Particulate Concentration (gr/dscf) ***TBD***
Moisture Content (%) ***TBD***	Halogens or Metals Present? ***Metals***
Pressure (in. Hg) ***TBD***	Organic Content (ppmv) $***1.86x10^{-1}***$
Heat Content (Btu/scfm) ***TBD***	O_2 Content (%) ***N/A***

SECTION D – POLLUTANT SPECIFIC DATA (Complete One Box for Each Pollutant in Emission Stream)

Pollutant Emitted ***Acetaldehyde***	Chemical Abstract Services (CAS) Number ***75-07-0***
Proposed Emission Rate (lb/hr) $***8.51x10^{-5}***$	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic Vapor***
Concentration in Emission Stream (ppmv) $***2.07x10^{-3}***$	Vapor Pressure (in. Hg @ °F) ***35.51 in Hg @ 68°C***
Solubility $***1x10^{+6}$ mg/L in water @ 77°F***	Molecular Weight (lb/lb-mole) ***44.05***
Absorptive Properties -	

Pollutant Emitted ***Benzene***	Chemical Abstract Services (CAS) Number ***71-43-2***
Proposed Emission Rate (lb/hr) $***1.49x10^{-5}***$	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) $***2.05x10^{-4}***$	Vapor Pressure (in. Hg @ °F) ***3.73 in Hg @ 77 °F***
Solubility $***In water 1.79x10^{3} mg/L @ 77 °F***$	Molecular Weight (lb/lb-mole) ***78.11***
Absorptive Properties -	

Pollutant Emitted ***Dichlorobenzene***	Chemical Abstract Services (CAS) Number ***Varies***
Proposed Emission Rate (lb/hr) $***8.51x10^{-6}***$	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) $***6.22x10^{-5}***$	Vapor Pressure (in. Hg @ °F) ***Varies***
Solubility ***Varies***	Molecular Weight (lb/lb-mole) ***147.00***
Absorptive Properties -	

Pollutant Emitted ***Ethylbenzene***	Chemical Abstract Services (CAS) Number ***100-41-4***
Proposed Emission Rate (lb/hr) ***1.13x10^{-4}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***1.15x10^{-3}***	Vapor Pressure (in. Hg @ °F) ***0.37 in Hg @ 77°F***
Solubility ***In water 0.014 g/100mL @ 59 °F***	Molecular Weight (lb/lb-mole) ***106.17***
Absorptive Properties -	

Pollutant Emitted ***Formaldehyde***	Chemical Abstract Services (CAS) Number ***50-00-0***
Proposed Emission Rate (lb/hr) ***5.24x10^{-4}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***1.88x10^{-2}***	Vapor Pressure (in. Hg @ °F) ***0.15 in Hg @ 77 °F***
Solubility ***In water 4.00 x10^{5} mg/L @ 68°F***	Molecular Weight (lb/lb-mole) ***30.03***
Absorptive Properties -	

Pollutant Emitted ***Hexane***	Chemical Abstract Services (CAS) Number ***110-54-5***
Proposed Emission Rate (lb/hr) ***1.28x10^{-2}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***1.59x10^{-1}***	Vapor Pressure (in. Hg @ °F) ***5.90 in Hg @ 68 °F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***86.1***
Absorptive Properties -	

Pollutant Emitted ***Naphthalene***	Chemical Abstract Services (CAS) Number ***91-20-3***
Proposed Emission Rate (lb/hr) ***4.25x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***3.56x10^{-5}***	Vapor Pressure (in. Hg @ °F) ***0.003 in Hg @ 77 °F***
Solubility ***In water 31 mg/L @ 77 °F***	Molecular Weight (lb/lb-mole) ***128.17***
Absorptive Properties -	

Pollutant Emitted ***Toluene***	Chemical Abstract Services (CAS) Number ***108-88-3***
Proposed Emission Rate (lb/hr) ***2.34x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***2.73x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***1.12 in Hg @ 77°F***
Solubility ***In water 526 mg/L @ 77°F***	Molecular Weight (lb/lb-mole) ***92.14***
Absorptive Properties -	

Pollutant Emitted ***Xylene***	Chemical Abstract Services (CAS) Number ***95-47-6***
Proposed Emission Rate (lb/hr) ***1.77x10^{-4}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***1.79x10^{-3}***	Vapor Pressure (in. Hg @ °F) ***0.26 in Hg @ 77°F***
Solubility ***In water 178 mg/L @ 77°F***	Molecular Weight (lb/lb-mole) ***106.16***
Absorptive Properties -	

Pollutant Emitted ***PAH***	Chemical Abstract Services (CAS) Number ***N/A***
Proposed Emission Rate (lb/hr) ***3.02x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***3.32x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***N/A***
Solubility ***N/A***	Molecular Weight (lb/lb-mole) ***TBD***
Absorptive Properties -	

Pollutant Emitted ***Antimony***	Chemical Abstract Services (CAS) Number ***7740-36-0***
Proposed Emission Rate (lb/hr) ***1.47x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/particulate***
Concentration in Emission Stream (ppmv) ***1.30x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***121.76***
Absorptive Properties -	

Pollutant Emitted ***Arsenic***	Chemical Abstract Services (CAS) Number ***7440-38-2***
Proposed Emission Rate (lb/hr) ***5.67x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***8.13x10^{-5}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole)
Absorptive Properties -	

Pollutant Emitted ***Beryllium***	Chemical Abstract Services (CAS) Number ***7440-41-7***
Proposed Emission Rate (lb/hr) ***3.69x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***4.39x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***9.01***
Absorptive Properties -	

Pollutant Emitted ***Cadmium***	Chemical Abstract Services (CAS) Number ***7440-43-9***
Proposed Emission Rate (lb/hr) ***3.12x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***2.98x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg@ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole)
Absorptive Properties -	

Pollutant Emitted ***Chromium (hexavalent)***	Chemical Abstract Services (CAS) Number ***1333-82-0***
Proposed Emission Rate (lb/hr) ***7.94x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***1.64x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @77°F***
Solubility ***1,660 g/L in water @ 77°F***	Molecular Weight (lb/lb-mole) ***51.99***
Absorptive Properties -	

Pollutant Emitted ***Chromium***	Chemical Abstract Services (CAS) Number ***7440-47-3***
Proposed Emission Rate (lb/hr) ***3.97x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***8.20x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***51.99***
Absorptive Properties -	

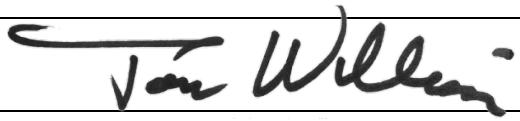
Pollutant Emitted ***Cobalt***	Chemical Abstract Services (CAS) Number ***7440-48-4***
Proposed Emission Rate (lb/hr) ***2.32x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***4.24x10^{-5}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***58.93***
Absorptive Properties -	

Pollutant Emitted ***Manganese***	Chemical Abstract Services (CAS) Number
Proposed Emission Rate (lb/hr) ***1.05x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***2.05x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77 °F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***54.94***
Absorptive Properties -	

Pollutant Emitted ***Mercury***	Chemical Abstract Services (CAS) Number ***7439-97-6***
Proposed Emission Rate (lb/hr) ***7.09x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***3.80x10^{-5}***	Vapor Pressure (in. Hg @ °F) ***7.85x10^{-5} in Hg @ 77 °F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***200.59***
Absorptive Properties -	

Pollutant Emitted ***Nickel***	Chemical Abstract Services (CAS) Number ***7044-02-0***
Proposed Emission Rate (lb/hr) ***5.95x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***1.09x10^{-3}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg Q 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***58.69***
Absorptive Properties -	

Pollutant Emitted ***Selenium***	Chemical Abstract Services (CAS) Number ***7782-49-2***
Proposed Emission Rate (lb/hr) ***2.49x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***3.39x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0.29 in Hg @ 807***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***78.96***
Absorptive Properties -	

Signature of Applicant 	Date 09/26/2016

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of
Health Division of Air Quality
918 E Divide Ave., 2nd Floor
Bismarck, ND 58501-1947
(701) 328-5188

PERMIT APPLICATION FOR
HAZARDOUS AIR POLLUTANT (HAP) SOURCES

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8329 (09-12)

SECTION A1 - APPLICANT INFORMATION

Name of Firm or Organization ***Meridian Energy Group - Davis Refinery***		
Applicant's Name ***Tom Williams***		
Title ***VP of Planning &Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***

SECTION A2 - FACILITY INFORMATION

Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number ***(409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***
Facility Address (Street & No. or Lat/Long to Nearest Second) ***37th Street / 46°52'45"N/103°14'55" W***		
City ***Belfield***	State ***ND***	ZIP Code ***58622***
County ***Billings***	Number of Employees at Location ***TBD***	
Land Area at Plant Site ***261*** Acres (or) Sq. Ft.	MSL Elevation at Plant ***2,685 feet***	

Describe Nature of Business/Process

Petroleum Refining / FCC Naphtha Hydrotreater / Heater

SECTION B – STACK DATA

Inside Diameter (ft) ***3.0***	Height Above Grade (ft) ***91.0***	
Gas Temperature at Exit (°F) ***784.3***	Gas Velocity at Exit (ft/sec) ***20.5***	Gas Volume (scfm) ***8,699.78***
Basis of any Estimates (attach separate sheet if necessary) ***Engineering data and Emission factors from Table 1.4-2. AP 42, Chapter 1: External Combustion Sources. See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"***		
Are Emission Control Devices in Place? If YES – Complete SFN 8532		Yes ☐ No ☒
Nearest Residences or Building ***Utility building***	Distance (ft) ***696 ft***	Direction ***South***
Nearest Property Line ***Fenceline***	Distance (ft) ***744 ft***	Direction ***South***

SECTION C – EMISSION STREAM DATA

Source ID No. From SFN 8516 ***114-H-1401***	Mean Particle Diameter (μm) ***TBD***
Flow Rate (scfm) ***8,699.78***	Drift Velocity (ft/sec) ***20.5***
Stream Temperature (°F) ***784.3***	Particulate Concentration (gr/dscf) ***TBD***
Moisture Content (%) ***TBD***	Halogens or Metals Present? ***Metals***
Pressure (in. Hg) ***TBD***	Organic Content (ppmv) $***3.72x10^{-1}***$
Heat Content (Btu/scfm) ***TBD***	O_2 Content (%) ***N/A***

SECTION D – POLLUTANT SPECIFIC DATA (Complete One Box for Each Pollutant in Emission Stream)

Pollutant Emitted ***Acetaldehyde***	Chemical Abstract Services (CAS) Number ***75-07-0***
Proposed Emission Rate (lb/hr) $***5.24x10^{-5}***$	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic Vapor***
Concentration in Emission Stream (ppmv) $***2.07x10^{-3}***$	Vapor Pressure (in. Hg @ °F) ***35.51 in Hg @ 68°C***
Solubility $***1x10^{+6}$ mg/L in water @ 77°F***	Molecular Weight (lb/lb-mole) ***44.05***
Absorptive Properties -	

Pollutant Emitted ***Benzene***	Chemical Abstract Services (CAS) Number ***71-43-2***
Proposed Emission Rate (lb/hr) $***9.18x10^{-6}***$	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) $***2.05x10^{-4}***$	Vapor Pressure (in. Hg @ °F) ***3.73 in Hg @ 77 °F***
Solubility $***In water 1.79x10^{3} mg/L @ 77 °F***$	Molecular Weight (lb/lb-mole) ***78.11***
Absorptive Properties -	

Pollutant Emitted ***Dichlorobenzene***	Chemical Abstract Services (CAS) Number ***Varies***
Proposed Emission Rate (lb/hr) $***5.24x10^{-6}***$	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) $***6.21x10^{-5}***$	Vapor Pressure (in. Hg @ °F) ***Varies***
Solubility ***Varies***	Molecular Weight (lb/lb-mole) ***147.00***
Absorptive Properties -	

Pollutant Emitted ***Ethylbenzene***	Chemical Abstract Services (CAS) Number ***100-41-4***
Proposed Emission Rate (lb/hr) ***6.99x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***1.15x10^{-3}***	Vapor Pressure (in. Hg @ °F) ***0.37 in Hg @ 77°F***
Solubility ***In water 0.014 g/100mL @ 59 °F***	Molecular Weight (lb/lb-mole) ***106.17***
Absorptive Properties -	

Pollutant Emitted ***Formaldehyde***	Chemical Abstract Services (CAS) Number ***50-00-0***
Proposed Emission Rate (lb/hr) ***3.23x10^{-4}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***1.88x10^{-2}***	Vapor Pressure (in. Hg @ °F) ***0.15 in Hg @ 77 °F***
Solubility ***In water 4.00 x10^{5} mg/L @ 68°F***	Molecular Weight (lb/lb-mole) ***30.03***
Absorptive Properties -	

Pollutant Emitted ***Hexane***	Chemical Abstract Services (CAS) Number ***110-54-5***
Proposed Emission Rate (lb/hr) ***7.87x10^{-3}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***1.59x10^{-1}***	Vapor Pressure (in. Hg @ °F) ***5.90 in Hg @ 68 °F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***86.1***
Absorptive Properties -	

Pollutant Emitted ***Naphthalene***	Chemical Abstract Services (CAS) Number ***91-20-3***
Proposed Emission Rate (lb/hr) ***2.62x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***3.56x10^{-5}***	Vapor Pressure (in. Hg @ °F) ***0.003 in Hg @ 77 °F***
Solubility ***In water 31 mg/L @ 77 °F***	Molecular Weight (lb/lb-mole) ***128.17***
Absorptive Properties -	

Pollutant Emitted ***Toluene***	Chemical Abstract Services (CAS) Number ***108-88-3***
Proposed Emission Rate (lb/hr) ***1.44x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***2.73x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***1.12 in Hg @ 77°F***
Solubility ***In water 526 mg/L @ 77°F***	Molecular Weight (lb/lb-mole) ***92.14***
Absorptive Properties -	

Pollutant Emitted ***Xylene***	Chemical Abstract Services (CAS) Number ***95-47-6***
Proposed Emission Rate (lb/hr) ***1.09x10^{-4}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***1.79x10^{-3}***	Vapor Pressure (in. Hg @ °F) ***0.26 in Hg @ 77°F***
Solubility ***In water 178 mg/L @ 77°F***	Molecular Weight (lb/lb-mole) ***106.16***
Absorptive Properties -	

Pollutant Emitted ***PAH***	Chemical Abstract Services (CAS) Number ***N/A***
Proposed Emission Rate (lb/hr) ***1.86x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***3.32x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***N/A***
Solubility ***N/A***	Molecular Weight (lb/lb-mole) ***TBD***
Absorptive Properties -	

Pollutant Emitted ***Antimony***	Chemical Abstract Services (CAS) Number ***7740-36-0***
Proposed Emission Rate (lb/hr) ***9.09x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/particulate***
Concentration in Emission Stream (ppmv) ***1.30x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***121.76***
Absorptive Properties -	

Pollutant Emitted ***Arsenic***	Chemical Abstract Services (CAS) Number ***7440-38-2***
Proposed Emission Rate (lb/hr) ***3.50x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***8.13x10^{-5}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole)
Absorptive Properties -	

Pollutant Emitted ***Beryllium***	Chemical Abstract Services (CAS) Number ***7440-41-7***
Proposed Emission Rate (lb/hr) ***2.27x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***4.39x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***9.01***
Absorptive Properties -	

Pollutant Emitted ***Cadmium***	Chemical Abstract Services (CAS) Number ***7440-43-9***
Proposed Emission Rate (lb/hr) ***1.92x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***2.98x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg@ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole)
Absorptive Properties -	

Pollutant Emitted ***Chromium (hexavalent)***	Chemical Abstract Services (CAS) Number ***1333-82-0***
Proposed Emission Rate (lb/hr) ***4.89x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***1.64x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @77°F***
Solubility ***1,660 g/L in water @ 77°F***	Molecular Weight (lb/lb-mole) ***51.99***
Absorptive Properties -	

Pollutant Emitted ***Chromium***	Chemical Abstract Services (CAS) Number ***7440-47-3***
Proposed Emission Rate (lb/hr) ***2.45x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***8.20x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***51.99***
Absorptive Properties -	

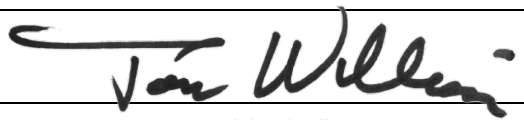
Pollutant Emitted ***Cobalt***	Chemical Abstract Services (CAS) Number ***7440-48-4***
Proposed Emission Rate (lb/hr) ***1.43x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***4.24x10^{-5}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***58.93***
Absorptive Properties -	

Pollutant Emitted ***Manganese***	Chemical Abstract Services (CAS) Number
Proposed Emission Rate (lb/hr) ***6.47x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***2.05x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77 °F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***54.94***
Absorptive Properties -	

Pollutant Emitted ***Mercury***	Chemical Abstract Services (CAS) Number ***7439-97-6***
Proposed Emission Rate (lb/hr) ***4.37x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***3.79x10^{-5}***	Vapor Pressure (in. Hg @ °F) ***7.85x10^{-5} in Hg @ 77 °F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***200.59***
Absorptive Properties -	

Pollutant Emitted ***Nickel***	Chemical Abstract Services (CAS) Number ***7044-02-0***
Proposed Emission Rate (lb/hr) ***3.67x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***1.09x10^{-3}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg Q 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***58.69***
Absorptive Properties -	

Pollutant Emitted ***Selenium***	Chemical Abstract Services (CAS) Number ***7782-49-2***
Proposed Emission Rate (lb/hr) ***1.54x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***3.39x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0.29 in Hg @ 807***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***78.96***
Absorptive Properties -	

Signature of Applicant 	Date 09/26/2016

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of
Health Division of Air Quality
918 E Divide Ave., 2nd Floor
Bismarck, ND 58501-1947
(701) 328-5188

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SECTION A1 - APPLICANT INFORMATION

Name of Firm or Organization ***Meridian Energy Group - Davis Refinery***		
Applicant's Name ***Tom Williams***		
Title ***VP of Planning &Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***

SECTION A2 - FACILITY INFORMATION

Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number ***(409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***
Facility Address (Street & No. or Lat/Long to Nearest Second) ***37th Street / 46°52'45"N/103°14'55" W***		
City ***Belfield***	State ***ND***	ZIP Code ***58622***
County ***Billings***	Number of Employees at Location ***TBD***	
Land Area at Plant Site ***261*** Acres (or) Sq. Ft.	MSL Elevation at Plant ***2,685 feet***	

Describe Nature of Business/Process

Petroleum Refining / Isomerization heater #1

SECTION B – STACK DATA

Inside Diameter (ft) ***2.7***	Height Above Grade (ft) ***36.0***	
Gas Temperature at Exit (°F) ***823.8***	Gas Velocity at Exit (ft/sec) ***2.5***	Gas Volume (scfm) ***852.56***
Basis of any Estimates (attach separate sheet if necessary) ***Engineering data and Emission factors from Table 1.4-2. AP 42, Chapter 1: External Combustion Sources. See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"***		
Are Emission Control Devices in Place? If YES – Complete SFN 8532		Yes ☐ No ☒
Nearest Residences or Building ***Utility building***	Distance (ft) ***959 ft***	Direction ***Southwest***
Nearest Property Line ***Fenceline***	Distance (ft) ***708 ft***	Direction ***East***

SECTION C – EMISSION STREAM DATA

Source ID No. From SFN 8516 ***117-H-1701***	Mean Particle Diameter (μm) ***TBD***
Flow Rate (scfm) ***852.56***	Drift Velocity (ft/sec) ***2.5***
Stream Temperature (°F) ***823.8***	Particulate Concentration (gr/dscf) ***TBD***
Moisture Content (%) ***TBD***	Halogens or Metals Present? ***Metals***
Pressure (in. Hg) ***TBD***	Organic Content (ppmv) $***1.85x10^{-1}***$
Heat Content (Btu/scfm) ***TBD***	O_2 Content (%) ***N/A***

SECTION D – POLLUTANT SPECIFIC DATA (Complete One Box for Each Pollutant in Emission Stream)

Pollutant Emitted ***Acetaldehyde***	Chemical Abstract Services (CAS) Number ***75-07-0***
Proposed Emission Rate (lb/hr) $***4.95x10^{-6}***$	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic Vapor***
Concentration in Emission Stream (ppmv) $***2.06x10^{-3}***$	Vapor Pressure (in. Hg @ °F) ***35.51 in Hg @ 68°C***
Solubility $***1x10^{+6}$ mg/L in water @ 77°F***	Molecular Weight (lb/lb-mole) ***44.05***
Absorptive Properties -	

Pollutant Emitted ***Benzene***	Chemical Abstract Services (CAS) Number ***71-43-2***
Proposed Emission Rate (lb/hr) $***8.66x10^{-7}***$	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) $***2.03x10^{-4}***$	Vapor Pressure (in. Hg @ °F) ***3.73 in Hg @ 77 °F***
Solubility $***In water 1.79x10^{3} mg/L @ 77 °F***$	Molecular Weight (lb/lb-mole) ***78.11***
Absorptive Properties -	

Pollutant Emitted ***Dichlorobenzene***	Chemical Abstract Services (CAS) Number ***Varies***
Proposed Emission Rate (lb/hr) $***4.95x10^{-7}***$	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) $***6.17x10^{-5}***$	Vapor Pressure (in. Hg @ °F) ***Varies***
Solubility ***Varies***	Molecular Weight (lb/lb-mole) ***147.00***
Absorptive Properties -	

Pollutant Emitted ***Ethylbenzene***	Chemical Abstract Services (CAS) Number ***100-41-4***
Proposed Emission Rate (lb/hr) ***6.60x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***1.14x10^{-3}***	Vapor Pressure (in. Hg @ °F) ***0.37 in Hg @ 77°F***
Solubility ***In water 0.014 g/100mL @ 59 °F***	Molecular Weight (lb/lb-mole) ***106.17***
Absorptive Properties -	

Pollutant Emitted ***Formaldehyde***	Chemical Abstract Services (CAS) Number ***50-00-0***
Proposed Emission Rate (lb/hr) ***3.05x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***1.86x10^{-2}***	Vapor Pressure (in. Hg @ °F) ***0.15 in Hg @ 77 °F***
Solubility ***In water 4.00 x10^{5} mg/L @ 68°F***	Molecular Weight (lb/lb-mole) ***30.03***
Absorptive Properties -	

Pollutant Emitted ***Hexane***	Chemical Abstract Services (CAS) Number ***110-54-5***
Proposed Emission Rate (lb/hr) ***7.43x10^{-4}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***1.58x10^{-1}***	Vapor Pressure (in. Hg @ °F) ***5.90 in Hg @ 68 °F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***86.1***
Absorptive Properties -	

Pollutant Emitted ***Naphthalene***	Chemical Abstract Services (CAS) Number ***91-20-3***
Proposed Emission Rate (lb/hr) ***2.48x10^{-7}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***3.54x10^{-5}***	Vapor Pressure (in. Hg @ °F) ***0.003 in Hg @ 77 °F***
Solubility ***In water 31 mg/L @ 77 °F***	Molecular Weight (lb/lb-mole) ***128.17***
Absorptive Properties -	

Pollutant Emitted ***Toluene***	Chemical Abstract Services (CAS) Number ***108-88-3***
Proposed Emission Rate (lb/hr) ***1.36x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***2.71x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***1.12 in Hg @ 77°F***
Solubility ***In water 526 mg/L @ 77°F***	Molecular Weight (lb/lb-mole) ***92.14***
Absorptive Properties -	

Pollutant Emitted ***Xylene***	Chemical Abstract Services (CAS) Number ***95-47-6***
Proposed Emission Rate (lb/hr) ***1.03x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***1.78x10^{-3}***	Vapor Pressure (in. Hg @ °F) ***0.26 in Hg @ 77°F***
Solubility ***In water 178 mg/L @ 77°F***	Molecular Weight (lb/lb-mole) ***106.16***
Absorptive Properties -	

Pollutant Emitted ***PAH***	Chemical Abstract Services (CAS) Number ***N/A***
Proposed Emission Rate (lb/hr) ***1.76x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***3.30x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***N/A***
Solubility ***N/A***	Molecular Weight (lb/lb-mole) ***TBD***
Absorptive Properties -	

Pollutant Emitted ***Antimony***	Chemical Abstract Services (CAS) Number ***7740-36-0***
Proposed Emission Rate (lb/hr) ***8.58x10^{-7}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/particulate***
Concentration in Emission Stream (ppmv) ***1.29x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***121.76***
Absorptive Properties -	

Pollutant Emitted ***Arsenic***	Chemical Abstract Services (CAS) Number ***7440-38-2***
Proposed Emission Rate (lb/hr) ***$3.30x10^{-7}$***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***$8.08x10^{-5}$***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole)
Absorptive Properties -	

Pollutant Emitted ***Beryllium***	Chemical Abstract Services (CAS) Number ***7440-41-7***
Proposed Emission Rate (lb/hr) ***$2.15x10^{-7}$***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***$4.37x10^{-4}$***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***9.01***
Absorptive Properties -	

Pollutant Emitted ***Cadmium***	Chemical Abstract Services (CAS) Number ***7440-43-9***
Proposed Emission Rate (lb/hr) ***$1.82x10^{-6}$***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***$2.96x10^{-4}$***	Vapor Pressure (in. Hg @ °F) ***0 in Hg@ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole)
Absorptive Properties -	

Pollutant Emitted ***Chromium (hexavalent)***	Chemical Abstract Services (CAS) Number ***1333-82-0***
Proposed Emission Rate (lb/hr) ***$4.62x10^{-7}$***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***$1.63x10^{-4}$***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @77°F***
Solubility ***1,660 g/L in water @ 77°F***	Molecular Weight (lb/lb-mole) ***51.99***
Absorptive Properties -	

Pollutant Emitted ***Chromium***	Chemical Abstract Services (CAS) Number ***7440-47-3***
Proposed Emission Rate (lb/hr) ***2.31x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***8.15x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***51.99***
Absorptive Properties -	

Pollutant Emitted ***Cobalt***	Chemical Abstract Services (CAS) Number ***7440-48-4***
Proposed Emission Rate (lb/hr) ***1.35x10^{-7}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***4.21x10^{-5}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***58.93***
Absorptive Properties -	

Pollutant Emitted ***Manganese***	Chemical Abstract Services (CAS) Number
Proposed Emission Rate (lb/hr) ***6.11x10^{-7}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***2.04x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77 °F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***54.94***
Absorptive Properties -	

Pollutant Emitted ***Mercury***	Chemical Abstract Services (CAS) Number ***7439-97-6***
Proposed Emission Rate (lb/hr) ***4.13x10^{-7}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***3.77x10^{-5}***	Vapor Pressure (in. Hg @ °F) ***7.85x10^{-5} in Hg @ 77 °F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***200.59***
Absorptive Properties -	

Pollutant Emitted ***Nickel***	Chemical Abstract Services (CAS) Number ***7044-02-0***
Proposed Emission Rate (lb/hr) ***3.47x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***1.08x10^{-3}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg Q 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***58.69***
Absorptive Properties -	

Pollutant Emitted ***Selenium***	Chemical Abstract Services (CAS) Number ***7782-49-2***
Proposed Emission Rate (lb/hr) ***1.45x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***3.37x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0.29 in Hg @ 807***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***78.96***
Absorptive Properties -	

Signature of Applicant	Date 09/26/2016

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of
Health Division of Air Quality
918 E Divide Ave., 2nd Floor
Bismarck, ND 58501-1947
(701) 328-5188

PERMIT APPLICATION FOR
HAZARDOUS AIR POLLUTANT (HAP) SOURCES

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8329 (09-12)

SECTION A1 - APPLICANT INFORMATION

Name of Firm or Organization ***Meridian Energy Group - Davis Refinery***		
Applicant's Name ***Tom Williams***		
Title ***VP of Planning &Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***

SECTION A2 - FACILITY INFORMATION

Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number ***(409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***
Facility Address (Street & No. or Lat/Long to Nearest Second) ***37th Street / 46°52'45"N/103°14'55" W***		
City ***Belfield***	State ***ND***	ZIP Code ***58622***
County ***Billings***	Number of Employees at Location ***TBD***	
Land Area at Plant Site ***261*** Acres (or) Sq. Ft.	MSL Elevation at Plant ***2,685 feet***	

Describe Nature of Business/Process

Petroleum Refining / Isomerization heater #2

SECTION B – STACK DATA

Inside Diameter (ft) ***4.6***	Height Above Grade (ft) ***46.0***	
Gas Temperature at Exit (°F) ***787.7***	Gas Velocity at Exit (ft/sec) ***1.9***	Gas Volume (scfm) ***1,872.75***
Basis of any Estimates (attach separate sheet if necessary) ***Engineering data and Emission factors from Table 1.4-2. AP 42, Chapter 1: External Combustion Sources. See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"***		
Are Emission Control Devices in Place? If YES – Complete SFN 8532		Yes ☐ No ☒
Nearest Residences or Building ***Utility building***	Distance (ft) ***947 ft***	Direction ***Southwest***
Nearest Property Line ***Fenceline***	Distance (ft) ***708 ft***	Direction ***East***

SECTION C – EMISSION STREAM DATA

Source ID No. From SFN 8516 ***117-H-1702***	Mean Particle Diameter (μm) ***TBD***
Flow Rate (scfm) ***1,872.75***	Drift Velocity (ft/sec) ***1.9***
Stream Temperature (°F) ***787.7***	Particulate Concentration (gr/dscf) ***TBD***
Moisture Content (%) ***TBD***	Halogens or Metals Present? ***Metals***
Pressure (in. Hg) ***TBD***	Organic Content (ppmv) ***$1.86x10^{-1}$***
Heat Content (Btu/scfm) ***TBD***	O_2 Content (%) ***N/A***

SECTION D – POLLUTANT SPECIFIC DATA (Complete One Box for Each Pollutant in Emission Stream)

Pollutant Emitted ***Acetaldehyde***	Chemical Abstract Services (CAS) Number ***75-07-0***
Proposed Emission Rate (lb/hr) ***$1.13x10^{-5}$***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic Vapor***
Concentration in Emission Stream (ppmv) ***$2.07x10^{-3}$***	Vapor Pressure (in. Hg @ °F) ***35.51 in Hg @ 68°C***
Solubility ***$1x10^{+6}$ mg/L in water @ 77°F***	Molecular Weight (lb/lb-mole) ***44.05***
Absorptive Properties -	

Pollutant Emitted ***Benzene***	Chemical Abstract Services (CAS) Number ***71-43-2***
Proposed Emission Rate (lb/hr) ***$1.97x10^{-6}$***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***$2.04x10^{-4}$***	Vapor Pressure (in. Hg @ °F) ***3.73 in Hg @ 77 °F***
Solubility ***In water $1.79x10^{3}$ mg/L @ 77 °F***	Molecular Weight (lb/lb-mole) ***78.11***
Absorptive Properties -	

Pollutant Emitted ***Dichlorobenzene***	Chemical Abstract Services (CAS) Number ***Varies***
Proposed Emission Rate (lb/hr) ***$1.13x10^{-6}$***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***$6.21x10^{-5}$***	Vapor Pressure (in. Hg @ °F) ***Varies***
Solubility ***Varies***	Molecular Weight (lb/lb-mole) ***147.00***
Absorptive Properties -	

Pollutant Emitted ***Ethylbenzene***	Chemical Abstract Services (CAS) Number ***100-41-4***
Proposed Emission Rate (lb/hr) ***1.50x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***1.15x10^{-3}***	Vapor Pressure (in. Hg @ °F) ***0.37 in Hg @ 77°F***
Solubility ***In water 0.014 g/100mL @ 59 °F***	Molecular Weight (lb/lb-mole) ***106.17***
Absorptive Properties -	

Pollutant Emitted ***Formaldehyde***	Chemical Abstract Services (CAS) Number ***50-00-0***
Proposed Emission Rate (lb/hr) ***6.94x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***1.87x10^{-2}***	Vapor Pressure (in. Hg @ °F) ***0.15 in Hg @ 77 °F***
Solubility ***In water 4.00 x10^{5} mg/L @ 68°F***	Molecular Weight (lb/lb-mole) ***30.03***
Absorptive Properties -	

Pollutant Emitted ***Hexane***	Chemical Abstract Services (CAS) Number ***110-54-5***
Proposed Emission Rate (lb/hr) ***1.69x10^{-3}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***1.59x10^{-1}***	Vapor Pressure (in. Hg @ °F) ***5.90 in Hg @ 68 °F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***86.1***
Absorptive Properties -	

Pollutant Emitted ***Naphthalene***	Chemical Abstract Services (CAS) Number ***91-20-3***
Proposed Emission Rate (lb/hr) ***5.63x10^{-7}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***3.56x10^{-5}***	Vapor Pressure (in. Hg @ °F) ***0.003 in Hg @ 77 °F***
Solubility ***In water 31 mg/L @ 77 °F***	Molecular Weight (lb/lb-mole) ***128.17***
Absorptive Properties -	

Pollutant Emitted ***Toluene***	Chemical Abstract Services (CAS) Number ***108-88-3***
Proposed Emission Rate (lb/hr) ***3.09 x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***2.72x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***1.12 in Hg @ 77°F***
Solubility ***In water 526 mg/L @ 77°F***	Molecular Weight (lb/lb-mole) ***92.14***
Absorptive Properties -	

Pollutant Emitted ***Xylene***	Chemical Abstract Services (CAS) Number ***95-47-6***
Proposed Emission Rate (lb/hr) ***2.34x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***1.79x10^{-3}***	Vapor Pressure (in. Hg @ °F) ***0.26 in Hg @ 77°F***
Solubility ***In water 178 mg/L @ 77°F***	Molecular Weight (lb/lb-mole) ***106.16***
Absorptive Properties -	

Pollutant Emitted ***PAH***	Chemical Abstract Services (CAS) Number ***N/A***
Proposed Emission Rate (lb/hr) ***3.99x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***3.32x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***N/A***
Solubility ***N/A***	Molecular Weight (lb/lb-mole) ***TBD***
Absorptive Properties -	

Pollutant Emitted ***Antimony***	Chemical Abstract Services (CAS) Number ***7740-36-0***
Proposed Emission Rate (lb/hr) ***1.95x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/particulate***
Concentration in Emission Stream (ppmv) ***1.30x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***121.76***
Absorptive Properties -	

Pollutant Emitted ***Arsenic***	Chemical Abstract Services (CAS) Number ***7440-38-2***
Proposed Emission Rate (lb/hr) ***7.50x10^{-7}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***8.12x10^{-5}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole)
Absorptive Properties -	

Pollutant Emitted ***Beryllium***	Chemical Abstract Services (CAS) Number ***7440-41-7***
Proposed Emission Rate (lb/hr) ***4.88x10^{-7}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***4.39x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***9.01***
Absorptive Properties -	

Pollutant Emitted ***Cadmium***	Chemical Abstract Services (CAS) Number ***7440-43-9***
Proposed Emission Rate (lb/hr) ***4.13x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***2.98x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg@ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole)
Absorptive Properties -	

Pollutant Emitted ***Chromium (hexavalent)***	Chemical Abstract Services (CAS) Number ***1333-82-0***
Proposed Emission Rate (lb/hr) ***1.05x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***1.64x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @77°F***
Solubility ***1,660 g/L in water @ 77°F***	Molecular Weight (lb/lb-mole) ***51.99***
Absorptive Properties -	

Pollutant Emitted ***Chromium***	Chemical Abstract Services (CAS) Number ***7440-47-3***
Proposed Emission Rate (lb/hr) ***5.25x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***8.19x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***51.99***
Absorptive Properties -	

Pollutant Emitted ***Cobalt***	Chemical Abstract Services (CAS) Number ***7440-48-4***
Proposed Emission Rate (lb/hr) ***3.08x10^{-7}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***4.23x10^{-5}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***58.93***
Absorptive Properties -	

Pollutant Emitted ***Manganese***	Chemical Abstract Services (CAS) Number
Proposed Emission Rate (lb/hr) ***1.39x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***2.05x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77 °F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***54.94***
Absorptive Properties -	

Pollutant Emitted ***Mercury***	Chemical Abstract Services (CAS) Number ***7439-97-6***
Proposed Emission Rate (lb/hr) ***9.38x10^{-7}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***3.79x10^{-5}***	Vapor Pressure (in. Hg @ °F) ***7.85x10^{-5} in Hg @ 77 °F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***200.59***
Absorptive Properties -	

Pollutant Emitted ***Nickel***	Chemical Abstract Services (CAS) Number ***7044-02-0***
Proposed Emission Rate (lb/hr) ***7.88x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***1.09x10^{-3}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg Q 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***58.69***
Absorptive Properties -	

Pollutant Emitted ***Selenium***	Chemical Abstract Services (CAS) Number ***7782-49-2***
Proposed Emission Rate (lb/hr) ***3.30x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***3.39x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0.29 in Hg @ 807***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***78.96***
Absorptive Properties -	

Signature of Applicant	Date
	09/26/2016

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of
Health Division of Air Quality
918 E Divide Ave., 2nd Floor
Bismarck, ND 58501-1947
(701) 328-5188

PERMIT APPLICATION FOR
HAZARDOUS AIR POLLUTANT (HAP) SOURCES

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8329 (09-12)

SECTION A1 - APPLICANT INFORMATION

Name of Firm or Organization ***Meridian Energy Group - Davis Refinery***		
Applicant's Name ***Tom Williams***		
Title ***VP of Planning &Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***

SECTION A2 - FACILITY INFORMATION

Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number ***(409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***
Facility Address (Street & No. or Lat/Long to Nearest Second) ***37th Street / 46°52'45"N/103°14'55" W***		
City ***Belfield***	State ***ND***	ZIP Code ***58622***
County ***Billings***	Number of Employees at Location ***TBD***	
Land Area at Plant Site ***261*** Acres (or) Sq. Ft.	MSL Elevation at Plant ***2,685 feet***	

Describe Nature of Business/Process

Petroleum Refining / Alkylation Unit / Iso-Stripper Reboiler

SECTION B – STACK DATA

Inside Diameter (ft) ***4.0***	Height Above Grade (ft) ***95.0***	
Gas Temperature at Exit (°F) ***785.5***	Gas Velocity at Exit (ft/sec) ***22.4***	Gas Volume (scfm) ***16,894.20***
Basis of any Estimates (attach separate sheet if necessary) ***Engineering data and Emission factors from Table 1.4-2. AP 42, Chapter 1: External Combustion Sources. See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"***		
Are Emission Control Devices in Place? If YES – Complete SFN 8532		Yes ☒ No ☐
Nearest Residences or Building ***Utility building***	Distance (ft) ***1,091 ft***	Direction ***Southwest***
Nearest Property Line ***Fenceline***	Distance (ft) ***536 ft***	Direction ***East***

SECTION C – EMISSION STREAM DATA

Source ID No. From SFN 8516 ***118-H-1801***	Mean Particle Diameter (μm) ***TBD***
Flow Rate (scfm) ***16,894.20***	Drift Velocity (ft/sec) ***22.4***
Stream Temperature (°F) ***785.5***	Particulate Concentration (gr/dscf) ***TBD***
Moisture Content (%) ***TBD***	Halogens or Metals Present? ***Metals***
Pressure (in. Hg) ***TBD***	Organic Content (ppmv) $***9.22x10^{-1}***$
Heat Content (Btu/scfm) ***TBD***	O_2 Content (%) ***N/A***

SECTION D – POLLUTANT SPECIFIC DATA (Complete One Box for Each Pollutant in Emission Stream)

Pollutant Emitted ***Acetaldehyde***	Chemical Abstract Services (CAS) Number ***75-07-0***
Proposed Emission Rate (lb/hr) $***2.53x10^{-4}***$	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic Vapor***
Concentration in Emission Stream (ppmv) $***5.15x10^{-3}***$	Vapor Pressure (in. Hg @ °F) ***35.51 in Hg @ 68°C***
Solubility $***1x10^{+6}$ mg/L in water @ 77°F***	Molecular Weight (lb/lb-mole) ***44.05***
Absorptive Properties -	

Pollutant Emitted ***Benzene***	Chemical Abstract Services (CAS) Number ***71-43-2***
Proposed Emission Rate (lb/hr) $***4.42x10^{-5}***$	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) $***5.08x10^{-4}***$	Vapor Pressure (in. Hg @ °F) ***3.73 in Hg @ 77 °F***
Solubility $***In water 1.79x10^{3} mg/L @ 77 °F***$	Molecular Weight (lb/lb-mole) ***78.11***
Absorptive Properties -	

Pollutant Emitted ***Dichlorobenzene***	Chemical Abstract Services (CAS) Number ***Varies***
Proposed Emission Rate (lb/hr) $***2.53x10^{-5}***$	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) $***1.54x10^{-4}***$	Vapor Pressure (in. Hg @ °F) ***Varies***
Solubility ***Varies***	Molecular Weight (lb/lb-mole) ***147.00***
Absorptive Properties -	

Pollutant Emitted ***Ethylbenzene***	Chemical Abstract Services (CAS) Number ***100-41-4***
Proposed Emission Rate (lb/hr) ***3.37x10^{-4}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***2.85x10^{-3}***	Vapor Pressure (in. Hg @ °F) ***0.37 in Hg @ 77°F***
Solubility ***In water 0.014 g/100mL @ 59 °F***	Molecular Weight (lb/lb-mole) ***106.17***
Absorptive Properties -	

Pollutant Emitted ***Formaldehyde***	Chemical Abstract Services (CAS) Number ***50-00-0***
Proposed Emission Rate (lb/hr) ***1.56x10^{-3}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***4.66x10^{-2}***	Vapor Pressure (in. Hg @ °F) ***0.15 in Hg @ 77 °F***
Solubility ***In water 4.00 x10^{5} mg/L @ 68°F***	Molecular Weight (lb/lb-mole) ***30.03***
Absorptive Properties -	

Pollutant Emitted ***Hexane***	Chemical Abstract Services (CAS) Number ***110-54-5***
Proposed Emission Rate (lb/hr) ***3.79x10^{-2}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***3.95x10^{-1}***	Vapor Pressure (in. Hg @ °F) ***5.90 in Hg @ 68 °F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***86.1***
Absorptive Properties -	

Pollutant Emitted ***Naphthalene***	Chemical Abstract Services (CAS) Number ***91-20-3***
Proposed Emission Rate (lb/hr) ***1.26x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***8.85x10^{-5}***	Vapor Pressure (in. Hg @ °F) ***0.003 in Hg @ 77 °F***
Solubility ***In water 31 mg/L @ 77 °F***	Molecular Weight (lb/lb-mole) ***128.17***
Absorptive Properties -	

Pollutant Emitted ***Toluene***	Chemical Abstract Services (CAS) Number ***108-88-3***
Proposed Emission Rate (lb/hr) ***6.95x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***6.77x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***1.12 in Hg @ 77°F***
Solubility ***In water 526 mg/L @ 77°F***	Molecular Weight (lb/lb-mole) ***92.14***
Absorptive Properties -	

Pollutant Emitted ***Xylene***	Chemical Abstract Services (CAS) Number ***95-47-6***
Proposed Emission Rate (lb/hr) ***5.26x10^{-4}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***4.45x10^{-3}***	Vapor Pressure (in. Hg @ °F) ***0.26 in Hg @ 77°F***
Solubility ***In water 178 mg/L @ 77°F***	Molecular Weight (lb/lb-mole) ***106.16***
Absorptive Properties -	

Pollutant Emitted ***PAH***	Chemical Abstract Services (CAS) Number ***N/A***
Proposed Emission Rate (lb/hr) ***8.96x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***8.25x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***N/A***
Solubility ***N/A***	Molecular Weight (lb/lb-mole) ***TBD***
Absorptive Properties -	

Pollutant Emitted ***Antimony***	Chemical Abstract Services (CAS) Number ***7740-36-0***
Proposed Emission Rate (lb/hr) ***4.38x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/particulate***
Concentration in Emission Stream (ppmv) ***3.23x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***121.76***
Absorptive Properties -	

Pollutant Emitted ***Arsenic***	Chemical Abstract Services (CAS) Number ***7440-38-2***
Proposed Emission Rate (lb/hr) ***1.68x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***2.02x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole)
Absorptive Properties -	

Pollutant Emitted ***Beryllium***	Chemical Abstract Services (CAS) Number ***7440-41-7***
Proposed Emission Rate (lb/hr) ***1.09x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***1.09x10^{-3}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***9.01***
Absorptive Properties -	

Pollutant Emitted ***Cadmium***	Chemical Abstract Services (CAS) Number ***7440-43-9***
Proposed Emission Rate (lb/hr) ***9.26x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***7.40x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg@ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole)
Absorptive Properties -	

Pollutant Emitted ***Chromium (hexavalent)***	Chemical Abstract Services (CAS) Number ***1333-82-0***
Proposed Emission Rate (lb/hr) ***2.36x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***4.07x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @77°F***
Solubility ***1,660 g/L in water @ 77°F***	Molecular Weight (lb/lb-mole) ***51.99***
Absorptive Properties -	

Pollutant Emitted ***Chromium***	Chemical Abstract Services (CAS) Number ***7440-47-3***
Proposed Emission Rate (lb/hr) ***1.18x10^{-4}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***2.04x10^{-3}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***51.99***
Absorptive Properties -	

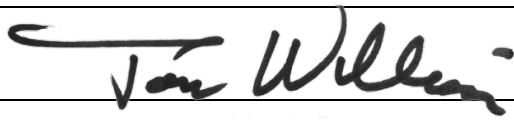
Pollutant Emitted ***Cobalt***	Chemical Abstract Services (CAS) Number ***7440-48-4***
Proposed Emission Rate (lb/hr) ***6.90x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***1.05x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***58.93***
Absorptive Properties -	

Pollutant Emitted ***Manganese***	Chemical Abstract Services (CAS) Number
Proposed Emission Rate (lb/hr) ***3.12x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***5.09x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77 °F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***54.94***
Absorptive Properties -	

Pollutant Emitted ***Mercury***	Chemical Abstract Services (CAS) Number ***7439-97-6***
Proposed Emission Rate (lb/hr) ***2.10x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***9.42x10^{-5}***	Vapor Pressure (in. Hg @ °F) ***7.85x10^{-5} in Hg @ 77 °F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***200.59***
Absorptive Properties -	

Pollutant Emitted ***Nickel***	Chemical Abstract Services (CAS) Number ***7044-02-0***
Proposed Emission Rate (lb/hr) ***1.77x10^{-4}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***2.70x10^{-3}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg Q 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***58.69***
Absorptive Properties -	

Pollutant Emitted ***Selenium***	Chemical Abstract Services (CAS) Number ***7782-49-2***
Proposed Emission Rate (lb/hr) ***7.41x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***8.42x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0.29 in Hg @ 807***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***78.96***
Absorptive Properties -	

Signature of Applicant 	Date 09/26/2016

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of
Health Division of Air Quality
918 E Divide Ave., 2nd Floor
Bismarck, ND 58501-1947
(701) 328-5188

PERMIT APPLICATION FOR
HAZARDOUS AIR POLLUTANT (HAP) SOURCES

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8329 (09-12)

SECTION A1 - APPLICANT INFORMATION

Name of Firm or Organization ***Meridian Energy Group - Davis Refinery***		
Applicant's Name ***Tom Williams***		
Title ***VP of Planning &Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***

SECTION A2 - FACILITY INFORMATION

Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number ***(409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***
Facility Address (Street & No. or Lat/Long to Nearest Second) ***37th Street / 46°52'45"N/103°14'55" W***		
City ***Belfield***	State ***ND***	ZIP Code ***58622***
County ***Billings***	Number of Employees at Location ***TBD***	
Land Area at Plant Site ***261*** Acres (or) Sq. Ft.	MSL Elevation at Plant ***2,685 feet***	

Describe Nature of Business/Process

Petroleum Refining / Kero Hydrotreater / Heater

SECTION B – STACK DATA

Inside Diameter (ft) ***2.5***	Height Above Grade (ft) ***96.0***	
Gas Temperature at Exit (°F) ***764.3***	Gas Velocity at Exit (ft/sec) ***21.9***	Gas Volume (scfm) ***6,224.68***
Basis of any Estimates (attach separate sheet if necessary) ***Engineering data and Emission factors from Table 1.4-2. AP 42, Chapter 1: External Combustion Sources. See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"***		
Are Emission Control Devices in Place? If YES – Complete SFN 8532		Yes ☐ No ☒
Nearest Residences or Building ***Utility building***	Distance (ft) ***778 ft***	Direction ***South***
Nearest Property Line ***Fenceline***	Distance (ft) ***970 ft***	Direction ***Southwest***

SECTION C – EMISSION STREAM DATA

Source ID No. From SFN 8516 ***125-H-2501***	Mean Particle Diameter (μm) ***TBD***
Flow Rate (scfm) ***6,224.68***	Drift Velocity (ft/sec) ***21.9***
Stream Temperature (°F) ***764.3***	Particulate Concentration (gr/dscf) ***TBD***
Moisture Content (%) ***TBD***	Halogens or Metals Present? ***Metals***
Pressure (in. Hg) ***TBD***	Organic Content (ppmv) $***3.65x10^{-1}***$
Heat Content (Btu/scfm) ***TBD***	O_2 Content (%) ***N/A***

SECTION D – POLLUTANT SPECIFIC DATA (Complete One Box for Each Pollutant in Emission Stream)

Pollutant Emitted ***Acetaldehyde***	Chemical Abstract Services (CAS) Number ***75-07-0***
Proposed Emission Rate (lb/hr) $***3.75x10^{-5}***$	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic Vapor***
Concentration in Emission Stream (ppmv) $***2.04x10^{-3}***$	Vapor Pressure (in. Hg @ °F) ***35.51 in Hg @ 68°C***
Solubility $***1x10^{+6}$ mg/L in water @ 77°F***	Molecular Weight (lb/lb-mole) ***44.05***
Absorptive Properties -	

Pollutant Emitted ***Benzene***	Chemical Abstract Services (CAS) Number ***71-43-2***
Proposed Emission Rate (lb/hr) $***6.56x10^{-6}***$	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) $***2.01x10^{-4}***$	Vapor Pressure (in. Hg @ °F) ***3.73 in Hg @ 77 °F***
Solubility $***In water 1.79x10^{3} mg/L @ 77 °F***$	Molecular Weight (lb/lb-mole) ***78.11***
Absorptive Properties -	

Pollutant Emitted ***Dichlorobenzene***	Chemical Abstract Services (CAS) Number ***Varies***
Proposed Emission Rate (lb/hr) $***3.75x10^{-6}***$	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) $***6.11x10^{-5}***$	Vapor Pressure (in. Hg @ °F) ***Varies***
Solubility ***Varies***	Molecular Weight (lb/lb-mole) ***147.00***
Absorptive Properties -	

Pollutant Emitted ***Ethylbenzene***	Chemical Abstract Services (CAS) Number ***100-41-4***
Proposed Emission Rate (lb/hr) ***5.00x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***1.13x10^{-3}***	Vapor Pressure (in. Hg @ °F) ***0.37 in Hg @ 77°F***
Solubility ***In water 0.014 g/100mL @ 59 °F***	Molecular Weight (lb/lb-mole) ***106.17***
Absorptive Properties -	

Pollutant Emitted ***Formaldehyde***	Chemical Abstract Services (CAS) Number ***50-00-0***
Proposed Emission Rate (lb/hr) ***2.31x10^{-4}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***1.84x10^{-2}***	Vapor Pressure (in. Hg @ °F) ***0.15 in Hg @ 77 °F***
Solubility ***In water 4.00 x10^{5} mg/L @ 68°F***	Molecular Weight (lb/lb-mole) ***30.03***
Absorptive Properties -	

Pollutant Emitted ***Hexane***	Chemical Abstract Services (CAS) Number ***110-54-5***
Proposed Emission Rate (lb/hr) ***5.63x10^{-3}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***1.56x10^{-1}***	Vapor Pressure (in. Hg @ °F) ***5.90 in Hg @ 68 °F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***86.1***
Absorptive Properties -	

Pollutant Emitted ***Naphthalene***	Chemical Abstract Services (CAS) Number ***91-20-3***
Proposed Emission Rate (lb/hr) ***1.88x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***3.50x10^{-5}***	Vapor Pressure (in. Hg @ °F) ***0.003 in Hg @ 77 °F***
Solubility ***In water 31 mg/L @ 77 °F***	Molecular Weight (lb/lb-mole) ***128.17***
Absorptive Properties -	

Pollutant Emitted ***Toluene***	Chemical Abstract Services (CAS) Number ***108-88-3***
Proposed Emission Rate (lb/hr) ***1.03x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***2.86x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***1.12 in Hg @ 77°F***
Solubility ***In water 526 mg/L @ 77°F***	Molecular Weight (lb/lb-mole) ***92.14***
Absorptive Properties -	

Pollutant Emitted ***Xylene***	Chemical Abstract Services (CAS) Number ***95-47-6***
Proposed Emission Rate (lb/hr) ***7.81x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***1.76x10^{-3}***	Vapor Pressure (in. Hg @ °F) ***0.26 in Hg @ 77°F***
Solubility ***In water 178 mg/L @ 77°F***	Molecular Weight (lb/lb-mole) ***106.16***
Absorptive Properties -	

Pollutant Emitted ***PAH***	Chemical Abstract Services (CAS) Number ***N/A***
Proposed Emission Rate (lb/hr) ***1.33x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***3.27x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***N/A***
Solubility ***N/A***	Molecular Weight (lb/lb-mole) ***TBD***
Absorptive Properties -	

Pollutant Emitted ***Antimony***	Chemical Abstract Services (CAS) Number ***7740-36-0***
Proposed Emission Rate (lb/hr) ***6.50x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/particulate***
Concentration in Emission Stream (ppmv) ***1.28x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***121.76***
Absorptive Properties -	

Pollutant Emitted ***Arsenic***	Chemical Abstract Services (CAS) Number ***7440-38-2***
Proposed Emission Rate (lb/hr) ***$2.50x10^{-6}$***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***$7.99x10^{-5}$***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole)
Absorptive Properties -	

Pollutant Emitted ***Beryllium***	Chemical Abstract Services (CAS) Number ***7440-41-7***
Proposed Emission Rate (lb/hr) ***$1.63x10^{-6}$***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***$4.32x10^{-4}$***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***9.01***
Absorptive Properties -	

Pollutant Emitted ***Cadmium***	Chemical Abstract Services (CAS) Number ***7440-43-9***
Proposed Emission Rate (lb/hr) ***$1.38x10^{-5}$***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***$2.93x10^{-4}$***	Vapor Pressure (in. Hg @ °F) ***0 in Hg@ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole)
Absorptive Properties -	

Pollutant Emitted ***Chromium (hexavalent)***	Chemical Abstract Services (CAS) Number ***1333-82-0***
Proposed Emission Rate (lb/hr) ***$3.50x10^{-6}$***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***$1.61x10^{-4}$***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @77°F***
Solubility ***1,660 g/L in water @ 77°F***	Molecular Weight (lb/lb-mole) ***51.99***
Absorptive Properties -	

Pollutant Emitted ***Chromium***	Chemical Abstract Services (CAS) Number ***7440-47-3***
Proposed Emission Rate (lb/hr) ***1.75x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***8.06x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***51.99***
Absorptive Properties -	

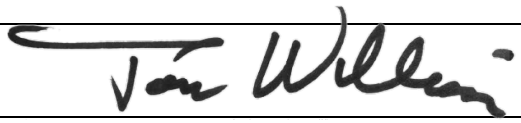
Pollutant Emitted ***Cobalt***	Chemical Abstract Services (CAS) Number ***7440-48-4***
Proposed Emission Rate (lb/hr) ***1.03x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***4.17x10^{-5}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***58.93***
Absorptive Properties -	

Pollutant Emitted ***Manganese***	Chemical Abstract Services (CAS) Number
Proposed Emission Rate (lb/hr) ***4.63x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***2.02x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77 °F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***54.94***
Absorptive Properties -	

Pollutant Emitted ***Mercury***	Chemical Abstract Services (CAS) Number ***7439-97-6***
Proposed Emission Rate (lb/hr) ***3.13x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***3.73x10^{-5}***	Vapor Pressure (in. Hg @ °F) ***7.85x10^{-5} in Hg @ 77 °F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***200.59***
Absorptive Properties -	

Pollutant Emitted ***Nickel***	Chemical Abstract Services (CAS) Number ***7044-02-0***
Proposed Emission Rate (lb/hr) ***2.63x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***1.07x10^{-3}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg Q 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***58.69***
Absorptive Properties -	

Pollutant Emitted ***Selenium***	Chemical Abstract Services (CAS) Number ***7782-49-2***
Proposed Emission Rate (lb/hr) ***1.10x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***3.34x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0.29 in Hg @ 807***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***78.96***
Absorptive Properties -	

Signature of Applicant 	Date 09/26/2016

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of
Health Division of Air Quality
918 E Divide Ave., 2nd Floor
Bismarck, ND 58501-1947
(701) 328-5188

PERMIT APPLICATION FOR
HAZARDOUS AIR POLLUTANT (HAP) SOURCES

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8329 (09-12)

SECTION A1 - APPLICANT INFORMATION

Name of Firm or Organization ***Meridian Energy Group - Davis Refinery***		
Applicant's Name ***Tom Williams***		
Title ***VP of Planning &Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***

SECTION A2 - FACILITY INFORMATION

Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number ***(409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***
Facility Address (Street & No. or Lat/Long to Nearest Second) ***37th Street / 46°52'45"N/103°14'55" W***		
City ***Belfield***	State ***ND***	ZIP Code ***58622***
County ***Billings***	Number of Employees at Location ***TBD***	
Land Area at Plant Site ***261*** Acres (or) Sq. Ft.	MSL Elevation at Plant ***2,685 feet***	

Describe Nature of Business/Process

Petroleum Refining / Utility Boiler 1

SECTION B – STACK DATA

Inside Diameter (ft) ***3.0***	Height Above Grade (ft) ***100***	
Gas Temperature at Exit (°F) ***294.2***	Gas Velocity at Exit (ft/sec) ***93.9***	Gas Volume (scfm) ***19,914.79***
Basis of any Estimates (attach separate sheet if necessary) ***Engineering data and Emission factors from Table 1.4-2. AP 42, Chapter 1: External Combustion Sources. See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"***		
Are Emission Control Devices in Place? If YES – Complete SFN 8532		Yes ☐ No ☒
Nearest Residences or Building ***Utility building***	Distance (ft) ***0 ft***	Direction ***N/A***
Nearest Property Line ***Fenceline***	Distance (ft) ***451 ft***	Direction ***East***

SECTION C – EMISSION STREAM DATA

Source ID No. From SFN 8516 ***202-PK-0201A***	Mean Particle Diameter (μm) ***TBD***
Flow Rate (scfm) ***19,914.79***	Drift Velocity (ft/sec) ***93.9***
Stream Temperature (°F) ***294.2***	Particulate Concentration (gr/dscf) ***TBD***
Moisture Content (%) ***TBD***	Halogens or Metals Present? ***Metals***
Pressure (in. Hg) ***TBD***	Organic Content (ppmv) $***3.38 \times 10^{-1}***$
Heat Content (Btu/scfm) ***TBD***	O_2 Content (%) ***N/A***

SECTION D – POLLUTANT SPECIFIC DATA (Complete One Box for Each Pollutant in Emission Stream)

Pollutant Emitted ***Acetaldehyde***	Chemical Abstract Services (CAS) Number ***75-07-0***
Proposed Emission Rate (lb/hr) $***1.80 \times 10^{-4}***$	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic Vapor***
Concentration in Emission Stream (ppmv) $***1.88 \times 10^{-3}***$	Vapor Pressure (in. Hg @ °F) ***35.51 in Hg @ 68°C***
Solubility $***1 \times 10^{+6}$ mg/L in water @ 77°F***	Molecular Weight (lb/lb-mole) ***44.05***
Absorptive Properties -	

Pollutant Emitted ***Benzene***	Chemical Abstract Services (CAS) Number ***71-43-2***
Proposed Emission Rate (lb/hr) $***3.15 \times 10^{-5}***$	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) $***1.86 \times 10^{-4}***$	Vapor Pressure (in. Hg @ °F) ***3.73 in Hg @ 77 °F***
Solubility $***In water 1.79 \times 10^{3}$ mg/L @ 77 °F***	Molecular Weight (lb/lb-mole) ***78.11***
Absorptive Properties -	

Pollutant Emitted ***Dichlorobenzene***	Chemical Abstract Services (CAS) Number ***Varies***
Proposed Emission Rate (lb/hr) $***1.80 \times 10^{-5}***$	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) $***5.65 \times 10^{-5}***$	Vapor Pressure (in. Hg @ °F) ***Varies***
Solubility ***Varies***	Molecular Weight (lb/lb-mole) ***147.00***
Absorptive Properties -	

Pollutant Emitted ***Ethylbenzene***	Chemical Abstract Services (CAS) Number ***100-41-4***
Proposed Emission Rate (lb/hr) ***$2.40x10^{-4}$***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***$1.04x10^{-3}$***	Vapor Pressure (in. Hg @ °F) ***0.37 in Hg @ 77°F***
Solubility ***In water 0.014 g/100mL @ 59 °F***	Molecular Weight (lb/lb-mole) ***106.17***
Absorptive Properties -	

Pollutant Emitted ***Formaldehyde***	Chemical Abstract Services (CAS) Number ***50-00-0***
Proposed Emission Rate (lb/hr) ***$1.11x10^{-3}$***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***$1.70x10^{-2}$***	Vapor Pressure (in. Hg @ °F) ***0.15 in Hg @ 77 °F***
Solubility ***In water 4.00 $x10^{5}$ mg/L @ 68°F***	Molecular Weight (lb/lb-mole) ***30.03***
Absorptive Properties -	

Pollutant Emitted ***Hexane***	Chemical Abstract Services (CAS) Number ***110-54-5***
Proposed Emission Rate (lb/hr) ***$2.70x10^{-2}$***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***$1.44x10^{-1}$***	Vapor Pressure (in. Hg @ °F) ***5.90 in Hg @ 68 °F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***86.1***
Absorptive Properties -	

Pollutant Emitted ***Naphthalene***	Chemical Abstract Services (CAS) Number ***91-20-3***
Proposed Emission Rate (lb/hr) ***$9.00x10^{-6}$***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***$3.24x10^{-5}$***	Vapor Pressure (in. Hg @ °F) ***0.003 in Hg @ 77 °F***
Solubility ***In water 31 mg/L @ 77 °F***	Molecular Weight (lb/lb-mole) ***128.17***
Absorptive Properties -	

Pollutant Emitted ***Toluene***	Chemical Abstract Services (CAS) Number ***108-88-3***
Proposed Emission Rate (lb/hr) ***4.95 x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***2.48x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***1.12 in Hg @ 77°F***
Solubility ***In water 526 mg/L @ 77°F***	Molecular Weight (lb/lb-mole) ***92.14***
Absorptive Properties -	

Pollutant Emitted ***Xylene***	Chemical Abstract Services (CAS) Number ***95-47-6***
Proposed Emission Rate (lb/hr) ***3.75x10^{-4}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***1.63x10^{-3}***	Vapor Pressure (in. Hg @ °F) ***0.26 in Hg @ 77°F***
Solubility ***In water 178 mg/L @ 77°F***	Molecular Weight (lb/lb-mole) ***106.16***
Absorptive Properties -	

Pollutant Emitted ***PAH***	Chemical Abstract Services (CAS) Number ***N/A***
Proposed Emission Rate (lb/hr) ***6.39x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***3.02x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***N/A***
Solubility ***N/A***	Molecular Weight (lb/lb-mole) ***TBD***
Absorptive Properties -	

Pollutant Emitted ***Antimony***	Chemical Abstract Services (CAS) Number ***7740-36-0***
Proposed Emission Rate (lb/hr) ***3.12x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/particulate***
Concentration in Emission Stream (ppmv) ***1.18x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***121.76***
Absorptive Properties -	

Pollutant Emitted ***Arsenic***	Chemical Abstract Services (CAS) Number ***7440-38-2***
Proposed Emission Rate (lb/hr) ***1.20x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***7.39x10^{-5}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole)
Absorptive Properties -	

Pollutant Emitted ***Beryllium***	Chemical Abstract Services (CAS) Number ***7440-41-7***
Proposed Emission Rate (lb/hr) ***7.80x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***3.99x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***9.01***
Absorptive Properties -	

Pollutant Emitted ***Cadmium***	Chemical Abstract Services (CAS) Number ***7440-43-9***
Proposed Emission Rate (lb/hr) ***6.60x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***2.71x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg@ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole)
Absorptive Properties -	

Pollutant Emitted ***Chromium (hexavalent)***	Chemical Abstract Services (CAS) Number ***1333-82-0***
Proposed Emission Rate (lb/hr) ***1.68x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***1.49x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @77°F***
Solubility ***1,660 g/L in water @ 77°F***	Molecular Weight (lb/lb-mole) ***51.99***
Absorptive Properties -	

Pollutant Emitted ***Chromium***	Chemical Abstract Services (CAS) Number ***7440-47-3***
Proposed Emission Rate (lb/hr) ***8.40x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***7.45x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***51.99***
Absorptive Properties -	

Pollutant Emitted ***Cobalt***	Chemical Abstract Services (CAS) Number ***7440-48-4***
Proposed Emission Rate (lb/hr) ***4.92x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***3.85x10^{-5}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***58.93***
Absorptive Properties -	

Pollutant Emitted ***Manganese***	Chemical Abstract Services (CAS) Number
Proposed Emission Rate (lb/hr) ***2.22x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***1.86x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77 °F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***54.94***
Absorptive Properties -	

Pollutant Emitted ***Mercury***	Chemical Abstract Services (CAS) Number ***7439-97-6***
Proposed Emission Rate (lb/hr) ***1.50x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***3.45x10^{-5}***	Vapor Pressure (in. Hg @ °F) ***7.85x10^{-5} in Hg @ 77 °F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***200.59***
Absorptive Properties -	

Pollutant Emitted ***Nickel***	Chemical Abstract Services (CAS) Number ***7044-02-0***
Proposed Emission Rate (lb/hr) ***1.26x10^{-4}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***9.90x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg Q 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***58.69***
Absorptive Properties -	

Pollutant Emitted ***Selenium***	Chemical Abstract Services (CAS) Number ***7782-49-2***
Proposed Emission Rate (lb/hr) ***5.28x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***3.08x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0.29 in Hg @ 807***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***78.96***
Absorptive Properties -	

Signature of Applicant	Date 09/26/2016

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of
Health Division of Air Quality
918 E Divide Ave., 2nd Floor
Bismarck, ND 58501-1947
(701) 328-5188

PERMIT APPLICATION FOR
HAZARDOUS AIR POLLUTANT (HAP) SOURCES

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8329 (09-12)

SECTION A1 - APPLICANT INFORMATION

Name of Firm or Organization ***Meridian Energy Group - Davis Refinery***		
Applicant's Name ***Tom Williams***		
Title ***VP of Planning &Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***

SECTION A2 - FACILITY INFORMATION

Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number ***(409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***
Facility Address (Street & No. or Lat/Long to Nearest Second) ***37th Street / 46°52'45"N/103°14'55" W***		
City ***Belfield***	State ***ND***	ZIP Code ***58622***
County ***Billings***	Number of Employees at Location ***TBD***	
Land Area at Plant Site ***261*** Acres (or) Sq. Ft.	MSL Elevation at Plant ***2,685 feet***	

Describe Nature of Business/Process

Petroleum Refining / Utility Boiler 2

SECTION B – STACK DATA

Inside Diameter (ft) ***3.0***	Height Above Grade (ft) ***100***	
Gas Temperature at Exit (°F) ***294.2***	Gas Velocity at Exit (ft/sec) ***93.9***	Gas Volume (scfm) ***19,914.79***
Basis of any Estimates (attach separate sheet if necessary) ***Engineering data and Emission factors from Table 1.4-2. AP 42, Chapter 1: External Combustion Sources. See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"***		
Are Emission Control Devices in Place? If YES – Complete SFN 8532		Yes ☐ No ☒
Nearest Residences or Building ***Utility building***	Distance (ft) ***0 ft***	Direction ***N/A***
Nearest Property Line ***Fenceline***	Distance (ft) ***415 ft***	Direction ***East***

SECTION C – EMISSION STREAM DATA

Source ID No. From SFN 8516 ***202-PK-0201B***	Mean Particle Diameter (μm) ***TBD***
Flow Rate (scfm) ***19,914.79***	Drift Velocity (ft/sec) ***93.9***
Stream Temperature (°F) ***294.2***	Particulate Concentration (gr/dscf) ***TBD***
Moisture Content (%) ***TBD***	Halogens or Metals Present? ***Metals***
Pressure (in. Hg) ***TBD***	Organic Content (ppmv) $***3.381x10^{-1}***$
Heat Content (Btu/scfm) ***TBD***	O_2 Content (%) ***N/A***

SECTION D – POLLUTANT SPECIFIC DATA (Complete One Box for Each Pollutant in Emission Stream)

Pollutant Emitted ***Acetaldehyde***	Chemical Abstract Services (CAS) Number ***75-07-0***
Proposed Emission Rate (lb/hr) $***1.80x10^{-4}***$	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic Vapor***
Concentration in Emission Stream (ppmv) $***1.88x10^{-3}***$	Vapor Pressure (in. Hg @ °F) ***35.51 in Hg @ 68°C***
Solubility $***1x10^{+6}$ mg/L in water @ 77°F***	Molecular Weight (lb/lb-mole) ***44.05***
Absorptive Properties -	

Pollutant Emitted ***Benzene***	Chemical Abstract Services (CAS) Number ***71-43-2***
Proposed Emission Rate (lb/hr) $***3.15x10^{-5}***$	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) $***1.86 x10^{-4}***$	Vapor Pressure (in. Hg @ °F) ***3.73 in Hg @ 77 °F***
Solubility $***In water 1.79x10^{3} mg/L @ 77 °F***$	Molecular Weight (lb/lb-mole) ***78.11***
Absorptive Properties -	

Pollutant Emitted ***Dichlorobenzene***	Chemical Abstract Services (CAS) Number ***Varies***
Proposed Emission Rate (lb/hr) $***1.80x10^{-5}***$	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) $***5.65x10^{-5}***$	Vapor Pressure (in. Hg @ °F) ***Varies***
Solubility ***Varies***	Molecular Weight (lb/lb-mole) ***147.00***
Absorptive Properties -	

Pollutant Emitted ***Ethylbenzene***	Chemical Abstract Services (CAS) Number ***100-41-4***
Proposed Emission Rate (lb/hr) ***$2.40x10^{-4}$***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***$1.04x10^{-3}$***	Vapor Pressure (in. Hg @ °F) ***0.37 in Hg @ 77°F***
Solubility ***In water 0.014 g/100mL @ 59 °F***	Molecular Weight (lb/lb-mole) ***106.17***
Absorptive Properties -	

Pollutant Emitted ***Formaldehyde***	Chemical Abstract Services (CAS) Number ***50-00-0***
Proposed Emission Rate (lb/hr) ***$1.11x10^{-3}$***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***$1.70x10^{-2}$***	Vapor Pressure (in. Hg @ °F) ***0.15 in Hg @ 77 °F***
Solubility ***In water 4.00 $x10^{5}$ mg/L @ 68°F***	Molecular Weight (lb/lb-mole) ***30.03***
Absorptive Properties -	

Pollutant Emitted ***Hexane***	Chemical Abstract Services (CAS) Number ***110-54-5***
Proposed Emission Rate (lb/hr) ***$2.70x10^{-2}$***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***$1.44x10^{-1}$***	Vapor Pressure (in. Hg @ °F) ***5.90 in Hg @ 68 °F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***86.1***
Absorptive Properties -	

Pollutant Emitted ***Naphthalene***	Chemical Abstract Services (CAS) Number ***91-20-3***
Proposed Emission Rate (lb/hr) ***$9.00x10^{-6}$***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***$3.24x10^{-5}$***	Vapor Pressure (in. Hg @ °F) ***0.003 in Hg @ 77 °F***
Solubility ***In water 31 mg/L @ 77 °F***	Molecular Weight (lb/lb-mole) ***128.17***
Absorptive Properties -	

Pollutant Emitted ***Toluene***	Chemical Abstract Services (CAS) Number ***108-88-3***
Proposed Emission Rate (lb/hr) ***4.95 x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***2.48x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***1.12 in Hg @ 77°F***
Solubility ***In water 526 mg/L @ 77°F***	Molecular Weight (lb/lb-mole) ***92.14***
Absorptive Properties -	

Pollutant Emitted ***Xylene***	Chemical Abstract Services (CAS) Number ***95-47-6***
Proposed Emission Rate (lb/hr) ***3.75x10^{-4}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***1.63x10^{-3}***	Vapor Pressure (in. Hg @ °F) ***0.26 in Hg @ 77°F***
Solubility ***In water 178 mg/L @ 77°F***	Molecular Weight (lb/lb-mole) ***106.16***
Absorptive Properties -	

Pollutant Emitted ***PAH***	Chemical Abstract Services (CAS) Number ***N/A***
Proposed Emission Rate (lb/hr) ***6.39x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***3.02x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***N/A***
Solubility ***N/A***	Molecular Weight (lb/lb-mole) ***TBD***
Absorptive Properties -	

Pollutant Emitted ***Antimony***	Chemical Abstract Services (CAS) Number ***7740-36-0***
Proposed Emission Rate (lb/hr) ***3.12x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/particulate***
Concentration in Emission Stream (ppmv) ***1.18x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***121.76***
Absorptive Properties -	

Pollutant Emitted ***Arsenic***	Chemical Abstract Services (CAS) Number ***7440-38-2***
Proposed Emission Rate (lb/hr) ***1.20x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***7.39x10^{-5}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole)
Absorptive Properties -	

Pollutant Emitted ***Beryllium***	Chemical Abstract Services (CAS) Number ***7440-41-7***
Proposed Emission Rate (lb/hr) ***7.80x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***3.99x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***9.01***
Absorptive Properties -	

Pollutant Emitted ***Cadmium***	Chemical Abstract Services (CAS) Number ***7440-43-9***
Proposed Emission Rate (lb/hr) ***6.60x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***2.71x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg@ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole)
Absorptive Properties -	

Pollutant Emitted ***Chromium (hexavalent)***	Chemical Abstract Services (CAS) Number ***1333-82-0***
Proposed Emission Rate (lb/hr) ***1.68x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***1.49x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @77°F***
Solubility ***1,660 g/L in water @ 77°F***	Molecular Weight (lb/lb-mole) ***51.99***
Absorptive Properties -	

Pollutant Emitted ***Chromium***	Chemical Abstract Services (CAS) Number ***7440-47-3***
Proposed Emission Rate (lb/hr) ***8.40x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***7.45x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***51.99***
Absorptive Properties -	

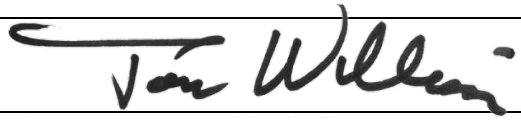
Pollutant Emitted ***Cobalt***	Chemical Abstract Services (CAS) Number ***7440-48-4***
Proposed Emission Rate (lb/hr) ***4.92x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***3.85x10^{-5}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***58.93***
Absorptive Properties -	

Pollutant Emitted ***Manganese***	Chemical Abstract Services (CAS) Number
Proposed Emission Rate (lb/hr) ***2.22x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***1.86x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77 °F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***54.94***
Absorptive Properties -	

Pollutant Emitted ***Mercury***	Chemical Abstract Services (CAS) Number ***7439-97-6***
Proposed Emission Rate (lb/hr) ***1.50x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***3.45x10^{-5}***	Vapor Pressure (in. Hg @ °F) ***7.85x10^{-5} in Hg @ 77 °F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***200.59***
Absorptive Properties -	

Pollutant Emitted ***Nickel***	Chemical Abstract Services (CAS) Number ***7044-02-0***
Proposed Emission Rate (lb/hr) ***1.26x10^{-4}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***9.90x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg Q 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***58.69***
Absorptive Properties -	

Pollutant Emitted ***Selenium***	Chemical Abstract Services (CAS) Number ***7782-49-2***
Proposed Emission Rate (lb/hr) ***5.28x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***3.08x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0.29 in Hg @ 807***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***78.96***
Absorptive Properties -	

Signature of Applicant 	Date 09/26/2016

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of
Health Division of Air Quality
918 E Divide Ave., 2nd Floor
Bismarck, ND 58501-1947
(701) 328-5188

PERMIT APPLICATION FOR
HAZARDOUS AIR POLLUTANT (HAP) SOURCES

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8329 (09-12)

SECTION A1 - APPLICANT INFORMATION

Name of Firm or Organization ***Meridian Energy Group - Davis Refinery***		
Applicant's Name ***Tom Williams***		
Title ***VP of Planning &Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***

SECTION A2 - FACILITY INFORMATION

Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number ***(409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***
Facility Address (Street & No. or Lat/Long to Nearest Second) ***37th Street / 46°52'45"N/103°14'55" W***		
City ***Belfield***	State ***ND***	ZIP Code ***58622***
County ***Billings***	Number of Employees at Location ***TBD***	
Land Area at Plant Site ***261*** Acres (or) Sq. Ft.	MSL Elevation at Plant ***2,685 feet***	

Describe Nature of Business/Process

Petroleum Refining / Utility Boiler 3

SECTION B – STACK DATA

Inside Diameter (ft) ***3.0***	Height Above Grade (ft) ***100***	
Gas Temperature at Exit (°F) ***294.2***	Gas Velocity at Exit (ft/sec) ***93.9***	Gas Volume (scfm) ***19,914.80***
Basis of any Estimates (attach separate sheet if necessary) ***Engineering data and Emission factors from Table 1.4-2. AP 42, Chapter 1: External Combustion Sources. See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"***		
Are Emission Control Devices in Place? If YES – Complete SFN 8532		Yes ☐ No ☒
Nearest Residences or Building ***Utility building***	Distance (ft) ***0 ft***	Direction ***N/A***
Nearest Property Line ***Fenceline***	Distance (ft) ***379 ft***	Direction ***East***

SECTION C – EMISSION STREAM DATA

Source ID No. From SFN 8516 ***202-PK-0201C***	Mean Particle Diameter (μm) ***TBD***
Flow Rate (scfm) ***19,914.80***	Drift Velocity (ft/sec) ***93.9***
Stream Temperature (°F) ***294.2***	Particulate Concentration (gr/dscf) ***TBD***
Moisture Content (%) ***TBD***	Halogens or Metals Present? ***Metals***
Pressure (in. Hg) ***TBD***	Organic Content (ppmv) $***2.81x10^{-2}***$
Heat Content (Btu/scfm) ***TBD***	O_2 Content (%) ***N/A***

SECTION D – POLLUTANT SPECIFIC DATA (Complete One Box for Each Pollutant in Emission Stream)

Pollutant Emitted ***Acetaldehyde***	Chemical Abstract Services (CAS) Number ***75-07-0***
Proposed Emission Rate (lb/hr) $***1.50x10^{-5}***$	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic Vapor***
Concentration in Emission Stream (ppmv) $***1.57x10^{-4}***$	Vapor Pressure (in. Hg @ °F) ***35.51 in Hg @ 68°C***
Solubility $***1x10^{+6}$ mg/L in water @ 77°F***	Molecular Weight (lb/lb-mole) ***44.05***
Absorptive Properties -	

Pollutant Emitted ***Benzene***	Chemical Abstract Services (CAS) Number ***71-43-2***
Proposed Emission Rate (lb/hr) $***2.63x10^{-6}***$	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) $***1.55x10^{-5}***$	Vapor Pressure (in. Hg @ °F) ***3.73 in Hg @ 77 °F***
Solubility $***In water 1.79x10^{3}$ mg/L @ 77 °F***	Molecular Weight (lb/lb-mole) ***78.11***
Absorptive Properties -	

Pollutant Emitted ***Dichlorobenzene***	Chemical Abstract Services (CAS) Number ***Varies***
Proposed Emission Rate (lb/hr) $***1.50x10^{-6}***$	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) $***4.71x10^{-6}***$	Vapor Pressure (in. Hg @ °F) ***Varies***
Solubility ***Varies***	Molecular Weight (lb/lb-mole) ***147.00***
Absorptive Properties -	

Pollutant Emitted ***Ethylbenzene***	Chemical Abstract Services (CAS) Number ***100-41-4***
Proposed Emission Rate (lb/hr) ***2.00x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***8.89x10^{-5}***	Vapor Pressure (in. Hg @ °F) ***0.37 in Hg @ 77°F***
Solubility ***In water 0.014 g/100mL @ 59 °F***	Molecular Weight (lb/lb-mole) ***106.17***
Absorptive Properties -	

Pollutant Emitted ***Formaldehyde***	Chemical Abstract Services (CAS) Number ***50-00-0***
Proposed Emission Rate (lb/hr) ***9.25x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***1.42x10^{-3}***	Vapor Pressure (in. Hg @ °F) ***0.15 in Hg @ 77 °F***
Solubility ***In water 4.00 x10^{5} mg/L @ 68°F***	Molecular Weight (lb/lb-mole) ***30.03***
Absorptive Properties -	

Pollutant Emitted ***Hexane***	Chemical Abstract Services (CAS) Number ***110-54-5***
Proposed Emission Rate (lb/hr) ***2.25x10^{-3}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***1.20x10^{-2}***	Vapor Pressure (in. Hg @ °F) ***5.90 in Hg @ 68 °F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***86.1***
Absorptive Properties -	

Pollutant Emitted ***Naphthalene***	Chemical Abstract Services (CAS) Number ***91-20-3***
Proposed Emission Rate (lb/hr) ***7.50x10^{-7}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***2.70x10^{-6}***	Vapor Pressure (in. Hg @ °F) ***0.003 in Hg @ 77 °F***
Solubility ***In water 31 mg/L @ 77 °F***	Molecular Weight (lb/lb-mole) ***128.17***
Absorptive Properties -	

Pollutant Emitted ***Toluene***	Chemical Abstract Services (CAS) Number ***108-88-3***
Proposed Emission Rate (lb/hr) ***4.13 x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***2.06x10^{-5}***	Vapor Pressure (in. Hg @ °F) ***1.12 in Hg @ 77°F***
Solubility ***In water 526 mg/L @ 77°F***	Molecular Weight (lb/lb-mole) ***92.14***
Absorptive Properties -	

Pollutant Emitted ***Xylene***	Chemical Abstract Services (CAS) Number ***95-47-6***
Proposed Emission Rate (lb/hr) ***3.13x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***1.36x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0.26 in Hg @ 77°F***
Solubility ***In water 178 mg/L @ 77°F***	Molecular Weight (lb/lb-mole) ***106.16***
Absorptive Properties -	

Pollutant Emitted ***PAH***	Chemical Abstract Services (CAS) Number ***N/A***
Proposed Emission Rate (lb/hr) ***5.32x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***2.52x10^{-5}***	Vapor Pressure (in. Hg @ °F) ***N/A***
Solubility ***N/A***	Molecular Weight (lb/lb-mole) ***TBD***
Absorptive Properties -	

Pollutant Emitted ***Antimony***	Chemical Abstract Services (CAS) Number ***7740-36-0***
Proposed Emission Rate (lb/hr) ***2.60x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/particulate***
Concentration in Emission Stream (ppmv) ***9.85x10^{-6}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***121.76***
Absorptive Properties -	

Pollutant Emitted ***Arsenic***	Chemical Abstract Services (CAS) Number ***7440-38-2***
Proposed Emission Rate (lb/hr) ***1.00x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***6.15x10^{-6}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole)
Absorptive Properties -	

Pollutant Emitted ***Beryllium***	Chemical Abstract Services (CAS) Number ***7440-41-7***
Proposed Emission Rate (lb/hr) ***6.50x10^{-7}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***3.33x10^{-5}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***9.01***
Absorptive Properties -	

Pollutant Emitted ***Cadmium***	Chemical Abstract Services (CAS) Number ***7440-43-9***
Proposed Emission Rate (lb/hr) ***5.50x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***2.26x10^{-5}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg@ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole)
Absorptive Properties -	

Pollutant Emitted ***Chromium (hexavalent)***	Chemical Abstract Services (CAS) Number ***1333-82-0***
Proposed Emission Rate (lb/hr) ***1.40x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***1.24x10^{-5}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @77°F***
Solubility ***1,660 g/L in water @ 77°F***	Molecular Weight (lb/lb-mole) ***51.99***
Absorptive Properties -	

Pollutant Emitted ***Chromium***	Chemical Abstract Services (CAS) Number ***7440-47-3***
Proposed Emission Rate (lb/hr) ***7.00x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***6.21x10^{-5}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***51.99***
Absorptive Properties -	

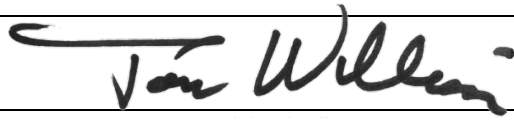
Pollutant Emitted ***Cobalt***	Chemical Abstract Services (CAS) Number ***7440-48-4***
Proposed Emission Rate (lb/hr) ***4.10x10^{-7}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***3.21x10^{-6}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***58.93***
Absorptive Properties -	

Pollutant Emitted ***Manganese***	Chemical Abstract Services (CAS) Number
Proposed Emission Rate (lb/hr) ***1.85x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***1.55x10^{-5}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77 °F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***54.94***
Absorptive Properties -	

Pollutant Emitted ***Mercury***	Chemical Abstract Services (CAS) Number ***7439-97-6***
Proposed Emission Rate (lb/hr) ***1.25x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***2.87x10^{-6}***	Vapor Pressure (in. Hg @ °F) ***7.85x10^{-5} in Hg @ 77 °F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***200.59***
Absorptive Properties -	

Pollutant Emitted ***Nickel***	Chemical Abstract Services (CAS) Number ***7044-02-0***
Proposed Emission Rate (lb/hr) ***1.05x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***8.25x10^{-5}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg Q 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***58.69***
Absorptive Properties -	

Pollutant Emitted ***Selenium***	Chemical Abstract Services (CAS) Number ***7782-49-2***
Proposed Emission Rate (lb/hr) ***4.40x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***2.57x10^{-5}***	Vapor Pressure (in. Hg @ °F) ***0.29 in Hg @ 807***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***78.96***
Absorptive Properties -	

Signature of Applicant 	Date 09/26/2016

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PERMIT APPLICATION FOR
HAZARDOUS AIR POLLUTANT (HAP) SOURCES

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8329 (09-12)

SECTION A1 - APPLICANT INFORMATION

Name of Firm or Organization ***Meridian Energy Group - Davis Refinery***		
Applicant's Name ***Tom Williams***		
Title ***VP of Planning &Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***

SECTION A2 - FACILITY INFORMATION

Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number ***(409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***
Facility Address (Street & No. or Lat/Long to Nearest Second) ***37th Street / 46°52'45"N/103°14'55" W***		
City ***Belfield***	State ***ND***	ZIP Code ***58622***
County ***Billings***	Number of Employees at Location ***TBD***	
Land Area at Plant Site ***261*** Acres (or) Sq. Ft.	MSL Elevation at Plant ***2,685 feet***	

Describe Nature of Business/Process

Petroleum Refining / Catalytic Reforming Unit / 107-H-0701

SECTION B – STACK DATA

Inside Diameter (ft) ***6.0***	Height Above Grade (ft) ***42.0***	
Gas Temperature at Exit (°F) ***787.7***	Gas Velocity at Exit (ft/sec) ***27.2***	Gas Volume (scfm) ***19,541.61***
Basis of any Estimates (attach separate sheet if necessary) ***Engineering Calculation Notes and emission factors from Table 5-6 of the Emissions Estimation Protocol for Petroleum Refineries. See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"***		
Are Emission Control Devices in Place? If YES – Complete SFN 8532	Yes ☐	No ☒
Nearest Residences or Building ***Utility building***	Distance (ft) ***268.4 ft***	Direction ***South***
Nearest Property Line ***Fenceline***	Distance (ft) ***810 ft***	Direction ***Southeast***

SECTION C – EMISSION STREAM DATA

Source ID No. From SFN 8516 ***107-H-0701***	Mean Particle Diameter (μm) ***TBD***
Flow Rate (scfm) ***19,541.61***	Drift Velocity (ft/sec) ***27.2***
Stream Temperature (°F) ***787.7***	Particulate Concentration (gr/dscf) ***TBD***
Moisture Content (%) ***N/A***	Halogens or Metals Present? ***N/A***
Pressure (in. Hg) ***TBD***	Organic Content (ppmv) ***2.67×10^{-8}***
Heat Content (Btu/scfm) ***TBD***	O_2 Content (%) ***N/A***

SECTION D – POLLUTANT SPECIFIC DATA (Complete One Box for Each Pollutant in Emission Stream)

Pollutant Emitted ***Benzene***	Chemical Abstract Services (CAS) Number ***71-43-2***
Proposed Emission Rate (lb/hr) ***1.46×10^{-3}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic/Vapor***
Concentration in Emission Stream (ppmv) ***6.17×10^{-3}***	Vapor Pressure (in. Hg @ °F) ***3.73 in Hg @ 77 °F***
Solubility ***In water 1.79×10^{3} mg/L @ 77 °F***	Molecular Weight (lb/lb-mole) ***78.11***
Absorptive Properties -	

Pollutant Emitted ***Naphthalene***	Chemical Abstract Services (CAS) Number ***91-20-3***
Proposed Emission Rate (lb/hr) ***1.28×10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic/Vapor***
Concentration in Emission Stream (ppmv) ***3.29×10^{-5}***	Vapor Pressure (in. Hg @ °F) ***0.003 in Hg @ 77 °F***
Solubility ***In water 31 mg/L @ 77 °F***	Molecular Weight (lb/lb-mole) ***128.17***
Absorptive Properties -	

Pollutant Emitted ***Toluene***	Chemical Abstract Services (CAS) Number ***108-88-3***
Proposed Emission Rate (lb/hr) ***3.50×10^{-3}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic/Vapor***
Concentration in Emission Stream (ppmv) ***1.26×10^{-2}***	Vapor Pressure (in. Hg @ °F) ***1.11 in Hg @ 77 °F***
Solubility ***In water 526 mg/L @ 77 °F***	Molecular Weight (lb/lb-mole) ***92.14***
Absorptive Properties -	

Pollutant Emitted ***Xylene***	Chemical Abstract Services (CAS) Number ***95-47-6***
Proposed Emission Rate (lb/hr) ***2.56x10^{-3}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic/Vapor***
Concentration in Emission Stream (ppmv) ***7.94 x 10^{-3}***	Vapor Pressure (in. Hg @ °F) ***0.26 in Hg @ 77°F***
Solubility ***In water 178 mg/L @ 77°F***	Molecular Weight (lb/lb-mole) ***106.16***
Absorptive Properties -	

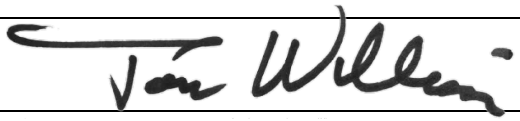
Pollutant Emitted ***Poly Aromatic Hydrocarbons (PAH)***	Chemical Abstract Services (CAS) Number ***N/A***
Proposed Emission Rate (lb/hr) ***8.78 x10^{-7}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic/Vapor***
Concentration in Emission Stream (ppmv) ***1.85 x 10^{-6}***	Vapor Pressure (in. Hg @ °F) ***TBD***
Solubility ***TBD***	Molecular Weight (lb/lb-mole) ***TBD***
Absorptive Properties -	

Pollutant Emitted ***Hydrogen Chloride***	Chemical Abstract Services (CAS) Number ***7647-01-0***
Proposed Emission Rate (lb/hr) ***1.53***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/ Vapor***
Concentration in Emission Stream (ppmv) ***1.39 x 10^{+1}***	Vapor Pressure (in. Hg @ °F) ***1.39 in Hg @ 77 °F***
Solubility ***67.3 g/100 mL of water @ 86 °F***	Molecular Weight (lb/lb-mole) ***36.46***
Absorptive Properties -	

Pollutant Emitted ***Chlorine***	Chemical Abstract Services (CAS) Number ***7782-50-5***
Proposed Emission Rate (lb/hr) ***0.08***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/ Vapor***
Concentration in Emission Stream (ppmv) ***3.91x10^{-1}***	Vapor Pressure (in. Hg @ °F) ***229.52 in Hg @ 77°F***
Solubility ***6.30 mg/L @ 77°F***	Molecular Weight (lb/lb-mole) ***70.91***
Absorptive Properties -	

Pollutant Emitted ***Dioxin Toxic Equivalents (TEQ)b***	Chemical Abstract Services (CAS) Number ***N/A***
Proposed Emission Rate (lb/hr) ***2.08 x10^{-9}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic/ Vapor***
Concentration in Emission Stream (ppmv) ***N/A***	Vapor Pressure (in. Hg @ °F) ***TBD***
Solubility ***TBD***	Molecular Weight (lb/lb-mole) ***TBD***
Absorptive Properties -	

Pollutant Emitted ***Total Polychlorinated biphenyls (PCB)***	Chemical Abstract Services (CAS) Number ***1336-36-3***
Proposed Emission Rate (lb/hr) ***9.49 x10^{-7}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic/ Vapor***
Concentration in Emission Stream (ppmv) ***N/A***	Vapor Pressure (in. Hg @ °F) ***TBD***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***291.98***
Absorptive Properties -	

Signature of Applicant 	Date 09/26/2016

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of Health
Division of Air Quality
918 E Divide Ave., 2nd Floor
Bismarck, ND 58501-1947
(701) 328-5188

PERMIT APPLICATION FOR
HAZARDOUS AIR POLLUTANT (HAP) SOURCES

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8329 (09-12)

SECTION A1 - APPLICANT INFORMATION

Name of Firm or Organization ***Meridian Energy Group - Davis Refinery***		
Applicant's Name ***Tom Williams***		
Title ***VP of Planning &Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***

SECTION A2 - FACILITY INFORMATION

Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number ***(409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***
Facility Address (Street & No. or Lat/Long to Nearest Second) ***37th Street / 46°52'45"N/103°14'55" W***		
City ***Belfield***	State ***ND***	ZIP Code ***58622***
County ***Billings***	Number of Employees at Location ***TBD***	
Land Area at Plant Site ***261*** Acres (or) Sq. Ft.	MSL Elevation at Plant ***2,685 feet***	

Describe Nature of Business/Process

Petroleum Refining / Catalytic Reforming Unit / 106-H-0601

SECTION B – STACK DATA

Inside Diameter (ft) ***4.0***	Height Above Grade (ft) ***42.0***	
Gas Temperature at Exit (°F) ***786.2***	Gas Velocity at Exit (ft/sec) ***27.5***	Gas Volume (scfm) ***8,796.80***
Basis of any Estimates (attach separate sheet if necessary) ***Engineering Calculation Notes and emission factors from Table 5-6 of the Emissions Estimation Protocol for Petroleum Refineries. See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"***		
Are Emission Control Devices in Place? If YES – Complete SFN 8532		Yes ☐ No ☒
Nearest Residences or Building ***Utility building***	Distance (ft) ***228 ft***	Direction ***South***
Nearest Property Line ***Fenceline***	Distance (ft) ***657 ft***	Direction ***Southeast***

SECTION C – EMISSION STREAM DATA

Source ID No. From SFN 8516 ***106-H-0601***	Mean Particle Diameter (μm) ***TBD***
Flow Rate (scfm) ***8,796.80***	Drift Velocity (ft/sec) ***27.5***
Stream Temperature (°F) ***786.2***	Particulate Concentration (gr/dscf) ***TBD***
Moisture Content (%) ***N/A***	Halogens or Metals Present? ***N/A***
Pressure (in. Hg) ***TBD***	Organic Content (ppmv) ***2.67×10^{-8}***
Heat Content (Btu/scfm) ***TBD***	O_2 Content (%) ***N/A***

SECTION D – POLLUTANT SPECIFIC DATA (Complete One Box for Each Pollutant in Emission Stream)

Pollutant Emitted ***Benzene***	Chemical Abstract Services (CAS) Number ***71-43-2***
Proposed Emission Rate (lb/hr) ***6.60×10^{-4}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic/Vapor***
Concentration in Emission Stream (ppmv) ***6.17×10^{-3}***	Vapor Pressure (in. Hg @ °F) ***3.73 in Hg @ 77 °F***
Solubility ***In water 1.79×10^{3} mg/L @ 77 °F***	Molecular Weight (lb/lb-mole) ***78.11***
Absorptive Properties -	

Pollutant Emitted ***Naphthalene***	Chemical Abstract Services (CAS) Number ***91-20-3***
Proposed Emission Rate (lb/hr) ***5.78×10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic/Vapor***
Concentration in Emission Stream (ppmv) ***3.29×10^{-5}***	Vapor Pressure (in. Hg @ °F) ***0.003 in Hg @ 77 °F***
Solubility ***In water 31 mg/L @ 77 °F***	Molecular Weight (lb/lb-mole) ***128.17***
Absorptive Properties -	

Pollutant Emitted ***Toluene***	Chemical Abstract Services (CAS) Number ***108-88-3***
Proposed Emission Rate (lb/hr) ***1.58×10^{-3}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic/Vapor***
Concentration in Emission Stream (ppmv) ***1.26×10^{-2}***	Vapor Pressure (in. Hg @ °F) ***1.11 in Hg @ 77 °F***
Solubility ***In water 526 mg/L @ 77 °F***	Molecular Weight (lb/lb-mole) ***92.14***
Absorptive Properties -	

Pollutant Emitted ***Xylene***	Chemical Abstract Services (CAS) Number ***95-47-6***
Proposed Emission Rate (lb/hr) ***1.16x10^{-3}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic/Vapor***
Concentration in Emission Stream (ppmv) ***7.95 x 10^{-3}***	Vapor Pressure (in. Hg @ °F) ***0.26 in Hg @ 77°F***
Solubility ***In water 178 mg/L @ 77°F***	Molecular Weight (lb/lb-mole) ***106.16***
Absorptive Properties -	

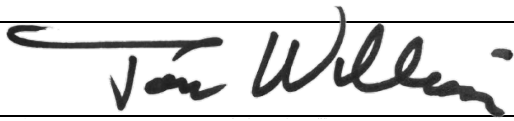
Pollutant Emitted ***Poly Aromatic Hydrocarbons (PAH)***	Chemical Abstract Services (CAS) Number ***N/A***
Proposed Emission Rate (lb/hr) ***3.97 x10^{-7}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic/Vapor***
Concentration in Emission Stream (ppmv) ***1.85 x 10^{-6}***	Vapor Pressure (in. Hg @ °F) ***TBD***
Solubility ***TBD***	Molecular Weight (lb/lb-mole) ***TBD***
Absorptive Properties -	

Pollutant Emitted ***Hydrogen Chloride***	Chemical Abstract Services (CAS) Number ***7647-01-0***
Proposed Emission Rate (lb/hr) ***0.69***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/ Vapor***
Concentration in Emission Stream (ppmv) ***1.39 x 10^{+1}***	Vapor Pressure (in. Hg @ °F) ***1.39 in Hg @ 77 °F***
Solubility ***67.3 g/100 mL of water @ 86 °F***	Molecular Weight (lb/lb-mole) ***36.46***
Absorptive Properties -	

Pollutant Emitted ***Chlorine***	Chemical Abstract Services (CAS) Number ***7782-50-5***
Proposed Emission Rate (lb/hr) ***0.04***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/ Vapor***
Concentration in Emission Stream (ppmv) ***3.91x10^{-1}***	Vapor Pressure (in. Hg @ °F) ***229.52 in Hg @ 77°F***
Solubility ***6.30 mg/L @ 77°F***	Molecular Weight (lb/lb-mole) ***70.91***
Absorptive Properties -	

Pollutant Emitted ***Dioxin Toxic Equivalents (TEQ)b***	Chemical Abstract Services (CAS) Number ***N/A***
Proposed Emission Rate (lb/hr) ***9.41 x10^{-10}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic/ Vapor***
Concentration in Emission Stream (ppmv) ***N/A***	Vapor Pressure (in. Hg @ °F) ***TBD***
Solubility ***TBD***	Molecular Weight (lb/lb-mole) ***TBD***
Absorptive Properties -	

Pollutant Emitted ***Total Polychlorinated biphenyls (PCB)***	Chemical Abstract Services (CAS) Number ***1336-36-3***
Proposed Emission Rate (lb/hr) ***4.29 x10^{-7}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic/ Vapor***
Concentration in Emission Stream (ppmv) ***N/A***	Vapor Pressure (in. Hg @ °F) ***TBD***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***291.98***
Absorptive Properties -	

Signature of Applicant		Date 09/26/2016

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Name of Firm or Organization ***Meridian Energy Group - Davis Refinery***		
Applicant's Name ***Tom Williams***		
Title ***VP of Planning &Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***

SECTION A2 - FACILITY INFORMATION

Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number ***(409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***
Facility Address (Street & No. or Lat/Long to Nearest Second) ***37th Street / 46°52'45"N/103°14'55" W***		
City ***Belfield***	State ***ND***	ZIP Code ***58622***
County ***Billings***	Number of Employees at Location ***TBD***	
Land Area at Plant Site ***261*** Acres (or) Sq. Ft.	MSL Elevation at Plant ***2,685 feet***	

Describe Nature of Business/Process

Petroleum Refining / Firewater Diesel Pump

SECTION B – STACK DATA

Inside Diameter (ft) ***TBD***	Height Above Grade (ft) ***TBD***	
Gas Temperature at Exit (°F) ***TBD***	Gas Velocity at Exit (ft/sec) ***TBD***	Gas Volume (scfm) ***TBD***
Basis of any Estimates (attach separate sheet if necessary) ***Emission factors From AP-42 Chapter 3 Section 3.4. Large Stationary Diesel And All Stationary Dual-fuel Engines. See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"***		
Are Emission Control Devices in Place? If YES – Complete SFN 8532		Yes ☐ No ☒
Nearest Residences or Building ***Administrative building***	Distance (ft) ***336 ft***	Direction ***South***
Nearest Property Line ***Fenceline***	Distance (ft) ***494 ft***	Direction ***East***

SECTION C – EMISSION STREAM DATA

Source ID No. From SFN 8516 ***212-P-1201 A/B/C***	Mean Particle Diameter (μm) ***TBD***
Flow Rate (scfm) ***TBD***	Drift Velocity (ft/sec) ***TBD***
Stream Temperature (°F) ***TBD***	Particulate Concentration (gr/dscf) ***TBD***
Moisture Content (%) ***TBD***	Halogens or Metals Present? ***N/A***
Pressure (in. Hg) ***TBD***	Organic Content (ppmv) ***TBD***
Heat Content (Btu/scfm) ***TBD***	O_2 Content (%) ***N/A***

SECTION D – POLLUTANT SPECIFIC DATA (Complete One Box for Each Pollutant in Emission Stream)

Pollutant Emitted ***Acetaldehyde***	Chemical Abstract Services (CAS) Number ***75-07-0***
Proposed Emission Rate (lb/hr) ***$3.45x10^{-4}$***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic Vapor***
Concentration in Emission Stream (ppmv) ***TBD***	Vapor Pressure (in. Hg @ °F) ***35.51 in Hg @ 68°C***
Solubility ***$1x10^{+6}$ mg/L in water @ 77°F***	Molecular Weight (lb/lb-mole) ***44.05***
Absorptive Properties -	

Pollutant Emitted ***Acrolein***	Chemical Abstract Services (CAS) Number ***107-02-8***
Proposed Emission Rate (lb/hr) ***$1.08x10^{-4}$***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***TBD***	Vapor Pressure (in. Hg @ °F) ***10.79 in Hg @ 77 °F***
Solubility ***In water 2.12 x 10^{5} mg/L @ 77°F***	Molecular Weight (lb/lb-mole) ***56.06***
Absorptive Properties -	

Pollutant Emitted ***Benzene***	Chemical Abstract Services (CAS) Number ***71-43-2***
Proposed Emission Rate (lb/hr) ***$1.06x10^{-2}$***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***TBD***	Vapor Pressure (in. Hg @ °F) ***3.73 in Hg @ 77 °F***
Solubility ***In water $1.79x10^{3}$ mg/L @ 77 °F***	Molecular Weight (lb/lb-mole) ***78.11***
Absorptive Properties -	

Pollutant Emitted ***Formaldehyde***	Chemical Abstract Services (CAS) Number ***50-00-0***
Proposed Emission Rate (lb/hr) ***1.08x10^{-3}***	Emission Source (describe) ***Processo Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***TBD***	Vapor Pressure (in. Hg @ °F) ***0.15 in Hg @ 77 °F***
Solubility ***In water 4.00 x10^{5} mg/L @ 68°F***	Molecular Weight (lb/lb-mole) ***30.03***
Absorptive Properties -	

Pollutant Emitted ***Naphthalene***	Chemical Abstract Services (CAS) Number ***91-20-3***
Proposed Emission Rate (lb/hr) ***1.78x10^{-3}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***TBD***	Vapor Pressure (in. Hg @ °F) ***0.003 in Hg @ 77 °F***
Solubility ***In water 31 mg/L @ 77 °F***	Molecular Weight (lb/lb-mole) ***128.17***
Absorptive Properties -	

Pollutant Emitted ***Propylene***	Chemical Abstract Services (CAS) Number ***115-07-1***
Proposed Emission Rate (lb/hr) ***3.82x10^{-2}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***TBD***	Vapor Pressure (in. Hg @ °F) ***342.12 in Hg @ 77 °F***
Solubility ***In water 200 mg/L @ 77°F***	Molecular Weight (lb/lb-mole) ***42.08***
Absorptive Properties -	

Pollutant Emitted ***Toluene***	Chemical Abstract Services (CAS) Number ***108-88-3***
Proposed Emission Rate (lb/hr) ***3.85x10^{-3}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***TBD***	Vapor Pressure (in. Hg @ °F) ***1.12 in Hg @ 77°F***
Solubility ***In water 526 mg/L @ 77°F***	Molecular Weight (lb/lb-mole) ***92.14***
Absorptive Properties -	

Pollutant Emitted ***Xylene***	Chemical Abstract Services (CAS) Number ***95-47-6***
Proposed Emission Rate (lb/hr) ***2.64x10^{-3}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***TBD***	Vapor Pressure (in. Hg @ °F) ***0.26 in Hg @ 77°F***
Solubility ***In water 178 mg/L @ 77°F***	Molecular Weight (lb/lb-mole) ***106.16***
Absorptive Properties -	

Pollutant Emitted ***PAH***	Chemical Abstract Services (CAS) Number ***N/A***
Proposed Emission Rate (lb/hr) ***1.12x10^{-3}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***TBD***	Vapor Pressure (in. Hg @ °F) ***N/A***
Solubility ***N/A***	Molecular Weight (lb/lb-mole) ***TBD***
Absorptive Properties -	

Signature of Applicant	Date 09/26/2016

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of
Health Division of Air Quality
918 E Divide Ave., 2nd Floor
Bismarck, ND 58501-1947
(701) 328-5188

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Applicant's Name ***Tom Williams***		
Title ***VP of Planning &Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***

SECTION A2 - FACILITY INFORMATION

Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number ***(409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***
Facility Address (Street & No. or Lat/Long to Nearest Second) ***37th Street / 46°52'45"N/103°14'55" W***		
City ***Belfield***	State ***ND***	ZIP Code ***58622***
County ***Billings***	Number of Employees at Location ***TBD***	
Land Area at Plant Site ***261*** Acres (or) Sq. Ft.	MSL Elevation at Plant ***2,685 feet***	

Describe Nature of Business/Process

Petroleum Refining / Diesel/Natural gas-fired emergency generator set

SECTION B – STACK DATA

Inside Diameter (ft) ***TBD***	Height Above Grade (ft) ***TBD***	
Gas Temperature at Exit (°F) ***TBD***	Gas Velocity at Exit (ft/sec) ***TBD***	Gas Volume (scfm) ***TBD***
Basis of any Estimates (attach separate sheet if necessary) ***Emission factors From AP-42 Chapter 3 Section 3.4. Large Stationary Diesel And All Stationary Dual-fuel Engines. See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"***		
Are Emission Control Devices in Place? If YES – Complete SFN 8532		Yes ☐ No ☒
Nearest Residences or Building ***Administrative building***	Distance (ft) ***300 ft***	Direction ***East***
Nearest Property Line ***Fenceline***	Distance (ft) ***690 ft***	Direction ***East***

SECTION C – EMISSION STREAM DATA

Source ID No. From SFN 8516 ***216-EG-1601 A/B/C***	Mean Particle Diameter (μm) ***TBD***
Flow Rate (scfm) ***TBD***	Drift Velocity (ft/sec) ***TBD***
Stream Temperature (°F) ***TBD***	Particulate Concentration (gr/dscf) ***TBD***
Moisture Content (%) ***TBD***	Halogens or Metals Present? ***N/A***
Pressure (in. Hg) ***TBD***	Organic Content (ppmv) ***TBD***
Heat Content (Btu/scfm) ***TBD***	O_2 Content (%) ***N/A***

SECTION D – POLLUTANT SPECIFIC DATA (Complete One Box for Each Pollutant in Emission Stream)

Pollutant Emitted ***Acetaldehyde***	Chemical Abstract Services (CAS) Number ***75-07-0***
Proposed Emission Rate (lb/hr) ***$4.38x10^{-3}$***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic Vapor***
Concentration in Emission Stream (ppmv) ***TBD***	Vapor Pressure (in. Hg @ °F) ***35.51 in Hg @ 68°C***
Solubility ***$1x10^{+6}$ mg/L in water @ 77°F***	Molecular Weight (lb/lb-mole) ***44.05***
Absorptive Properties -	

Pollutant Emitted ***Acrolein***	Chemical Abstract Services (CAS) Number ***107-02-8***
Proposed Emission Rate (lb/hr) ***$1.37x10^{-3}$***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***TBD***	Vapor Pressure (in. Hg @ °F) ***10.79 in Hg @ 77 °F***
Solubility ***In water 2.12 x 10^{5} mg/L @ 77°F***	Molecular Weight (lb/lb-mole) ***56.06***
Absorptive Properties -	

Pollutant Emitted ***Benzene***	Chemical Abstract Services (CAS) Number ***71-43-2***
Proposed Emission Rate (lb/hr) ***$1.35x10^{-1}$***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***TBD***	Vapor Pressure (in. Hg @ °F) ***3.73 in Hg @ 77 °F***
Solubility ***In water $1.79x10^{3}$ mg/L @ 77 °F***	Molecular Weight (lb/lb-mole) ***78.11***
Absorptive Properties -	

Pollutant Emitted ***Formaldehyde***	Chemical Abstract Services (CAS) Number ***50-00-0***
Proposed Emission Rate (lb/hr) ***1.37x10^{-2}***	Emission Source (describe) ***Processo Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***TBD***	Vapor Pressure (in. Hg @ °F) ***0.15 in Hg @ 77 °F***
Solubility ***In water 4.00 x10^{5} mg/L @ 68°F***	Molecular Weight (lb/lb-mole) ***30.03***
Absorptive Properties -	

Pollutant Emitted ***Naphthalene***	Chemical Abstract Services (CAS) Number ***91-20-3***
Proposed Emission Rate (lb/hr) ***2.26x10^{-2}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***TBD***	Vapor Pressure (in. Hg @ °F) ***0.003 in Hg @ 77 °F***
Solubility ***In water 31 mg/L @ 77 °F***	Molecular Weight (lb/lb-mole) ***128.17***
Absorptive Properties -	

Pollutant Emitted ***Propylene***	Chemical Abstract Services (CAS) Number ***115-07-1***
Proposed Emission Rate (lb/hr) ***4.85x10^{-1}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***TBD***	Vapor Pressure (in. Hg @ °F) ***342.12 in Hg @ 77 °F***
Solubility ***In water 200 mg/L @ 77°F***	Molecular Weight (lb/lb-mole) ***42.08***
Absorptive Properties -	

Pollutant Emitted ***Toluene***	Chemical Abstract Services (CAS) Number ***108-88-3***
Proposed Emission Rate (lb/hr) ***4.89 x10^{-2}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***TBD***	Vapor Pressure (in. Hg @ °F) ***1.12 in Hg @ 77°F***
Solubility ***In water 526 mg/L @ 77°F***	Molecular Weight (lb/lb-mole) ***92.14***
Absorptive Properties -	

Pollutant Emitted ***Xylene***	Chemical Abstract Services (CAS) Number ***95-47-6***
Proposed Emission Rate (lb/hr) ***$3.36x10^{-2}$***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***TBD***	Vapor Pressure (in. Hg @ °F) ***0.26 in Hg @ 77°F***
Solubility ***In water 178 mg/L @ 77°F***	Molecular Weight (lb/lb-mole) ***106.16***
Absorptive Properties -	

Pollutant Emitted ***PAH***	Chemical Abstract Services (CAS) Number ***N/A***
Proposed Emission Rate (lb/hr) ***$1.42x10^{-2}$***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***TBD***	Vapor Pressure (in. Hg @ °F) ***N/A***
Solubility ***N/A***	Molecular Weight (lb/lb-mole) ***TBD***
Absorptive Properties -	

Signature of Applicant	Date 09/26/2016

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of
Health Division of Air Quality
918 E Divide Ave., 2nd Floor
Bismarck, ND 58501-1947
(701) 328-5188

PERMIT APPLICATION FOR
HAZARDOUS AIR POLLUTANT (HAP) SOURCES

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8329 (09-12)

SECTION A1 - APPLICANT INFORMATION

Name of Firm or Organization ***Meridian Energy Group - Davis Refinery***		
Applicant's Name ***Tom Williams***		
Title ***VP of Planning &Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***

SECTION A2 - FACILITY INFORMATION

Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number ***(409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***
Facility Address (Street & No. or Lat/Long to Nearest Second) ***37th Street / 46°52'45"N/103°14'55" W***		
City ***Belfield***	State ***ND***	ZIP Code ***58622***
County ***Billings***	Number of Employees at Location ***TBD***	
Land Area at Plant Site ***261*** Acres (or) Sq. Ft.	MSL Elevation at Plant ***2,685 feet***	

Describe Nature of Business/Process

Petroleum Refining / Fluid Catalytic Cracking Unit

SECTION B – STACK DATA

Inside Diameter (ft) ***4.0***	Height Above Grade (ft) ***120***	
Gas Temperature at Exit (°F) ***480***	Gas Velocity at Exit (ft/sec) ***64.8***	Gas Volume (scfm) ***28,110***
Basis of any Estimates (attach separate sheet if necessary) ***Emission factors from Table 5-4 of the Emissions Estimation Protocol for Petroleum Refineries. Metal HAPs were calculated using the Equation 5-1 and Table 5-3. See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"***		
Are Emission Control Devices in Place? If YES – Complete SFN 8532		Yes ☒ No ☐
Nearest Residences or Building ***Utility building***	Distance (ft) ***783 ft***	Direction ***Southwest***
Nearest Property Line ***Fenceline***	Distance (ft) ***590 ft***	Direction ***South***

SECTION C – EMISSION STREAM DATA

Source ID No. From SFN 8516 ***112-VS-1201***	Mean Particle Diameter (μm) ***<10***
Flow Rate (scfm) ***28,110***	Drift Velocity (ft/sec) ***64.8***
Stream Temperature (°F) ***480***	Particulate Concentration (gr/dscf) ***TBD***
Moisture Content (%) ***TBD***	Halogens or Metals Present? ***Metals***
Pressure (in. Hg) ***TBD***	Organic Content (ppmv) ***TBD***
Heat Content (Btu/scfm) ***TBD***	O_2 Content (%) ***N/A***

SECTION D – POLLUTANT SPECIFIC DATA (Complete One Box for Each Pollutant in Emission Stream)

Pollutant Emitted ***Acetaldehyde***	Chemical Abstract Services (CAS) Number ***75-07-0***
Proposed Emission Rate (lb/hr) $***1.21x10^{-2}***$	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic Vapor***
Concentration in Emission Stream (ppmv) $***1.12 x10^{-1}***$	Vapor Pressure (in. Hg @ °F) ***35.51 in Hg @ 68°C***
Solubility $***1x10^{+6}$ mg/L in water @ 77°F***	Molecular Weight (lb/lb-mole) ***44.05***
Absorptive Properties -	

Pollutant Emitted ***Acetone***	Chemical Abstract Services (CAS) Number ***67-64-1***
Proposed Emission Rate (lb/hr) $***1.49x10^{-3}***$	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) $***1.05 x 10^{-2}***$	Vapor Pressure (in. Hg @ °F) ***9.09 in Hg @ 77°F***
Solubility ***Miscible in water***	Molecular Weight (lb/lb-mole) ***58.07***
Absorptive Properties -	

Pollutant Emitted ***Acrolein***	Chemical Abstract Services (CAS) Number ***107-02-8***
Proposed Emission Rate (lb/hr) $***6.17x10^{-4}***$	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) $***4.48 x10^{-3}***$	Vapor Pressure (in. Hg @ °F) ***10.78 in Hg @ 77 °F***
Solubility $***In water 2.12 x10^{5} mg/L @ 77 °F***$	Molecular Weight (lb/lb-mole) ***56.06***
Absorptive Properties -	

Pollutant Emitted ***Benzene***	Chemical Abstract Services (CAS) Number ***71-43-2***
Proposed Emission Rate (lb/hr) ***1.03x10^{-2}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***5.53 x 10^{-2}***	Vapor Pressure (in. Hg @ °F) ***3.73 in Hg @ 77 °F***
Solubility ***In water 1.79x10^{3} mg/L @ 77 °F***	Molecular Weight (lb/lb-mole) ***78.11***
Absorptive Properties -	

Pollutant Emitted ***Bromomethane***	Chemical Abstract Services (CAS) Number ***74-83-9***
Proposed Emission Rate (lb/hr) ***1.31x10^{-3}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***5.61 x 10^{-3}***	Vapor Pressure (in. Hg @ °F) ***63.78 in Hg @ 68°F***
Solubility ***In water 15,200 mg/L @ 77°F***	Molecular Weight (lb/lb-mole) ***94.94***
Absorptive Properties -	

Pollutant Emitted ***1,3-Butadiene***	Chemical Abstract Services (CAS) Number ***106-99-0***
Proposed Emission Rate (lb/hr) ***1.87x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***1.41 x 10^{-4}***	Vapor Pressure (in. Hg @ °F) ***72.34 in Hg @ 68°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***54.09***
Absorptive Properties -	

Pollutant Emitted ***Carbon disulfide***	Chemical Abstract Services (CAS) Number ***75-15-0***
Proposed Emission Rate (lb/hr) ***3.46x10^{-4}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic /Vapor***
Concentration in Emission Stream (ppmv) ***1.85 x 10^{-3}***	Vapor Pressure (in. Hg @ °F) ***14.4 in Hg @ 77 °F***
Solubility ***In water 2,160 mg/L @ 77°F***	Molecular Weight (lb/lb-mole) ***76.14***
Absorptive Properties -	

Pollutant Emitted ***Formaldehyde***	Chemical Abstract Services (CAS) Number ***50-00-0***
Proposed Emission Rate (lb/hr) ***1.49x10^{-1}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***2.03***	Vapor Pressure (in. Hg @ °F) ***153.15 in Hg @ 68°F***
Solubility ***Miscible in water***	Molecular Weight (lb/lb-mole) ***30.03***
Absorptive Properties -	

Pollutant Emitted ***Hexachlorodibenzofuran***	Chemical Abstract Services (CAS) Number ***N/A***
Proposed Emission Rate (lb/hr) ***5.89x10^{-10}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***6.44 x 10^{-10}***	Vapor Pressure (in. Hg @ °F) ***TBD***
Solubility ***TBD***	Molecular Weight (lb/lb-mole) ***374.86***
Absorptive Properties -	

Pollutant Emitted ***Heptacholorodibenzo-p-dioxin***	Chemical Abstract Services (CAS) Number ***19408-74-3***
Proposed Emission Rate (lb/hr) ***5.23x10^{-10}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***5.01 x 10^{-10}***	Vapor Pressure (in. Hg @ °F) ***1.91 x 10^{-12} in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***390.86***
Absorptive Properties -	

Pollutant Emitted ***Hydrogen Chloride***	Chemical Abstract Services (CAS) Number ***7647-01-0***
Proposed Emission Rate (lb/hr) ***2.06x10^{-2}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic /Vapor***
Concentration in Emission Stream (ppmv) ***2.29 x 10^{-1}***	Vapor Pressure (in. Hg @ °F) ***1.39 in Hg @ 77°F***
Solubility ***Miscible in water***	Molecular Weight (lb/lb-mole) ***36.46***
Absorptive Properties -	

Pollutant Emitted ***Hydrogen Cyanide***	Chemical Abstract Services (CAS) Number ***74-90-8***
Proposed Emission Rate (lb/hr) ***8.03x10^{-2}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic /Vapor***
Concentration in Emission Stream (ppmv) ***1.21***	Vapor Pressure (in. Hg @ °F) ***29.21 in Hg @ 77°F***
Solubility ***In water 0.014 g/100mL @ 59 °F***	Molecular Weight (lb/lb-mole) ***27.03***
Absorptive Properties -	

Pollutant Emitted ***Ethylbenzene***	Chemical Abstract Services (CAS) Number ***100-41-4***
Proposed Emission Rate (lb/hr) ***1.49x10^{-4}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***5.73x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0.37 in Hg @ 77°F***
Solubility ***In water 0.014 g/100mL @ 59 °F***	Molecular Weight (lb/lb-mole) ***106.17***
Absorptive Properties -	

Pollutant Emitted ***Methylene Chloride***	Chemical Abstract Services (CAS) Number ***75-09-2***
Proposed Emission Rate (lb/hr) ***4.11x10^{-3}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***1.97 x10^{-2}***	Vapor Pressure (in. Hg @ °F) ***17.13 in Hg @ 77 °F***
Solubility ***In water 1.30 x10^{4} mg/L @ 77°F***	Molecular Weight (lb/lb-mole) ***30.03***
Absorptive Properties -	

Pollutant Emitted ***Penthachlorodibenzofurans***	Chemical Abstract Services (CAS) Number ***57117-41-6***
Proposed Emission Rate (lb/hr) ***2.99x10^{-10}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***3.57x10^{-10}***	Vapor Pressure (in. Hg @ °F) ***TBD***
Solubility ***TBD***	Molecular Weight (lb/lb-mole) ***54.09***
Absorptive Properties -	

Pollutant Emitted ***Phenol***	Chemical Abstract Services (CAS) Number ***108-95-2***
Proposed Emission Rate (lb/hr) ***5.32x10^{-3}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***2.30 x 10^{-2}***	Vapor Pressure (in. Hg @ °F) ***0.013 in Hg @ 68 °F***
Solubility ***50 to 100 mg/mL @ 66°F***	Molecular Weight (lb/lb-mole) ***94.11***
Absorptive Properties -	

Pollutant Emitted ***Naphthalene***	Chemical Abstract Services (CAS) Number ***91-20-3***
Proposed Emission Rate (lb/hr) ***6.54x10^{-4}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***2.08 x10^{-3}***	Vapor Pressure (in. Hg @ °F) ***0.003 in Hg @ 77 °F***
Solubility ***In water 31 mg/L @ 77 °F***	Molecular Weight (lb/lb-mole) ***128.17***
Absorptive Properties -	

Pollutant Emitted ***Toluene***	Chemical Abstract Services (CAS) Number ***108-88-3***
Proposed Emission Rate (lb/hr) ***1.96x10^{-3}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***8.66x10^{-3}***	Vapor Pressure (in. Hg @ °F) ***1.12 in Hg @ 77°F***
Solubility ***In water 526 mg/L @ 77°F***	Molecular Weight (lb/lb-mole) ***92.14***
Absorptive Properties -	

Pollutant Emitted ***Trichlorofluoromethane***	Chemical Abstract Services (CAS) Number ***75-69-4***
Proposed Emission Rate (lb/hr) ***1.49x10^{-3}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***4.43x10^{-3}***	Vapor Pressure (in. Hg @ °F) ***31.61 in Hg @ 77°F***
Solubility ***In water 1,100 mg/L @ 77 °F***	Molecular Weight (lb/lb-mole) ***54.09***
Absorptive Properties -	

Pollutant Emitted ***Xylene***	Chemical Abstract Services (CAS) Number ***95-47-6***
Proposed Emission Rate (lb/hr) ***1.96x10^{-3}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***7.52x10^{-3}***	Vapor Pressure (in. Hg @ °F) ***0.26 in Hg @ 77°F***
Solubility ***In water 178 mg/L @ 77°F***	Molecular Weight (lb/lb-mole) ***106.16***
Absorptive Properties -	

Pollutant Emitted ***PAH***	Chemical Abstract Services (CAS) Number ***N/A***
Proposed Emission Rate (lb/hr) ***3.32x10^{-4}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***7.40x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***N/A***
Solubility ***N/A***	Molecular Weight (lb/lb-mole) ***TBD***
Absorptive Properties -	

Pollutant Emitted ***Antimony***	Chemical Abstract Services (CAS) Number ***7740-36-0***
Proposed Emission Rate (lb/hr) ***4.08x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/particulate***
Concentration in Emission Stream (ppmv) ***1.36x10^{-5}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***121.76***
Absorptive Properties -	

Pollutant Emitted ***Arsenic***	Chemical Abstract Services (CAS) Number ***7440-38-2***
Proposed Emission Rate (lb/hr) ***6.28x10^{-7}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***3.41x10^{-6}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole)
Absorptive Properties -	

Pollutant Emitted ***Beryllium***	Chemical Abstract Services (CAS) Number ***7440-41-7***
Proposed Emission Rate (lb/hr) ***1.88x10^{-7}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***8.51x10^{-6}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***9.01***
Absorptive Properties -	

Pollutant Emitted ***Cadmium***	Chemical Abstract Services (CAS) Number ***7440-43-9***
Proposed Emission Rate (lb/hr) ***8.16x10^{-7}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***2.95x10^{-6}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg@ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole)
Absorptive Properties -	

Pollutant Emitted ***Chromium***	Chemical Abstract Services (CAS) Number ***7440-47-3***
Proposed Emission Rate (lb/hr) ***1.57x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***1.23x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***51.99***
Absorptive Properties -	

Pollutant Emitted ***Cobalt***	Chemical Abstract Services (CAS) Number ***7440-48-4***
Proposed Emission Rate (lb/hr) ***3.26x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***2.25x10^{-5}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***58.93***
Absorptive Properties -	

Pollutant Emitted ***Manganese***	Chemical Abstract Services (CAS) Number
Proposed Emission Rate (lb/hr) ***8.16x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***6.04x10^{-5}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77 °F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***54.94***
Absorptive Properties -	

Pollutant Emitted ***Mercury***	Chemical Abstract Services (CAS) Number ***7439-97-6***
Proposed Emission Rate (lb/hr) ***1.12x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***2.27x10^{-6}***	Vapor Pressure (in. Hg @ °F) ***7.85x10^{-5} in Hg @ 77 °F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***200.59***
Absorptive Properties -	

Pollutant Emitted ***Nickel***	Chemical Abstract Services (CAS) Number ***7044-02-0***
Proposed Emission Rate (lb/hr) ***6.28x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***4.35x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0 in Hg @ 77°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***58.69***
Absorptive Properties -	

Pollutant Emitted ***Selenium***	Chemical Abstract Services (CAS) Number ***7782-49-2***
Proposed Emission Rate (lb/hr) ***1.57x10^{-6}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***8.09x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***0.29 in Hg @ 807 °F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***78.96***
Absorptive Properties -	

Pollutant Emitted ***Vanadium***	Chemical Abstract Services (CAS) Number ***7440-62-2***
Proposed Emission Rate (lb/hr) ***8.29x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***6.62x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***Approx. 0 in Hg***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***50.94***
Absorptive Properties -	

Pollutant Emitted ***Zinc***	Chemical Abstract Services (CAS) Number ***7440-66-6***
Proposed Emission Rate (lb/hr) ***4.65x10^{-5}***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Particulate***
Concentration in Emission Stream (ppmv) ***2.89x10^{-4}***	Vapor Pressure (in. Hg @ °F) ***2.95 x 10 $^{-8}$ in Hg @ 908.6***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***65.38***
Absorptive Properties -	

Signature of Applicant	Date

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of
Health Division of Air Quality
918 E Divide Ave., 2nd Floor
Bismarck, ND 58501-1947
(701) 328-5188

PERMIT APPLICATION FOR
HAZARDOUS AIR POLLUTANT (HAP) SOURCES

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8329 (09-12)

SECTION A1 - APPLICANT INFORMATION

Name of Firm or Organization ***Meridian Energy Group - Davis Refinery***		
Applicant's Name ***Tom Williams***		
Title ***VP of Planning &Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***

SECTION A2 - FACILITY INFORMATION

Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number ***(409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***
Facility Address (Street & No. or Lat/Long to Nearest Second) ***37th Street / 46°52'45"N/103°14'55" W***		
City ***Belfield***	State ***ND***	ZIP Code ***58622***
County ***Billings***	Number of Employees at Location ***TBD***	
Land Area at Plant Site ***261*** Acres (or) Sq. Ft.	MSL Elevation at Plant ***2,685 feet***	

Describe Nature of Business/Process

Petroleum Refining / Process Leaks (Fugitive) - FUG-1

SECTION B – STACK DATA

Inside Diameter (ft) ***N/A***	Height Above Grade (ft) ***N/A***	
Gas Temperature at Exit (°F) ***N/A***	Gas Velocity at Exit (ft/sec) ***N/A***	Gas Volume (scfm) ***N/A***
Basis of any Estimates (attach separate sheet if necessary) ***Emission factors from Tables 2-5, 2-6 and 2-7 of the Emissions Estimation Protocol for Petroleum Refineries. See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"***		
Are Emission Control Devices in Place? If YES – Complete SFN 8532		Yes ☐ No ☒
Nearest Residences or Building ***Administrative building***	Distance (ft) ***N/A***	Direction ***N/A***
Nearest Property Line ***Fenceline***	Distance (ft) ***N/A***	Direction ***N/A***

SECTION C – EMISSION STREAM DATA

Source ID No. From SFN 8516 ***FUG-1***	Mean Particle Diameter (μm) ***N/A***
Flow Rate (scfm) ***N/A***	Drift Velocity (ft/sec) ***N/A***
Stream Temperature (°F) ***N/A***	Particulate Concentration (gr/dscf) ***N/A***
Moisture Content (%) ***N/A***	Halogens or Metals Present? ***No***
Pressure (in. Hg) ***N/A***	Organic Content (ppmv) ***N/A***
Heat Content (Btu/scfm) ***N/A***	O_2 Content (%) ***N/A***

SECTION D – POLLUTANT SPECIFIC DATA
(Complete One Box for Each Pollutant in Emission Stream)

Pollutant Emitted ***1,3-Butadiene***	Chemical Abstract Services (CAS) Number ***106-99-0***
Proposed Emission Rate (lb/hr) ***$1.23x10^{-3}$***	Emission Source (describe) ***Fugitive***
Source Classification (process point, process fugitive, area fugitive) ***Process Fugitive***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***N/A***	Vapor Pressure (in. Hg @ °F) ***72.34 in Hg @ 68 °F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***54.09***
Absorptive Properties -	

Pollutant Emitted ***2,2,4-trimethylpentane***	Chemical Abstract Services (CAS) Number ***540-84-1***
Proposed Emission Rate (lb/hr) ***$1.18\ x10^{-1}$***	Emission Source (describe) ***Fugitive***
Source Classification (process point, process fugitive, area fugitive) ***Process Fugitive***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic/Vapor***
Concentration in Emission Stream (ppmv) ***N/A***	Vapor Pressure (in. Hg @ °F) ***1.50 in Hg @ 68 °F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***114.22***
Absorptive Properties -	

Pollutant Emitted ***Benzene***	Chemical Abstract Services (CAS) Number ***71-43-2***
Proposed Emission Rate (lb/hr) ***$3.60\ x10^{-2}$***	Emission Source (describe) ***Fugitive***
Source Classification (process point, process fugitive, area fugitive) ***Process Fugitive***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***N/A***	Vapor Pressure (in. Hg @ °F) ***3.73 in Hg @ 77 °F***
Solubility ***In water $1.79x10^{3}$ mg/L @ 77 °F***	Molecular Weight (lb/lb-mole) ***78.11***
Absorptive Properties -	

Pollutant Emitted ***Biphenyl***	Chemical Abstract Services (CAS) Number ***95-52-4***
Proposed Emission Rate (lb/hr) ***$6.01x10^{-3}$***	Emission Source (describe) ***Fugitive***
Source Classification (process point, process fugitive, area fugitive) ***Process Fugitive***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***N/A***	Vapor Pressure (in. Hg @ °F) ***$3.51x\ 10^{-4}$ in Hg @ 77 °F***
Solubility ***In water 0.0004 g/100mL @ 68 °F***	Molecular Weight (lb/lb-mole) ***154.21***
Absorptive Properties -	

Pollutant Emitted ***1,2,4- Trimethyl benzene***	Chemical Abstract Services (CAS) Number ***95-63-6***
Proposed Emission Rate (lb/hr) ***$3.87\ x\ 10^{-2}$***	Emission Source (describe) ***Fugitive***
Source Classification (process point, process fugitive, area fugitive) ***Process Fugitive***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***N/A***	Vapor Pressure (in. Hg @ °F) ***0.28 in Hg @ 111.92°F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***72.15***
Absorptive Properties -	

Pollutant Emitted ***Cumene***	Chemical Abstract Services (CAS) Number ***98-82-8***
Proposed Emission Rate (lb/hr) ***$3.36\ x10^{-3}$***	Emission Source (describe) ***Fugitive***
Source Classification (process point, process fugitive, area fugitive) ***Process Fugitive***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***N/A***	Vapor Pressure (in. Hg @ °F) ***0.17 in Hg @ 77°F***
Solubility ***61.3 mg/L @ 77°F***	Molecular Weight (lb/lb-mole) ***120.19***
Absorptive Properties -	

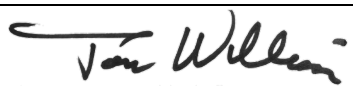
Pollutant Emitted ***Ethylbenzene***	Chemical Abstract Services (CAS) Number ***100-41-4***
Proposed Emission Rate (lb/hr) ***$2.69x10^{-2}$***	Emission Source (describe) ***Fugitive***
Source Classification (process point, process fugitive, area fugitive) ***Process Fugitive***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***N/A***	Vapor Pressure (in. Hg @ °F) ***0.37 in Hg @ 77°F***
Solubility ***In water 0.014 g/100mL @ 59 °F***	Molecular Weight (lb/lb-mole) ***106.17***
Absorptive Properties -	

Pollutant Emitted ***Hexane***	Chemical Abstract Services (CAS) Number ***110-54-5***
Proposed Emission Rate (lb/hr) ***$8.19x10^{-2}$***	Emission Source (describe) ***Fugitive***
Source Classification (process point, process fugitive, area fugitive) ***Process Fugitive***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***N/A***	Vapor Pressure (in. Hg @ °F) ***5.90 in Hg @ 68 °F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***86.1***
Absorptive Properties -	

Pollutant Emitted ***Naphthalene***	Chemical Abstract Services (CAS) Number ***91-20-3***
Proposed Emission Rate (lb/hr) ***$1.28x10^{-2}$***	Emission Source (describe) ***Fugitive***
Source Classification (process point, process fugitive, area fugitive) ***Process Fugitive***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***N/A***	Vapor Pressure (in. Hg @ °F) ***0.003 in Hg @ 77 °F***
Solubility ***In water 31 mg/L @ 77 °F***	Molecular Weight (lb/lb-mole) ***128.17***
Absorptive Properties -	

Pollutant Emitted ***Toluene***	Chemical Abstract Services (CAS) Number ***108-88-3***
Proposed Emission Rate (lb/hr) ***$1.06x10^{-1}$***	Emission Source (describe) ***Fugitive***
Source Classification (process point, process fugitive, area fugitive) ***Process fugitive***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***TBD***	Vapor Pressure (in. Hg @ °F) ***1.12 in Hg @ 77°F***
Solubility ***In water 526 mg/L @ 77°F***	Molecular Weight (lb/lb-mole) ***92.14***
Absorptive Properties -	

Pollutant Emitted ***Xylene***	Chemical Abstract Services (CAS) Number ***95-47-6***
Proposed Emission Rate (lb/hr) ***$1.14x10^{-1}$***	Emission Source (describe) ***Fugitive***
Source Classification (process point, process fugitive, area fugitive) ***Process Fugitive***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***N/A***	Vapor Pressure (in. Hg @ °F) ***0.26 in Hg @ 77°F***
Solubility ***In water 178 mg/L @ 77°F***	Molecular Weight (lb/lb-mole) ***106.16***
Absorptive Properties -	

Signature of Applicant	Date
	09/26/2016

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of Health
Division of Air Quality
918 E Divide Ave., 2nd Floor
Bismarck, ND 58501-1947
(701) 328-5188

PERMIT APPLICATION FOR
HAZARDOUS AIR POLLUTANT (HAP) SOURCES

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8329 (09-12)

SECTION A1 - APPLICANT INFORMATION

Name of Firm or Organization ***Meridian Energy Group - Davis Refinery***		
Applicant's Name ***Tom Williams***		
Title ***VP of Planning &Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***

SECTION A2 - FACILITY INFORMATION

Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number ***(409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***
Facility Address (Street & No. or Lat/Long to Nearest Second) ***37th Street / 46°52'45"N/103°14'55" W***		
City ***Belfield***	State ***ND***	ZIP Code ***58622***
County ***Billings***	Number of Employees at Location ***TBD***	
Land Area at Plant Site ***261*** Acres (or) Sq. Ft.	MSL Elevation at Plant ***2,685 feet***	

Describe Nature of Business/Process

Petroleum Refining / Sulfur Recovering Unit / Oxidizer Vent (OV) and Flash Drum Vent (FDV), both directed to a thermal oxidizer (122-H-2201)

SECTION B – STACK DATA

Inside Diameter (ft) ***TBD***	Height Above Grade (ft) ***TBD***	
Gas Temperature at Exit (°F) ***125 (OV)/ 125 (FDV)***	Gas Velocity at Exit (ft/sec) ***TBD***	Gas Volume (scfm) ***3,725.69 (OV)/53.47 (FDV)***
Basis of any Estimates (attach separate sheet if necessary) ***Engineering data from vendor.***		
Are Emission Control Devices in Place? If YES – Complete SFN 8532		Yes ☒ No ☐
Nearest Residences or Building ***Utility building***	Distance (ft) ***618 ft***	Direction ***Southeast***
Nearest Property Line ***Fenceline***	Distance (ft) ***820 ft***	Direction ***Northwest***

SECTION C – EMISSION STREAM DATA

Source ID No. From SFN 8516 ***Not listed (directed to 122-H-2201)***	Mean Particle Diameter (μm) ***N/A***
Flow Rate (scfm) ***3,725.69 (OV)/ 53.47 (FDV)***	Drift Velocity (ft/sec) ***TBD***
Stream Temperature (°F) ***125 (OV)/ 125 (FDV)***	Particulate Concentration (gr/dscf) ***N/A***
Moisture Content (%) ***9.55%(OV)/ 5.88% (FDV)***	Halogens or Metals Present? ***None***
Pressure (in. Hg) ***29.92 (OV) / 50.28 (FDV)***	Organic Content (ppmv) ***0.39% molar (OV) / 81.46% molar (FDV)***
Heat Content (Btu/scfm) ***TBD***	O_2 Content (%) ***16.16% (OV)/ 0% (FDV)***

SECTION D – POLLUTANT SPECIFIC DATA
(Complete One Box for Each Pollutant in Emission Stream)

Pollutant Emitted ***Volatile Organic Compounds (VOC)***	Chemical Abstract Services (CAS) Number ***N/A***
Proposed Emission Rate (lb/hr) ***64.88 (OV) / 202.29 (FDV)***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic/Vapor***
Concentration in Emission Stream (ppmv) ***TBD***	Vapor Pressure (in. Hg @ °F) ***N/A***
Solubility ***-***	Molecular Weight (lb/lb-mole) ***N/A***
Absorptive Properties -	

Pollutant Emitted ***Hydrogen Sulfide***	Chemical Abstract Services (CAS) Number ***7783-06-4***
Proposed Emission Rate (lb/hr) ***- (OV) / - (FDV)***	Emission Source (describe) ***Process Point***
Source Classification (process point, process fugitive, area fugitive) ***Process Point***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Inorganic/Vapor***
Concentration in Emission Stream (ppmv) ***<1 ppmv (OV) / <10 ppmv (FDV)***	Vapor Pressure (in. Hg @ °F) ***$1.55x10^{-7}$ in Hg @ 77 °F***
Solubility ***Insoluble in water; soluble in carbon disulfide***	Molecular Weight (lb/lb-mole) ***34.08***
Absorptive Properties -	

Signature of Applicant	Date

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of Health
Division of Air Quality
918 E Divide Ave., 2nd Floor
Bismarck, ND 58501-1947
(701) 328-5188

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Facility Address (Street & No. or Lat/Long to Nearest Second) ***37th Street / 46°52'45"N/103°14'55" W***		
City ***Belfield***	State ***ND***	ZIP Code ***58622***
County ***Billings***	Number of Employees at Location ***TBD***	
Land Area at Plant Site ***261*** Acres (or) Sq. Ft.	MSL Elevation at Plant ***2,685 feet***	

Describe Nature of Business/Process

Petroleum Refining / Storage Tanks (Tank farm)

SECTION B – STACK DATA

Inside Diameter (ft) ***N/A***	Height Above Grade (ft) ***N/A***	
Gas Temperature at Exit (°F) ***N/A***	Gas Velocity at Exit (ft/sec) ***N/A***	Gas Volume (scfm) ***N/A***
Basis of any Estimates (attach separate sheet if necessary) ***Emission factors from Table 3-3 of the Emissions Estimation Protocol for Petroleum Refineries. See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"***		
Are Emission Control Devices in Place? If YES – Complete SFN 8532 Yes ☒ No ☐		
Nearest Residences or Building ***Administrative building***	Distance (ft) ***1,230 ft***	Direction ***East***
Nearest Property Line ***Fenceline***	Distance (ft) ***310 ft***	Direction ***South***

SECTION C – EMISSION STREAM DATA

Source ID No. From SFN 8516 ***Storage Tanks***	Mean Particle Diameter (μm) ***TBD***
Flow Rate (scfm) ***N/A***	Drift Velocity (ft/sec) ***TBD***
Stream Temperature (°F) ***N/A***	Particulate Concentration (gr/dscf) ***TBD***
Moisture Content (%) ***TBD***	Halogens or Metals Present? ***Halogens***
Pressure (in. Hg) ***TBD***	Organic Content (ppmv) ***TBD***
Heat Content (Btu/scfm) ***TBD***	O_2 Content (%) ***TBD***

SECTION D – POLLUTANT SPECIFIC DATA
(Complete One Box for Each Pollutant in Emission Stream)

Pollutant Emitted ***2-Methyl naphthalene***	Chemical Abstract Services (CAS) Number ***91-57-6***
Proposed Emission Rate (lb/hr) ***$2.09x10^{-3}$***	Emission Source (describe) ***Tank Farm***
Source Classification (process point, process fugitive, area fugitive) ***Area Fugitive***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic/Vapor***
Concentration in Emission Stream (ppmv) ***N/A***	Vapor Pressure (in. Hg @ °F) ***$2.17x10^{-3}$ in Hg @ 77 °F***
Solubility ***In water mg/L @ 77 °F***	Molecular Weight (lb/lb-mole) ***142.08***
Absorptive Properties -	

Pollutant Emitted ***Anthracene***	Chemical Abstract Services (CAS) Number ***120-12-7***
Proposed Emission Rate (lb/hr) ***$1.43x10^{-4}$***	Emission Source (describe) ***Tank Farm***
Source Classification (process point, process fugitive, area fugitive) ***Process Fugitive***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic/Vapor***
Concentration in Emission Stream (ppmv) ***TBD***	Vapor Pressure (in. Hg @ °F) ***$2.17x10^{-5}$ in Hg @ 77 °F***
Solubility ***In water 1.29 mg/L @ 77 °F***	Molecular Weight (lb/lb-mole) ***178.23***
Absorptive Properties -	

Pollutant Emitted ***Benzene***	Chemical Abstract Services (CAS) Number ***71-43-2***
Proposed Emission Rate (lb/hr) ***$5.01x10^{-2}$***	Emission Source (describe) ***Tank Farm***
Source Classification (process point, process fugitive, area fugitive) ***Area Fugitive***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic/Vapor***
Concentration in Emission Stream (ppmv) ***N/A***	Vapor Pressure (in. Hg @ °F) ***3.73 in Hg @ 77 °F***
Solubility ***In water $1.79x10^{3}$ mg/L @ 77 °F***	Molecular Weight (lb/lb-mole) ***78.11***
Absorptive Properties -	

Pollutant Emitted ***Biphenyl***	Chemical Abstract Services (CAS) Number ***95-52-4***
Proposed Emission Rate (lb/hr) ***2.77x10^{-4}***	Emission Source (describe) ***Tank Farm***
Source Classification (process point, process fugitive, area fugitive) ***Area Fugitive***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***N/A***	Vapor Pressure (in. Hg @ °F) ***3.51x 10^{-4} in Hg @ 77 °F***
Solubility ***In water 0.0004 g/100mL @ 68 °F***	Molecular Weight (lb/lb-mole) ***154.21***
Absorptive Properties -	

Pollutant Emitted ***Chrysene***	Chemical Abstract Services (CAS) Number ***218-01-9***
Proposed Emission Rate (lb/hr) ***1.25x10^{-4}***	Emission Source (describe) ***Tank Farm***
Source Classification (process point, process fugitive, area fugitive) ***Area Fugitive***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic/Vapor***
Concentration in Emission Stream (ppmv) ***TBD***	Vapor Pressure (in. Hg @ °F) ***2.45 x10^{-10}in Hg @ 77 °F***
Solubility ***In water 0.002 mg/L @ 77 °F***	Molecular Weight (lb/lb-mole) ***228.29***
Absorptive Properties -	

Pollutant Emitted ***Cresols***	Chemical Abstract Services (CAS) Number ***106-44-5***
Proposed Emission Rate (lb/hr) ***7.71x10^{-3}***	Emission Source (describe) ***Tank Farm***
Source Classification (process point, process fugitive, area fugitive) ***Area Fugitive***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***N/A***	Vapor Pressure (in. Hg @ °F) ***0.004 in Hg @ 77°F***
Solubility ***In water 2.15x10^{+4}@77°F***	Molecular Weight (lb/lb-mole) ***108.14***
Absorptive Properties -	

Pollutant Emitted ***Cumene***	Chemical Abstract Services (CAS) Number ***98-82-8***
Proposed Emission Rate (lb/hr) ***9.17x10^{-3}***	Emission Source (describe) ***Tank Farm***
Source Classification (process point, process fugitive, area fugitive) ***Area Fugitive***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***N/A***	Vapor Pressure (in. Hg @ °F) ***0.17 in Hg @ 77°F***
Solubility ***61.3 mg/L @ 77°F***	Molecular Weight (lb/lb-mole) ***120.19***
Absorptive Properties -	

Pollutant Emitted ***Ethylbenzene***	Chemical Abstract Services (CAS) Number ***100-41-4***
Proposed Emission Rate (lb/hr) ***1.93x10^{-2}***	Emission Source (describe) ***Tank Farm***
Source Classification (process point, process fugitive, area fugitive) ***Area Fugitive***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***N/A***	Vapor Pressure (in. Hg @ °F) ***0.37 in Hg @ 77°F***
Solubility ***In water 0.014 g/100mL @ 59 °F***	Molecular Weight (lb/lb-mole) ***106.17***
Absorptive Properties -	

Pollutant Emitted ***Fluorene***	Chemical Abstract Services (CAS) Number ***86-73-7***
Proposed Emission Rate (lb/hr) ***2.15x10^{-4}***	Emission Source (describe) ***Tank Farm***
Source Classification (process point, process fugitive, area fugitive) ***Area Fugitive***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic/Vapor***
Concentration in Emission Stream (ppmv) ***TBD***	Vapor Pressure (in. Hg @ °F) ***1.26x10 $^{-5}$ in Hg @ 77 °F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***166.22***
Absorptive Properties -	

Pollutant Emitted ***Hexane***	Chemical Abstract Services (CAS) Number ***110-54-5***
Proposed Emission Rate (lb/hr) ***3.30x10^{-1}***	Emission Source (describe) ***Tank Farm***
Source Classification (process point, process fugitive, area fugitive) ***Area Fugitive***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***N/A***	Vapor Pressure (in. Hg @ °F) ***5.90 in Hg @ 68 °F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***86.1***
Absorptive Properties -	

Pollutant Emitted ***Methanol***	Chemical Abstract Services (CAS) Number ***67-56-1***
Proposed Emission Rate (lb/hr) ***2.26x10^{-3}***	Emission Source (describe) ***Tank Farm***
Source Classification (process point, process fugitive, area fugitive) ***Area Fugitive***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic/Vapor***
Concentration in Emission Stream (ppmv) ***TBD***	Vapor Pressure (in. Hg @ °F) ***5.0 in Hg @ 77 °F***
Solubility ***Miscible in water***	Molecular Weight (lb/lb-mole) ***32.04***
Absorptive Properties -	

Pollutant Emitted ***Methyl isobutyl Ketone***	Chemical Abstract Services (CAS) Number ***108-10-1***
Proposed Emission Rate (lb/hr) ***$1.91x10^{-1}$***	Emission Source (describe) ***Tank Farm***
Source Classification (process point, process fugitive, area fugitive) ***Area Fugitive***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic/Vapor***
Concentration in Emission Stream (ppmv) ***TBD***	Vapor Pressure (in. Hg @ °F) ***0.78 in Hg @ 77 °F***
Solubility ***In water 19,000 mg/L @ 77 °F***	Molecular Weight (lb/lb-mole) ***100.16***
Absorptive Properties -	

Pollutant Emitted ***Methyl tertiary-butyl ether***	Chemical Abstract Services (CAS) Number
Proposed Emission Rate (lb/hr) ***$1.71x10^{-1}$***	Emission Source (describe) ***Tank Farm***
Source Classification (process point, process fugitive, area fugitive) ***Area Fugitive***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***N/A***	Vapor Pressure (in. Hg @ °F) ***2.95 in Hg @ 154 °F***
Solubility ***In water 4.2 g/100mL @ 68°F***	Molecular Weight (lb/lb-mole) ***88.15***
Absorptive Properties -	

Pollutant Emitted ***Naphthalene***	Chemical Abstract Services (CAS) Number ***91-20-3***
Proposed Emission Rate (lb/hr) ***$4.91x10^{-3}$***	Emission Source (describe) ***Tank Farm***
Source Classification (process point, process fugitive, area fugitive) ***Area Fugitive***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic/Vapor***
Concentration in Emission Stream (ppmv) ***N/A***	Vapor Pressure (in. Hg @ °F) ***0.003 in Hg @ 77 °F***
Solubility ***In water 31 mg/L @ 77 °F***	Molecular Weight (lb/lb-mole) ***128.17***
Absorptive Properties -	

Pollutant Emitted ***Phenanthrene***	Chemical Abstract Services (CAS) Number ***85-01-8***
Proposed Emission Rate (lb/hr) ***$8.94x10^{-4}$***	Emission Source (describe) ***Tank Farm***
Source Classification (process point, process fugitive, area fugitive) ***Area Fugitive***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic/Vapor***
Concentration in Emission Stream (ppmv) ***TBD***	Vapor Pressure (in. Hg @ °F) ***$4.76x10^{-6}$ in Hg @ 77 °F***
Solubility ***In water 1.15 mg/L @ 77 °F***	Molecular Weight (lb/lb-mole) ***178.23***
Absorptive Properties -	

Pollutant Emitted ***Phenol***	Chemical Abstract Services (CAS) Number ***108-95-2***
Proposed Emission Rate (lb/hr) ***1.35x10^{-3}***	Emission Source (describe) ***Tank Farm***
Source Classification (process point, process fugitive, area fugitive) ***Area Fugitive***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***N/A***	Vapor Pressure (in. Hg @ °F) ***0.013 in Hg @ 77°F***
Solubility ***In water 1 g/15mL***	Molecular Weight (lb/lb-mole) ***94.11***
Absorptive Properties -	

Pollutant Emitted ***Pyrene***	Chemical Abstract Services (CAS) Number ***129-00-0***
Proposed Emission Rate (lb/hr) ***2.32 x10^{-4}***	Emission Source (describe) ***Tank Farm***
Source Classification (process point, process fugitive, area fugitive) ***Area Fugitive***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic/Vapor***
Concentration in Emission Stream (ppmv) ***TBD***	Vapor Pressure (in. Hg @ °F) ***1.77x10^{-7} in Hg @ 77 °F***
Solubility ***In water 0.135 mg/L @ 77 °F***	Molecular Weight (lb/lb-mole) ***202.25***
Absorptive Properties -	

Pollutant Emitted ***Styrene***	Chemical Abstract Services (CAS) Number ***100-42-5***
Proposed Emission Rate (lb/hr) ***3.63x10^{-2}***	Emission Source (describe) ***Tank Farm***
Source Classification (process point, process fugitive, area fugitive) ***Area Fugitive***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic/Vapor***
Concentration in Emission Stream (ppmv) ***N/A***	Vapor Pressure (in. Hg @ °F) ***0.25 in Hg @ 77 °F***
Solubility ***In water 300 mg/L @ 77 °F***	Molecular Weight (lb/lb-mole) ***104.15***
Absorptive Properties -	

Pollutant Emitted ***Toluene***	Chemical Abstract Services (CAS) Number ***108-88-3***
Proposed Emission Rate (lb/hr) ***1.10x10^{-1}***	Emission Source (describe) ***Tank Farm***
Source Classification (process point, process fugitive, area fugitive) ***Area Fugitive***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic/Vapor***
Concentration in Emission Stream (ppmv) ***N/A***	Vapor Pressure (in. Hg @ °F) ***1.11 in Hg @ 77 °F***
Solubility ***In water 526 mg/L @ 77 °F***	Molecular Weight (lb/lb-mole) ***92.14***
Absorptive Properties -	

Pollutant Emitted ***Xylene***	Chemical Abstract Services (CAS) Number ***95-47-6***
Proposed Emission Rate (lb/hr) ***8.59x10^{-2}***	Emission Source (describe) ***Tank Farm***
Source Classification (process point, process fugitive, area fugitive) ***Area Fugitive***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic/Vapor***
Concentration in Emission Stream (ppmv) ***N/A***	Vapor Pressure (in. Hg @ °F) ***0.26 in Hg @ 77 °F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***106.17***
Absorptive Properties -	

Pollutant Emitted ***Volatile Organic Compounds (VOC)***	Chemical Abstract Services (CAS) Number ***N/A***
Proposed Emission Rate (lb/hr) ***2.09***	Emission Source (describe) ***Tank Farm***
Source Classification (process point, process fugitive, area fugitive) ***Area Fugitive***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic/Vapor***
Concentration in Emission Stream (ppmv) ***N/A***	Vapor Pressure (in. Hg @ °F) ***N/A***
Solubility ***-***	Molecular Weight (lb/lb-mole) ***0.11***
Absorptive Properties -	

Signature of Applicant	Date 09/26/2016

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of
Health Division of Air Quality
918 E Divide Ave., 2nd Floor
Bismarck, ND 58501-1947
(701) 328-5188

PERMIT APPLICATION FOR
HAZARDOUS AIR POLLUTANT (HAP) SOURCES

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8329 (09-12)

SECTION A1 - APPLICANT INFORMATION

Name of Firm or Organization ***Meridian Energy Group - Davis Refinery***		
Applicant's Name ***Tom Williams***		
Title ***VP of Planning &Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***

SECTION A2 - FACILITY INFORMATION

Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number ***(409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***
Facility Address (Street & No. or Lat/Long to Nearest Second) ***37th Street / 46°52'45"N/103°14'55" W***		
City ***Belfield***	State ***ND***	ZIP Code ***58622***
County ***Billings***	Number of Employees at Location ***TBD***	
Land Area at Plant Site ***261*** Acres (or) Sq. Ft.	MSL Elevation at Plant ***2,685 feet***	

Describe Nature of Business/Process

Petroleum Refining / WasteWater Treatment Plant - 206WWT (Fugitive)

SECTION B – STACK DATA

Inside Diameter (ft) ***N/A***	Height Above Grade (ft) ***N/A***	
Gas Temperature at Exit (°F) ***N/A***	Gas Velocity at Exit (ft/sec) ***N/A***	Gas Volume (scfm) ***N/A***
Basis of any Estimates (attach separate sheet if necessary) ***Engineering data and * Table 7-8. Table 7-9. and Table 7-10 from the Emissions Estimation Protocol for Petroleum Refineries. See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"***		
Are Emission Control Devices in Place? If YES – Complete SFN 8532		Yes ☐ No ☒
Nearest Residences or Building ***Administrative building***	Distance (ft) ***1,434 ft***	Direction ***South***
Nearest Property Line ***Fenceline***	Distance (ft) ***963 ft***	Direction ***Northwest***

SECTION C – EMISSION STREAM DATA

Source ID No. From SFN 8516 ***206WWT (Fugitive)***	Mean Particle Diameter (μm)
Flow Rate (scfm) ***N/A***	Drift Velocity (ft/sec) ***N/A***
Stream Temperature (°F) ***N/A***	Particulate Concentration (gr/dscf) ***N/A***
Moisture Content (%) ***N/A***	Halogens or Metals Present? ***No***
Pressure (in. Hg) ***N/A***	Organic Content (ppmv) ***N/A***
Heat Content (Btu/scfm) ***N/A***	O_2 Content (%) ***N/A***

SECTION D – POLLUTANT SPECIFIC DATA
(Complete One Box for Each Pollutant in Emission Stream)

Pollutant Emitted ***2,2,4-trimethylpentane***	Chemical Abstract Services (CAS) Number ***540-84-1***
Proposed Emission Rate (lb/hr) ***2.41 x10^{-2}***	Emission Source (describe) ***Fugitive***
Source Classification (process point, process fugitive, area fugitive) ***Process Fugitive***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic/Vapor***
Concentration in Emission Stream (ppmv) ***N/A***	Vapor Pressure (in. Hg @ °F) ***1.50 in Hg @ 68 °F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***114.22***
Absorptive Properties -	

Pollutant Emitted ***Benzene***	Chemical Abstract Services (CAS) Number ***71-43-2***
Proposed Emission Rate (lb/hr) ***5.56x10^{-3}***	Emission Source (describe) ***Fugitive***
Source Classification (process point, process fugitive, area fugitive) ***Process Fugitive***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***N/A***	Vapor Pressure (in. Hg @ °F) ***3.73 in Hg @ 77 °F***
Solubility ***In water 1.79x10^{3} mg/L @ 77 °F***	Molecular Weight (lb/lb-mole) ***78.11***
Absorptive Properties -	

Pollutant Emitted ***Biphenyl***	Chemical Abstract Services (CAS) Number ***95-52-4***
Proposed Emission Rate (lb/hr) ***2.34x10^{-5}***	Emission Source (describe) ***Fugitive***
Source Classification (process point, process fugitive, area fugitive) ***Process Fugitive***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***N/A***	Vapor Pressure (in. Hg @ °F) ***3.51x 10^{-4} in Hg @ 77 °F***
Solubility ***In water 0.0004 g/100mL @ 68 °F***	Molecular Weight (lb/lb-mole) ***154.21***
Absorptive Properties -	

Pollutant Emitted ***Cresols***	Chemical Abstract Services (CAS) Number ***106-44-5***
Proposed Emission Rate (lb/hr) ***0***	Emission Source (describe) ***Fugitive***
Source Classification (process point, process fugitive, area fugitive) ***Process Fugitive***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***N/A***	Vapor Pressure (in. Hg @ °F) ***0.004 in Hg @ 77°F***
Solubility ***In water 2.15x10^{+4}@77°F***	Molecular Weight (lb/lb-mole) ***108.14***
Absorptive Properties -	

Pollutant Emitted ***Cumene***	Chemical Abstract Services (CAS) Number ***98-82-8***
Proposed Emission Rate (lb/hr) ***1.97x10^{-3}***	Emission Source (describe) ***Fugitive***
Source Classification (process point, process fugitive, area fugitive) ***Process Fugitive***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***N/A***	Vapor Pressure (in. Hg @ °F) ***0.17 in Hg @ 77°F***
Solubility ***61.3 mg/L @ 77°F***	Molecular Weight (lb/lb-mole) ***120.19***
Absorptive Properties -	

Pollutant Emitted ***Ethylbenzene***	Chemical Abstract Services (CAS) Number ***100-41-4***
Proposed Emission Rate (lb/hr) ***4.31x10^{-3}***	Emission Source (describe) ***Fugitive***
Source Classification (process point, process fugitive, area fugitive) ***Process Fugitive***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***N/A***	Vapor Pressure (in. Hg @ °F) ***0.37 in Hg @ 77°F***
Solubility ***In water 0.014 g/100mL @ 59 °F***	Molecular Weight (lb/lb-mole) ***106.17***
Absorptive Properties -	

Pollutant Emitted ***Hexane***	Chemical Abstract Services (CAS) Number ***110-54-5***
Proposed Emission Rate (lb/hr) ***4.28x10^{-2}***	Emission Source (describe) ***Fugitive***
Source Classification (process point, process fugitive, area fugitive) ***Process Fugitive***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***N/A***	Vapor Pressure (in. Hg @ °F) ***5.90 in Hg @ 68 °F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***86.1***
Absorptive Properties -	

Pollutant Emitted ***Methyl tertiary-butyl ether***	Chemical Abstract Services (CAS) Number
Proposed Emission Rate (lb/hr) ***1.17x10^{-3}***	Emission Source (describe) ***Fugitive***
Source Classification (process point, process fugitive, area fugitive) ***Process Fugitive***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***N/A***	Vapor Pressure (in. Hg @ °F) ***2.95 in Hg @ 154 °F***
Solubility ***In water 4.2 g/100mL @ 68°F***	Molecular Weight (lb/lb-mole) ***88.15***
Absorptive Properties -	

Pollutant Emitted ***Naphthalene***	Chemical Abstract Services (CAS) Number ***91-20-3***
Proposed Emission Rate (lb/hr) ***6.32x10^{-4}***	Emission Source (describe) ***Fugitive***
Source Classification (process point, process fugitive, area fugitive) ***Process Fugitive***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***N/A***	Vapor Pressure (in. Hg @ °F) ***0.003 in Hg @ 77 °F***
Solubility ***In water 31 mg/L @ 77 °F***	Molecular Weight (lb/lb-mole) ***128.17***
Absorptive Properties -	

Pollutant Emitted ***Phenol***	Chemical Abstract Services (CAS) Number ***108-95-2***
Proposed Emission Rate (lb/hr) ***0***	Emission Source (describe) ***Fugitive***
Source Classification (process point, process fugitive, area fugitive) ***Process Fugitive***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***N/A***	Vapor Pressure (in. Hg @ °F) ***0.013 in Hg @ 77°F***
Solubility ***In water 1 g/15mL***	Molecular Weight (lb/lb-mole) ***94.11***
Absorptive Properties -	

Pollutant Emitted ***Styrene***	Chemical Abstract Services (CAS) Number ***100-42-5***
Proposed Emission Rate (lb/hr) ***8.26 x10^{-3}***	Emission Source (describe) ***Fugitive***
Source Classification (process point, process fugitive, area fugitive) ***Process Fugitive***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***N/A***	Vapor Pressure (in. Hg @ °F) ***0.25 in Hg @ 77°F***
Solubility ***In water 300 mg/L @ 77°F***	Molecular Weight (lb/lb-mole) ***104.15***
Absorptive Properties -	

Pollutant Emitted ***Toluene***	Chemical Abstract Services (CAS) Number ***108-88-3***
Proposed Emission Rate (lb/hr) ***1.39x10^{-2}***	Emission Source (describe) ***Fugitive***
Source Classification (process point, process fugitive, area fugitive) ***Process Fugitive***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***N/A***	Vapor Pressure (in. Hg @ °F) ***1.11 in Hg @ 77 °F***
Solubility ***In water 526 mg/L @ 77 °F***	Molecular Weight (lb/lb-mole) ***92.14***
Absorptive Properties -	

Pollutant Emitted ***Xylene***	Chemical Abstract Services (CAS) Number ***95-47-6***
Proposed Emission Rate (lb/hr) ***1.68x10^{-2}***	Emission Source (describe) ***Fugitive***
Source Classification (process point, process fugitive, area fugitive) ***Process Fugitive***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***N/A***	Vapor Pressure (in. Hg @ °F) ***0.26 in Hg @ 77°F***
Solubility ***In water 178 mg/L @ 77°F***	Molecular Weight (lb/lb-mole) ***106.16***
Absorptive Properties -	

Pollutant Emitted ***1,3-Butadiene***	Chemical Abstract Services (CAS) Number ***106-99-0***
Proposed Emission Rate (lb/hr) ***1.00x10^{-5}***	Emission Source (describe) ***Fugitive***
Source Classification (process point, process fugitive, area fugitive) ***Process Fugitive***	Pollutant Class and Form (organic/inorganic - particulate/vapor) ***Organic /Vapor***
Concentration in Emission Stream (ppmv) ***N/A***	Vapor Pressure (in. Hg @ °F) ***72.34 in Hg @ 68 °F***
Solubility ***Insoluble in water***	Molecular Weight (lb/lb-mole) ***54.09***
Absorptive Properties -	

Signature of Applicant	Date 09/26/2016

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of
Health Division of Air Quality
918 E Divide Ave., 2nd Floor
Bismarck, ND 58501-1947
(701) 328-5188

PERMIT APPLICATION FOR
VOLATILE ORGANIC COMPOUNDS STORAGE TANK

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8535 (10-13)

SECTION A – FACILITY INFORMATION

Name of Firm or Organization ***Meridian Energy Group – Davis Refinery***		
Applicant´s Name ***Tom Williams***		
Title ***VP of Planning & Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***
Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number (***409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***

SECTION B – TANK DATA

Legal Description of Facility Site ***Property ID 07 0000 00165 000 in the SE 1/4 of Section 2, Twp 139N, Range 100W and Property ID: 07 0000 00162 000 in the NW1/4 and SW 1/4 of Section 1, Twp 139N, Range 100W***				
County ***Billings***		Source ID Number ***203-T-0001***		
Capacity	Barrels ***110,999***		Gallons ***4,661,958***	
Dimensions	Diameter ***115'***	Height ***60'***	Length	Width
Shape	☒Cylindrical	☐Spherical	☐Other – Specify:	
Materials of Construction	***Carbon Steel***			
Construction	☐Riveted	☒Welded	☐Other – Specify:	
Color	***Beige***			
Condition	☒Good	☐Fair	☐Poor	
Status	☒New Construction	☐Alteration	☐Existing (Give Date Constructed): _____	
Type of Tank	☐Fixed Roof ☐Variable Vapor Space ☐Pressure (low or high)		☐External Floating ☒ Internal Floating ☐Other – Specify:	
Type of Roof	☐Pan	☒Double Deck	☐Pontoon	☐Other – Specify:
Type of Seal	Metallic Shoe Seal	Liquid Mounted Resilient Seal	Vapor Mounted Resilient Seal	
	☐Primary Seal Only ☒With Rim Mounted Seal ☐With Shoe Mounted Secondary Seal	☐Primary Seal Only ☐With Rim Mounted Seal ☐With Weather Shield	☐Primary Seal Only ☐With Rim Mounted Seal ☐With Weather Shield	

SECTION C – TANK CONTENTS

Crude Oil, (RVP 6.8 – 7 psi)

SECTION D – VAPOR DISPOSAL

☒Atmosphere ☐Vapor Recovery Unit ☐Flare ☐Other – Specify:

SECTION E – VAPOR PRESSURE DATA

psia	
Maximum True Vapor Pressure ***-***	Maximum Reid Vapor Pressure ***6.8 - 7***

SECTION F – OPERATIONAL DATA

Maximum Filling Rate (barrels per hour or gallons per hour) ***TBD***	Vapor Space Outage (See AP-42, 7.1-92, Equation 1-15) ***N/A***
Average Throughput (gallons per day) ***770,000***	Tank Turnovers per Year ***60.25***

SECTION G – SOLUTION STORAGE

If material stored is a solution, supply the following information:	
Name of Solvent ***N/A***	Name of Material Dissolved ***N/A***
Concentration of Material Dissolved (% by weight or % by volume or lbs/gal) ***N/A***	

SECTION H – AIR CONTAMINANTS EMITTED

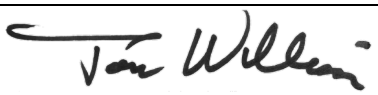
Pollutant*	Maximum Pounds Per Hour	Tons Per Year	Basis and Calculations for Quantities (Attach separate sheet if needed)
Benzene	***3.06E-03***	***1.34E-02***	***VOC from TANKS 4.0.9d software modeled runs.*** ***HAPs from Table 3-3 of the Emissions Estimation Protocol for Petroleum Refineries*** ***See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"***
Biphenyl	***6.11E-05***	***2.68E-04***	
Cresol	***1.83E-04***	***8.03E-04***	
Cumene	***1.53E-04***	***6.69E-04***	
Ethylbenzene	***4.89E-04***	***2.14E-03***	
Hexane	***2.57E-02***	***1.12E-01***	
Naphthalene	***1.83E-04***	***8.03E-04***	
Phenol	***2.75E-04***	***1.20E-03***	
Toluene	***2.29E-03***	***1.00E-02***	
Xylene	***1.89E-03***	***8.30E-03***	
VOC	***2.80E-01***	***1.22E+00***	

* Include an estimate of greenhouse gas emissions (CO_2e)

SECTION I – STANDARDS OF PERFORMANCE

Tank subject to:	☐40 CFR 60, Subpart K	☐40 CFR 60, Subpart Ka	☒40 CFR 60, Subpart Kb

Are the standards of performance for new stationary sources; petroleum liquid storage vessels, 40 CFR Part 60, Subparts K, Ka, and Kb being adhered to, where applicable? ☒Yes ☐ No – Explain:

Signature of Applicant	Date
	09/26/2016

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of Health
Division of Air Quality
918 E Divide Ave., 2nd Floor
Bismarck, ND 58501-1947
(701) 328-5188

PERMIT APPLICATION FOR
VOLATILE ORGANIC COMPOUNDS STORAGE TANK

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8535 (10-13)

SECTION A – FACILITY INFORMATION

Name of Firm or Organization ***Meridian Energy Group – Davis Refinery***		
Applicant´s Name ***Tom Williams***		
Title ***VP of Planning & Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***
Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number (***409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***

SECTION B – TANK DATA

Legal Description of Facility Site ***Property ID 07 0000 00165 000 in the SE 1/4 of Section 2, Twp 139N, Range 100W and Property ID: 07 0000 00162 000 in the NW1/4 and SW 1/4 of Section 1, Twp 139N, Range 100W***				
County ***Billings***		Source ID Number ***203-T-0002***		
Capacity	Barrels ***110,999***		Gallons ***4,661,958***	
Dimensions	Diameter ***115'***	Height ***60'***	Length	Width
Shape	☒Cylindrical	☐Spherical	☐Other – Specify:	
Materials of Construction	***Carbon Steel***			
Construction	☐Riveted	☒Welded	☐Other – Specify:	
Color	***Beige***			
Condition	☒Good	☐Fair	☐Poor	
Status	☒New Construction	☐Alteration	☐Existing (Give Date Constructed): _____	
Type of Tank	☐Fixed Roof ☐Variable Vapor Space ☐Pressure (low or high)		☐External Floating ☒ Internal Floating ☐Other – Specify:	
Type of Roof	☐Pan	☒Double Deck	☐Pontoon	☐Other – Specify:
Type of Seal	Metallic Shoe Seal	Liquid Mounted Resilient Seal	Vapor Mounted Resilient Seal	
	☐Primary Seal Only ☐With Rim Mounted Seal ☒With Shoe Mounted Secondary Seal	☐Primary Seal Only ☐With Rim Mounted Seal ☐With Weather Shield	☐Primary Seal Only ☐With Rim Mounted Seal ☐With Weather Shield	

SECTION C – TANK CONTENTS

Crude Oil, (RVP 6.8 – 7 psi)

SECTION D – VAPOR DISPOSAL

☒Atmosphere ☐Vapor Recovery Unit ☐Flare ☐Other – Specify:

SECTION E – VAPOR PRESSURE DATA

psia	
Maximum True Vapor Pressure ***-***	Maximum Reid Vapor Pressure ***6.8 - 7***

SECTION F – OPERATIONAL DATA

Maximum Filling Rate (barrels per hour or gallons per hour) ***TBD***	Vapor Space Outage (See AP-42, 7.1-92, Equation 1-15) ***N/A***
Average Throughput (gallons per day) ***770,000***	Tank Turnovers per Year ***60.25***

SECTION G – SOLUTION STORAGE

If material stored is a solution, supply the following information:	
Name of Solvent ***N/A***	Name of Material Dissolved ***N/A***
Concentration of Material Dissolved (% by weight or % by volume or lbs/gal) ***N/A***	

SECTION H – AIR CONTAMINANTS EMITTED

Pollutant*	Maximum Pounds Per Hour	Tons Per Year	Basis and Calculations for Quantities (Attach separate sheet if needed)
Benzene	***3.06E-03***	***1.34E-02***	***VOC from TANKS 4.0.9d software modeled runs.*** ***HAPs from Table 3-3 of the Emissions Estimation Protocol for Petroleum Refineries*** ***See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"***
Biphenyl	***6.11E-05***	***2.68E-04***	
Cresol	***1.83E-04***	***8.03E-04***	
Cumene	***1.53E-04***	***6.69E-04***	
Ethylbenzene	***4.89E-04***	***2.14E-03***	
Hexane	***2.57E-02***	***1.12E-01***	
Naphthalene	***1.83E-04***	***8.03E-04***	
Phenol	***2.75E-04***	***1.20E-03***	
Toluene	***2.29E-03***	***1.00E-02***	
Xylene	***1.89E-03***	***8.30E-03***	
VOC	***2.80E-01***	***1.22E+00***	

* Include an estimate of greenhouse gas emissions (CO_2e)

SECTION I – STANDARDS OF PERFORMANCE

Tank subject to:	☐40 CFR 60, Subpart K	☐40 CFR 60, Subpart Ka	☒40 CFR 60, Subpart Kb

Are the standards of performance for new stationary sources; petroleum liquid storage vessels, 40 CFR Part 60, Subparts K, Ka, and Kb being adhered to, where applicable? ☒Yes ☐ No – Explain:

Signature of Applicant	Date
Jon Wilson	09/26/2016

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of Health
Division of Air Quality
918 E Divide Ave., 2nd Floor
Bismarck, ND 58501-1947
(701) 328-5188

PERMIT APPLICATION FOR
VOLATILE ORGANIC COMPOUNDS STORAGE TANK

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8535 (10-13)

SECTION A – FACILITY INFORMATION

Name of Firm or Organization ***Meridian Energy Group – Davis Refinery***		
Applicant´s Name ***Tom Williams***		
Title ***VP of Planning & Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***
Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number (***409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***

SECTION B – TANK DATA

Legal Description of Facility Site ***Property ID 07 0000 00165 000 in the SE 1/4 of Section 2, Twp 139N, Range 100W and Property ID: 07 0000 00162 000 in the NW1/4 and SW 1/4 of Section 1, Twp 139N, Range 100W***				
County ***Billings***		Source ID Number ***203-T-0003***		
Capacity	Barrels ***110,999***		Gallons ***4,661,958***	
Dimensions	Diameter ***115'***	Height ***60'***	Length	Width
Shape	☒Cylindrical	☐Spherical	☐Other – Specify:	
Materials of Construction	***Carbon Steel***			
Construction	☐Riveted	☒Welded	☐Other – Specify:	
Color	***Beige***			
Condition	☒Good	☐Fair	☐Poor	
Status	☒New Construction	☐Alteration	☐Existing (Give Date Constructed): _____	
Type of Tank	☐Fixed Roof ☐Variable Vapor Space ☐Pressure (low or high)		☐External Floating ☒ Internal Floating ☐Other – Specify:	
Type of Roof	☐Pan	☒Double Deck	☐Pontoon	☐Other – Specify:
Type of Seal	Metallic Shoe Seal	Liquid Mounted Resilient Seal	Vapor Mounted Resilient Seal	
	☐Primary Seal Only ☐With Rim Mounted Seal ☒With Shoe Mounted Secondary Seal	☐Primary Seal Only ☐With Rim Mounted Seal ☐With Weather Shield	☐Primary Seal Only ☐With Rim Mounted Seal ☐With Weather Shield	

SECTION C – TANK CONTENTS

Crude Oil, (RVP 6.8 – 7 psi)

SECTION D – VAPOR DISPOSAL

☒Atmosphere ☐Vapor Recovery Unit ☐Flare ☐Other – Specify:

SECTION E – VAPOR PRESSURE DATA

psia	
Maximum True Vapor Pressure ***-***	Maximum Reid Vapor Pressure ***6.8 - 7***

SECTION F – OPERATIONAL DATA

Maximum Filling Rate (barrels per hour or gallons per hour) ***TBD***	Vapor Space Outage (See AP-42, 7.1-92, Equation 1-15) ***N/A***
Average Throughput (gallons per day) ***770,000***	Tank Turnovers per Year ***60.25***

SECTION G – SOLUTION STORAGE

If material stored is a solution, supply the following information:	
Name of Solvent ***N/A***	Name of Material Dissolved ***N/A***
Concentration of Material Dissolved (% by weight or % by volume or lbs/gal) ***N/A***	

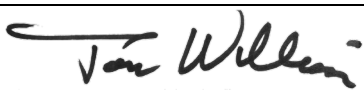
SECTION H – AIR CONTAMINANTS EMITTED

Pollutant*	Maximum Pounds Per Hour	Tons Per Year	Basis and Calculations for Quantities (Attach separate sheet if needed)
Benzene	***3.06E-03***	***1.34E-02***	***VOC from TANKS 4.0.9d software modeled runs.*** ***HAPs from Table 3-3 of the Emissions Estimation Protocol for Petroleum Refineries*** ***See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"***
Biphenyl	***6.11E-05***	***2.68E-04***	
Cresol	***1.83E-04***	***8.03E-04***	
Cumene	***1.53E-04***	***6.69E-04***	
Ethylbenzene	***4.89E-04***	***2.14E-03***	
Hexane	***2.57E-02***	***1.12E-01***	
Naphthalene	***1.83E-04***	***8.03E-04***	
Phenol	***2.75E-04***	***1.20E-03***	
Toluene	***2.29E-03***	***1.00E-02***	
Xylene	***1.89E-03***	***8.30E-03***	
VOC	***2.80E-01***	***1.22E+00***	

* Include an estimate of greenhouse gas emissions (CO_2e)

SECTION I – STANDARDS OF PERFORMANCE

Tank subject to:	☐40 CFR 60, Subpart K	☐40 CFR 60, Subpart Ka	☒40 CFR 60, Subpart Kb
Are the standards of performance for new stationary sources; petroleum liquid storage vessels, 40 CFR Part 60, Subparts K, Ka, and Kb being adhered to, where applicable? ☒Yes ☐ No – Explain:			

Signature of Applicant	Date
	09/26/2016

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Division of Air Quality
918 E Divide Ave., 2nd Floor
Bismarck, ND 58501-1947
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PERMIT APPLICATION FOR VOLATILE ORGANIC COMPOUNDS STORAGE TANK

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8535 (10-13)

SECTION A – FACILITY INFORMATION

Name of Firm or Organization ***Meridian Energy Group – Davis Refinery***		
Applicant´s Name ***Tom Williams***		
Title ***VP of Planning & Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***
Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number (***409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***

SECTION B – TANK DATA

Legal Description of Facility Site ***Property ID 07 0000 00165 000 in the SE 1/4 of Section 2, Twp 139N, Range 100W and Property ID: 07 0000 00162 000 in the NW1/4 and SW 1/4 of Section 1, Twp 139N, Range 100W***				
County ***Billings***		Source ID Number ***203-T-0005***		
Capacity	Barrels ***64,996***		Gallons ***2,729,832***	
Dimensions	Diameter ***88'***	Height ***60'***	Length	Width
Shape	☒Cylindrical	☐Spherical	☐Other – Specify:	
Materials of Construction	***Carbon Steel***			
Construction	☐Riveted	☒Welded	☐Other – Specify:	
Color	***Beige***			
Condition	☒Good	☐Fair	☐Poor	
Status	☒New Construction	☐Alteration	☐Existing (Give Date Constructed): _____	
Type of Tank	☐Fixed Roof ☐Variable Vapor Space ☐Pressure (low or high)		☐External Floating ☒ Internal Floating ☐Other – Specify:	
Type of Roof	☐Pan	☒Double Deck	☐Pontoon	☐Other – Specify:
Type of Seal	Metallic Shoe Seal	Liquid Mounted Resilient Seal	Vapor Mounted Resilient Seal	
	☐Primary Seal Only ☐With Rim Mounted Seal ☐With Shoe Mounted Secondary Seal	☐Primary Seal Only ☒With Rim Mounted Seal ☐With Weather Shield	☐Primary Seal Only ☐With Rim Mounted Seal ☐With Weather Shield	

SECTION C – TANK CONTENTS

Desulfurized Heavy Naphtha, (RVP 1.2 psi)

SECTION D – VAPOR DISPOSAL

☒Atmosphere	☐Vapor Recovery Unit	☐Flare	☐Other – Specify:

SECTION E – VAPOR PRESSURE DATA

psia	
Maximum True Vapor Pressure ***-***	Maximum Reid Vapor Pressure ***1.2***

SECTION F – OPERATIONAL DATA

Maximum Filling Rate (barrels per hour or gallons per hour) ***TBD***	Vapor Space Outage (See AP-42, 7.1-92, Equation 1-15) ***N/A***
Average Throughput (gallons per day) ***89,896.8***	Tank Turnovers per Year ***26.78***

SECTION G – SOLUTION STORAGE

If material stored is a solution, supply the following information:	
Name of Solvent ***N/A***	Name of Material Dissolved ***N/A***
Concentration of Material Dissolved (% by weight or % by volume or lbs/gal) ***N/A***	

SECTION H – AIR CONTAMINANTS EMITTED

Pollutant*	Maximum Pounds Per Hour	Tons Per Year	Basis and Calculations for Quantities (Attach separate sheet if needed)
2-Methyl naphthalene	***2.4E-04***	***1.0E-03***	***VOC from TANKS 4.0.9d software modeled runs.*** ***HAPs from Table 3-3 of the Emissions Estimation Protocol for Petroleum Refineries*** ***See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"***
Anthracene	***1.6E-05***	***7.1E-05***	
Benzene	***4.7E-03***	***2.1E-02***	
Biphenyl	***1.1E-05***	***5.0E-05***	
Chrysene	***1.4E-05***	***6.2E-05***	
Cresol	***8.8E-04***	***3.8E-03***	
Cumene	***1.0E-03***	***4.4E-03***	
Ethylbenzene	***2.1E-03***	***9.2E-03***	
Fluorene	***2.4E-05***	***1.1E-04***	
Hexane	***2.8E-02***	***1.2E-01***	
Methanol	***2.6E-04***	***1.1E-03***	
Methyl isobutyl ketone	***2.2E-02***	***9.5E-02***	
Methyl tertiary-butyl ether	***2.1E-02***	***9.2E-02***	
Naphthalene	***5.1E-04***	***2.2E-03***	
Phenanthrene	***1.0E-04***	***4.4E-04***	
Phenol	***6.1E-05***	***2.7E-04***	
Pyrene	***2.6E-05***	***1.2E-04***	
Styrene	***4.5E-03***	***2.0E-02***	
Toluene	***1.2E-02***	***5.3E-02***	
Xylene	***9.5E-03***	***4.1E-02***	
VOC	***3.95E-02***	***1.73E-01***	

* Include an estimate of greenhouse gas emissions (CO_2e)

SECTION I – STANDARDS OF PERFORMANCE

Tank subject to:	☐40 CFR 60, Subpart K	☐40 CFR 60, Subpart Ka	☒40 CFR 60, Subpart Kb
Are the standards of performance for new stationary sources; petroleum liquid storage vessels, 40 CFR Part 60, Subparts K, Ka, and Kb being adhered to, where applicable? ☒Yes ☐ No – Explain:			

Signature of Applicant	Date
	09/26/2016

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918 E Divide Ave., 2nd Floor
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PERMIT APPLICATION FOR
VOLATILE ORGANIC COMPOUNDS STORAGE TANK

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8535 (10-13)

SECTION A – FACILITY INFORMATION

Name of Firm or Organization ***Meridian Energy Group – Davis Refinery***		
Applicant´s Name ***Tom Williams***		
Title ***VP of Planning & Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***
Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number (***409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***

SECTION B – TANK DATA

Legal Description of Facility Site ***Property ID 07 0000 00165 000 in the SE 1/4 of Section 2, Twp 139N, Range 100W and Property ID: 07 0000 00162 000 in the NW1/4 and SW 1/4 of Section 1, Twp 139N, Range 100W***				
County ***Billings***		Source ID Number ***203-T-0006***		
Capacity	Barrels ***33,312***		Gallons ***1,399,104***	
Dimensions	Diameter ***63'***	Height ***60'***	Length	Width
Shape	☒Cylindrical	☐Spherical	☐Other – Specify:	
Materials of Construction	***Carbon Steel***			
Construction	☐Riveted	☒Welded	☐Other – Specify:	
Color	***Beige***			
Condition	☒Good	☐Fair	☐Poor	
Status	☒New Construction	☐Alteration	☐Existing (Give Date Constructed): _____	
Type of Tank	☐Fixed Roof ☐Variable Vapor Space ☐Pressure (low or high)		☐External Floating ☒ Internal Floating ☐Other – Specify:	
Type of Roof	☐Pan	☒Double Deck	☐Pontoon	☐Other – Specify:
Type of Seal	Metallic Shoe Seal	Liquid Mounted Resilient Seal	Vapor Mounted Resilient Seal	
	☐Primary Seal Only ☐With Rim Mounted Seal ☐With Shoe Mounted Secondary Seal	☐Primary Seal Only ☒With Rim Mounted Seal ☐With Weather Shield	☐Primary Seal Only ☐With Rim Mounted Seal ☐With Weather Shield	

SECTION C – TANK CONTENTS

Reformate, (RVP 3 psi)

SECTION D – VAPOR DISPOSAL

☒Atmosphere	☐Vapor Recovery Unit	☐Flare	☐Other – Specify:

SECTION E – VAPOR PRESSURE DATA

psia	
Maximum True Vapor Pressure ***-***	Maximum Reid Vapor Pressure ***3***

SECTION F – OPERATIONAL DATA

Maximum Filling Rate (barrels per hour or gallons per hour) ***TBD***	Vapor Space Outage (See AP-42, 7.1-92, Equation 1-15) ***N/A***
Average Throughput (gallons per day) ***179,793.60***	Tank Turnovers per Year ***46.90***

SECTION G – SOLUTION STORAGE

If material stored is a solution, supply the following information:	
Name of Solvent ***N/A***	Name of Material Dissolved ***N/A***
Concentration of Material Dissolved (% by weight or % by volume or lbs/gal) ***N/A***	

SECTION H – AIR CONTAMINANTS EMITTED

Pollutant*	Maximum Pounds Per Hour	Tons Per Year	Basis and Calculations for Quantities (Attach separate sheet if needed)
2-Methyl naphthalene	***1.2E-04***	***5.3E-04***	***VOC from TANKS 4.0.9d software modeled runs.*** ***HAPs from Table 3-3 of the Emissions Estimation Protocol for Petroleum Refineries*** ***See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"***
Anthracene	***8.3E-06***	***3.6E-05***	
Benzene	***2.4E-03***	***1.1E-02***	
Biphenyl	***5.9E-06***	***2.6E-05***	
Chrysene	***7.3E-06***	***3.2E-05***	
Cresol	***4.5E-04***	***2.0E-03***	
Cumene	***5.2E-04***	***2.3E-03***	
Ethylbenzene	***1.1E-03***	***4.7E-03***	
Fluorene	***1.2E-05***	***5.5E-05***	
Hexane	***1.5E-02***	***6.4E-02***	
Methanol	***1.3E-04***	***5.8E-04***	
Methyl isobutyl ketone	***1.1E-02***	***4.9E-02***	
Methyl tertiary-butyl ether	***1.1E-02***	***4.7E-02***	
Naphthalene	***2.6E-04***	***1.2E-03***	
Phenanthrene	***5.2E-05***	***2.3E-04***	
Phenol	***3.1E-05***	***1.4E-04***	
Pyrene	***1.4E-05***	***5.9E-05***	
Styrene	***2.3E-03***	***1.0E-02***	
Toluene	***6.2E-03***	***2.7E-02***	
Xylene	***4.8E-03***	***2.1E-02***	
VOC	***5.92E-02***	***2.59E-01***	

* Include an estimate of greenhouse gas emissions (CO_2e)

SECTION I – STANDARDS OF PERFORMANCE

Tank subject to:	☐40 CFR 60, Subpart K	☐40 CFR 60, Subpart Ka	☒40 CFR 60, Subpart Kb
Are the standards of performance for new stationary sources; petroleum liquid storage vessels, 40 CFR Part 60, Subparts K, Ka, and Kb being adhered to, where applicable? ☒Yes ☐ No – Explain:			

Signature of Applicant	Date
	09/26/2016

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Division of Air Quality
918 E Divide Ave., 2nd Floor
Bismarck, ND 58501-1947
(701) 328-5188

PERMIT APPLICATION FOR VOLATILE ORGANIC COMPOUNDS STORAGE TANK

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8535 (10-13)

SECTION A – FACILITY INFORMATION

Name of Firm or Organization ***Meridian Energy Group – Davis Refinery***		
Applicant´s Name ***Tom Williams***		
Title ***VP of Planning & Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***
Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number (***409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***

SECTION B – TANK DATA

Legal Description of Facility Site ***Property ID 07 0000 00165 000 in the SE 1/4 of Section 2, Twp 139N, Range 100W and Property ID: 07 0000 00162 000 in the NW1/4 and SW 1/4 of Section 1, Twp 139N, Range 100W***				
County ***Billings***		Source ID Number ***203-T-0007***		
Capacity	Barrels ***33,312***		Gallons ***1,399,104***	
Dimensions	Diameter ***63'***	Height ***60'***	Length	Width
Shape	☒Cylindrical	☐Spherical	☐Other – Specify:	
Materials of Construction	***Carbon Steel***			
Construction	☐Riveted	☒Welded	☐Other – Specify:	
Color	***Beige***			
Condition	☒Good	☐Fair	☐Poor	
Status	☒New Construction	☐Alteration	☐Existing (Give Date Constructed): _____	
Type of Tank	☐Fixed Roof ☐Variable Vapor Space ☐Pressure (low or high)		☐External Floating ☒ Internal Floating ☐Other – Specify:	
Type of Roof	☐Pan	☒Double Deck	☐Pontoon	☐Other – Specify:
Type of Seal	Metallic Shoe Seal	Liquid Mounted Resilient Seal	Vapor Mounted Resilient Seal	
	☐Primary Seal Only ☐With Rim Mounted Seal ☐With Shoe Mounted Secondary Seal	☐Primary Seal Only ☒With Rim Mounted Seal ☐With Weather Shield	☐Primary Seal Only ☐With Rim Mounted Seal ☐With Weather Shield	

SECTION C – TANK CONTENTS

Reformate, (RVP 3 psi)

SECTION D – VAPOR DISPOSAL

☒Atmosphere	☐Vapor Recovery Unit	☐Flare	☐Other – Specify:

SECTION E – VAPOR PRESSURE DATA

psia	
Maximum True Vapor Pressure ***-***	Maximum Reid Vapor Pressure ***3***

SECTION F – OPERATIONAL DATA

Maximum Filling Rate (barrels per hour or gallons per hour) ***TBD***	Vapor Space Outage (See AP-42, 7.1-92, Equation 1-15) ***N/A***
Average Throughput (gallons per day) ***179,793.60***	Tank Turnovers per Year ***46.90***

SECTION G – SOLUTION STORAGE

If material stored is a solution, supply the following information:	
Name of Solvent ***N/A***	Name of Material Dissolved ***N/A***
Concentration of Material Dissolved (% by weight or % by volume or lbs/gal) ***N/A***	

SECTION H – AIR CONTAMINANTS EMITTED

Pollutant*	Maximum Pounds Per Hour	Tons Per Year	Basis and Calculations for Quantities (Attach separate sheet if needed)
2-Methyl naphthalene	***1.2E-04***	***5.3E-04***	***VOC from TANKS 4.0.9d software modeled runs.*** ***HAPs from Table 3-3 of the Emissions Estimation Protocol for Petroleum Refineries*** ***See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"***
Anthracene	***8.3E-06***	***3.6E-05***	
Benzene	***2.4E-03***	***1.1E-02***	
Biphenyl	***5.9E-06***	***2.6E-05***	
Chrysene	***7.3E-06***	***3.2E-05***	
Cresol	***4.5E-04***	***2.0E-03***	
Cumene	***5.2E-04***	***2.3E-03***	
Ethylbenzene	***1.1E-03***	***4.7E-03***	
Fluorene	***1.2E-05***	***5.5E-05***	
Hexane	***1.5E-02***	***6.4E-02***	
Methanol	***1.3E-04***	***5.8E-04***	
Methyl isobutyl ketone	***1.1E-02***	***4.9E-02***	
Methyl tertiary-butyl ether	***1.1E-02***	***4.7E-02***	
Naphthalene	***2.6E-04***	***1.2E-03***	
Phenanthrene	***5.2E-05***	***2.3E-04***	
Phenol	***3.1E-05***	***1.4E-04***	
Pyrene	***1.4E-05***	***5.9E-05***	
Styrene	***2.3E-03***	***1.0E-02***	
Toluene	***6.2E-03***	***2.7E-02***	
Xylene	***4.8E-03***	***2.1E-02***	
VOC	***5.92E-02***	***2.59E-01***	

* Include an estimate of greenhouse gas emissions (CO_2e)

SECTION I – STANDARDS OF PERFORMANCE

Tank subject to:	☐40 CFR 60, Subpart K	☐40 CFR 60, Subpart Ka	☒40 CFR 60, Subpart Kb
Are the standards of performance for new stationary sources; petroleum liquid storage vessels, 40 CFR Part 60, Subparts K, Ka, and Kb being adhered to, where applicable? ☒Yes ☐ No – Explain:			

Signature of Applicant	Date
	09/26/2016

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of Health
Division of Air Quality
918 E Divide Ave., 2nd Floor
Bismarck, ND 58501-1947
(701) 328-5188

PERMIT APPLICATION FOR
VOLATILE ORGANIC COMPOUNDS STORAGE TANK

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8535 (10-13)

SECTION A – FACILITY INFORMATION

Name of Firm or Organization ***Meridian Energy Group – Davis Refinery***		
Applicant´s Name ***Tom Williams***		
Title ***VP of Planning & Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***
Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number (***409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***

SECTION B – TANK DATA

Legal Description of Facility Site ***Property ID 07 0000 00165 000 in the SE 1/4 of Section 2, Twp 139N, Range 100W and Property ID: 07 0000 00162 000 in the NW1/4 and SW 1/4 of Section 1, Twp 139N, Range 100W***				
County ***Billings***		Source ID Number ***203-T-0008***		
Capacity	Barrels ***64,996***		Gallons ***2,729,832***	
Dimensions	Diameter ***88'***	Height ***60'***	Length	Width
Shape	☒Cylindrical	☐Spherical	☐Other – Specify:	
Materials of Construction	***Carbon Steel***			
Construction	☐Riveted	☒Welded	☐Other – Specify:	
Color	***Beige***			
Condition	☒Good	☐Fair	☐Poor	
Status	☒New Construction	☐Alteration	☐Existing (Give Date Constructed): _____	
Type of Tank	☐Fixed Roof ☐Variable Vapor Space ☐Pressure (low or high)		☐External Floating ☒ Internal Floating ☐Other – Specify:	
Type of Roof	☐Pan	☒Double Deck	☐Pontoon	☐Other – Specify:
Type of Seal	Metallic Shoe Seal	Liquid Mounted Resilient Seal	Vapor Mounted Resilient Seal	
	☐Primary Seal Only ☐With Rim Mounted Seal ☐With Shoe Mounted Secondary Seal	☐Primary Seal Only ☒With Rim Mounted Seal ☐With Weather Shield	☐Primary Seal Only ☐With Rim Mounted Seal ☐With Weather Shield	

SECTION C – TANK CONTENTS

Gasoline, (RVP 13-15 psi)

SECTION D – VAPOR DISPOSAL

☒Atmosphere	☐Vapor Recovery Unit	☐Flare	☐Other – Specify:

SECTION E – VAPOR PRESSURE DATA

psia	
Maximum True Vapor Pressure ***-***	Maximum Reid Vapor Pressure ***13-15***

SECTION F – OPERATIONAL DATA

Maximum Filling Rate (barrels per hour or gallons per hour) ***TBD***	Vapor Space Outage (See AP-42, 7.1-92, Equation 1-15) ***N/A***
Average Throughput (gallons per day) ***416,780***	Tank Turnovers per Year ***55.73***

SECTION G – SOLUTION STORAGE

If material stored is a solution, supply the following information:	
Name of Solvent ***N/A***	Name of Material Dissolved ***N/A***
Concentration of Material Dissolved (% by weight or % by volume or lbs/gal) ***N/A***	

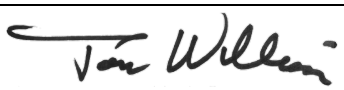
SECTION H – AIR CONTAMINANTS EMITTED

Pollutant*	Maximum Pounds Per Hour	Tons Per Year	Basis and Calculations for Quantities (Attach separate sheet if needed)
2-Methyl naphthalene	***2.4E-04***	***1.0E-03***	***VOC from TANKS 4.0.9d software modeled runs.*** ***HAPs from Table 3-3 of the Emissions Estimation Protocol for Petroleum Refineries*** ***See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"***
Anthracene	***1.6E-05***	***7.1E-05***	
Benzene	***4.7E-03***	***2.1E-02***	
Biphenyl	***1.1E-05***	***5.0E-05***	
Chrysene	***1.4E-05***	***6.2E-05***	
Cresol	***8.8E-04***	***3.8E-03***	
Cumene	***1.0E-03***	***4.4E-03***	
Ethylbenzene	***2.1E-03***	***9.2E-03***	
Fluorene	***2.4E-05***	***1.1E-04***	
Hexane	***2.8E-02***	***1.2E-01***	
Methanol	***2.6E-04***	***1.1E-03***	
Methyl isobutyl ketone	***2.2E-02***	***9.5E-02***	
Methyl tertiary-butyl ether	***2.1E-02***	***9.2E-02***	
Naphthalene	***5.1E-04***	***2.2E-03***	
Phenanthrene	***1.0E-04***	***4.4E-04***	
Phenol	***6.1E-05***	***2.7E-04***	
Pyrene	***2.6E-05***	***1.2E-04***	
Styrene	***4.5E-03***	***2.0E-02***	
Toluene	***1.2E-02***	***5.3E-02***	
Xylene	***9.5E-03***	***4.1E-02***	
VOC	***1.20E-01***	***5.24E-01***	

* Include an estimate of greenhouse gas emissions (CO_2e)

SECTION I – STANDARDS OF PERFORMANCE

Tank subject to:	☐40 CFR 60, Subpart K	☐40 CFR 60, Subpart Ka	☒40 CFR 60, Subpart Kb
Are the standards of performance for new stationary sources; petroleum liquid storage vessels, 40 CFR Part 60, Subparts K, Ka, and Kb being adhered to, where applicable? ☒Yes ☐ No – Explain:			

Signature of Applicant	Date
	09/26/2016

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of Health
Division of Air Quality
918 E Divide Ave., 2nd Floor
Bismarck, ND 58501-1947
(701) 328-5188

PERMIT APPLICATION FOR
VOLATILE ORGANIC COMPOUNDS STORAGE TANK

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8535 (10-13)

SECTION A – FACILITY INFORMATION

Name of Firm or Organization ***Meridian Energy Group – Davis Refinery***		
Applicant´s Name ***Tom Williams***		
Title ***VP of Planning & Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***
Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number (***409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***

SECTION B – TANK DATA

Legal Description of Facility Site ***Property ID 07 0000 00165 000 in the SE 1/4 of Section 2, Twp 139N, Range 100W and Property ID: 07 0000 00162 000 in the NW1/4 and SW 1/4 of Section 1, Twp 139N, Range 100W***				
County ***Billings***		Source ID Number ***203-T-0009***		
Capacity	Barrels ***64,996***		Gallons ***2,729,832***	
Dimensions	Diameter ***88'***	Height ***60'***	Length	Width
Shape	☒Cylindrical	☐Spherical	☐Other – Specify:	
Materials of Construction	***Carbon Steel***			
Construction	☐Riveted	☒Welded	☐Other – Specify:	
Color	***Beige***			
Condition	☒Good	☐Fair	☐Poor	
Status	☒New Construction	☐Alteration	☐Existing (Give Date Constructed): _____	
Type of Tank	☐Fixed Roof ☐Variable Vapor Space ☐Pressure (low or high)		☐External Floating ☒ Internal Floating ☐Other – Specify:	
Type of Roof	☐Pan	☒Double Deck	☐Pontoon	☐Other – Specify:
Type of Seal	Metallic Shoe Seal	Liquid Mounted Resilient Seal	Vapor Mounted Resilient Seal	
	☐Primary Seal Only ☐With Rim Mounted Seal ☐With Shoe Mounted Secondary Seal	☐Primary Seal Only ☒With Rim Mounted Seal ☐With Weather Shield	☐Primary Seal Only ☐With Rim Mounted Seal ☐With Weather Shield	

SECTION C – TANK CONTENTS

Gasoline, (RVP 13-15 psi)

SECTION D – VAPOR DISPOSAL

☒Atmosphere	☐Vapor Recovery Unit	☐Flare	☐Other – Specify:

SECTION E – VAPOR PRESSURE DATA

psia	
Maximum True Vapor Pressure ***-***	Maximum Reid Vapor Pressure ***13-15***

SECTION F – OPERATIONAL DATA

Maximum Filling Rate (barrels per hour or gallons per hour) ***TBD***	Vapor Space Outage (See AP-42, 7.1-92, Equation 1-15) ***N/A***
Average Throughput (gallons per day) ***416,780***	Tank Turnovers per Year ***55.73***

SECTION G – SOLUTION STORAGE

If material stored is a solution, supply the following information:	
Name of Solvent ***N/A***	Name of Material Dissolved ***N/A***
Concentration of Material Dissolved (% by weight or % by volume or lbs/gal) ***N/A***	

SECTION H – AIR CONTAMINANTS EMITTED

Pollutant*	Maximum Pounds Per Hour	Tons Per Year	Basis and Calculations for Quantities (Attach separate sheet if needed)
2-Methyl naphthalene	***2.4E-04***	***1.0E-03***	***VOC from TANKS 4.0.9d software modeled runs.*** ***HAPs from Table 3-3 of the Emissions Estimation Protocol for Petroleum Refineries*** ***See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"***
Anthracene	***1.6E-05***	***7.1E-05***	
Benzene	***4.7E-03***	***2.1E-02***	
Biphenyl	***1.1E-05***	***5.0E-05***	
Chrysene	***1.4E-05***	***6.2E-05***	
Cresol	***8.8E-04***	***3.8E-03***	
Cumene	***1.0E-03***	***4.4E-03***	
Ethylbenzene	***2.1E-03***	***9.2E-03***	
Fluorene	***2.4E-05***	***1.1E-04***	
Hexane	***2.8E-02***	***1.2E-01***	
Methanol	***2.6E-04***	***1.1E-03***	
Methyl isobutyl ketone	***2.2E-02***	***9.5E-02***	
Methyl tertiary-butyl ether	***2.1E-02***	***9.2E-02***	
Naphthalene	***5.1E-04***	***2.2E-03***	
Phenanthrene	***1.0E-04***	***4.4E-04***	
Phenol	***6.1E-05***	***2.7E-04***	
Pyrene	***2.6E-05***	***1.2E-04***	
Styrene	***4.5E-03***	***2.0E-02***	
Toluene	***1.2E-02***	***5.3E-02***	
Xylene	***9.5E-03***	***4.1E-02***	
VOC	***1.20E-01***	***5.24E-01***	

* Include an estimate of greenhouse gas emissions (CO_2e)

SECTION I – STANDARDS OF PERFORMANCE

Tank subject to:	☐40 CFR 60, Subpart K	☐40 CFR 60, Subpart Ka	☒40 CFR 60, Subpart Kb
Are the standards of performance for new stationary sources; petroleum liquid storage vessels, 40 CFR Part 60, Subparts K, Ka, and Kb being adhered to, where applicable? ☒Yes ☐ No – Explain:			

Signature of Applicant	Date
	09/26/2016

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of Health
Division of Air Quality
918 E Divide Ave., 2nd Floor
Bismarck, ND 58501-1947
(701) 328-5188

PERMIT APPLICATION FOR
VOLATILE ORGANIC COMPOUNDS STORAGE TANK

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8535 (10-13)

SECTION A – FACILITY INFORMATION

Name of Firm or Organization ***Meridian Energy Group – Davis Refinery***		
Applicant´s Name ***Tom Williams***		
Title ***VP of Planning & Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***
Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number (***409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***

SECTION B – TANK DATA

Legal Description of Facility Site ***Property ID 07 0000 00165 000 in the SE 1/4 of Section 2, Twp 139N, Range 100W and Property ID: 07 0000 00162 000 in the NW1/4 and SW 1/4 of Section 1, Twp 139N, Range 100W***				
County ***Billings***		Source ID Number ***203-T-0010***		
Capacity	Barrels ***64,996***		Gallons ***2,729,832***	
Dimensions	Diameter ***88'***	Height ***60'***	Length	Width
Shape	☒Cylindrical	☐Spherical	☐Other – Specify:	
Materials of Construction	***Carbon Steel***			
Construction	☐Riveted	☒Welded	☐Other – Specify:	
Color	***Beige***			
Condition	☒Good	☐Fair	☐Poor	
Status	☒New Construction	☐Alteration	☐Existing (Give Date Constructed): _____	
Type of Tank	☐Fixed Roof ☐Variable Vapor Space ☐Pressure (low or high)		☐External Floating ☒ Internal Floating ☐Other – Specify:	
Type of Roof	☐Pan	☒Double Deck	☐Pontoon	☐Other – Specify:
Type of Seal	Metallic Shoe Seal	Liquid Mounted Resilient Seal	Vapor Mounted Resilient Seal	
	☐Primary Seal Only ☐With Rim Mounted Seal ☐With Shoe Mounted Secondary Seal	☐Primary Seal Only ☒With Rim Mounted Seal ☐With Weather Shield	☐Primary Seal Only ☐With Rim Mounted Seal ☐With Weather Shield	

SECTION C – TANK CONTENTS

Gasoline, (RVP 13-15 psi)

SECTION D – VAPOR DISPOSAL

☒Atmosphere	☐Vapor Recovery Unit	☐Flare	☐Other – Specify:

SECTION E – VAPOR PRESSURE DATA

psia	
Maximum True Vapor Pressure ***-***	Maximum Reid Vapor Pressure ***13-15***

SECTION F – OPERATIONAL DATA

Maximum Filling Rate (barrels per hour or gallons per hour) ***TBD***	Vapor Space Outage (See AP-42, 7.1-92, Equation 1-15) ***N/A***
Average Throughput (gallons per day) ***416,780***	Tank Turnovers per Year ***55.73***

SECTION G – SOLUTION STORAGE

If material stored is a solution, supply the following information:	
Name of Solvent ***N/A***	Name of Material Dissolved ***N/A***
Concentration of Material Dissolved (% by weight or % by volume or lbs/gal) ***N/A***	

SECTION H – AIR CONTAMINANTS EMITTED

Pollutant*	Maximum Pounds Per Hour	Tons Per Year	Basis and Calculations for Quantities (Attach separate sheet if needed)
2-Methyl naphthalene	***2.4E-04***	***1.0E-03***	***VOC from TANKS 4.0.9d software modeled runs.*** ***HAPs from Table 3-3 of the Emissions Estimation Protocol for Petroleum Refineries*** ***See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"***
Anthracene	***1.6E-05***	***7.1E-05***	
Benzene	***4.7E-03***	***2.1E-02***	
Biphenyl	***1.1E-05***	***5.0E-05***	
Chrysene	***1.4E-05***	***6.2E-05***	
Cresol	***8.8E-04***	***3.8E-03***	
Cumene	***1.0E-03***	***4.4E-03***	
Ethylbenzene	***2.1E-03***	***9.2E-03***	
Fluorene	***2.4E-05***	***1.1E-04***	
Hexane	***2.8E-02***	***1.2E-01***	
Methanol	***2.6E-04***	***1.1E-03***	
Methyl isobutyl ketone	***2.2E-02***	***9.5E-02***	
Methyl tertiary-butyl ether	***2.1E-02***	***9.2E-02***	
Naphthalene	***5.1E-04***	***2.2E-03***	
Phenanthrene	***1.0E-04***	***4.4E-04***	
Phenol	***6.1E-05***	***2.7E-04***	
Pyrene	***2.6E-05***	***1.2E-04***	
Styrene	***4.5E-03***	***2.0E-02***	
Toluene	***1.2E-02***	***5.3E-02***	
Xylene	***9.5E-03***	***4.1E-02***	
VOC	***1.20E-01***	***5.24E-01***	

* Include an estimate of greenhouse gas emissions (CO_2e)

SECTION I – STANDARDS OF PERFORMANCE

Tank subject to:	☐40 CFR 60, Subpart K	☐40 CFR 60, Subpart Ka	☒40 CFR 60, Subpart Kb
Are the standards of performance for new stationary sources; petroleum liquid storage vessels, 40 CFR Part 60, Subparts K, Ka, and Kb being adhered to, where applicable? ☒Yes ☐ No – Explain:			

Signature of Applicant	Date
	09/26/2016

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of Health
Division of Air Quality
918 E Divide Ave., 2nd Floor
Bismarck, ND 58501-1947
(701) 328-5188

PERMIT APPLICATION FOR VOLATILE ORGANIC COMPOUNDS STORAGE TANK

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8535 (10-13)

SECTION A – FACILITY INFORMATION

Name of Firm or Organization ***Meridian Energy Group – Davis Refinery***		
Applicant´s Name ***Tom Williams***		
Title ***VP of Planning & Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***
Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number (***409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***

SECTION B – TANK DATA

Legal Description of Facility Site ***Property ID 07 0000 00165 000 in the SE 1/4 of Section 2, Twp 139N, Range 100W and Property ID: 07 0000 00162 000 in the NW1/4 and SW 1/4 of Section 1, Twp 139N, Range 100W***				
County ***Billings***		Source ID Number ***203-T-0011***		
Capacity	Barrels ***33,312***		Gallons ***1,399,104***	
Dimensions	Diameter ***63'***	Height ***60'***	Length	Width
Shape	☒Cylindrical	☐Spherical	☐Other – Specify:	
Materials of Construction	***Carbon Steel***			
Construction	☐Riveted	☒Welded	☐Other – Specify:	
Color	***Beige***			
Condition	☒Good	☐Fair	☐Poor	
Status	☒New Construction	☐Alteration	☐Existing (Give Date Constructed): _____	
Type of Tank	☐Fixed Roof ☐Variable Vapor Space ☐Pressure (low or high)		☐External Floating ☒ Internal Floating ☐Other – Specify:	
Type of Roof	☐Pan	☒Double Deck	☐Pontoon	☐Other – Specify:
Type of Seal	Metallic Shoe Seal	Liquid Mounted Resilient Seal	Vapor Mounted Resilient Seal	
	☐Primary Seal Only ☐With Rim Mounted Seal ☐With Shoe Mounted Secondary Seal	☐Primary Seal Only ☒With Rim Mounted Seal ☐With Weather Shield	☐Primary Seal Only ☐With Rim Mounted Seal ☐With Weather Shield	

SECTION C – TANK CONTENTS

Jet Fuel, (TVP 0.04 psia)

SECTION D – VAPOR DISPOSAL

☒Atmosphere	☐Vapor Recovery Unit	☐Flare	☐Other – Specify:

SECTION E – VAPOR PRESSURE DATA

psia	
Maximum True Vapor Pressure ***0.04***	Maximum Reid Vapor Pressure ***-***

SECTION F – OPERATIONAL DATA

Maximum Filling Rate (barrels per hour or gallons per hour) ***TBD***	Vapor Space Outage (See AP-42, 7.1-92, Equation 1-15) ***N/A***
Average Throughput (gallons per day) ***89,250***	Tank Turnovers per Year ***23.28***

SECTION G – SOLUTION STORAGE

If material stored is a solution, supply the following information:	
Name of Solvent ***N/A***	Name of Material Dissolved ***N/A***
Concentration of Material Dissolved (% by weight or % by volume or lbs/gal) ***N/A***	

SECTION H – AIR CONTAMINANTS EMITTED

Pollutant*	Maximum Pounds Per Hour	Tons Per Year	Basis and Calculations for Quantities (Attach separate sheet if needed)
2-Methyl naphthalene	***1.2E-05***	***5.1E-05***	***VOC from TANKS 4.0.9d software modeled runs.*** ***HAPs from Table 3-3 of the Emissions Estimation Protocol for Petroleum Refineries*** ***See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"***
Anthracene	***7.9E-07***	***3.5E-06***	
Benzene	***1.8E-04***	***7.8E-04***	
Biphenyl	***0.0E+00***	***0.0E+00***	
Chrysene	***6.9E-07***	***3.0E-06***	
Cresol	***6.3E-07***	***2.7E-06***	
Cumene	***3.3E-05***	***1.4E-04***	
Ethylbenzene	***5.9E-05***	***2.6E-04***	
Fluorene	***1.2E-06***	***5.2E-06***	
Hexane	***1.6E-03***	***6.9E-03***	
Methanol	***1.3E-05***	***5.5E-05***	
Methyl isobutyl ketone	***1.1E-03***	***4.6E-03***	
Methyl tertiary-butyl ether	***0.0E+00***	***0.0E+00***	
Naphthalene	***1.3E-05***	***5.8E-05***	
Phenanthrene	***5.0E-06***	***2.2E-05***	
Phenol	***2.2E-06***	***9.7E-06***	
Pyrene	***1.3E-06***	***5.6E-06***	
Styrene	***0.0E+00***	***0.0E+00***	
Toluene	***3.3E-04***	***1.4E-03***	
Xylene	***2.3E-04***	***1.0E-03***	
VOC	***2.57E-02***	***1.13E-01***	

* Include an estimate of greenhouse gas emissions (CO_2e)

SECTION I – STANDARDS OF PERFORMANCE

Tank subject to:	☐40 CFR 60, Subpart K	☐40 CFR 60, Subpart Ka	☒40 CFR 60, Subpart Kb
Are the standards of performance for new stationary sources; petroleum liquid storage vessels, 40 CFR Part 60, Subparts K, Ka, and Kb being adhered to, where applicable? ☒Yes ☐ No – Explain:			

Signature of Applicant	Date
	09/26/2016

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of Health
Division of Air Quality
918 E Divide Ave., 2nd Floor
Bismarck, ND 58501-1947
(701) 328-5188

PERMIT APPLICATION FOR VOLATILE ORGANIC COMPOUNDS STORAGE TANK

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8535 (10-13)

SECTION A – FACILITY INFORMATION

Name of Firm or Organization ***Meridian Energy Group – Davis Refinery***		
Applicant´s Name ***Tom Williams***		
Title ***VP of Planning & Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***
Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number (***409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***

SECTION B – TANK DATA

Legal Description of Facility Site ***Property ID 07 0000 00165 000 in the SE 1/4 of Section 2, Twp 139N, Range 100W and Property ID: 07 0000 00162 000 in the NW1/4 and SW 1/4 of Section 1, Twp 139N, Range 100W***				
County ***Billings***		Source ID Number ***203-T-0012***		
Capacity	Barrels ***33,312***		Gallons ***1,399,104***	
Dimensions	Diameter ***63'***	Height ***60'***	Length	Width
Shape	☒Cylindrical	☐Spherical	☐Other – Specify:	
Materials of Construction	***Carbon Steel***			
Construction	☐Riveted	☒Welded	☐Other – Specify:	
Color	***Beige***			
Condition	☒Good	☐Fair	☐Poor	
Status	☒New Construction	☐Alteration	☐Existing (Give Date Constructed): _____	
Type of Tank	☐Fixed Roof ☐Variable Vapor Space ☐Pressure (low or high)		☐External Floating ☒ Internal Floating ☐Other – Specify:	
Type of Roof	☐Pan	☒Double Deck	☐Pontoon	☐Other – Specify:
Type of Seal	Metallic Shoe Seal	Liquid Mounted Resilient Seal	Vapor Mounted Resilient Seal	
	☐Primary Seal Only ☐With Rim Mounted Seal ☐With Shoe Mounted Secondary Seal	☐Primary Seal Only ☒With Rim Mounted Seal ☐With Weather Shield	☐Primary Seal Only ☐With Rim Mounted Seal ☐With Weather Shield	

SECTION C – TANK CONTENTS

Jet Fuel, (TVP 0.04 psia)

SECTION D – VAPOR DISPOSAL

☒Atmosphere	☐Vapor Recovery Unit	☐Flare	☐Other – Specify:

SECTION E – VAPOR PRESSURE DATA

psia	
Maximum True Vapor Pressure ***0.04***	Maximum Reid Vapor Pressure ***-***

SECTION F – OPERATIONAL DATA

Maximum Filling Rate (barrels per hour or gallons per hour) ***TBD***	Vapor Space Outage (See AP-42, 7.1-92, Equation 1-15) ***N/A***
Average Throughput (gallons per day) ***89,250***	Tank Turnovers per Year ***23.28***

SECTION G – SOLUTION STORAGE

If material stored is a solution, supply the following information:	
Name of Solvent ***N/A***	Name of Material Dissolved ***N/A***
Concentration of Material Dissolved (% by weight or % by volume or lbs/gal) ***N/A***	

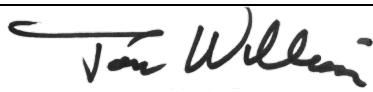
SECTION H – AIR CONTAMINANTS EMITTED

Pollutant*	Maximum Pounds Per Hour	Tons Per Year	Basis and Calculations for Quantities (Attach separate sheet if needed)
2-Methyl naphthalene	***1.2E-05***	***5.1E-05***	***VOC from TANKS 4.0.9d software modeled runs.*** ***HAPs from Table 3-3 of the Emissions Estimation Protocol for Petroleum Refineries*** ***See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"***
Anthracene	***7.9E-07***	***3.5E-06***	
Benzene	***1.8E-04***	***7.8E-04***	
Biphenyl	***0.0E+00***	***0.0E+00***	
Chrysene	***6.9E-07***	***3.0E-06***	
Cresol	***6.3E-07***	***2.7E-06***	
Cumene	***3.3E-05***	***1.4E-04***	
Ethylbenzene	***5.9E-05***	***2.6E-04***	
Fluorene	***1.2E-06***	***5.2E-06***	
Hexane	***1.6E-03***	***6.9E-03***	
Methanol	***1.3E-05***	***5.5E-05***	
Methyl isobutyl ketone	***1.1E-03***	***4.6E-03***	
Methyl tertiary-butyl ether	***0.0E+00***	***0.0E+00***	
Naphthalene	***1.3E-05***	***5.8E-05***	
Phenanthrene	***5.0E-06***	***2.2E-05***	
Phenol	***2.2E-06***	***9.7E-06***	
Pyrene	***1.3E-06***	***5.6E-06***	
Styrene	***0.0E+00***	***0.0E+00***	
Toluene	***3.3E-04***	***1.4E-03***	
Xylene	***2.3E-04***	***1.0E-03***	
VOC	***2.57E-02***	***1.13E-01***	

* Include an estimate of greenhouse gas emissions (CO_2e)

SECTION I – STANDARDS OF PERFORMANCE

Tank subject to:	☐40 CFR 60, Subpart K	☐40 CFR 60, Subpart Ka	☒40 CFR 60, Subpart Kb
Are the standards of performance for new stationary sources; petroleum liquid storage vessels, 40 CFR Part 60, Subparts K, Ka, and Kb being adhered to, where applicable? ☒Yes ☐ No – Explain:			

Signature of Applicant	Date
	09/26/2016

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of Health
Division of Air Quality
918 E Divide Ave., 2nd Floor
Bismarck, ND 58501-1947
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DIVISION OF AIR QUALITY
SFN 8535 (10-13)

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Applicant´s Name ***Tom Williams***		
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Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number (***409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***

SECTION B – TANK DATA

Legal Description of Facility Site ***Property ID 07 0000 00165 000 in the SE 1/4 of Section 2, Twp 139N, Range 100W and Property ID: 07 0000 00162 000 in the NW1/4 and SW 1/4 of Section 1, Twp 139N, Range 100W***				
County ***Billings***		Source ID Number ***203-T-0013***		
Capacity	Barrels ***33,312***		Gallons ***1,399,104***	
Dimensions	Diameter ***63'***	Height ***60'***	Length	Width
Shape	☒Cylindrical	☐Spherical	☐Other – Specify:	
Materials of Construction	***Carbon Steel***			
Construction	☐Riveted	☒Welded	☐Other – Specify:	
Color	***Beige***			
Condition	☒Good	☐Fair	☐Poor	
Status	☒New Construction	☐Alteration	☐Existing (Give Date Constructed): _____	
Type of Tank	☒Fixed Roof ☐Variable Vapor Space ☐Pressure (low or high)		☐External Floating ☐ Internal Floating ☐Other – Specify:	
Type of Roof	☐Pan	☐Double Deck	☐Pontoon	☒Other – Specify: ***Cone Roof***
Type of Seal	Metallic Shoe Seal	Liquid Mounted Resilient Seal	Vapor Mounted Resilient Seal	
	☐Primary Seal Only ☐With Rim Mounted Seal ☐With Shoe Mounted Secondary Seal	☐Primary Seal Only ☐With Rim Mounted Seal ☐With Weather Shield	☐Primary Seal Only ☐With Rim Mounted Seal ☐With Weather Shield	

SECTION C – TANK CONTENTS

Undesulphurized Diesel, (TVP 0.004 psia)

SECTION D – VAPOR DISPOSAL

☐Atmosphere	☒Vapor Recovery Unit	☐Flare	☐Other – Specify:

SECTION E – VAPOR PRESSURE DATA

psia	
Maximum True Vapor Pressure ***0.004***	Maximum Reid Vapor Pressure ***-***

SECTION F – OPERATIONAL DATA

Maximum Filling Rate (barrels per hour or gallons per hour) ***TBD***	Vapor Space Outage (See AP-42, 7.1-92, Equation 1-15) ***41.67***
Average Throughput (gallons per day) ***88,208.4***	Tank Turnovers per Year ***27.61***

SECTION G – SOLUTION STORAGE

If material stored is a solution, supply the following information:	
Name of Solvent ***N/A***	Name of Material Dissolved ***N/A***
Concentration of Material Dissolved (% by weight or % by volume or lbs/gal) ***N/A***	

SECTION H – AIR CONTAMINANTS EMITTED

Pollutant*	Maximum Pounds Per Hour	Tons Per Year	Basis and Calculations for Quantities (Attach separate sheet if needed)
2-Methyl naphthalene	***1.2E-05***	***5.1E-05***	***VOC from TANKS 4.0.9d software modeled runs.*** ***HAPs from Table 3-3 of the Emissions Estimation Protocol for Petroleum Refineries*** ***See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"***
Anthracene	***7.9E-07***	***3.5E-06***	
Benzene	***1.8E-04***	***7.8E-04***	
Biphenyl	***0.0E+00***	***0.0E+00***	
Chrysene	***6.9E-07***	***3.0E-06***	
Cresol	***6.3E-07***	***2.7E-06***	
Cumene	***3.3E-05***	***1.4E-04***	
Ethylbenzene	***5.9E-05***	***2.6E-04***	
Fluorene	***1.2E-06***	***5.2E-06***	
Hexane	***1.6E-03***	***6.9E-03***	
Methanol	***1.3E-05***	***5.5E-05***	
Methyl isobutyl ketone	***1.1E-03***	***4.6E-03***	
Methyl tertiary-butyl ether	***0.0E+00***	***0.0E+00***	
Naphthalene	***1.3E-05***	***5.8E-05***	
Phenanthrene	***5.0E-06***	***2.2E-05***	
Phenol	***2.2E-06***	***9.7E-06***	
Pyrene	***1.3E-06***	***5.6E-06***	
Styrene	***0.0E+00***	***0.0E+00***	
Toluene	***3.3E-04***	***1.4E-03***	
Xylene	***2.3E-04***	***1.0E-03***	
VOC	***4.29E-03***	***1.88E-02***	

* Include an estimate of greenhouse gas emissions (CO_2e)

SECTION I – STANDARDS OF PERFORMANCE

Tank subject to:	☐40 CFR 60, Subpart K	☐40 CFR 60, Subpart Ka	☒40 CFR 60, Subpart Kb
Are the standards of performance for new stationary sources; petroleum liquid storage vessels, 40 CFR Part 60, Subparts K, Ka, and Kb being adhered to, where applicable? ☒Yes ☐ No – Explain:			

Signature of Applicant	Date
	09/26/2016

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Applicant´s Name ***Tom Williams***		
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Title ***Vice President of Operations***	Telephone Number (***409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***

SECTION B – TANK DATA

Legal Description of Facility Site ***Property ID 07 0000 00165 000 in the SE 1/4 of Section 2, Twp 139N, Range 100W and Property ID: 07 0000 00162 000 in the NW1/4 and SW 1/4 of Section 1, Twp 139N, Range 100W***				
County ***Billings***		Source ID Number ***203-T-0014***		
Capacity	Barrels ***33,312***		Gallons ***1,399,104***	
Dimensions	Diameter ***63'***	Height ***60'***	Length	Width
Shape	☒Cylindrical	☐Spherical	☐Other – Specify:	
Materials of Construction	***Carbon Steel***			
Construction	☐Riveted	☒Welded	☐Other – Specify:	
Color	***Beige***			
Condition	☒Good	☐Fair	☐Poor	
Status	☒New Construction	☐Alteration	☐Existing (Give Date Constructed): _____	
Type of Tank	☒Fixed Roof ☐Variable Vapor Space ☐Pressure (low or high)		☐External Floating ☐ Internal Floating ☐Other – Specify:	
Type of Roof	☐Pan	☐Double Deck	☐Pontoon	☒Other – Specify: ***Cone Roof***
Type of Seal	Metallic Shoe Seal	Liquid Mounted Resilient Seal	Vapor Mounted Resilient Seal	
	☐Primary Seal Only ☐With Rim Mounted Seal ☐With Shoe Mounted Secondary Seal	☐Primary Seal Only ☐With Rim Mounted Seal ☐With Weather Shield	☐Primary Seal Only ☐With Rim Mounted Seal ☐With Weather Shield	

SECTION C – TANK CONTENTS

Undesulphurized Diesel, (TVP 0.004 psia)

SECTION D – VAPOR DISPOSAL

☐Atmosphere	☒Vapor Recovery Unit	☐Flare	☐Other – Specify:

SECTION E – VAPOR PRESSURE DATA

psia	
Maximum True Vapor Pressure ***0.004***	Maximum Reid Vapor Pressure ***-***

SECTION F – OPERATIONAL DATA

Maximum Filling Rate (barrels per hour or gallons per hour) ***TBD***	Vapor Space Outage (See AP-42, 7.1-92, Equation 1-15) ***41.67***
Average Throughput (gallons per day) ***88,208.4***	Tank Turnovers per Year ***27.61***

SECTION G – SOLUTION STORAGE

If material stored is a solution, supply the following information:	
Name of Solvent ***N/A***	Name of Material Dissolved ***N/A***
Concentration of Material Dissolved (% by weight or % by volume or lbs/gal) ***N/A***	

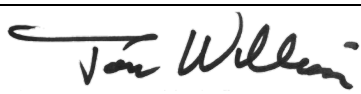
SECTION H – AIR CONTAMINANTS EMITTED

Pollutant*	Maximum Pounds Per Hour	Tons Per Year	Basis and Calculations for Quantities (Attach separate sheet if needed)
2-Methyl naphthalene	***1.2E-05***	***5.1E-05***	***VOC from TANKS 4.0.9d software modeled runs.*** ***HAPs from Table 3-3 of the Emissions Estimation Protocol for Petroleum Refineries*** ***See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"***
Anthracene	***7.9E-07***	***3.5E-06***	
Benzene	***1.8E-04***	***7.8E-04***	
Biphenyl	***0.0E+00***	***0.0E+00***	
Chrysene	***6.9E-07***	***3.0E-06***	
Cresol	***6.3E-07***	***2.7E-06***	
Cumene	***3.3E-05***	***1.4E-04***	
Ethylbenzene	***5.9E-05***	***2.6E-04***	
Fluorene	***1.2E-06***	***5.2E-06***	
Hexane	***1.6E-03***	***6.9E-03***	
Methanol	***1.3E-05***	***5.5E-05***	
Methyl isobutyl ketone	***1.1E-03***	***4.6E-03***	
Methyl tertiary-butyl ether	***0.0E+00***	***0.0E+00***	
Naphthalene	***1.3E-05***	***5.8E-05***	
Phenanthrene	***5.0E-06***	***2.2E-05***	
Phenol	***2.2E-06***	***9.7E-06***	
Pyrene	***1.3E-06***	***5.6E-06***	
Styrene	***0.0E+00***	***0.0E+00***	
Toluene	***3.3E-04***	***1.4E-03***	
Xylene	***2.3E-04***	***1.0E-03***	
VOC	***4.29E-03***	***1.88E-02***	

* Include an estimate of greenhouse gas emissions (CO_2e)

SECTION I – STANDARDS OF PERFORMANCE

Tank subject to:	☐40 CFR 60, Subpart K	☐40 CFR 60, Subpart Ka	☒40 CFR 60, Subpart Kb
Are the standards of performance for new stationary sources; petroleum liquid storage vessels, 40 CFR Part 60, Subparts K, Ka, and Kb being adhered to, where applicable? ☒Yes ☐ No – Explain:			

Signature of Applicant	Date
	09/26/2016

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County ***Billings***		Source ID Number ***203-T-0015***		
Capacity	Barrels ***64,996***		Gallons ***2,729,832***	
Dimensions	Diameter ***88'***	Height ***60'***	Length	Width
Shape	☒Cylindrical	☐Spherical	☐Other – Specify:	
Materials of Construction	***Carbon Steel***			
Construction	☐Riveted	☒Welded	☐Other – Specify:	
Color	***Beige***			
Condition	☒Good	☐Fair	☐Poor	
Status	☒New Construction	☐Alteration	☐Existing (Give Date Constructed): _____	
Type of Tank	☒Fixed Roof ☐Variable Vapor Space ☐Pressure (low or high)		☐External Floating ☐ Internal Floating ☐Other – Specify:	
Type of Roof	☐Pan	☐Double Deck	☐Pontoon	☒Other – Specify: ***Cone Roof***
Type of Seal	Metallic Shoe Seal	Liquid Mounted Resilient Seal	Vapor Mounted Resilient Seal	
	☐Primary Seal Only ☐With Rim Mounted Seal ☐With Shoe Mounted Secondary Seal	☐Primary Seal Only ☐With Rim Mounted Seal ☐With Weather Shield	☐Primary Seal Only ☐With Rim Mounted Seal ☐With Weather Shield	

SECTION C – TANK CONTENTS

Desulphurized Diesel, (TVP 0.004 psia)

SECTION D – VAPOR DISPOSAL

☐Atmosphere	☒Vapor Recovery Unit	☐Flare	☐Other – Specify:

SECTION E – VAPOR PRESSURE DATA

psia	
Maximum True Vapor Pressure ***0.004***	Maximum Reid Vapor Pressure ***-***

SECTION F – OPERATIONAL DATA

Maximum Filling Rate (barrels per hour or gallons per hour) ***TBD***	Vapor Space Outage (See AP-42, 7.1-92, Equation 1-15) ***13.67***
Average Throughput (gallons per day) ***351,792***	Tank Turnovers per Year ***56.44***

SECTION G – SOLUTION STORAGE

If material stored is a solution, supply the following information:	
Name of Solvent ***N/A***	Name of Material Dissolved ***N/A***
Concentration of Material Dissolved (% by weight or % by volume or lbs/gal) ***N/A***	

SECTION H – AIR CONTAMINANTS EMITTED

Pollutant*	Maximum Pounds Per Hour	Tons Per Year	Basis and Calculations for Quantities (Attach separate sheet if needed)
2-Methyl naphthalene	***2.3E-05***	***9.9E-05***	***VOC from TANKS 4.0.9d software modeled runs.*** ***HAPs from Table 3-3 of the Emissions Estimation Protocol for Petroleum Refineries*** ***See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"***
Anthracene	***1.5E-06***	***6.8E-06***	
Benzene	***3.5E-04***	***1.5E-03***	
Biphenyl	***0.0E+00***	***0.0E+00***	
Chrysene	***1.4E-06***	***5.9E-06***	
Cresol	***1.2E-06***	***5.4E-06***	
Cumene	***6.4E-05***	***2.8E-04***	
Ethylbenzene	***1.2E-04***	***5.1E-04***	
Fluorene	***2.3E-06***	***1.0E-05***	
Hexane	***3.1E-03***	***1.4E-02***	
Methanol	***2.4E-05***	***1.1E-04***	
Methyl isobutyl ketone	***2.1E-03***	***9.0E-03***	
Methyl tertiary-butyl ether	***0.0E+00***	***0.0E+00***	
Naphthalene	***2.6E-05***	***1.1E-04***	
Phenanthrene	***9.7E-06***	***4.2E-05***	
Phenol	***4.3E-06***	***1.9E-05***	
Pyrene	***2.5E-06***	***1.1E-05***	
Styrene	***0.0E+00***	***0.0E+00***	
Toluene	***6.4E-04***	***2.8E-03***	
Xylene	***4.5E-04***	***2.0E-03***	
VOC	***7.95E-03***	***3.48E-02***	

* Include an estimate of greenhouse gas emissions (CO_2e)

SECTION I – STANDARDS OF PERFORMANCE

Tank subject to:	☐40 CFR 60, Subpart K	☐40 CFR 60, Subpart Ka	☒40 CFR 60, Subpart Kb
Are the standards of performance for new stationary sources; petroleum liquid storage vessels, 40 CFR Part 60, Subparts K, Ka, and Kb being adhered to, where applicable? ☒Yes ☐ No – Explain:			

Signature of Applicant	Date
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County ***Billings***		Source ID Number ***203-T-0016***		
Capacity	Barrels ***64,996***		Gallons ***2,729,832***	
Dimensions	Diameter ***88'***	Height ***60'***	Length	Width
Shape	☒Cylindrical	☐Spherical	☐Other – Specify:	
Materials of Construction	***Carbon Steel***			
Construction	☐Riveted	☒Welded	☐Other – Specify:	
Color	***Beige***			
Condition	☒Good	☐Fair	☐Poor	
Status	☒New Construction	☐Alteration	☐Existing (Give Date Constructed): _____	
Type of Tank	☒Fixed Roof ☐Variable Vapor Space ☐Pressure (low or high)		☐External Floating ☐ Internal Floating ☐Other – Specify:	
Type of Roof	☐Pan	☐Double Deck	☐Pontoon	☒Other – Specify: ***Cone Roof***
Type of Seal	Metallic Shoe Seal	Liquid Mounted Resilient Seal	Vapor Mounted Resilient Seal	
	☐Primary Seal Only ☐With Rim Mounted Seal ☐With Shoe Mounted Secondary Seal	☐Primary Seal Only ☐With Rim Mounted Seal ☐With Weather Shield	☐Primary Seal Only ☐With Rim Mounted Seal ☐With Weather Shield	

SECTION C – TANK CONTENTS

Desulphurized Diesel, (TVP 0.004 psia)

SECTION D – VAPOR DISPOSAL

☐Atmosphere	☒Vapor Recovery Unit	☐Flare	☐Other – Specify:

SECTION E – VAPOR PRESSURE DATA

psia	
Maximum True Vapor Pressure ***0.004***	Maximum Reid Vapor Pressure ***-***

SECTION F – OPERATIONAL DATA

Maximum Filling Rate (barrels per hour or gallons per hour) ***TBD***	Vapor Space Outage (See AP-42, 7.1-92, Equation 1-15) ***13.67***
Average Throughput (gallons per day) ***351,792***	Tank Turnovers per Year ***56.44***

SECTION G – SOLUTION STORAGE

If material stored is a solution, supply the following information:	
Name of Solvent ***N/A***	Name of Material Dissolved ***N/A***
Concentration of Material Dissolved (% by weight or % by volume or lbs/gal) ***N/A***	

SECTION H – AIR CONTAMINANTS EMITTED

Pollutant*	Maximum Pounds Per Hour	Tons Per Year	Basis and Calculations for Quantities (Attach separate sheet if needed)
2-Methyl naphthalene	***2.3E-05***	***9.9E-05***	***VOC from TANKS 4.0.9d software modeled runs.*** ***HAPs from Table 3-3 of the Emissions Estimation Protocol for Petroleum Refineries*** ***See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"***
Anthracene	***1.5E-06***	***6.8E-06***	
Benzene	***3.5E-04***	***1.5E-03***	
Biphenyl	***0.0E+00***	***0.0E+00***	
Chrysene	***1.4E-06***	***5.9E-06***	
Cresol	***1.2E-06***	***5.4E-06***	
Cumene	***6.4E-05***	***2.8E-04***	
Ethylbenzene	***1.2E-04***	***5.1E-04***	
Fluorene	***2.3E-06***	***1.0E-05***	
Hexane	***3.1E-03***	***1.4E-02***	
Methanol	***2.4E-05***	***1.1E-04***	
Methyl isobutyl ketone	***2.1E-03***	***9.0E-03***	
Methyl tertiary-butyl ether	***0.0E+00***	***0.0E+00***	
Naphthalene	***2.6E-05***	***1.1E-04***	
Phenanthrene	***9.7E-06***	***4.2E-05***	
Phenol	***4.3E-06***	***1.9E-05***	
Pyrene	***2.5E-06***	***1.1E-05***	
Styrene	***0.0E+00***	***0.0E+00***	
Toluene	***6.4E-04***	***2.8E-03***	
Xylene	***4.5E-04***	***2.0E-03***	
VOC	***7.95E-03***	***3.48E-02***	

* Include an estimate of greenhouse gas emissions (CO_2e)

SECTION I – STANDARDS OF PERFORMANCE

Tank subject to:	☐40 CFR 60, Subpart K	☐40 CFR 60, Subpart Ka	☒40 CFR 60, Subpart Kb
Are the standards of performance for new stationary sources; petroleum liquid storage vessels, 40 CFR Part 60, Subparts K, Ka, and Kb being adhered to, where applicable? ☒Yes ☐ No – Explain:			

Signature of Applicant	Date
	09/26/2016

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of Health
Division of Air Quality
918 E Divide Ave., 2nd Floor
Bismarck, ND 58501-1947
(701) 328-5188

PERMIT APPLICATION FOR
VOLATILE ORGANIC COMPOUNDS STORAGE TANK

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8535 (10-13)

SECTION A – FACILITY INFORMATION

Name of Firm or Organization ***Meridian Energy Group – Davis Refinery***		
Applicant´s Name ***Tom Williams***		
Title ***VP of Planning & Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***
Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number (***409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***

SECTION B – TANK DATA

Legal Description of Facility Site ***Property ID 07 0000 00165 000 in the SE 1/4 of Section 2, Twp 139N, Range 100W and Property ID: 07 0000 00162 000 in the NW1/4 and SW 1/4 of Section 1, Twp 139N, Range 100W***				
County ***Billings***		Source ID Number ***203-T-0017***		
Capacity	Barrels ***33,312***		Gallons ***1,399,104***	
Dimensions	Diameter ***63'***	Height ***60'***	Length	Width
Shape	☒Cylindrical	☐Spherical	☐Other – Specify:	
Materials of Construction	***Carbon Steel***			
Construction	☐Riveted	☒Welded	☐Other – Specify:	
Color	***Beige***			
Condition	☒Good	☐Fair	☐Poor	
Status	☒New Construction	☐Alteration	☐Existing (Give Date Constructed): _____	
Type of Tank	☒Fixed Roof ☐Variable Vapor Space ☐Pressure (low or high)		☐External Floating ☐ Internal Floating ☐Other – Specify:	
Type of Roof	☐Pan	☐Double Deck	☐Pontoon	☒Other – Specify: ***Cone Roof***
Type of Seal	Metallic Shoe Seal	Liquid Mounted Resilient Seal	Vapor Mounted Resilient Seal	
	☐Primary Seal Only ☐With Rim Mounted Seal ☐With Shoe Mounted Secondary Seal	☐Primary Seal Only ☐With Rim Mounted Seal ☐With Weather Shield	☐Primary Seal Only ☐With Rim Mounted Seal ☐With Weather Shield	

SECTION C – TANK CONTENTS

Vacuum Gasoil, (TVP 0,00002 – 0,00003)

SECTION D – VAPOR DISPOSAL

☒Atmosphere	☐Vapor Recovery Unit	☐Flare	☐Other – Specify:

SECTION E – VAPOR PRESSURE DATA

psia	
Maximum True Vapor Pressure ***0,00002 – 0,00003***	Maximum Reid Vapor Pressure ***-***

SECTION F – OPERATIONAL DATA

Maximum Filling Rate (barrels per hour or gallons per hour) ***TBD***	Vapor Space Outage (See AP-42, 7.1-92, Equation 1-15) ***41.67***
Average Throughput (gallons per day) ***124,740***	Tank Turnovers per Year ***39.05***

SECTION G – SOLUTION STORAGE

If material stored is a solution, supply the following information:	
Name of Solvent ***N/A***	Name of Material Dissolved ***N/A***
Concentration of Material Dissolved (% by weight or % by volume or lbs/gal) ***N/A***	

SECTION H – AIR CONTAMINANTS EMITTED

Pollutant*	Maximum Pounds Per Hour	Tons Per Year	Basis and Calculations for Quantities (Attach separate sheet if needed)
2-Methyl naphthalene	***1.2E-05***	***5.1E-05***	***VOC from TANKS 4.0.9d software modeled runs.*** ***HAPs from Table 3-3 of the Emissions Estimation Protocol for Petroleum Refineries*** ***See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"***
Anthracene	***7.9E-07***	***3.5E-06***	
Benzene	***1.8E-04***	***7.8E-04***	
Biphenyl	***0.0E+00***	***0.0E+00***	
Chrysene	***6.9E-07***	***3.0E-06***	
Cresol	***6.3E-07***	***2.7E-06***	
Cumene	***3.3E-05***	***1.4E-04***	
Ethylbenzene	***5.9E-05***	***2.6E-04***	
Fluorene	***1.2E-06***	***5.2E-06***	
Hexane	***1.6E-03***	***6.9E-03***	
Methanol	***1.3E-05***	***5.5E-05***	
Methyl isobutyl ketone	***1.1E-03***	***4.6E-03***	
Methyl tertiary-butyl ether	***0.0E+00***	***0.0E+00***	
Naphthalene	***1.3E-05***	***5.8E-05***	
Phenanthrene	***5.0E-06***	***2.2E-05***	
Phenol	***2.2E-06***	***9.7E-06***	
Pyrene	***1.3E-06***	***5.6E-06***	
Styrene	***0.0E+00***	***0.0E+00***	
Toluene	***3.3E-04***	***1.4E-03***	
Xylene	***2.3E-04***	***1.0E-03***	
VOC	***1.97E-03***	***8.64E-03***	

* Include an estimate of greenhouse gas emissions (CO_2e)

SECTION I – STANDARDS OF PERFORMANCE

Tank subject to:	☐40 CFR 60, Subpart K	☐40 CFR 60, Subpart Ka	☒40 CFR 60, Subpart Kb
Are the standards of performance for new stationary sources; petroleum liquid storage vessels, 40 CFR Part 60, Subparts K, Ka, and Kb being adhered to, where applicable? ☒Yes ☐ No – Explain:			

Signature of Applicant	Date
	09/26/2016

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of Health
Division of Air Quality
918 E Divide Ave., 2nd Floor
Bismarck, ND 58501-1947
(701) 328-5188

PERMIT APPLICATION FOR
VOLATILE ORGANIC COMPOUNDS STORAGE TANK

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8535 (10-13)

SECTION A – FACILITY INFORMATION

Name of Firm or Organization ***Meridian Energy Group – Davis Refinery***		
Applicant´s Name ***Tom Williams***		
Title ***VP of Planning & Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***
Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number (***409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***

SECTION B – TANK DATA

Legal Description of Facility Site ***Property ID 07 0000 00165 000 in the SE 1/4 of Section 2, Twp 139N, Range 100W and Property ID: 07 0000 00162 000 in the NW1/4 and SW 1/4 of Section 1, Twp 139N, Range 100W***				
County ***Billings***		Source ID Number ***203-T-0018***		
Capacity	Barrels ***33,312***		Gallons ***1,399,104***	
Dimensions	Diameter ***63'***	Height ***60'***	Length	Width
Shape	☒Cylindrical	☐Spherical	☐Other – Specify:	
Materials of Construction	***Carbon Steel***			
Construction	☐Riveted	☒Welded	☐Other – Specify:	
Color	***Beige***			
Condition	☒Good	☐Fair	☐Poor	
Status	☒New Construction	☐Alteration	☐Existing (Give Date Constructed): _____	
Type of Tank	☐Fixed Roof ☐Variable Vapor Space ☐Pressure (low or high)		☐External Floating ☒ Internal Floating ☐Other – Specify:	
Type of Roof	☐Pan	☒Double Deck	☐Pontoon	☐Other – Specify:
Type of Seal	Metallic Shoe Seal	Liquid Mounted Resilient Seal	Vapor Mounted Resilient Seal	
	☐Primary Seal Only ☐With Rim Mounted Seal ☐With Shoe Mounted Secondary Seal	☐Primary Seal Only ☐With Rim Mounted Seal ☐With Weather Shield	☐Primary Seal Only ☒With Rim Mounted Seal ☐With Weather Shield	

SECTION C – TANK CONTENTS

FCC Naphtha, (RVP 15 psia)

SECTION D – VAPOR DISPOSAL

☒Atmosphere	☐Vapor Recovery Unit	☐Flare	☐Other – Specify:

SECTION E – VAPOR PRESSURE DATA

psia	
Maximum True Vapor Pressure ***-***	Maximum Reid Vapor Pressure ***15***

SECTION F – OPERATIONAL DATA

Maximum Filling Rate (barrels per hour or gallons per hour) ***TBD***	Vapor Space Outage (See AP-42, 7.1-92, Equation 1-15) ***N/A***
Average Throughput (gallons per day) ***181,146***	Tank Turnovers per Year ***26.78***

SECTION G – SOLUTION STORAGE

If material stored is a solution, supply the following information:	
Name of Solvent ***N/A***	Name of Material Dissolved ***N/A***
Concentration of Material Dissolved (% by weight or % by volume or lbs/gal) ***N/A***	

SECTION H – AIR CONTAMINANTS EMITTED

Pollutant*	Maximum Pounds Per Hour	Tons Per Year	Basis and Calculations for Quantities (Attach separate sheet if needed)
2-Methyl naphthalene	***1.2E-04***	***5.3E-04***	***VOC from TANKS 4.0.9d software modeled runs.*** ***HAPs from Table 3-3 of the Emissions Estimation Protocol for Petroleum Refineries*** ***See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"***
Anthracene	***8.3E-06***	***3.6E-05***	
Benzene	***2.4E-03***	***1.1E-02***	
Biphenyl	***5.9E-06***	***2.6E-05***	
Chrysene	***7.3E-06***	***3.2E-05***	
Cresol	***4.5E-04***	***2.0E-03***	
Cumene	***5.2E-04***	***2.3E-03***	
Ethylbenzene	***1.1E-03***	***4.7E-03***	
Fluorene	***1.2E-05***	***5.5E-05***	
Hexane	***1.5E-02***	***6.4E-02***	
Methanol	***1.3E-04***	***5.8E-04***	
Methyl isobutyl ketone	***1.1E-02***	***4.9E-02***	
Methyl tertiary-butyl ether	***1.1E-02***	***4.7E-02***	
Naphthalene	***2.6E-04***	***1.2E-03***	
Phenanthrene	***5.2E-05***	***2.3E-04***	
Phenol	***3.1E-05***	***1.4E-04***	
Pyrene	***1.4E-05***	***5.9E-05***	
Styrene	***2.3E-03***	***1.0E-02***	
Toluene	***6.2E-03***	***2.7E-02***	
Xylene	***4.8E-03***	***2.1E-02***	
VOC	***9.60E-02***	***4.20E-01***	

* Include an estimate of greenhouse gas emissions (CO_2e)

SECTION I – STANDARDS OF PERFORMANCE

Tank subject to:	☐40 CFR 60, Subpart K	☐40 CFR 60, Subpart Ka	☒40 CFR 60, Subpart Kb
Are the standards of performance for new stationary sources; petroleum liquid storage vessels, 40 CFR Part 60, Subparts K, Ka, and Kb being adhered to, where applicable? ☒Yes ☐ No – Explain:			

Signature of Applicant	Date
	09/26/2016

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of Health
Division of Air Quality
918 E Divide Ave., 2nd Floor
Bismarck, ND 58501-1947
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PERMIT APPLICATION FOR
VOLATILE ORGANIC COMPOUNDS STORAGE TANK

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8535 (10-13)

SECTION A – FACILITY INFORMATION

Name of Firm or Organization ***Meridian Energy Group – Davis Refinery***		
Applicant´s Name ***Tom Williams***		
Title ***VP of Planning & Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***
Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number (***409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***

SECTION B – TANK DATA

Legal Description of Facility Site ***Property ID 07 0000 00165 000 in the SE 1/4 of Section 2, Twp 139N, Range 100W and Property ID: 07 0000 00162 000 in the NW1/4 and SW 1/4 of Section 1, Twp 139N, Range 100W***				
County ***Billings***		Source ID Number ***203-T-0019***		
Capacity	Barrels ***33,312***		Gallons ***1,399,104***	
Dimensions	Diameter ***63'***	Height ***60'***	Length	Width
Shape	☒Cylindrical	☐Spherical	☐Other – Specify:	
Materials of Construction	***Carbon Steel***			
Construction	☐Riveted	☒Welded	☐Other – Specify:	
Color	***Beige***			
Condition	☒Good	☐Fair	☐Poor	
Status	☒New Construction	☐Alteration	☐Existing (Give Date Constructed): _____	
Type of Tank	☐Fixed Roof ☐Variable Vapor Space ☐Pressure (low or high)		☐External Floating ☒ Internal Floating ☐Other – Specify:	
Type of Roof	☐Pan	☒Double Deck	☐Pontoon	☐Other – Specify:
Type of Seal	Metallic Shoe Seal	Liquid Mounted Resilient Seal	Vapor Mounted Resilient Seal	
	☐Primary Seal Only ☐With Rim Mounted Seal ☐With Shoe Mounted Secondary Seal	☐Primary Seal Only ☐With Rim Mounted Seal ☐With Weather Shield	☐Primary Seal Only ☒With Rim Mounted Seal ☐With Weather Shield	

SECTION C – TANK CONTENTS

FCC Naphtha, (RVP 15 psia)

SECTION D – VAPOR DISPOSAL

☒Atmosphere	☐Vapor Recovery Unit	☐Flare	☐Other – Specify:

SECTION E – VAPOR PRESSURE DATA

psia	
Maximum True Vapor Pressure ***-***	Maximum Reid Vapor Pressure ***15***

SECTION F – OPERATIONAL DATA

Maximum Filling Rate (barrels per hour or gallons per hour) ***TBD***	Vapor Space Outage (See AP-42, 7.1-92, Equation 1-15) ***N/A***
Average Throughput (gallons per day) ***181,146***	Tank Turnovers per Year ***26.78***

SECTION G – SOLUTION STORAGE

If material stored is a solution, supply the following information:	
Name of Solvent ***N/A***	Name of Material Dissolved ***N/A***
Concentration of Material Dissolved (% by weight or % by volume or lbs/gal) ***N/A***	

SECTION H – AIR CONTAMINANTS EMITTED

Pollutant*	Maximum Pounds Per Hour	Tons Per Year	Basis and Calculations for Quantities (Attach separate sheet if needed)
2-Methyl naphthalene	***1.2E-04***	***5.3E-04***	***VOC from TANKS 4.0.9d software modeled runs.*** ***HAPs from Table 3-3 of the Emissions Estimation Protocol for Petroleum Refineries*** ***See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"***
Anthracene	***8.3E-06***	***3.6E-05***	
Benzene	***2.4E-03***	***1.1E-02***	
Biphenyl	***5.9E-06***	***2.6E-05***	
Chrysene	***7.3E-06***	***3.2E-05***	
Cresol	***4.5E-04***	***2.0E-03***	
Cumene	***5.2E-04***	***2.3E-03***	
Ethylbenzene	***1.1E-03***	***4.7E-03***	
Fluorene	***1.2E-05***	***5.5E-05***	
Hexane	***1.5E-02***	***6.4E-02***	
Methanol	***1.3E-04***	***5.8E-04***	
Methyl isobutyl ketone	***1.1E-02***	***4.9E-02***	
Methyl tertiary-butyl ether	***1.1E-02***	***4.7E-02***	
Naphthalene	***2.6E-04***	***1.2E-03***	
Phenanthrene	***5.2E-05***	***2.3E-04***	
Phenol	***3.1E-05***	***1.4E-04***	
Pyrene	***1.4E-05***	***5.9E-05***	
Styrene	***2.3E-03***	***1.0E-02***	
Toluene	***6.2E-03***	***2.7E-02***	
Xylene	***4.8E-03***	***2.1E-02***	
VOC	***9.60E-02***	***4.20E-01***	

* Include an estimate of greenhouse gas emissions (CO_2e)

SECTION I – STANDARDS OF PERFORMANCE

Tank subject to:	☐40 CFR 60, Subpart K	☐40 CFR 60, Subpart Ka	☒40 CFR 60, Subpart Kb
Are the standards of performance for new stationary sources; petroleum liquid storage vessels, 40 CFR Part 60, Subparts K, Ka, and Kb being adhered to, where applicable? ☒Yes ☐ No – Explain:			

Signature of Applicant	Date
	09/26/2016

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of Health
Division of Air Quality
918 E Divide Ave., 2nd Floor
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NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8535 (10-13)

SECTION A – FACILITY INFORMATION

Name of Firm or Organization ***Meridian Energy Group – Davis Refinery***		
Applicant´s Name ***Tom Williams***		
Title ***VP of Planning & Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***
Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number (***409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***

SECTION B – TANK DATA

Legal Description of Facility Site ***Property ID 07 0000 00165 000 in the SE 1/4 of Section 2, Twp 139N, Range 100W and Property ID: 07 0000 00162 000 in the NW1/4 and SW 1/4 of Section 1, Twp 139N, Range 100W***				
County ***Billings***		Source ID Number ***203-T-0020***		
Capacity	Barrels ***33,312***		Gallons ***1,399,104***	
Dimensions	Diameter ***63'***	Height ***60'***	Length	Width
Shape	☒Cylindrical	☐Spherical	☐Other – Specify:	
Materials of Construction	***Carbon Steel***			
Construction	☐Riveted	☒Welded	☐Other – Specify:	
Color	***Beige***			
Condition	☒Good	☐Fair	☐Poor	
Status	☒New Construction	☐Alteration	☐Existing (Give Date Constructed): _____	
Type of Tank	☐Fixed Roof ☐Variable Vapor Space ☐Pressure (low or high)		☐External Floating ☒ Internal Floating ☐Other – Specify:	
Type of Roof	☐Pan	☒Double Deck	☐Pontoon	☐Other – Specify:
Type of Seal	Metallic Shoe Seal	Liquid Mounted Resilient Seal	Vapor Mounted Resilient Seal	
	☐Primary Seal Only ☐With Rim Mounted Seal ☐With Shoe Mounted Secondary Seal	☐Primary Seal Only ☐With Rim Mounted Seal ☐With Weather Shield	☐Primary Seal Only ☒With Rim Mounted Seal ☐With Weather Shield	

SECTION C – TANK CONTENTS

Alkylate, (RVP 4 psia)

SECTION D – VAPOR DISPOSAL

☒Atmosphere	☐Vapor Recovery Unit	☐Flare	☐Other – Specify:

SECTION E – VAPOR PRESSURE DATA

psia	
Maximum True Vapor Pressure ***-***	Maximum Reid Vapor Pressure ***4***

SECTION F – OPERATIONAL DATA

Maximum Filling Rate (barrels per hour or gallons per hour) ***TBD***	Vapor Space Outage (See AP-42, 7.1-92, Equation 1-15) ***N/A***
Average Throughput (gallons per day) ***102,648***	Tank Turnovers per Year ***26.78***

SECTION G – SOLUTION STORAGE

If material stored is a solution, supply the following information:	
Name of Solvent ***N/A***	Name of Material Dissolved ***N/A***
Concentration of Material Dissolved (% by weight or % by volume or lbs/gal) ***N/A***	

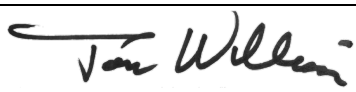
SECTION H – AIR CONTAMINANTS EMITTED

Pollutant*	Maximum Pounds Per Hour	Tons Per Year	Basis and Calculations for Quantities (Attach separate sheet if needed)
2-Methyl naphthalene	***1,2E-04***	***5,3E-04***	***VOC from TANKS 4.0.9d software modeled runs.*** ***HAPs from Table 3-3 of the Emissions Estimation Protocol for Petroleum Refineries*** ***See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"***
Anthracene	***8,3E-06***	***3,6E-05***	
Benzene	***2,4E-03***	***1,1E-02***	
Biphenyl	***5,9E-06***	***2,6E-05***	
Chrysene	***7,3E-06***	***3,2E-05***	
Cresol	***4,5E-04***	***2,0E-03***	
Cumene	***5,2E-04***	***2,3E-03***	
Ethylbenzene	***1,1E-03***	***4,7E-03***	
Fluorene	***1,2E-05***	***5,5E-05***	
Hexane	***1,5E-02***	***6,4E-02***	
Methanol	***1,3E-04***	***5,8E-04***	
Methyl isobutyl ketone	***1,1E-02***	***4,9E-02***	
Methyl tertiary-butyl ether	***1,1E-02***	***4,7E-02***	
Naphthalene	***2,6E-04***	***1,2E-03***	
Phenanthrene	***5,2E-05***	***2,3E-04***	
Phenol	***3,1E-05***	***1,4E-04***	
Pyrene	***1,4E-05***	***5,9E-05***	
Styrene	***2,3E-03***	***1,0E-02***	
Toluene	***6,2E-03***	***2,7E-02***	
Xylene	***4,8E-03***	***2,1E-02***	
VOC	***6.27E-02***	***2.74E-01***	

* Include an estimate of greenhouse gas emissions (CO_2e)

SECTION I – STANDARDS OF PERFORMANCE

Tank subject to:	☐40 CFR 60, Subpart K	☐40 CFR 60, Subpart Ka	☒40 CFR 60, Subpart Kb
Are the standards of performance for new stationary sources; petroleum liquid storage vessels, 40 CFR Part 60, Subparts K, Ka, and Kb being adhered to, where applicable? ☒Yes ☐ No – Explain:			

Signature of Applicant	Date
	09/26/2016

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of Health
Division of Air Quality
918 E Divide Ave., 2nd Floor
Bismarck, ND 58501-1947
(701) 328-5188

PERMIT APPLICATION FOR VOLATILE ORGANIC COMPOUNDS STORAGE TANK

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8535 (10-13)

SECTION A – FACILITY INFORMATION

Name of Firm or Organization ***Meridian Energy Group – Davis Refinery***		
Applicant´s Name ***Tom Williams***		
Title ***VP of Planning & Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***
Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number (***409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***

SECTION B – TANK DATA

Legal Description of Facility Site ***Property ID 07 0000 00165 000 in the SE 1/4 of Section 2, Twp 139N, Range 100W and Property ID: 07 0000 00162 000 in the NW1/4 and SW 1/4 of Section 1, Twp 139N, Range 100W***				
County ***Billings***		Source ID Number ***203-T-0021***		
Capacity	Barrels ***33,312***		Gallons ***1,399,104***	
Dimensions	Diameter ***63'***	Height ***60'***	Length	Width
Shape	☒Cylindrical	☐Spherical	☐Other – Specify:	
Materials of Construction	***Carbon Steel***			
Construction	☐Riveted	☒Welded	☐Other – Specify:	
Color	***Beige***			
Condition	☒Good	☐Fair	☐Poor	
Status	☒New Construction	☐Alteration	☐Existing (Give Date Constructed): _____	
Type of Tank	☐Fixed Roof ☐Variable Vapor Space ☐Pressure (low or high)		☐External Floating ☒ Internal Floating ☐Other – Specify:	
Type of Roof	☐Pan	☒Double Deck	☐Pontoon	☐Other – Specify:
Type of Seal	Metallic Shoe Seal	Liquid Mounted Resilient Seal	Vapor Mounted Resilient Seal	
	☐Primary Seal Only ☐With Rim Mounted Seal ☐With Shoe Mounted Secondary Seal	☐Primary Seal Only ☐With Rim Mounted Seal ☐With Weather Shield	☐Primary Seal Only ☒With Rim Mounted Seal ☐With Weather Shield	

SECTION C – TANK CONTENTS

Alkylate, (RVP 4 psia)

SECTION D – VAPOR DISPOSAL

☒Atmosphere	☐Vapor Recovery Unit	☐Flare	☐Other – Specify:

SECTION E – VAPOR PRESSURE DATA

psia	
Maximum True Vapor Pressure ***-***	Maximum Reid Vapor Pressure ***4***

SECTION F – OPERATIONAL DATA

Maximum Filling Rate (barrels per hour or gallons per hour) ***TBD***	Vapor Space Outage (See AP-42, 7.1-92, Equation 1-15) ***N/A***
Average Throughput (gallons per day) ***102,648***	Tank Turnovers per Year ***26.78***

SECTION G – SOLUTION STORAGE

If material stored is a solution, supply the following information:	
Name of Solvent ***N/A***	Name of Material Dissolved ***N/A***
Concentration of Material Dissolved (% by weight or % by volume or lbs/gal) ***N/A***	

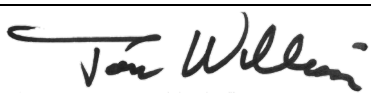
SECTION H – AIR CONTAMINANTS EMITTED

Pollutant*	Maximum Pounds Per Hour	Tons Per Year	Basis and Calculations for Quantities (Attach separate sheet if needed)
2-Methyl naphthalene	***1,2E-04***	***5,3E-04***	***VOC from TANKS 4.0.9d software modeled runs.*** ***HAPs from Table 3-3 of the Emissions Estimation Protocol for Petroleum Refineries*** ***See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"***
Anthracene	***8,3E-06***	***3,6E-05***	
Benzene	***2,4E-03***	***1,1E-02***	
Biphenyl	***5,9E-06***	***2,6E-05***	
Chrysene	***7,3E-06***	***3,2E-05***	
Cresol	***4,5E-04***	***2,0E-03***	
Cumene	***5,2E-04***	***2,3E-03***	
Ethylbenzene	***1,1E-03***	***4,7E-03***	
Fluorene	***1,2E-05***	***5,5E-05***	
Hexane	***1,5E-02***	***6,4E-02***	
Methanol	***1,3E-04***	***5,8E-04***	
Methyl isobutyl ketone	***1,1E-02***	***4,9E-02***	
Methyl tertiary-butyl ether	***1,1E-02***	***4,7E-02***	
Naphthalene	***2,6E-04***	***1,2E-03***	
Phenanthrene	***5,2E-05***	***2,3E-04***	
Phenol	***3,1E-05***	***1,4E-04***	
Pyrene	***1,4E-05***	***5,9E-05***	
Styrene	***2,3E-03***	***1,0E-02***	
Toluene	***6,2E-03***	***2,7E-02***	
Xylene	***4,8E-03***	***2,1E-02***	
VOC	***6.27E-02***	***2.74E-01***	

* Include an estimate of greenhouse gas emissions (CO_2e)

SECTION I – STANDARDS OF PERFORMANCE

Tank subject to:	☐40 CFR 60, Subpart K	☐40 CFR 60, Subpart Ka	☒40 CFR 60, Subpart Kb
Are the standards of performance for new stationary sources; petroleum liquid storage vessels, 40 CFR Part 60, Subparts K, Ka, and Kb being adhered to, where applicable? ☒Yes ☐ No – Explain:			

Signature of Applicant	Date
	09/26/2016

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of Health
Division of Air Quality
918 E Divide Ave., 2nd Floor
Bismarck, ND 58501-1947
(701) 328-5188

PERMIT APPLICATION FOR
VOLATILE ORGANIC COMPOUNDS STORAGE TANK

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8535 (10-13)

SECTION A – FACILITY INFORMATION

Name of Firm or Organization ***Meridian Energy Group – Davis Refinery***		
Applicant´s Name ***Tom Williams***		
Title ***VP of Planning & Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***
Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number (***409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***

SECTION B – TANK DATA

Legal Description of Facility Site ***Property ID 07 0000 00165 000 in the SE 1/4 of Section 2, Twp 139N, Range 100W and Property ID: 07 0000 00162 000 in the NW1/4 and SW 1/4 of Section 1, Twp 139N, Range 100W***				
County ***Billings***		Source ID Number ***203-T-0022***		
Capacity	Barrels ***33,312***		Gallons ***1,399,104***	
Dimensions	Diameter ***63'***	Height ***60'***	Length	Width
Shape	☒Cylindrical	☐Spherical	☐Other – Specify:	
Materials of Construction	***Carbon Steel***			
Construction	☐Riveted	☒Welded	☐Other – Specify:	
Color	***Beige***			
Condition	☒Good	☐Fair	☐Poor	
Status	☒New Construction	☐Alteration	☐Existing (Give Date Constructed): _____	
Type of Tank	☒Fixed Roof ☐Variable Vapor Space ☐Pressure (low or high)		☐External Floating ☐ Internal Floating ☐Other – Specify:	
Type of Roof	☐Pan	☐Double Deck	☐Pontoon	☒Other – Specify: ***Cone Roof***
Type of Seal	Metallic Shoe Seal	Liquid Mounted Resilient Seal	Vapor Mounted Resilient Seal	
	☐Primary Seal Only ☐With Rim Mounted Seal ☐With Shoe Mounted Secondary Seal	☐Primary Seal Only ☐With Rim Mounted Seal ☐With Weather Shield	☐Primary Seal Only ☐With Rim Mounted Seal ☐With Weather Shield	

SECTION C – TANK CONTENTS

Diluent, (TVP 0.004 psia)

SECTION D – VAPOR DISPOSAL

☒Atmosphere	☐Vapor Recovery Unit	☐Flare	☐Other – Specify:

SECTION E – VAPOR PRESSURE DATA

psia	
Maximum True Vapor Pressure ***0.004***	Maximum Reid Vapor Pressure ***-***

SECTION F – OPERATIONAL DATA

Maximum Filling Rate (barrels per hour or gallons per hour) ***TBD***	Vapor Space Outage (See AP-42, 7.1-92, Equation 1-15) ***41.67***
Average Throughput (gallons per day) ***39,564***	Tank Turnovers per Year ***0.01***

SECTION G – SOLUTION STORAGE

If material stored is a solution, supply the following information:	
Name of Solvent ***N/A***	Name of Material Dissolved ***N/A***
Concentration of Material Dissolved (% by weight or % by volume or lbs/gal) ***N/A***	

SECTION H – AIR CONTAMINANTS EMITTED

Pollutant*	Maximum Pounds Per Hour	Tons Per Year	Basis and Calculations for Quantities (Attach separate sheet if needed)
2-Methyl naphthalene	***1.2E-05***	***5.1E-05***	***VOC from TANKS 4.0.9d software modeled runs.*** ***HAPs from Table 3-3 of the Emissions Estimation Protocol for Petroleum Refineries*** ***See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"***
Anthracene	***7.9E-07***	***3.5E-06***	
Benzene	***1.8E-04***	***7.8E-04***	
Biphenyl	***0.0E+00***	***0.0E+00***	
Chrysene	***6.9E-07***	***3.0E-06***	
Cresol	***6.3E-07***	***2.7E-06***	
Cumene	***3.3E-05***	***1.4E-04***	
Ethylbenzene	***5.9E-05***	***2.6E-04***	
Fluorene	***1.2E-06***	***5.2E-06***	
Hexane	***1.6E-03***	***6.9E-03***	
Methanol	***1.3E-05***	***5.5E-05***	
Methyl isobutyl ketone	***1.1E-03***	***4.6E-03***	
Methyl tertiary-butyl ether	***0.0E+00***	***0.0E+00***	
Naphthalene	***1.3E-05***	***5.8E-05***	
Phenanthrene	***5.0E-06***	***2.2E-05***	
Phenol	***2.2E-06***	***9.7E-06***	
Pyrene	***1.3E-06***	***5.6E-06***	
Styrene	***0.0E+00***	***0.0E+00***	
Toluene	***3.3E-04***	***1.4E-03***	
Xylene	***2.3E-04***	***1.0E-03***	
VOC	***3.73E-02***	***1.63E-01***	

* Include an estimate of greenhouse gas emissions (CO_2e)

SECTION I – STANDARDS OF PERFORMANCE

Tank subject to:	☐40 CFR 60, Subpart K	☐40 CFR 60, Subpart Ka	☒40 CFR 60, Subpart Kb
Are the standards of performance for new stationary sources; petroleum liquid storage vessels, 40 CFR Part 60, Subparts K, Ka, and Kb being adhered to, where applicable? ☒Yes ☐ No – Explain:			

Signature of Applicant	Date
	09/26/2016

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of Health
Division of Air Quality
918 E Divide Ave., 2nd Floor
Bismarck, ND 58501-1947
(701) 328-5188

PERMIT APPLICATION FOR VOLATILE ORGANIC COMPOUNDS STORAGE TANK

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8535 (10-13)

SECTION A – FACILITY INFORMATION

Name of Firm or Organization ***Meridian Energy Group – Davis Refinery***		
Applicant´s Name ***Tom Williams***		
Title ***VP of Planning & Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***
Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number (***409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***

SECTION B – TANK DATA

Legal Description of Facility Site ***Property ID 07 0000 00165 000 in the SE 1/4 of Section 2, Twp 139N, Range 100W and Property ID: 07 0000 00162 000 in the NW1/4 and SW 1/4 of Section 1, Twp 139N, Range 100W***				
County ***Billings***		Source ID Number ***203-T-0023***		
Capacity	Barrels ***64,996***		Gallons ***2,729,832***	
Dimensions	Diameter ***88'***	Height ***60'***	Length	Width
Shape	☒Cylindrical	☐Spherical	☐Other – Specify:	
Materials of Construction	***Carbon Steel***			
Construction	☐Riveted	☒Welded	☐Other – Specify:	
Color	***Beige***			
Condition	☒Good	☐Fair	☐Poor	
Status	☒New Construction	☐Alteration	☐Existing (Give Date Constructed): _____	
Type of Tank	☒Fixed Roof ☐Variable Vapor Space ☐Pressure (low or high)		☐External Floating ☐ Internal Floating ☐Other – Specify:	
Type of Roof	☐Pan	☐Double Deck	☐Pontoon	☒Other – Specify: ***Cone Roof***
Type of Seal	Metallic Shoe Seal	Liquid Mounted Resilient Seal	Vapor Mounted Resilient Seal	
	☐Primary Seal Only ☐With Rim Mounted Seal ☐With Shoe Mounted Secondary Seal	☐Primary Seal Only ☐With Rim Mounted Seal ☐With Weather Shield	☐Primary Seal Only ☐With Rim Mounted Seal ☐With Weather Shield	

SECTION C – TANK CONTENTS

Fuel Oil, (TVP 0.000028 psia)

SECTION D – VAPOR DISPOSAL

☒Atmosphere	☐Vapor Recovery Unit	☐Flare	☐Other – Specify:

SECTION E – VAPOR PRESSURE DATA

psia	
Maximum True Vapor Pressure ***0.000028***	Maximum Reid Vapor Pressure ***-***

SECTION F – OPERATIONAL DATA

Maximum Filling Rate (barrels per hour or gallons per hour) ***TBD***	Vapor Space Outage (See AP-42, 7.1-92, Equation 1-15) ***14***
Average Throughput (gallons per day) ***131,880***	Tank Turnovers per Year ***21.16***

SECTION G – SOLUTION STORAGE

If material stored is a solution, supply the following information:	
Name of Solvent ***N/A***	Name of Material Dissolved ***N/A***
Concentration of Material Dissolved (% by weight or % by volume or lbs/gal) ***N/A***	

SECTION H – AIR CONTAMINANTS EMITTED

Pollutant*	Maximum Pounds Per Hour	Tons Per Year	Basis and Calculations for Quantities (Attach separate sheet if needed)
2-Methyl naphthalene	***2.3E-05***	***9.9E-05***	***VOC from TANKS 4.0.9d software modeled runs.*** ***HAPs from Table 3-3 of the Emissions Estimation Protocol for Petroleum Refineries*** ***See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"***
Anthracene	***1.5E-06***	***6.8E-06***	
Benzene	***3.5E-04***	***1.5E-03***	
Biphenyl	***0.0E+00***	***0.0E+00***	
Chrysene	***1.4E-06***	***5.9E-06***	
Cresol	***1.2E-06***	***5.4E-06***	
Cumene	***6.4E-05***	***2.8E-04***	
Ethylbenzene	***1.2E-04***	***5.1E-04***	
Fluorene	***2.3E-06***	***1.0E-05***	
Hexane	***3.1E-03***	***1.4E-02***	
Methanol	***2.4E-05***	***1.1E-04***	
Methyl isobutyl ketone	***2.1E-03***	***9.0E-03***	
Methyl tertiary-butyl ether	***0.0E+00***	***0.0E+00***	
Naphthalene	***2.6E-05***	***1.1E-04***	
Phenanthrene	***9.7E-06***	***4.2E-05***	
Phenol	***4.3E-06***	***1.9E-05***	
Pyrene	***2.5E-06***	***1.1E-05***	
Styrene	***0.0E+00***	***0.0E+00***	
Toluene	***6.4E-04***	***2.8E-03***	
Xylene	***4.5E-04***	***2.0E-03***	
VOC	***9.42E-04***	***4.13E-03***	

* Include an estimate of greenhouse gas emissions (CO_2e)

SECTION I – STANDARDS OF PERFORMANCE

Tank subject to:	☐40 CFR 60, Subpart K	☐40 CFR 60, Subpart Ka	☒40 CFR 60, Subpart Kb
Are the standards of performance for new stationary sources; petroleum liquid storage vessels, 40 CFR Part 60, Subparts K, Ka, and Kb being adhered to, where applicable? ☒Yes ☐ No – Explain:			

Signature of Applicant	Date
	09/26/2016

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of Health
Division of Air Quality
918 E Divide Ave., 2nd Floor
Bismarck, ND 58501-1947
(701) 328-5188

PERMIT APPLICATION FOR VOLATILE ORGANIC COMPOUNDS STORAGE TANK

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8535 (10-13)

SECTION A – FACILITY INFORMATION

Name of Firm or Organization ***Meridian Energy Group – Davis Refinery***		
Applicant´s Name ***Tom Williams***		
Title ***VP of Planning & Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***
Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number (***409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***

SECTION B – TANK DATA

Legal Description of Facility Site ***Property ID 07 0000 00165 000 in the SE 1/4 of Section 2, Twp 139N, Range 100W and Property ID: 07 0000 00162 000 in the NW1/4 and SW 1/4 of Section 1, Twp 139N, Range 100W***				
County ***Billings***		Source ID Number ***203-T-0024***		
Capacity	Barrels ***64,996***		Gallons ***2,729,832***	
Dimensions	Diameter ***88'***	Height ***60'***	Length	Width
Shape	☒Cylindrical	☐Spherical	☐Other – Specify:	
Materials of Construction	***Carbon Steel***			
Construction	☐Riveted	☒Welded	☐Other – Specify:	
Color	***Beige***			
Condition	☒Good	☐Fair	☐Poor	
Status	☒New Construction	☐Alteration	☐Existing (Give Date Constructed): _____	
Type of Tank	☒Fixed Roof ☐Variable Vapor Space ☐Pressure (low or high)		☐External Floating ☐ Internal Floating ☐Other – Specify:	
Type of Roof	☐Pan	☐Double Deck	☐Pontoon	☒Other – Specify: ***Cone Roof***
Type of Seal	Metallic Shoe Seal	Liquid Mounted Resilient Seal	Vapor Mounted Resilient Seal	
	☐Primary Seal Only ☐With Rim Mounted Seal ☐With Shoe Mounted Secondary Seal	☐Primary Seal Only ☐With Rim Mounted Seal ☐With Weather Shield	☐Primary Seal Only ☐With Rim Mounted Seal ☐With Weather Shield	

SECTION C – TANK CONTENTS

Fuel Oil, (TVP 0.000028 psia)

SECTION D – VAPOR DISPOSAL

☒Atmosphere	☐Vapor Recovery Unit	☐Flare	☐Other – Specify:

SECTION E – VAPOR PRESSURE DATA

psia	
Maximum True Vapor Pressure ***0.000028***	Maximum Reid Vapor Pressure ***-***

SECTION F – OPERATIONAL DATA

Maximum Filling Rate (barrels per hour or gallons per hour) ***TBD***	Vapor Space Outage (See AP-42, 7.1-92, Equation 1-15) ***14***
Average Throughput (gallons per day) ***131,880***	Tank Turnovers per Year ***21.16***

SECTION G – SOLUTION STORAGE

If material stored is a solution, supply the following information:	
Name of Solvent ***N/A***	Name of Material Dissolved ***N/A***
Concentration of Material Dissolved (% by weight or % by volume or lbs/gal) ***N/A***	

SECTION H – AIR CONTAMINANTS EMITTED

Pollutant*	Maximum Pounds Per Hour	Tons Per Year	Basis and Calculations for Quantities (Attach separate sheet if needed)
2-Methyl naphthalene	***2.3E-05***	***9.9E-05***	***VOC from TANKS 4.0.9d software modeled runs.*** ***HAPs from Table 3-3 of the Emissions Estimation Protocol for Petroleum Refineries*** ***See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"***
Anthracene	***1.5E-06***	***6.8E-06***	
Benzene	***3.5E-04***	***1.5E-03***	
Biphenyl	***0.0E+00***	***0.0E+00***	
Chrysene	***1.4E-06***	***5.9E-06***	
Cresol	***1.2E-06***	***5.4E-06***	
Cumene	***6.4E-05***	***2.8E-04***	
Ethylbenzene	***1.2E-04***	***5.1E-04***	
Fluorene	***2.3E-06***	***1.0E-05***	
Hexane	***3.1E-03***	***1.4E-02***	
Methanol	***2.4E-05***	***1.1E-04***	
Methyl isobutyl ketone	***2.1E-03***	***9.0E-03***	
Methyl tertiary-butyl ether	***0.0E+00***	***0.0E+00***	
Naphthalene	***2.6E-05***	***1.1E-04***	
Phenanthrene	***9.7E-06***	***4.2E-05***	
Phenol	***4.3E-06***	***1.9E-05***	
Pyrene	***2.5E-06***	***1.1E-05***	
Styrene	***0.0E+00***	***0.0E+00***	
Toluene	***6.4E-04***	***2.8E-03***	
Xylene	***4.5E-04***	***2.0E-03***	
VOC	***9.42E-04***	***4.13E-03***	

* Include an estimate of greenhouse gas emissions (CO_2e)

SECTION I – STANDARDS OF PERFORMANCE

Tank subject to:	☐40 CFR 60, Subpart K	☐40 CFR 60, Subpart Ka	☒40 CFR 60, Subpart Kb
Are the standards of performance for new stationary sources; petroleum liquid storage vessels, 40 CFR Part 60, Subparts K, Ka, and Kb being adhered to, where applicable? ☒Yes ☐ No – Explain:			

Signature of Applicant	Date
	09/26/2016

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Division of Air Quality
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Bismarck, ND 58501-1947
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PERMIT APPLICATION FOR
VOLATILE ORGANIC COMPOUNDS STORAGE TANK

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8535 (10-13)

SECTION A – FACILITY INFORMATION

Name of Firm or Organization ***Meridian Energy Group – Davis Refinery***		
Applicant´s Name ***Tom Williams***		
Title ***VP of Planning & Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***
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County ***Billings***		Source ID Number ***203-T-0031***		
Capacity	Barrels ***33,312***		Gallons ***1,399,104***	
Dimensions	Diameter ***63'***	Height ***60'***	Length	Width
Shape	☒Cylindrical	☐Spherical	☐Other – Specify:	
Materials of Construction	***Carbon Steel***			
Construction	☐Riveted	☒Welded	☐Other – Specify:	
Color	***Beige***			
Condition	☒Good	☐Fair	☐Poor	
Status	☒New Construction	☐Alteration	☐Existing (Give Date Constructed):	
Type of Tank	☐Fixed Roof ☐Variable Vapor Space ☐Pressure (low or high)		☐External Floating ☒ Internal Floating ☐Other – Specify:	
Type of Roof	☐Pan	☒Double Deck	☐Pontoon	☐Other – Specify:
Type of Seal	Metallic Shoe Seal	Liquid Mounted Resilient Seal	Vapor Mounted Resilient Seal	
	☐Primary Seal Only ☐With Rim Mounted Seal ☐With Shoe Mounted Secondary Seal	☐Primary Seal Only ☒With Rim Mounted Seal ☐With Weather Shield	☐Primary Seal Only ☐With Rim Mounted Seal ☐With Weather Shield	

SECTION C – TANK CONTENTS

Light Naphtha, (RVP 15 psia)

SECTION D – VAPOR DISPOSAL

☒Atmosphere	☐Vapor Recovery Unit	☐Flare	☐Other – Specify:

SECTION E – VAPOR PRESSURE DATA

psia	
Maximum True Vapor Pressure ***-***	Maximum Reid Vapor Pressure ***15***

SECTION F – OPERATIONAL DATA

Maximum Filling Rate (barrels per hour or gallons per hour) ***TBD***	Vapor Space Outage (See AP-42, 7.1-92, Equation 1-15) ***N/A***
Average Throughput (gallons per day) ***136,500***	Tank Turnovers per Year ***35.61***

SECTION G – SOLUTION STORAGE

If material stored is a solution, supply the following information:	
Name of Solvent ***N/A***	Name of Material Dissolved ***N/A***
Concentration of Material Dissolved (% by weight or % by volume or lbs/gal) ***N/A***	

SECTION H – AIR CONTAMINANTS EMITTED

Pollutant*	Maximum Pounds Per Hour	Tons Per Year	Basis and Calculations for Quantities (Attach separate sheet if needed)
2-Methyl naphthalene	***1.2E-04***	***5.3E-04***	***VOC from TANKS 4.0.9d software modeled runs.*** ***HAPs from Table 3-3 of the Emissions Estimation Protocol for Petroleum Refineries*** ***See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"***
Anthracene	***8.3E-06***	***3.6E-05***	
Benzene	***2.4E-03***	***1.1E-02***	
Biphenyl	***5.9E-06***	***2.6E-05***	
Chrysene	***7.3E-06***	***3.2E-05***	
Cresol	***4.5E-04***	***2.0E-03***	
Cumene	***5.2E-04***	***2.3E-03***	
Ethylbenzene	***1.1E-03***	***4.7E-03***	
Fluorene	***1.2E-05***	***5.5E-05***	
Hexane	***1.5E-02***	***6.4E-02***	
Methanol	***1.3E-04***	***5.8E-04***	
Methyl isobutyl ketone	***1.1E-02***	***4.9E-02***	
Methyl tertiary-butyl ether	***1.1E-02***	***4.7E-02***	
Naphthalene	***2.6E-04***	***1.2E-03***	
Phenanthrene	***5.2E-05***	***2.3E-04***	
Phenol	***3.1E-05***	***1.4E-04***	
Pyrene	***1.4E-05***	***5.9E-05***	
Styrene	***2.3E-03***	***1.0E-02***	
Toluene	***6.2E-03***	***2.7E-02***	
Xylene	***4.8E-03***	***2.1E-02***	
VOC	***8.55E-02***	***3.75E-01***	

* Include an estimate of greenhouse gas emissions (CO_2e)

SECTION I – STANDARDS OF PERFORMANCE

Tank subject to:	☐40 CFR 60, Subpart K	☐40 CFR 60, Subpart Ka	☒40 CFR 60, Subpart Kb
Are the standards of performance for new stationary sources; petroleum liquid storage vessels, 40 CFR Part 60, Subparts K, Ka, and Kb being adhered to, where applicable? ☒Yes ☐ No – Explain:			

Signature of Applicant	Date
	09/26/2016

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of Health
Division of Air Quality
918 E Divide Ave., 2nd Floor
Bismarck, ND 58501-1947
(701) 328-5188

PERMIT APPLICATION FOR
VOLATILE ORGANIC COMPOUNDS STORAGE TANK

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8535 (10-13)

SECTION A – FACILITY INFORMATION

Name of Firm or Organization ***Meridian Energy Group – Davis Refinery***		
Applicant´s Name ***Tom Williams***		
Title ***VP of Planning & Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***
Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number (***409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***

SECTION B – TANK DATA

Legal Description of Facility Site ***Property ID 07 0000 00165 000 in the SE 1/4 of Section 2, Twp 139N, Range 100W and Property ID: 07 0000 00162 000 in the NW1/4 and SW 1/4 of Section 1, Twp 139N, Range 100W***				
County ***Billings***		Source ID Number ***203-T-0032***		
Capacity	Barrels ***33,312***		Gallons ***1,399,104***	
Dimensions	Diameter ***63'***	Height ***60'***	Length	Width
Shape	☒Cylindrical	☐Spherical	☐Other – Specify:	
Materials of Construction	***Carbon Steel***			
Construction	☐Riveted	☒Welded	☐Other – Specify:	
Color	***Beige***			
Condition	☒Good	☐Fair	☐Poor	
Status	☒New Construction	☐Alteration	☐Existing (Give Date Constructed): _____	
Type of Tank	☐Fixed Roof ☐Variable Vapor Space ☐Pressure (low or high)		☐External Floating ☒ Internal Floating ☐Other – Specify:	
Type of Roof	☐Pan	☒Double Deck	☐Pontoon	☐Other – Specify:
Type of Seal	Metallic Shoe Seal	Liquid Mounted Resilient Seal	Vapor Mounted Resilient Seal	
	☐Primary Seal Only ☐With Rim Mounted Seal ☐With Shoe Mounted Secondary Seal	☐Primary Seal Only ☒With Rim Mounted Seal ☐With Weather Shield	☐Primary Seal Only ☐With Rim Mounted Seal ☐With Weather Shield	

SECTION C – TANK CONTENTS

Light Naphtha, (RVP 15 psia)

SECTION D – VAPOR DISPOSAL

☒Atmosphere	☐Vapor Recovery Unit	☐Flare	☐Other – Specify:

SECTION E – VAPOR PRESSURE DATA

psia	
Maximum True Vapor Pressure ***-***	Maximum Reid Vapor Pressure ***15***

SECTION F – OPERATIONAL DATA

Maximum Filling Rate (barrels per hour or gallons per hour) ***TBD***	Vapor Space Outage (See AP-42, 7.1-92, Equation 1-15) ***N/A***
Average Throughput (gallons per day) ***136,500***	Tank Turnovers per Year ***35.61***

SECTION G – SOLUTION STORAGE

If material stored is a solution, supply the following information:	
Name of Solvent ***N/A***	Name of Material Dissolved ***N/A***
Concentration of Material Dissolved (% by weight or % by volume or lbs/gal) ***N/A***	

SECTION H – AIR CONTAMINANTS EMITTED

Pollutant*	Maximum Pounds Per Hour	Tons Per Year	Basis and Calculations for Quantities (Attach separate sheet if needed)
2-Methyl naphthalene	***1.2E-04***	***5.3E-04***	***VOC from TANKS 4.0.9d software modeled runs.*** ***HAPs from Table 3-3 of the Emissions Estimation Protocol for Petroleum Refineries*** ***See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"***
Anthracene	***8.3E-06***	***3.6E-05***	
Benzene	***2.4E-03***	***1.1E-02***	
Biphenyl	***5.9E-06***	***2.6E-05***	
Chrysene	***7.3E-06***	***3.2E-05***	
Cresol	***4.5E-04***	***2.0E-03***	
Cumene	***5.2E-04***	***2.3E-03***	
Ethylbenzene	***1.1E-03***	***4.7E-03***	
Fluorene	***1.2E-05***	***5.5E-05***	
Hexane	***1.5E-02***	***6.4E-02***	
Methanol	***1.3E-04***	***5.8E-04***	
Methyl isobutyl ketone	***1.1E-02***	***4.9E-02***	
Methyl tertiary-butyl ether	***1.1E-02***	***4.7E-02***	
Naphthalene	***2.6E-04***	***1.2E-03***	
Phenanthrene	***5.2E-05***	***2.3E-04***	
Phenol	***3.1E-05***	***1.4E-04***	
Pyrene	***1.4E-05***	***5.9E-05***	
Styrene	***2.3E-03***	***1.0E-02***	
Toluene	***6.2E-03***	***2.7E-02***	
Xylene	***4.8E-03***	***2.1E-02***	
VOC	***8.55E-02***	***3.75E-01***	

* Include an estimate of greenhouse gas emissions (CO_2e)

SECTION I – STANDARDS OF PERFORMANCE

Tank subject to:	☐40 CFR 60, Subpart K	☐40 CFR 60, Subpart Ka	☒40 CFR 60, Subpart Kb
Are the standards of performance for new stationary sources; petroleum liquid storage vessels, 40 CFR Part 60, Subparts K, Ka, and Kb being adhered to, where applicable? ☒Yes ☐ No – Explain:			

Signature of Applicant	Date
	09/26/2016

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of Health
Division of Air Quality
918 E Divide Ave., 2nd Floor
Bismarck, ND 58501-1947
(701) 328-5188

PERMIT APPLICATION FOR
VOLATILE ORGANIC COMPOUNDS STORAGE TANK

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8535 (10-13)

SECTION A – FACILITY INFORMATION

Name of Firm or Organization ***Meridian Energy Group – Davis Refinery***		
Applicant´s Name ***Tom Williams***		
Title ***VP of Planning & Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***
Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number (***409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***

SECTION B – TANK DATA

Legal Description of Facility Site ***Property ID 07 0000 00165 000 in the SE 1/4 of Section 2, Twp 139N, Range 100W and Property ID: 07 0000 00162 000 in the NW1/4 and SW 1/4 of Section 1, Twp 139N, Range 100W***				
County ***Billings***		Source ID Number ***203-T-0033***		
Capacity	Barrels ***2,620***		Gallons ***110,040***	
Dimensions	Diameter ***25'***	Height ***30'***	Length	Width
Shape	☒Cylindrical	☐Spherical	☐Other – Specify:	
Materials of Construction	***Carbon Steel***			
Construction	☐Riveted	☒Welded	☐Other – Specify:	
Color	***Beige***			
Condition	☒Good	☐Fair	☐Poor	
Status	☒New Construction	☐Alteration	☐Existing (Give Date Constructed): _____	
Type of Tank	☐Fixed Roof ☐Variable Vapor Space ☐Pressure (low or high)		☐External Floating ☒ Internal Floating ☐Other – Specify:	
Type of Roof	☐Pan	☒Double Deck	☐Pontoon	☐Other – Specify:
Type of Seal	Metallic Shoe Seal	Liquid Mounted Resilient Seal	Vapor Mounted Resilient Seal	
	☐Primary Seal Only ☐With Rim Mounted Seal ☒With Shoe Mounted Secondary Seal	☐Primary Seal Only ☐With Rim Mounted Seal ☐With Weather Shield	☐Primary Seal Only ☐With Rim Mounted Seal ☐With Weather Shield	

SECTION C – TANK CONTENTS

Light Slops, (RVP 10 psia)

SECTION D – VAPOR DISPOSAL

☐Atmosphere	☒Vapor Recovery Unit	☐Flare	☐Other – Specify:

SECTION E – VAPOR PRESSURE DATA

psia	
Maximum True Vapor Pressure -	Maximum Reid Vapor Pressure ***10 psia***

SECTION F – OPERATIONAL DATA

Maximum Filling Rate (barrels per hour or gallons per hour) ***TBD***	Vapor Space Outage (See AP-42, 7.1-92, Equation 1-15) ***N/A***
Average Throughput (gallons per day) ***5,775***	Tank Turnovers per Year ***22.96***

SECTION G – SOLUTION STORAGE

If material stored is a solution, supply the following information:	
Name of Solvent ***N/A***	Name of Material Dissolved ***N/A***
Concentration of Material Dissolved (% by weight or % by volume or lbs/gal) ***N/A***	

SECTION H – AIR CONTAMINANTS EMITTED

Pollutant*	Maximum Pounds Per Hour	Tons Per Year	Basis and Calculations for Quantities (Attach separate sheet if needed)
2-Methyl naphthalene	***9.53E-06***	***4.2E-05***	***VOC from TANKS 4.0.9d software modeled runs.*** ***HAPs from Table 3-3 of the Emissions Estimation Protocol for Petroleum Refineries*** ***See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"***
Anthracene	***6.54E-07***	***2.9E-06***	
Benzene	***1.91E-04***	***8.4E-04***	
Biphenyl	***4.63E-07***	***2.0E-06***	
Chrysene	***5.72E-07***	***2.5E-06***	
Cresol	***3.54E-05***	***1.6E-04***	
Cumene	***4.09E-05***	***1.8E-04***	
Ethylbenzene	***8.44E-05***	***3.7E-04***	
Fluorene	***9.80E-07***	***4.3E-06***	
Hexane	***1.14E-03***	***5.0E-03***	
Methanol	***1.03E-05***	***4.5E-05***	
Methyl isobutyl ketone	***8.72E-04***	***3.8E-03***	
Methyl tertiary-butyl ether	***8.44E-04***	***3.7E-03***	
Naphthalene	***2.07E-05***	***9.1E-05***	
Phenanthrene	***4.09E-06***	***1.8E-05***	
Phenol	***2.45E-06***	***1.1E-05***	
Pyrene	***1.06E-06***	***4.7E-06***	
Styrene	***1.80E-04***	***7.9E-04***	
Toluene	***4.90E-04***	***2.1E-03***	
Xylene	***3.81E-04***	***1.7E-03***	
VOC	***1.27E-01***	***5.57E-01***	

* Include an estimate of greenhouse gas emissions (CO_2e)

SECTION I – STANDARDS OF PERFORMANCE

Tank subject to:	☐40 CFR 60, Subpart K	☐40 CFR 60, Subpart Ka	☒40 CFR 60, Subpart Kb
Are the standards of performance for new stationary sources; petroleum liquid storage vessels, 40 CFR Part 60, Subparts K, Ka, and Kb being adhered to, where applicable? ☒Yes ☐ No – Explain:			

Signature of Applicant	Date
	09/26/2016

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of Health
Division of Air Quality
918 E Divide Ave., 2nd Floor
Bismarck, ND 58501-1947
(701) 328-5188

PERMIT APPLICATION FOR
VOLATILE ORGANIC COMPOUNDS STORAGE TANK

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8535 (10-13)

SECTION A – FACILITY INFORMATION

Name of Firm or Organization ***Meridian Energy Group – Davis Refinery***		
Applicant´s Name ***Tom Williams***		
Title ***VP of Planning & Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***
Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number (***409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***

SECTION B – TANK DATA

Legal Description of Facility Site ***Property ID 07 0000 00165 000 in the SE 1/4 of Section 2, Twp 139N, Range 100W and Property ID: 07 0000 00162 000 in the NW1/4 and SW 1/4 of Section 1, Twp 139N, Range 100W***				
County ***Billings***		Source ID Number ***203-T-0034***		
Capacity	Barrels ***2,620***		Gallons ***110,040***	
Dimensions	Diameter ***25'***	Height ***30'***	Length	Width
Shape	☒Cylindrical	☐Spherical	☐Other – Specify:	
Materials of Construction	***Carbon Steel***			
Construction	☐Riveted	☒Welded	☐Other – Specify:	
Color	***Beige***			
Condition	☒Good	☐Fair	☐Poor	
Status	☒New Construction	☐Alteration	☐Existing (Give Date Constructed): _____	
Type of Tank	☒Fixed Roof ☐Variable Vapor Space ☐Pressure (low or high)		☐External Floating ☐ Internal Floating ☐Other – Specify:	
Type of Roof	☐Pan	☐Double Deck	☐Pontoon	☒Other – Specify: ***Cone Roof***
Type of Seal	Metallic Shoe Seal	Liquid Mounted Resilient Seal	Vapor Mounted Resilient Seal	
	☐Primary Seal Only ☐With Rim Mounted Seal ☐With Shoe Mounted Secondary Seal	☐Primary Seal Only ☐With Rim Mounted Seal ☐With Weather Shield	☐Primary Seal Only ☐With Rim Mounted Seal ☐With Weather Shield	

SECTION C – TANK CONTENTS

Heavy Slops, (TVP 0.000028 – 0.004 psia)

SECTION D – VAPOR DISPOSAL

☒Atmosphere	☐Vapor Recovery Unit	☐Flare	☐Other – Specify:

SECTION E – VAPOR PRESSURE DATA

psia	
Maximum True Vapor Pressure ***0.000028 – 0.004 psia***	Maximum Reid Vapor Pressure *-*

SECTION F – OPERATIONAL DATA

Maximum Filling Rate (barrels per hour or gallons per hour) ***TBD***	Vapor Space Outage (See AP-42, 7.1-92, Equation 1-15) ***21.67 ft***
Average Throughput (gallons per day) ***5,775***	Tank Turnovers per Year ***22.96***

SECTION G – SOLUTION STORAGE

If material stored is a solution, supply the following information:	
Name of Solvent ***N/A***	Name of Material Dissolved ***N/A***
Concentration of Material Dissolved (% by weight or % by volume or lbs/gal) ***N/A***	

SECTION H – AIR CONTAMINANTS EMITTED

Pollutant*	Maximum Pounds Per Hour	Tons Per Year	Basis and Calculations for Quantities (Attach separate sheet if needed)
2-Methyl naphthalene	***9.09E-07***	***4.0E-06***	***VOC from TANKS 4.0.9d software modeled runs.*** ***HAPs from Table 3-3 of the Emissions Estimation Protocol for Petroleum Refineries*** ***See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"***
Anthracene	***6.23E-08***	***2.7E-07***	
Benzene	***1.40E-05***	***6.1E-05***	
Biphenyl	***0.00E+00***	***0.0E+00***	
Chrysene	***5.45E-08***	***2.4E-07***	
Cresol	***4.93E-08***	***2.2E-07***	
Cumene	***2.60E-06***	***1.1E-05***	
Ethylbenzene	***4.67E-06***	***2.0E-05***	
Fluorene	***9.35E-08***	***4.1E-07***	
Hexane	***1.25E-04***	***5.5E-04***	
Methanol	***9.87E-07***	***4.3E-06***	
Methyl isobutyl ketone	***8.31E-05***	***3.6E-04***	
Methyl tertiary-butyl ether	***0.00E+00***	***0.0E+00***	
Naphthalene	***1.04E-06***	***4.5E-06***	
Phenanthrene	***3.89E-07***	***1.7E-06***	
Phenol	***1.74E-07***	***7.6E-07***	
Pyrene	***1.01E-07***	***4.4E-07***	
Styrene	***0.00E+00***	***0.0E+00***	
Toluene	***2.60E-05***	***1.1E-04***	
Xylene	***1.82E-05***	***8.0E-05***	
VOC	***0.00E+00***	***0.00E+00***	

* Include an estimate of greenhouse gas emissions (CO_2e)

SECTION I – STANDARDS OF PERFORMANCE

Tank subject to:	☐40 CFR 60, Subpart K	☐40 CFR 60, Subpart Ka	☒40 CFR 60, Subpart Kb
Are the standards of performance for new stationary sources; petroleum liquid storage vessels, 40 CFR Part 60, Subparts K, Ka, and Kb being adhered to, where applicable? ☒Yes ☐ No – Explain:			

Signature of Applicant	Date
	09/26/2016

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of Health
Division of Air Quality
918 E Divide Ave., 2nd Floor
Bismarck, ND 58501-1947
(701) 328-5188

PERMIT APPLICATION FOR
AIR POLLUTION CONTROL EQUIPMENT
NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8532 (09-12)

NOTE: READ INSTRUCTIONS BEFORE COMPLETING THIS FORM.

SECTION A – GENERAL INFORMATION

Name of Firm or Organization ***Meridian Energy Group - Davis Refinery***		
Applicant's Name ***Tom Williams***		
Title ***VP of Planning &Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***

SECTION B – FACILITY INFORMATION

Facility Name ***Davis Refinery / Process Heaters and Boilers***		
Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number ***(409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***
Facility Location ***Property ID 07 0000 00165 000 in the SE 1/4 of Section 2, Twp 139N, Range 100W and Property ID: 07 0000 00162 000 in the NW1/4 and SW 1/4 of Section 1, Twp 139N, Range 100W***		Source ID No. ***101-H-0101***

SECTION C – EQUIPMENT

Type: ☐ Cyclone ☐ Multicyclone ☐ Baghouse ☐ Electrostatic Precipitator

☐ Wet Scrubber ☐ Spray Dryer ☒ Other – Specify: ***Selective Catalytic Reduction (SCR)***

Name of Manufacturer ***TBD***	Model Number ***TBD***	Date to Be Installed ***TBD***

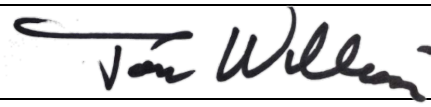
Application: ☐ Boiler ☐ Kiln ☐ Engine ☒ Other – Specify: ***Process heater***

Pollutants Removed	***NOx***			
Design Efficiency (%)	***TBD***			
Operating Efficiency (%)	***TBD***			

Describe method used to determine operating efficiency:
TBD

SECTION D – GAS CONDITIONS

Gas Conditions			Inlet	Outlet
Gas Volume (SCFM; 68°F; 14.7 psia)			***TBD***	***TBD***
Gas Temperature (°F)			***TBD***	***TBD***
Gas Pressure (in. H_2O)			***TBD***	***TBD***
Gas Velocity (ft/sec)			***TBD***	***TBD***
Pollutant Concentration (Specify Pollutant and Unit of Concentration)	Pollutant	Unit of Concentration		
	NOx	***ppmv***	***TBD (2.160 lb/h)***	***TBD (0.454 lb/h)***
Pressure Drop Through Gas Cleaning Device (in. H_2O) ***TBD***				

Signature of Applicant	Date
	9/26/2016

PERMIT APPLICATION FOR
AIR POLLUTION CONTROL EQUIPMENT
NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8532 (09-12)

NOTE: READ INSTRUCTIONS BEFORE COMPLETING THIS FORM.

SECTION A – GENERAL INFORMATION

Name of Firm or Organization ***Meridian Energy Group - Davis Refinery***		
Applicant's Name ***Tom Williams***		
Title ***VP of Planning &Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
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SECTION B – FACILITY INFORMATION

Facility Name ***Davis Refinery / Process Heaters and Boilers***		
Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number ***(409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***
Facility Location ***Property ID 07 0000 00165 000 in the SE 1/4 of Section 2, Twp 139N, Range 100W and Property ID: 07 0000 00162 000 in the NW1/4 and SW 1/4 of Section 1, Twp 139N, Range 100W***		Source ID No. ***102-H-0201***

SECTION C – EQUIPMENT

Type: ☐ Cyclone ☐ Multicyclone ☐ Baghouse ☐ Electrostatic Precipitator

☐ Wet Scrubber ☐ Spray Dryer ☒ Other – Specify: ***Selective Catalytic Reduction (SCR)***

Name of Manufacturer ***TBD***	Model Number ***TBD***	Date to Be Installed ***TBD***

Application: ☐ Boiler ☐ Kiln ☐ Engine ☒ Other – Specify: ***Process heater***

Pollutants Removed	***NOx***			
Design Efficiency (%)	***TBD***			
Operating Efficiency (%)	***TBD***			

Describe method used to determine operating efficiency:
TBD

SECTION D – GAS CONDITIONS

Gas Conditions			Inlet	Outlet
Gas Volume (SCFM; 68°F; 14.7 psia)			***TBD***	***TBD***
Gas Temperature (°F)			***TBD***	***TBD***
Gas Pressure (in. H_2O)			***TBD***	***TBD***
Gas Velocity (ft/sec)			***TBD***	***TBD***
Pollutant Concentration (Specify Pollutant and Unit of Concentration)	Pollutant	Unit of Concentration		
	NOx	***ppmv***	***TBD (2.160 lb/h)***	***TBD (0.454 lb/h)***
Pressure Drop Through Gas Cleaning Device (in. H_2O) ***TBD***				

Signature of Applicant	Date
	9/26/2016

PERMIT APPLICATION FOR
AIR POLLUTION CONTROL EQUIPMENT
NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8532 (09-12)

NOTE: READ INSTRUCTIONS BEFORE COMPLETING THIS FORM.

SECTION A – GENERAL INFORMATION

Name of Firm or Organization ***Meridian Energy Group - Davis Refinery***		
Applicant's Name ***Tom Williams***		
Title ***VP of Planning &Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***

SECTION B – FACILITY INFORMATION

Facility Name ***Davis Refinery / Process Heaters and Boilers***		
Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number ***(409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***
Facility Location ***Property ID 07 0000 00165 000 in the SE 1/4 of Section 2, Twp 139N, Range 100W and Property ID: 07 0000 00162 000 in the NW1/4 and SW 1/4 of Section 1, Twp 139N, Range 100W***		Source ID No. ***103-H-0301***

SECTION C – EQUIPMENT

Type: ☐ Cyclone ☐ Multicyclone ☐ Baghouse ☐ Electrostatic Precipitator

☐ Wet Scrubber ☐ Spray Dryer ☒ Other – Specify: ***Selective Catalytic Reduction (SCR)***

Name of Manufacturer ***TBD***	Model Number ***TBD***	Date to Be Installed ***TBD***

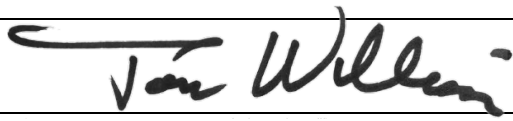
Application: ☐ Boiler ☐ Kiln ☐ Engine ☒ Other – Specify: ***Process heater***

Pollutants Removed	***NOx***			
Design Efficiency (%)	***TBD***			
Operating Efficiency (%)	***TBD***			

Describe method used to determine operating efficiency:
TBD

SECTION D – GAS CONDITIONS

Gas Conditions			Inlet	Outlet
Gas Volume (SCFM; 68°F; 14.7 psia)			***TBD***	***TBD***
Gas Temperature (°F)			***TBD***	***TBD***
Gas Pressure (in. H_2O)			***TBD***	***TBD***
Gas Velocity (ft/sec)			***TBD***	***TBD***
Pollutant Concentration (Specify Pollutant and Unit of Concentration)	Pollutant	Unit of Concentration		
	NOx	***ppmv***	***TBD (2.294 lb/h)***	***TBD (0.482 lb/h)***
Pressure Drop Through Gas Cleaning Device (in. H_2O) ***TBD***				

Signature of Applicant	Date
	9/26/2016

PERMIT APPLICATION FOR
AIR POLLUTION CONTROL EQUIPMENT
NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8532 (09-12)

NOTE: READ INSTRUCTIONS BEFORE COMPLETING THIS FORM.

SECTION A – GENERAL INFORMATION

Name of Firm or Organization ***Meridian Energy Group - Davis Refinery***		
Applicant's Name ***Tom Williams***		
Title ***VP of Planning &Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***

SECTION B – FACILITY INFORMATION

Facility Name ***Davis Refinery / Process Heaters and Boilers***		
Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number ***(409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***
Facility Location ***Property ID 07 0000 00165 000 in the SE 1/4 of Section 2, Twp 139N, Range 100W and Property ID: 07 0000 00162 000 in the NW1/4 and SW 1/4 of Section 1, Twp 139N, Range 100W***		Source ID No. ***103-H-0302***

SECTION C – EQUIPMENT

Type: ☐ Cyclone ☐ Multicyclone ☐ Baghouse ☐ Electrostatic Precipitator

☐ Wet Scrubber ☐ Spray Dryer ☒ Other – Specify: ***Selective Catalytic Reduction (SCR)***

Name of Manufacturer ***TBD***	Model Number ***TBD***	Date to Be Installed ***TBD***

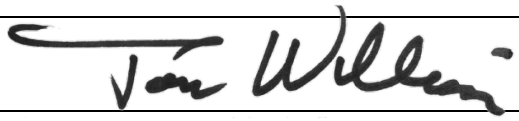
Application: ☐ Boiler ☐ Kiln ☐ Engine ☒ Other – Specify: ***Process heater***

Pollutants Removed	***NOx***			
Design Efficiency (%)	***TBD***			
Operating Efficiency (%)	***TBD***			

Describe method used to determine operating efficiency:
TBD

SECTION D – GAS CONDITIONS

Gas Conditions			Inlet	Outlet
Gas Volume (SCFM; 68°F; 14.7 psia)			***TBD***	***TBD***
Gas Temperature (°F)			***TBD***	***TBD***
Gas Pressure (in. H_2O)			***TBD***	***TBD***
Gas Velocity (ft/sec)			***TBD***	***TBD***
Pollutant Concentration (Specify Pollutant and Unit of Concentration)	Pollutant	Unit of Concentration		
	NOx	***ppmv***	***TBD (1.730 lb/h)***	***TBD (0.363 lb/h)***
Pressure Drop Through Gas Cleaning Device (in. H_2O) ***TBD***				

Signature of Applicant	Date
	9/26/2016

PERMIT APPLICATION FOR
AIR POLLUTION CONTROL EQUIPMENT
NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8532 (09-12)

NOTE: READ INSTRUCTIONS BEFORE COMPLETING THIS FORM.

SECTION A – GENERAL INFORMATION

Name of Firm or Organization ***Meridian Energy Group - Davis Refinery***		
Applicant's Name ***Tom Williams***		
Title ***VP of Planning &Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***

SECTION B – FACILITY INFORMATION

Facility Name ***Davis Refinery / Process Heaters and Boilers***		
Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number ***(409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***
Facility Location ***Property ID 07 0000 00165 000 in the SE 1/4 of Section 2, Twp 139N, Range 100W and Property ID: 07 0000 00162 000 in the NW1/4 and SW 1/4 of Section 1, Twp 139N, Range 100W***		Source ID No. ***106-H-0601***

SECTION C – EQUIPMENT

Type: ☐ Cyclone ☐ Multicyclone ☐ Baghouse ☐ Electrostatic Precipitator

☐ Wet Scrubber ☐ Spray Dryer ☒ Other – Specify: ***Selective Catalytic Reduction (SCR)***

Name of Manufacturer ***TBD***	Model Number ***TBD***	Date to Be Installed ***TBD***

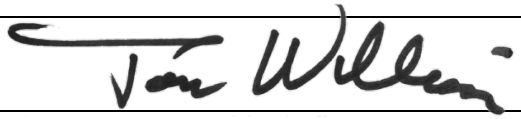
Application: ☐ Boiler ☐ Kiln ☐ Engine ☒ Other – Specify: ***Process heater***

Pollutants Removed	***NOx***			
Design Efficiency (%)	***TBD***			
Operating Efficiency (%)	***TBD***			

Describe method used to determine operating efficiency:
TBD

SECTION D – GAS CONDITIONS

Gas Conditions			Inlet	Outlet
Gas Volume (SCFM; 68°F; 14.7 psia)			***TBD***	***TBD***
Gas Temperature (°F)			***TBD***	***TBD***
Gas Pressure (in. H_2O)			***TBD***	***TBD***
Gas Velocity (ft/sec)			***TBD***	***TBD***
Pollutant Concentration (Specify Pollutant and Unit of Concentration)	Pollutant	Unit of Concentration		
	NOx	***ppmv***	***TBD (1.252 lb/h)***	***TBD (0.263 lb/h)***
Pressure Drop Through Gas Cleaning Device (in. H_2O) ***TBD***				

Signature of Applicant	Date
	09/26/2016

PERMIT APPLICATION FOR
AIR POLLUTION CONTROL EQUIPMENT
NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8532 (09-12)

NOTE: READ INSTRUCTIONS BEFORE COMPLETING THIS FORM.

SECTION A – GENERAL INFORMATION

Name of Firm or Organization ***Meridian Energy Group - Davis Refinery***		
Applicant's Name ***Tom Williams***		
Title ***VP of Planning &Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***

SECTION B – FACILITY INFORMATION

Facility Name ***Davis Refinery / Process Heaters and Boilers***		
Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number ***(409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***
Facility Location ***Property ID 07 0000 00165 000 in the SE 1/4 of Section 2, Twp 139N, Range 100W and Property ID: 07 0000 00162 000 in the NW1/4 and SW 1/4 of Section 1, Twp 139N, Range 100W***		Source ID No. ***107-H-0701***

SECTION C – EQUIPMENT

Type: ☐ Cyclone ☐ Multicyclone ☐ Baghouse ☐ Electrostatic Precipitator

☐ Wet Scrubber ☐ Spray Dryer ☒ Other – Specify: ***Selective Catalytic Reduction (SCR)***

Name of Manufacturer ***TBD***	Model Number ***TBD***	Date to Be Installed ***TBD***

Application: ☐ Boiler ☐ Kiln ☐ Engine ☒ Other – Specify: ***Process heater***

Pollutants Removed	***NOx***			
Design Efficiency (%)	***TBD***			
Operating Efficiency (%)	***TBD***			

Describe method used to determine operating efficiency:
TBD

SECTION D – GAS CONDITIONS

Gas Conditions			Inlet	Outlet
Gas Volume (SCFM; 68°F; 14.7 psia)			***TBD***	***TBD***
Gas Temperature (°F)			***TBD***	***TBD***
Gas Pressure (in. H_2O)			***TBD***	***TBD***
Gas Velocity (ft/sec)			***TBD***	***TBD***
Pollutant Concentration (Specify Pollutant and Unit of Concentration)	Pollutant	Unit of Concentration		
	NOx	***ppmv***	***TBD (2.775lb/h)***	***TBD (0.583 lb/h)***
Pressure Drop Through Gas Cleaning Device (in. H_2O) ***TBD***				

Signature of Applicant	Date
	09/26/2016

PERMIT APPLICATION FOR
AIR POLLUTION CONTROL EQUIPMENT
NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8532 (09-12)

NOTE: READ INSTRUCTIONS BEFORE COMPLETING THIS FORM.

SECTION A – GENERAL INFORMATION

Name of Firm or Organization ***Meridian Energy Group - Davis Refinery***		
Applicant's Name ***Tom Williams***		
Title ***VP of Planning &Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***

SECTION B – FACILITY INFORMATION

Facility Name ***Davis Refinery / Process Heaters and Boilers***		
Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number ***(409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***
Facility Location ***Property ID 07 0000 00165 000 in the SE 1/4 of Section 2, Twp 139N, Range 100W and Property ID: 07 0000 00162 000 in the NW1/4 and SW 1/4 of Section 1, Twp 139N, Range 100W***		Source ID No. ***118-H-1801***

SECTION C – EQUIPMENT

Type: ☐ Cyclone ☐ Multicyclone ☐ Baghouse ☐ Electrostatic Precipitator

☐ Wet Scrubber ☐ Spray Dryer ☒ Other – Specify: ***Selective Catalytic Reduction (SCR)***

Name of Manufacturer ***TBD***	Model Number ***TBD***	Date to Be Installed ***TBD***

Application: ☐ Boiler ☐ Kiln ☐ Engine ☒ Other – Specify: ***Process heater***

Pollutants Removed	***NOx***			
Design Efficiency (%)	***TBD***			
Operating Efficiency (%)	***TBD***			

Describe method used to determine operating efficiency:
TBD

SECTION D – GAS CONDITIONS

Gas Conditions			Inlet	Outlet
Gas Volume (SCFM; 68°F; 14.7 psia)			***TBD***	***TBD***
Gas Temperature (°F)			***TBD***	***TBD***
Gas Pressure (in. H_2O)			***TBD***	***TBD***
Gas Velocity (ft/sec)			***TBD***	***TBD***
Pollutant Concentration (Specify Pollutant and Unit of Concentration)	Pollutant	Unit of Concentration		
	NOx	***ppmv***	***TBD (2.526 lb/h)***	***TBD (0.530 lb/h)***
Pressure Drop Through Gas Cleaning Device (in. H_2O) ***TBD***				

Signature of Applicant	Date
	09/26/2016

PERMIT APPLICATION FOR
AIR POLLUTION CONTROL EQUIPMENT
NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8532 (09-12)

NOTE: READ INSTRUCTIONS BEFORE COMPLETING THIS FORM.

SECTION A – GENERAL INFORMATION

Name of Firm or Organization ***Meridian Energy Group - Davis Refinery***		
Applicant's Name ***Tom Williams***		
Title ***VP of Planning &Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***

SECTION B – FACILITY INFORMATION

Facility Name ***Davis Refinery / Process Heaters and Boilers***		
Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number ***(409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***
Facility Location ***Property ID 07 0000 00165 000 in the SE 1/4 of Section 2, Twp 139N, Range 100W and Property ID: 07 0000 00162 000 in the NW1/4 and SW 1/4 of Section 1, Twp 139N, Range 100W***		Source ID No. ***202-PK-0201A***

SECTION C – EQUIPMENT

Type: ☐ Cyclone ☐ Multicyclone ☐ Baghouse ☐ Electrostatic Precipitator

☐ Wet Scrubber ☐ Spray Dryer ☒ Other – Specify: ***Selective Catalytic Reduction (SCR)***

Name of Manufacturer ***TBD***	Model Number ***TBD***	Date to Be Installed ***TBD***

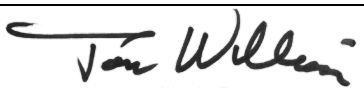
Application: ☐ Boiler ☐ Kiln ☐ Engine ☒ Other – Specify: ***Utility boiler***

Pollutants Removed	***NOx***	***Organic HAP***		
Design Efficiency (%)	***75***	***75***		
Operating Efficiency (%)	***TBD***	***TBD***		

Describe method used to determine operating efficiency:
TBD

SECTION D – GAS CONDITIONS

Gas Conditions			Inlet	Outlet
Gas Volume (SCFM; 68°F; 14.7 psia)			***TBD***	***TBD***
Gas Temperature (°F)			***TBD***	***TBD***
Gas Pressure (in. H_2O)			***TBD***	***TBD***
Gas Velocity (ft/sec)			***TBD***	***TBD***
Pollutant Concentration (Specify Pollutant and Unit of Concentration)	Pollutant	Unit of Concentration		
	NOx	***ppmv***	***TBD (2.941 lb/h)***	***TBD (0.735 lb/h)***
	Organic HAPs	***ppmv***	***TBD (1.17E-01 lb/h)***	***TBD (2.93E-02 lb/h)***
Pressure Drop Through Gas Cleaning Device (in. H_2O) ***TBD***				

Signature of Applicant	Date
	09/26/2016

PERMIT APPLICATION FOR
AIR POLLUTION CONTROL EQUIPMENT
NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8532 (09-12)

NOTE: READ INSTRUCTIONS BEFORE COMPLETING THIS FORM.

SECTION A – GENERAL INFORMATION

Name of Firm or Organization ***Meridian Energy Group - Davis Refinery***		
Applicant's Name ***Tom Williams***		
Title ***VP of Planning &Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***

SECTION B – FACILITY INFORMATION

Facility Name ***Davis Refinery / Process Heaters and Boilers***		
Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number ***(409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***
Facility Location ***Property ID 07 0000 00165 000 in the SE 1/4 of Section 2, Twp 139N, Range 100W and Property ID: 07 0000 00162 000 in the NW1/4 and SW 1/4 of Section 1, Twp 139N, Range 100W***		Source ID No. ***202-PK-0201B***

SECTION C – EQUIPMENT

Type: ☐ Cyclone ☐ Multicyclone ☐ Baghouse ☐ Electrostatic Precipitator

☐ Wet Scrubber ☐ Spray Dryer ☒ Other – Specify: ***Selective Catalytic Reduction (SCR)***

Name of Manufacturer ***TBD***	Model Number ***TBD***	Date to Be Installed ***TBD***

Application: ☐ Boiler ☐ Kiln ☐ Engine ☒ Other – Specify: ***Utility boiler***

Pollutants Removed	***NOx***	***Organic HAP***		
Design Efficiency (%)	***75***	***75***		
Operating Efficiency (%)	***TBD***	***TBD***		

Describe method used to determine operating efficiency:
TBD

SECTION D – GAS CONDITIONS

Gas Conditions			Inlet	Outlet
Gas Volume (SCFM; 68°F; 14.7 psia)			***TBD***	***TBD***
Gas Temperature (°F)			***TBD***	***TBD***
Gas Pressure (in. H_2O)			***TBD***	***TBD***
Gas Velocity (ft/sec)			***TBD***	***TBD***
Pollutant Concentration (Specify Pollutant and Unit of Concentration)	Pollutant	Unit of Concentration		
	NOx	***ppmv***	***TBD (2.941 lb/h)***	***TBD (0.735 lb/h)***
	Organic HAPs	***ppmv***	***TBD (1.17E-01 lb/h)***	***TBD (2.93E-02 lb/h)***
Pressure Drop Through Gas Cleaning Device (in. H_2O) ***TBD***				

Signature of Applicant	Date
	09/26/2016

PERMIT APPLICATION FOR
AIR POLLUTION CONTROL EQUIPMENT
NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8532 (09-12)

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SECTION A – GENERAL INFORMATION

Name of Firm or Organization ***Meridian Energy Group - Davis Refinery***		
Applicant's Name ***Tom Williams***		
Title ***VP of Planning &Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***

SECTION B – FACILITY INFORMATION

Facility Name ***Davis Refinery / Process Heaters and Boilers***		
Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number ***(409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***
Facility Location ***Property ID 07 0000 00165 000 in the SE 1/4 of Section 2, Twp 139N, Range 100W and Property ID: 07 0000 00162 000 in the NW1/4 and SW 1/4 of Section 1, Twp 139N, Range 100W***		Source ID No. ***202-PK-0201C***

SECTION C – EQUIPMENT

Type: ☐ Cyclone ☐ Multicyclone ☐ Baghouse ☐ Electrostatic Precipitator ☐ Wet Scrubber ☐ Spray Dryer ☒ Other – Specify: ***Selective Catalytic Reduction (SCR)***

Name of Manufacturer ***TBD***	Model Number ***TBD***	Date to Be Installed ***TBD***

Application: ☐ Boiler ☐ Kiln ☐ Engine ☒ Other – Specify: ***Utility boiler***

Pollutants Removed	***NOx***	***Organic HAP***		
Design Efficiency (%)	***75***	***75***		
Operating Efficiency (%)	***TBD***	***TBD***		

Describe method used to determine operating efficiency:
TBD

SECTION D – GAS CONDITIONS

Gas Conditions			Inlet	Outlet
Gas Volume (SCFM; 68°F; 14.7 psia)			***TBD***	***TBD***
Gas Temperature (°F)			***TBD***	***TBD***
Gas Pressure (in. H_2O)			***TBD***	***TBD***
Gas Velocity (ft/sec)			***TBD***	***TBD***
Pollutant Concentration (Specify Pollutant and Unit of Concentration)	Pollutant	Unit of Concentration		
	NOx	***ppmv***	***TBD (2.941 lb/h)***	***TBD (0.735 lb/h)***
	Organic HAPs	***ppmv***	***TBD (1.17E-01 lb/h)***	***TBD (2.93E-02 lb/h)***
Pressure Drop Through Gas Cleaning Device (in. H_2O) ***TBD***				

Signature of Applicant	Date
	09/26/2016

PERMIT APPLICATION FOR
AIR POLLUTION CONTROL EQUIPMENT
NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8532 (09-12)

NOTE: READ INSTRUCTIONS BEFORE COMPLETING THIS FORM.

SECTION A – GENERAL INFORMATION

Name of Firm or Organization ***Meridian Energy Group - Davis Refinery***		
Applicant's Name ***Tom Williams***		
Title ***VP of Planning &Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***

SECTION B – FACILITY INFORMATION

Facility Name ***Davis Refinery / FCCU***		
Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number ***(409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***
Facility Location ***Property ID 07 0000 00165 000 in the SE 1/4 of Section 2, Twp 139N, Range 100W and Property ID: 07 0000 00162 000 in the NW1/4 and SW 1/4 of Section 1, Twp 139N, Range 100W***		Source ID No. ***112-VS-1201***

SECTION C – EQUIPMENT

Type: ☐ Cyclone ☐ Multicyclone ☐ Baghouse ☐ Electrostatic Precipitator

☒ ***Wet Scrubber*** ☐ Spray Dryer ☒ Other – Specify:

COP-NP - Non-Platinum
CO combustion promoter

Name of Manufacturer ***TBD***	Model Number ***TBD***	Date to Be Installed ***TBD***

Application: ☐ Boiler ☐ Kiln ☐ Engine ☒ Other – Specify: ***Process Vent***

Pollutants Removed	***PM***	***SO_2***	***NOx***		
Design Efficiency (%)	***98***	***99***	***98***		
Operating Efficiency	***TBD***	***TBD***	***TBD***		

Describe method used to determine operating efficiency:
TBD

SECTION D – GAS CONDITIONS

Gas Conditions			Inlet	Outlet
Gas Volume (SCFM; 68°F; 14.7 psia)			***TBD***	***TBD***
Gas Temperature (°F)			***TBD***	***TBD***
Gas Pressure (in. H_2O)			***TBD***	***TBD***
Gas Velocity (ft/sec)			***TBD***	***TBD***
Pollutant Concentration (Specify Pollutant and Unit of Concentration)	Pollutant	Unit of Concentration		
	PM	***ppmv***	***TBD***	***TBD***
	SO_2	***ppmv***	***TBD***	***TBD***
	NOx	***ppmv***	***TBD***	***TBD***
	VOC	***ppmv***	***TBD***	***TBD***
	HAPs	***ppmv***	***TBD***	***TBD***
Pressure Drop Through Gas Cleaning Device (in. H_2O) ***TBD***				

Signature of Applicant	Date
	09/26/2016

PERMIT APPLICATION FOR AIR POLLUTION CONTROL EQUIPMENT

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8532 (09-12)

NOTE: READ INSTRUCTIONS BEFORE COMPLETING THIS FORM.

SECTION A – GENERAL INFORMATION

Name of Firm or Organization ***Meridian Energy Group - Davis Refinery***		
Applicant's Name ***Tom Williams***		
Title ***VP of Planning &Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***

SECTION B – FACILITY INFORMATION

Facility Name ***Davis Refinery / SRU Thermal Oxidizer***		
Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number ***(409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***
Facility Location ***Property ID 07 0000 00165 000 in the SE 1/4 of Section 2, Twp 139N, Range 100W and Property ID: 07 0000 00162 000 in the NW1/4 and SW 1/4 of Section 1, Twp 139N, Range 100W***		Source ID No. ***122-H-2201***

SECTION C – EQUIPMENT

Type: ☐ Cyclone ☐ Multicyclone ☐ Baghouse ☐ Electrostatic Precipitator

☐ Wet Scrubber ☐ Spray Dryer ☒ Other – Specify: ***Thermal Oxidizer***

Name of Manufacturer ***TBD***	Model Number ***TBD***	Date to Be Installed ***TBD***

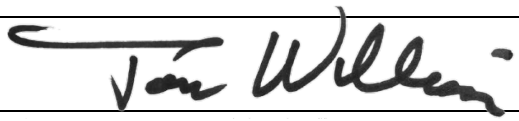
Application: ☐ Boiler ☐ Kiln ☐ Engine ☒ Other – Specify: ***Process Vent***

Pollutants Removed	***VOC***	***H_2S***		
Design Efficiency (%)	***99.9***	***99.9***		
Operating Efficiency (%)	***TBD***	***TBD***		

Describe method used to determine operating efficiency:
TBD

SECTION D – GAS CONDITIONS

Gas Conditions			Inlet	Outlet
Gas Volume (SCFM; 68°F; 14.7 psia)			***3,779.2***	***3,917.2***
Gas Temperature (°F)			***125***	***414.5***
Gas Pressure (in. H_2O)			***TBD***	***406.8***
Gas Velocity (ft/sec)			***TBD***	***50***
Pollutant Concentration (Specify Pollutant and Unit of Concentration)	Pollutant	Unit of Concentration		
	VOC	***ppmv***	***1.54% (molar)***	***16.0***
	SO_2	***ppmv***	***1.13 (H_2S)***	***1.15***
	CO	***ppmv***	***0***	***28.7***
	NO_x	***ppmv***	***0***	***3.84***
Pressure Drop Through Gas Cleaning Device (in. H_2O) ***TBD***				

Signature of Applicant	Date
	9/26/2016

PERMIT APPLICATION FOR
AIR POLLUTION CONTROL EQUIPMENT
NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8532 (09-12)

NOTE: READ INSTRUCTIONS BEFORE COMPLETING THIS FORM.

SECTION A – GENERAL INFORMATION

Name of Firm or Organization ***Meridian Energy Group - Davis Refinery***		
Applicant's Name ***Tom Williams***		
Title ***VP of Planning &Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***

SECTION B – FACILITY INFORMATION

Facility Name ***Davis Refinery / Vapor Recovery Unit (VRU)***		
Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number ***(409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***
Facility Location ***Property ID 07 0000 00165 000 in the SE 1/4 of Section 2, Twp 139N, Range 100W and Property ID: 07 0000 00162 000 in the NW1/4 and SW 1/4 of Section 1, Twp 139N, Range 100W***		Source ID No. ***Applied to sources: 203-T-0013, 203-T-0014, 203-T-0015, 203-T-0016, 203-T-0033***

SECTION C – EQUIPMENT

Type: ☐ Cyclone ☐ Multicyclone ☐ Baghouse ☐ Electrostatic Precipitator

☐ Wet Scrubber ☐ Spray Dryer ☒ Other – Specify: ***Vapor Recovery Unit***

Name of Manufacturer ***TBD***	Model Number ***TBD***	Date to Be Installed ***TBD***

Application: ☐ Boiler ☐ Kiln ☐ Engine ☒ Other – Specify: ***Diesel and Slop Tanks***

Pollutants Removed	***VOC***			
Design Efficiency (%)	***95***			
Operating Efficiency (%)	***TBD***			

Describe method used to determine operating efficiency:
TBD

SECTION D – GAS CONDITIONS

Gas Conditions			Inlet	Outlet
Gas Volume (SCFM; 68°F; 14.7 psia)			***TBD***	***TBD***
Gas Temperature (°F)			***TBD***	***TBD***
Gas Pressure (in. H_2O)			***TBD***	***TBD***
Gas Velocity (ft/sec)			***TBD***	***TBD***
Pollutant Concentration (Specify Pollutant and Unit of Concentration)	Pollutant	Unit of Concentration		
	VOC	***ppmv***	***TBD***	***TBD***
Pressure Drop Through Gas Cleaning Device (in. H_2O) ***TBD***				

Signature of Applicant	Date
	09/26/2016

PERMIT APPLICATION FOR FLARES

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 59652 (09-12)

SECTION A – GENERAL INFORMATION

Name of Firm or Organization ***Meridian Energy Group – Davis Refinery***		
Applicant's Name ***Tom Williams***		
Title ***VP of Planning & Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***

SECTION B – FACILITY INFORMATION

Facility Name ***Davis Refinery / Enclosed HC Operating Flare***			
ND Air Pollution Control Permit No. (If Applicable) ***N/A***			
Contact Person for Air Pollution Matters ***Tom Johnson***			
Title ***Vice President of Operations***	Telephone Number ***(409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***	
Facility Address (Street & No.) ***37th Street***			
City ***Belfield***	State ***ND***	ZIP Code ***58622***	
Country ***USA***	Latitude (Nearest Second) ***46°52'45"N***	Longitude (Nearest Second) ***103°14'55" W***	
Legal Description of Facility Site ***Property ID 07 0000 00165 000 in the SE 1/4 of Section 2, Twp 139N, Range 100W and Property ID: 07 0000 00162 000 in the NW1/4 and SW 1/4 of Section 1, Twp 139N, Range 100W***	MSL Elevation at Facility ***2,685 feet***	Source ID ***207-FL-1701***	

SECTION C – FLARE INFORMATION

Use: ☐Emergency ☒Process ☐Both	Subject to NSPS (40 CFR 60.18) ☒Yes ☐No		
Emission Point ID ***207-FL-1701***	Height Above Ground Level (ft.) ***50***	Diameter at Top (ft.) ***30***	
Flame Monitor:	☒Thermocouple ☐Infrared ☐Ultraviolet ☐Acoustic ☐Other:		
Ignition:	☐Automatic ☐Other:	☒Continuous Burning Pilot	
Average Btu/1000 scf ***0.52***	Percent H_2S ***0***	Maximum Hourly Flow Rate to Flare ***24.4 MMSCFD***	

SECTION D – AIR CONTAMINANTS EMITTED

Pollutant	Quantity		Basis Of Estimate
	Pounds/Hr	Tons/Yr	
SO_2	***7.20E-04***	***3.15E-03***	***Criteria Pollutants from Gas pilots: TABLE 1.4-2. AP 42, Chapter 1: External Combustion Sources.*** ***HAPs: Emissions Estimation Protocol for Petroleum Refineries, Table 6-4 "Flare General Emission Factors"*** ***See Document P-5715043-00-001-18042-I001 "EMISSIONS INVENTORY"***
VOC	***6.60E-03***	***2.89E-02***	
NOx	***6.00E-02***	***2.63E-01***	
CO	***1.01E-01***	***4.42E-01***	
PM 10 Total	***9.12E-03***	***3.99E-02***	
PM 10 Filterable	***2.28E-03***	***9.99E-03***	
PM 2.5 Total	***9.12E-03***	***3.99E-02***	
PM 2.5 Filterable	***2.28E-03***	***9.99E-03***	
PM 2.5 Condensable	***6.84E-03***	***3.00E-02***	
Lead (Pb)	***6.00E-07***	***2.63E-06***	
GHG (as CO2e)	***N/A***		
Total HAPS	***5.42E-01***	***2.38***	

Will flaring of gas comply with applicable Ambient Air Quality Standards? ☒Yes ☐No

IS THIS UNIT IN COMPLIANCE WITH ALL APPLICABLE AIR POLLUTION RULES AND REGULATIONS?

☒YES ☐NO

If “NO” a Compliance Schedule must be completed and attached.

Signature of Applicant	Date
	09/26/2016

Attach and label separate sheet(s) if you need more space to explain any system or answers or to provide complete listings of Emissions, Contaminants, or other items.

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of Health
Division of Air Quality
918 E Divide Ave., 2nd Floor
Bismarck, ND 58501-1947
(701) 328-5188

PERMIT APPLICATION FOR FLARES

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 59652 (09-12)

SECTION A – GENERAL INFORMATION

Name of Firm or Organization ***Meridian Energy Group – Davis Refinery***		
Applicant's Name ***Tom Williams***		
Title ***VP of Planning & Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***

SECTION B – FACILITY INFORMATION

Facility Name ***Davis Refinery / Acid Flare***			
ND Air Pollution Control Permit No. (If Applicable) ***N/A***			
Contact Person for Air Pollution Matters ***Tom Johnson***			
Title ***Vice President of Operations***	Telephone Number ***(409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***	
Facility Address (Street & No.) ***37th Street***			
City ***Belfield***	State ***ND***	ZIP Code ***58622***	
Country ***USA***	Latitude (Nearest Second) ***46°52'45"N***	Longitude (Nearest Second) ***103°14'55" W***	
Legal Description of Facility Site ***Property ID 07 0000 00165 000 in the SE 1/4 of Section 2, Twp 139N, Range 100W and Property ID: 07 0000 00162 000 in the NW1/4 and SW 1/4 of Section 1, Twp 139N, Range 100W***	MSL Elevation at Facility ***2,685 feet***	Source ID ***207-FL-1702***	

SECTION C – FLARE INFORMATION

Use: ☐Emergency ☒Process ☐Both	Subject to NSPS (40 CFR 60.18) ☒Yes ☐No		
Emission Point ID ***207-FL-1702***	Height Above Ground Level (ft.) ***150***	Diameter at Top (ft.) ***0.8333***	
Flame Monitor:	☒Thermocouple ☐Infrared ☐Ultraviolet ☐Acoustic ☐Other:		
Ignition:	☐Automatic ☒Continuous Burning Pilot ☐Other:		
Average Btu/1000 scf ***0.52***	Percent H_2S ***0***	Maximum Hourly Flow Rate to Flare ***15.8 MMSCFD***	

SECTION D – AIR CONTAMINANTS EMITTED

Pollutant	Quantity		Basis Of Estimate
	Pounds/Hr	Tons/Yr	
SO2	***1.20E-04***	***5.26E-04***	***Criteria Pollutants from Gas pilots: TABLE 1.4-2. AP 42, Chapter 1: External Combustion Sources.*** ***See Document P-5715043-00-001-18042-I001 "EMISSIONS INVENTORY"***
VOC	***1.10E-03***	***4.82E-03***	
NOx	***1.00E-02***	***4.38E-02***	
CO	***1.68E-02***	***7.36E-02***	
PM 10 Total	***1.52E-03***	***6.66E-03***	
PM 10 Filterable	***3.80E-04***	***1.66E-03***	
PM 2.5 Total	***1.52E-03***	***6.66E-03***	
PM 2.5 Filterable	***3.80E-04***	***1.66E-03***	
PM 2.5 Condensable	***1.14E-03***	***4.99E-03***	
Lead (Pb)	***1.00E-07***	***4.38E-07***	
GHG (as CO2e)	***N/A***		
Total HAPS	***-***	***-***	

Will flaring of gas comply with applicable Ambient Air Quality Standards? ☒Yes ☐No

IS THIS UNIT IN COMPLIANCE WITH ALL APPLICABLE AIR POLLUTION RULES AND REGULATIONS?

☒YES ☐NO

If "NO" a Compliance Schedule must be completed and attached.

Signature of Applicant	Date
Jon Wilson	09/26/2016

Attach and label separate sheet(s) if you need more space to explain any system or answers or to provide complete listings of Emissions, Contaminants, or other items.

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of Health
Division of Air Quality
918 E Divide Ave., 2nd Floor
Bismarck, ND 58501-1947
(701) 328-5188

PERMIT APPLICATION FOR FLARES

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 59652 (09-12)

SECTION A – GENERAL INFORMATION

Name of Firm or Organization ***Meridian Energy Group – Davis Refinery***		
Applicant's Name ***Tom Williams***		
Title ***VP of Planning & Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***

SECTION B – FACILITY INFORMATION

Facility Name ***Davis Refinery / HC Emergency Flare (Phase 1)***			
ND Air Pollution Control Permit No. (If Applicable) ***N/A***			
Contact Person for Air Pollution Matters ***Tom Johnson***			
Title ***Vice President of Operations***	Telephone Number ***(409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***	
Facility Address (Street & No.) ***37th Street***			
City ***Belfield***	State ***ND***	ZIP Code ***58622***	
Country ***USA***	Latitude (Nearest Second) ***46°52'45"N***	Longitude (Nearest Second) ***103°14'55" W***	
Legal Description of Facility Site ***Property ID 07 0000 00165 000 in the SE 1/4 of Section 2, Twp 139N, Range 100W and Property ID: 07 0000 00162 000 in the NW1/4 and SW 1/4 of Section 1, Twp 139N, Range 100W***	MSL Elevation at Facility ***2,685 feet***	Source ID ***207-FL-1703***	

SECTION C – FLARE INFORMATION

Use: ☒Emergency ☐Process ☐Both	Subject to NSPS (40 CFR 60.18) ☒Yes ☐No		
Emission Point ID ***207-FL-1703***	Height Above Ground Level (ft.) ***150***	Diameter at Top (ft.) ***3***	
Flame Monitor:	☒Thermocouple ☐Infrared ☐Ultraviolet ☐Acoustic ☐Other:		
Ignition:	☐Automatic ☐Other:	☒Continuous Burning Pilot	
Average Btu/1000 scf ***0.52***	Percent H_2S ***0***	Maximum Hourly Flow Rate to Flare ***74.6 MMSCFD***	

SECTION D – AIR CONTAMINANTS EMITTED

Pollutant	Quantity		Basis Of Estimate
	Pounds/Hr	Tons/Yr	
SO2	***1.80E-04***	***7.88E-04***	***Criteria Pollutants from Gas pilots: TABLE 1.4-2. AP 42, Chapter 1: External Combustion Sources.*** ***See Document P-5715043-00-001-18042-I001 "EMISSIONS INVENTORY"***
VOC	***1.65E-03***	***7.23E-03***	
NOx	***1.50E-02***	***6.57E-02***	
CO	***2.52E-02***	***1.10E-01***	
PM 10 Total	***2.28E-03***	***9.99E-03***	
PM 10 Filterable	***5.70E-04***	***2.50E-03***	
PM 2.5 Total	***2.28E-03***	***9.99E-03***	
PM 2.5 Filterable	***5.70E-04***	***2.50E-03***	
PM 2.5 Condensable	***1.71E-03***	***7.49E-03***	
Lead (Pb)	***1.50E-07***	***6.57E-07***	
GHG (as CO2e)	***N/A***		
Total HAPS	***-***	***-***	

Will flaring of gas comply with applicable Ambient Air Quality Standards? ☒Yes ☐No

IS THIS UNIT IN COMPLIANCE WITH ALL APPLICABLE AIR POLLUTION RULES AND REGULATIONS?

☒YES ☐NO

If "NO" a Compliance Schedule must be completed and attached.

Signature of Applicant	Date
Jon Wilson	09/26/2016

Attach and label separate sheet(s) if you need more space to explain any system or answers or to provide complete listings of Emissions, Contaminants, or other items.

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of Health
Division of Air Quality
918 E Divide Ave., 2nd Floor
Bismarck, ND 58501-1947
(701) 328-5188

PERMIT APPLICATION FOR FLARES

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 59652 (09-12)

SECTION A – GENERAL INFORMATION

Name of Firm or Organization ***Meridian Energy Group – Davis Refinery***		
Applicant's Name ***Tom Williams***		
Title ***VP of Planning & Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***

SECTION B – FACILITY INFORMATION

Facility Name ***Davis Refinery / HC Emergency Flare (Phase 2)***			
ND Air Pollution Control Permit No. (If Applicable) ***N/A***			
Contact Person for Air Pollution Matters ***Tom Johnson***			
Title ***Vice President of Operations***	Telephone Number ***(409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***	
Facility Address (Street & No.) ***37th Street***			
City ***Belfield***	State ***ND***	ZIP Code ***58622***	
Country ***USA***	Latitude (Nearest Second) ***46°52'45"N***	Longitude (Nearest Second) ***103°14'55" W***	
Legal Description of Facility Site ***Property ID 07 0000 00165 000 in the SE 1/4 of Section 2, Twp 139N, Range 100W and Property ID: 07 0000 00162 000 in the NW1/4 and SW 1/4 of Section 1, Twp 139N, Range 100W***	MSL Elevation at Facility ***2,685 feet***	Source ID ***207-FL-1704***	

SECTION C – FLARE INFORMATION

Use: ☒Emergency ☐Process ☐Both	Subject to NSPS (40 CFR 60.18) ☒Yes ☐No		
Emission Point ID ***207-FL-1704***	Height Above Ground Level (ft.) ***150***	Diameter at Top (ft.) ***3***	
Flame Monitor:	☒Thermocouple ☐Infrared ☐Ultraviolet ☐Acoustic ☐Other:		
Ignition:	☐Automatic ☐Other:	☒Continuous Burning Pilot	
Average Btu/1000 scf ***0.52***	Percent H_2S ***0***	Maximum Hourly Flow Rate to Flare ***88.8 MMSCFD***	

SECTION D – AIR CONTAMINANTS EMITTED

Pollutant	Quantity		Basis Of Estimate
	Pounds/Hr	Tons/Yr	
SO2	***1.80E-04***	***7.88E-04***	***Criteria Pollutants from Gas pilots: TABLE 1.4-2. AP 42, Chapter 1: External Combustion Sources.*** ***See Document P-5715043-00-001-18042-I001 "EMISSIONS INVENTORY"***
VOC	***1.65E-03***	***7.23E-03***	
NOx	***1.50E-02***	***6.57E-02***	
CO	***2.52E-02***	***1.10E-01***	
PM 10 Total	***2.28E-03***	***9.99E-03***	
PM 10 Filterable	***5.70E-04***	***2.50E-03***	
PM 2.5 Total	***2.28E-03***	***9.99E-03***	
PM 2.5 Filterable	***5.70E-04***	***2.50E-03***	
PM 2.5 Condensable	***1.71E-03***	***7.49E-03***	
Lead (Pb)	***1.50E-07***	***6.57E-07***	
GHG (as CO2e)	***N/A***		
Total HAPS	***-***	***-***	

Will flaring of gas comply with applicable Ambient Air Quality Standards? ☒Yes ☐No

IS THIS UNIT IN COMPLIANCE WITH ALL APPLICABLE AIR POLLUTION RULES AND REGULATIONS?

☒YES ☐NO

If "NO" a Compliance Schedule must be completed and attached.

Signature of Applicant	Date
Jon Wilson	09/26/2016

Attach and label separate sheet(s) if you need more space to explain any system or answers or to provide complete listings of Emissions, Contaminants, or other items.

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of Health
Division of Air Quality
918 E Divide Ave., 2nd Floor
Bismarck, ND 58501-1947
(701) 328-5188

PERMIT APPLICATION FOR INTERNAL COMBUSTION ENGINES AND TURBINES

NORTH DAKOTA DEPARTMENT OF
HEALTH DIVISION OF AIR QUALITY
SFN 8891 (09-12)

SECTION A – GENERAL INFORMATION

Name of Firm or Organization ***Meridian Energy Group – Davis Refinery***		
Applicant's Name ***Tom Williams***		
Title ***VP of Planning & Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***
Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number (***409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***

SECTION B – FACILITY AND UNIT INFORMATION

Facility Location ***37th Street, Belfield, ND. ZIP: 58622***		
County ***Billings***	Source ID Number (From SFN 8516) ***212-P-1201 A/B/C***	
Type of Unit (check all that apply)	☐Stationary Natural Gas-Fired Engine ☒Stationary Diesel and Dual Fuel ☐Engine Stationary Gasoline Engine ☐Stationary Natural Gas-Fired Turbine	☒Emergency Use ☐Only Non- Emergency ☐Use Peaking ☐Demand Response
	Other – Specify: ***Firewater Diesel Pump***	

SECTION C – MANUFACTURER DATA

Make ***TBD***	Model ***TBD***		Date of Manufacture ***TBD***
Reciprocating Internal Combustion Engine			
☒ Spark Ignition ☐Compression Ignition			
☐ 4 Stroke ☐ 2 Stroke		☐Rich Burn ☐ Lean Burn	
Maximum Rating (BHP @ rpm) ***TBD***		Operating Capacity (BHP @ rpm) ***600 HP each***	
Engine Subject to: ☒ 40 CFR 60, Subpart IIII ☒ 40 CFR 60, Subpart JJJJ ☒ 40 CFR 63, Subpart ZZZZ			
Turbine		Dry Low Emissions? ☐ Yes ☐ No	
Heat Input (MMBtu/hr)	Maximum Rating (HP)	75% Rating (HP)	Efficiency
Turbine Subject to: ☐ 40 CFR 60, Subpart GG ☐ 40 CFR 60, Subpart KKKK			

SECTION D – FUELS USED

Natural Gas (10^6 cu ft/year)	Percent Sulfur	Percent H_2S
Oil (gal/year)	Percent Sulfur	Grade No.
LP Gas (gal/year)	Other – Specify: ***Diesel <0.05% sulfur. 3,334 gal/year***	

SECTION E – NORMAL OPERATING SCHEDULE

Hours Per Day	Days Per Week	Weeks Per Year	Hours Per Year	Peak Production Season (if any)
N/A	***N/A***	***N/A***	***100 (emergency)***	***N/A***

SECTION F – STACK PARAMETERS

Emission Point		Stack Height Above Ground Level (feet)	
212-P-1201 A/B/C		***TBD***	
Stack Diameter (feet at top)	Gas Discharged (SCFM)	Exit Temp (°F)	Gas Velocity (FPS)
TBD	***TBD***	***TBD***	***TBD***

SECTION G – EMISSION CONTROL EQUIPMENT

Is any emission control equipment installed on this unit?

☒ No ☐ Yes – Complete and attach form SFN 8532

SECTION H – MAXIMUM AIR CONTAMINANTS EMITTED

Emission Point	Pollutant	Maximum Pounds Per Hour	Amount (Tons Per Year)	Basis of Estimate*
	NO_X	***23.40***	***1.17***	***Emission factors From AP-42 Chapter 3 Section 3.4. Large Stationary Diesel And All Stationary Dual-fuel Engines. See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"***
	CO	***9.90***	***0.50***	
	PM	***1.26***	***0.06***	
	PM 10 (Total)	***7.85E-01***	***3.93E-02***	
	PM 10 (Filterable)	***6.80E-01***	***3.40E-02***	
	PM 2.5 (Total)	***6.56E-01***	***3.28E-02***	
	PM 2.5(Filterable)	***6.56E-01***	***3.28E-02***	
	PM (Condensable)	***1.06E-01***	***5.28E-03***	
	SO_2	***7.28E-03***	***3.64E-04***	
	VOC	***1.27***	***6.35E-02***	
	GHG (as CO_2e)	***N/A***	***N/A***	
	Formaldehyde	***1.08E-03***	***5.41E-05***	
	Total HAPS**	***5.98E-02***	***2.99E-03***	

* If performance test results are available for the unit, submit a copy of test with this application

** Total HAPS includes formaldehyde

IS THIS UNIT IN COMPLIANCE WITH ALL APPLICABLE AIR POLLUTION RULES AND REGULATIONS? ☒YES ☐NO	If "NO" a Compliance Schedule must be completed and attached.

Signature of Applicant	Date 09/26/2016

Attach and label separate sheet(s) if you need more space to explain any system or answers or to provide complete listings of Emissions, Contaminants, or other items.

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of Health
Division of Air Quality
918 E Divide Ave., 2nd Floor
Bismarck, ND 58501-1947
(701) 328-5188

PERMIT APPLICATION FOR INTERNAL COMBUSTION ENGINES AND TURBINES

NORTH DAKOTA DEPARTMENT OF
HEALTH DIVISION OF AIR QUALITY
SFN 8891 (09-12)

SECTION A – GENERAL INFORMATION

Name of Firm or Organization ***Meridian Energy Group – Davis Refinery***		
Applicant's Name ***Tom Williams***		
Title ***VP of Planning & Permitting***	Telephone Number ***(707) 299-0182***	E-mail Address ***twilliams@meridianenergygroup.inc***
Mailing Address (Street & No.) ***2062 Business Center Drive, Suite 115***		
City ***Irvine***	State ***CA***	ZIP Code ***92612***
Contact Person for Air Pollution Matters ***Tom Johnson***		
Title ***Vice President of Operations***	Telephone Number (***409)795-0792***	E-mail Address ***tjohnson@meridianenergygroup.inc***

SECTION B – FACILITY AND UNIT INFORMATION

Facility Location ***37th Street, Belfield, ND. ZIP: 58622***		
County ***Billings***	Source ID Number (From SFN 8516) ***216-EG-1601 A/B/C***	
Type of Unit (check all that apply)	☒Stationary Natural Gas-Fired Engine ☒Stationary Diesel and Dual Fuel ☐Engine Stationary Gasoline Engine ☐Stationary Natural Gas-Fired Turbine	☒Emergency Use ☐Only Non- Emergency ☐Use Peaking ☐Demand Response
	Other – Specify: ***Diesel/Natural gas-fired emergency generator set***	

SECTION C – MANUFACTURER DATA

Make ***TBD***	Model ***TBD***		Date of Manufacture ***TBD***
Reciprocating Internal Combustion Engine			
☒ Spark Ignition ☐Compression Ignition			
☐ 4 Stroke ☐ 2 Stroke		☐Rich Burn ☐ Lean Burn	
Maximum Rating (BHP @ rpm) ***TBD***		Operating Capacity (BHP @ rpm) ***3.5 MW each (4,700 HP each)***	
Engine Subject to: ☒ 40 CFR 60, Subpart IIII ☒ 40 CFR 60, Subpart JJJJ ☒ 40 CFR 63, Subpart ZZZZ			
Turbine		Dry Low Emissions? ☐ Yes ☐ No	
Heat Input (MMBtu/hr)	Maximum Rating (HP)	75% Rating (HP)	Efficiency
Turbine Subject to: ☐ 40 CFR 60, Subpart GG ☐ 40 CFR 60, Subpart KKKK			

SECTION D – FUELS USED

Natural Gas (10^6 cu ft/year) ***TBD***	Percent Sulfur	Percent H_2S
Oil (gal/year)	Percent Sulfur	Grade No.
LP Gas (gal/year)	Other – Specify: ***Diesel <0.05% sulfur. 4,230 gal/year***	

SECTION E – NORMAL OPERATING SCHEDULE

Hours Per Day	Days Per Week	Weeks Per Year	Hours Per Year	Peak Production Season (if any)
N/A	***N/A***	***N/A***	***100 (emergency)***	***N/A***

SECTION F – STACK PARAMETERS

Emission Point		Stack Height Above Ground Level (feet)	
216-EG-1601 A/B/C		***TBD***	
Stack Diameter (feet at top)	Gas Discharged (SCFM)	Exit Temp (°F)	Gas Velocity (FPS)
TBD	***TBD***	***TBD***	***TBD***

SECTION G – EMISSION CONTROL EQUIPMENT

Is any emission control equipment installed on this unit?

☒ No ☐ Yes – Complete and attach form SFN 8532

SECTION H – MAXIMUM AIR CONTAMINANTS EMITTED

Emission Point	Pollutant	Maximum Pounds Per Hour	Amount (Tons Per Year)	Basis of Estimate*
	NO_X	***183.05***	***9.15***	***Emission factors From AP-42 Chapter 3 Section 3.4. Large Stationary Diesel And All Stationary Dual-fuel Engines. See Document P-5715043-01-001-18042-I001 "EMISSIONS INVENTORY" and P-5715043-01-001-18035-I001 "BACT Analysis"***
	CO	***77.44***	***3.87***	
	PM	***9.86***	***0.49***	
	PM 10 (Total)	***9.96***	***4.98E-01***	
	PM 10 (Filterable)	***8.62***	***4.31E-01***	
	PM 2.5 (Total)	***8.33***	***4.16E-01***	
	PM 2.5(Filterable)	***8.33***	***4.16E-01***	
	PM (Condensable)	***1.34***	***6.69E-02***	
	SO_2	***5.70E-02***	***2.85E-03***	
	VOC	***9.93***	***4.96E-01***	
	GHG (as CO_2e)	***N/A***	***N/A***	
	Formaldehyde	***1.37E-02***	***6.86E-04***	
	Total HAPS**	***7.59E-01***	***3.79E-02***	

* If performance test results are available for the unit, submit a copy of test with this application

** Total HAPS includes formaldehyde

IS THIS UNIT IN COMPLIANCE WITH ALL APPLICABLE AIR POLLUTION RULES AND REGULATIONS? ☒YES ☐NO	If "NO" a Compliance Schedule must be completed and attached.

Signature of Applicant	Date 09/26/2016

Attach and label separate sheet(s) if you need more space to explain any system or answers or to provide complete listings of Emissions, Contaminants, or other items.

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of Health
Division of Air Quality
918 E Divide Ave., 2nd Floor
Bismarck, ND 58501-1947
(701) 328-5188

Exhibit B: Emissions Inventory

VEPICA CODE : P-5715043-01-001-18042-I001 **SHEET** 1 **OF** 224

COMPANY CODE: TBD

TITLE: EMISSIONS INVENTORY

PROJECT Nº : P-5715043

NAME : PERMITTING SUPPORT – DAVIS REFINERY

CLIENT : MERIDIAN ENERGY GROUP INC.

LOCATION : BILLINGS COUNTY, NORTH DAKOTA

0	09/23/16	ISSUED FOR PTC	J. GOMEZ J. SOLANO	A. PEÑA	C. GARCÍA	T. JOHNSON
ISSUE	**DATE**	**DESCRIPTION**	**PREPARED**	**REVIEWED**	**APPROVED VEPICA**	**APPROVED CLIENT**

INDEX

DESCRIPTION **SHEET**

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1. INTRODUCTION

Meridian Energy Group (MEG) has engaged VEPICA to develop an air permit application for construction of the 55,000 BPD (barrels per day) oil Davis Refinery in Billings County, North Dakota.

The present document comprises the Emissions Inventory from Davis Refinery, based on the available engineering data and guidelines stablished in EPA *Emissions Estimation Protocol for Petroleum Refineries, Version 3* (RTI International, April 2015).

2. DOCUMENT SCOPE

This emission inventory includes the estimation of annual atmospheric discharges of criteria pollutants and hazardous air pollutants (HAPs) from primary sources within the refinery, categorized as follows:

- Equipment Leaks
- Storage Tanks
- Stationary Combustion
- Process Vents
- Flares
- Wastewater Treatment Systems
- Cooling Towers
- Product Loading
- Fugitive Dust

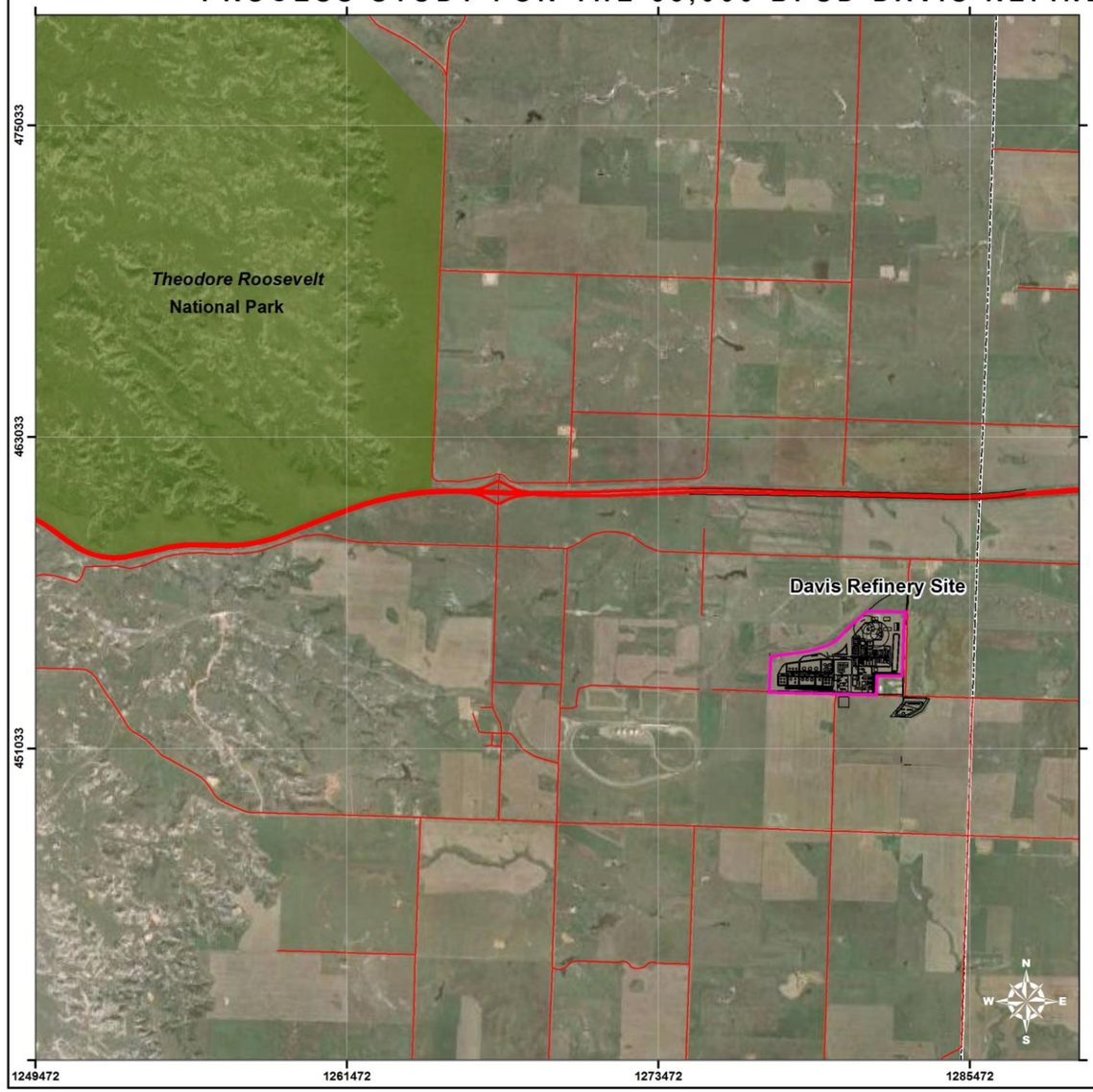
It is important to highlight that the estimations for New Source Review (NSR) regulated pollutants presented in this document comprise normal operation scenario for these main units using the engineering, licensor and vendor data available to date. Other Emission categories indicated in the protocol, such as, Startup/Shutdown and Malfunctions, are not considered in this scope.

Additionally, Greenhouse Gas (GHG) emissions are not included as part of this inventory since GHG are not “Regulated NSR pollutant”, in accordance NDAC 33-15-15 and 33-15-16. Regulated NSR pollutants for petroleum refineries include particulate matter (PM), particulate matter with a diameter of 10 microns or less (PM_{10}), particulate matter with a diameter of 2.5 microns or less ($PM_{2.5}$), sulfur dioxide (SO_2), nitrogen oxides (NOx), carbon monoxide (CO), ozone (as VOCs), lead (Pb), hydrogen sulphide (H_2S) and reduced sulfur compounds.

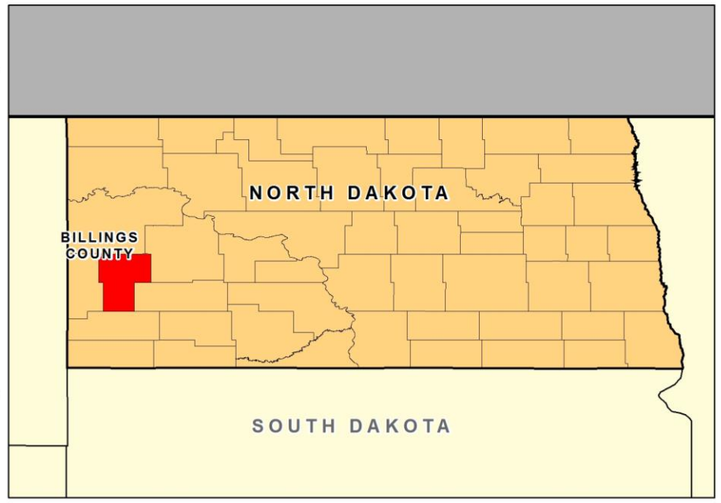
3. LOCATION

The oil Davis Refinery will be located in Billings County, North Dakota. Figure 1 shows the site layout and its geographical location.

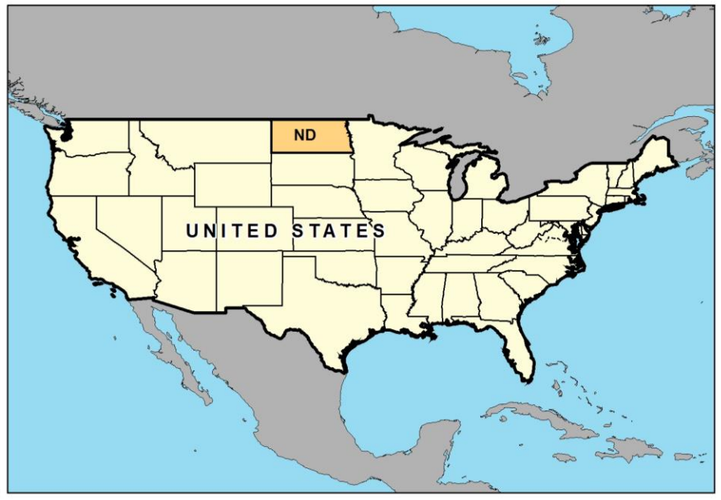
FIGURE 1.: SITE LOCATION MAP
PROCESS STUDY FOR THE 55,000 BPSD DAVIS REFINERY IN BILLINGS COUNTY, ND



RELATIVE REGIONAL LOCATION



RELATIVE NATIONAL LOCATION



4. EMISSION INVENTORY METHODOLOGY

This section describes the methodology and main activities performed to prepare the detailed emissions inventory of the Emission Units associated with the refinery operations

4.1. Sources Identification

Identification of primary sources was made based on the review of engineering data of process units, specifically: block and process flow diagrams (BFD & PFDs), process descriptions and data sheets.

“Potential to emit" has the meaning given to it in NDAC 33-15-14-06: *“the maximum capacity of a stationary source to emit any air contaminant under its physical and operational design. Any physical or operational limitation on the capacity of a source to emit an air contaminant, including air pollution control equipment and restrictions on hours of operation or on the type or amount of material combusted, stored, or processed, shall be treated as part of its design if the limitation is enforceable by the administrator of the United States environmental protection agency and the department.”* For a petroleum refinery, quantifiable fugitive emissions must also be included with point source emissions in the facility-wide PTE calculation.

“Emissions Unit” in accordance with NDAC 33-15-14-06 *“means any part or activity of a stationary source that emits or has the potential to emit any regulated air contaminant or any contaminant listed under section 112(b) of the Federal Clean Air Act.”*

The emission units of the proposed Davis Refinery include:

Process Units

1. Atmospheric Distillation Unit #1 & #2: heaters.
2. Vacuum Distillation Unit: heaters.
3. Light Naphtha Hydrotreater: heater.
4. Heavy Naphtha Hydrotreater Unit: heaters.
5. Diesel Hydrotreater Unit: heater.
6. Catalytic Reforming Units #1 & #2: heaters and regenerator vents.
7. Fluid Catalytic Cracking (FCC) Unit (including gas concentrator): heater and regenerator vent.

8. FCC Naphtha Hydrotreater: heater.
9. Kerosene Hydrotreater: heater.
10. Isomerization Unit: heaters.
11. Alkylation Unit: heater.
12. SRU - Thermal Oxidizer: thermal oxidizer vent stack.
13. Tank Farm (through relief valves in each tank), including crude oil (feed), intermediate products and final products.
14. Flare System.

Main Utilities

15. Boiler #1, #2 & #3 (in stand-by).
16. Waste Water Treatment System: equalization tank, API, IGF, MBR (fugitive).
17. Cooling Water System: drift loss in cooling tower.
18. Loading Stations: product loading operations.
19. Emergency Generator (Diesel): internal combustion engine exhaust stack.
20. Firewater Diesel Pump: exhaust stack
21. Emergency Power Generator: exhaust stack

The emission sources identified for each primary units of the refinery are listed as follows in Table 1. Figure 2 shows the identification of emission units in a block flow diagram.

Table 1: Identified emission sources

Unit Number	Unit Description	Emission Unit Description	TAG	Point ID	Point Number	Air Pollution Control Equipment (inherent to design)
101	Atmospheric Distillation Unit #1	ADU #1 heater rated 72.00 MMBTU/h and fired on refinery fuel gas	101-H-0101	101H0101	1	Best combustion practices. Ultra Low NOx Burner
102	Atmospheric Distillation Unit #2	ADU #2 heater rated 72.00 MMBTU/h and fired on refinery fuel gas	102-H-0201	102H0201	2	Best combustion practices. Ultra Low NOx Burner
103	Vacuum Distillation Unit	VDU heater #1 rated 76.47 MMBTU/h and fired on refinery fuel gas	103-H-0301	103H0301	3	Best combustion practices. Ultra Low NOx Burner
		VDU heater #2 rated 57.65 MMBTU/h and fired on refinery fuel gas	103-H-0302	103H0302	4	Best combustion practices. Ultra Low NOx Burner
105	Heavy Naphtha Hydrotreater	HNHT heater #1 rated 13.75 MMBTU/h and fired on refinery fuel gas	105-H-0501	105H0501	5	Best combustion practices. Ultra Low NOx Burner
		HNHT heater #2 rated 16.25 MMBTU/h and fired on refinery fuel gas	105-H-0502	105H0502	6	Best combustion practices. Ultra Low NOx Burner
106	Catalytic Reformer Unit #2	CRU #2 heater with a combined rating of 41.73 MMBTU/h and fired on refinery fuel gas	106-H-0601	106H0601	7	Best combustion practices. Ultra Low NOx Burner

Unit Number	Unit Description	Emission Unit Description	TAG	Point ID	Point Number	Air Pollution Control Equipment (inherent to design)
107	Catalytic Reformer Unit #1	CRU #1 heater with a combined rating of 92.50 MMBTU/h and fired on refinery fuel gas	107-H-0701	107H0701	8	Best combustion practices. Ultra Low NOx Burner
110	Diesel Hydrotreater	Diesel HDT heater rated 16.25 MMBTU/h and fired on refinery fuel gas	110-H-1001	110H1001	9	Best combustion practices. Ultra Low NOx Burner
111	Light Naphtha Hydrotreater	LNHT heater rated 13.90MMBTU/h and fired on refinery fuel gas	111-H-1101	111H1101	10	Best combustion practices. Ultra Low NOx Burner
112	Fluid Catalytic Cracking (FCC) Unit	Regenerator vent stack	112-VS-1201	112VS1201	11	Best combustion practices (complete Carbon burn regenerator design)*
		FCCU heater rated 28.35 MMBTU/h and fired on refinery fuel gas	112-H-1201	112H1201	12	Best combustion practices. Ultra Low NOx Burner
114	FCC Naphtha Hydrotreater	FCC Naphtha HDT heater rated 17.48 MMBTU/h and fired on refinery fuel gas	114-H-1401	114H1401	13	Best combustion practices. Ultra Low NOx Burner
117	Isomerization Unit	Isomerization heater #1 rated 1.65 MMBTU/h and fired on refinery fuel gas	117-H-1701	117H1701	14	Best combustion practices. Ultra Low NOx Burner
		Isomerization heater #2 rated 3.75 MMBTU/h and fired on refinery fuel gas	117-H-1702	117H1702	15	Best combustion practices. Ultra Low NOx Burner

Unit Number	Unit Description	Emission Unit Description	TAG	Point ID	Point Number	Air Pollution Control Equipment (inherent to design)
118	Alkylation Unit	Alkylation heater rated 84.19 MMBTU/h and fired on refinery fuel gas	118-H-1801	118H1801	16	Best combustion practices. Ultra Low NOx Burner
122	SRU Thermal Oxidizer	Thermal Oxidizer with a rated capacity of 1.58 MMBTU/h	122-H-2201	122H2201	17	Emissions from SRU vents will be routed via a common header to aThermal Oxidizer.
125	Kerosene Hydrotreater	Kerosene HDT heater rated 12.50 MMBTU/h and fired on refinery fuel gas	125-H-2501	125H2501	18	Best combustion practices. Ultra Low NOx Burner
202	Utility Boiler 1	Boiler with a rated capacity of 60 MMBTU	202-B-0201A	202B0201A	19	Under normal operations 2 Boilers in service 1 in hot standby
202	Utility Boiler 2	Boiler with a rated capacity of 60 MMBTU	202-B-0201B	202B0201B	20	
202	Utility Boiler 3	Boiler with a rated capacity of 60 MMBTU	202-B-0201C	202B0201C	21	
203	Crude oil tank #1	Bakken crude oil storage tank #1 with a nominal 110,999 bbl capacity	203-T-0001	203T0001	22	Dome with IFR (Internal Floating Roof) and Submerged Fill Pipe
203	Crude oil tank #2	Bakken crude oil storage tank #2 with a nominal 110,999 bbl capacity	203-T-0002	203T0002	23	Dome with IFR (Internal Floating Roof) and Submerged Fill Pipe
203	Crude oil tank #3	Bakken crude oil storage tank #3 with a nominal 110,999 bbl capacity	203-T-0003	203T0003	24	Dome with IFR (Internal Floating Roof) and Submerged Fill Pipe

Unit Number	Unit Description	Emission Unit Description	TAG	Point ID	Point Number	Air Pollution Control Equipment (inherent to design)
203	Desulfurized Heavy Naphtha tank #1	Heavy Naphtha storage tank #1 with a nominal 64,996 bbl capacity	203-T-0005	203T0005	25	Dome with IFR (Internal Floating Roof) and Submerged Fill Pipe
203	Reformate tank #1	Reformate storage tank #1 with a nominal 33,312 bbl capacity	203-T-0006	203T0006	26	Dome with IFR (Internal Floating Roof) and Submerged Fill Pipe
203	Reformate tank #2	Reformate storage tank #2 with a nominal 33,312 bbl capacity	203-T-0007	203T0007	27	Dome with IFR (Internal Floating Roof) and Submerged Fill Pipe
203	Gasoline tank #1	Regular Gasoline tank #1 with a nominal 64,996 bbl capacity	203-T-0008	203T0008	28	Dome with IFR (Internal Floating Roof) and Submerged Fill Pipe
203	Gasoline tank #2	Regular Gasoline tank #2 with a nominal 64,996 bbl capacity	203-T-0009	203T0009	29	Dome with IFR (Internal Floating Roof) and Submerged Fill Pipe
203	Mid Gasoline tank #1	Mid Gasoline tank #1 with a nominal 64,996 bbl capacity	203-T-0010	203T0010	30	Dome with IFR (Internal Floating Roof) and Submerged Fill Pipe
203	Jet Fuel tank #1	Jet Fuel tank #1 with a nominal 33,312 bbl capacity	203-T-0011	203T0011	31	Dome with IFR (Internal Floating Roof) and Submerged Fill Pipe
203	Jet Fuel tank #2	Jet Fuel tank #2 with a nominal 33,312 bbl capacity	203-T-0012	203T0012	32	Dome with IFR (Internal Floating Roof) and Submerged Fill Pipe

Unit Number	Unit Description	Emission Unit Description	TAG	Point ID	Point Number	Air Pollution Control Equipment (inherent to design)
203	Undesulphurized Diesel tank #1	Undesulphurized Diesel storage tank #1 with a nominal 33,312 bbl capacity	203-T-0013	203T0013	33	Cone Roof, Submerged Fill Pipe
203	Undesulphurized Diesel tank #2	Undesulphurized Diesel storage tank #2 with a nominal 33,312 bbl capacity	203-T-0014	203T0014	34	Cone Roof, Submerged Fill Pipe
203	Desulphurized Diesel tank #1	Desulphurized Diesel storage tank #1 with a nominal 64,996 bbl capacity	203-T-0015	203T0015	35	Cone Roof, Submerged Fill Pipe
203	Desulphurized Diesel tank #2	Desulphurized Diesel storage tank #2 with a nominal 64,996 bbl capacity	203-T-0016	203T0016	36	Cone Roof, Submerged Fill Pipe
203	UVGO tank	UVGO storage tank with a nominal 33,312 bbl capacity	203-T-0017	203T0017	37	Cone Roof, Submerged Fill Pipe
203	FCC Naphtha tank #1	FCC naphtha storage tank #1 with a nominal 33,312 bbl capacity	203-T-0018	203T0018	38	Dome with IFR (Internal Floating Roof) and Submerged Fill Pipe
203	FCC Naphtha tank #2	FCC naphtha storage tank #2 with a nominal 33,312 bbl capacity	203-T-0019	203T0019	39	Dome with IFR (Internal Floating Roof) and Submerged Fill Pipe

Unit Number	Unit Description	Emission Unit Description	TAG	Point ID	Point Number	Air Pollution Control Equipment (inherent to design)
203	Alkylate tank #1	Alkylate storage tank #1 with a nominal 33,312 bbl capacity	203-T-0020	203T0020	40	Dome with IFR (Internal Floating Roof) and Submerged Fill Pipe
203	Alkylate tank #2	Alkylate storage tank #2 with a nominal 33,312 bbl capacity	203-T-0021	203T0021	41	Dome with IFR (Internal Floating Roof) and Submerged Fill Pipe
203	Diluent tank	Diluent tank with a nominal 33,312 bbl capacity	203-T-0022	203T0022	42	Cone Roof, Submerged Fill Pipe
203	Fuel Oil tank #1	Fuel Oil tank #1 with a nominal 64,996 bbl capacity	203-T-0023	203T0023	43	Cone Roof, Submerged Fill Pipe
203	Fuel Oil tank #2	Fuel Oil tank #2 with a nominal 64,996 bbl capacity	203-T-0024	203T0024	44	Cone Roof, Submerged Fill Pipe
203	Light Naphtha tank #1	Light Naphtha tank #1 with a nominal 33,312 bbl capacity	203-T-0031	203T0031	45	Dome with IFR (Internal Floating Roof) and Submerged Fill Pipe
203	Light Naphtha tank #2	Light Naphtha tank #2 with a nominal 33,312 bbl capacity	203-T-0032	203T0032	46	Dome with IFR (Internal Floating Roof) and Submerged Fill Pipe
203	Light Slops tank	Light slops tank with a nominal 2,620 bbl capacity	203-T-0033	203T0033	47	Cone Roof, Submerged Fill Pipe

Unit Number	Unit Description	Emission Unit Description	TAG	Point ID	Point Number	Air Pollution Control Equipment (inherent to design)
203	Heavy Slops tank	Heavy slops tank with a nominal 2,620 bbl capacity	203-T-0034	203T0034	48	Cone Roof, Submerged Fill Pipe
206	Wastewater Treatment Plant	Oil/Separator Inlet from Benzene Waste Operations NESHAP (BWON) Compliant plant with a design capacity of 155,000 gal/d**	-	206WWT	49	Wastewater treatment plant must comply with the design requirements of 40 CFR 60 Subpart QQQ
207	Enclosed HC Operating Flare	Enclosed flare with pilot at 100 SCFH average of fuel gas, for handling up to 24.4 MMSCFD (including purges and fuel gas blowdown)	207-FL-1701	207FL1701	50	High temperature, optimal balance between air flow, gas/pollutant loading and low heating value
207	Acid Flare	Acid gas flare with pilot at 100 SCFH average of fuel gas, for handling up to 15.8 MMSCFD of gas.	207-FL-1702	207FL1702	51	High temperature, optimal balance between air flow, gas/pollutant loading and low heating value
207	HC Emergency Flare #1	HC Emergency Flare at 100 SCFH average of fuel gas, for handling up to 74.6 MMSCFD (including purges and fuel gas blowdown)	207-FL-1703	207FL1703	52	High temperature, optimal balance between air flow, gas/pollutant loading and low heating value

Unit Number	Unit Description	Emission Unit Description	TAG	Point ID	Point Number	Air Pollution Control Equipment (inherent to design)
207	HC Emergency Flare #2	HC Emergency Flare at 100 SCFH average of fuel gas, for handling up to 88.8 MMSCFD (including purges and fuel gas blowdown)	207-FL-1704	207FL1704	53	High temperature, optimal balance between air flow, gas/pollutant loading and low heating value
208	Truck Loading-Unloading System	Dedicated normal service of loading/unloading refinery products (Gasoline, Jet Kerosene, Diesel and Fuel Oil).	-	208TL	54	Submerged Loading and dedicated service.
209	Rail Loading-Unloading System	Dedicated normal service of loading/unloading refinery products (Gasoline, Jet Kerosene, Diesel and Fuel Oil).	-	209RL	55	Submerged Loading and dedicated service
212	Firewater Diesel Pumps	Combustion gases (flue gas) from 600 HP x3 diesel firewater pump.	212-P-1201 A/B/C	212P1201A/B/C	56	Normal operation of less than 100 hours per year. The engines shall be certified to emissions standards as outlined under 40 CFR 60, Subparts IIII and JJJ. The engines shall be manufactured with the appropriate control equipment to meet these emissions standards

Unit Number	Unit Description	Emission Unit Description	TAG	Point ID	Point Number	Air Pollution Control Equipment (inherent to design)
215	Cooling Towers	Induced draft - counter flow Cooling Tower. Design Cooling Water Circulation Rate: 1,500 gpm	215-CT-1501A/B/C	215CT1501A/B/C	57 58 59	Drift Eliminators Inherent to Design. Under normal operations 2 in service 1 in standby
216	Diesel/Natural gas-fired emergency generator set	Combustion gases (flue gas) from 3.5 MWx3 emergency generator stack.	216-EG-1601 A/B/C	216EG1601 A/B/C	60	Normal operation of less than 100 hours per year. The engines shall be certified to emissions standards as outlined under 40 CFR 60, Subparts IIII and JJJ. The engines shall be manufactured with the appropriate control equipment to meet these emissions standards
FUGITIVE	Process equipment leaks in VOC and Natural Gas service	Fugitive (leaks) emissions from process equipment elements throughout the refinery	-	FUG-1	61	Leak Detection and Repair (LDAR) Program Screen level at 500 ppm

*: An add-on pollution control device such as ESP, filtering media or wet/dry scrubber are being considered for this unit. Further discussion is in the Controls Technology Review Report.

**: Calculated based on waste water treatment plant design.

.

4.2. Emission Estimation – Basis and Assumptions

Emissions for criteria pollutants and HAPs were estimated using the Emission Factors presented in the EPA *Emissions Estimation Protocol for Petroleum Refineries* and engineering data, unless noted otherwise. When needed, EPA AP-42 *Compilation of Air Pollutant Emission Factors. Volume 1: Stationary Point and Area Sources*, Fifth Edition, was consulted for specific criteria pollutant emission factors.

When using the mentioned emission factors, the following basis and assumptions were considered:

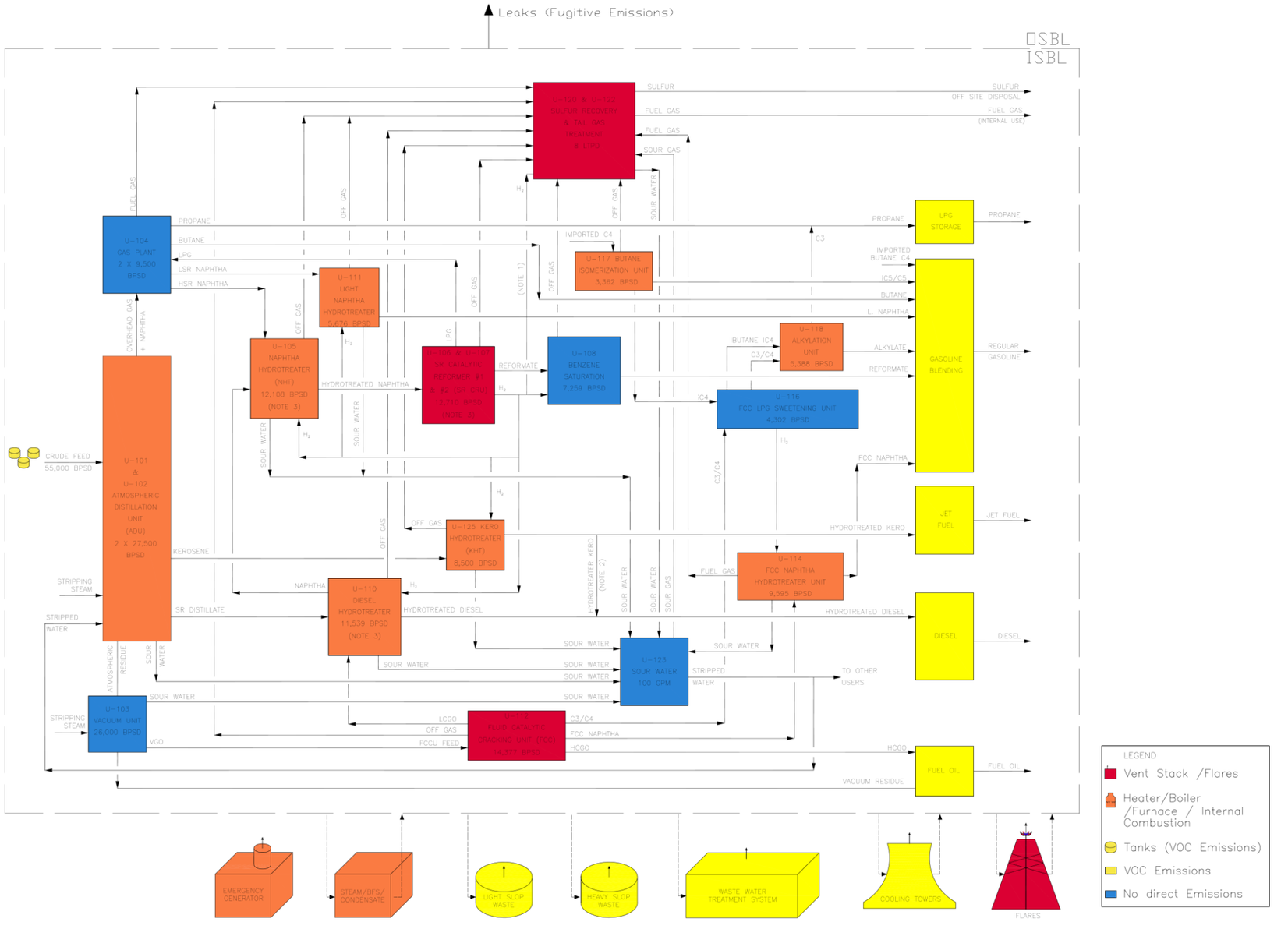
- Since this is a new refinery, and site-specific measurement or test data are not available, default emission factors (Methodology Ranks 5, or 4, as applicable) were used to estimate criteria pollutant and HAPs emissions, unless noted otherwise. For new industrial sources with no actual monitoring or direct measurements, the methodology ranks above mentioned were used since they are based on typical refinery average stream concentrations and statistical default process compositions. Also, when available, actual engineering/licensor data or vendor guarantees were used.

- When normalized emission factors for feed or throughput were used to determine PTE, maximum design capacity for applicable units/equipment was considered.

- For continuous operation process units, 8,760 hr/yr operating hours per year was considered to obtain annual mass emissions (tons per year or tpy). Depending on specific equipment, such as venting from regeneration units, these operating hours would in practice be less, in accordance with the process operation philosophy.

- For fugitive dust emissions from vehicular traffic, the base case is paving high traffic areas including employee parking areas and truck loading facilities. Actual emissions may be lower, since crude and/or products may be imported/dispatched via pipeline in the future.

Figure 1: Identification of emission sources per main process units



5. CALCULATION BASIS

This section describes de basis of the calculations made to estimate the emissions of pollutants from each main unit and equipment identified in section 4.1 of this document.

5.1. Equipment Leaks

Equipment leaks are small fugitive emissions that occur throughout the refinery from a broad variety of equipment components and connections that may develop leaks through normal wear and tear which allow volatile fluids to escape into the atmosphere.

To estimate VOCs and HAPs leak emissions, Methodology Rank 2 and 4 were used, based in default model process component counts. Equipment counts for large model processes (more than 50,000 BPSD) were selected from Table 2-5 *Median Equipment Leak Component Counts for Large Model Processes*,

For the base case emissions inventory a 10,000 ppmv leak definition, which is the highest detection threshold allowed by New Source Performance Standards (NSPS), was utilized to determine emission factors. Emission Factors were obtained from AP-42 *Table 2-6. Refinery and SOCMI Average Component Emission Factors (Rank 4)*. Emissions reductions from implementing a Leak Detection and Repair (LDAR) program with a monthly monitoring interval at a 10,000 ppmv leak definition rate were taken from Table 4.1 – *Control effectiveness for an LDAR program at a chemical process unit and a refinery* – in EPA's Publication EPA-305-D-07-001, "*Leak Detection and Repair, A Best Practices Guide".*

However, in order to demonstrate compliance with 40 CFR 60 Subpart GGGa, applicable portions of Subpart VVa, and compliance with 40 CFR 61 Subparts J and V, Meridian has chosen to adopt a 500 ppmv leak definition which is the current EPA recommended value for implementation of monitoring rather than the previous regulatory level of 10,000 for NSPS. In addition, to minimize leaks, the design of the refinery will include pumps in VOC service with double mechanical seals, enhanced valve packing, no open ended lines and connection of pressure relief devices, sampling connecting systems, surge control vessels and bottoms receivers to closed-vent systems routed to fuel gas or flare. Meridian's facility integrity management system for the Davis Refinery will also include the use of advanced monitoring methods such as differential light absorption and ranging (DIAL) or optical gas imaging (OGI) technology that can visualize gas leaks using ultra-sensitive passive infrared sensing technology, as part of, and complementing, its proposed LDAR program to improve operational and safety practices so that leaks can be identified more efficiently and fixed soon as practicable.

Meridian's proposed LDAR program assumes monitoring and directed maintenance with a leak definition of 500 ppmv for all components other than compressors which are to be screened at 10,000 ppmv. To estimate potential fugitive emissions from refinery equipment leaks, Emission Factors were obtained from AP-42 *Table 2-2. Equipment Leak Rate for Petroleum and SOCMI Equipment Components (Rank 2)*. Emissions reductions from implementing an LDAR program equivalent to Texas Commission on Environmental Quality (TCEQ) approved 28LAER program have been considered in the controlled emissions inventory. Results of this estimation is summarized in Appendix 2.

5.2. Storage Tanks Emissions

For Storage Tank VOC Emission Estimates a Methodology Rank 2 *Tank-specific modeling* with EPA Tanks 4.09d software was used for all petroleum liquid storage tanks in the refinery, based on available engineering information such as tank type, tank dimensions, stored liquid properties, tank condition/fitting information, annual throughput. Results of this modeling for VOCs are shown in Appendix 2.

For Storage Tank HAPs Emission Estimates, a Methodology Rank 3b *Default Tank Modeling* was used, which is applicable to common petroleum liquid storage tanks, and requires Crude throughput and production capacities. These default emissions factors consider assumptions regarding the typical fitting controls and the average composition of crude oil, gasoline, and other products at the refinery. Emission factors for VOCs were used from Table 3-3 *Default Emissions Factors for Petroleum Refinery Storage Tanks* of the protocol, based on crude oil processing capacity and production of various distillates, as noted in Appendix 2.

These factors consider an estimation of distillates production as a fraction of crude oil processing capacity, subtracting the production of heavy distillates and aromatics. In the emissions inventory for the proposed Davis Refinery, such production was assumed zero since the heaviest product will be fuel oil which is considered part of the middle distillates pool. The HAP emissions were assumed then from:

- Gasoline and Other Light Distillates (such as desulfurized naphtha, alkylates, reformates, butane) at 60% of the crude oil processing rate, and,

- Diesel Fuel and Other Middle Distillates (diesel, kerosenes, jet fuel, fuel oil), at 40% of crude oil processing rate.

5.3. Stationary Combustion Sources

Combustion sources such as heaters and boilers of the proposed Davis Refinery will For the base case emissions inventory for criteria pollutants, AP-42 emission factors based on heat input in MMBTU/hr were taken from Chapter 1 of the *Compilation of Air Pollutant Emission Factors. Volume 1: Stationary Point and Area Sources* (*External*

Combustion Sources, *Tables 1.4-1 and 1.4-2*). Manufacturer guaranteed emission rates for particulate matter (PM), nitrogen oxides (NOx), and carbon monoxide (CO) were utilized to obtain the emissions inventory process for process heaters and utility boilers. For emission estimates of SO_2 and VOC default AP-42 emission values were utilized. For the controlled emissions inventory a reduction on emissions were applied based on the add-on controls selected.

HAPs emissions for process heaters and boilers were calculated based on fuel usage using Methodology Rank 4 and default emission factors in Table 4-3 *Summary of Emission Factors for Boilers and Process Heaters Firing Various Fuels*.

In the case of criteria pollutants and HAPs from internal combustion engines, such as the emergency generator and firewater pump engines, emission factors based on power output (HP) and fuel input (MMBTUh) were taken from AP-42 Chapter 3 Section 3.4. *Large Stationary Diesel And All Stationary Dual-fuel Engines, Table 3.4-1 to 3.4-3*). It should be noted that these emissions were not added to the total refinery emissions as it is expected that these emergency engines will not operate under normal conditions for more than 100 hours per year.

Emission factors and emission estimations for stationary combustion equipment (heaters and boilers) are presented in Appendix 3.

5.4. Process Vents

Emissions from process vents are those that can be released directly to the atmosphere through a vent stack. .At the proposed Davis Refinery most of the process gases will be routed to the refinery's fuel gas system. Those not routed to the refinery's fuel system will be controlled using a flare, thermal incinerator, or other air pollution control technique. Process vent emissions from the proposed Davis Refinery that are not recovered into the refinery's fuel gas system are described in this section.

5.4.1. Fluid Catalytic Cracking Unit (FCCU)

Emissions from the FCCU catalyst regenerator vent are often the single largest emissions vent at the refinery. These emissions include a variety of pollutants, such as PM (primary, filterable and condensable), SO_2, NOx, CO, VOC, metal HAPs, organic HAPs, and ammonia.

Criteria pollutant emissions for the base case were based on FCCU fresh feed rate using AP-42 Emission Factors, *Volume 1: Stationary Point and Area Sources* (*Petroleum Industry Table 5.1-1*). For the controlled emissions inventory the FCCU technology licensor provided CO and SO_2 emission rates to replace default values based on its licensed technology design for Bakken crude coke and hot burn regenerator. Tables and Results of these calculations are presented in Appendix 4.

For PM emissions including PM size distribution estimates, default values based on the FCCU coke-burn off rate were used, following the procedure for PM Emissions Inventory Calculations indicated in the protocol. Likewise, emission estimates for metal HAPs were based on Nickel E-Cat typical value for FCC units (Methodology Rank 5A).

For HAPs (volatile, semi-volatile, non-volatile organics), dioxins, furans, inorganics and other pollutants of interest, the emission factors from Table 5-4. *Organic HAP Emissions Factors for CCU Catalyst Regenerator Vent,* based on FCCU feed (Methodology Rank 5B for Catalytic Cracking Units).

5.4.2. Catalytic Reforming Units

Emissions from the Catalytic Reforming Units # 1 & 2 process vents are discharged while purging in the regeneration cycle. For CRU semi-regenerative design as is porposed for the Davis Refinery, these emissions are generated for a maximum 672 hr/yr for each reactor at each unit.

To estimate emissions from catalyst regeneration, based on catalytic reforming unit process capacity, Methodology Rank 5 and AP-42 Default Emission Factors for VOCs, organic HAPs, dioxins, PCBs, inorganics and other pollutants of interest were taken from Table 5-6 *Emissions Factors for CRU Catalyst Regeneration Vent*. Results are summarized in Appendix 4.

5.4.3. Sulfur Recovery Unit (SRU)

The sulfur recovery plant of the Davis Refinery will be based on Merichem's LO-CAT® licensed technology. This patented liquid-redox system uses a proprietary chelated iron solution catalyst to convert H_2S to innocuous, elemental sulfur slurry inside an oxidizer vessel. The slurry passes through a sulfur filter to produce an elemental sulfur cake which is loaded onto trucks for offsite reuse or disposal. No hazardous waste byproducts are produced. The environmentally safe catalyst is continuously regenerated in the process. The LO-CAT process allows 100% turndown in gas flow and H_2S concentrations and has an H_2S Removal efficiency of 99.9 %. The process vents of the LO-CAT unit; an oxidizer vent and a flash drum vent, will be routed to a thermal oxidizer for the 99.9% destruction (oxidation) of any unconverted sulphur and residual organic volatiles.

Calculations for the emissions associated with SRU - Thermal Oxidizer were performed on the basis of engineering data provided by the licensor of the LO-CAT unit. These calculations are summarized in Appendix 4.

5.4.4. Blowdown System

Blowdown systems are used during depressurization processes to recover liquids entrained in a process gas stream. The remaining uncondensed gases may be compressed and recovered for use as fuel gas or they may be vented to a thermal destruction device (thermal oxidizer or flare). Either of these scenarios is considered a "controlled" blowdown system. The design of the proposed Davis Refinery includes a vapor recovery system to capture vapors released by pressure control valves during normal operations and return to product/processes instead of releasing through stacks or via flaring.

To estimate yearly emissions from blowdown scenarios for the proposed Davis Refinery, the total refinery Fuel Gas production was considered as being routed to the Flare system for no more than 168 hours a year. Emissions estimations were performed based on the total refinery capacity using the AP-42 emission factors presented in *Table 5-12. Default Emissions Factors for Blowdown Systems*. These results are presented in Appendix 4.

5.4.5. Vacuum Producing Systems

VOC emissions from the Vacuum Distillation Unit, are generated from the ejectors and condensers system. The design of the Vacuum Distilation Unit at the Davis Refinery considers recovery of uncondensed gases into the refinery's fuel gas system. Therefore, there are no emissions associated to process vents from the vacuum distillation unit at the proposed Davis Refinery.

5.5. Flares

Emissions from flares consist of a fraction of the hydrocarbons in the flare gas (e.g., CH_4, CO, VOC, and specific organic HAP) that are not combusted in the flare; SO_2 resulting from the oxidation of sulfur compound impurities, such as H_2S, in the gas stream; and CO_2 from the combustion process. Flares are also expected to produce NO_x emissions and may produce PM (soot) if combustion conditions are not adequate.

To safely combust hydrocarbon relief flows during process upsets, and other times as needed during startups, shutdowns, or malfunctions the refinery will have a flare system comprised of a combination of an enclosed flare and elevated flares. A separate system with an elevated flare to handle acid gases in cases of SRU unavailability will be provided.

The proposed Davis Refinery will include four (4) flares; one main enclosed flare for normal operation, one acid gas flare and two elevated emergency flares. The enclosed flare is being designed to receive the streams of excess gas expected to be produced during purge and blowdown beyond the capacity of the refinery's vapor recovery system. The elevated flares will only operate during emergency cases in

which the capacity of the enclosed flare is exceeded. Blowdown cases emission estimates are captured under Blowdown System in Section 5.4.4 and Appendix 4.

Flaring at the proposed Davis Refinery will be on an intermittent and as-needed basis, since the refinery will operate a vapor recovery system to capture vapors and return to product/processes instead of releasing through stacks or via flaring during normal operations. Therefore, emissions estimates were calculated using Methodologies Ranks 5 and 6 based flare pilots capacity and the Lower Heating Value (LHV) of the gas stream routed to the pilots. AP-42 *Table 6-4. Flare General Emission Factors* were used to estimate HAP emissions associated to the normal operation of the flares. The AP-42 emission factors of *Table 6-2. Flare Energy Consumption-Based Emission Factors* and *Table 6-3. Emission Factors for Soot from Flares* were used to calculate emissions of VOCs, CO, NO_x and Soot (PM) based on the LHV of the gas stream being flared through the pilots under normal operations. Tables and Results of these calculations are presented in Appendix 5.

5.6. Wastewater Treatment Systems

Methodology Rank 3 was utilized to estimate the VOC emissions associated to the WWTS. The mass flow through the WWTS was estimated based on the average throughput of Davis Refinery main units, using the emissions factors from *Table 7-8. Model Process Unit Characteristics for Petroleum Refinery Wastewater* and *Table 7-9. Refinery Wastewater Contaminant Concentrations as a Ratio to Benzene* since the WWTS for the proposed Davis Refinery will be a Benzene Waste Operations NESHAP (BWON) Compliant plant. The estimation of the uncontrolled amount of the compounds emitted was calculated using AP-42 emission factors in *Table 7-10. Default Mass Emission Factors for Refinery Wastewater Collection and Treatment Systems,* the controlled estimate included a percentage of control as expected for a BWON compliant plant. The results of these calculations are presented in Appendix 6.

5.7. Cooling Towers

The main emissions from cooling towers are VOC and particulate matter, which are picked up by cooling water when leaks occur in heat exchangers or condensers (product on the high-pressure side, leaks through cracks in the exchanger and contaminants the water).

The base case emission inventory calculations for the Cooling Towers were based on Cooling Water Circulation Rate, a default drift factor and AP-42 emission factors of *Table 8-5. Methodology Rank 5 Default Emission Factors.* Controlled emissions were estimated based on the proposed Davis Refinery cooling towers which are induced mechanical draft type with counter flow arrangement and drift eliminators (0.005% drift rate) built into the media. Results of these estimations are presented in Appendix 7.

5.8. Product Loading

During loading and unloading operations of feedstock and products from tank trucks and rail tank cars, vapors from the material previously transported and vapors from the material being loaded, are displaced and consequently emitted if left uncontrolled. HAPs and VOCs are the main gases to be emitted from loading operations.

Based on the type of product and loading/unloading rates of the Davis Refinery (Crude Oil, Gasoline, Jet Kerosene, Diesel and Fuel Oil), the potential uncontrolled emissions were calculated using the AP-42 emission factors of *Table 5.2-5 Total Uncontrolled Organic Emission Factors for Petroleum Liquid Rail Tank Cars and Tank Trucks*, from Chapter 5 of the AP-42 *Compilation of Air Pollutant Emission Factors. Volume 1, Chapter 5: Transportation And Marketing Of Petroleum Liquids.*

Controlled emissions were estimated considering that the loading/unloading facilities will be designed with vapor recovery to product recycle with upsets routed to emergency flares, since the proposed Davis Refinery must comply with the provisions of 40 CFR 63 Subpart BBBBBB. These results are presented in Appendix 8.

5.9. Fugitive Dust

Fugitive dust from the proposed Davis Refinery comprises silt suspension from vehicular traffic, and particulate matter from catalyst handling at the FCC unit. Results for these estimations are shown in Appendix 9.

Emissions from vehicular traffic at the proposed Davis Refinery were estimated using expected truck traffic at loading facilities and employee vehicular traffic following AP-42 guidelines, and utilizing the silt loading factor for limited access roads in Chapter 13 of the AP-42 *Compilation of Air Pollutant Emission Factors. Volume 1, Chapter 13: Miscellaneous Sources. Section 13.2.1: Paved Roads*. Primary control is paving of areas of routine vehicle traffic, and speed controls to limit vehicle speeds to less than 15 mph.

Regarding emissions from FCCU catalyst handling were estimated based on experience and best practices for these operations and considering catalyst to flow from the control device hopper and deliver it to enclosed bins for storage pending off-site disposal. The particulate matter generated by the displacement of air within the bin as it fills is controlled by a filter bag (sock).

6. BASE CASE EMISSIONS INVENTORY

In the base case emissions inventory, emission factors that consider air pollution control systems were used, as applicable, only when these controls were inherent part of the equipment design (i.e. Ultra Low NOx Burners, IFR tank design, etc.). A summary of the base case emissions inventory for the proposed Davis Refinery is presented in Table 2.

Table 2: Base Case Emissions Inventory Summary for Davis Refinery

	Criteria Pollutants										HAPs
Emissions Unit	CO	Pb	PM<10	Filerable PM <10	PM <2.5	Filterable PM <2.5	Condensable PM	NO_X (as NO_2)	SO_2	VOC	Total HAPs
Leaks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	243.72	40.35
Tanks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	21.79	14.95
Stationary Combustion Sources	91.42	1.60E-03	13.06	3.26	13.06	3.26	9.79	97.95	1.92	17.61	6.41
Fluid Catalytic Cracking Unit	0.00	2.03E-03	50.14	33.16	45.65	28.67	16.98	186.28	664.88	577.20	5.39
Catalytic Reforming Unit	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.79
Sulfur Recovery Plant	2.15	0.00	0.00	0.00	0.00	0.00	0.00	0.47	0.20	1.50	0.00
Vacuum Systems	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Blowdown System	0.83	0.00	0.01	0.01	0.01	0.01	0.00	3.66	5.20	0.15	0.00
Flares	0.25	4.38E-06	0.04	0.01	0.04	0.01	0.03	0.27	0.005	0.05	0.00
Wastewater	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	210.41	23.28
Cooling Towers	0.00	0.00	24.83	0.00	0.00	0.00	0.00	0.00	0.00	4.73	0.00
Rail Product Loading	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1,713.49	0.00
Truck Product Loading	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	366.76	0.00
Fugitive Dust	0.00	0.00	1.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total (STPY)	**94.65**	**0.004**	**89.40**	**36.44**	**58.75**	**31.95**	**26.80**	**288.62**	**672.20**	**3,157.45**	**91.17**

7. PROPOSED DAVIS REFINERY POTENTIAL TO EMIT

A Controls Technology Review was conducted as part of determining the proposed Davis Refinery "Potential to Emit", as defined in North Dakota's Air Pollution Control Rules (NDAC 33-15-14-06).

This review generally followed Best Available Control Technology (BACT) methods for identification of proposed controls and included a pollutant-by-pollutant analysis of technically feasible available control technologies that can be implemented for each emission unit. Based on the estimated controlled emissions for the facility, the source qualifies as a synthetic minor source under North Dakota Air Quality regulations, and therefore, a formal BACT analysis was not completed. The results of the Controls Technology Review is detailed in Exhibit C of the Permit Application, and a summary of the selected controls is listed in Table 3 below.

The proposed Davis Refinery "Potential to Emit", under its physical and operational design and including the effect of add-on pollution control equipment, was calculated utilizing the same methodologies as in the "Base Case" or "uncontrolled" Emissions Inventory, this time applying the reduction efficiencies of the selected add-on control technologies. Table 4 summarizes the "Potential to Emit" of the proposed Davis Refinery.

Table 3: Summary of Proposed Control Technology for the Davis Refinery

Source/Unit	Target Pollutant	Pollution Control Technologies Used	Assumed % Control
Leaks (Fugitive Emissions)	VOC	LDAR (Leak, Detection and Repair) program with 500 ppmv leak definition, and including differential light absorption and ranging (DIAL) or optical gas imaging (OGI) technology	97% valves, 93% pumps, 97% flanges, 97% sample points, (30% heavies). Program baseline/ screen value of 500 ppm
Tanks	VOC	Double Seal and Wipers on IFR Tanks (NESHAP std). Vapor Recovery to product recycle on select fixed roof tanks	95%
Stationary Combustion Sources (Heater and Boilers)	CO NOx VOC/HAPs PM SO2	CO – Best Comb. Practices w/ Ultra Low NOx Burners NOx – SCR's w/ Ultra Low NOx Burners VOC / HAPs – Best Comb. Practices with Ultra Low NOx Burners PM – Venturi Scrubbers on larger heaters	CO – 96% NOx – 75% VOCs / HAPs – 75%
FCC Regeneration Vent	CO NOx SO2	CO– Best Comb. Practices / complete carbon burn regenerator design NOx – COP-NP Combustion Promotor OR Tri-Mer SO2 – Wet Scrubber OR Dri-Sorb Catalyst	CO – 100% NOx – 98% SO_2 – 99%
Catalytic Reforming Unit	HAPs	NA – minor emissions levels	NA
Sulfur Recovery Plants	SO_2	Lo-CAT with tail gas treatment (thermal oxidizer) Other pollutants are considered minor	SO_2 - 99.9%
Blowdown System	CO NOx SO_2	Vapor recovery to product capture and emergency flaring only for upsets	99.8%
Flares	CO NOx VOC HAPs	Lower heating value of feed gases, requirements specified by EPA and NDDoH regulations. Flares will only be used during upset conditions.	98% +
Wastewater Treatment System	VOC/HAPs	Covered API/CPI oil/water separators and induced/dissolved air flotation units. Equalization tanks instead of open ponds. Vapor Recovery System	VOC – 95% HAPs – 55%
Cooling Towers	PM VOC	PM10 – drift eliminators VOC – periodic monitoring of flows for VOC's hydrocarbons	Controls are inherent in design for cooling tower for PM10 and are part water level monitoring for VOCs
Product Loading	VOC	Vapor recovery to product recycle with upsets to emergency flares	98%
Fugitive (on-site vehicular) emissions	PM	Paving of areas of routine vehicle traffic. Maintain vehicle speeds to < 15 mph	$PM_{2.5}$ - 0.00054 lb/vmt PM_{10} - 0.0022 lb/vmt Silt load = 2.15E-02
Spent Catalyst	PM	De-minimus	NA – de-minimus

Taken from report N° P-5715043-01-001-18035-I001. EMISSIONS INVENTORY – CONTROLS TECHNOLOGY REVIEW FOR DAVIS REFINERY. VEPICA, 2016.

Table 4: Summary of proposed Davis Refinery "Potential to Emit"

	Criteria Pollutants										HAPs
Emissions Unit	CO	Pb	PM<10	Filerable PM <10	PM <2.5	Filterable PM <2.5	Condensable PM	NO_X (as NO_2)	SO_2	VOC	Total HAPs
Leaks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	21.06	2.39
Tanks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.17	4.48
Stationary Combustion Sources	91.42	1.60E-03	8.00	2.00	8.00	2.00	6.00	46.40	1.92	17.61	1.62
Fluid Catalytic Cracking Unit	0.00	2.03E-05	1.00	0.66	0.91	0.57	0.34	3.73	6.65	5.77	0.87
Catalytic Reforming Unit	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.79
Sulfur Recovery Plant	2.15	0.00	0.00	0.00	0.00	0.00	0.00	0.47	0.20	1.50	0.00
Vacuum Systems	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Blowdown System	0.83	0.00	0.01	0.01	0.01	0.01	0.00	3.66	5.20	0.15	0.00
Flares	0.25	4.38E-06	0.04	0.01	0.04	0.01	0.03	0.27	0.005	0.05	0.00
Wastewater	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.52	0.52
Cooling Towers	0.00	0.00	1.86	0.00	0.00	0.00	0.00	0.00	0.00	0.35	0.00
Rail Product Loading	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.81	0.00
Truck Product Loading	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.73	0.00
Fugitive Dust	0.00	0.00	1.33	0.00	5.65E-04	0.00	0.00	0.00	0.00	0.00	0.00
Total (STPY)	**94.65**	**1.62E-03**	**12.24**	**2.68**	**8.96**	**2.59**	**6.37**	**54.53**	**13.97**	**69.78**	**10.67**

8. REFERENCES

- Vendor information, Engineering Documentation and Process calculations from VEPICA.
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9. APPENDIXES

APPENDIX 1: Results for Equipment Leaks

APPENDIX 2: Results for Storage Tanks

APPENDIX 3: Results for Stationary Combustion

APPENDIX 4: Results for Process Vents

APPENDIX 5: Results for Flares

APPENDIX 6: Results for Wastewater Treatment Systems

APPENDIX 7: Results for Cooling Towers

APPENDIX 8: Results for Product Loading

APPENDIX 9: Results for Fugitive Dust

APPENDIX 1: Results for Equipment Leaks

Table A1-1 - Number of Equipment per Unit (Average for a large refinery) [(a)]

		Number of Equipments (Average for a large refinery)								
	Median Equipments Leak Components Count*	Crude Distillation	Alkylation	Catalytic reforming	Hydrotreating/ hydrorefining	Catalytic cracking	Product blending	Sulfur plant	Vacuum distillation	Isomerization
Valves	Gas	204	192	310	224	277	75	100	229	164
	Light Liquid	440	597	383	253	282	419	125	108	300
	Heavy Liquid	498	0	84	200	445	186	110	447	78
Pumps	Light Liquid	15	21	12	7	12	10	8	2	9
	Heavy Liquid	14	0	2	6	12	10	3	12	5
	Compressors	2	2	3	2	2	2	1	1	2
Pressure Relief Valves	Gas	7	13	8	9	11	9	4	5	15
Flanges	Gas	549	491	653	439	593	227	280	473	300
	Light Liquid	982	1,328	842	581	747	664	460	136	540
	Heavy Liquid	1,046	600	132	481	890	473	179	1,072	265
	Open-Ended Lines	75	35	48	49	59	24	22	0	36
	Sampling Connections	9	6	9	8	15	8	7	7	7

[(a)] Adapted from Table 2-5 *Median Equipment Leak Component Counts for Large Model Processes* of Emissions Estimation Protocol for Petroleum Refineries, Version 3 (RTI, 2015).

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Table A1-2 – Controlled Emissions from Leaking Equipment

		LDAR Program*	Emission Factor Definition**			Controlled Leak Emissions (VOC) in lb/h								
	Median Equipment Leak Components Count*	Yes	Screening Value (ppmv)	Emission Factor (Kg/h)***	Emission Factor (lb/h)***	Crude Distillation	Alkylation	Catalytic reforming	Hydrotreating/ hydrorefining	Catalytic cracking	Product blending	Sulfur plant	Vacuum distillation	Isomerization
Valves	Gas	97%	500	2.36E-04	5.21E-04	3.19E-03	3.00E-03	4.85E-03	3.50E-03	4.33E-03	1.17E-03	1.56E-03	3.58E-03	2.56E-03
	Light Liquid	97%	500	2.36E-04	5.21E-04	6.88E-03	9.33E-03	5.99E-03	3.95E-03	4.41E-03	6.55E-03	1.95E-03	1.69E-03	4.69E-03
	Heavy Liquid	0%	500	2.36E-04	5.21E-04	2.59E-01	0.00E+00	4.38E-02	1.04E-01	2.32E-01	9.69E-02	5.73E-02	2.33E-01	4.06E-02
Pumps	Light Liquid	85%	500	2.23E-03	4.92E-03	1.11E-02	1.55E-02	8.85E-03	5.16E-03	8.85E-03	7.37E-03	5.90E-03	1.47E-03	6.64E-03
	Heavy Liquid	85%	500	2.23E-03	4.92E-03	1.03E-02	0.00E+00	1.47E-03	4.42E-03	8.85E-03	7.37E-03	2.21E-03	8.85E-03	3.69E-03
	Compressors	85%	10,000	7.30E-02	1.61E-01	4.83E-02	4.83E-02	7.25E-02	4.83E-02	4.83E-02	4.83E-02	2.42E-02	2.42E-02	4.83E-02
Pressure Relief Valves	Gas	97%	500	2.36E-04	5.21E-04	1.09E-04	2.03E-04	1.25E-04	1.41E-04	1.72E-04	1.41E-04	6.25E-05	7.82E-05	2.34E-04
Flanges	Gas	97%	500	3.64E-04	8.03E-04	1.32E-02	1.18E-02	1.57E-02	1.06E-02	1.43E-02	5.47E-03	6.74E-03	1.14E-02	7.23E-03
	Light Liquid	97%	500	3.64E-04	8.03E-04	2.37E-02	3.20E-02	2.03E-02	1.40E-02	1.80E-02	1.60E-02	1.11E-02	3.28E-03	1.30E-02
	Heavy Liquid	30%	500	3.64E-04	8.03E-04	5.88E-01	3.37E-01	7.42E-02	2.70E-01	5.00E-01	2.66E-01	1.01E-01	6.03E-01	1.49E-01
	Open-Ended Lines	97%	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Sampling Connections	97%	500	5.29E-04	1.17E-03	3.15E-04	2.10E-04	3.15E-04	2.80E-04	5.25E-04	2.80E-04	2.45E-04	2.45E-04	2.45E-04
					Total (lb/h)	0.96	0.46	0.25	0.46	0.84	0.46	0.21	0.89	0.28
					Total Controlled (STPY)	4.22	2.00	1.09	2.04	3.68	1.99	0.93	3.90	1.21
					Total Controlled (STPY)	**21.06**	Total VOC Controlled TPY							
					Total Controlled (lb/h)	**4.81**	Total VOC Controlled (lb/h)							

*LDAR program efficiency in reducing fugitive emissions equivalent to those achievable under the TCEQ 28LAER. LDAR assumes automated monitoring/directed maintenance
Average Efficiency 73%
**Table 2-2. Equipment Leak Rate for Petroleum and SOCMI Equipment Components. of Emissions Estimation Protocol for Petroleum Refineries, Version 3 (RTI, 2015)
*** Emission factors used (correlation), based in a threshold of 500 ppmv for leak detection, with automated corrective action, and pegged emission factor for 10,000 ppm SV....

Table A1-2 – Controlled Speciated VOC HAPs Emissions from Leaking Equipment

	Average Weight Percent of Compound in Process Unit Streams[1]								
HAPs	Crude Distillation	Alkylation	Catalytic reforming	Hydrotreating/ hydrorefining	Catalytic cracking	Product blending	Sulfur plant	Vacuum distillation	Isomerization
1,3-Butadiene	0.01	0.22	0.009		0.012				
n-Hexane	4.3	1.6	2.8	1.9	1.0			0.01	3.2
2,2,4-Trimethyl pentane	0.05	25	0.25		0.3			0.003	0.01
Benzene	0.9	0.03	6.3	0.37	1.0			0.003	0.5
Toluene	1.7	2.0	17.4	1.7	3.3			0.04	0.6
Xylenes (total)	2.0	0.08	17.6	1.9	4.9			0.04	0.15
Ethylbenzene	0.63		3.9	0.37	1.1			0.02	
Cumene	0.12		0.42	0.07	0.10				
1,2,4-trimethyl benzene	0.63		5.9	0.4	1.9			0.02	
Naphthalene	0.25		0.87	0.25	0.72			0.12	
Biphenyl	0.06			0.22	0.43			0.09	

1 - Table 2-7. Concentration of HAP in Refinery Process Unit Streams, Emissions Estimation Protocol for Petroleum Refineries, Version 3, RTI International.

Table A1-2 – Controlled Speciated VOC HAPs Emissions from Leaking Equipment (Cont.)

	Controlled Leak Emissions (HAP) in STPY									
HAPs	Crude Distillation	Alkylation	Catalytic reforming	Hydrotreat/ hydrorefining	Catalytic cracking	Product blending	Sulfur plant	Vacuum distillation	Isomerization	Total HAPs Controlled (STPY)
1,3-Butadiene	4.22E-04	4.41E-03	9.78E-05	0.00E+00	4.41E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.37E-03
n-Hexane	1.82E-01	3.21E-02	3.04E-02	3.87E-02	3.68E-02	0.00E+00	0.00E+00	3.90E-04	3.87E-02	3.59E-01
2,2,4-Trimethyl pentane	2.11E-03	5.01E-01	2.72E-03	0.00E+00	1.10E-02	0.00E+00	0.00E+00	1.17E-04	1.21E-04	5.17E-01
Benzene	3.80E-02	6.01E-04	6.84E-02	7.53E-03	3.68E-02	0.00E+00	0.00E+00	1.17E-04	6.05E-03	1.58E-01
Toluene	7.18E-02	4.01E-02	1.89E-01	3.46E-02	1.21E-01	0.00E+00	0.00E+00	1.56E-03	7.26E-03	4.66E-01
Xylenes (total)	8.45E-02	1.60E-03	1.91E-01	3.87E-02	1.80E-01	0.00E+00	0.00E+00	1.56E-03	1.81E-03	5.00E-01
Ethylbenzene	2.66E-02	0.00E+00	4.24E-02	7.53E-03	4.05E-02	0.00E+00	0.00E+00	7.80E-04	0.00E+00	1.18E-01
Cumene	5.07E-03	0.00E+00	4.56E-03	1.43E-03	3.68E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.47E-02
1,2,4-trimethyl benzene	2.66E-02	0.00E+00	6.41E-02	8.15E-03	6.99E-02	0.00E+00	0.00E+00	7.80E-04	0.00E+00	1.70E-01
Naphthalene	1.06E-02	0.00E+00	9.45E-03	5.09E-03	2.65E-02	0.00E+00	0.00E+00	4.68E-03	0.00E+00	5.63E-02
Biphenyl	2.53E-03	0.00E+00	0.00E+00	4.48E-03	1.58E-02	0.00E+00	0.00E+00	3.51E-03	0.00E+00	2.63E-02
	0.45	0.58	0.60	0.15	0.54	0.00	0.00	0.01	0.05	**2.39**

APPENDIX 2: Results for Storage Tanks

Table A2-1 – Controlled VOC Emissions from Petroleum Refinery Storage Tanks

	Qty.	Roof Type ->	Emissions per Tank (pounds/year)				Emissions per Tank (STPY)			Total VOC Tank Emissions (STPY)		
			IFR / External Self Supporting Roof[1]	Fixed Cone Uncontrolled Emissions	Fixed Cone Not Connected to VRU	Fixed Cone connected to VRU[2]	Self-Supported & Gasketed Penetrations	Fixed Cone not connected to VRU	Fixed Cone connected to VRU	Self-Supported & Gasketed Penetrations	Fixed Cone not connected to VRU	Fixed Cone connected to VRU
CRUDE OIL	3.00	115 ID X 60	2,449.39				1.22			3.67		
HEAVY NAPHTHA	1.00	88 ID X 60	345.61				0.17			0.17		
GASOLINE	3.00	88 ID X 60	1,047.99				0.52			1.57		
REFORMATE	2.00	63 ID X 60	518.55				0.26			0.52		
FCC NAPHTHA	2.00	63 ID X 60	840.74				0.42			0.84		
LIGHT NAPHTHA	2.00	63 ID X 60	749.26				0.37			0.75		
ALKYLATE	2.00	63 ID X 60	548.95				0.27			0.55		
JET FUEL	2.00	63 ID X 60	225.38				0.11			0.23		
DESULPHURIZED DIESEL	2.00	88 ID X 60		1,392.64		69.63			0.03			0.07
UNDESULPHURIZED DIESEL	2.00	63 ID X 60		751.10		37.56			0.02			0.04
VACUUM GASOIL	2.00	63 ID X 60		8.64	8.64			0.00			8.64E-03	
DILUENT - HEAVY FCC PRODUCT	1.00	63 ID X 60		326.64	326.64			0.16			1.63E-01	
FUEL OIL	2.00	88 ID X 60		8.25	8.25			0.004			8.25E-03	
LIGHT SLOPS	1.00	25 ID X 30		22,281.90		1,114.10			0.56			0.56
HEAVY SLOPS	1.00	25 ID X 30		54.65	54.65			0.03			2.73E-02	
										8.30	**0.21**	**0.66**

[1] Self-supported & gasketed penetrations - External Self-Supporting Roof, double seals and wipers, all gasketed tank fittings and fixed floating roof legs.

[2] VRU Efficiency 95%

Emission Estimates from EPA Tanks 4.09d modeled runs.

Table A2-2 – Controlled HAPs Emissions from Petroleum Refinery Storage Tanks

	Emissions Factors for Petroleum Liquid Storage Tanks (lb/MMbbl)*			Emissions (lb/h)			STPY (Uncontrolled)			Control Efficiencies***			STPY (Controlled)				
Chemical Name	Crude Oil	Gasoline and Other Light Distillates	Diesel Fuel and Other Middle Distillates	Crude Oil	Gasoline and Other Light Distillates	Diesel Fuel and Other Middle Distillates	Crude Oil	Gasoline and Other Light Distillates**	Diesel Fuel and Other Middle Distillates	Crude Oil	Gasoline and Other Light Distillates	Diesel Fuel and Other Middle Distillates	Crude Oil	Gasoline and Other Light Distillates	Diesel Fuel and Other Middle Distillates	TOTAL (STPY)	TOTAL (lb/h)
HAP																	
2-Methyl naphthalene	0	3.5	3.5	0.00E+00	4.81E-03	3.21E-03	0.00	2.11E-02	1.41E-02	60%	60%	95%	0.00E+00	0.008	0.001	9.13E-03	2.09E-03
Anthracene	0	0.24	0.24	0.00E+00	3.30E-04	2.20E-04	0.00	1.45E-03	9.64E-04	60%	60%	95%	0.00E+00	0.001	0.000	6.26E-04	1.43E-04
Benzene	10	70	54	2.29E-02	9.63E-02	4.95E-02	0.10	4.22E-01	2.17E-01	60%	60%	95%	4.02E-02	0.169	0.011	2.20E-01	5.01E-02
Biphenyl	0.2	0.17	0	4.58E-04	2.34E-04	0.00E+00	0.00	1.02E-03	0.00E+00	60%	60%	95%	8.03E-04	0.000	0.000	1.21E-03	2.77E-04
Chrysene	0	0.21	0.21	0.00E+00	2.89E-04	1.93E-04	0.00	1.26E-03	8.43E-04	60%	60%	95%	0.00E+00	0.001	0.000	5.48E-04	1.25E-04
Cresol	0.6	13	0.19	1.38E-03	1.79E-02	1.74E-04	0.01	7.83E-02	7.63E-04	60%	60%	95%	2.41E-03	0.031	0.000	3.38E-02	7.71E-03
Cumene	0.5	15	10	1.15E-03	2.06E-02	9.17E-03	0.01	9.03E-02	4.02E-02	60%	60%	95%	2.01E-03	0.036	0.002	4.02E-02	9.17E-03
Ethylbenzene	1.6	31	18	3.67E-03	4.26E-02	1.65E-02	0.02	1.87E-01	7.23E-02	60%	60%	95%	6.42E-03	0.075	0.004	8.47E-02	1.93E-02
Fluorene	0	0.36	0.36	0.00E+00	4.95E-04	3.30E-04	0.00	2.17E-03	1.45E-03	60%	60%	95%	0.00E+00	0.001	0.000	9.40E-04	2.15E-04
Hexane	84	420	480	1.93E-01	5.78E-01	4.40E-01	0.84	2.53E+00	1.93E+00	60%	60%	95%	3.37E-01	1.012	0.096	1.45E+00	3.30E-01
Methanol	0	3.8	3.8	0.00E+00	5.23E-03	3.48E-03	0.00	2.29E-02	1.53E-02	60%	60%	95%	0.00E+00	0.009	0.001	9.92E-03	2.26E-03
Methyl isobutyl ketone	0	320	320	0.00E+00	4.40E-01	2.93E-01	0.00	1.93E+00	1.28E+00	60%	60%	95%	0.00E+00	0.771	0.064	8.35E-01	1.91E-01
Methyl tertiary-butyl ether	0	310	0	0.00E+00	4.26E-01	0.00E+00	0.00	1.87E+00	0.00E+00	60%	60%	95%	0.00E+00	0.747	0.000	7.47E-01	1.71E-01
Naphthalene	0.6	7.6	4	1.38E-03	1.05E-02	3.67E-03	0.01	4.58E-02	1.61E-02	60%	60%	95%	2.41E-03	0.018	0.001	2.15E-02	4.91E-03
Phenanthrene	0	1.5	1.5	0.00E+00	2.06E-03	1.38E-03	0.00	9.03E-03	6.02E-03	60%	60%	95%	0.00E+00	0.004	0.000	3.91E-03	8.94E-04
Phenol	0.9	0.9	0.67	2.06E-03	1.24E-03	6.14E-04	0.01	5.42E-03	2.69E-03	60%	60%	95%	3.61E-03	0.002	0.000	5.92E-03	1.35E-03
Pyrene	0	0.39	0.39	0.00E+00	5.36E-04	3.58E-04	0.00	2.35E-03	1.57E-03	60%	60%	95%	0.00E+00	0.001	0.000	1.02E-03	2.32E-04
Styrene	0	66	0	0.00E+00	9.08E-02	0.00E+00	0.00	3.97E-01	0.00E+00	60%	60%	95%	0.00E+00	0.159	0.000	1.59E-01	3.63E-02
Toluene	7.5	180	100	1.72E-02	2.48E-01	9.17E-02	0.08	1.08E+00	4.02E-01	60%	60%	95%	3.01E-02	0.434	0.020	4.84E-01	1.10E-01
Xylene	6.2	140	70	1.42E-02	1.93E-01	6.42E-02	0.06	8.43E-01	2.81E-01	60%	60%	95%	2.49E-02	0.337	0.014	3.76E-01	8.59E-02
				Total Hazardous Air Pollutants (HAP), Uncontrolled			**1.13**	**9.54**	**4.28**	**Total Hazardous Air Pollutants (HAP), Controlled**			**0.45**	**3.82**	**0.21**		

*: Adapted from Table 3-3. *Default Emissions Factors for Petroleum Refinery Storage Tanks* of Emissions Estimation Protocol for Petroleum Refineries, Version 3 (RTI, 2015).

**These factors consider an estimation of distillates production as a fraction of crude oil processing capacity, subtracting the production of heavy distillates and aromatics. In the case of Davis Refinery, such production is zero, then: Gasoline and Other Light Distillates (such as desulfurized naphtha, alkylates, reformates, butane) is considered to be up to 60% of crude oil processing rate, and, Diesel Fuel and Other Middle Distillates (diesel, kerosenes, jet fuel, fuel oil), is considered to be up to 40% of crude oil processing rate.

*** Efficiency of seals 60%. Efficiency of Vapor Recovery Systems 95% VRU + thermal destruction / thermal destruction achieved via flaring, use as fuel gas or thermal oxidizer.

APPENDIX 3: Results for Stationary Combustion

Table A3-1 – Summary of Controlled Emissions from Stationary Combustion Sources (Heaters/Boilers) – See detailed calculations in next Appendix

Emissions Summary	CO	Pb	PM Total 2.5	Filterable PM2.5	Condensable PM	NOx	SO_2	VOC	Metal HAP	Total Organic HAP
Heaters	87.918	1.54E-03	7.50	1.88	5.63	42.65	1.847	16.93	0.020	1.33
Boilers	3.500	6.13E-05	0.50	0.13	0.38	3.75	0.074	0.67	0.004	0.27
Total STPY	**91.42**	**1.60E-03**	**8.00**	**2.00**	**6.00**	**46.40**	**1.92**	**17.61**	**0.024**	**1.60**
Total lb/h	**20.87**	**3.65E-04**	**1.83**	**0.46**	**1.37**	**10.59**	**0.44**	**4.02**	**0.005**	**0.36**

Table A3-2 Emissions from Stationary Combustion Sources (Internal Combustion Engines)

			EMERGENCY GENERATOR SET						
			216-EG-1601A		216-EG-1601B		216-EG-1601C		
Criteria Pollutants	Emission Factor		Emission (lb/h)	Emission (STPY)	Emission (lb/h)	Emission (STPY)	Emission (lb/h)	Emission (STPY)	Total Emissions Gen Set (STPY)
	lb/HP-hr	lb/MMBTU							
Carbon Monoxide	0.0055		25.8	1.29	25.8	1.3	25.8	1.3	3.87
PM	0.0007		3.29	0.16	3.29	0.16	3.29	0.16	0.49
PM 10 (Total)		0.0573	3.32	0.17	3.3	0.2	3.3	0.2	4.98E-01
PM 10 (Filterable)		0.0496	2.87	0.14	2.9	0.1	2.9	0.1	4.31E-01
PM 2.5 (Total)		0.0479	2.78	0.14	2.8	0.1	2.8	0.1	4.16E-01
PM 2.5(Filterable)		0.0479	2.78	0.14	2.8	0.1	2.8	0.1	4.16E-01
PM (Condensable)		0.0077	0.45	0.02	0.4	0.0	0.4	0.0	6.69E-02
NOx*	0.013		61.0	3.05	61.0	3.1	61.0	3.1	9.15
SOx	4.05E-06		1.90E-02	9.49E-04	1.90E-02	9.49E-04	1.90E-02	9.49E-04	2.85E-03
TOC (as VOC)	7.05E-04		3.31	0.17	3.31	0.17	3.31	0.17	4.96E-01
Org HAP (Total)			2.53E-01	1.26E-02	2.53E-01	1.26E-02	2.53E-01	1.26E-02	3.79E-02

Table A3-2 Emissions from Stationary Combustion Sources (Internal Combustion Engines) Cont.

			FIREWATER PUMPS						
			212-P-1201 A		212-P-1201 B		212-P-1201 C		
Criteria Pollutants	Emission Factor		Emission (lb/h)	Emission (STPY)	Emission (lb/h)	Emission (STPY)	Emission (lb/h)	Emission (STPY)	Total Emissions FWP (STPY)
	lb/HP-hr	lb/MMBTU							
Carbon Monoxide	0.0055		3.3	0.17	3.3	0.2	3.3	0.2	0.50
PM	0.0007		0.42	0.02	0.42	0.02	0.42	0.02	0.06
PM 10 (Total)		0.0573	0.26	0.01	0.26	0.01	0.26	0.01	3.93E-02
PM 10 (Filterable)		0.0496	0.23	0.01	0.23	0.01	0.23	0.01	3.40E-02
PM 2.5 (Total)		0.0479	0.22	0.01	0.22	0.01	0.22	0.01	3.28E-02
PM 2.5(Filterable)		0.0479	0.22	0.01	0.22	0.01	0.22	0.01	3.28E-02
PM (Condensable)		0.0077	0.04	0.00	0.04	0.00	0.04	0.00	5.28E-03
NOx*	0.013		7.8	0.39	7.80	0.39	7.80	0.39	1.17
SOx	4.05E-06		2.43E-03	1.21E-04	2.43E-03	1.21E-04	2.43E-03	1.21E-04	3.64E-04
TOC (as VOC)	7.05E-04		0.42	0.02	0.42	0.02	0.42	0.02	6.35E-02
Org HAP (Total)			1.99E-02	9.97E-04	1.99E-02	9.97E-04	1.99E-02	9.97E-04	2.99E-03

*Controlled by ignition timing retard.

"From AP-42 Chapter 3 Section 3.4. Large Stationary Diesel And All Stationary Dual-fuel Engines. Table 3.4-1. GASEOUS EMISSION FACTORS FOR LARGE STATIONARY DIESEL AND ALL STATIONARY DUAL-FUEL ENGINES and Table 3.4-2. PARTICULATE AND PARTICLE-SIZING EMISSION FACTORS FOR LARGE UNCONTROLLED STATIONARY DIESEL ENGINES"

Table A3-3 HAPs Emissions from Stationary Combustion Sources (Internal Combustion Engines)

		EMERGENCY GENERATOR SETx3		FIREWATER PUMPSx3	
Volatile HAPS	lb/MMBTU	lb/hr	Emission (STPY)	lb/hr	Emission (STPY)
Benzene	7.76E-04	1.35E-01	6.75E-03	1.06E-02	5.32E-04
Toluene	2.81E-04	4.89E-02	2.44E-03	3.85E-03	1.93E-04
Xylene	1.93E-04	3.36E-02	1.68E-03	2.64E-03	1.32E-04
Propylene	2.79E-03	4.85E-01	2.43E-02	3.82E-02	1.91E-03
Formaldehyde	7.89E-05	1.37E-02	6.86E-04	1.08E-03	5.41E-05
Acetaldehyde	2.52E-05	4.38E-03	2.19E-04	3.45E-04	1.73E-05
Acrolein	7.88E-06	1.37E-03	6.85E-05	1.08E-04	5.40E-06
TOTAL VOLATILE HAPS		**7.22E-01**	**3.61E-02**	**5.69E-02**	**2.84E-03**
PAHs					
Naphthalene	1.30E-04	2.26E-02	1.13E-03	1.78E-03	8.91E-05
Acenaphthylene	9.23E-06	1.61E-03	8.03E-05	1.26E-04	6.32E-06
Acenaphthene	4.68E-06	8.14E-04	4.07E-05	6.41E-05	3.21E-06
Fluorene	1.28E-05	2.23E-03	1.11E-04	1.75E-04	8.77E-06
Phenanthrene	4.08E-05	7.09E-03	3.55E-04	5.59E-04	2.80E-05
Anthracene	1.23E-06	2.14E-04	1.07E-05	1.69E-05	8.43E-07
Fluoranthene	4.03E-06	7.01E-04	3.50E-05	5.52E-05	2.76E-06
Pyrene	3.71E-06	6.45E-04	3.23E-05	5.08E-05	2.54E-06
Benz(a)anthracene	6.22E-07	1.08E-04	5.41E-06	8.52E-06	4.26E-07
Chrysene	1.53E-06	2.66E-04	1.33E-05	2.10E-05	1.05E-06
Benzo(b)fluoranthene	1.11E-06	1.93E-04	9.65E-06	1.52E-05	7.61E-07
Benzo(k)fluoranthene	2.18E-07	3.79E-05	1.90E-06	2.99E-06	1.49E-07
Benzo(a)pyrene	2.57E-07	4.47E-05	2.23E-06	3.52E-06	1.76E-07
Indeno(1,2,3-cd)pyrene	4.14E-07	7.20E-05	3.60E-06	5.67E-06	2.84E-07
Dibenz(a,h)anthracene	3.46E-07	6.02E-05	3.01E-06	4.74E-06	2.37E-07
Benzo(g,h,l)perylene	5.56E-07	9.67E-05	4.83E-06	7.62E-06	3.81E-07
TOTAL PAH	**2.12E-04**	**3.69E-02**	**1.84E-03**	**2.91E-03**	**1.45E-04**

"From AP-42 Chapter 3 Section 3.4. Large Stationary Diesel And All Stationary Dual-fuel Engines. Table 3.4-3. SPECIATED ORGANIC COMPOUND EMISSION FACTORS FOR LARGE, UNCONTROLLED STATIONARY DIESEL ENGINES and Table 3.4-4. PAH EMISSION FACTORS FOR LARGE UNCONTROLLED STATIONARY DIESEL ENGINES"

APPENDIX 4: Results for Process Vents

Table A4-1 – Summary of Controlled Emissions from the Fluid Catalytic Cracking Unit[(a)]

	Uncontrolled			Controlled			
Criteria Pollutants	Emission Factors (lb/Mbbl Fresh Feed)	Emissions (lb/h) Uncontrolled	Emission (STPY) Uncontrolled	Contol Device	Control %	Emissions (lb/h) Controlled	Emission (STPY) Controlled
CO*	0	0	0	BCP	100%	0	0
Lead (Ratio to Nickel Conc.)	0.08	4.63E-04	2.03E-03	BCP	99%	4.63E-06	2.03E-05
PM10 Primary	-	11.448	50.1	Wet Scrubber or Tri-Mer	98.0%	0.229	1.003
PM condensable	-	3.876	17.0	Wet Scrubber or Tri-Mer	98.0%	0.078	0.340
PM2.5 filterable	-	6.55	28.7	Wet Scrubber or Tri-Mer	98.0%	0.131	0.573
PM2.5 Primary	-	10.42	45.7	Wet Scrubber or Tri-Mer	98.0%	0.208	0.913
PM10 filterable	-	7.572	33.2	Wet Scrubber or Tri-Mer	98.0%	0.151	0.663
NOx	71	42.53	186.3	COP-NP or Tri-Mer	98%	0.851	3.73
SO_2	***	151.80	664.9	Wet Scrubber or Dry Sorbent	99%	1.52	6.65
VOC**	220	131.78	577.2	Flue Gas Recirculation	99%	1.32	5.77
Total HAP [(b)]	-	4.85	5.39	BCP		2.70E-01	0.87

* Based on FCCU regenerator design for complete carbon burn operation

** Based on FCCU flue gas capture and recirculation design for complete combustion

*** Based on FCCU Licensor Data

BCP - Best Combustion Practices

COP-NP - Non-Platinum CO combustion promoter

[(a)] All calculations are based on Table 5-4 *Organic HAP Emissions Factors for CCU Catalyst Regenerator Vent* of Emissions Estimation Protocol for Petroleum Refineries, Version 3 (RTI, 2015), unless noted otherwise.

[(b)] Metal HAPs were calculated using the Equation 5-1 and Table 5-3 of the RTI Emissions Estimation Protocol. HCN emissions considered to be emitted only in startup and shutdown operations, which means a factor of 200 hours/year.

Table A4-2 – Emissions from the Catalytic Reforming Units (Reformers) [(a)]

		Reformer #2		Reformer #1	
	Emissions Factor (lb/Mbbl fresh feed)	Emission (lb/h)	Emission (US TPY)	Emission (lb/h)	Emission (US TPY)
Dioxins/PCBs					
Dioxin toxic equivalents (TEQ)	5.70E-09	9.41E-10	**3.16E-10**	2.08E-09	**7.00E-10**
Total polychlorinated biphenyls	2.60E-06	4.29E-07	**1.44E-07**	9.49E-07	**3.19E-07**
SV-NV Organic HAPs					
Naphthalene	3.50E-05	5.78E-06	1.94E-06	1.28E-05	4.30E-06
2-Methylnaphthalene	1.30E-06	2.15E-07	7.21E-08	4.75E-07	1.60E-07
Acenaphthylene	3.00E-08	4.95E-09	1.66E-09	1.10E-08	3.68E-09
Acenaphthene	4.30E-08	7.10E-09	2.39E-09	1.57E-08	5.28E-09
Fluorene	2.00E-07	3.30E-08	1.11E-08	7.30E-08	2.46E-08
Phenanthrene	6.10E-07	1.01E-07	3.38E-08	2.23E-07	7.49E-08
Anthracene	9.10E-08	1.50E-08	5.05E-09	3.32E-08	1.12E-08
Fluoranthene	1.00E-07	1.65E-08	5.55E-09	3.65E-08	1.23E-08
Pyrene	1.50E-08	2.48E-09	8.32E-10	5.48E-09	1.84E-09
Benzo(a)anthracene	9.00E-10	1.49E-10	4.99E-11	3.29E-10	1.10E-10
Benzo(b)fluoranthene	1.50E-09	2.48E-10	8.32E-11	5.48E-10	1.84E-10
Benzo(k)fluoranthene	7.50E-10	1.24E-10	4.16E-11	2.74E-10	9.21E-11
Benzo(e)pyrene	2.90E-09	4.79E-10	1.61E-10	1.06E-09	3.56E-10
Benzo(g,h,i)perylene	4.00E-09	6.60E-10	2.22E-10	1.46E-09	4.91E-10
Chrysene	2.90E-09	4.79E-10	1.61E-10	1.06E-09	3.56E-10
Dibenzo(a,h)anthracene	7.80E-10	1.29E-10	4.33E-11	2.85E-10	9.57E-11
Indeno(1,2,3-c,d)pyrene	1.70E-09	2.81E-10	9.43E-11	6.21E-10	2.09E-10
Total SV-NV Organic HAPs			**2.07E-06**		**4.59E-06**

		Reformer #2		Reformer #1	
	Emissions Factor (lb/Mbbl fresh feed)	Emission (lb/h)	Emission (US TPY)	Emission (lb/h)	Emission (US TPY)
Volatile Organics					
Benzene	0.004	6.60E-04	2.22E-04	1.46E-03	4.91E-04
Toluene	0.0096	1.58E-03	5.33E-04	3.50E-03	1.18E-03
Xylene	0.007	1.16E-03	3.88E-04	2.56E-03	8.59E-04
THC (Total Hydrocarbons)*	0.24	3.96E-02	**1.33E-02**	8.76E-02	**2.94E-02**
Other Inorganic HAPs					
Hydrogen chloride**	4.2	0.69	2.33E-01	1.53	5.16E-01
Chlorine**	0.23	0.04	1.28E-02	8.40E-02	2.82E-02
Total Inorganic HAPs		0.73	**2.47E-01**	1.62	**5.46E-01**

[(a)] All calculations are based on Table 5-6 *Emissions Factors for CRU Catalyst Regeneration Vent* of Emissions Estimation Protocol for Petroleum Refineries, Version 3 (RTI, 2015), unless noted otherwise.

*Total hydrocarbons may be used as a surrogate for VOC. Total hydrocarbons are presented on an as propane basis.

**Emissions factor for uncontrolled coke burn vent.

Table A4-3 –Controlled Emissions from Sulfur Recovery Unit (SRU) + Thermal Oxidizer [(a)]

SRU UNIT: LO-CAT ® (licensed by MERICHEM)			LTPD	10.14
Capacity (MMSCFD)	9.4			
Operating hours/year	8,760			
Number of Vents:	2			
to be directed to a Thermal Oxidizer				
Molar Flow combined	597.6	lbmol/h		
STD Vapor Volumetric Flow Combined	5.442	MMSCFD		
Component	Combined Mole%	Molar Flow (lbmol/h)		
H2	0.1722	1.0292		
C1	0.4742	2.8335		
Ethylene	0.3566	2.1310		
C2	0.4245	2.5370		
C3	0.1750	1.0456		
iC4	0.0295	0.1765		
nC4	0.0843	0.5040		
H2S	1.17E-06	0.0007	1.13	ppmv
CO2	0.0000	0.0000		
H2O	14.3990	86.0485		
O2	15.9311	95.2045		
N2	67.1550	401.3185		
Ar	0.7985	4.7717		
	100.0000	597.6007		
Specifications Thermal Oxidizer				
Duty (MMBTU/h)	1.583			
VOC Destruction (%)	99.9			
Flue Gas Component	Molar Flow (lbmol/h)	MW	lb/hr	STPY
C1	0.001	16.04	0.02	0.07
Ethylene	0.003	28.05	0.08	0.35
C2	0.002	30.07	0.06	0.28
C3	0.003	44.1	0.11	0.49
iC4	0.001	58.12	0.06	0.27
nC4	0.000	58.12	0.01	0.04
Sum VOC				**1.50**
SO2	0.0007	64.1	0.04	**0.20**

	Emission Factor *** (lb/MMBtu, LHV basis)	Emission (lb/h)	Emission (US tpy)
Carbon monoxide	0.31	4.91E-01	**2.15E+00**
Nitrogen oxides	0.068	1.08E-01	**4.71E-01**

Emissions Estimation Protocol for Petroleum Refineries, Table 6-2 "Flare Energy Consumption-Based Emission Factors"

[(a)] Calculations are based on available engineering data from licensor.

Table A4-4 –Emissions from Blowdown System (with vapor recovery and flaring) [(a)]

Compound Name	Emissions Factor (lb/MBbl of refinery feed)*	Emission (lb/h)	Emission (US TPY)
Carbon monoxide	4.3	9.85	0.83
Nitrogen oxides	19	43.54	3.66
Sulfur dioxide	27	61.88	5.20
Total hydrocarbons	0.8	1.83	0.15
SOOT ($PM_{2.5}$-FIL) from Lightly smoking flares (2)	0.027	0.1	0.005

[(a)] Calculations are based on Table 5-12. *Default Emissions Factors for Blowdown Systems* of Emissions Estimation Protocol for Petroleum Refineries, Version 3 (RTI, 2015).
* This calculation shows how much from the total flare emission, corresponds to the blowdown.

APPENDIX 5: Results for Flares

Table A5-1 –Flare Natural Gas (Fuel Gas)-Based Pilot Emissions

				Emissions (lb/h)								
				EF (lb/MMBTU)*	CO	Pb	PM total	PM COND	PM FILT	NOX	SO2	VOC
Flare	# Pilots	NG Flow/Pilot	NG SCF/h	MMBTU/h	0.0280000	0.0000005	0.0040000	0.0030000	0.0010000	0.0300000	0.0005882	0.0053922
HC Emergency Flare 1	3	100	300	0.306	8.57E-03	1.50E-07	1.22E-03	9.18E-04	3.06E-04	9.18E-03	1.80E-04	1.65E-03
HC Emergency Flare 2	3	100	300	0.306	8.57E-03	1.50E-07	1.22E-03	9.18E-04	3.06E-04	9.18E-03	1.80E-04	1.65E-03
Acid Flare	2	100	200	0.204	5.71E-03	1.00E-07	8.16E-04	6.12E-04	2.04E-04	6.12E-03	1.20E-04	1.10E-03
Enclosed HC Operating Flare	12	100	1200	1.224	3.43E-02	6.00E-07	4.90E-03	3.67E-03	1.22E-03	3.67E-02	7.20E-04	6.60E-03
				Total (lb/h)	**5.71E-02**	**1.00E-06**	**8.16E-03**	**6.12E-03**	**2.04E-03**	**6.12E-02**	**1.20E-03**	**1.10E-02**
				Total (STPY)	**0.25**	**4.38E-06**	**0.04**	**0.03**	**0.01**	**0.27**	**0.005**	**0.05**

*: Calculated based on the TABLE 1.4-2. AP 42, Fifth Edition, Volume I, Chapter 1: External Combustion Sources.

Table A5-2 – Total Flare HAP Emissions [(a)]

Compound	Emission Factor (tons/yr/bbl/cd)	Emission US TPY	Emission (lb/h)
Benzene	9.00E-06	0.495	1.13E-01
Toluene	7.00E-06	0.385	8.79E-02
Xylene	6.00E-06	0.330	7.53E-02
Methyl tertiary-butyl ether	3.00E-06	0.165	3.77E-02
Hexane	1.00E-05	0.550	1.26E-01
Formaldehyde	1.00E-06	0.055	1.26E-02
Ethylbenzene	2.00E-07	0.011	2.51E-03
1,3-Butadiene	7.00E-06	0.385	8.79E-02
Total VOC HAPs TPY		**2.376**	**5.42E-01**

[(a)] Calculations are based on Table 6-4. *Flare General Emission Factors* of Emissions Estimation Protocol for Petroleum Refineries, Version 3 (RTI, 2015)

APPENDIX 6: Results for Wastewater Treatment Systems

Table A6-1 – Waste Water Flow and Benzene Mass calculation for Petroleum Refinery Wastewater [(a)]

Process Unit	Average Waste Water Flow Factor (gal/bbl)	Average Benzene Concentration (ppmw)	Average Organic HAP Concentration (ppmw)	Average Throughput of the Unit (bbl/cd)	Waste Water Flow (gal/cd)	Uncontrolled Benzene Mass Flow (lb/cd)	Benzene Mass Flow (lb/d) Controlled ***
Crude distillation*	0.05*	21	140	55,000	115,644	20.25	1.013
Alkylation unit	6	3	6.9	5,388	0	0.00	-
Catalytic reforming	1.5	106	238	12,720	0	0.00	-
Hydrotreating/ hydrorefining	2.6	6.3	32	47,418	0	0.00	-
Catalytic cracking	2.4	13	165	14,376	0	0.00	-
Product blending	2.9	24	1,810	32,221	0	0.00	-
Sulfur plant**	9.7	0.8	3.4	11.37	110.28	0.0007	0.000
Isomerization	1.5	33	117	3,362	0	0.00	-
Tank drawdown	0.02	188	840	110,586	2,211.72	3.47	0.173
					Total Benzene Mass (lb/cd)	23.72	1.186

[(a)]Calculations are based on Table 7-8. *Model Process Unit Characteristics for Petroleum Refinery Wastewater* of Emissions Estimation Protocol for Petroleum Refineries, Version 3 (RTI, 2015)

* Estimated as 5% of the unit throughput (desalter purge)

**This flow factor is given in gal/ton of sulfur

*** Assumes VSEP pretreatment or similar pretreatment of inflow into API (or in lieu of API) 95% Assumed Efficiency

Table A6-2 – Controlled Waste Water Emissions Calculations for Petroleum Refinery Wastewater [(a)]

	Benzene Mass Ratio [(b)]	Mass Flow (lb/d)	Mass Fraction Table 7-10 BWON [(C)]	Emissions (STPY)	Emissions (STPY) Controlled*
Total VOC	81	96.08	0.6	10.52	**10.52**
2,2,4- Trimethylpentane	1.97	2.34	0.55	0.23	**1.06E-01**
Benzene	1	1.19	0.25	0.05	**2.44E-02**
Biphenyl	0.034	0.04	0.031	2.28E-04	**1.03E-04**
Cresols	0.25	0.30	0	0.00E+00	**0.00E+00**
Cumene	0.37	0.44	0.24	0.02	**8.65E-03**
Ethylbenzene	0.88	1.04	0.22	0.04	**1.89E-02**
Hexane	3.5	4.15	0.55	0.42	**1.88E-01**
Methyl tertiary-butyl ether	0.58	0.69	0.091	0.01	**5.14E-03**
Naphthalene	0.29	0.34	0.098	0.01	**2.77E-03**
Phenol	0.18	0.21	0	0.00	**0.00E+00**
Styrene	0.58	0.69	0.64	0.08	**3.62E-02**
Toluene	3.3	3.91	0.19	0.14	**6.11E-02**
Xylene	3.6	4.27	0.21	0.16	**7.36E-02**
1,3-Butadiene	0.0006	0.00	0.75	0.00	**4.38E-05**
			Total HAP (Uncontrolled)	1.16	
*55% Efficiency by use of activated carbon filters in API Separator			Total HAP (Controlled)	0.52	

[(a)] Calculations are based on Table 7-8. *Model Process Unit Characteristics for Petroleum Refinery Wastewater* of Emissions Estimation Protocol for Petroleum Refineries, Version 3 (RTI, 2015)

[(b)] Calculations are based on Table 7-9. *Refinery Wastewater Contaminant Concentrations as a Ratio to Benzene* of Emissions Estimation Protocol for Petroleum Refineries, Version 3 (RTI, 2015)

[(c)] Calculations are based on Table 7-10. *Default Mass Emission Factors for Refinery Wastewater Collection and Treatment Systems* of Emissions Estimation Protocol for Petroleum Refineries, Version 3 (RTI, 2015). **Emission Factors for: BWON-Compliant Wastewater Collection and Treatment System

APPENDIX 7: Results for Cooling Towers

Table A7-1 – Controlled Emissions from the Cooling Tower Systems [(a)]

Compound	Emission Factor (lbs/MMgal)*	Emission (lb/h)	Emission (US TPY)
VOC	6	8.10E-02	3.55E-01
PM_{10}	31.5	4.25E-01	1.86E+00

[(a)] Calculations are based on Table 8-5. *Methodology Rank 5 Default Emission Factors* of Emissions Estimation Protocol for Petroleum Refineries, Version 3 (RTI, 2015).

* Emission Factors showed correspond only to induced draft, counter flow cooling towers, for a drift factor Water Drift Factor of 625.5 lb/Mgal (0.005% of drift factor for a water loss of 0.075 GPM) . Engineering calculations can yield drift factors considerably lower, to minimize water loss.

APPENDIX 8: Results for Product Loading

Table A8-1 – Controlled Emissions from the Rail Product Loading/Unloading Operations [(a)]

Description	EF (lb/Mgal)1	Uncontrolled Emissions (lb/h)	Uncontrolled Emissions (TPY)	Control Device	% Efficiency	Actual Emissions (TPY)	Actual Emissions (lb/h)
Crude oil	2	193	562	NG Assisted Flare or VRU	99.85%	0.83	0.19
Gasoline+butane	5	198	579	NG Assisted Flare or VRU	99.85%	0.86	0.20
Jet Kerosene	0.016	0.2	0.5		0.00%	0.52	0.12
Diesel No. 2	0.014	0.2	0.6		0.00%	0.60	0.14
Fuel Oil No. 6	0.0001	0.001	0.002	None	0%	0.00	0.00
	Totals	391	1,142			**2.81**	**0.64**

[(a)] Calculations are based on Table 5.2-5 AP-42, Fifth Edition, Volume I, Chapter 5: Transportation And Marketing Of Petroleum Liquids.

Table A8-2 – Controlled Emissions from the Truck Product Loading/Unloading Operations [(a)]

Description	EF (lb/Mgal)1	Uncontrolled Emissions (lb/h)	Uncontrolled Emissions (TPY)	Control Device	% Efficiency	Actual Emissions (TPY)	Actual Emissions (lb/h)
Gasoline+butane	5	84	244	NG Assisted Flare or VRU	99.85%	0.4	0.1
Jet Kerosene	0.016	0.1	0.2	None	0%	0.17	0.0
Diesel No. 2	0.014	0.1	0.2	None	0%	0.20	0.0
	Totals	84	245			**0.73**	**0.17**

[(a)] Calculations are based on Table 5.2-5 AP-42, Fifth Edition, Volume I, Chapter 5: Transportation And Marketing Of Petroleum Liquids.

APPENDIX 9: Results for Fugitive Dust

A.9.1. PAVED ROADS DUST

BASIS

It is assumed that crude oil inlet is via rails, not trucking. Also, it is assumed that 25% of liquid products (excep fuel oil) are loaded and transported via trucking; actual emissions might be lower, since in the future more volume may be transported via

Refinery production	bbl/d	gal/d	Notes	Truck Capacity (gallon)	trips/day
Gasoline+butane	9,555	401,321	Including offspec gasoline/naphtha and light slop	10000	40
Jet Kerosene	2,116	88,883		8000	11
Diesel	2,776	116,582	Including offspec diesel/fuel oil	6000	19
LPG	1,500	63,000	Including heavy slop	6000	11
				Total	81

Truck Round Trip Distance/t	0.0379	mile
	5280	feet
		mile
	200	feet traveled

TRUCK LOADING VMT

	81 Trip	0.04 mile	365 day	=	1,120	VMT
	day	Round Trip	year			year
				=	3.07	VMT
						d

Maximum Gross Weight for USDOT tractor trailer

	80000	lb
	40	ton

Average Speed		
	5	mile
		hr
Wet days (Mean)	90	day
P (Value)	2160	hour
N (Value)	8760	hour

TRUCK VMT IN LIMITED ACCESS ROAD

Pollutant	k (lb/VMT)	Silt L (grain/sq ft) [2]	W (ST)	N (hour)	P (hour)	Emission Factor (lb/VMT)
PM 2.5	0.00054	2.15E-02	40	8760	2160	0.001
PM 10	0.0022	2.15E-02	40	8760	2160	0.003

PM 2.5 Emissions									
				0.001 lb	3.07 VMT	d	=	8.47E-05	lb PM 2.5
				VMT	d	24 h			h
			0.001 lb	3.07 VMT	365 day	ton	=	3.71E-04	Ton PM 2.5
			VMT	d	year	2000 lb			Year
	0.001 lb	3.07 VMT	d	h	kg	1000 g	=	1.07E-05	g PM 2.5
	VMT	d	24 h	3600 s	2.206 lb	s			s
PM 10 Emissions									
				0.003 lb	3.07 VMT	d	=	3.45E-04	lb PM TOT
				VMT	d	24 h			h
			0 lb	3.07 VMT	365 day	ton	=	1.51E-03	Ton PM TOT
			VMT	d	year	2000 lb			Year
	0.003lb	3.07 VMT	d	h	kg	1000 g	=	5.37E-04	g PM TOT
	VMT	d	24 h	3600 s	2.206 lb	s			s

Assumption: Silt loading at the lower range of values since the vehicles will not exceed 5 MPH, and will not be involved in heavy braking

EMPLOYEE PARKING VMT

Employees/shift	Shifts	Trips
100	2	200

Employee Round Trip Distance/trip		
	0.1894	mile
	5280	feet
		mile
	1000	feet traveled

Vehicle Miles Traveled									
	200 Trip	0.19 mile	365 day	=	13,826	VMT			
	day	Round Trip	year			year			
				=	37.88	VMT			
						d			
Average Gross Weight Vehicle [1]									
	3600	lb							
	1.8	ton							
Average Speed									
	5	mile							
		hr							
Wet days (Mean)	90	day							
P (Value)	2160	hour							
N (Value)	8760	hour							

EMPLOYEE VMT IN LIMITED ACCESS PARKING LOT

Pollutant	k (lb/VMT)	Silt L (grain/sq ft) [2]	W (ST)	N (hour)	P (hour)	Emission Factor (lb/VMT)
PM 2.5	0.00054	2.15E-02	1.8	8760	2160	2.80E-05
PM 10	0.0022	2.15E-02	1.8	8760	2160	1.14E-04

PM 2.5 Emissions									
				0.000028 lb	37.88 VMT	d	=	4.42E-05	lb PM 2.5
				VMT	d	24 h			h
			0.00003 lb	37.88 VMT	365 day	ton	=	1.94E-04	Ton PM 2.5
			VMT	d	year	2000 lb			Year
	0.00003 lb	37.88 VMT	d	h	kg	1000 g	=	5.57E-06	g PM 2.5
	VMT	d	24 h	3600 s	2.206 lb	s			s

PM 10 Emissions									
				0.0001142 lb	37.88 VMT	d	=	1.80E-04	lb PM TOT
				VMT	d	24 h			h
			0.00011 lb	37.88 VMT	365 day	ton	=	7.89E-04	Ton PM TOT
			VMT	d	year	2000 lb			Year
	0.00011 lb	37.88 VMT	d	h	kg	1000 g	=	2.27E-05	g PM TOT
	VMT	d	24 h	3600 s	2.206 lb	s			s
Assumption	Silt loading at the lower range of values since the vehicles will not exceed 5 MPH, and will not be involved in heavy braking								
[1]	Passenger Car and Light Truck Fleets Characteristics, Corporate Average Fuel Economy (CAFE) standards								
	http://www.nhtsa.gov/cars/rules/CAFE/NewPassengerCarFleet.htm								
[2]	AP 42 Emission Factors, Fifth Edition, Volume I, Section 13.2.1. Paved Roads, Silt loading factor for limited access roads, page 13.2.1-9								

A.9.2. CATALYST HANDLING

Data

8.614	ton catalyst/14 day
14	day maintenance schedule
70000	bbl/day

Calculations

Spent Catalyst Production

$$\frac{8.614\ \text{ton}}{} \times \frac{2000\ \text{lb}}{\text{ton}} \times \frac{}{14\ \text{day}} = 1231\ \frac{\text{lb PM}}{\text{day}}$$

Percentage of catalyst suspended in the air during transfer into the bin: 15%

$$\frac{1230.6\ \text{lb}}{\text{day}} \times \frac{15\%}{} = 184.59\ \frac{\text{lb PM}}{\text{day}}$$

Controlled Emissions 95% efficiency

$$\frac{184.6\ \text{lb}}{\text{day}} \times \frac{\text{day}}{70000\ \text{bbl}} \times \frac{(1-0.95)}{} = 1.32\text{E-}04\ \frac{\text{lb PM}}{\text{bbl}}$$

Emissions for 365 day operation, 55 000 barrel/day

$$\frac{0.0001\ \text{lb}}{\text{bbl}} \times \frac{55000\ \text{bbl}}{\text{day}} \times \frac{365\ \text{day}}{\text{year}} = 2646.83\ \frac{\text{lb PM}}{\text{year}}$$

$$\frac{2646.8\text{lb}}{\text{year}} \times \frac{\text{yr}}{2000\ \text{lb}} = 1.32\ \frac{\text{ton PM}}{\text{year}}$$

EMISSION INVENTORY CALCULATION NOTES

	Criteria Pollutants										HAPs
Unit	CO	Pb	PM<10	Filerable PM <10	PM <2.5	Filterable PM <2.5	Condensable PM	NOx	SO_2	VOC	Total HAP
Leaks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	21.06	2.39
Tanks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.17	4.48
Stationary Combustion Sources	91.42	1.60E-03	13.06	3.26	13.06	3.26	9.79	46.40	1.92	17.61	1.62
Fluid Catalytic Cracking Unit	0.00	2.03E-05	1.00	0.66	0.91	0.57	0.34	3.73	6.65	5.77	0.87
Catalytic Reforming Unit	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.79
Sulfur Recovery Plant	2.15	0.00	0.00	0.00	0.00	0.00	0.00	0.47	0.20	1.50	0.00
Vacuum Systems	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Blowdown System	0.83	0.00	0.01	0.01	0.01	0.01	0.00	3.66	5.20	0.15	0.00
Flares	0.74	4.38E-06	0.07	0.02	0.07	0.02	0.05	0.44	0.005	0.05	2.38
Wastewater	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.52	0.52
Cooling Towers	0.00	0.00	1.86	0.00	0.00	0.00	0.00	0.00	0.00	0.35	0.00
Rail Product Loading	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.81	0.00
Truck Product Loading	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.73	0.00
Fugitive Dust	0.00	0.00	1.33	0.00	5.65E-04	0.00	0.00	0.00	0.00	0.00	0.00
Total Short Ton per Year	95.13	1.62E-03	17.32	3.95	14.05	3.86	10.18	54.70	13.97	69.78	13.05

											Operating hours/year	8760
		LDAR Program	Number of Equipments (Average for a large refinery)*									
	Median Equipments Leak Components Count*	Yes	Crude Distillation	Alkylation	Catalytic reforming	Hydrotreating/ hydrorefining	Catalytic cracking	Product blending	Sulfur plant	Vacuum distillation	Isomerization
Valves	Gas	97%	204	192	310	224	277	75	100	229	164
	Light Liquid	97%	440	597	383	253	282	419	125	108	300
	Heavy Liquid	0%	498	0	84	200	445	186	110	447	78
Pumps	Light Liquid	85%	15	21	12	7	12	10	8	2	9
	Heavy Liquid	85%	14	0	2	6	12	10	3	12	5
	Compressors	85%	2	2	3	2	2	2	1	1	2
Pressure Relief Valves****	Gas	97%	7	13	8	9	11	9	4	5	15
Flanges	Gas	97%	549	491	653	439	593	227	280	473	300
	Light Liquid	97%	982	1,328	842	581	747	664	460	136	540
	Heavy Liquid	30%	1,046	600	132	481	890	473	179	1,072	265
	Open-Ended Lines	97%	75	35	48	49	59	24	22	0	36
	Sampling Connections	97%	9	6	9	8	15	8	7	7	7

ASSUMPTIONS

LDAR program efficiency in reducing fugitive emissions equivalent to those achievable under the TCEQ 28LAER. LDAR assumes automated monitoring/directed maintenance

Average Efficiency 73%

	Average Weight Percent of Compound in Process Unit Streams[1]								
HAPs	Crude Distillation	Alkylation	Catalytic reforming	Hydrotreating/ hydrorefining	Catalytic cracking	Product blending	Sulfur plant	Vacuum distillation	Isomerization
1,3-Butadiene	0.01	0.22	0.009		0.012				
n-Hexane	4.3	1.6	2.8	1.9	1.0			0.01	3.2
2,2,4-Trimethyl pentane	0.05	25	0.25		0.3			0.003	0.01
Benzene	0.9	0.03	6.3	0.37	1.0			0.003	0.5
Toluene	1.7	2.0	17.4	1.7	3.3			0.04	0.6
Xylenes (total)	2.0	0.08	17.6	1.9	4.9			0.04	0.15
Ethylbenzene	0.63		3.9	0.37	1.1			0.02	
Cumene	0.12		0.42	0.07	0.10				
1,2,4-trimethyl benzene	0.63		5.9	0.4	1.9			0.02	
Naphthalene	0.25		0.87	0.25	0.72			0.12	
Biphenyl	0.06			0.22	0.43			0.09	

REFERENCES 1 - Table 2-7. Concentration of HAP in Refinery Process Unit Streams, Emissions Estimation Protocol for Petroleum Refineries, Version 3, RTI International.

U.S. Environmental Protection Agency. Oil and Natural Gas Sector: Standards of Performance for Crude Oil and Natural Gas Production, Transmission, and

*Process component counts as presented in EPA's document, Locating and Estimating Air Emissions from Sources of Benzene (U.S. EPA, 1998a), for refineries with

		LDAR Program	Emission Factor Definition**			Uncontrolled Leak Emissions (VOC) in lb/h								
	Median Equipments Leak Components Count*	Yes	Screening Value (ppmv)	Emission Factor (Kg/h)***	Emission Factor (lb/h)***	Crude Distillation	Alkylation	Catalytic reforming	Hydrotreating/ hydrorefining	Catalytic cracking	Product blending	Sulfur plant	Vacuum distillation	Isomerization
Valves	Gas	97%	500	2.36E-04	5.21E-04	0.11	0.10	0.16	0.12	0.14	0.04	0.05	0.12	0.09
	Light Liquid	97%	500	2.36E-04	5.21E-04	0.23	0.31	0.20	0.13	0.15	0.22	0.07	0.06	0.16
	Heavy Liquid	0%	500	2.36E-04	5.21E-04	0.26	0.00	0.04	0.10	0.23	0.10	0.06	0.23	0.04
Pumps	Light Liquid	85%	500	2.23E-03	4.92E-03	0.07	0.10	0.06	0.03	0.06	0.05	0.04	0.01	0.04
	Heavy Liquid	85%	500	2.23E-03	4.92E-03	0.07	0.00	0.01	0.03	0.06	0.05	0.01	0.06	0.02
	Compressors	85%	10,000	7.30E-02	1.61E-01	0.32	0.32	0.48	0.32	0.32	0.32	0.16	0.16	0.32
Pressure Relief Valves****	Gas	97%	500	2.36E-04	5.21E-04	0.00	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.01
Flanges	Gas	97%	500	3.64E-04	8.03E-04	0.44	0.39	0.52	0.35	0.48	0.18	0.22	0.38	0.24
	Light Liquid	97%	500	3.64E-04	8.03E-04	0.79	1.07	0.68	0.47	0.60	0.53	0.37	0.11	0.43
	Heavy Liquid	30%	500	3.64E-04	8.03E-04	0.84	0.48	0.11	0.39	0.71	0.38	0.14	0.86	0.21
	Open-Ended Lines	97%	0	0.00E+00	0.00E+00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Sampling Connections	97%	500	5.29E-04	1.17E-03	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.01
				Total (lb/h)		3.14	2.79	2.28	1.96	2.78	1.88	1.14	2.00	1.58
ASSUMPTIONS				Total Uncontrolled (STPY)		13.77	12.23	9.98	8.58	12.16	8.25	4.98	8.75	6.91
				Total Controlled (STPY)		4.22	2.00	1.09	2.04	3.68	1.99	0.93	3.90	1.21
				Total Controlled (lb/h)		0.96	0.46	0.25	0.46	0.84	0.46	0.21	0.89	0.28

LDAR program efficiency in reducing fugitive emissions equivalent to th

Average Efficiency 73%

**Table 2-2. Equipment Leak Rate for Petroleum and SOCMI Equipment Components.

*** Emission factors used (correlation), based in a threshold of 500 ppmv for leak detection, with automated corrective action, and pegged emission factor for 10,000 ppm SV

HAPs	Total HAPs Uncontrolled (STPY)	Uncontrolled Leak Emissions (HAP) in STPY								
		Crude Distillation	Alkylation	Catalytic reforming	Hydrotreat/ hydrorefining	Catalytic cracking	Product blending	Sulfur plant	Vacuum distillation	Isomerization
1,3-Butadiene	3.06E-02	1.38E-03	2.69E-02	8.98E-04	0.00E+00	1.46E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00
n-Hexane	1.57E+00	5.92E-01	1.96E-01	2.79E-01	1.63E-01	1.22E-01	0.00E+00	0.00E+00	8.75E-04	2.21E-01
2,2,4-Trimethyl pentane	3.13E+00	6.88E-03	3.06E+00	2.49E-02	0.00E+00	3.65E-02	0.00E+00	0.00E+00	2.63E-04	6.91E-04
Benzene	9.44E-01	1.24E-01	3.67E-03	6.29E-01	3.17E-02	1.22E-01	0.00E+00	0.00E+00	2.63E-04	3.45E-02
Toluene	2.81E+00	2.34E-01	2.45E-01	1.74E+00	1.46E-01	4.01E-01	0.00E+00	0.00E+00	3.50E-03	4.14E-02
Xylenes (total)	2.81E+00	2.75E-01	9.78E-03	1.76E+00	1.63E-01	5.96E-01	0.00E+00	0.00E+00	3.50E-03	1.04E-02
Ethylbenzene	6.43E-01	8.67E-02	0.00E+00	3.89E-01	3.17E-02	1.34E-01	0.00E+00	0.00E+00	1.75E-03	0.00E+00
Cumene	7.66E-02	1.65E-02	0.00E+00	4.19E-02	6.00E-03	1.22E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,2,4-trimethyl benzene	9.43E-01	8.67E-02	0.00E+00	5.89E-01	3.43E-02	2.31E-01	0.00E+00	0.00E+00	1.75E-03	0.00E+00
Naphthalene	2.41E-01	3.44E-02	0.00E+00	8.68E-02	2.14E-02	8.76E-02	0.00E+00	0.00E+00	1.05E-02	0.00E+00
Biphenyl	8.73E-02	8.26E-03	0.00E+00	0.00E+00	1.89E-02	5.23E-02	0.00E+00	0.00E+00	7.88E-03	0.00E+00
REFERENCES	**13.29**	1.47	3.54	5.53	0.62	1.80	0.00	0.00	0.03	0.31

		LDAR Program	Controlled Leak Emissions (VOC) in lb/h									
	Median Equipments Leak Components Count*	Yes	Crude Distillation	Alkylation	Catalytic reforming	Hydrotreating/ hydrorefining	Catalytic cracking	Product blending	Sulfur plant	Vacuum distillation	Isomerization	
Valves	Gas	97%	3.19E-03	3.00E-03	4.85E-03	3.50E-03	4.33E-03	1.17E-03	1.56E-03	3.58E-03	2.56E-03	
	Light Liquid	97%	6.88E-03	9.33E-03	5.99E-03	3.95E-03	4.41E-03	6.55E-03	1.95E-03	1.69E-03	4.69E-03	
	Heavy Liquid	0%	2.59E-01	0.00E+00	4.38E-02	1.04E-01	2.32E-01	9.69E-02	5.73E-02	2.33E-01	4.06E-02	
Pumps	Light Liquid	85%	1.11E-02	1.55E-02	8.85E-03	5.16E-03	8.85E-03	7.37E-03	5.90E-03	1.47E-03	6.64E-03	
	Heavy Liquid	85%	1.03E-02	0.00E+00	1.47E-03	4.42E-03	8.85E-03	7.37E-03	2.21E-03	8.85E-03	3.69E-03	
	Compressors	85%	4.83E-02	4.83E-02	7.25E-02	4.83E-02	4.83E-02	4.83E-02	2.42E-02	2.42E-02	4.83E-02	
Pressure Relief Valves****	Gas	97%	1.09E-04	2.03E-04	1.25E-04	1.41E-04	1.72E-04	1.41E-04	6.25E-05	7.82E-05	2.34E-04	
Flanges	Gas	97%	1.32E-02	1.18E-02	1.57E-02	1.06E-02	1.43E-02	5.47E-03	6.74E-03	1.14E-02	7.23E-03	
	Light Liquid	97%	2.37E-02	3.20E-02	2.03E-02	1.40E-02	1.80E-02	1.60E-02	1.11E-02	3.28E-03	1.30E-02	
	Heavy Liquid	30%	5.88E-01	3.37E-01	7.42E-02	2.70E-01	5.00E-01	2.66E-01	1.01E-01	6.03E-01	1.49E-01	
	Open-Ended Lines	97%	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
	Sampling Connections	97%	3.15E-04	2.10E-04	3.15E-04	2.80E-04	5.25E-04	2.80E-04	2.45E-04	2.45E-04	2.45E-04	
			0.96	0.46	0.25	0.46	0.84	0.46	0.21	0.89	0.28	4.81
ASSUMPTIONS			4.22	2.00	1.09	2.04	3.68	1.99	0.93	3.90	1.21	21.06
			21.06	Total VOC Controlled (STPY)								
			4.81	Total VOC Controlled (lb/h)								

LDAR program efficiency in reducing fugitive emissions equivalent to th

Average Efficiency 73%

	Controlled Leak Emissions (HAP) in STPY									
HAPs	Crude Distillation	Alkylation	Catalytic reforming	Hydrotreating/ hydrorefining	Catalytic cracking	Product blending	Sulfur plant	Vacuum distillation	Isomerization	Total HAPs Controlled (STPY)
1,3-Butadiene	4.22E-04	4.41E-03	9.78E-05	0.00E+00	4.41E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.37E-03
n-Hexane	1.82E-01	3.21E-02	3.04E-02	3.87E-02	3.68E-02	0.00E+00	0.00E+00	3.90E-04	3.87E-02	3.59E-01
2,2,4-Trimethyl pentane	2.11E-03	5.01E-01	2.72E-03	0.00E+00	1.10E-02	0.00E+00	0.00E+00	1.17E-04	1.21E-04	5.17E-01
Benzene	3.80E-02	6.01E-04	6.84E-02	7.53E-03	3.68E-02	0.00E+00	0.00E+00	1.17E-04	6.05E-03	1.58E-01
Toluene	7.18E-02	4.01E-02	1.89E-01	3.46E-02	1.21E-01	0.00E+00	0.00E+00	1.56E-03	7.26E-03	4.66E-01
Xylenes (total)	8.45E-02	1.60E-03	1.91E-01	3.87E-02	1.80E-01	0.00E+00	0.00E+00	1.56E-03	1.81E-03	5.00E-01
Ethylbenzene	2.66E-02	0.00E+00	4.24E-02	7.53E-03	4.05E-02	0.00E+00	0.00E+00	7.80E-04	0.00E+00	1.18E-01
Cumene	5.07E-03	0.00E+00	4.56E-03	1.43E-03	3.68E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.47E-02
1,2,4-trimethyl benzene	2.66E-02	0.00E+00	6.41E-02	8.15E-03	6.99E-02	0.00E+00	0.00E+00	7.80E-04	0.00E+00	1.70E-01
Naphthalene	1.06E-02	0.00E+00	9.45E-03	5.09E-03	2.65E-02	0.00E+00	0.00E+00	4.68E-03	0.00E+00	5.63E-02
Biphenyl	2.53E-03	0.00E+00	0.00E+00	4.48E-03	1.58E-02	0.00E+00	0.00E+00	3.51E-03	0.00E+00	2.63E-02
REFERENCES	0.45	0.58	0.60	0.15	0.54	0.00	0.00	0.01	0.05	**2.39**

	Qty.	Roof Type ->	Emissions per Tank (pounds/year)				Emissions per Tank (STPY)			Total VOC Tank Emissions (STPY)				VOC Emission per Unit (lb/h)	VOC Emission per Unit (STPY)
			IFR / External Self Supporting Roof[1]	Fixed Cone Uncontrolled Emissions	Fixed Cone Not Connected to VRU	Fixed Cone connected to VRU[2]	Self-Supported & Gasketed Penetrations	Fixed Cone not connected to VRU	Fixed Cone connected to VRU	Self-Supported & Gasketed Penetrations	Fixed Cone not connected to VRU	Fixed Cone connected to VRU			
CRUDE OIL	3.00	115 ID X 60	2,449.39				1.22			3.67			CRUDE OIL	2.80E-01	1.22E+00
HEAVY NAPHTHA	1.00	88 ID X 60	345.61				0.17			0.17			HEAVY NAPHTHA	3.95E-02	1.73E-01
GASOLINE	3.00	88 ID X 60	1,047.99				0.52			1.57			GASOLINE	1.20E-01	5.24E-01
REFORMATE	2.00	63 ID X 60	518.55				0.26			0.52			REFORMATE	5.92E-02	2.59E-01
FCC NAPHTHA	2.00	63 ID X 60	840.74				0.42			0.84			FCC NAPHTHA	9.60E-02	4.20E-01
LIGHT NAPHTHA	2.00	63 ID X 60	749.26				0.37			0.75			LIGHT NAPHTHA	8.55E-02	3.75E-01
ALKYLATE	2.00	63 ID X 60	548.95				0.27			0.55			ALKYLATE	6.27E-02	2.74E-01
JET FUEL	2.00	63 ID X 60	225.38				0.11			0.23			JET FUEL	2.57E-02	1.13E-01
DESULPHURIZED DIESEL	2.00	88 ID X 60		1,392.64		69.63			0.03			0.07	DESULPHURIZED DIESEL	7.95E-03	3.48E-02
UNDESULPHURIZED DIESEL	2.00	63 ID X 60		751.10		37.56			0.02			0.04	UNDESULPHURIZED DIESEL	4.29E-03	1.88E-02
VACUUM GASOIL	2.00	63 ID X 60		8.64	8.64			0.00			8.64E-03		VACUUM GASOIL	1.97E-03	8.64E-03
DILUENT - HEAVY FCC PRODUCT	1.00	63 ID X 60		326.64	326.64			0.16			1.63E-01		DILUENT - HEAVY FCC PRODUCT	3.73E-02	1.63E-01
FUEL OIL	2.00	88 ID X 60		8.25	8.25			0.004			8.25E-03		FUEL OIL	9.42E-04	4.13E-03
LIGHT SLOPS	1.00	25 ID X 30		22,281.90		1,114.10			0.56			0.56	LIGHT SLOPS	1.27E-01	5.57E-01
HEAVY SLOPS	1.00	25 ID X 30		54.65	54.65			0.03			2.73E-02		HEAVY SLOPS	6.24E-03	2.73E-02
										8.30	**0.21**	**0.66**	**Total Tank Farm**	**2.09**	**9.17**

1 - Self-supported & gasketed penetrations - External Self-Supporting Roof, double seals and wipers, all gasketed tank fittings and fixed floating roof legs.
2 - VRU Efficiency 95%
3 - Emission Estimates from EPA Tanks 4.09d modeled runs

	Emissions Factors for Petroleum Liquid Storage Tanks (lb/MMbbl)*			Emissions (lb/h)			STPY (Uncontrolled)			Control Efficiencies			STPY (Controlled)				
Chemical Name	Crude Oil	Gasoline and Other Light Distillates	Diesel Fuel and Other Middle Distillates	Crude Oil	Gasoline and Other Light Distillates	Diesel Fuel and Other Middle Distillates	Crude Oil	Gasoline and Other Light Distillates**	Diesel Fuel and Other Middle Distillates	Crude Oil	Gasoline and Other Light Distillates	Diesel Fuel and Other Middle Distillates	Crude Oil	Gasoline and Other Light Distillates	Diesel Fuel and Other Middle Distillates	TOTAL (STPY)	TOTAL (lb/h)
HAP																	
2-Methyl naphthalene	0	3.5	3.5	0.00E+00	4.81E-03	3.21E-03	0.00	2.11E-02	1.41E-02	60%	60%	95%	0.00E+00	0.008	0.001	9.13E-03	2.09E-03
Anthracene	0	0.24	0.24	0.00E+00	3.30E-04	2.20E-04	0.00	1.45E-03	9.64E-04	60%	60%	95%	0.00E+00	0.001	0.000	6.26E-04	1.43E-04
Benzene	10	70	54	2.29E-02	9.63E-02	4.95E-02	0.10	4.22E-01	2.17E-01	60%	60%	95%	4.02E-02	0.169	0.011	2.20E-01	5.01E-02
Biphenyl	0.2	0.17	0	4.58E-04	2.34E-04	0.00E+00	0.00	1.02E-03	0.00E+00	60%	60%	95%	8.03E-04	0.000	0.000	1.21E-03	2.77E-04
Chrysene	0	0.21	0.21	0.00E+00	2.89E-04	1.93E-04	0.00	1.26E-03	8.43E-04	60%	60%	95%	0.00E+00	0.001	0.000	5.48E-04	1.25E-04
Cresol	0.6	13	0.19	1.38E-03	1.79E-02	1.74E-04	0.01	7.83E-02	7.63E-04	60%	60%	95%	2.41E-03	0.031	0.000	3.38E-02	7.71E-03
Cumene	0.5	15	10	1.15E-03	2.06E-02	9.17E-03	0.01	9.03E-02	4.02E-02	60%	60%	95%	2.01E-03	0.036	0.002	4.02E-02	9.17E-03
Ethylbenzene	1.6	31	18	3.67E-03	4.26E-02	1.65E-02	0.02	1.87E-01	7.23E-02	60%	60%	95%	6.42E-03	0.075	0.004	8.47E-02	1.93E-02
Fluorene	0	0.36	0.36	0.00E+00	4.95E-04	3.30E-04	0.00	2.17E-03	1.45E-03	60%	60%	95%	0.00E+00	0.001	0.000	9.40E-04	2.15E-04
Hexane	84	420	480	1.93E-01	5.78E-01	4.40E-01	0.84	2.53E+00	1.93E+00	60%	60%	95%	3.37E-01	1.012	0.096	1.45E+00	3.30E-01
Methanol	0	3.8	3.8	0.00E+00	5.23E-03	3.48E-03	0.00	2.29E-02	1.53E-02	60%	60%	95%	0.00E+00	0.009	0.001	9.92E-03	2.26E-03
Methyl isobutyl ketone	0	320	320	0.00E+00	4.40E-01	2.93E-01	0.00	1.93E+00	1.28E+00	60%	60%	95%	0.00E+00	0.771	0.064	8.35E-01	1.91E-01
Methyl tertiary-butyl ether	0	310	0	0.00E+00	4.26E-01	0.00E+00	0.00	1.87E+00	0.00E+00	60%	60%	95%	0.00E+00	0.747	0.000	7.47E-01	1.71E-01
Naphthalene	0.6	7.6	4	1.38E-03	1.05E-02	3.67E-03	0.01	4.58E-02	1.61E-02	60%	60%	95%	2.41E-03	0.018	0.001	2.15E-02	4.91E-03
Phenanthrene	0	1.5	1.5	0.00E+00	2.06E-03	1.38E-03	0.00	9.03E-03	6.02E-03	60%	60%	95%	0.00E+00	0.004	0.000	3.91E-03	8.94E-04
Phenol	0.9	0.9	0.67	2.06E-03	1.24E-03	6.14E-04	0.01	5.42E-03	2.69E-03	60%	60%	95%	3.61E-03	0.002	0.000	5.92E-03	1.35E-03
Pyrene	0	0.39	0.39	0.00E+00	5.36E-04	3.58E-04	0.00	2.35E-03	1.57E-03	60%	60%	95%	0.00E+00	0.001	0.000	1.02E-03	2.32E-04
Styrene	0	66	0	0.00E+00	9.08E-02	0.00E+00	0.00	3.97E-01	0.00E+00	60%	60%	95%	0.00E+00	0.159	0.000	1.59E-01	3.63E-02
Toluene	7.5	180	100	1.72E-02	2.48E-01	9.17E-02	0.08	1.08E+00	4.02E-01	60%	60%	95%	3.01E-02	0.434	0.020	4.84E-01	1.10E-01
Xylene	6.2	140	70	1.42E-02	1.93E-01	6.42E-02	0.06	8.43E-01	2.81E-01	60%	60%	95%	2.49E-02	0.337	0.014	3.76E-01	8.59E-02
				Total Hazardous Air Pollutants (HAP), Uncontrolled			**1.13**	**9.54**	**4.28**	**Total Hazardous Air Pollutants (HAP), Controlled**			**0.45**	**3.82**	**0.21**		

Operating hours/year (opsh) 8760
Refinery capacity (bbl/d) 55,000
Efficiency of seals 60%
Efficiency of Vapor Recovery Systems 95% VRU + thermal destruction thermal destruction achieved via flaring, use as fuel gas or thermal oxidizer
Reference 1: "Emissions Estimation Protocol for Petroleum Refineries, Table 3-3. *Default Emissions Factors for Petroleum Refinery Storage Tank*
*Table 3-3. Default Emissions Factors for Petroleum Refinery Storage Tanks (Normalized by production capacity of the refinery)
**These factors consider an estimation of distillates production as a fraction of feed processing capacity, subtracting the production of heavy distillates and aromatics. In the case of Soljet, such production is zero, then:
Gasoline and Other Light Distillates (such as desulfurized naphtha, alkylates, reformates, butane) is considered to be up to 60% of Transmix processing rate, and,
Diesel Fuel and Other Middle Distillates (diesel, kerosenes, jet fuel, fuel oil), is considered to be up to 40% of Transmix processing rate.

	Atmospheric Distillation Unit #1		Atmospheric Distillation Unit #2		Vacuum Distillation Unit				Fluid Catalytic Cracking Unit (FCCU)		ISOMERIZATION			
	ADU #1 HEATER		ADU #2 HEATER		Vacuum Heater 1		Vacuum Heater 2		Raw Charge Heater		Reactor Charge Heater		Dryer Regeneration Heater	
	101-H-0101		102-H-0201		103-H-0301		103-H-0302		112-H-1201		117-H-1701		117-H-1702	
Heat Capacity (MMBTU/h)	72		72		76.47		57.65		28.35		1.65		3.75	
SCR Control Device (YES/NO)?	YES		YES		YES		YES		NO		NO		NO	
PM Control (YES/NO)?	YES		YES		YES		YES		NO		NO		NO	
Best Combustion Practice (5 ppm)	YES		YES		YES		YES		YES		YES		YES	
Criteria Pollutants	Emission (lb/h)	Emission (STPY)	Emissions (lb/h)	Emission (STPY)	Emissions (lb/h)	Emission (STPY)	Emission (lb/h)	Emission (STPY)	Emission (lb/h)	Emission (STPY)	Emissions (lb/h)	Emission (STPY)	Emission (lb/h)	Emission (STPY)
Carbon Monoxide	2.02E+00	8.83E+00	2.02E+00	8.83E+00	2.14E+00	9.38E+00	1.61E+00	7.07E+00	7.94E-01	3.48E+00	4.62E-02	2.02E-01	1.05E-01	4.60E-01
Lead	3.53E-05	1.55E-04	3.53E-05	1.55E-04	3.75E-05	1.64E-04	2.82E-05	1.24E-04	1.39E-05	6.08E-05	8.09E-07	3.54E-06	1.84E-06	8.05E-06
PM (Total)	8.64E-02	3.78E-01	8.64E-02	3.78E-01	9.18E-02	4.02E-01	6.92E-02	3.03E-01	1.13E-01	4.97E-01	6.60E-03	2.89E-02	1.50E-02	6.57E-02
PM (Condensable)	6.48E-02	2.84E-01	6.48E-02	2.84E-01	6.88E-02	3.01E-01	5.19E-02	2.27E-01	8.51E-02	3.73E-01	4.95E-03	2.17E-02	1.13E-02	4.93E-02
PM (Filterable)	2.16E-02	9.46E-02	2.16E-02	9.46E-02	2.29E-02	1.00E-01	1.73E-02	7.58E-02	2.84E-02	1.24E-01	1.65E-03	7.23E-03	3.75E-03	1.64E-02
NOx	4.54E-01	1.99E+00	4.54E-01	1.99E+00	4.82E-01	2.11E+00	3.63E-01	1.59E+00	8.51E-01	3.73E+00	4.95E-02	2.17E-01	1.13E-01	4.93E-01
SOx	4.24E-02	1.86E-01	4.24E-02	1.86E-01	4.50E-02	1.97E-01	3.39E-02	1.49E-01	1.67E-02	7.30E-02	9.71E-04	4.25E-03	2.21E-03	9.66E-03
VOC	3.88E-01	1.70E+00	3.88E-01	1.70E+00	4.12E-01	1.81E+00	3.11E-01	1.36E+00	1.53E-01	6.70E-01	8.90E-03	3.90E-02	2.02E-02	8.86E-02
Metal HAP (Total)	5.26E-04	2.31E-03	5.26E-04	2.31E-03	5.59E-04	2.45E-03	4.22E-04	1.85E-03	2.07E-04	9.08E-04	1.21E-05	5.28E-05	2.74E-05	1.20E-04
Org HAP (Total)	1.41E-01	6.17E-01	1.41E-01	6.17E-01	1.50E-01	6.55E-01	1.13E-01	4.94E-01	5.54E-02	2.43E-01	3.23E-03	1.41E-02	7.33E-03	3.21E-02
Org HAP (Controlled)	3.52E-02	1.54E-01	3.52E-02	1.54E-01	3.74E-02	1.64E-01	2.82E-02	1.23E-01	1.39E-02	6.07E-02	8.07E-04	3.53E-03	1.83E-03	8.03E-03
NOx Ultra Low NOx	2.160	9.461	2.160	9.461	2.294	10.048	1.730	7.575	0.851	3.725	0.050	0.217	0.113	0.493
NOx Ultra Low NOx + SCR	0.454	1.987	0.454	1.987	0.482	2.110	0.363	1.591	0.000	0.000	0.000	0.000	0.000	0.000

Emissions Summary	CO	Pb	PM Total	Filterable PM	Condensable PM	NOx	SO_2	VOC	Total Metal HAP	Controlled Organic HAP
Heaters	87.918	1.54E-03	7.50	1.88	5.63	42.65	1.847	16.93	0.020	1.33
Boilers	3.500	6.13E-05	0.50	0.13	0.38	3.75	0.074	0.67	0.004	0.27
Total STPY	**91.42**	**1.60E-03**	**8.00**	**2.00**	**6.00**	**46.40**	**1.92**	**17.61**	**0.024**	**1.60**
Total lb/h	**20.87**	**3.65E-04**	**1.83**	**0.46**	**1.37**	**10.59**	**0.44**	**4.02**	**0.005**	**0.36**

Hours of Operation

Annual Operation Hours
(opsh) 8760 hour/year

EMISSION FACTORS

Criteria Pollutants Emission Factors	lb/MMBTU		
Carbon Monoxide	2.80E-02		Vendor Guarantee
CO Controlled	2.80E-02		Vendor Guarantee
Lead*	4.90E-07		
NOx (Ultra Low NOx Burner)	3.00E-02		Vendor Guarantee
NOx (Ultra Low NOx + SCR)	6.30E-03		Vendor Guarantee
PM (Total)	0.0040		Vendor Guarantee
PM (Total) Controlled	0.0012	70%	Venturi scrubber
PM (Condensable)	0.0030		
PM (Filterable)	0.0010		
SOx	0.0006		
VOC	0.0054		

Metal HAPs	Emission Factor (lb/M
Antimony	5.20E-07
Arsenic	2.00E-07
Beryllium	1.30E-07
Cadmium	1.10E-06
Chromium (hexavalent)	2.80E-07
Chromium	1.40E-06
Cobalt	8.20E-08
Manganese	3.70E-07
Mercury	2.50E-07
Nickel	2.10E-06
Selenium	8.80E-07
Total Metal HAP (lb/MMBTU)	7.31E-06

Org HAP Total	1.96E-03		
Org HAP Controlled	4.89E-04	75%	Good combustion practices

PM (Total)	7.45E-03
PM (Condensable) * **	5.59E-03
PM (Filterable) * **	1.86E-03
Total	7.45E-03

REFERENCES

*Calculated based on the TABLE 1.4-2. AP 42, Fifth Edition, Volume I Chapter 1: External Combustion Sources, unless noted otherwise

** All PM (total, Condensable, and filterable) is assumed to be less than 1.0 micrometer in diameter. Therefore, the PM emission factors presented here may be used to estimate PM10, PM2.5 or PM1 emissions.

	Heavy Naphtha Hydrotreater				Catalytic Reformer Unit #2		Catalytic Reformer Unit #1		Diesel Hydrotreater		Alkylation Unit		Light Naphtha Hydrotreater		Ker
	Charge Heater		Stripper Reboiler Heater		CRU #2 Heater		CRU #1 Heater		Diesel HDT Heater		Alky Unit Heater		Feed Heater		Kerosene H
	105-H-0501		105-H-0502		106-H-0601		107-H-0701		110-H-1001		118-H-1801		111-H-1101		125-H
Heat Capacity (MMBTU/h)	13.75		16.25		41.73		92.5		16.25		84.19		13.9		12.5
SCR Control Device (YES/NO)?	NO		NO		YES		YES		NO		YES		NO		NO
PM Control (YES/NO)?	NO		NO		YES		YES		NO		NO		NO		NO
Best Combustion Practice (5 ppm)	YES		YES		YES		YES		YES		YES		YES		YES
Criteria Pollutants	Emissions (lb/h)	Emission (STPY)	Emission (lb/h)	Emission (STPY)	Emissions (lb/h)	Emission (STPY)	Emissions (lb/h)	Emission (STPY)	Emissions (lb/h)	Emission (STPY)	Emissions (lb/h)	Emission (STPY)	Emissions (lb/h)	Emission (STPY)	Emissions (lb/h)
Carbon Monoxide	3.85E-01	1.69E+00	4.55E-01	1.99E+00	1.17E+00	5.12E+00	2.59E+00	1.13E+01	4.55E-01	1.99E+00	2.36E+00	1.03E+01	3.89E-01	1.70E+00	3.50E-01
Lead	6.74E-06	2.95E-05	7.96E-06	3.49E-05	2.04E-05	8.96E-05	4.53E-05	1.99E-04	7.96E-06	3.49E-05	4.13E-05	1.81E-04	6.81E-06	2.98E-05	6.13E-06
PM (Total)	5.50E-02	2.41E-01	6.50E-02	2.85E-01	5.01E-02	2.19E-01	1.11E-01	4.86E-01	6.50E-02	2.85E-01	3.37E-01	1.48E+00	5.56E-02	2.44E-01	5.00E-02
PM (Condensable)	4.13E-02	1.81E-01	4.88E-02	2.14E-01	3.76E-02	1.64E-01	8.33E-02	3.65E-01	4.88E-02	2.14E-01	2.53E-01	1.11E+00	4.17E-02	1.83E-01	3.75E-02
PM (Filterable)	1.38E-02	6.02E-02	1.63E-02	7.12E-02	1.25E-02	5.48E-02	2.78E-02	1.22E-01	1.63E-02	7.12E-02	8.42E-02	3.69E-01	1.39E-02	6.09E-02	1.25E-02
NOx	4.13E-01	1.81E+00	4.88E-01	2.14E+00	2.63E-01	1.15E+00	5.83E-01	2.55E+00	4.88E-01	2.14E+00	5.30E-01	2.32E+00	4.17E-01	1.83E+00	3.75E-01
SOx	8.09E-03	3.54E-02	9.56E-03	4.19E-02	2.45E-02	1.08E-01	5.44E-02	2.38E-01	9.56E-03	4.19E-02	4.95E-02	2.17E-01	8.18E-03	3.58E-02	7.35E-03
VOC	7.41E-02	3.25E-01	8.76E-02	3.84E-01	2.25E-01	9.86E-01	4.99E-01	2.18E+00	8.76E-02	3.84E-01	4.54E-01	1.99E+00	7.50E-02	3.28E-01	6.74E-02
Metal HAP (Total)	1.01E-04	4.40E-04	1.19E-04	5.20E-04	3.05E-04	1.34E-03	6.76E-04	2.96E-03	1.19E-04	5.20E-04	6.16E-04	2.70E-03	1.02E-04	4.45E-04	9.14E-05
Org HAP (Total)	2.69E-02	1.18E-01	3.18E-02	1.39E-01	8.16E-02	3.57E-01	1.81E-01	7.92E-01	3.18E-02	1.39E-01	1.65E-01	7.21E-01	2.72E-02	1.19E-01	2.44E-02
Org HAP (Controlled)	6.72E-03	2.94E-02	7.94E-03	3.48E-02	2.04E-02	8.94E-02	4.52E-02	1.98E-01	7.94E-03	3.48E-02	4.12E-02	1.80E-01	6.80E-03	2.98E-02	6.11E-03
NOx Ultra Low NOx	0.413	1.807	0.488	2.135	1.252	5.483	2.775	12.155	0.488	2.135	2.526	11.063	0.417	1.826	0.375
NOx Ultra Low NOx + SCR	0.000	0.000	0.000	0.000	0.263	1.151	0.583	2.552	0.000	0.000	0.530	2.323	0.000	0.000	0.000

EMISSION FACTORS

Criteria Pollutants Emission Factors	lb/MMBTU		
Carbon Monoxide	2.80E-02		Vendor Guarantee
CO Controlled	2.80E-02		Vendor Guarantee
Lead*	4.90E-07		
NOx (Ultra Low NOx Burner)	3.00E-02		Vendor Guarantee
NOx (Ultra Low NOx + SCR)	6.30E-03		Vendor Guarantee
PM (Total)	0.0040		Vendor Guarantee
PM (Total) Controlled	0.0012	70%	Venturi scrubber
PM (Condensable)	0.0030		
PM (Filterable)	0.0010		
SOx	0.0006		
VOC	0.0054		

Metal HAPs	Emission Factor (lb/M
Antimony	5.20E-07
Arsenic	2.00E-07
Beryllium	1.30E-07
Cadmium	1.10E-06
Chromium (hexavalent)	2.80E-07
Chromium	1.40E-06
Cobalt	8.20E-08
Manganese	3.70E-07
Mercury	2.50E-07
Nickel	2.10E-06
Selenium	8.80E-07
Total Metal HAP (lb/MMBTU)	7.31E-06

Org HAP Total	1.96E-03		
Org HAP Controlled	4.89E-04	75%	Good combustion practices

PM (Total)	7.45E-03
PM (Condensable) * **	5.59E-03
PM (Filterable) * **	1.86E-03
Total	7.45E-03

REFERENCES

*Calculated based on the TABLE 1.4-2. AP 42, Fifth Edition, Volume I Chapter 1: External Combustion Sources, unless noted otherwise

** All PM (total, Condensable, and filterable) is assumed to be less than 1.0 micrometer in diameter. Therefore, the PM emission factors presented here may be used to estimate PM10, PM2.5 or PM1 emissions.

	‹ HT	FCC Naphtha Hydrotreater		BOILER						
	‹IDT Heater	FCC NHDT Heater		Boiler 1		Boiler 2		Boiler 3		
	-2501	114-H-1401		202-PK-0201A		202-PK-0201B		202-PK-0201C		
Heat Capacity (MMBTU/h)		17.48		60		60		5	Stand-by Duty	
SCR Control Device (YES/NO)?		NO		NO		NO		NO		
PM Control (YES/NO)?		NO		NO		NO		NO		
Best Combustion Practice (5 ppm)		YES		YES		YES		YES		
Criteria Pollutants	Emission (STPY)	Emission (lb/h)	Emission (STPY)	Emission (lb/h)	Emission (STPY)	Emission (lb/h)	Emission (STPY)	Emission (lb/h)	Emission (STPY)	Total Emissions (STPY)
Carbon Monoxide	1.53E+00	4.89E-01	2.14E+00	1.68E+00	7.36E+00	1.68E+00	7.36E+00	1.40E-01	6.13E-01	91.42
Lead	2.68E-05	8.57E-06	3.75E-05	2.94E-05	1.29E-04	2.94E-05	1.29E-04	2.45E-06	1.07E-05	1.60E-03
PM (Total)	2.19E-01	6.99E-02	3.06E-01	2.40E-01	1.05E+00	2.40E-01	1.05E+00	2.00E-02	8.76E-02	8.00
PM (Condensable)	1.64E-01	5.24E-02	2.30E-01	1.80E-01	7.88E-01	1.80E-01	7.88E-01	1.50E-02	6.57E-02	6.00
PM (Filterable)	5.48E-02	1.75E-02	7.66E-02	6.00E-02	2.63E-01	6.00E-02	2.63E-01	5.00E-03	2.19E-02	2.00
NOx	1.64E+00	5.24E-01	2.30E+00	1.80E+00	7.88E+00	1.80E+00	7.88E+00	1.50E-01	6.57E-01	46.40
SOx	3.22E-02	1.03E-02	4.50E-02	3.53E-02	1.55E-01	3.53E-02	1.55E-01	2.94E-03	1.29E-02	1.92
VOC	2.95E-01	9.43E-02	4.13E-01	3.24E-01	1.42E+00	3.24E-01	1.42E+00	2.70E-02	1.18E-01	17.61
Metal HAP (Total)	4.00E-04	1.28E-04	5.60E-04	4.39E-04	1.92E-03	4.39E-04	1.92E-03	3.66E-05	1.60E-04	0.024
Org HAP (Total)	1.07E-01	3.42E-02	1.50E-01	1.17E-01	5.14E-01	1.17E-01	5.14E-01	9.78E-03	4.28E-02	6.38
Org HAP (Controlled)	2.68E-02	8.55E-03	3.74E-02	2.93E-02	1.28E-01	2.93E-02	1.28E-01	2.44E-03	1.07E-02	1.60
NOx Ultra Low NOx	1.643	0.524	2.297	1.800	7.884	1.800	7.884	0.150	0.657	97.95
NOx Ultra Low NOx + SCR	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	13.70

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Operating hours/year 8760 **CONTROL** 75% Good combustion practices

Emissions Estimation Protocol for Petroleum Refineries, Version 3, RTI International.

Table 4-3. Summary of Emission Factors for Boilers and Process Heaters Firing Various Fuels

Emission Factors for Boilers and Process Heaters Firing. External Combustion, Natural Gas/Refinery Gas (lb/MMBtu)		Atmospheric Distillation Unit #1 Crude Oil Heater Heat input (MMBtu/h)	72	Tag flue gas (lb/h)	101-H-0101 66470.6 density (lb/ft3)	0.0296	Atmospheric Distillation Unit #2 Crude Oil Heater 1 Heat input (MMBtu/h)	72	Tag flue gas (lb/h)	102-H-0201 66470.6 density (lb/ft3)	0.0296
		Emission (lb/h)	Emission (us tpy)	flue gas (ft3/h)	2,245,628.38	37,427.14	Emission (lb/h)	Emission (us tpy)	flue gas (ft3/h)	2,245,628.38	
				T (°F)	787.7				T (°F)	787.7	
				T(K)	692.98				T(K)	692.98	
HAP				Conc. (lb/ft3)	Conc. (mg/m3)	Conc. (ppmv)			Conc. (lb/ft3)	Conc. (mg/m3)	
Antimony	5.20E-07	3.74E-05	1.64E-04	1.67E-11	2.67E-04	1.25E-04	3.74E-05	1.64E-04	1.67E-11	2.67E-04	
Arsenic	2.00E-07	1.44E-05	6.31E-05	6.41E-12	1.03E-04	7.80E-05	1.44E-05	6.31E-05	6.41E-12	1.03E-04	
Beryllium	1.30E-07	9.36E-06	4.10E-05	4.17E-12	6.68E-05	4.22E-04	9.36E-06	4.10E-05	4.17E-12	6.68E-05	
Cadmium	1.10E-06	7.92E-05	3.47E-04	3.53E-11	5.65E-04	2.86E-04	7.92E-05	3.47E-04	3.53E-11	5.65E-04	
Chromium (hexavalent)	2.80E-07	2.02E-05	8.83E-05	8.98E-12	1.44E-04	1.57E-04	2.02E-05	8.83E-05	8.98E-12	1.44E-04	
Chromium (total)	1.40E-06	1.01E-04	4.42E-04	4.49E-11	7.20E-04	7.87E-04	1.01E-04	4.42E-04	4.49E-11	7.20E-04	
Cobalt	8.20E-08	5.90E-06	2.59E-05	2.63E-12	4.22E-05	4.07E-05	5.90E-06	2.59E-05	2.63E-12	4.22E-05	
Manganese	3.70E-07	2.66E-05	1.17E-04	1.19E-11	1.90E-04	1.97E-04	2.66E-05	1.17E-04	1.19E-11	1.90E-04	
Mercury	2.50E-07	1.80E-05	7.88E-05	8.02E-12	1.29E-04	3.64E-05	1.80E-05	7.88E-05	8.02E-12	1.29E-04	
Nickel	2.10E-06	1.51E-04	6.62E-04	6.73E-11	1.08E-03	1.05E-03	1.51E-04	6.62E-04	6.73E-11	1.08E-03	
Selenium	8.80E-07	6.34E-05	2.78E-04	2.82E-11	4.52E-04	3.26E-04	6.34E-05	2.78E-04	2.82E-11	4.52E-04	
Total Metal HAPs	-	**5.26E-04**	**2.31E-03**	**2.34E-10**	**3.76E-03**		**5.26E-04**	**2.31E-03**	**2.34E-10**	**3.76E-03**	
Volatile Organics HAPs				Conc. (lb/ft3)	Conc. (mg/m3)	Conc. (ppmv)			Conc. (lb/ft3)	Conc. (mg/m3)	
Acetaldehyde	1.20E-05	2.16E-04	9.46E-04	9.62E-11	1.54E-03	1.99E-03	2.16E-04	9.46E-04	9.62E-11	1.54E-03	
Acrolein	1.70E-05	3.06E-04	1.34E-03	1.36E-10	2.18E-03	2.22E-03	3.06E-04	1.34E-03	1.36E-10	2.18E-03	
Benzene	2.10E-06	3.78E-05	1.66E-04	1.68E-11	2.70E-04	1.96E-04	3.78E-05	1.66E-04	1.68E-11	2.70E-04	
Benzo(a)anthracene	2.20E-08	3.96E-07	1.73E-06	1.76E-13	2.83E-06	7.04E-07	3.96E-07	1.73E-06	1.76E-13	2.83E-06	
Dichlorobenzene	1.20E-06	2.16E-05	9.46E-05	9.62E-12	1.54E-04	5.97E-05	2.16E-05	9.46E-05	9.62E-12	1.54E-04	
Ethylbenzene	1.60E-05	2.88E-04	1.26E-03	1.28E-10	2.06E-03	1.10E-03	2.88E-04	1.26E-03	1.28E-10	2.06E-03	
Formaldehyde	7.40E-05	1.33E-03	5.83E-03	5.93E-10	9.51E-03	1.80E-02	1.33E-03	5.83E-03	5.93E-10	9.51E-03	
Hexane	1.80E-03	3.24E-02	1.42E-01	1.44E-08	2.31E-01	1.53E-01	3.24E-02	1.42E-01	1.44E-08	2.31E-01	
Toluene	3.30E-06	5.94E-05	2.60E-04	2.65E-11	4.24E-04	2.62E-04	5.94E-05	2.60E-04	2.65E-11	4.24E-04	
Xylene (total)	2.50E-05	4.50E-04	1.97E-03	2.00E-10	3.21E-03	1.72E-03	4.50E-04	1.97E-03	2.00E-10	3.21E-03	
Total VOC HAPs		3.51E-02	1.54E-01	1.56E-08	2.51E-01		3.51E-02	1.54E-01	1.56E-08	2.51E-01	
Semivolatile and Nonvolatile Organics (excluding dioxin/furans)				Conc. (lb/ft3)	Conc. (mg/m3)	Conc. (ppmv)			Conc. (lb/ft3)	Conc. (mg/m3)	
Acenaphthene	2.40E-09	4.32E-08	1.89E-07	1.92E-14	3.08E-07	1.14E-07	4.32E-08	1.89E-07	1.92E-14	3.08E-07	
Acenaphthylene	6.50E-09	1.17E-07	5.12E-07	5.21E-14	8.35E-07	3.12E-07	1.17E-07	5.12E-07	5.21E-14	8.35E-07	
Anthracene	4.70E-09	8.46E-08	3.71E-07	3.77E-14	6.04E-07	1.93E-07	8.46E-08	3.71E-07	3.77E-14	6.04E-07	
Benzo(a)pyrene	5.70E-08	1.03E-06	4.49E-06	4.57E-13	7.33E-06	1.65E-06	1.03E-06	4.49E-06	4.57E-13	7.33E-06	
Benzo(b)fluoranthene	2.70E-08	4.86E-07	2.13E-06	2.16E-13	3.47E-06	7.82E-07	4.86E-07	2.13E-06	2.16E-13	3.47E-06	

Operating hours/year 8760 **CONTROL** 75% Good combustion practices

Emissions Estimation Protocol for Petroleum Refineries, Version 3, RTI International.

Table 4-3. Summary of Emission Factors for Boilers and Process Heaters Firing Various Fuels

Emission Factors for Boilers and Process Heaters Firing. External Combustion, Natural Gas/Refinery Gas (lb/MMBtu)		Atmospheric Distillation Unit #1 Crude Oil Heater Heat input (MMBtu/h)	72	Tag flue gas (lb/h)	101-H-0101 66470.6		Atmospheric Distillation Unit #2 Crude Oil Heater 1 Heat input (MMBtu/h)	72	Tag flue gas (lb/h)	102-H-0201 66470.6
				density (lb/ft3)	0.0296				density (lb/ft3)	0.0296
		Emission (lb/h)	Emission (us tpy)	flue gas (ft3/h)	2,245,628.38	37,427.14	Emission (lb/h)	Emission (us tpy)	flue gas (ft3/h)	2,245,628.38
				T (°F)	787.7				T (°F)	787.7
				T(K)	692.98				T(K)	692.98
HAP				Conc. (lb/ft3)	Conc. (mg/m3)	Conc. (ppmv)			Conc. (lb/ft3)	Conc. (mg/m3)
Benzo(g,h,i)perylene	1.30E-09	2.34E-08	1.02E-07	1.04E-14	1.67E-07	3.44E-08	2.34E-08	1.02E-07	1.04E-14	1.67E-07
Benzo(k)fluoranthene	1.70E-08	3.06E-07	1.34E-06	1.36E-13	2.18E-06	4.92E-07	3.06E-07	1.34E-06	1.36E-13	2.18E-06
Chrysene	1.60E-09	2.88E-08	1.26E-07	1.28E-14	2.06E-07	5.12E-08	2.88E-08	1.26E-07	1.28E-14	2.06E-07
Dibenz(a,h)anthracene	1.20E-09	2.16E-08	9.46E-08	9.62E-15	1.54E-07	3.15E-08	2.16E-08	9.46E-08	9.62E-15	1.54E-07
7,12-Dimethylbenz(a) anthracene	1.60E-08	2.88E-07	1.26E-06	1.28E-13	2.06E-06	4.56E-07	2.88E-07	1.26E-06	1.28E-13	2.06E-06
Fluoranthene	2.90E-09	5.22E-08	2.29E-07	2.32E-14	3.73E-07	1.05E-07	5.22E-08	2.29E-07	2.32E-14	3.73E-07
Fluorene	2.70E-09	4.86E-08	2.13E-07	2.16E-14	3.47E-07	1.19E-07	4.86E-08	2.13E-07	2.16E-14	3.47E-07
Indeno-(1,2,3cd)pyrene	7.10E-08	1.28E-06	5.60E-06	5.69E-13	9.12E-06	1.88E-06	1.28E-06	5.60E-06	5.69E-13	9.12E-06
3-Methylchloranthrene	1.80E-09	3.24E-08	1.42E-07	1.44E-14	2.31E-07	4.90E-08	3.24E-08	1.42E-07	1.44E-14	2.31E-07
2-Methylnaphthalene	2.40E-08	4.32E-07	1.89E-06	1.92E-13	3.08E-06	1.23E-06	4.32E-07	1.89E-06	1.92E-13	3.08E-06
Naphthalene	6.00E-07	1.08E-05	4.73E-05	4.81E-12	7.71E-05	3.42E-05	1.08E-05	4.73E-05	4.81E-12	7.71E-05
Phenanthrene	1.70E-08	3.06E-07	1.34E-06	1.36E-13	2.18E-06	6.97E-07	3.06E-07	1.34E-06	1.36E-13	2.18E-06
Phenol	4.00E-06	7.20E-05	3.15E-04	3.21E-11	5.14E-04	3.11E-04	7.20E-05	3.15E-04	3.21E-11	5.14E-04
Pyrene	4.90E-09	8.82E-08	3.86E-07	3.93E-14	6.30E-07	1.77E-07	8.82E-08	3.86E-07	3.93E-14	6.30E-07
Sum PAH (without naphthalene)	**4.26E-06**	**7.67E-05**	**3.36E-04**	**3.41E-11**	**5.47E-04**	**3.19E-04**	**7.67E-05**	**3.36E-04**	**3.41E-11**	**5.47E-04**
Total SV-NV Organic HAPs		8.75E-05	3.83E-04	3.89E-11	6.24E-04		8.75E-05	3.83E-04	3.89E-11	6.24E-04
TOTAL ORGANIC HAPS		**3.52E-02**	**1.54E-01**				**3.52E-02**	**1.54E-01**		
Other Compounds of Interest				Conc. (lb/ft3)	Conc. (mg/m3)	Conc. (ppmv)			Conc. (lb/ft3)	Conc. (mg/m3)
Barium	4.30E-06	3.10E-04	1.36E-03	1.38E-10	2.21E-03	9.15E-04	3.10E-04	1.36E-03	1.38E-10	2.21E-03
Butane	2.10E-03	1.51E-01	6.62E-01	6.73E-08	1.08E+00	1.06E+00	1.51E-01	6.62E-01	6.73E-08	1.08E+00
Copper	8.30E-07	5.98E-05	2.62E-04	2.66E-11	4.27E-04	3.82E-04	5.98E-05	2.62E-04	2.66E-11	4.27E-04
Ethane	3.00E-03	2.16E-01	9.46E-01	9.62E-08	1.54E+00	2.92E+00	2.16E-01	9.46E-01	9.62E-08	1.54E+00
Hydrogen sulfide	8.50E-05	6.12E-03	2.68E-02	2.73E-09	4.37E-02	7.29E-02	6.12E-03	2.68E-02	2.73E-09	4.37E-02
Molybdenum	1.10E-06	7.92E-05	3.47E-04	3.53E-11	5.65E-04	3.35E-04	7.92E-05	3.47E-04	3.53E-11	5.65E-04
Phosphorus (Inorganic HAP)	6.40E-07	4.61E-05	2.02E-04	2.05E-11	3.29E-04	6.04E-04	4.61E-05	2.02E-04	2.05E-11	3.29E-04
Vanadium	2.30E-06	1.66E-04	7.25E-04	7.37E-11	1.18E-03	1.32E-03	1.66E-04	7.25E-04	7.37E-11	1.18E-03
Zinc	2.80E-05	2.02E-03	8.83E-03	8.98E-10	1.44E-02	1.25E-02	2.02E-03	8.83E-03	8.98E-10	1.44E-02

*Calculated based on the TABLE 1.4-2. AP 42, Fifth Edition, Volume IChapter 1: External Combustion Sources.

** All PM (total, Condensable, and filterable) is assumed to be less than 1.0 micrometer in diameter.Therefore, the PM emission factors presented here were used for PM2.5 emissions.

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Emissions Estimation Protocol for Petroleum Refineries, Version 3, RTI International.

Table 4-3. Summary of Emission Factors for Boilers and Process Heaters Firing Various Fuels

Emission Factors for Boilers and Process Heaters Firing. External Combustion, Natural Gas/Refinery Gas (lb/MMBtu)		37,427.14	Vacuum Distillation Unit / Vacuum Heater 1 / Heat input (MMBtu/h)	76.47	Tag / flue gas (lb/h) / density (lb/ft3)	103-H-0301 / 70,380.60 / 0.0349	33,610.60	Vacuum Distillation Unit / Vacuum Heater 2 / Heat input (MMBtu/h)	57.65	Tag / flue gas (lb/h) / density (lb/ft3)
		Emission (lb/h)		Emission (us tpy)	flue gas (ft3/h)	2,016,636.10		Emission (lb/h)	Emission (us tpy)	flue gas (ft3/h)
					T (°F)	600.4				T (°F)
					T(K)	588.93				T(K)
HAP		Conc. (ppmv)			Conc. (lb/ft3)	Conc. (mg/m3)	Conc. (ppmv)			Conc. (lb/ft3)
Antimony	5.20E-07	1.25E-04	3.98E-05	1.74E-04	1.97E-11	3.16E-04	1.25E-04	3.00E-05	1.31E-04	1.97E-11
Arsenic	2.00E-07	7.80E-05	1.53E-05	6.70E-05	7.58E-12	1.22E-04	7.84E-05	1.15E-05	5.05E-05	7.59E-12
Beryllium	1.30E-07	4.22E-04	9.94E-06	4.35E-05	4.93E-12	7.90E-05	4.24E-04	7.49E-06	3.28E-05	4.93E-12
Cadmium	1.10E-06	2.86E-04	8.41E-05	3.68E-04	4.17E-11	6.69E-04	2.87E-04	6.34E-05	2.78E-04	4.17E-11
Chromium (hexavalent)	2.80E-07	1.57E-04	2.14E-05	9.38E-05	1.06E-11	1.70E-04	1.58E-04	1.61E-05	7.07E-05	1.06E-11
Chromium (total)	1.40E-06	7.87E-04	1.07E-04	4.69E-04	5.31E-11	8.51E-04	7.91E-04	8.07E-05	3.54E-04	5.31E-11
Cobalt	8.20E-08	4.07E-05	6.27E-06	2.75E-05	3.11E-12	4.99E-05	4.09E-05	4.73E-06	2.07E-05	3.11E-12
Manganese	3.70E-07	1.97E-04	2.83E-05	1.24E-04	1.40E-11	2.25E-04	1.98E-04	2.13E-05	9.34E-05	1.40E-11
Mercury	2.50E-07	3.64E-05	1.91E-05	8.37E-05	9.48E-12	1.52E-04	3.66E-05	1.44E-05	6.31E-05	9.48E-12
Nickel	2.10E-06	1.05E-03	1.61E-04	7.03E-04	7.96E-11	1.28E-03	1.05E-03	1.21E-04	5.30E-04	7.96E-11
Selenium	8.80E-07	3.26E-04	6.73E-05	2.95E-04	3.34E-11	5.35E-04	3.27E-04	5.07E-05	2.22E-04	3.34E-11
Total Metal HAPs	-		**5.59E-04**	**2.45E-03**	**2.49E-10**	**4.45E-03**		**4.22E-04**	**1.85E-03**	**1.88E-10**
Volatile Organics HAPs		Conc. (ppmv)			Conc. (lb/ft3)	Conc. (mg/m3)	Conc. (ppmv)			Conc. (lb/ft3)
Acetaldehyde	1.20E-05	1.99E-03	2.29E-04	1.00E-03	1.14E-10	1.82E-03	2.00E-03	1.73E-04	7.58E-04	1.14E-10
Acrolein	1.70E-05	2.22E-03	3.25E-04	1.42E-03	1.61E-10	2.58E-03	2.23E-03	2.45E-04	1.07E-03	1.61E-10
Benzene	2.10E-06	1.96E-04	4.01E-05	1.76E-04	1.99E-11	3.19E-04	1.97E-04	3.03E-05	1.33E-04	1.99E-11
Benzo(a)anthracene	2.20E-08	7.04E-07	4.21E-07	1.84E-06	2.09E-13	3.34E-06	7.08E-07	3.17E-07	1.39E-06	2.09E-13
Dichlorobenzene	1.20E-06	5.97E-05	2.29E-05	1.00E-04	1.14E-11	1.82E-04	6.00E-05	1.73E-05	7.58E-05	1.14E-11
Ethylbenzene	1.60E-05	1.10E-03	3.06E-04	1.34E-03	1.52E-10	2.43E-03	1.11E-03	2.31E-04	1.01E-03	1.52E-10
Formaldehyde	7.40E-05	1.80E-02	1.41E-03	6.20E-03	7.02E-10	1.12E-02	1.81E-02	1.07E-03	4.67E-03	7.02E-10
Hexane	1.80E-03	1.53E-01	3.44E-02	1.51E-01	1.71E-08	2.74E-01	1.53E-01	2.59E-02	1.14E-01	1.71E-08
Toluene	3.30E-06	2.62E-04	6.31E-05	2.76E-04	3.13E-11	5.02E-04	2.63E-04	4.76E-05	2.08E-04	3.13E-11
Xylene (total)	2.50E-05	1.72E-03	4.78E-04	2.09E-03	2.37E-10	3.80E-03	1.73E-03	3.60E-04	1.58E-03	2.37E-10
Total VOC HAPs			3.73E-02	1.63E-01	1.85E-08	2.96E-01		2.81E-02	1.23E-01	1.85E-08
Semivolatile and Nonvolatile Organics (excluding dioxin/furans)		Conc. (ppmv)			Conc. (lb/ft3)	Conc. (mg/m3)	Conc. (ppmv)			Conc. (lb/ft3)
Acenaphthene	2.40E-09	1.14E-07	4.59E-08	2.01E-07	2.28E-14	3.65E-07	1.14E-07	3.46E-08	1.52E-07	2.28E-14
Acenaphthylene	6.50E-09	3.12E-07	1.24E-07	5.44E-07	6.16E-14	9.88E-07	3.14E-07	9.37E-08	4.10E-07	6.16E-14
Anthracene	4.70E-09	1.93E-07	8.99E-08	3.94E-07	4.46E-14	7.14E-07	1.94E-07	6.77E-08	2.97E-07	4.46E-14
Benzo(a)pyrene	5.70E-08	1.65E-06	1.09E-06	4.77E-06	5.40E-13	8.66E-06	1.66E-06	8.22E-07	3.60E-06	5.40E-13
Benzo(b)fluoranthene	2.70E-08	7.82E-07	5.16E-07	2.26E-06	2.56E-13	4.10E-06	7.86E-07	3.89E-07	1.70E-06	2.56E-13

Operating hours/year 8760

Emissions Estimation Protocol for Petroleum Refineries, Version 3, RTI International.

Table 4-3. Summary of Emission Factors for Boilers and Process Heaters Firing Various Fuels

Emission Factors for Boilers and Process Heaters Firing. External Combustion, Natural Gas/Refinery Gas (lb/MMBtu)		37,427.14	Vacuum Distillation Unit / Vacuum Heater 1 / Heat input (MMBtu/h)	76.47	Tag / flue gas (lb/h) / density (lb/ft3)	103-H-0301 / 70,380.60 / 0.0349		Vacuum Distillation Unit / Vacuum Heater 2 / Heat input (MMBtu/h)	57.65	Tag / flue gas (lb/h) / density (lb/ft3)
		Emission (lb/h)		Emission (us tpy)	flue gas (ft3/h)	2,016,636.10	33,610.60	Emission (lb/h)	Emission (us tpy)	flue gas (ft3/h)
					T (°F)	600.4				T (°F)
					T(K)	588.93				T(K)
HAP		Conc. (ppmv)			Conc. (lb/ft3)	Conc. (mg/m3)	Conc. (ppmv)			Conc. (lb/ft3)
Benzo(g,h,i)perylene	1.30E-09	3.44E-08	2.49E-08	1.09E-07	1.23E-14	1.98E-07	3.46E-08	1.87E-08	8.21E-08	1.23E-14
Benzo(k)fluoranthene	1.70E-08	4.92E-07	3.25E-07	1.42E-06	1.61E-13	2.58E-06	4.95E-07	2.45E-07	1.07E-06	1.61E-13
Chrysene	1.60E-09	5.12E-08	3.06E-08	1.34E-07	1.52E-14	2.43E-07	5.15E-08	2.31E-08	1.01E-07	1.52E-14
Dibenz(a,h)anthracene	1.20E-09	3.15E-08	2.29E-08	1.00E-07	1.14E-14	1.82E-07	3.17E-08	1.73E-08	7.58E-08	1.14E-14
7,12-Dimethylbenz(a) anthracene	1.60E-08	4.56E-07	3.06E-07	1.34E-06	1.52E-13	2.43E-06	4.58E-07	2.31E-07	1.01E-06	1.52E-13
Fluoranthene	2.90E-09	1.05E-07	5.54E-08	2.43E-07	2.75E-14	4.41E-07	1.05E-07	4.18E-08	1.83E-07	2.75E-14
Fluorene	2.70E-09	1.19E-07	5.16E-08	2.26E-07	2.56E-14	4.10E-07	1.19E-07	3.89E-08	1.70E-07	2.56E-14
Indeno-(1,2,3cd)pyrene	7.10E-08	1.88E-06	1.36E-06	5.95E-06	6.73E-13	1.08E-05	1.89E-06	1.02E-06	4.48E-06	6.73E-13
3-Methylchloranthrene	1.80E-09	4.90E-08	3.44E-08	1.51E-07	1.71E-14	2.74E-07	4.93E-08	2.59E-08	1.14E-07	1.71E-14
2-Methylnaphthalene	2.40E-08	1.23E-06	4.59E-07	2.01E-06	2.28E-13	3.65E-06	1.24E-06	3.46E-07	1.52E-06	2.28E-13
Naphthalene	6.00E-07	3.42E-05	1.15E-05	5.02E-05	5.69E-12	9.12E-05	3.44E-05	8.65E-06	3.79E-05	5.69E-12
Phenanthrene	1.70E-08	6.97E-07	3.25E-07	1.42E-06	1.61E-13	2.58E-06	7.01E-07	2.45E-07	1.07E-06	1.61E-13
Phenol	4.00E-06	3.11E-04	7.65E-05	3.35E-04	3.79E-11	6.08E-04	3.12E-04	5.77E-05	2.53E-04	3.79E-11
Pyrene	4.90E-09	1.77E-07	9.37E-08	4.10E-07	4.65E-14	7.45E-07	1.78E-07	7.06E-08	3.09E-07	4.65E-14
Sum PAH (without naphthalene)	**4.26E-06**	**3.19E-04**	**8.14E-05**	**3.57E-04**	**4.04E-11**	**6.47E-04**	**3.21E-04**	**6.14E-05**	**2.69E-04**	**4.04E-11**
Total SV-NV Organic HAPs			9.29E-05	4.07E-04	4.61E-11	7.39E-04		7.00E-05	3.07E-04	4.61E-11
TOTAL ORGANIC HAPS			**3.74E-02**	**1.64E-01**				**2.82E-02**	**1.23E-01**	
Other Compounds of Interest		Conc. (ppmv)			Conc. (lb/ft3)	Conc. (mg/m3)	Conc. (ppmv)			Conc. (lb/ft3)
Barium	4.30E-06	9.15E-04	3.29E-04	1.44E-03	1.63E-10	2.61E-03	9.20E-04	2.48E-04	1.09E-03	1.63E-10
Butane	2.10E-03	1.06E+00	1.61E-01	7.03E-01	7.96E-08	1.28E+00	1.06E+00	1.21E-01	5.30E-01	7.96E-08
Copper	8.30E-07	3.82E-04	6.35E-05	2.78E-04	3.15E-11	5.05E-04	3.84E-04	4.78E-05	2.10E-04	3.15E-11
Ethane	3.00E-03	2.92E+00	2.29E-01	1.00E+00	1.14E-07	1.82E+00	2.93E+00	1.73E-01	7.58E-01	1.14E-07
Hydrogen sulfide	8.50E-05	7.29E-02	6.50E-03	2.85E-02	3.22E-09	5.17E-02	7.33E-02	4.90E-03	2.15E-02	3.22E-09
Molybdenum	1.10E-06	3.35E-04	8.41E-05	3.68E-04	4.17E-11	6.69E-04	3.37E-04	6.34E-05	2.78E-04	4.17E-11
Phosphorus (Inorganic HAP)	6.40E-07	6.04E-04	4.89E-05	2.14E-04	2.43E-11	3.89E-04	6.07E-04	3.69E-05	1.62E-04	2.43E-11
Vanadium	2.30E-06	1.32E-03	1.76E-04	7.70E-04	8.72E-11	1.40E-03	1.33E-03	1.33E-04	5.81E-04	8.72E-11
Zinc	2.80E-05	1.25E-02	2.14E-03	9.38E-03	1.06E-09	1.70E-02	1.26E-02	1.61E-03	7.07E-03	1.06E-09

*Calculated based on the TABLE 1.4-2. AP 42, Fifth Edition, Volume IChapter 1: External Comb

** All PM (total, Condensable, and filterable) is assumed to be less than 1.0 micrometer in di

Operating hours/year 8760

Emissions Estimation Protocol for Petroleum Refineries, Version 3, RTI International.

Table 4-3. Summary of Emission Factors for Boilers and Process Heaters Firing Various Fuels

		103-H-0302		Fluid Catalytic Cracking (FCC) Unit		Tag	112-H-1201			
		53,050.00		Raw Charge Heater		flue gas (lb/h)	25,145.00		Reactor Charge Heater	
		0.0349		Heat input (MMBtu/h)	28.35	density (lb/ft3)	0.0297		Heat input (MMBtu/h)	1.65
Emission Factors for Boilers and Process Heaters Firing. External Combustion, Natural Gas/Refinery Gas (lb/MMBtu)		1,520,057.31	25334.2884	Emission (lb/h)	Emission (us tpy)	flue gas (ft3/h)	846,633.00	14110.5499	Emission (lb/h)	Emission (us tpy)
		600.1				T (°F)	785			
		588.76				T(K)	691.48			
HAP		Conc. (mg/m3)	Conc. (ppmv)			Conc. (lb/ft3)	Conc. (mg/m3)	Conc. (ppmv)		
Antimony	5.20E-07	3.16E-04	1.25E-04	1.47E-05	6.46E-05	1.74E-11	2.79E-04	1.30E-04	8.58E-07	3.76E-06
Arsenic	2.00E-07	1.22E-04	7.84E-05	5.67E-06	2.48E-05	6.70E-12	1.07E-04	8.13E-05	3.30E-07	1.45E-06
Beryllium	1.30E-07	7.90E-05	4.24E-04	3.69E-06	1.61E-05	4.35E-12	6.98E-05	4.39E-04	2.15E-07	9.40E-07
Cadmium	1.10E-06	6.69E-04	2.87E-04	3.12E-05	1.37E-04	3.68E-11	5.91E-04	2.98E-04	1.82E-06	7.95E-06
Chromium (hexavalent)	2.80E-07	1.70E-04	1.58E-04	7.94E-06	3.48E-05	9.38E-12	1.50E-04	1.64E-04	4.62E-07	2.02E-06
Chromium (total)	1.40E-06	8.51E-04	7.91E-04	3.97E-05	1.74E-04	4.69E-11	7.52E-04	8.20E-04	2.31E-06	1.01E-05
Cobalt	8.20E-08	4.99E-05	4.09E-05	2.32E-06	1.02E-05	2.75E-12	4.40E-05	4.24E-05	1.35E-07	5.93E-07
Manganese	3.70E-07	2.25E-04	1.98E-04	1.05E-05	4.59E-05	1.24E-11	1.99E-04	2.05E-04	6.11E-07	2.67E-06
Mercury	2.50E-07	1.52E-04	3.66E-05	7.09E-06	3.10E-05	8.37E-12	1.34E-04	3.80E-05	4.13E-07	1.81E-06
Nickel	2.10E-06	1.28E-03	1.05E-03	5.95E-05	2.61E-04	7.03E-11	1.13E-03	1.09E-03	3.47E-06	1.52E-05
Selenium	8.80E-07	5.35E-04	3.27E-04	2.49E-05	1.09E-04	2.95E-11	4.72E-04	3.39E-04	1.45E-06	6.36E-06
Total Metal HAPs	-	**4.45E-03**		**2.07E-04**	**9.08E-04**	**9.23E-11**	**3.93E-03**		**1.21E-05**	**5.28E-05**
Volatile Organics HAPs		Conc. (mg/m3)	Conc. (ppmv)			Conc. (lb/ft3)	Conc. (mg/m3)	Conc. (ppmv)		
Acetaldehyde	1.20E-05	1.82E-03	2.00E-03	8.51E-05	3.73E-04	1.00E-10	1.61E-03	2.07E-03	4.95E-06	2.17E-05
Acrolein	1.70E-05	2.58E-03	2.23E-03	1.20E-04	5.28E-04	1.42E-10	2.28E-03	2.31E-03	7.01E-06	3.07E-05
Benzene	2.10E-06	3.19E-04	1.97E-04	1.49E-05	6.52E-05	1.76E-11	2.82E-04	2.05E-04	8.66E-07	3.79E-06
Benzo(a)anthracene	2.20E-08	3.34E-06	7.08E-07	1.56E-07	6.83E-07	1.84E-13	2.95E-06	7.34E-07	9.08E-09	3.97E-08
Dichlorobenzene	1.20E-06	1.82E-04	5.99E-05	8.51E-06	3.73E-05	1.00E-11	1.61E-04	6.22E-05	4.95E-07	2.17E-06
Ethylbenzene	1.60E-05	2.43E-03	1.11E-03	1.13E-04	4.97E-04	1.34E-10	2.15E-03	1.15E-03	6.60E-06	2.89E-05
Formaldehyde	7.40E-05	1.12E-02	1.81E-02	5.24E-04	2.30E-03	6.19E-10	9.93E-03	1.88E-02	3.05E-05	1.34E-04
Hexane	1.80E-03	2.74E-01	1.53E-01	1.28E-02	5.59E-02	1.51E-08	2.42E-01	1.59E-01	7.43E-04	3.25E-03
Toluene	3.30E-06	5.02E-04	2.63E-04	2.34E-05	1.02E-04	2.76E-11	4.43E-04	2.73E-04	1.36E-06	5.96E-06
Xylene (total)	2.50E-05	3.80E-03	1.73E-03	1.77E-04	7.76E-04	2.09E-10	3.36E-03	1.79E-03	1.03E-05	4.52E-05
Total VOC HAPs		2.97E-01		1.38E-02	6.06E-02	1.63E-08	2.62E-01		8.05E-04	3.52E-03
Semivolatile and Nonvolatile Organics (excluding dioxin/furans)		Conc. (mg/m3)	Conc. (ppmv)			Conc. (lb/ft3)	Conc. (mg/m3)	Conc. (ppmv)		
Acenaphthene	2.40E-09	3.65E-07	1.14E-07	1.70E-08	7.45E-08	2.01E-14	3.22E-07	1.19E-07	9.90E-10	4.34E-09
Acenaphthylene	6.50E-09	9.88E-07	3.14E-07	4.61E-08	2.02E-07	5.44E-14	8.72E-07	3.25E-07	2.68E-09	1.17E-08
Anthracene	4.70E-09	7.14E-07	1.94E-07	3.33E-08	1.46E-07	3.93E-14	6.31E-07	2.01E-07	1.94E-09	8.49E-09
Benzo(a)pyrene	5.70E-08	8.66E-06	1.66E-06	4.04E-07	1.77E-06	4.77E-13	7.65E-06	1.72E-06	2.35E-08	1.03E-07
Benzo(b)fluoranthene	2.70E-08	4.10E-06	7.86E-07	1.91E-07	8.38E-07	2.26E-13	3.62E-06	8.15E-07	1.11E-08	4.88E-08

Operating hours/year 8760

Emissions Estimation Protocol for Petroleum Refineries, Version 3, RTI International.

Table 4-3. Summary of Emission Factors for Boilers and Process Heaters Firing Various Fuels

		103-H-0302		Fluid Catalytic Cracking (FCC) Unit		Tag	112-H-1201			
		53,050.00		Raw Charge Heater		flue gas (lb/h)	25,145.00		Reactor Charge Heater	
		0.0349		Heat input (MMBtu/h)	28.35	density (lb/ft3)	0.0297		Heat input (MMBtu/h)	1.65
Emission Factors for Boilers and Process Heaters Firing. External Combustion, Natural Gas/Refinery Gas (lb/MMBtu)		1,520,057.31	25334.2884	Emission (lb/h)	Emission (us tpy)	flue gas (ft3/h)	846,633.00	14110.5499	Emission (lb/h)	Emission (us tpy)
		600.1				T (°F)	785			
		588.76				T(K)	691.48			
HAP		Conc. (mg/m3)	Conc. (ppmv)			Conc. (lb/ft3)	Conc. (mg/m3)	Conc. (ppmv)		
Benzo(g,h,i)perylene	1.30E-09	1.98E-07	3.46E-08	9.21E-09	4.04E-08	1.09E-14	1.74E-07	3.58E-08	5.36E-10	2.35E-09
Benzo(k)fluoranthene	1.70E-08	2.58E-06	4.95E-07	1.20E-07	5.28E-07	1.42E-13	2.28E-06	5.13E-07	7.01E-09	3.07E-08
Chrysene	1.60E-09	2.43E-07	5.15E-08	1.13E-08	4.97E-08	1.34E-14	2.15E-07	5.34E-08	6.60E-10	2.89E-09
Dibenz(a,h)anthracene	1.20E-09	1.82E-07	3.17E-08	8.51E-09	3.73E-08	1.00E-14	1.61E-07	3.28E-08	4.95E-10	2.17E-09
7,12-Dimethylbenz(a) anthracene	1.60E-08	2.43E-06	4.58E-07	1.13E-07	4.97E-07	1.34E-13	2.15E-06	4.75E-07	6.60E-09	2.89E-08
Fluoranthene	2.90E-09	4.41E-07	1.05E-07	2.06E-08	9.00E-08	2.43E-14	3.89E-07	1.09E-07	1.20E-09	5.24E-09
Fluorene	2.70E-09	4.10E-07	1.19E-07	1.91E-08	8.38E-08	2.26E-14	3.62E-07	1.24E-07	1.11E-09	4.88E-09
Indeno-(1,2,3cd)pyrene	7.10E-08	1.08E-05	1.89E-06	5.03E-07	2.20E-06	5.94E-13	9.53E-06	1.96E-06	2.93E-08	1.28E-07
3-Methylchloranthrene	1.80E-09	2.74E-07	4.93E-08	1.28E-08	5.59E-08	1.51E-14	2.42E-07	5.11E-08	7.43E-10	3.25E-09
2-Methylnaphthalene	2.40E-08	3.65E-06	1.24E-06	1.70E-07	7.45E-07	2.01E-13	3.22E-06	1.29E-06	9.90E-09	4.34E-08
Naphthalene	6.00E-07	9.12E-05	3.44E-05	4.25E-06	1.86E-05	5.02E-12	8.05E-05	3.56E-05	2.48E-07	1.08E-06
Phenanthrene	1.70E-08	2.58E-06	7.00E-07	1.20E-07	5.28E-07	1.42E-13	2.28E-06	7.26E-07	7.01E-09	3.07E-08
Phenol	4.00E-06	6.08E-04	3.12E-04	2.84E-05	1.24E-04	3.35E-11	5.37E-04	3.24E-04	1.65E-06	7.23E-06
Pyrene	4.90E-09	7.45E-07	1.78E-07	3.47E-08	1.52E-07	4.10E-14	6.58E-07	1.84E-07	2.02E-09	8.85E-09
Sum PAH (without naphthalene)	**4.26E-06**	**6.47E-04**	**3.21E-04**	**3.02E-05**	**1.32E-04**	**3.57E-11**	**5.72E-04**	**3.32E-04**	**1.76E-06**	**7.69E-06**
Total SV-NV Organic HAPs		7.39E-04	3.55E-04	3.44E-05	1.51E-04	4.07E-11	6.52E-04		2.00E-06	8.78E-06
TOTAL ORGANIC HAPS				**1.39E-02**	**6.07E-02**				**8.07E-04**	**3.53E-03**
Other Compounds of Interest		Conc. (mg/m3)	Conc. (ppmv)			Conc. (lb/ft3)	Conc. (mg/m3)	Conc. (ppmv)		
Barium	4.30E-06	2.61E-03	9.20E-04	1.22E-04	5.34E-04	1.44E-10	2.31E-03	9.54E-04	7.10E-06	3.11E-05
Butane	2.10E-03	1.28E+00	1.06E+00	5.95E-02	2.61E-01	7.03E-08	1.13E+00	1.10E+00	3.47E-03	1.52E-02
Copper	8.30E-07	5.05E-04	3.84E-04	2.35E-05	1.03E-04	2.78E-11	4.46E-04	3.98E-04	1.37E-06	6.00E-06
Ethane	3.00E-03	1.82E+00	2.93E+00	8.51E-02	3.73E-01	1.00E-07	1.61E+00	3.04E+00	4.95E-03	2.17E-02
Hydrogen sulfide	8.50E-05	5.17E-02	7.33E-02	2.41E-03	1.06E-02	2.85E-09	4.56E-02	7.60E-02	1.40E-04	6.14E-04
Molybdenum	1.10E-06	6.69E-04	3.37E-04	3.12E-05	1.37E-04	3.68E-11	5.91E-04	3.49E-04	1.82E-06	7.95E-06
Phosphorus (Inorganic HAP)	6.40E-07	3.89E-04	6.07E-04	1.81E-05	7.95E-05	2.14E-11	3.44E-04	6.29E-04	1.06E-06	4.63E-06
Vanadium	2.30E-06	1.40E-03	1.33E-03	6.52E-05	2.86E-04	7.70E-11	1.23E-03	1.38E-03	3.80E-06	1.66E-05
Zinc	2.80E-05	1.70E-02	1.26E-02	7.94E-04	3.48E-03	9.38E-10	1.50E-02	1.30E-02	4.62E-05	2.02E-04

*Calculated based on the TABLE 1.4-2. AP 42, Fifth Edition, Volume IChapter 1: External Comb

** All PM (total, Condensable, and filterable) is assumed to be less than 1.0 micrometer in di

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		Isomerization Unit								
Emissions Estimation Protocol for Petroleum Refineries, Version 3, RTI International.		flue gas (lb/h)	1463	Tag	Dryer Regeneration Heater		flue gas (lb/h)	3326	Tag	Charge H
Table 4-3. Summary of Emission Factors for Boilers and Process Heaters Firing Various Fuels		density (lb/ft3)	0.0286	117-H-1701	Heat input (MMBtu/h)	3.75	density (lb/ft3)	0.0296	117-H-1702	Heat input (MMBtu/h)
Emission Factors for Boilers and Process Heaters Firing. External Combustion, Natural Gas/Refinery Gas (lb/MMBtu)		flue gas (ft3/h)	51,153.85	852.56	Emission (lb/h)	Emission (us tpy)	flue gas (ft3/h)	112,364.86	1,872.75	Emission (lb/h)
		T (°F)	823.8				T (°F)	787.7		
		T(K)	713.04				T(K)	692.98		
HAP		Conc. (lb/ft3)	Conc. (mg/m3)	Conc. (ppmv)			Conc. (lb/ft3)	Conc. (mg/m3)	Conc. (ppmv)	
Antimony	5.20E-07	1.68E-11	2.69E-04	1.29E-04	1.95E-06	8.54E-06	1.74E-11	2.78E-04	1.30E-04	7.23E-06
Arsenic	2.00E-07	6.45E-12	1.03E-04	8.08E-05	7.50E-07	3.29E-06	6.67E-12	1.07E-04	8.12E-05	2.78E-06
Beryllium	1.30E-07	4.19E-12	6.72E-05	4.37E-04	4.88E-07	2.14E-06	4.34E-12	6.96E-05	4.39E-04	1.81E-06
Cadmium	1.10E-06	3.55E-11	5.69E-04	2.96E-04	4.13E-06	1.81E-05	3.67E-11	5.89E-04	2.98E-04	1.53E-05
Chromium (hexavalent)	2.80E-07	9.03E-12	1.45E-04	1.63E-04	1.05E-06	4.60E-06	9.34E-12	1.50E-04	1.64E-04	3.89E-06
Chromium (total)	1.40E-06	4.52E-11	7.24E-04	8.15E-04	5.25E-06	2.30E-05	4.67E-11	7.49E-04	8.19E-04	1.95E-05
Cobalt	8.20E-08	2.64E-12	4.24E-05	4.21E-05	3.08E-07	1.35E-06	2.74E-12	4.39E-05	4.23E-05	1.14E-06
Manganese	3.70E-07	1.19E-11	1.91E-04	2.04E-04	1.39E-06	6.08E-06	1.23E-11	1.98E-04	2.05E-04	5.14E-06
Mercury	2.50E-07	8.06E-12	1.29E-04	3.77E-05	9.38E-07	4.11E-06	8.34E-12	1.34E-04	3.79E-05	3.48E-06
Nickel	2.10E-06	6.77E-11	1.09E-03	1.08E-03	7.88E-06	3.45E-05	7.01E-11	1.12E-03	1.09E-03	2.92E-05
Selenium	8.80E-07	2.84E-11	4.55E-04	3.37E-04	3.30E-06	1.45E-05	2.94E-11	4.71E-04	3.39E-04	1.22E-05
Total Metal HAPs	-	**5.37E-12**	**3.78E-03**		**2.74E-05**	**1.20E-04**	**1.22E-11**	**3.91E-03**		**1.02E-04**
Volatile Organics HAPs		Conc. (lb/ft3)	Conc. (mg/m3)	Conc. (ppmv)			Conc. (lb/ft3)	Conc. (mg/m3)	Conc. (ppmv)	
Acetaldehyde	1.20E-05	9.68E-11	1.55E-03	2.06E-03	1.13E-05	4.93E-05	1.00E-10	1.61E-03	2.07E-03	4.17E-05
Acrolein	1.70E-05	1.37E-10	2.20E-03	2.29E-03	1.59E-05	6.98E-05	1.42E-10	2.27E-03	2.31E-03	5.91E-05
Benzene	2.10E-06	1.69E-11	2.72E-04	2.03E-04	1.97E-06	8.62E-06	1.75E-11	2.81E-04	2.04E-04	7.30E-06
Benzo(a)anthracene	2.20E-08	1.77E-13	2.84E-06	7.29E-07	2.06E-08	9.03E-08	1.84E-13	2.94E-06	7.33E-07	7.65E-08
Dichlorobenzene	1.20E-06	9.68E-12	1.55E-04	6.17E-05	1.13E-06	4.93E-06	1.00E-11	1.61E-04	6.21E-05	4.17E-06
Ethylbenzene	1.60E-05	1.29E-10	2.07E-03	1.14E-03	1.50E-05	6.57E-05	1.33E-10	2.14E-03	1.15E-03	5.56E-05
Formaldehyde	7.40E-05	5.97E-10	9.57E-03	1.86E-02	6.94E-05	3.04E-04	6.17E-10	9.90E-03	1.87E-02	2.57E-04
Hexane	1.80E-03	1.45E-08	2.33E-01	1.58E-01	1.69E-03	7.39E-03	1.50E-08	2.41E-01	1.59E-01	6.26E-03
Toluene	3.30E-06	2.66E-11	4.27E-04	2.71E-04	3.09E-06	1.36E-05	2.75E-11	4.41E-04	2.72E-04	1.15E-05
Xylene (total)	2.50E-05	2.02E-10	3.23E-03	1.78E-03	2.34E-05	1.03E-04	2.09E-10	3.34E-03	1.79E-03	8.69E-05
Total VOC HAPs		1.57E-08	2.52E-01		1.83E-03	8.01E-03	1.63E-08	2.61E-01		6.78E-03
Semivolatile and Nonvolatile Organics (excluding dioxin/furans)		Conc. (lb/ft3)	Conc. (mg/m3)	Conc. (ppmv)			Conc. (lb/ft3)	Conc. (mg/m3)	Conc. (ppmv)	
Acenaphthene	2.40E-09	1.94E-14	3.10E-07	1.18E-07	2.25E-09	9.86E-09	2.00E-14	3.21E-07	1.18E-07	8.34E-09
Acenaphthylene	6.50E-09	5.24E-14	8.40E-07	3.23E-07	6.09E-09	2.67E-08	5.42E-14	8.69E-07	3.25E-07	2.26E-08
Anthracene	4.70E-09	3.79E-14	6.08E-07	1.99E-07	4.41E-09	1.93E-08	3.92E-14	6.29E-07	2.01E-07	1.63E-08
Benzo(a)pyrene	5.70E-08	4.60E-13	7.37E-06	1.71E-06	5.34E-08	2.34E-07	4.76E-13	7.62E-06	1.72E-06	1.98E-07
Benzo(b)fluoranthene	2.70E-08	2.18E-13	3.49E-06	8.09E-07	2.53E-08	1.11E-07	2.25E-13	3.61E-06	8.14E-07	9.38E-08

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Emissions Estimation Protocol for Petroleum Refineries, Version 3, RTI International.

Table 4-3. Summary of Emission Factors for Boilers and Process Heaters Firing Various Fuels

		Isomerization Unit								Charge H
		flue gas (lb/h)	1463	Tag	Dryer Regeneration Heater		flue gas (lb/h)	3326	Tag	
		density (lb/ft3)	0.0286	117-H-1701	Heat input (MMBtu/h)	3.75	density (lb/ft3)	0.0296	117-H-1702	Heat input (MMBtu/h)
Emission Factors for Boilers and Process Heaters Firing. External Combustion, Natural Gas/Refinery Gas (lb/MMBtu)		flue gas (ft3/h)	51,153.85	852.56	Emission (lb/h)	Emission (us tpy)	flue gas (ft3/h)	112,364.86	1,872.75	Emission (lb/h)
		T (°F)	823.8				T (°F)	787.7		
		T(K)	713.04				T(K)	692.98		
HAP		Conc. (lb/ft3)	Conc. (mg/m3)	Conc. (ppmv)			Conc. (lb/ft3)	Conc. (mg/m3)	Conc. (ppmv)	
Benzo(g,h,i)perylene	1.30E-09	1.05E-14	1.68E-07	3.56E-08	1.22E-09	5.34E-09	1.08E-14	1.74E-07	3.58E-08	4.52E-09
Benzo(k)fluoranthene	1.70E-08	1.37E-13	2.20E-06	5.10E-07	1.59E-08	6.98E-08	1.42E-13	2.27E-06	5.12E-07	5.91E-08
Chrysene	1.60E-09	1.29E-14	2.07E-07	5.30E-08	1.50E-09	6.57E-09	1.33E-14	2.14E-07	5.33E-08	5.56E-09
Dibenz(a,h)anthracene	1.20E-09	9.68E-15	1.55E-07	3.26E-08	1.13E-09	4.93E-09	1.00E-14	1.61E-07	3.28E-08	4.17E-09
7,12-Dimethylbenz(a) anthracene	1.60E-08	1.29E-13	2.07E-06	4.72E-07	1.50E-08	6.57E-08	1.33E-13	2.14E-06	4.75E-07	5.56E-08
Fluoranthene	2.90E-09	2.34E-14	3.75E-07	1.08E-07	2.72E-09	1.19E-08	2.42E-14	3.88E-07	1.09E-07	1.01E-08
Fluorene	2.70E-09	2.18E-14	3.49E-07	1.23E-07	2.53E-09	1.11E-08	2.25E-14	3.61E-07	1.24E-07	9.38E-09
Indeno-(1,2,3cd)pyrene	7.10E-08	5.73E-13	9.18E-06	1.94E-06	6.66E-08	2.92E-07	5.92E-13	9.50E-06	1.95E-06	2.47E-07
3-Methylchloranthrene	1.80E-09	1.45E-14	2.33E-07	5.07E-08	1.69E-09	7.39E-09	1.50E-14	2.41E-07	5.10E-08	6.26E-09
2-Methylnaphthalene	2.40E-08	1.94E-13	3.10E-06	1.28E-06	2.25E-08	9.86E-08	2.00E-13	3.21E-06	1.28E-06	8.34E-08
Naphthalene	6.00E-07	4.84E-12	7.76E-05	3.54E-05	5.63E-07	2.46E-06	5.01E-12	8.03E-05	3.56E-05	2.09E-06
Phenanthrene	1.70E-08	1.37E-13	2.20E-06	7.21E-07	1.59E-08	6.98E-08	1.42E-13	2.27E-06	7.25E-07	5.91E-08
Phenol	4.00E-06	3.23E-11	5.17E-04	3.21E-04	3.75E-06	1.64E-05	3.34E-11	5.35E-04	3.23E-04	1.39E-05
Pyrene	4.90E-09	3.95E-14	6.34E-07	1.83E-07	4.59E-09	2.01E-08	4.09E-14	6.55E-07	1.84E-07	1.70E-08
Sum PAH (without naphthalene)	**4.26E-06**	**3.43E-11**	**5.51E-04**	**3.30E-04**	**3.99E-06**	**1.75E-05**	**3.55E-11**	**5.70E-04**	**3.32E-04**	**1.48E-05**
Total SV-NV Organic HAPs		3.92E-11	6.28E-04		4.56E-06	2.00E-05	4.05E-11	6.50E-04		1.69E-05
TOTAL ORGANIC HAPS					**1.83E-03**	**8.03E-03**				**6.80E-03**
Other Compounds of Interest		Conc. (lb/ft3)	Conc. (mg/m3)	Conc. (ppmv)			Conc. (lb/ft3)	Conc. (mg/m3)	Conc. (ppmv)	
Barium	4.30E-06	1.39E-10	2.22E-03	9.47E-04	1.61E-05	7.06E-05	1.44E-10	2.30E-03	9.53E-04	5.98E-05
Butane	2.10E-03	6.77E-08	1.09E+00	1.09E+00	7.88E-03	3.45E-02	7.01E-08	1.12E+00	1.10E+00	2.92E-02
Copper	8.30E-07	2.68E-11	4.29E-04	3.95E-04	3.11E-06	1.36E-05	2.77E-11	4.44E-04	3.97E-04	1.15E-05
Ethane	3.00E-03	9.68E-08	1.55E+00	3.02E+00	1.13E-02	4.93E-02	1.00E-07	1.61E+00	3.04E+00	4.17E-02
Hydrogen sulfide	8.50E-05	2.74E-09	4.40E-02	7.55E-02	3.19E-04	1.40E-03	2.84E-09	4.55E-02	7.59E-02	1.18E-03
Molybdenum	1.10E-06	3.55E-11	5.69E-04	3.47E-04	4.13E-06	1.81E-05	3.67E-11	5.89E-04	3.49E-04	1.53E-05
Phosphorus (Inorganic HAP)	6.40E-07	2.06E-11	3.31E-04	6.25E-04	2.40E-06	1.05E-05	2.14E-11	3.42E-04	6.29E-04	8.90E-06
Vanadium	2.30E-06	7.42E-11	1.19E-03	1.37E-03	8.63E-06	3.78E-05	7.68E-11	1.23E-03	1.37E-03	3.20E-05
Zinc	2.80E-05	9.03E-10	1.45E-02	1.30E-02	1.05E-04	4.60E-04	9.34E-10	1.50E-02	1.30E-02	3.89E-04

*Calculated based on the TABLE 1.4-2. AP 42, Fifth Edition, Volume IChapter 1: External Comb

** All PM (total, Condensable, and filterable) is assumed to be less than 1.0 micrometer in di

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Emissions Estimation Protocol for Petroleum Refineries, Version 3, RTI International.

Table 4-3. Summary of Emission Factors for Boilers and Process Heaters Firing Various Fuels

		Light Naphtha Hydrotreater				Catalytic Reformer Unit #2				
		eater	flue gas (lb/h)	12,328.00	Tag	Reformer Heater 1		flue gas (lb/h)	37,012.00	Tag
		13.9	density (lb/ft3)	0.03	111-H-1101	Heat input (MMBtu/h)	41.73	density (lb/ft3)	0.03	106-H-0601
Emission Factors for Boilers and Process Heaters Firing. External Combustion, Natural Gas/Refinery Gas (lb/MMBtu)		Emission (us tpy)	flue gas (ft3/h)	417,898.31	6,964.97	Emission (lb/h)	Emission (us tpy)	flue gas (ft3/h)	1,246,195.29	20,769.92
			T (°F)	793.1				T (°F)	786.2	
			T(K)	695.98				T(K)	692.15	
HAP			Conc. (lb/ft3)	Conc. (mg/m3)	Conc. (ppmv)			Conc. (lb/ft3)	Conc. (mg/m3)	Conc. (ppmv)
Antimony	5.20E-07	3.17E-05	1.73E-11	2.77E-04	1.30E-04	2.17E-05	9.50E-05	1.74E-11	2.79E-04	1.30E-04
Arsenic	2.00E-07	1.22E-05	6.65E-12	1.07E-04	8.13E-05	8.35E-06	3.66E-05	6.70E-12	1.07E-04	8.14E-05
Beryllium	1.30E-07	7.91E-06	4.32E-12	6.93E-05	4.39E-04	5.42E-06	2.38E-05	4.35E-12	6.98E-05	4.40E-04
Cadmium	1.10E-06	6.70E-05	3.66E-11	5.87E-04	2.98E-04	4.59E-05	2.01E-04	3.68E-11	5.91E-04	2.98E-04
Chromium (hexavalent)	2.80E-07	1.70E-05	9.31E-12	1.49E-04	1.64E-04	1.17E-05	5.12E-05	9.38E-12	1.50E-04	1.64E-04
Chromium (total)	1.40E-06	8.52E-05	4.66E-11	7.47E-04	8.20E-04	5.84E-05	2.56E-04	4.69E-11	7.52E-04	8.21E-04
Cobalt	8.20E-08	4.99E-06	2.73E-12	4.37E-05	4.24E-05	3.42E-06	1.50E-05	2.75E-12	4.40E-05	4.24E-05
Manganese	3.70E-07	2.25E-05	1.23E-11	1.97E-04	2.05E-04	1.54E-05	6.76E-05	1.24E-11	1.99E-04	2.05E-04
Mercury	2.50E-07	1.52E-05	8.32E-12	1.33E-04	3.80E-05	1.04E-05	4.57E-05	8.37E-12	1.34E-04	3.80E-05
Nickel	2.10E-06	1.28E-04	6.98E-11	1.12E-03	1.09E-03	8.76E-05	3.84E-04	7.03E-11	1.13E-03	1.09E-03
Selenium	8.80E-07	5.36E-05	2.93E-11	4.69E-04	3.39E-04	3.67E-05	1.61E-04	2.95E-11	4.72E-04	3.40E-04
Total Metal HAPs	-	**4.45E-04**	**4.53E-11**	**3.90E-03**		**3.05E-04**	**1.34E-03**	**1.36E-10**	**3.93E-03**	
Volatile Organics HAPs			Conc. (lb/ft3)	Conc. (mg/m3)	Conc. (ppmv)			Conc. (lb/ft3)	Conc. (mg/m3)	Conc. (ppmv)
Acetaldehyde	1.20E-05	1.83E-04	9.98E-11	1.60E-03	2.07E-03	1.25E-04	5.48E-04	1.00E-10	1.61E-03	2.08E-03
Acrolein	1.70E-05	2.59E-04	1.41E-10	2.27E-03	2.31E-03	1.77E-04	7.77E-04	1.42E-10	2.28E-03	2.31E-03
Benzene	2.10E-06	3.20E-05	1.75E-11	2.80E-04	2.05E-04	2.19E-05	9.60E-05	1.76E-11	2.82E-04	2.05E-04
Benzo(a)anthracene	2.20E-08	3.35E-07	1.83E-13	2.93E-06	7.34E-07	2.30E-07	1.01E-06	1.84E-13	2.95E-06	7.35E-07
Dichlorobenzene	1.20E-06	1.83E-05	9.98E-12	1.60E-04	6.21E-05	1.25E-05	5.48E-05	1.00E-11	1.61E-04	6.22E-05
Ethylbenzene	1.60E-05	2.44E-04	1.33E-10	2.13E-03	1.15E-03	1.67E-04	7.31E-04	1.34E-10	2.15E-03	1.15E-03
Formaldehyde	7.40E-05	1.13E-03	6.15E-10	9.87E-03	1.88E-02	7.72E-04	3.38E-03	6.19E-10	9.93E-03	1.88E-02
Hexane	1.80E-03	2.74E-02	1.50E-08	2.40E-01	1.59E-01	1.88E-02	8.22E-02	1.51E-08	2.42E-01	1.59E-01
Toluene	3.30E-06	5.02E-05	2.74E-11	4.40E-04	2.73E-04	3.44E-05	1.51E-04	2.76E-11	4.43E-04	2.73E-04
Xylene (total)	2.50E-05	3.81E-04	2.08E-10	3.33E-03	1.79E-03	2.61E-04	1.14E-03	2.09E-10	3.36E-03	1.80E-03
Total VOC HAPs		2.97E-02	1.62E-08	2.60E-01		2.03E-02	8.91E-02	1.63E-08	2.62E-01	
Semivolatile and Nonvolatile Organics (excluding dioxin/furans)			Conc. (lb/ft3)	Conc. (mg/m3)	Conc. (ppmv)			Conc. (lb/ft3)	Conc. (mg/m3)	Conc. (ppmv)
Acenaphthene	2.40E-09	3.65E-08	2.00E-14	3.20E-07	1.18E-07	2.50E-08	1.10E-07	2.01E-14	3.22E-07	1.19E-07
Acenaphthylene	6.50E-09	9.89E-08	5.41E-14	8.67E-07	3.25E-07	6.78E-08	2.97E-07	5.44E-14	8.72E-07	3.26E-07
Anthracene	4.70E-09	7.15E-08	3.91E-14	6.27E-07	2.01E-07	4.90E-08	2.15E-07	3.93E-14	6.31E-07	2.01E-07
Benzo(a)pyrene	5.70E-08	8.68E-07	4.74E-13	7.60E-06	1.72E-06	5.95E-07	2.60E-06	4.77E-13	7.65E-06	1.72E-06
Benzo(b)fluoranthene	2.70E-08	4.11E-07	2.25E-13	3.60E-06	8.15E-07	2.82E-07	1.23E-06	2.26E-13	3.62E-06	8.16E-07

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Emissions Estimation Protocol for Petroleum Refineries, Version 3, RTI International.

Table 4-3. Summary of Emission Factors for Boilers and Process Heaters Firing Various Fuels

		Light Naphtha Hydrotreater				Catalytic Reformer Unit #2				
		eater	flue gas (lb/h)	12,328.00	Tag	Reformer Heater 1		flue gas (lb/h)	37,012.00	Tag
		13.9	density (lb/ft3)	0.03	111-H-1101	Heat input (MMBtu/h)	41.73	density (lb/ft3)	0.03	106-H-0601
Emission Factors for Boilers and Process Heaters Firing. External Combustion, Natural Gas/Refinery Gas (lb/MMBtu)		Emission (us tpy)	flue gas (ft3/h)	417,898.31	6,964.97	Emission (lb/h)	Emission (us tpy)	flue gas (ft3/h)	1,246,195.29	20,769.92
			T (°F)	793.1				T (°F)	786.2	
			T(K)	695.98				T(K)	692.15	
HAP			Conc. (lb/ft3)	Conc. (mg/m3)	Conc. (ppmv)			Conc. (lb/ft3)	Conc. (mg/m3)	Conc. (ppmv)
Benzo(g,h,i)perylene	1.30E-09	1.98E-08	1.08E-14	1.73E-07	3.58E-08	1.36E-08	5.94E-08	1.09E-14	1.74E-07	3.59E-08
Benzo(k)fluoranthene	1.70E-08	2.59E-07	1.41E-13	2.27E-06	5.13E-07	1.77E-07	7.77E-07	1.42E-13	2.28E-06	5.14E-07
Chrysene	1.60E-09	2.44E-08	1.33E-14	2.13E-07	5.34E-08	1.67E-08	7.31E-08	1.34E-14	2.15E-07	5.34E-08
Dibenz(a,h)anthracene	1.20E-09	1.83E-08	9.98E-15	1.60E-07	3.28E-08	1.25E-08	5.48E-08	1.00E-14	1.61E-07	3.29E-08
7,12-Dimethylbenz(a) anthracene	1.60E-08	2.44E-07	1.33E-13	2.13E-06	4.75E-07	1.67E-07	7.31E-07	1.34E-13	2.15E-06	4.76E-07
Fluoranthene	2.90E-09	4.41E-08	2.41E-14	3.87E-07	1.09E-07	3.03E-08	1.33E-07	2.43E-14	3.89E-07	1.09E-07
Fluorene	2.70E-09	4.11E-08	2.25E-14	3.60E-07	1.24E-07	2.82E-08	1.23E-07	2.26E-14	3.62E-07	1.24E-07
Indeno-(1,2,3cd)pyrene	7.10E-08	1.08E-06	5.90E-13	9.47E-06	1.96E-06	7.41E-07	3.24E-06	5.94E-13	9.53E-06	1.96E-06
3-Methylchloranthrene	1.80E-09	2.74E-08	1.50E-14	2.40E-07	5.11E-08	1.88E-08	8.22E-08	1.51E-14	2.42E-07	5.11E-08
2-Methylnaphthalene	2.40E-08	3.65E-07	2.00E-13	3.20E-06	1.29E-06	2.50E-07	1.10E-06	2.01E-13	3.22E-06	1.29E-06
Naphthalene	6.00E-07	9.13E-06	4.99E-12	8.00E-05	3.56E-05	6.26E-06	2.74E-05	5.02E-12	8.05E-05	3.57E-05
Phenanthrene	1.70E-08	2.59E-07	1.41E-13	2.27E-06	7.26E-07	1.77E-07	7.77E-07	1.42E-13	2.28E-06	7.27E-07
Phenol	4.00E-06	6.09E-05	3.33E-11	5.33E-04	3.24E-04	4.17E-05	1.83E-04	3.35E-11	5.37E-04	3.24E-04
Pyrene	4.90E-09	7.46E-08	4.07E-14	6.53E-07	1.84E-07	5.11E-08	2.24E-07	4.10E-14	6.58E-07	1.85E-07
Sum PAH (without naphthalene)	**4.26E-06**	**6.48E-05**	**3.54E-11**	**5.68E-04**	**3.32E-04**	**4.44E-05**	**1.95E-04**	**3.57E-11**	**5.72E-04**	**3.33E-04**
Total SV-NV Organic HAPs		7.40E-05	4.04E-11	6.48E-04		5.07E-05	2.22E-04	4.07E-11	6.52E-04	
TOTAL ORGANIC HAPS		**2.98E-02**				**2.04E-02**	**8.94E-02**			
Other Compounds of Interest			Conc. (lb/ft3)	Conc. (mg/m3)	Conc. (ppmv)			Conc. (lb/ft3)	Conc. (mg/m3)	Conc. (ppmv)
Barium	4.30E-06	2.62E-04	1.43E-10	2.29E-03	9.54E-04	1.79E-04	7.86E-04	1.44E-10	2.31E-03	9.55E-04
Butane	2.10E-03	1.28E-01	6.98E-08	1.12E+00	1.10E+00	8.76E-02	3.84E-01	7.03E-08	1.13E+00	1.10E+00
Copper	8.30E-07	5.05E-05	2.76E-11	4.43E-04	3.98E-04	3.46E-05	1.52E-04	2.78E-11	4.46E-04	3.98E-04
Ethane	3.00E-03	1.83E-01	9.98E-08	1.60E+00	3.04E+00	1.25E-01	5.48E-01	1.00E-07	1.61E+00	3.04E+00
Hydrogen sulfide	8.50E-05	5.17E-03	2.83E-09	4.53E-02	7.60E-02	3.55E-03	1.55E-02	2.85E-09	4.56E-02	7.60E-02
Molybdenum	1.10E-06	6.70E-05	3.66E-11	5.87E-04	3.49E-04	4.59E-05	2.01E-04	3.68E-11	5.91E-04	3.50E-04
Phosphorus (Inorganic HAP)	6.40E-07	3.90E-05	2.13E-11	3.41E-04	6.29E-04	2.67E-05	1.17E-04	2.14E-11	3.44E-04	6.30E-04
Vanadium	2.30E-06	1.40E-04	7.65E-11	1.23E-03	1.37E-03	9.60E-05	4.20E-04	7.70E-11	1.23E-03	1.38E-03
Zinc	2.80E-05	1.70E-03	9.31E-10	1.49E-02	1.30E-02	1.17E-03	5.12E-03	9.38E-10	1.50E-02	1.31E-02

*Calculated based on the TABLE 1.4-2. AP 42, Fifth Edition, Volume IChapter 1: External Comb

** All PM (total, Condensable, and filterable) is assumed to be less than 1.0 micrometer in di

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Emissions Estimation Protocol for Petroleum Refineries, Version 3, RTI International.

Table 4-3. Summary of Emission Factors for Boilers and Process Heaters Firing Various Fuels

		Catalytic Reformer Unit #1					Diesel Hydrotreater			
		Reformer Heater 1		flue gas (lb/h)	82,042.00	Tag	Reactor Charge Heater		flue gas (lb/h)	15,342.00
		Heat input (MMBtu/h)	92.5	density (lb/ft3)	0.03	107-H-0701	Heat input (MMBtu/h)	16.25	density (lb/ft3)	0.03
Emission Factors for Boilers and Process Heaters Firing. External Combustion, Natural Gas/Refinery Gas (lb/MMBtu)		Emission (lb/h)	Emission (us tpy)	flue gas (ft3/h)	2,771,689.19	46,194.82	Emission (lb/h)	Emission (us tpy)	flue gas (ft3/h)	485,506.33
				T (°F)	787.7				T (°F)	764.3
				T(K)	692.98				T(K)	679.98
HAP				Conc. (lb/ft3)	Conc. (mg/m3)	Conc. (ppmv)			Conc. (lb/ft3)	Conc. (mg/m3)
Antimony	5.20E-07	4.81E-05	2.11E-04	1.74E-11	2.78E-04	1.30E-04	8.45E-06	3.70E-05	1.74E-11	2.79E-04
Arsenic	2.00E-07	1.85E-05	8.10E-05	6.67E-12	1.07E-04	8.12E-05	3.25E-06	1.42E-05	6.69E-12	1.07E-04
Beryllium	1.30E-07	1.20E-05	5.27E-05	4.34E-12	6.96E-05	4.39E-04	2.11E-06	9.25E-06	4.35E-12	6.98E-05
Cadmium	1.10E-06	1.02E-04	4.46E-04	3.67E-11	5.89E-04	2.98E-04	1.79E-05	7.83E-05	3.68E-11	5.90E-04
Chromium (hexavalent)	2.80E-07	2.59E-05	1.13E-04	9.34E-12	1.50E-04	1.64E-04	4.55E-06	1.99E-05	9.37E-12	1.50E-04
Chromium (total)	1.40E-06	1.30E-04	5.67E-04	4.67E-11	7.49E-04	8.19E-04	2.28E-05	9.96E-05	4.69E-11	7.51E-04
Cobalt	8.20E-08	7.59E-06	3.32E-05	2.74E-12	4.39E-05	4.23E-05	1.33E-06	5.84E-06	2.74E-12	4.40E-05
Manganese	3.70E-07	3.42E-05	1.50E-04	1.23E-11	1.98E-04	2.05E-04	6.01E-06	2.63E-05	1.24E-11	1.99E-04
Mercury	2.50E-07	2.31E-05	1.01E-04	8.34E-12	1.34E-04	3.79E-05	4.06E-06	1.78E-05	8.37E-12	1.34E-04
Nickel	2.10E-06	1.94E-04	8.51E-04	7.01E-11	1.12E-03	1.09E-03	3.41E-05	1.49E-04	7.03E-11	1.13E-03
Selenium	8.80E-07	8.14E-05	3.57E-04	2.94E-11	4.71E-04	3.39E-04	1.43E-05	6.26E-05	2.95E-11	4.72E-04
Total Metal HAPs	-	**6.76E-04**	**2.96E-03**	**3.01E-10**	**3.91E-03**		**1.19E-04**	**5.20E-04**	**5.29E-11**	**3.92E-03**
Volatile Organics HAPs				Conc. (lb/ft3)	Conc. (mg/m3)	Conc. (ppmv)			Conc. (lb/ft3)	Conc. (mg/m3)
Acetaldehyde	1.20E-05	2.78E-04	1.22E-03	1.00E-10	1.61E-03	2.07E-03	4.88E-05	2.14E-04	1.00E-10	1.61E-03
Acrolein	1.70E-05	3.93E-04	1.72E-03	1.42E-10	2.27E-03	2.31E-03	6.91E-05	3.02E-04	1.42E-10	2.28E-03
Benzene	2.10E-06	4.86E-05	2.13E-04	1.75E-11	2.81E-04	2.04E-04	8.53E-06	3.74E-05	1.76E-11	2.82E-04
Benzo(a)anthracene	2.20E-08	5.09E-07	2.23E-06	1.84E-13	2.94E-06	7.33E-07	8.94E-08	3.91E-07	1.84E-13	2.95E-06
Dichlorobenzene	1.20E-06	2.78E-05	1.22E-04	1.00E-11	1.61E-04	6.21E-05	4.88E-06	2.14E-05	1.00E-11	1.61E-04
Ethylbenzene	1.60E-05	3.70E-04	1.62E-03	1.33E-10	2.14E-03	1.15E-03	6.50E-05	2.85E-04	1.34E-10	2.15E-03
Formaldehyde	7.40E-05	1.71E-03	7.50E-03	6.17E-10	9.90E-03	1.87E-02	3.01E-04	1.32E-03	6.19E-10	9.93E-03
Hexane	1.80E-03	4.16E-02	1.82E-01	1.50E-08	2.41E-01	1.59E-01	7.31E-03	3.20E-02	1.51E-08	2.41E-01
Toluene	3.30E-06	7.63E-05	3.34E-04	2.75E-11	4.41E-04	2.72E-04	1.34E-05	5.87E-05	2.76E-11	4.43E-04
Xylene (total)	2.50E-05	5.78E-04	2.53E-03	2.09E-10	3.34E-03	1.79E-03	1.02E-04	4.45E-04	2.09E-10	3.35E-03
Total VOC HAPs		4.51E-02	1.98E-01	1.63E-08	2.61E-01		7.92E-03	3.47E-02	1.63E-08	2.62E-01
Semivolatile and Nonvolatile Organics (excluding dioxin/furans)				Conc. (lb/ft3)	Conc. (mg/m3)	Conc. (ppmv)			Conc. (lb/ft3)	Conc. (mg/m3)
Acenaphthene	2.40E-09	5.55E-08	2.43E-07	2.00E-14	3.21E-07	1.18E-07	9.75E-09	4.27E-08	2.01E-14	3.22E-07
Acenaphthylene	6.50E-09	1.50E-07	6.58E-07	5.42E-14	8.69E-07	3.25E-07	2.64E-08	1.16E-07	5.44E-14	8.72E-07
Anthracene	4.70E-09	1.09E-07	4.76E-07	3.92E-14	6.29E-07	2.01E-07	1.91E-08	8.36E-08	3.93E-14	6.31E-07
Benzo(a)pyrene	5.70E-08	1.32E-06	5.77E-06	4.76E-13	7.62E-06	1.72E-06	2.32E-07	1.01E-06	4.77E-13	7.65E-06
Benzo(b)fluoranthene	2.70E-08	6.24E-07	2.73E-06	2.25E-13	3.61E-06	8.14E-07	1.10E-07	4.80E-07	2.26E-13	3.62E-06

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Emissions Estimation Protocol for Petroleum Refineries, Version 3, RTI International.

Table 4-3. Summary of Emission Factors for Boilers and Process Heaters Firing Various Fuels

		Catalytic Reformer Unit #1					Diesel Hydrotreater			
		Reformer Heater 1		flue gas (lb/h)	82,042.00	Tag	Reactor Charge Heater		flue gas (lb/h)	15,342.00
		Heat input (MMBtu/h)	92.5	density (lb/ft3)	0.03	107-H-0701	Heat input (MMBtu/h)	16.25	density (lb/ft3)	0.03
Emission Factors for Boilers and Process Heaters Firing. External Combustion, Natural Gas/Refinery Gas (lb/MMBtu)		Emission (lb/h)	Emission (us tpy)	flue gas (ft3/h)	2,771,689.19	46,194.82	Emission (lb/h)	Emission (us tpy)	flue gas (ft3/h)	485,506.33
				T (°F)	787.7				T (°F)	764.3
				T(K)	692.98				T(K)	679.98
HAP				Conc. (lb/ft3)	Conc. (mg/m3)	Conc. (ppmv)			Conc. (lb/ft3)	Conc. (mg/m3)
Benzo(g,h,i)perylene	1.30E-09	3.01E-08	1.32E-07	1.08E-14	1.74E-07	3.58E-08	5.28E-09	2.31E-08	1.09E-14	1.74E-07
Benzo(k)fluoranthene	1.70E-08	3.93E-07	1.72E-06	1.42E-13	2.27E-06	5.12E-07	6.91E-08	3.02E-07	1.42E-13	2.28E-06
Chrysene	1.60E-09	3.70E-08	1.62E-07	1.33E-14	2.14E-07	5.33E-08	6.50E-09	2.85E-08	1.34E-14	2.15E-07
Dibenz(a,h)anthracene	1.20E-09	2.78E-08	1.22E-07	1.00E-14	1.61E-07	3.28E-08	4.88E-09	2.14E-08	1.00E-14	1.61E-07
7,12-Dimethylbenz(a) anthracene	1.60E-08	3.70E-07	1.62E-06	1.33E-13	2.14E-06	4.75E-07	6.50E-08	2.85E-07	1.34E-13	2.15E-06
Fluoranthene	2.90E-09	6.71E-08	2.94E-07	2.42E-14	3.88E-07	1.09E-07	1.18E-08	5.16E-08	2.43E-14	3.89E-07
Fluorene	2.70E-09	6.24E-08	2.73E-07	2.25E-14	3.61E-07	1.24E-07	1.10E-08	4.80E-08	2.26E-14	3.62E-07
Indeno-(1,2,3cd)pyrene	7.10E-08	1.64E-06	7.19E-06	5.92E-13	9.50E-06	1.95E-06	2.88E-07	1.26E-06	5.94E-13	9.53E-06
3-Methylchloranthrene	1.80E-09	4.16E-08	1.82E-07	1.50E-14	2.41E-07	5.10E-08	7.31E-09	3.20E-08	1.51E-14	2.41E-07
2-Methylnaphthalene	2.40E-08	5.55E-07	2.43E-06	2.00E-13	3.21E-06	1.28E-06	9.75E-08	4.27E-07	2.01E-13	3.22E-06
Naphthalene	6.00E-07	1.39E-05	6.08E-05	5.01E-12	8.03E-05	3.56E-05	2.44E-06	1.07E-05	5.02E-12	8.05E-05
Phenanthrene	1.70E-08	3.93E-07	1.72E-06	1.42E-13	2.27E-06	7.25E-07	6.91E-08	3.02E-07	1.42E-13	2.28E-06
Phenol	4.00E-06	9.25E-05	4.05E-04	3.34E-11	5.35E-04	3.23E-04	1.63E-05	7.12E-05	3.35E-11	5.37E-04
Pyrene	4.90E-09	1.13E-07	4.96E-07	4.09E-14	6.55E-07	1.84E-07	1.99E-08	8.72E-08	4.10E-14	6.57E-07
Sum PAH (without naphthalene)	**4.26E-06**	**9.85E-05**	**4.31E-04**	**3.55E-11**	**5.70E-04**	**3.32E-04**	**1.73E-05**	**7.58E-05**	**3.56E-11**	**5.71E-04**
Total SV-NV Organic HAPs		1.12E-04	4.92E-04	4.05E-11	6.50E-04		1.97E-05	8.65E-05	4.07E-11	6.52E-04
TOTAL ORGANIC HAPS		**4.52E-02**	**1.98E-01**				**7.94E-03**	**3.48E-02**		
Other Compounds of Interest				Conc. (lb/ft3)	Conc. (mg/m3)	Conc. (ppmv)			Conc. (lb/ft3)	Conc. (mg/m3)
Barium	4.30E-06	3.98E-04	1.74E-03	1.44E-10	2.30E-03	9.53E-04	6.99E-05	3.06E-04	1.44E-10	2.31E-03
Butane	2.10E-03	1.94E-01	8.51E-01	7.01E-08	1.12E+00	1.10E+00	3.41E-02	1.49E-01	7.03E-08	1.13E+00
Copper	8.30E-07	7.68E-05	3.36E-04	2.77E-11	4.44E-04	3.97E-04	1.35E-05	5.91E-05	2.78E-11	4.45E-04
Ethane	3.00E-03	2.78E-01	1.22E+00	1.00E-07	1.61E+00	3.04E+00	4.88E-02	2.14E-01	1.00E-07	1.61E+00
Hydrogen sulfide	8.50E-05	7.86E-03	3.44E-02	2.84E-09	4.55E-02	7.59E-02	1.38E-03	6.05E-03	2.84E-09	4.56E-02
Molybdenum	1.10E-06	1.02E-04	4.46E-04	3.67E-11	5.89E-04	3.49E-04	1.79E-05	7.83E-05	3.68E-11	5.90E-04
Phosphorus (Inorganic HAP)	6.40E-07	5.92E-05	2.59E-04	2.14E-11	3.42E-04	6.29E-04	1.04E-05	4.56E-05	2.14E-11	3.43E-04
Vanadium	2.30E-06	2.13E-04	9.32E-04	7.68E-11	1.23E-03	1.37E-03	3.74E-05	1.64E-04	7.70E-11	1.23E-03
Zinc	2.80E-05	2.59E-03	1.13E-02	9.34E-10	1.50E-02	1.30E-02	4.55E-04	1.99E-03	9.37E-10	1.50E-02

*Calculated based on the TABLE 1.4-2. AP 42, Fifth Edition, Volume IChapter 1: External Comb

** All PM (total, Condensable, and filterable) is assumed to be less than 1.0 micrometer in di

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Emissions Estimation Protocol for Petroleum Refineries, Version 3, RTI International.

Table 4-3. Summary of Emission Factors for Boilers and Process Heaters Firing Various Fuels

			Alkylation Unit							
		Tag	Iso-Stripper Reboiler		flue gas (lb/h)	30,004.10	Tag	Feed Heater		flue gas (lb/h)
		110-H-1001	Heat input (MMBtu/h)	84.19	density (lb/ft3)	0.03	118-H-1801	Heat input (MMBtu/h)	13.75	density (lb/ft3)
Emission Factors for Boilers and Process Heaters Firing. External Combustion, Natural Gas/Refinery Gas (lb/MMBtu)		8,091.77	Emission (lb/h)	Emission (us tpy)	flue gas (ft3/h)	1,013,652.03	16,894.20	Emission (lb/h)	Emission (us tpy)	flue gas (ft3/h)
					T (°F)	785.5				T (°F)
					T(K)	691.76				T(K)
HAP		Conc. (ppmv)			Conc. (lb/ft3)	Conc. (mg/m3)	Conc. (ppmv)			Conc. (lb/ft3)
Antimony	5.20E-07	1.28E-04	4.38E-05	1.92E-04	4.32E-11	6.92E-04	3.23E-04	7.15E-06	3.13E-05	1.74E-11
Arsenic	2.00E-07	7.99E-05	1.68E-05	7.38E-05	1.66E-11	2.66E-04	2.02E-04	2.75E-06	1.20E-05	6.67E-12
Beryllium	1.30E-07	4.32E-04	1.09E-05	4.79E-05	1.08E-11	1.73E-04	1.09E-03	1.79E-06	7.83E-06	4.34E-12
Cadmium	1.10E-06	2.93E-04	9.26E-05	4.06E-04	9.14E-11	1.46E-03	7.40E-04	1.51E-05	6.62E-05	3.67E-11
Chromium (hexavalent)	2.80E-07	1.61E-04	2.36E-05	1.03E-04	2.33E-11	3.73E-04	4.07E-04	3.85E-06	1.69E-05	9.34E-12
Chromium (total)	1.40E-06	8.06E-04	1.18E-04	5.16E-04	1.16E-10	1.86E-03	2.04E-03	1.93E-05	8.43E-05	4.67E-11
Cobalt	8.20E-08	4.17E-05	6.90E-06	3.02E-05	6.81E-12	1.09E-04	1.05E-04	1.13E-06	4.94E-06	2.74E-12
Manganese	3.70E-07	2.02E-04	3.12E-05	1.36E-04	3.07E-11	4.93E-04	5.09E-04	5.09E-06	2.23E-05	1.23E-11
Mercury	2.50E-07	3.73E-05	2.10E-05	9.22E-05	2.08E-11	3.33E-04	9.42E-05	3.44E-06	1.51E-05	8.34E-12
Nickel	2.10E-06	1.07E-03	1.77E-04	7.74E-04	1.74E-10	2.80E-03	2.70E-03	2.89E-05	1.26E-04	7.01E-11
Selenium	8.80E-07	3.34E-04	7.41E-05	3.25E-04	7.31E-11	1.17E-03	8.42E-04	1.21E-05	5.30E-05	2.94E-11
Total Metal HAPs	-		**6.16E-04**	**2.70E-03**	**2.74E-10**	**9.74E-03**	**9.05E-03**	**1.01E-04**	**4.40E-04**	**4.48E-11**
Volatile Organics HAPs		Conc. (ppmv)			Conc. (lb/ft3)	Conc. (mg/m3)	Conc. (ppmv)			Conc. (lb/ft3)
Acetaldehyde	1.20E-05	2.04E-03	2.53E-04	1.11E-03	2.49E-10	3.99E-03	5.15E-03	4.13E-05	1.81E-04	1.00E-10
Acrolein	1.70E-05	2.27E-03	3.58E-04	1.57E-03	3.53E-10	5.66E-03	5.73E-03	5.84E-05	2.56E-04	1.42E-10
Benzene	2.10E-06	2.01E-04	4.42E-05	1.94E-04	4.36E-11	6.99E-04	5.08E-04	7.22E-06	3.16E-05	1.75E-11
Benzo(a)anthracene	2.20E-08	7.21E-07	4.63E-07	2.03E-06	4.57E-13	7.32E-06	1.82E-06	7.56E-08	3.31E-07	1.84E-13
Dichlorobenzene	1.20E-06	6.11E-05	2.53E-05	1.11E-04	2.49E-11	3.99E-04	1.54E-04	4.13E-06	1.81E-05	1.00E-11
Ethylbenzene	1.60E-05	1.13E-03	3.37E-04	1.48E-03	3.32E-10	5.33E-03	2.85E-03	5.50E-05	2.41E-04	1.33E-10
Formaldehyde	7.40E-05	1.84E-02	1.56E-03	6.82E-03	1.54E-09	2.46E-02	4.66E-02	2.54E-04	1.11E-03	6.17E-10
Hexane	1.80E-03	1.56E-01	3.79E-02	1.66E-01	3.74E-08	5.99E-01	3.95E-01	6.19E-03	2.71E-02	1.50E-08
Toluene	3.30E-06	2.68E-04	6.95E-05	3.04E-04	6.85E-11	1.10E-03	6.77E-04	1.13E-05	4.97E-05	2.75E-11
Xylene (total)	2.50E-05	1.76E-03	5.26E-04	2.30E-03	5.19E-10	8.32E-03	4.45E-03	8.59E-05	3.76E-04	2.09E-10
Total VOC HAPs			4.11E-02	1.80E-01	4.05E-08	6.49E-01	4.61E-01	6.71E-03	2.94E-02	1.63E-08
Semivolatile and Nonvolatile Organics (excluding dioxin/furans)		Conc. (ppmv)			Conc. (lb/ft3)	Conc. (mg/m3)	Conc. (ppmv)			Conc. (lb/ft3)
Acenaphthene	2.40E-09	1.16E-07	5.05E-08	2.21E-07	4.98E-14	7.99E-07	2.94E-07	8.25E-09	3.61E-08	2.00E-14
Acenaphthylene	6.50E-09	3.20E-07	1.37E-07	5.99E-07	1.35E-13	2.16E-06	8.07E-07	2.23E-08	9.79E-08	5.42E-14
Anthracene	4.70E-09	1.97E-07	9.89E-08	4.33E-07	9.76E-14	1.56E-06	4.98E-07	1.62E-08	7.08E-08	3.92E-14
Benzo(a)pyrene	5.70E-08	1.69E-06	1.20E-06	5.25E-06	1.18E-12	1.90E-05	4.27E-06	1.96E-07	8.58E-07	4.76E-13
Benzo(b)fluoranthene	2.70E-08	8.01E-07	5.68E-07	2.49E-06	5.61E-13	8.99E-06	2.02E-06	9.28E-08	4.07E-07	2.25E-13

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Emissions Estimation Protocol for Petroleum Refineries, Version 3, RTI International.

Table 4-3. Summary of Emission Factors for Boilers and Process Heaters Firing Various Fuels

			Alkylation Unit							
		Tag	Iso-Stripper Reboiler		flue gas (lb/h)	30,004.10	Tag	Feed Heater		flue gas (lb/h)
		110-H-1001	Heat input (MMBtu/h)	84.19	density (lb/ft3)	0.03	118-H-1801	Heat input (MMBtu/h)	13.75	density (lb/ft3)
Emission Factors for Boilers and Process Heaters Firing. External Combustion, Natural Gas/Refinery Gas (lb/MMBtu)		8,091.77	Emission (lb/h)	Emission (us tpy)	flue gas (ft3/h)	1,013,652.03	16,894.20	Emission (lb/h)	Emission (us tpy)	flue gas (ft3/h)
					T (°F)	785.5				T (°F)
					T(K)	691.76				T(K)
HAP		Conc. (ppmv)			Conc. (lb/ft3)	Conc. (mg/m3)	Conc. (ppmv)			Conc. (lb/ft3)
Benzo(g,h,i)perylene	1.30E-09	3.52E-08	2.74E-08	1.20E-07	2.70E-14	4.33E-07	8.89E-08	4.47E-09	1.96E-08	1.08E-14
Benzo(k)fluoranthene	1.70E-08	5.04E-07	3.58E-07	1.57E-06	3.53E-13	5.66E-06	1.27E-06	5.84E-08	2.56E-07	1.42E-13
Chrysene	1.60E-09	5.25E-08	3.37E-08	1.48E-07	3.32E-14	5.33E-07	1.32E-07	5.50E-09	2.41E-08	1.33E-14
Dibenz(a,h)anthracene	1.20E-09	3.23E-08	2.53E-08	1.11E-07	2.49E-14	3.99E-07	8.15E-08	4.13E-09	1.81E-08	1.00E-14
7,12-Dimethylbenz(a) anthracene	1.60E-08	4.67E-07	3.37E-07	1.48E-06	3.32E-13	5.33E-06	1.18E-06	5.50E-08	2.41E-07	1.33E-13
Fluoranthene	2.90E-09	1.07E-07	6.10E-08	2.67E-07	6.02E-14	9.65E-07	2.71E-07	9.97E-09	4.37E-08	2.42E-14
Fluorene	2.70E-09	1.22E-07	5.68E-08	2.49E-07	5.61E-14	8.99E-07	3.07E-07	9.28E-09	4.07E-08	2.25E-14
Indeno-(1,2,3cd)pyrene	7.10E-08	1.92E-06	1.49E-06	6.55E-06	1.47E-12	2.36E-05	4.85E-06	2.44E-07	1.07E-06	5.92E-13
3-Methylchloranthrene	1.80E-09	5.02E-08	3.79E-08	1.66E-07	3.74E-14	5.99E-07	1.27E-07	6.19E-09	2.71E-08	1.50E-14
2-Methylnaphthalene	2.40E-08	1.26E-06	5.05E-07	2.21E-06	4.98E-13	7.99E-06	3.19E-06	8.25E-08	3.61E-07	2.00E-13
Naphthalene	6.00E-07	3.50E-05	1.26E-05	5.53E-05	1.25E-11	2.00E-04	8.85E-05	2.06E-06	9.03E-06	5.01E-12
Phenanthrene	1.70E-08	7.14E-07	3.58E-07	1.57E-06	3.53E-13	5.66E-06	1.80E-06	5.84E-08	2.56E-07	1.42E-13
Phenol	4.00E-06	3.18E-04	8.42E-05	3.69E-04	8.31E-11	1.33E-03	8.03E-04	1.38E-05	6.02E-05	3.34E-11
Pyrene	4.90E-09	1.81E-07	1.03E-07	4.52E-07	1.02E-13	1.63E-06	4.58E-07	1.68E-08	7.38E-08	4.09E-14
Sum PAH (without naphthalene)	**4.26E-06**	**3.27E-04**	**8.96E-05**	**3.93E-04**	**8.84E-11**	**1.42E-03**	**8.25E-04**	**1.46E-05**	**6.41E-05**	**3.55E-11**
Total SV-NV Organic HAPs			1.02E-04	4.48E-04	1.01E-10	1.62E-03	9.13E-04	1.67E-05	7.32E-05	4.05E-11
TOTAL ORGANIC HAPS			**4.12E-02**	**1.80E-01**				**6.72E-03**	**2.94E-02**	
Other Compounds of Interest		Conc. (ppmv)			Conc. (lb/ft3)	Conc. (mg/m3)	Conc. (ppmv)			Conc. (lb/ft3)
Barium	4.30E-06	9.37E-04	3.62E-04	1.59E-03	3.57E-10	5.73E-03	2.37E-03	5.91E-05	2.59E-04	1.44E-10
Butane	2.10E-03	1.08E+00	1.77E-01	7.74E-01	1.74E-07	2.80E+00	2.73E+00	2.89E-02	1.26E-01	7.01E-08
Copper	8.30E-07	3.91E-04	6.99E-05	3.06E-04	6.89E-11	1.11E-03	9.87E-04	1.14E-05	5.00E-05	2.77E-11
Ethane	3.00E-03	2.99E+00	2.53E-01	1.11E+00	2.49E-07	3.99E+00	7.54E+00	4.13E-02	1.81E-01	1.00E-07
Hydrogen sulfide	8.50E-05	7.47E-02	7.16E-03	3.13E-02	7.06E-09	1.13E-01	1.89E-01	1.17E-03	5.12E-03	2.84E-09
Molybdenum	1.10E-06	3.43E-04	9.26E-05	4.06E-04	9.14E-11	1.46E-03	8.67E-04	1.51E-05	6.62E-05	3.67E-11
Phosphorus (Inorganic HAP)	6.40E-07	6.19E-04	5.39E-05	2.36E-04	5.32E-11	8.52E-04	1.56E-03	8.80E-06	3.85E-05	2.14E-11
Vanadium	2.30E-06	1.35E-03	1.94E-04	8.48E-04	1.91E-10	3.06E-03	3.41E-03	3.16E-05	1.39E-04	7.68E-11
Zinc	2.80E-05	1.28E-02	2.36E-03	1.03E-02	2.33E-09	3.73E-02	3.24E-02	3.85E-04	1.69E-03	9.34E-10

*Calculated based on the TABLE 1.4-2. AP 42, Fifth Edition, Volume IChapter 1: External Comb

** All PM (total, Condensable, and filterable) is assumed to be less than 1.0 micrometer in di

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		Heavy Naphtha Hydrotreater							
Emissions Estimation Protocol for Petroleum Refineries, Version 3, RTI International.		12,195.00	Tag	Heater 2		flue gas (lb/h)	14,412.80	Tag	
Table 4-3. Summary of Emission Factors for Boilers and Process Heaters Firing Various Fuels		0.03	105-H-0501	Heat input (MMBtu/h)	16.25	density (lb/ft3)	0.03	105-H-0502	Heat input (MMBtu/h)
Emission Factors for Boilers and Process Heaters Firing. External Combustion, Natural Gas/Refinery Gas (lb/MMBtu)		411,993.24	6,866.55	Emission (lb/h)	Emission (us tpy)	flue gas (ft3/h)	486,918.92	8,115.32	Emission (lb/h)
		787.7				T (°F)	787.7		
		692.98				T(K)	692.98		
HAP		Conc. (mg/m3)	Conc. (ppmv)			Conc. (lb/ft3)	Conc. (mg/m3)	Conc. (ppmv)	
Antimony	5.20E-07	2.78E-04	1.30E-04	8.45E-06	3.70E-05	1.74E-11	2.78E-04	1.30E-04	6.50E-06
Arsenic	2.00E-07	1.07E-04	8.12E-05	3.25E-06	1.42E-05	6.67E-12	1.07E-04	8.12E-05	2.50E-06
Beryllium	1.30E-07	6.96E-05	4.39E-04	2.11E-06	9.25E-06	4.34E-12	6.96E-05	4.39E-04	1.63E-06
Cadmium	1.10E-06	5.89E-04	2.98E-04	1.79E-05	7.83E-05	3.67E-11	5.89E-04	2.98E-04	1.38E-05
Chromium (hexavalent)	2.80E-07	1.50E-04	1.64E-04	4.55E-06	1.99E-05	9.34E-12	1.50E-04	1.64E-04	3.50E-06
Chromium (total)	1.40E-06	7.49E-04	8.19E-04	2.28E-05	9.96E-05	4.67E-11	7.49E-04	8.19E-04	1.75E-05
Cobalt	8.20E-08	4.39E-05	4.23E-05	1.33E-06	5.84E-06	2.74E-12	4.39E-05	4.23E-05	1.03E-06
Manganese	3.70E-07	1.98E-04	2.05E-04	6.01E-06	2.63E-05	1.23E-11	1.98E-04	2.05E-04	4.63E-06
Mercury	2.50E-07	1.34E-04	3.79E-05	4.06E-06	1.78E-05	8.34E-12	1.34E-04	3.79E-05	3.13E-06
Nickel	2.10E-06	1.12E-03	1.09E-03	3.41E-05	1.49E-04	7.01E-11	1.12E-03	1.09E-03	2.63E-05
Selenium	8.80E-07	4.71E-04	3.39E-04	1.43E-05	6.26E-05	2.94E-11	4.71E-04	3.39E-04	1.10E-05
Total Metal HAPs	-	**3.91E-03**		**1.19E-04**	**5.20E-04**	**5.29E-11**	**3.91E-03**	**3.64E-03**	**9.14E-05**
Volatile Organics HAPs		Conc. (mg/m3)	Conc. (ppmv)			Conc. (lb/ft3)	Conc. (mg/m3)	Conc. (ppmv)	
Acetaldehyde	1.20E-05	1.61E-03	2.07E-03	4.88E-05	2.14E-04	1.00E-10	1.61E-03	2.07E-03	3.75E-05
Acrolein	1.70E-05	2.27E-03	2.31E-03	6.91E-05	3.02E-04	1.42E-10	2.27E-03	2.31E-03	5.31E-05
Benzene	2.10E-06	2.81E-04	2.04E-04	8.53E-06	3.74E-05	1.75E-11	2.81E-04	2.04E-04	6.56E-06
Benzo(a)anthracene	2.20E-08	2.94E-06	7.33E-07	8.94E-08	3.91E-07	1.84E-13	2.94E-06	7.33E-07	6.88E-08
Dichlorobenzene	1.20E-06	1.61E-04	6.21E-05	4.88E-06	2.14E-05	1.00E-11	1.61E-04	6.21E-05	3.75E-06
Ethylbenzene	1.60E-05	2.14E-03	1.15E-03	6.50E-05	2.85E-04	1.33E-10	2.14E-03	1.15E-03	5.00E-05
Formaldehyde	7.40E-05	9.90E-03	1.87E-02	3.01E-04	1.32E-03	6.17E-10	9.90E-03	1.87E-02	2.31E-04
Hexane	1.80E-03	2.41E-01	1.59E-01	7.31E-03	3.20E-02	1.50E-08	2.41E-01	1.59E-01	5.63E-03
Toluene	3.30E-06	4.41E-04	2.72E-04	1.34E-05	5.87E-05	2.75E-11	4.41E-04	2.72E-04	1.03E-05
Xylene (total)	2.50E-05	3.34E-03	1.79E-03	1.02E-04	4.45E-04	2.09E-10	3.34E-03	1.79E-03	7.81E-05
Total VOC HAPs		2.61E-01	1.85E-01	7.92E-03	3.47E-02	1.63E-08	2.61E-01	1.85E-01	6.10E-03
Semivolatile and Nonvolatile Organics (excluding dioxin/furans)		Conc. (mg/m3)	Conc. (ppmv)			Conc. (lb/ft3)	Conc. (mg/m3)	Conc. (ppmv)	
Acenaphthene	2.40E-09	3.21E-07	1.18E-07	9.75E-09	4.27E-08	2.00E-14	3.21E-07	1.18E-07	7.50E-09
Acenaphthylene	6.50E-09	8.70E-07	3.25E-07	2.64E-08	1.16E-07	5.42E-14	8.69E-07	3.25E-07	2.03E-08
Anthracene	4.70E-09	6.29E-07	2.01E-07	1.91E-08	8.36E-08	3.92E-14	6.29E-07	2.01E-07	1.47E-08
Benzo(a)pyrene	5.70E-08	7.62E-06	1.72E-06	2.32E-07	1.01E-06	4.76E-13	7.62E-06	1.72E-06	1.78E-07
Benzo(b)fluoranthene	2.70E-08	3.61E-06	8.14E-07	1.10E-07	4.80E-07	2.25E-13	3.61E-06	8.14E-07	8.44E-08

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		Heavy Naphtha Hydrotreater							
Emissions Estimation Protocol for Petroleum Refineries, Version 3, RTI International.		12,195.00	Tag	Heater 2		flue gas (lb/h)	14,412.80	Tag	
Table 4-3. Summary of Emission Factors for Boilers and Process Heaters Firing Various Fuels		0.03	105-H-0501	Heat input (MMBtu/h)	16.25	density (lb/ft3)	0.03	105-H-0502	Heat input (MMBtu/h)
Emission Factors for Boilers and Process Heaters Firing. External Combustion, Natural Gas/Refinery Gas (lb/MMBtu)		411,993.24	6,866.55	Emission (lb/h)	Emission (us tpy)	flue gas (ft3/h)	486,918.92	8,115.32	Emission (lb/h)
		787.7				T (°F)	787.7		
		692.98				T(K)	692.98		
HAP		Conc. (mg/m3)	Conc. (ppmv)			Conc. (lb/ft3)	Conc. (mg/m3)	Conc. (ppmv)	
Benzo(g,h,i)perylene	1.30E-09	1.74E-07	3.58E-08	5.28E-09	2.31E-08	1.08E-14	1.74E-07	3.58E-08	4.06E-09
Benzo(k)fluoranthene	1.70E-08	2.27E-06	5.13E-07	6.91E-08	3.02E-07	1.42E-13	2.27E-06	5.12E-07	5.31E-08
Chrysene	1.60E-09	2.14E-07	5.33E-08	6.50E-09	2.85E-08	1.33E-14	2.14E-07	5.33E-08	5.00E-09
Dibenz(a,h)anthracene	1.20E-09	1.61E-07	3.28E-08	4.88E-09	2.14E-08	1.00E-14	1.61E-07	3.28E-08	3.75E-09
7,12-Dimethylbenz(a) anthracene	1.60E-08	2.14E-06	4.75E-07	6.50E-08	2.85E-07	1.33E-13	2.14E-06	4.75E-07	5.00E-08
Fluoranthene	2.90E-09	3.88E-07	1.09E-07	1.18E-08	5.16E-08	2.42E-14	3.88E-07	1.09E-07	9.06E-09
Fluorene	2.70E-09	3.61E-07	1.24E-07	1.10E-08	4.80E-08	2.25E-14	3.61E-07	1.24E-07	8.44E-09
Indeno-(1,2,3cd)pyrene	7.10E-08	9.50E-06	1.95E-06	2.88E-07	1.26E-06	5.92E-13	9.50E-06	1.95E-06	2.22E-07
3-Methylchloranthrene	1.80E-09	2.41E-07	5.10E-08	7.31E-09	3.20E-08	1.50E-14	2.41E-07	5.10E-08	5.63E-09
2-Methylnaphthalene	2.40E-08	3.21E-06	1.28E-06	9.75E-08	4.27E-07	2.00E-13	3.21E-06	1.28E-06	7.50E-08
Naphthalene	6.00E-07	8.03E-05	3.56E-05	2.44E-06	1.07E-05	5.01E-12	8.03E-05	3.56E-05	1.88E-06
Phenanthrene	1.70E-08	2.27E-06	7.25E-07	6.91E-08	3.02E-07	1.42E-13	2.27E-06	7.25E-07	5.31E-08
Phenol	4.00E-06	5.35E-04	3.23E-04	1.63E-05	7.12E-05	3.34E-11	5.35E-04	3.23E-04	1.25E-05
Pyrene	4.90E-09	6.55E-07	1.84E-07	1.99E-08	8.72E-08	4.09E-14	6.55E-07	1.84E-07	1.53E-08
Sum PAH (without naphthalene)	**4.26E-06**	**5.70E-04**	**3.32E-04**	**1.73E-05**	**7.58E-05**	**3.55E-11**	**5.70E-04**	**3.32E-04**	**1.33E-05**
Total SV-NV Organic HAPs		6.50E-04	3.68E-04	1.97E-05	8.65E-05	4.05E-11	6.50E-04	3.68E-04	1.52E-05
TOTAL ORGANIC HAPS				**7.94E-03**	**3.48E-02**				**6.11E-03**
Other Compounds of Interest		Conc. (mg/m3)	Conc. (ppmv)			Conc. (lb/ft3)	Conc. (mg/m3)	Conc. (ppmv)	
Barium	4.30E-06	2.30E-03	9.53E-04	6.99E-05	3.06E-04	1.44E-10	2.30E-03	9.53E-04	5.38E-05
Butane	2.10E-03	1.12E+00	1.10E+00	3.41E-02	1.49E-01	7.01E-08	1.12E+00	1.10E+00	2.63E-02
Copper	8.30E-07	4.44E-04	3.97E-04	1.35E-05	5.91E-05	2.77E-11	4.44E-04	3.97E-04	1.04E-05
Ethane	3.00E-03	1.61E+00	3.04E+00	4.88E-02	2.14E-01	1.00E-07	1.61E+00	3.04E+00	3.75E-02
Hydrogen sulfide	8.50E-05	4.55E-02	7.59E-02	1.38E-03	6.05E-03	2.84E-09	4.55E-02	7.59E-02	1.06E-03
Molybdenum	1.10E-06	5.89E-04	3.49E-04	1.79E-05	7.83E-05	3.67E-11	5.89E-04	3.49E-04	1.38E-05
Phosphorus (Inorganic HAP)	6.40E-07	3.42E-04	6.29E-04	1.04E-05	4.56E-05	2.14E-11	3.42E-04	6.29E-04	8.00E-06
Vanadium	2.30E-06	1.23E-03	1.37E-03	3.74E-05	1.64E-04	7.68E-11	1.23E-03	1.37E-03	2.88E-05
Zinc	2.80E-05	1.50E-02	1.30E-02	4.55E-04	1.99E-03	9.34E-10	1.50E-02	1.30E-02	3.50E-04

*Calculated based on the TABLE 1.4-2. AP 42, Fifth Edition, Volume IChapter 1: External Comb

** All PM (total, Condensable, and filterable) is assumed to be less than 1.0 micrometer in di

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			Kero HT						
Emissions Estimation Protocol for Petroleum Refineries, Version 3, RTI International.				flue gas (lb/h)	11,802.00	Tag	Boiler 1		flue gas (lb/h)	58,549.50
Table 4-3. Summary of Emission Factors for Boilers and Process Heaters Firing Various Fuels		12.5		density (lb/ft3)	0.03	125-H-2501	Heat input (MMBtu/h)	60	density (lb/ft3)	0.05
Emission Factors for Boilers and Process Heaters Firing. External Combustion, Natural Gas/Refinery Gas (lb/MMBtu)		Emission (us tpy)		flue gas (ft3/h)	373,481.01	6,224.68	Emission (lb/h)	Emission (us tpy)	flue gas (ft3/h)	1,194,887.76
				T (°F)	764.3				T (°F)	294.2
				T(K)	679.98				T(K)	418.82
HAP				Conc. (lb/ft3)	Conc. (mg/m3)	Conc. (ppmv)			Conc. (lb/ft3)	Conc. (mg/m3)
Antimony	5.20E-07	2.85E-05		1.74E-11	2.79E-04	1.28E-04	3.12E-05	1.37E-04	2.61E-11	4.19E-04
Arsenic	2.00E-07	1.10E-05		6.69E-12	1.07E-04	7.99E-05	1.20E-05	5.26E-05	1.00E-11	1.61E-04
Beryllium	1.30E-07	7.12E-06		4.35E-12	6.98E-05	4.32E-04	7.80E-06	3.42E-05	6.53E-12	1.05E-04
Cadmium	1.10E-06	6.02E-05		3.68E-11	5.90E-04	2.93E-04	6.60E-05	2.89E-04	5.52E-11	8.86E-04
Chromium (hexavalent)	2.80E-07	1.53E-05		9.37E-12	1.50E-04	1.61E-04	1.68E-05	7.36E-05	1.41E-11	2.25E-04
Chromium (total)	1.40E-06	7.67E-05		4.69E-11	7.51E-04	8.06E-04	8.40E-05	3.68E-04	7.03E-11	1.13E-03
Cobalt	8.20E-08	4.49E-06		2.74E-12	4.40E-05	4.17E-05	4.92E-06	2.15E-05	4.12E-12	6.60E-05
Manganese	3.70E-07	2.03E-05		1.24E-11	1.99E-04	2.02E-04	2.22E-05	9.72E-05	1.86E-11	2.98E-04
Mercury	2.50E-07	1.37E-05		8.37E-12	1.34E-04	3.73E-05	1.50E-05	6.57E-05	1.26E-11	2.01E-04
Nickel	2.10E-06	1.15E-04		7.03E-11	1.13E-03	1.07E-03	1.26E-04	5.52E-04	1.05E-10	1.69E-03
Selenium	8.80E-07	4.82E-05		2.95E-11	4.72E-04	3.34E-04	5.28E-05	2.31E-04	4.42E-11	7.08E-04
Total Metal HAPs	-	**4.00E-04**		**4.07E-11**	**3.92E-03**	**3.59E-03**	**4.39E-04**	**1.92E-03**	**1.95E-10**	**5.89E-03**
Volatile Organics HAPs				Conc. (lb/ft3)	Conc. (mg/m3)	Conc. (ppmv)			Conc. (lb/ft3)	Conc. (mg/m3)
Acetaldehyde	1.20E-05	1.64E-04		1.00E-10	1.61E-03	2.04E-03	1.80E-04	7.88E-04	1.51E-10	2.42E-03
Acrolein	1.70E-05	2.33E-04		1.42E-10	2.28E-03	2.27E-03	2.55E-04	1.12E-03	2.13E-10	3.42E-03
Benzene	2.10E-06	2.87E-05		1.76E-11	2.82E-04	2.01E-04	3.15E-05	1.38E-04	2.64E-11	4.23E-04
Benzo(a)anthracene	2.20E-08	3.01E-07		1.84E-13	2.95E-06	7.21E-07	3.30E-07	1.45E-06	2.76E-13	4.43E-06
Dichlorobenzene	1.20E-06	1.64E-05		1.00E-11	1.61E-04	6.11E-05	1.80E-05	7.88E-05	1.51E-11	2.42E-04
Ethylbenzene	1.60E-05	2.19E-04		1.34E-10	2.15E-03	1.13E-03	2.40E-04	1.05E-03	2.01E-10	3.22E-03
Formaldehyde	7.40E-05	1.01E-03		6.19E-10	9.93E-03	1.84E-02	1.11E-03	4.86E-03	9.29E-10	1.49E-02
Hexane	1.80E-03	2.46E-02		1.51E-08	2.41E-01	1.56E-01	2.70E-02	1.18E-01	2.26E-08	3.62E-01
Toluene	3.30E-06	4.52E-05		2.76E-11	4.43E-04	2.68E-04	4.95E-05	2.17E-04	4.14E-11	6.64E-04
Xylene (total)	2.50E-05	3.42E-04		2.09E-10	3.35E-03	1.76E-03	3.75E-04	1.64E-03	3.14E-10	5.03E-03
Total VOC HAPs		2.67E-02		1.63E-08	2.62E-01	1.83E-01	2.93E-02	1.28E-01	2.45E-08	3.93E-01
Semivolatile and Nonvolatile Organics (excluding dioxin/furans)				Conc. (lb/ft3)	Conc. (mg/m3)	Conc. (ppmv)			Conc. (lb/ft3)	Conc. (mg/m3)
Acenaphthene	2.40E-09	3.29E-08		2.01E-14	3.22E-07	1.16E-07	3.60E-08	1.58E-07	3.01E-14	4.83E-07
Acenaphthylene	6.50E-09	8.90E-08		5.44E-14	8.72E-07	3.20E-07	9.75E-08	4.27E-07	8.16E-14	1.31E-06
Anthracene	4.70E-09	6.43E-08		3.93E-14	6.31E-07	1.97E-07	7.05E-08	3.09E-07	5.90E-14	9.46E-07
Benzo(a)pyrene	5.70E-08	7.80E-07		4.77E-13	7.65E-06	1.69E-06	8.55E-07	3.74E-06	7.16E-13	1.15E-05
Benzo(b)fluoranthene	2.70E-08	3.70E-07		2.26E-13	3.62E-06	8.01E-07	4.05E-07	1.77E-06	3.39E-13	5.43E-06

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Emissions Estimation Protocol for Petroleum Refineries, Version 3, RTI International.		Kero HT							
			flue gas (lb/h)	11,802.00	Tag	Boiler 1		flue gas (lb/h)	58,549.50
Table 4-3. Summary of Emission Factors for Boilers and Process Heaters Firing Various Fuels		12.5	density (lb/ft3)	0.03	125-H-2501	Heat input (MMBtu/h)	60	density (lb/ft3)	0.05
Emission Factors for Boilers and Process Heaters Firing. External Combustion, Natural Gas/Refinery Gas (lb/MMBtu)		Emission (us tpy)	flue gas (ft3/h)	373,481.01	6,224.68	Emission (lb/h)	Emission (us tpy)	flue gas (ft3/h)	1,194,887.76
			T (°F)	764.3				T (°F)	294.2
			T(K)	679.98				T(K)	418.82
HAP			Conc. (lb/ft3)	Conc. (mg/m3)	Conc. (ppmv)			Conc. (lb/ft3)	Conc. (mg/m3)
Benzo(g,h,i)perylene	1.30E-09	1.78E-08	1.09E-14	1.74E-07	3.52E-08	1.95E-08	8.54E-08	1.63E-14	2.62E-07
Benzo(k)fluoranthene	1.70E-08	2.33E-07	1.42E-13	2.28E-06	5.04E-07	2.55E-07	1.12E-06	2.13E-13	3.42E-06
Chrysene	1.60E-09	2.19E-08	1.34E-14	2.15E-07	5.25E-08	2.40E-08	1.05E-07	2.01E-14	3.22E-07
Dibenz(a,h)anthracene	1.20E-09	1.64E-08	1.00E-14	1.61E-07	3.23E-08	1.80E-08	7.88E-08	1.51E-14	2.42E-07
7,12-Dimethylbenz(a) anthracene	1.60E-08	2.19E-07	1.34E-13	2.15E-06	4.67E-07	2.40E-07	1.05E-06	2.01E-13	3.22E-06
Fluoranthene	2.90E-09	3.97E-08	2.43E-14	3.89E-07	1.07E-07	4.35E-08	1.91E-07	3.64E-14	5.84E-07
Fluorene	2.70E-09	3.70E-08	2.26E-14	3.62E-07	1.22E-07	4.05E-08	1.77E-07	3.39E-14	5.43E-07
Indeno-(1,2,3cd)pyrene	7.10E-08	9.72E-07	5.94E-13	9.52E-06	1.92E-06	1.07E-06	4.66E-06	8.91E-13	1.43E-05
3-Methylchloranthrene	1.80E-09	2.46E-08	1.51E-14	2.41E-07	5.02E-08	2.70E-08	1.18E-07	2.26E-14	3.62E-07
2-Methylnaphthalene	2.40E-08	3.29E-07	2.01E-13	3.22E-06	1.26E-06	3.60E-07	1.58E-06	3.01E-13	4.83E-06
Naphthalene	6.00E-07	8.21E-06	5.02E-12	8.05E-05	3.50E-05	9.00E-06	3.94E-05	7.53E-12	1.21E-04
Phenanthrene	1.70E-08	2.33E-07	1.42E-13	2.28E-06	7.14E-07	2.55E-07	1.12E-06	2.13E-13	3.42E-06
Phenol	4.00E-06	5.48E-05	3.35E-11	5.37E-04	3.18E-04	6.00E-05	2.63E-04	5.02E-11	8.05E-04
Pyrene	4.90E-09	6.71E-08	4.10E-14	6.57E-07	1.81E-07	7.35E-08	3.22E-07	6.15E-14	9.86E-07
Sum PAH (without naphthalene)	**4.26E-06**	**5.83E-05**	**3.56E-11**	**5.71E-04**	**3.27E-04**	**6.39E-05**	**2.80E-04**	**5.35E-11**	**8.57E-04**
Total SV-NV Organic HAPs		6.65E-05	4.07E-11	6.52E-04	3.62E-04	7.29E-05	3.19E-04	6.10E-11	9.78E-04
TOTAL ORGANIC HAPS		**2.68E-02**				**2.93E-02**	**1.28E-01**		
Other Compounds of Interest			Conc. (lb/ft3)	Conc. (mg/m3)	Conc. (ppmv)			Conc. (lb/ft3)	Conc. (mg/m3)
Barium	4.30E-06	2.35E-04	1.44E-10	2.31E-03	9.37E-04	2.58E-04	1.13E-03	2.16E-10	3.46E-03
Butane	2.10E-03	1.15E-01	7.03E-08	1.13E+00	1.08E+00	1.26E-01	5.52E-01	1.05E-07	1.69E+00
Copper	8.30E-07	4.54E-05	2.78E-11	4.45E-04	3.91E-04	4.98E-05	2.18E-04	4.17E-11	6.68E-04
Ethane	3.00E-03	1.64E-01	1.00E-07	1.61E+00	2.99E+00	1.80E-01	7.88E-01	1.51E-07	2.42E+00
Hydrogen sulfide	8.50E-05	4.65E-03	2.84E-09	4.56E-02	7.47E-02	5.10E-03	2.23E-02	4.27E-09	6.84E-02
Molybdenum	1.10E-06	6.02E-05	3.68E-11	5.90E-04	3.43E-04	6.60E-05	2.89E-04	5.52E-11	8.86E-04
Phosphorus (Inorganic HAP)	6.40E-07	3.50E-05	2.14E-11	3.43E-04	6.19E-04	3.84E-05	1.68E-04	3.21E-11	5.15E-04
Vanadium	2.30E-06	1.26E-04	7.70E-11	1.23E-03	1.35E-03	1.38E-04	6.04E-04	1.15E-10	1.85E-03
Zinc	2.80E-05	1.53E-03	9.37E-10	1.50E-02	1.28E-02	1.68E-03	7.36E-03	1.41E-09	2.25E-02

*Calculated based on the TABLE 1.4-2. AP 42, Fifth Edition, Volume IChapter 1: External Comb

** All PM (total, Condensable, and filterable) is assumed to be less than 1.0 micrometer in di

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Emissions Estimation Protocol for Petroleum Refineries, Version 3, RTI International.

Table 4-3. Summary of Emission Factors for Boilers and Process Heaters Firing Various Fuels

		Utility Boiler						
		Tag	Boiler 2		flue gas (lb/h)	58,549.50	Tag	Boil
		202-PK-0201A	Heat input (MMBtu/h)	60	density (lb/ft3)	0.05	202-PK-0201B	Heat input (MMBtu/h)
Emission Factors for Boilers and Process Heaters Firing. External Combustion, Natural Gas/Refinery Gas (lb/MMBtu)		19,914.80	Emission (lb/h)	Emission (us tpy)	flue gas (ft3/h)	1,194,887.76	19,914.80	Emission (lb/h)
					T (°F)	294.2		
					T(K)	418.82		
HAP		Conc. (ppmv)			Conc. (lb/ft3)	Conc. (mg/m3)	Conc. (ppmv)	
Antimony	5.20E-07	1.18E-04	3.12E-05	1.37E-04	2.61E-11	4.19E-04	1.18E-04	2.60E-06
Arsenic	2.00E-07	7.39E-05	1.20E-05	5.26E-05	1.00E-11	1.61E-04	7.39E-05	1.00E-06
Beryllium	1.30E-07	3.99E-04	7.80E-06	3.42E-05	6.53E-12	1.05E-04	3.99E-04	6.50E-07
Cadmium	1.10E-06	2.71E-04	6.60E-05	2.89E-04	5.52E-11	8.86E-04	2.71E-04	5.50E-06
Chromium (hexavalent)	2.80E-07	1.49E-04	1.68E-05	7.36E-05	1.41E-11	2.25E-04	1.49E-04	1.40E-06
Chromium (total)	1.40E-06	7.45E-04	8.40E-05	3.68E-04	7.03E-11	1.13E-03	7.45E-04	7.00E-06
Cobalt	8.20E-08	3.85E-05	4.92E-06	2.15E-05	4.12E-12	6.60E-05	3.85E-05	4.10E-07
Manganese	3.70E-07	1.86E-04	2.22E-05	9.72E-05	1.86E-11	2.98E-04	1.86E-04	1.85E-06
Mercury	2.50E-07	3.45E-05	1.50E-05	6.57E-05	1.26E-11	2.01E-04	3.45E-05	1.25E-06
Nickel	2.10E-06	9.90E-04	1.26E-04	5.52E-04	1.05E-10	1.69E-03	9.90E-04	1.05E-05
Selenium	8.80E-07	3.08E-04	5.28E-05	2.31E-04	4.42E-11	7.08E-04	3.08E-04	4.40E-06
Total Metal HAPs	-	**3.31E-03**	**4.39E-04**	**1.92E-03**	**1.95E-10**	**5.89E-03**	**3.31E-03**	**3.66E-05**
Volatile Organics HAPs		Conc. (ppmv)			Conc. (lb/ft3)	Conc. (mg/m3)	Conc. (ppmv)	
Acetaldehyde	1.20E-05	1.88E-03	1.80E-04	7.88E-04	1.51E-10	2.42E-03	1.88E-03	1.50E-05
Acrolein	1.70E-05	2.10E-03	2.55E-04	1.12E-03	2.13E-10	3.42E-03	2.10E-03	2.13E-05
Benzene	2.10E-06	1.86E-04	3.15E-05	1.38E-04	2.64E-11	4.23E-04	1.86E-04	2.63E-06
Benzo(a)anthracene	2.20E-08	6.66E-07	3.30E-07	1.45E-06	2.76E-13	4.43E-06	6.66E-07	2.75E-08
Dichlorobenzene	1.20E-06	5.65E-05	1.80E-05	7.88E-05	1.51E-11	2.42E-04	5.65E-05	1.50E-06
Ethylbenzene	1.60E-05	1.04E-03	2.40E-04	1.05E-03	2.01E-10	3.22E-03	1.04E-03	2.00E-05
Formaldehyde	7.40E-05	1.70E-02	1.11E-03	4.86E-03	9.29E-10	1.49E-02	1.70E-02	9.25E-05
Hexane	1.80E-03	1.44E-01	2.70E-02	1.18E-01	2.26E-08	3.62E-01	1.44E-01	2.25E-03
Toluene	3.30E-06	2.48E-04	4.95E-05	2.17E-04	4.14E-11	6.64E-04	2.48E-04	4.13E-06
Xylene (total)	2.50E-05	1.63E-03	3.75E-04	1.64E-03	3.14E-10	5.03E-03	1.63E-03	3.13E-05
Total VOC HAPs		1.69E-01	2.93E-02	1.28E-01	2.45E-08	3.93E-01	1.69E-01	2.44E-03
Semivolatile and Nonvolatile Organics (excluding dioxin/furans)		Conc. (ppmv)			Conc. (lb/ft3)	Conc. (mg/m3)	Conc. (ppmv)	
Acenaphthene	2.40E-09	1.08E-07	3.60E-08	1.58E-07	3.01E-14	4.83E-07	1.08E-07	3.00E-09
Acenaphthylene	6.50E-09	2.95E-07	9.75E-08	4.27E-07	8.16E-14	1.31E-06	2.95E-07	8.13E-09
Anthracene	4.70E-09	1.82E-07	7.05E-08	3.09E-07	5.90E-14	9.46E-07	1.82E-07	5.88E-09
Benzo(a)pyrene	5.70E-08	1.56E-06	8.55E-07	3.74E-06	7.16E-13	1.15E-05	1.56E-06	7.13E-08
Benzo(b)fluoranthene	2.70E-08	7.40E-07	4.05E-07	1.77E-06	3.39E-13	5.43E-06	7.40E-07	3.38E-08

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		Utility Boiler						
Emissions Estimation Protocol for Petroleum Refineries, Version 3, RTI International.		Tag	Boiler 2		flue gas (lb/h)	58,549.50	Tag	Boil
Table 4-3. Summary of Emission Factors for Boilers and Process Heaters Firing Various Fuels		202-PK-0201A	Heat input (MMBtu/h)	60	density (lb/ft3)	0.05	202-PK-0201B	Heat input (MMBtu/h)
Emission Factors for Boilers and Process Heaters Firing. External Combustion, Natural Gas/Refinery Gas (lb/MMBtu)		19,914.80	Emission (lb/h)	Emission (us tpy)	flue gas (ft3/h)	1,194,887.76	19,914.80	Emission (lb/h)
					T (°F)	294.2		
					T(K)	418.82		
HAP		Conc. (ppmv)			Conc. (lb/ft3)	Conc. (mg/m3)	Conc. (ppmv)	
Benzo(g,h,i)perylene	1.30E-09	3.25E-08	1.95E-08	8.54E-08	1.63E-14	2.62E-07	3.25E-08	1.63E-09
Benzo(k)fluoranthene	1.70E-08	4.66E-07	2.55E-07	1.12E-06	2.13E-13	3.42E-06	4.66E-07	2.13E-08
Chrysene	1.60E-09	4.85E-08	2.40E-08	1.05E-07	2.01E-14	3.22E-07	4.85E-08	2.00E-09
Dibenz(a,h)anthracene	1.20E-09	2.98E-08	1.80E-08	7.88E-08	1.51E-14	2.42E-07	2.98E-08	1.50E-09
7,12-Dimethylbenz(a) anthracene	1.60E-08	4.32E-07	2.40E-07	1.05E-06	2.01E-13	3.22E-06	4.32E-07	2.00E-08
Fluoranthene	2.90E-09	9.92E-08	4.35E-08	1.91E-07	3.64E-14	5.84E-07	9.92E-08	3.63E-09
Fluorene	2.70E-09	1.12E-07	4.05E-08	1.77E-07	3.39E-14	5.43E-07	1.12E-07	3.38E-09
Indeno-(1,2,3cd)pyrene	7.10E-08	1.78E-06	1.07E-06	4.66E-06	8.91E-13	1.43E-05	1.78E-06	8.88E-08
3-Methylchloranthrene	1.80E-09	4.64E-08	2.70E-08	1.18E-07	2.26E-14	3.62E-07	4.64E-08	2.25E-09
2-Methylnaphthalene	2.40E-08	1.17E-06	3.60E-07	1.58E-06	3.01E-13	4.83E-06	1.17E-06	3.00E-08
Naphthalene	6.00E-07	3.24E-05	9.00E-06	3.94E-05	7.53E-12	1.21E-04	3.24E-05	7.50E-07
Phenanthrene	1.70E-08	6.60E-07	2.55E-07	1.12E-06	2.13E-13	3.42E-06	6.60E-07	2.13E-08
Phenol	4.00E-06	2.94E-04	6.00E-05	2.63E-04	5.02E-11	8.05E-04	2.94E-04	5.00E-06
Pyrene	4.90E-09	1.68E-07	7.35E-08	3.22E-07	6.15E-14	9.86E-07	1.68E-07	6.13E-09
Sum PAH (without naphthalene)	**4.26E-06**	**3.02E-04**	**6.39E-05**	**2.80E-04**	**5.35E-11**	**8.57E-04**	**3.02E-04**	**5.32E-06**
Total SV-NV Organic HAPs		3.34E-04	7.29E-05	3.19E-04	6.10E-11	9.78E-04	3.34E-04	6.07E-06
TOTAL ORGANIC HAPS			**2.93E-02**	**1.28E-01**				**2.44E-03**
Other Compounds of Interest		Conc. (ppmv)			Conc. (lb/ft3)	Conc. (mg/m3)	Conc. (ppmv)	
Barium	4.30E-06	8.66E-04	2.58E-04	1.13E-03	2.16E-10	3.46E-03	8.66E-04	2.58E-04
Butane	2.10E-03	1.00E+00	1.26E-01	5.52E-01	1.05E-07	1.69E+00	1.00E+00	1.26E-01
Copper	8.30E-07	3.61E-04	4.98E-05	2.18E-04	4.17E-11	6.68E-04	3.61E-04	4.98E-05
Ethane	3.00E-03	2.76E+00	1.80E-01	7.88E-01	1.51E-07	2.42E+00	2.76E+00	1.80E-01
Hydrogen sulfide	8.50E-05	6.90E-02	5.10E-03	2.23E-02	4.27E-09	6.84E-02	6.90E-02	5.10E-03
Molybdenum	1.10E-06	3.17E-04	6.60E-05	2.89E-04	5.52E-11	8.86E-04	3.17E-04	6.60E-05
Phosphorus (Inorganic HAP)	6.40E-07	5.72E-04	3.84E-05	1.68E-04	3.21E-11	5.15E-04	5.72E-04	3.84E-05
Vanadium	2.30E-06	1.25E-03	1.38E-04	6.04E-04	1.15E-10	1.85E-03	1.25E-03	1.38E-04
Zinc	2.80E-05	1.18E-02	1.68E-03	7.36E-03	1.41E-09	2.25E-02	1.18E-02	1.68E-03

*Calculated based on the TABLE 1.4-2. AP 42, Fifth Edition, Volume IChapter 1: External Comb

** All PM (total, Condensable, and filterable) is assumed to be less than 1.0 micrometer in di

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Emissions Estimation Protocol for Petroleum Refineries, Version 3, RTI International.

Table 4-3. Summary of Emission Factors for Boilers and Process Heaters Firing Various Fuels

						FCC Naphtha Hydrotreate		
		er 3	flue gas (lb/h)	58,549.50	Tag			flue gas (lb/h)
		5	density (lb/ft3)	0.05	202-PK-0201C	Heat input (MMBtu/h)	17.48	density (lb/ft3)
Emission Factors for Boilers and Process Heaters Firing. External Combustion, Natural Gas/Refinery Gas (lb/MMBtu)		Emission (us tpy)	flue gas (ft3/h)	1,194,887.76	19,914.80	Emission (lb/h)	Emission (us tpy)	flue gas (ft3/h)
			T (°F)	294.2				T (°F)
			T(K)	418.82				T(K)
HAP			Conc. (lb/ft3)	Conc. (mg/m3)	Conc. (ppmv)			Conc. (lb/ft3)
Antimony	5.20E-07	1.14E-05	2.18E-12	3.49E-05	9.85E-06	9.09E-06	3.98E-05	1.74E-11
Arsenic	2.00E-07	4.38E-06	8.37E-13	1.34E-05	6.15E-06	3.50E-06	1.53E-05	6.70E-12
Beryllium	1.30E-07	2.85E-06	5.44E-13	8.72E-06	3.33E-05	2.27E-06	9.95E-06	4.35E-12
Cadmium	1.10E-06	2.41E-05	4.60E-12	7.38E-05	2.26E-05	1.92E-05	8.42E-05	3.68E-11
Chromium (hexavalent)	2.80E-07	6.13E-06	1.17E-12	1.88E-05	1.24E-05	4.89E-06	2.14E-05	9.38E-12
Chromium (total)	1.40E-06	3.07E-05	5.86E-12	9.39E-05	6.21E-05	2.45E-05	1.07E-04	4.69E-11
Cobalt	8.20E-08	1.80E-06	3.43E-13	5.50E-06	3.21E-06	1.43E-06	6.28E-06	2.75E-12
Manganese	3.70E-07	8.10E-06	1.55E-12	2.48E-05	1.55E-05	6.47E-06	2.83E-05	1.24E-11
Mercury	2.50E-07	5.48E-06	1.05E-12	1.68E-05	2.87E-06	4.37E-06	1.91E-05	8.37E-12
Nickel	2.10E-06	4.60E-05	8.79E-12	1.41E-04	8.25E-05	3.67E-05	1.61E-04	7.03E-11
Selenium	8.80E-07	1.93E-05	3.68E-12	5.90E-05	2.57E-05	1.54E-05	6.74E-05	2.95E-11
Total Metal HAPs	-	**1.60E-04**	**1.63E-11**	**4.91E-04**	**2.76E-04**	**1.28E-04**	**5.60E-04**	**5.69E-11**
Volatile Organics HAPs			Conc. (lb/ft3)	Conc. (mg/m3)	Conc. (ppmv)			Conc. (lb/ft3)
Acetaldehyde	1.20E-05	6.57E-05	1.26E-11	2.01E-04	1.57E-04	5.24E-05	2.30E-04	1.00E-10
Acrolein	1.70E-05	9.31E-05	1.78E-11	2.85E-04	1.75E-04	7.43E-05	3.25E-04	1.42E-10
Benzene	2.10E-06	1.15E-05	2.20E-12	3.52E-05	1.55E-05	9.18E-06	4.02E-05	1.76E-11
Benzo(a)anthracene	2.20E-08	1.20E-07	2.30E-14	3.69E-07	5.55E-08	9.61E-08	4.21E-07	1.84E-13
Dichlorobenzene	1.20E-06	6.57E-06	1.26E-12	2.01E-05	4.71E-06	5.24E-06	2.30E-05	1.00E-11
Ethylbenzene	1.60E-05	8.76E-05	1.67E-11	2.68E-04	8.69E-05	6.99E-05	3.06E-04	1.34E-10
Formaldehyde	7.40E-05	4.05E-04	7.74E-11	1.24E-03	1.42E-03	3.23E-04	1.42E-03	6.20E-10
Hexane	1.80E-03	9.86E-03	1.88E-09	3.02E-02	1.20E-02	7.87E-03	3.45E-02	1.51E-08
Toluene	3.30E-06	1.81E-05	3.45E-12	5.53E-05	2.06E-05	1.44E-05	6.32E-05	2.76E-11
Xylene (total)	2.50E-05	1.37E-04	2.62E-11	4.19E-04	1.36E-04	1.09E-04	4.79E-04	2.09E-10
Total VOC HAPs		1.07E-02	2.04E-09	3.27E-02	1.41E-02	8.52E-03	3.73E-02	1.63E-08
Semivolatile and Nonvolatile Organics (excluding dioxin/furans)			Conc. (lb/ft3)	Conc. (mg/m3)	Conc. (ppmv)			Conc. (lb/ft3)
Acenaphthene	2.40E-09	1.31E-08	2.51E-15	4.03E-08	8.97E-09	1.05E-08	4.59E-08	2.01E-14
Acenaphthylene	6.50E-09	3.56E-08	6.80E-15	1.09E-07	2.46E-08	2.84E-08	1.24E-07	5.44E-14
Anthracene	4.70E-09	2.57E-08	4.92E-15	7.88E-08	1.52E-08	2.05E-08	9.00E-08	3.93E-14
Benzo(a)pyrene	5.70E-08	3.12E-07	5.96E-14	9.56E-07	1.30E-07	2.49E-07	1.09E-06	4.77E-13
Benzo(b)fluoranthene	2.70E-08	1.48E-07	2.82E-14	4.53E-07	6.17E-08	1.18E-07	5.17E-07	2.26E-13

Operating hours/year 8760

								FCC Naphtha Hydrotreate	
Emissions Estimation Protocol for Petroleum Refineries, Version 3, RTI International.		er 3	flue gas (lb/h)	58,549.50	Tag				flue gas (lb/h)
Table 4-3. Summary of Emission Factors for Boilers and Process Heaters Firing Various Fuels		5	density (lb/ft3)	0.05	202-PK-0201C	Heat input (MMBtu/h)	17.48		density (lb/ft3)
Emission Factors for Boilers and Process Heaters Firing. External Combustion, Natural Gas/Refinery Gas (lb/MMBtu)		Emission (us tpy)	flue gas (ft3/h)	1,194,887.76	19,914.80	Emission (lb/h)	Emission (us tpy)		flue gas (ft3/h)
			T (°F)	294.2					T (°F)
			T(K)	418.82					T(K)
HAP			Conc. (lb/ft3)	Conc. (mg/m3)	Conc. (ppmv)				Conc. (lb/ft3)
Benzo(g,h,i)perylene	1.30E-09	7.12E-09	1.36E-15	2.18E-08	2.71E-09	5.68E-09	2.49E-08		1.09E-14
Benzo(k)fluoranthene	1.70E-08	9.31E-08	1.78E-14	2.85E-07	3.88E-08	7.43E-08	3.25E-07		1.42E-13
Chrysene	1.60E-09	8.76E-09	1.67E-15	2.68E-08	4.04E-09	6.99E-09	3.06E-08		1.34E-14
Dibenz(a,h)anthracene	1.20E-09	6.57E-09	1.26E-15	2.01E-08	2.48E-09	5.24E-09	2.30E-08		1.00E-14
7,12-Dimethylbenz(a) anthracene	1.60E-08	8.76E-08	1.67E-14	2.68E-07	3.60E-08	6.99E-08	3.06E-07		1.34E-13
Fluoranthene	2.90E-09	1.59E-08	3.03E-15	4.86E-08	8.26E-09	1.27E-08	5.55E-08		2.43E-14
Fluorene	2.70E-09	1.48E-08	2.82E-15	4.53E-08	9.36E-09	1.18E-08	5.17E-08		2.26E-14
Indeno-(1,2,3cd)pyrene	7.10E-08	3.89E-07	7.43E-14	1.19E-06	1.48E-07	3.10E-07	1.36E-06		5.94E-13
3-Methylchloranthrene	1.80E-09	9.86E-09	1.88E-15	3.02E-08	3.87E-09	7.87E-09	3.45E-08		1.51E-14
2-Methylnaphthalene	2.40E-08	1.31E-07	2.51E-14	4.03E-07	9.73E-08	1.05E-07	4.59E-07		2.01E-13
Naphthalene	6.00E-07	3.29E-06	6.28E-13	1.01E-05	2.70E-06	2.62E-06	1.15E-05		5.02E-12
Phenanthrene	1.70E-08	9.31E-08	1.78E-14	2.85E-07	5.50E-08	7.43E-08	3.25E-07		1.42E-13
Phenol	4.00E-06	2.19E-05	4.18E-12	6.71E-05	2.45E-05	1.75E-05	7.66E-05		3.35E-11
Pyrene	4.90E-09	2.68E-08	5.13E-15	8.22E-08	1.40E-08	2.14E-08	9.38E-08		4.10E-14
Sum PAH (without naphthalene)	**4.26E-06**	**2.33E-05**	**4.46E-12**	**7.14E-05**	**2.52E-05**	**1.86E-05**	**8.15E-05**		**3.57E-11**
Total SV-NV Organic HAPs		2.66E-05	5.08E-12	8.15E-05	2.79E-05	2.12E-05	9.30E-05		4.07E-11
TOTAL ORGANIC HAPS		**1.07E-02**				**8.55E-03**	**3.74E-02**		
Other Compounds of Interest			Conc. (lb/ft3)	Conc. (mg/m3)	Conc. (ppmv)				Conc. (lb/ft3)
Barium	4.30E-06	1.13E-03	2.16E-10	3.46E-03	8.66E-04	7.52E-05	3.29E-04		1.44E-10
Butane	2.10E-03	5.52E-01	1.05E-07	1.69E+00	1.00E+00	3.67E-02	1.61E-01		7.03E-08
Copper	8.30E-07	2.18E-04	4.17E-11	6.68E-04	3.61E-04	1.45E-05	6.35E-05		2.78E-11
Ethane	3.00E-03	7.88E-01	1.51E-07	2.42E+00	2.76E+00	5.24E-02	2.30E-01		1.00E-07
Hydrogen sulfide	8.50E-05	2.23E-02	4.27E-09	6.84E-02	6.90E-02	1.49E-03	6.51E-03		2.85E-09
Molybdenum	1.10E-06	2.89E-04	5.52E-11	8.86E-04	3.17E-04	1.92E-05	8.42E-05		3.68E-11
Phosphorus (Inorganic HAP)	6.40E-07	1.68E-04	3.21E-11	5.15E-04	5.72E-04	1.12E-05	4.90E-05		2.14E-11
Vanadium	2.30E-06	6.04E-04	1.15E-10	1.85E-03	1.25E-03	4.02E-05	1.76E-04		7.70E-11
Zinc	2.80E-05	7.36E-03	1.41E-09	2.25E-02	1.18E-02	4.89E-04	2.14E-03		9.38E-10

*Calculated based on the TABLE 1.4-2. AP 42, Fifth Edition, Volume IChapter 1: External Comb

** All PM (total, Condensable, and filterable) is assumed to be less than 1.0 micrometer in di

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				TOTALS		
Emissions Estimation Protocol for Petroleum Refineries, Version 3, RTI International.		15,503.00	Tag			
Table 4-3. Summary of Emission Factors for Boilers and Process Heaters Firing Various Fuels		0.03	114-H-1401			
Emission Factors for Boilers and Process Heaters Firing. External Combustion, Natural Gas/Refinery Gas (lb/MMBtu)		521,986.53	8,699.78			
		784.3				
		691.09				
HAP		Conc. (mg/m3)	Conc. (ppmv)	Boilers (US tpy)	Heaters (US tpy)	Total US tpy
Antimony	5.20E-07	2.79E-04	1.30E-04	**2.8E-04**	**1.4E-03**	**1.7E-03**
Arsenic	2.00E-07	1.07E-04	8.13E-05	**1.1E-04**	**5.4E-04**	**6.5E-04**
Beryllium	1.30E-07	6.98E-05	4.39E-04	**7.1E-05**	**3.5E-04**	**4.2E-04**
Cadmium	1.10E-06	5.91E-04	2.98E-04	**6.0E-04**	**3.0E-03**	**3.6E-03**
Chromium (hexavalent)	2.80E-07	1.50E-04	1.64E-04	**1.5E-04**	**7.6E-04**	**9.1E-04**
Chromium (total)	1.40E-06	7.52E-04	8.20E-04	**7.7E-04**	**3.8E-03**	**4.6E-03**
Cobalt	8.20E-08	4.40E-05	4.24E-05	**4.5E-05**	**2.2E-04**	**2.7E-04**
Manganese	3.70E-07	1.99E-04	2.05E-04	**2.0E-04**	**1.0E-03**	**1.2E-03**
Mercury	2.50E-07	1.34E-04	3.79E-05	**1.4E-04**	**6.8E-04**	**8.2E-04**
Nickel	2.10E-06	1.13E-03	1.09E-03	**1.1E-03**	**5.7E-03**	**6.9E-03**
Selenium	8.80E-07	4.72E-04	3.39E-04	**4.8E-04**	**2.4E-03**	**2.9E-03**
Total Metal HAPs	-	**3.93E-03**	**3.65E-03**	**4.0E-03**	**2.0E-02**	**2.39E-02**
Volatile Organics HAPs		Conc. (mg/m3)	Conc. (ppmv)	Boilers (US tpy)	Heaters (US tpy)	Total US tpy
Acetaldehyde	1.20E-05	1.61E-03	2.07E-03	**1.6E-03**	**8.2E-03**	**9.8E-03**
Acrolein	1.70E-05	2.28E-03	2.31E-03	**2.3E-03**	**1.2E-02**	**1.4E-02**
Benzene	2.10E-06	2.82E-04	2.05E-04	**2.9E-04**	**1.4E-03**	**1.7E-03**
Benzo(a)anthracene	2.20E-08	2.95E-06	7.33E-07	**3.0E-06**	**1.5E-05**	**1.8E-05**
Dichlorobenzene	1.20E-06	1.61E-04	6.21E-05	**1.6E-04**	**8.2E-04**	**9.8E-04**
Ethylbenzene	1.60E-05	2.15E-03	1.15E-03	**2.2E-03**	**1.1E-02**	**1.3E-02**
Formaldehyde	7.40E-05	9.93E-03	1.88E-02	**1.0E-02**	**5.0E-02**	**6.0E-02**
Hexane	1.80E-03	2.42E-01	1.59E-01	**2.5E-01**	**1.2E+00**	**1.5E+00**
Toluene	3.30E-06	4.43E-04	2.73E-04	**4.5E-04**	**2.2E-03**	**2.7E-03**
Xylene (total)	2.50E-05	3.36E-03	1.79E-03	**3.4E-03**	**1.7E-02**	**2.0E-02**
Total VOC HAPs		2.62E-01	1.86E-01	**2.7E-01**	**1.3E+00**	**1.59E+00**
Semivolatile and Nonvolatile Organics (excluding dioxin/furans)		Conc. (mg/m3)	Conc. (ppmv)	Boilers (US tpy)	Heaters (US tpy)	Total US tpy
Acenaphthene	2.40E-09	3.22E-07	1.18E-07	**3.3E-07**	**1.6E-06**	**2.0E-06**
Acenaphthylene	6.50E-09	8.72E-07	3.25E-07	**8.9E-07**	**4.4E-06**	**5.3E-06**
Anthracene	4.70E-09	6.31E-07	2.01E-07	**6.4E-07**	**3.2E-06**	**3.8E-06**
Benzo(a)pyrene	5.70E-08	7.65E-06	1.72E-06	**7.8E-06**	**3.9E-05**	**4.7E-05**
Benzo(b)fluoranthene	2.70E-08	3.62E-06	8.15E-07	**3.7E-06**	**1.8E-05**	**2.2E-05**

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				TOTALS		
Emissions Estimation Protocol for Petroleum Refineries, Version 3, RTI International.		15,503.00	Tag			
Table 4-3. Summary of Emission Factors for Boilers and Process Heaters Firing Various Fuels		0.03	114-H-1401			
Emission Factors for Boilers and Process Heaters Firing. External Combustion, Natural Gas/Refinery Gas (lb/MMBtu)		521,986.53	8,699.78			
		784.3				
		691.09				
HAP		Conc. (mg/m3)	Conc. (ppmv)	Boilers (US tpy)	Heaters (US tpy)	Total US tpy
Benzo(g,h,i)perylene	1.30E-09	1.74E-07	3.58E-08	**1.8E-07**	**8.8E-07**	**1.1E-06**
Benzo(k)fluoranthene	1.70E-08	2.28E-06	5.13E-07	**2.3E-06**	**1.2E-05**	**1.4E-05**
Chrysene	1.60E-09	2.15E-07	5.33E-08	**2.2E-07**	**1.1E-06**	**1.3E-06**
Dibenz(a,h)anthracene	1.20E-09	1.61E-07	3.28E-08	**1.6E-07**	**8.2E-07**	**9.8E-07**
7,12-Dimethylbenz(a) anthracene	1.60E-08	2.15E-06	4.75E-07	**2.2E-06**	**1.1E-05**	**1.3E-05**
Fluoranthene	2.90E-09	3.89E-07	1.09E-07	**4.0E-07**	**2.0E-06**	**2.4E-06**
Fluorene	2.70E-09	3.62E-07	1.24E-07	**3.7E-07**	**1.8E-06**	**2.2E-06**
Indeno-(1,2,3cd)pyrene	7.10E-08	9.53E-06	1.96E-06	**9.7E-06**	**4.8E-05**	**5.8E-05**
3-Methylchloranthrene	1.80E-09	2.42E-07	5.11E-08	**2.5E-07**	**1.2E-06**	**1.5E-06**
2-Methylnaphthalene	2.40E-08	3.22E-06	1.28E-06	**3.3E-06**	**1.6E-05**	**2.0E-05**
Naphthalene	6.00E-07	8.05E-05	3.56E-05	**8.2E-05**	**4.1E-04**	**4.9E-04**
Phenanthrene	1.70E-08	2.28E-06	7.26E-07	**2.3E-06**	**1.2E-05**	**1.4E-05**
Phenol	4.00E-06	5.37E-04	3.23E-04	**5.5E-04**	**2.7E-03**	**3.3E-03**
Pyrene	4.90E-09	6.58E-07	1.84E-07	**6.7E-07**	**3.3E-06**	**4.0E-06**
Sum PAH (without naphthalene)	**4.26E-06**	**5.72E-04**	**3.32E-04**	**Boilers (US tpy)**	**Heaters (US tpy)**	**Total US tpy**
Total SV-NV Organic HAPs		6.52E-04	3.68E-04	**6.7E-04**	**3.3E-03**	**4.0E-03**
TOTAL ORGANIC HAPS				**2.68E-01**	**1.33E+00**	**1.596E+00**
Other Compounds of Interest		Conc. (mg/m3)	Conc. (ppmv)	Boilers (US tpy)	Heaters (US tpy)	Total US tpy
Barium	4.30E-06	2.31E-03	9.53E-04	**3.4E-03**	**1.2E-02**	**1.5E-02**
Butane	2.10E-03	1.13E+00	1.10E+00	**1.7E+00**	**5.7E+00**	**7.4E+00**
Copper	8.30E-07	4.46E-04	3.98E-04	**6.5E-04**	**2.3E-03**	**2.9E-03**
Ethane	3.00E-03	1.61E+00	3.04E+00	**2.4E+00**	**8.2E+00**	**1.1E+01**
Hydrogen sulfide	8.50E-05	4.56E-02	7.59E-02	**6.7E-02**	**2.3E-01**	**3.0E-01**
Molybdenum	1.10E-06	5.91E-04	3.49E-04	**8.7E-04**	**3.0E-03**	**3.9E-03**
Phosphorus (Inorganic HAP)	6.40E-07	3.44E-04	6.29E-04	**5.0E-04**	**1.7E-03**	**2.2E-03**
Vanadium	2.30E-06	1.23E-03	1.37E-03	**1.8E-03**	**6.3E-03**	**8.1E-03**
Zinc	2.80E-05	1.50E-02	1.30E-02	**2.2E-02**	**7.6E-02**	**9.8E-02**

*Calculated based on the TABLE 1.4-2. AP 42, Fifth Edition, Volume IChapter 1: External Comb

** All PM (total, Condensable, and filterable) is assumed to be less than 1.0 micrometer in di

Operating hours/year	8,760		
Maximum Operating Coke Burn-off	8,614	lb/h	Based on FCCU Licensor Data
Unit Fresh Feed rate (bbl/d)	14376	bbl/d	
	14.376	Mbbl/d	
Nickel E-cat (mg/kg)	1,200	PPM (mg/kg)	
C_{Nickel} (in the fines) (kg/kg)	96	PPM (mg/kg)	

	Uncontrolled			Controlled			
Criteria Pollutants	Emission Factors (lb/Mbbl Fresh Feed)	Emissions (lb/h) Uncontrolled	Emission (STPY) Uncontrolled	Contol Device	Control %	Emissions (lb/h) Controlled	Emission (STPY) Controlled
CO*	0	0	0	BCP	100%	0	0
Lead (Ratio to Nickel Concentration)	0.08	4.63E-04	2.03E-03	BCP	99%	4.63E-06	2.03E-05
PM10 Primary	-	11.448	50.1	Wet Scrubber or Tri-Mer	98.0%	0.229	1.003
PM condensable	-	3.876	17.0	Wet Scrubber or Tri-Mer	98.0%	0.078	0.340
PM2.5 filterable	-	6.55	28.7	Wet Scrubber or Tri-Mer	98.0%	0.131	0.573
PM2.5 Primary	-	10.42	45.7	Wet Scrubber or Tri-Mer	98.0%	0.208	0.913
PM10 filterable	-	7.572	33.2	Wet Scrubber or Tri-Mer	98.0%	0.151	0.663
NOx	71	42.53	186.3	COP-NP or Tri-Mer	98%	0.851	3.73
SO_2	***	151.80	664.9	Wet Scrubber or Dry Sorbent	99%	1.52	6.65
VOC**	220	131.78	577.2	Flue Gas Recirculation	99%	1.32	5.77
Total HAP	-	4.85	5.39	BCP		2.70E-01	0.87

* Based on FCCU regenerator design for complete carbon burn operation
** Based on FCCU flue gas capture and recirculation design for complete combustion
*** Based on FCCU Licensor Data
BCP - Best Combustion Practices
COP-NP - Non-Platinum CO combustion promoter

CALCULATIONS

METAL HAP

E_{Nickel} 0.025 ton Enickel / year

Example: $E_{Antimony}$ 0.025 Ton Enickel / year × 0.065 EAntimony / Enickel = 0.002 ton Eantimony / year

		Uncontrolled			Controlled		
HAP	Emission Ratio	Emission (lb/h)	STPY	Control Device Yes/No?	Control %	Emission (STPY),	lb/h
E_{nickel}	1	5.79E-03	2.54E-02	Yes	99%	2.54E-04	5.79E-05
$E_{antimony}$	0.065	3.76E-04	1.65E-03	Yes	99%	1.65E-05	3.76E-06
$E_{arsenic}$	0.01	5.79E-05	2.54E-04	Yes	99%	2.54E-06	5.79E-07
$E_{beryllium}$	0.003	1.74E-05	7.61E-05	Yes	99%	7.61E-07	1.74E-07
$E_{cadmium}$	0.013	7.53E-05	3.30E-04	Yes	99%	3.30E-06	7.53E-07
$E_{chromium}$	0.25	1.45E-03	6.34E-03	Yes	99%	6.34E-05	1.45E-05
E_{cobalt}	0.052	3.01E-04	1.32E-03	Yes	99%	1.32E-05	3.01E-06
$E_{manganese}$	0.13	7.53E-04	3.30E-03	Yes	99%	3.30E-05	7.53E-06
$E_{selenium}$	0.025	1.45E-04	6.34E-04	Yes	99%	6.34E-06	1.45E-06
$E_{vanadium}$ ***	1.32	7.64E-03	3.35E-02	Yes	99%	3.35E-04	7.64E-05
E_{zinc} ***	0.74	4.28E-03	1.88E-02	Yes	99%	1.88E-04	4.28E-05
		2.09E-02	9.15E-02		**Total Metal HAP**	9.15E-04	2.09E-04

Assumptions

Rate of circulation of catalyst is equal to the coke burnoff rate

Calculations

Maximum Operating Coke Burn-off	8,614	lb/h
Nickel E-cat (mg/kg)	1,200	PPM (mg/kg)

PM Calculation

PM Filterable 0.90 lb / 1000 lb Coke

0.9 lb / 1000 lb-Coke BO × 8614 lb Coke / h × 8760 h / year = 33.96 STPY PM_{FIL} / Year

PM Condensable 0.45 lb / 1000 lb Coke

0.45 lb / 1000 lb-Coke BO × lb Coke / h × 8760 h / year = 16.98 ton PM_{FIL} / Year

PM Primary = PM Filterable + PM Condensable = 50.93 ton PM Primary / year

PM Sulfate = PM_{FIL} - $PM_{NONSULF}$

$PM_{NONSULF}$ 0.70 lb / 1000 lb Coke

0.7 lb / 1000 lb-Coke BO × 8614 lb Coke / h × 8760 h / year = 26.41 ton $PM_{NONSULF}$ / Year

PM Sulfate = PM Filterable - PM Non Sulfate

PM Sulfate = 7.5 ton PM Sulfate / year

PM10-Filterable

PM10-Fil Fraction 0.97

0.97 × 26.41 ST PM nonsulf / year + 7.5 ST PM SUL / year = 33.16 ton PM10 Fil / year

PM2.5-Filterable

PM10-Fil Fraction 0.80

0.80 × 26.41 ST PM nonsulf / year + 7.5 ST PM SUL / year = 28.67 ton PM10 Fil / year

PM2.5PRI

PM2.5-Pri = P<2.5FIL + PM Condensable = 45.65 ton PM2.5 PRI / year

Calculation of CNi

CNi 1,200 mg / kg

Fraction PM FIL <2.5 0.80

26.41 ton PMNONSULF / Year

0.8 × 1200 mg / kg = 960 mg / kg

26.41 ton nonsulfate × 960 mg / kg × 1 E06 mg = 0.025 ton Enickel / year

Organic HAP Emissions

Maximum Operating Coke Burn-off 8,614 **lb Coke/h**

8.614 1000 lb Coke / h

Example

Acetaldehyde 8614 lb Coke / h × 0.0013 lb / 1000 lb Coke = 0.0112 lb / h

PAH

	Uncontrolled			Controlled			
	EF (lb/1000 lb-Coke)	Emission (lb/h)	STPY	Control	Control Efficiency	STPY	lb/h
Acetaldehyde	0.0013	1.12E-02	4.90E-02			4.90E-02	1.12E-02
Acetone	1.60E-04	1.38E-03	6.04E-03			6.04E-03	1.38E-03
Acrolein	6.60E-05	5.69E-04	2.49E-03			2.49E-03	5.69E-04
Benzene	1.10E-03	9.48E-03	4.15E-02			4.15E-02	9.48E-03
Bromomethane	1.40E-04	1.21E-03	5.28E-03			5.28E-03	1.21E-03
1,3-Butadiene	2.00E-06	1.72E-05	7.55E-05			7.55E-05	1.72E-05
Ethylbenzene	1.60E-05	1.38E-04	6.04E-04			6.04E-04	1.38E-04
Formaldehyde	0.016	1.38E-01	6.04E-01			6.04E-01	1.38E-01
Methylene chloride	4.40E-04	3.79E-03	1.66E-02			1.66E-02	3.79E-03
Phenol	5.70E-04	4.91E-03	2.15E-02			2.15E-02	4.91E-03
Toluene	2.10E-04	1.81E-03	7.92E-03			7.92E-03	1.81E-03
Trichlorofluoromethane	1.60E-04	1.38E-03	6.04E-03			6.04E-03	1.38E-03
Xylene	2.10E-04	1.81E-03	7.92E-03			7.92E-03	1.81E-03
Acenaphthene	2.20E-07	1.90E-06	8.30E-06			8.30E-06	1.90E-06
Acenaphthylene	7.80E-06	6.72E-05	2.94E-04			2.94E-04	6.72E-05
Anthracene	6.70E-06	5.77E-05	2.53E-04			2.53E-04	5.77E-05
Benzo(a)anthracene	3.80E-08	3.27E-07	1.43E-06			1.43E-06	3.27E-07
Benzo(a)pyrene	7.10E-07	6.12E-06	2.68E-05			2.68E-05	6.12E-06
Benzo(b)fluoranthene	2.40E-07	2.07E-06	9.06E-06			9.06E-06	2.07E-06
Benzo(e)pyrene	3.30E-08	2.84E-07	1.25E-06			1.25E-06	2.84E-07
Benzo(g,h,i)perylene	3.10E-07	2.67E-06	1.17E-05			1.17E-05	2.67E-06
Benzo(k)fluoranthene	1.80E-07	1.55E-06	6.79E-06			6.79E-06	1.55E-06
Chrysene	2.30E-07	1.98E-06	8.68E-06			8.68E-06	1.98E-06
Dibenz(a,h)anthracene	2.80E-07	2.41E-06	1.06E-05			1.06E-05	2.41E-06
Fluoranthene	6.10E-06	5.25E-05	2.30E-04			2.30E-04	5.25E-05
Fluorene	2.40E-06	2.07E-05	9.06E-05			9.06E-05	2.07E-05

Indeno(1,2,3-cd)pyrene	3.00E-07	2.58E-06	1.13E-05			1.13E-05	2.58E-06
2-Methylnaphthalene	1.80E-06	1.55E-05	6.79E-05			6.79E-05	1.55E-05
Naphthalene	7.00E-05	6.03E-04	2.64E-03			2.64E-03	6.03E-04
Phenanthrene	1.60E-05	1.38E-04	6.04E-04			6.04E-04	1.38E-04
Pyrene	2.20E-07	1.90E-06	8.30E-06			8.30E-06	1.90E-06
PAH (without Naphtalene)		3.06E-04	1.34E-03			1.34E-03	3.06E-04
Pentachlorodibenzofurans	3.20E-11	2.76E-10	1.21E-09			1.21E-09	2.76E-10
Hexachlorodibenzofuran	6.30E-11	5.43E-10	2.38E-09			2.38E-09	5.43E-10
Heptachlorodibenzo-p-dioxin	5.60E-11	4.82E-10	2.11E-09			2.11E-09	4.82E-10
Carbon disulfide	3.70E-05	3.19E-04	1.40E-03			1.40E-03	3.19E-04
Hydrogen chloride	0.11	9.48E-01	4.15E+00	Dry Sorbent	98%	8.30E-02	1.90E-02
Hydrogen cyanide****	0.43	3.70E+00	3.70E-01	BCP	98%	7.41E-03	7.41E-02
Mercury	6.00E-06	5.17E-05	2.26E-04		98%	4.53E-06	1.03E-06
		4.83	5.30		**Total Organic HAP**	**8.65E-01**	**2.70E-01**
Ammonia	0.57	4.91E+00	2.15E+01			2.15E+01	4.91E+00

REFERENCES

All calculations were based on the Table 5-4 of the Emissions Estimation Protocol for Petroleum Refineries, Version 3, RTI International (unless noted otherwise)
Metal HAPs were calculated using the Equation 5-1 and Table 5-3 of the RTI Emissions Estimation Protocol.
* Calculated based on the TABLE 5,1-1. AP 42, Fifth Edition, Volume IChapter 1: External Combustion Sources.
** Overall, less than 1% weight of total hydrocarbon emissions is methane.
Neg: negligible.
*** Vanadium and zinc are not HAPs, but are included here as other pollutants of interest.
****: HCN emissions considered to be emitted only in startup and shutdownoperations, which means a factor of 200 hours/year

Reformer 2 Capacity (Mbbl/d)	3.96	
Reformer 1 Capacity (Mbbl/d)	8.76	
Operating hours/year*	672	Four weeks of catalyst regeneration per reactor per year

		Reformer 2		Reformer 1		Notes
	Emissions Factor (lb/Mbbl fresh feed)	Emission (lb/h)	Emission (STPY)	Emission (lb/h)	Emission (STPY)	
Dioxins/PCBs						
Dioxin toxic equivalents (TEQ)b	5.70E-09	9.41E-10	3.16E-10	2.08E-09	6.99E-10	
Total polychlorinated biphenyls (PCB)	2.60E-06	4.29E-07	1.44E-07	9.49E-07	3.19E-07	
Semi-volatile and Non-volatile Organic HAP						Except dioxins, furans, and PCB
Naphthalene	3.50E-05	5.78E-06	1.94E-06	1.28E-05	4.29E-06	Not in the Section 112 list of HAP
2-Methylnaphthalene	1.30E-06	2.15E-07	7.21E-08	4.75E-07	1.59E-07	Not in the Section 112 list of HAP
Acenaphthylene	3.00E-08	4.95E-09	1.66E-09	1.10E-08	3.68E-09	Not in the Section 112 list of HAP
Acenaphthene	4.30E-08	7.10E-09	2.38E-09	1.57E-08	5.27E-09	Not in the Section 112 list of HAP
Fluorene	2.00E-07	3.30E-08	1.11E-08	7.30E-08	2.45E-08	Not in the Section 112 list of HAP
Phenanthrene	6.10E-07	1.01E-07	3.38E-08	2.23E-07	7.48E-08	Not in the Section 112 list of HAP
Anthracene	9.10E-08	1.50E-08	5.05E-09	3.32E-08	1.12E-08	Not in the Section 112 list of HAP
Fluoranthene	1.00E-07	1.65E-08	5.54E-09	3.65E-08	1.23E-08	Not in the Section 112 list of HAP
Pyrene	1.50E-08	2.48E-09	8.32E-10	5.48E-09	1.84E-09	Not in the Section 112 list of HAP
Benzo(a)anthracene	9.00E-10	1.49E-10	4.99E-11	3.29E-10	1.10E-10	Not in the Section 112 list of HAP
Benzo(b)fluoranthene	1.50E-09	2.48E-10	8.32E-11	5.48E-10	1.84E-10	Not in the Section 112 list of HAP
Benzo(k)fluoranthene	7.50E-10	1.24E-10	4.16E-11	2.74E-10	9.20E-11	Not in the Section 112 list of HAP
Benzo(e)pyrene	2.90E-09	4.79E-10	1.61E-10	1.06E-09	3.56E-10	Not in the Section 112 list of HAP
Benzo(g,h,i)perylene	4.00E-09	6.60E-10	2.22E-10	1.46E-09	4.91E-10	Not in the Section 112 list of HAP
Chrysene	2.90E-09	4.79E-10	1.61E-10	1.06E-09	3.56E-10	Not in the Section 112 list of HAP
Dibenzo(a,h)anthracene	7.80E-10	1.29E-10	4.32E-11	2.85E-10	9.57E-11	Not in the Section 112 list of HAP
Indeno(1,2,3-c,d)pyrene	1.70E-09	2.81E-10	9.42E-11	6.21E-10	2.08E-10	Not in the Section 112 list of HAP
Total SV-NV Organic HAPs			**2.07E-06**		**4.59E-06**	
PAH without naphtalene		3.97E-07		8.78E-07		
HAP						
Benzene	0.004	6.60E-04	2.22E-04	1.46E-03	4.91E-04	
Toluene	0.0096	1.58E-03	5.32E-04	3.50E-03	1.18E-03	
Xylene	0.007	1.16E-03	3.88E-04	2.56E-03	8.58E-04	
Total SV-NV Organic HAPs			**1.14E-03**		**2.53E-03**	
THC (Total Hydrocarbons)*	0.24	3.96E-02	**1.33E-02**	8.76E-02	**2.94E-02**	
Other Inorganic HAPs						
Hydrogen Chloride	4.2	0.69	2.33E-01	1.53	0.52	Controlled by Best Operation Practices
Chlorine	0.23	0.04	1.28E-02	0.08	0.03	Controlled by Best Operation Practices
			0.25		**0.54**	
Reference 1:		**Total HAPs**	**2.47E-01**		**5.46E-01**	

Calculations based on the Table 5-6 of the Emissions Estimation Protocol for Petroleum Refineries, Version 3, RTI International.

Reference 2:

*Total hydrocarbons may be used as a surrogate for VOC. Total hydrocarbons are presented on an as propane basis.

SRU UNIT: LO-CAT ® (licensed by MERICHEM)			LTPD	10.14
Capacity (MMSCFD)	9.4			
Operating hours/year	8,760			
Number of Vents:	2			
to be directed to a Thermal Oxidizer				
Molar Flow combined	597.6	lbmol/h		
STD Vapor Volumetric Flow				
Combined	5.442	MMSCFD	para ppmv es este	
Component	Combined Mole%	Molar Flow (lbmol/h)		
H2	0.1722	1.0292		
C1	0.4742	2.8335		
Ethylene	0.3566	2.1310		
C2	0.4245	2.5370		
C3	0.1750	1.0456		
iC4	0.0295	0.1765		
nC4	0.0843	0.5040		
H2S	1.17E-06	0.0007	1.13 ppmv	
CO2	0.0000	0.0000		
H2O	14.3990	86.0485		
O2	15.9311	95.2045		
N2	67.1550	401.3185		
Ar	0.7985	4.7717		
	100.0000	597.6007		

Specifications Thermal Oxidizer				
Duty (MMBTU/h)	1.583			
VOC Destruction (%)	99.9		V1 (ft3/h)	389370.46
Exit Temperatur (°F)	414.5	485.65	T1 (°F)	414,5
Flue gas (lb/h)	16,081		T2 (°F)	68
Density (lb/ft3)	0.0413			
Volume flow (ft3/h)	389,370.46			
SCFM (68°F, 14 psi)	3,917.22	0.978		

Flue Gas Component	Molar Flow (lbmol/h)	MW	lb/hr	STPY	Conc. (lb/ft3)	Conc. (mg/m3)	Conc. (ppmv)
C1	0.001	16.04	0.02	0.07	4.24E-08	6.80E-01	1.69E+00
Ethylene	0.003	28.05	0.08	0.35	2.04E-07	3.27E+00	4.65E+00
C2	0.002	30.07	0.06	0.28	1.65E-07	2.64E+00	3.50E+00
C3	0.003	44.1	0.11	0.49	2.87E-07	4.61E+00	4.16E+00
iC4	0.001	58.12	0.06	0.27	1.56E-07	2.50E+00	1.72E+00
nC4	0.000	58.12	0.01	0.04	2.63E-08	4.22E-01	2.90E-01
Sum VOC	0.010	35.17	**0.34**	**1.50**	8.81E-07	1.41E+01	16.0
SO2	0.0007	64.1	0.04	**0.20**	1.16E-07	1.85E+00	1.15

	Emission Factor *** (lb/MMBtu, LHV basis)	Emission (lb/h)	Emission (US tpy)	Conc. (lb/ft3)	Conc. (mg/m3)	Conc. (ppmv)
Carbon monoxide	0.31	4.91E-01	**2.15E+00**	1.26032E-06	2.02E+01	**28.7**
Nitrogen oxides	0.068	1.08E-01	**4.71E-01**	2.76457E-07	4.43E+00	**3.84**

Operating hours/year (purge and B.S.) - Flare pilot Emissions 168

Refinery capacity

55,000	bbl/d
55	Mbbl/d
0.055	MMbbl/d

Blowdown Operations (1)

Blowdown hours 168

Criteria Pollutant	lb/Mbbl Refinery Capacity	Blowdown Emission (lb/h)	Blowdown Emission (STPY)
Carbon monoxide (CAS No. 630-08-0)	4.3	9.9	0.828
Nitrogen oxides	19	43.5	3.658
SOX	27	61.9	5.198
VOC	0.8	1.8	0.154
SOOT ($PM_{2.5}$-FIL) from Lightly smoking flares (2)	0.027	0.1	0.005

Reference 1: "Emissions Estimation Protocol for Petroleum Refineries, Table 5-12 *"Default Emission Factors for Blowdown Systems"*

Assumption: Controlled emissions of a blowdown system with vapor recovery and flaring

Reference 2: "Emissions Estimation Protocol for Petroleum Refineries, Table 6-3 *"Emission Factors for Soot from Flares"*

Calculated using the LHV energy consumption-based emission factor

		BAT*
Vacuum feed bbl/day	26,000.00	0
Operating hours/year	8,760	

	Emissions Factor(lb/Mbbl of vacuum feed)*	Vacuum feed Mbbl/day	Emission (lb/d)	Emission (TPY)
Total hydrocarbons	0	0	0	0.00

Total hydrocarbon may be estimated as a surrogate for VOC. (Overall, less than 1 weight % of total hydrocarbon emissions is methane.)
Emission factors based on Table 5.1-1, AP-42, Chapter 5.1: Petroleum Refining.
*The purge is recovered and sent to fuel gas system (that's within the design), and those emissions are 0.
Any equipment leaks leading to the vacuum system are accounted in the LDAR program.

Refinery capacity

	55,000	bbl/d
	55	Mbbl/d
	0.055	MMbbl/d

Number of flares	4		Number of pilots	20
Fuel Gas to Pilots (SCF/h) (each pilot)	100	scf/h		
Flare hours	168	h		
		year		

Case: Normal operation	
Heating Value (MMBTU / SCF) (Natural Gas)=	0.00052
Fuel Gas to Pilots (SCF/h) (each flare)	100
LHV (MMBTU/h)	1.04

	HC Emergency Flare 1	HC Emergency Flare 2	Acid Flare	Enclosed HC Operating Flare
Number of Pilots	3	3	2	12
LHV (MMBTU/h)	0.156	0.156	0.104	0.624

Flare HAP

FOR 168 Hours of flaring

HAP	Emission Factor (tons/yr/bbl/d)	Emission (TPY)	lb/h-flaring
Benzene	9.00E-06	9.49E-06	1.13E-04
Toluene	7.00E-06	7.38E-06	8.79E-05
Xylene	6.00E-06	6.33E-06	7.53E-05
Methyl tertiary-butyl ether	3.00E-06	3.16E-06	3.77E-05
Hexane	1.00E-05	1.05E-05	1.26E-04
Formaldehyde	1.00E-06	1.05E-06	1.26E-05
Ethylbenzene	2.00E-07	2.11E-07	2.51E-06
1,3-Butadiene	7.00E-06	7.38E-06	8.79E-05
Total HAP (TPY)		4.56E-05	5.42E-04

MBBL	9.0 E-06 Ton-(	2000 lb	y
d	yr-Mbbl	ton	8760 h-flaring
	0.000113 lb	h-flaring	ton
	h-flaring	yr	2000 lb

Reference: "Emissions Estimation Protocol for Petroleum Refineries, Table 6-4 *"Flare General Emission Factors"*

Flare Pilot Operations

	8760	h
		y
Conversion	1020	BTU / SCF

Pilot Emissions (lb/h)

				Emissions (lb/h)				
				EF (lb/MMBTU)*	CO	Pb	PM total	PM COND
Flare	# Pilots	NG Flow/Pilot	NG SCF/h	MMBTU/h	0.0280000	0.0000005	0.0040000	0.0030000
HC Emergency Flare 1	3	100	300	0.306	8.57E-03	1.50E-07	1.22E-03	9.18E-04
HC Emergency Flare 2	3	100	300	0.306	8.57E-03	1.50E-07	1.22E-03	9.18E-04
Acid Flare	2	100	200	0.204	5.71E-03	1.00E-07	8.16E-04	6.12E-04
Enclosed HC Operating Flare	12	100	1200	1.224	3.43E-02	6.00E-07	4.90E-03	3.67E-03
				Total (lb/h)	**5.71E-02**	**1.00E-06**	**8.16E-03**	**6.12E-03**
				Total (STPY)	**0.25**	**4.38E-06**	**0.04**	**0.03**

				Emissions (lb/h)				
				EF (lb/MMBTU)*	PM FILT	NOX	SO2	VOC
Flare	# Pilots	NG Flow/Pilot	NG SCF/h	MMBTU/h	0.0010000	0.0300000	0.0005882	0.0053922
HC Emergency Flare 1	3	100	300	0.306	3.06E-04	9.18E-03	1.80E-04	1.65E-03
HC Emergency Flare 2	3	100	300	0.306	3.06E-04	9.18E-03	1.80E-04	1.65E-03
Acid Flare	2	100	200	0.204	2.04E-04	6.12E-03	1.20E-04	1.10E-03
Enclosed HC Operating Flare	12	100	1200	1.224	1.22E-03	3.67E-02	7.20E-04	6.60E-03
				Total (lb/h)	**2.04E-03**	**6.12E-02**	**1.20E-03**	**1.10E-02**
				Total (STPY)	**0.01**	**0.27**	**0.01**	**0.05**

*Calculated based on the TABLE 1.4-2. AP 42, Fifth Edition, Volume IChapter 1: External Combustion Sources.

DATA

Operating Hours	8760	yr
Charge	55,000.00	bbl/day
Water Density	8.34	lb/gal

Process Unit	Average Throughput of the Unit (bbl/d)	Average Waste Water Flow Factor (gal/bbl) (a)	Waste Water Flow (gal/d)**	Average Benzene Concentration (ppmw) (a)	Benzene Mass Flow (lb/d) Uncontrolled	Benzene Mass Flow (lb/d) Controlled
Desalter Charge*	55,000	0.05	115,644	21	20.254	1.013
Alkylation unit	5,388	6	-	3	-	-
Catalytic reforming	12,720	1.5	-	106	-	-
Hydrotreating/hydrorefining	47,418	2.6	-	6.3	-	-
Catalytic cracking	14,376	2.4	-	13	-	-
Product blending	32,221	2.9	-	24	-	-
Sulfur plant*	11.37	9.7	110.3	0.8	0.001	0.000
Isomerization	3,362	1.5	-	33	-	-
Tank drawdown	110,586	0.02	2,212	188	3.468	0.173
* Estimated from process data for the desalter.				**Total**	**23.72**	1.186

*This flow factor is given in gal/ton of sulfur

** WWTP engineering data

*** Assumes VSEP pretreatment or similar pretreatment of inflow into API (or in lieu of API)

95% Assumed Efficiency

YES — Pretreatment Control *** Yes/No?

CALCULATIONS

Mass Flow Benzene $1.19 \frac{\text{lb}}{\text{day}}$

Example

	Benzene Mass Ratio			Mass Flow lb/d	
Toluene	3.3	1.19 lb / day	=	3.91	Toluene lb / day

	Benzene Mass Ratio (b)	Mass Flow (lb/d)	Mass Fraction Table 7-10 BWON (C)	Emissions (STPY)	Emissions (STPY) Controlled	Emissions (lb/h) Controlled
Total VOC	81	96.08	0.6	10.52	**10.52**	**2.40**
2,2,4- Trimethylpentane	1.97	2.34	0.55	0.23	**1.06E-01**	**2.41E-02**
Benzene	1	1.19	0.25	0.05	**2.44E-02**	**5.56E-03**
Biphenyl	0.034	0.04	0.031	2.28E-04	**1.03E-04**	**2.34E-05**
Cresols	0.25	0.30	0	0.00E+00	**0.00E+00**	**0.00E+00**
Cumene	0.37	0.44	0.24	0.02	**8.65E-03**	**1.97E-03**
Ethylbenzene	0.88	1.04	0.22	0.04	**1.89E-02**	**4.31E-03**
Hexane	3.5	4.15	0.55	0.42	**1.88E-01**	**4.28E-02**
Methyl tertiary-butyl ether	0.58	0.69	0.091	0.01	**5.14E-03**	**1.17E-03**
Naphthalene	0.29	0.34	0.098	0.01	**2.77E-03**	**6.32E-04**
Phenol	0.18	0.21	0	0.00	**0.00E+00**	**0.00E+00**
Styrene	0.58	0.69	0.64	0.08	**3.62E-02**	**8.26E-03**
Toluene	3.3	3.91	0.19	0.14	**6.11E-02**	**1.39E-02**
Xylene	3.6	4.27	0.21	0.16	**7.36E-02**	**1.68E-02**
1,3-Butadiene	0.0006	0.00	0.75	0.00	**4.38E-05**	**1.00E-05**
			Total HAP (Uncontrolled)	1.16	5.24E-01	1.20E-01
			Total HAP (Controlled)	0.524		

55% Efficiency by use of activated carbon filters in API Separator

PROPOSED CONTROL OF HAP TO THE WWTS

The HAP contribution exceeds the 10 TPY limit for this pollutant. Existing technology can remove the benzene directly from the streams that are contributing the highest load.

The technology can remove at a minimum 90% of the benzene. The Catalytic Reformer and the Product Blending process sewers would have to be segregated and lifted to the pretreatment unit prior to discharge to the WWTS

The efficiency must be at least 82% to achieve the reduction in emissions necessary

(a) Table 7-8. Model Process Unit Characteristics for Petroleum Refinery Wastewater

(b) Table 7-9. Refinery Wastewater Contaminant Concentrations as a Ratio to Benzene

(c) Table 7-10. Default Mass Emission Factors for Refinery Wastewater Collection and Treatment Systems

Tables adpted from the Emissions Estimation Protocol for Petroleum Refineries, Version 3, RTI International.

Design Cooling Water Circulation

Rate (Mgpm):	3	Three cells, 1,500 gpm each, two operating one on standby
Operating hours/year	8760	
Water density	8.34 lb/gal	

Emission	Emission Factor* (lb/Mgal)	TDS Concentration (ppm)	Emission (lb/h)	Emission (STPY)
VOC	0.006	-	8.10E-02	3.55E-01
PM10	0.0315	14,279	4.25E-01	1.86E+00

*Emission Factos shown here correspond only to induced draft, counter flow.

PM Emission Calculation

Water Drift Factor (lb/Mgal)	625.5
0.005% of drift factor for a water loss of 0.075 GPM	

$$\frac{625.5\ \text{lb H2O Drift}}{\text{Mgal}} \times \frac{3\ \text{Mgal H2O}}{\text{minute}} = 1876.5\ \frac{\text{lb H2O Drift}}{\text{minute}}$$

$$\frac{1876.5\ \text{lb H2O}}{\text{minute}} \times \frac{60\ \text{minute}}{\text{hour}} \times \frac{\text{gal}}{8.3378\ \text{lb}} = 13503.56\ \frac{\text{gal Drift}}{\text{hour}}$$

$$\frac{13503.56\ \text{gal Drift}}{\text{hour}} \times \frac{0.0315\ \text{lb PM}}{\text{Mgal}} \times \frac{\text{Mgal}}{1000\ \text{gal}} = 4.25E\text{-}01\ \frac{\text{lb PM}}{\text{hour}}$$

$$\frac{0.0315\ \text{lb}}{\text{Mgal}} \times \frac{\text{kg}}{2.206\ \text{lb}} \times \frac{1\ E06\ \text{mg}}{\text{kg}} \times \frac{\text{ppm}}{\text{mg}} = 14279\ \text{ppm}$$

VOC Calculation

$$\frac{625.5\ \text{lb H2O Drift}}{\text{Mgal}} \times \frac{\text{Mgal H2O}}{\text{minute}} = 1876.5\ \frac{\text{lb H2O Drift}}{\text{minute}}$$

$$\frac{1876.5\ \text{lb H2O}}{\text{minute}} \times \frac{60\ \text{minute}}{\text{hour}} \times \frac{\text{gal}}{8.3378\ \text{lb}} = 13503.56\ \frac{\text{gal Drift}}{\text{hour}}$$

$$\frac{13503.56\ \text{gal Drift}}{\text{hour}} \times \frac{0.006\ \text{lb PM}}{\text{Mgal}} \times \frac{\text{Mgal}}{1000\ \text{gal}} = 8.10E\text{-}02\ \frac{\text{lb PM}}{\text{hour}}$$

Operating hours/year: 5840 (2 - 8 hr shifts per day)

Refinery production	bbl/d	gal/d	Notes	gal/year
Crude oil	55,000	2,310,000		20,075,000
Gasoline	22,666	951,962	Including offspec gasoline/naphtha and light slop	8,272,999
Jet Kerosene	6,349	266,648		2,317,294
Diesel	8,327	349,745	Including offspec diesel/fuel oil	3,039,446
Fuel Oil	3,797	159,474	Including heavy slop	1,385,905

Description	EF (lb/Mgal)1	Uncontrolled Emissions (lb/h)	Uncontrolled Emissions (TPY)	Control Device	% Efficiency	Actual Emissions (TPY)	Actual Emissions (lb/h)
Crude oil	2	193	562	NG Assisted Flare or VRU	99.85%	0.83	0.19
Gasoline+butane	5	198	579	NG Assisted Flare or VRU	99.85%	0.86	0.20
Jet Kerosene	0.016	0.2	0.5	None	0.00%	0.52	0.12
Diesel No. 2	0.014	0.2	0.6	None	0.00%	0.60	0.14
Fuel Oil No. 6	0.0001	0.001	0.002	None	0%	0.002	0.0004
	Totals	391	1,142			2.81	0.64

Reference 1

AP-42 Table 5.2-5 TOTAL UNCONTROLLED ORGANIC EMISSION FACTORS FOR PETROLEUM LIQUID RAIL TANK CARS AND TANK TRUCKS, AP 42, Fifth Edition, Volume I Chapter 5: Transportation And Marketing Of Petroleum Liquids.

Operating hours/year: 5840 (2 - 8 hr shifts per day)

Refinery production	bbl/d	gal/d	Notes	gal/year
Crude oil	-	-		-
Gasoline+butane	9,555	401,321	Including offspec gasoline/naphtha and light slop	3,487,666
Jet Kerosene	2,116	88,883		772,431
Diesel	2,776	116,582	Including offspec diesel/fuel oil	1,013,149
Fuel Oil	-	-	Including heavy slop	-

Description	EF (lb/Mgal)1	Uncontrolled Emissions (lb/h)	Uncontrolled Emissions (TPY)	Control Device	% Efficiency	Actual Emissions (TPY)	Actual Emissions (lb/h)
Crude oil	2	-	-	None	0%	0.0	0.0
Gasoline+butane	5	84	244	NG Assisted Flare or VRU	99.85%	0.36	0.1
Jet Kerosene	0.016	0.1	0.2	None	0%	0.17	0.0
Diesel No. 2	0.014	0.1	0.2	None	0%	0.20	0.0
Fuel Oil No. 6	0.0001	-	-	None	0%	0.00	0.0
	Totals	84	245			0.73	0.17

Reference 1

AP-42 Table 5.2-5 TOTAL UNCONTROLLED ORGANIC EMISSION FACTORS FOR PETROLEUM LIQUID RAIL TANK CARS AND TANK TRUCKS, AP 42, Fifth Edition, Volume I Chapter 5: Transportation And Marketing Of Petroleum Liquids.

BASIS

It is assumed that crude oil inlet is via rails, not trucking. Also, it is assumed that 25% of liquid products (excep fuel oil) are loaded and transported via trucking; actual emissions might be lower, since in the future more volume may be transported via railroad.

Refinery production	bbl/d	gal/d	Notes	Truck Capacity (gallon)	trips/day
Gasoline+butane	9,555	401,321	Including offspec gasoline/naphtha and light slop	10000	40
Jet Kerosene	2,116	88,883		8000	11
Diesel	2,776	116,582	Including offspec diesel/fuel oil	6000	19
LPG	1,500	63,000	Including heavy slop	6000	11
				Total	81

Truck Round Trip Distance/trip 0.0379 mile

5280 feet / mile

200 feet traveled

TRUCK LOADING VMT

81 Trip/day × 0.04 mile/Round Trip × 365 day/year = 1,120 VMT/year

= 3.07 VMT/d

Maximum Gross Weight for USDOT tractor trailer

80000 lb

40 ton

Average Speed

5 mile/hr

Wet days (Mean) 90 day

P (Value) 2160 hour

N (Value) 8760 hour

TRUCK VMT IN LIMITED ACCESS ROAD

Pollutant	k (lb/VMT)	Silt L (grain/sq ft) [2]	W (ST)	N (hour)	P (hour)	Emission Factor (lb/VMT)
PM 2.5	0.00054	2.15E-02	40	8760	2160	0.001
PM 10	0.0022	2.15E-02	40	8760	2160	0.003

PM 2.5 Emissions

0.001 lb/VMT × 3.07 VMT/d × d/24 h = 8.47E-05 lb PM 2.5/h

0.001 lb/VMT × 3.07 VMT/d × 365 day/year × ton/2000 lb = 3.71E-04 Ton PM 2.5/Year

0.001 lb/VMT × 3.07 VMT/d × d/24 h × h/3600 s × kg/2.206 lb × 1000 g/s = 1.07E-05 g PM 2.5/s

PM 10 Emissions

0.003 lb/VMT × 3.07 VMT/d × d/24 h = 3.45E-04 lb PM TOT/h

0 lb/VMT × 3.07 VMT/d × 365 day/year × ton/2000 lb = 1.51E-03 Ton PM TOT/Year

0.003lb/VMT × 3.07 VMT/d × d/24 h × h/3600 s × kg/2.206 lb × 1000 g/s = 5.37E-04 g PM TOT/s

Assumption Silt loading at the lower range of values since the vehicles will not exceed 5 MPH, and will not be involved in heavy braking

EMPLOYEE PARKING VMT

Employees/shift	Shifts	Trips
100	2	200

Employee Round Trip Distance/trip

0.1894 mile
5280 feet / mile
1000 feet traveled

Vehicle Miles Traveled

200 Trip / day	0.19 mile / Round Trip	365 day / year	=	13,826 VMT / year
			=	37.88 VMT / d

Average Gross Weight Vehicle [1]

3600 lb
1.8 ton

Average Speed

5 mile / hr

Wet days (Mean) 90 day

P (Value) 2160 hour
N (Value) 8760 hour

EMPLOYEE VMT IN LIMITED ACCESS PARKING LOT

Pollutant	k (lb/VMT)	Silt L (grain/sq ft) [2]	W (ST)	N (hour)	P (hour)	Emission Factor (lb/VMT)
PM 2.5	0.00054	2.15E-02	1.8	8760	2160	2.80E-05
PM 10	0.0022	2.15E-02	1.8	8760	2160	1.14E-04

PM 2.5 Emissions

0.000028 lb / VMT	37.88 VMT / d	d / 24 h	=	4.42E-05 lb PM 2.5 / h

0.00003 lb / VMT	37.88 VMT / d	365 day / year	ton / 2000 lb	=	1.94E-04 Ton PM 2.5 / Year

0.00003 lb / VMT	37.88 VMT / d	d / 24 h	h / 3600 s	kg / 2.206 lb	1000 g / s	=	5.57E-06 g PM 2.5 / s

PM 10 Emissions

0.0001142 lb / VMT	37.88 VMT / d	d / 24 h	=	1.80E-04 lb PM TOT / h

0.00011 lb / VMT	37.88 VMT / d	365 day / year	ton / 2000 lb	=	7.89E-04 Ton PM TOT / Year

0.00011 lb / VMT	37.88 VMT / d	d / 24 h	h / 3600 s	kg / 2.206 lb	1000 g / s	=	2.27E-05 g PM TOT / s

Assumption Silt loading at the lower range of values since the vehicles will not exceed 5 MPH, and will not be involved in heavy braking

[1] Passenger Car and Light Truck Fleets Characteristics, Corporate Average Fuel Economy (CAFE) standards
http://www.nhtsa.gov/cars/rules/CAFE/NewPassengerCarFleet.htm
[2] AP 42 Emission Factors, Fifth Edition, Volume I, Section 13.2.1. Paved Roads, Silt loading factor for limited access roads, page 13.2.1-9

Spent Catalyst Handling

Data

8.614	ton catalyst/14 day
14	day maintenance schedule
70000	bbl/day

Calculations

Spent Catalyst Production

$$\frac{8.614\ \text{ton}}{\ } \times \frac{2000\ \text{lb}}{\text{ton}} \times \frac{\ }{14\ \text{day}} = 1231\ \frac{\text{lb PM}}{\text{day}}$$

Percentage of catalyst suspended in the air during transfer into the bi 15%

$$\frac{1230.6\ \text{lb}}{\text{day}} \times \frac{15\%}{\ } = 184.59\ \frac{\text{lb PM}}{\text{day}}$$

Controlled Emissions 95% efficiency

$$\frac{184.6\ \text{lb}}{\text{day}} \times \frac{\text{day}}{70000\ \text{bbl}} \times \frac{(1-0.95)}{\ } = 1.32\text{E-}04\ \frac{\text{lb PM}}{\text{bbl}}$$

Emissions for 365 day operation, 55 000 barrel/day

$$\frac{0.0001\ \text{lb}}{\text{bbl}} \times \frac{55000\ \text{bbl}}{\text{day}} \times \frac{365\ \text{day}}{\text{year}} = 2646.83\ \frac{\text{lb PM}}{\text{year}}$$

$$\frac{2646.8\text{lb}}{\text{year}} \times \frac{\text{yr}}{2000\ \text{lb}} = 1.32\ \frac{\text{ton PM}}{\text{year}}$$

Operating hours/yr:		EMERGENCY GENERATOR SET						FIREWATER DIESEL PUMP											
100		Power (MW)	3.5	HP	4693.5			HP	600	GPH = (specific fuel consumption x HP)/Fuel Specific Weight									
sulfur content in diesel	0.05%	Fuel consumption (gph)	423	Diesel Energy Content (MMBTU/gal)	0.137	MMBTUh	57.96	Fuel consumption (gph)	33.33	Diesel Energy Content (MMBTU/gal)	0.137	MMBTUh	4.57						
		216-EG-1601A		216-EG-1601B		216-EG-1601C		212-P-1201 A		212-P-1201 B		212-P-1201 C							
Criteria Pollutants	Emission Factor	Emission (lb/h)	Emission (STPY)	Emission (lb/h)	Emission (STPY)	Emission (lb/h)	Emission (STPY)	Emission (lb/h)	Emission (STPY)	Emission (lb/h)	Emission (STPY)	Emission (lb/h)	Emission (STPY)	Total Emissions Gen Set (lb/h)	Total Emissions Gen Set (STPY)	Total Emissions FWP (lb/h)	Total Emissions FWP (STPY)	Total Emissions (lb/h)	Total Emissions (STPY)
	lb/HP-hr lb/MMBTU																		
Carbon Monoxide	0.0055	25.8	1.29	25.8	1.3	25.8	1.3	3.3	0.17	3.3	0.2	3.3	0.2	77.44	3.87	9.90	0.50	87.34	4.37
PM	0.0007	3.29	0.16	3.29	0.16	3.29	0.16	0.42	0.02	0.42	0.02	0.42	0.02	9.86	0.49	1.26	0.06	11.12	0.56
PM 10 (Total)	0.0573	3.32	0.17	3.3	0.2	3.3	0.2	0.26	0.01	0.26	0.01	0.26	0.01	9.96	4.98E-01	7.85E-01	3.93E-02	10.75	5.37E-01
PM 10 (Filterable)	0.0496	2.87	0.14	2.9	0.1	2.9	0.1	0.23	0.01	0.23	0.01	0.23	0.01	8.62	4.31E-01	6.80E-01	3.40E-02	9.30	4.65E-01
PM 2.5 (Total)	0.0479	2.78	0.14	2.8	0.1	2.8	0.1	0.22	0.01	0.22	0.01	0.22	0.01	8.33	4.16E-01	6.56E-01	3.28E-02	8.99	4.49E-01
PM 2.5(Filterable)	0.0479	2.78	0.14	2.8	0.1	2.8	0.1	0.22	0.01	0.22	0.01	0.22	0.01	8.33	4.16E-01	6.56E-01	3.28E-02	8.99	4.49E-01
PM (Condensable)	0.0077	0.45	0.02	0.4	0.0	0.4	0.0	0.04	0.00	0.04	0.00	0.04	0.00	1.34	6.69E-02	1.06E-01	5.28E-03	1.44	7.22E-02
NOx*	0.013	61.0	3.05	61.0	3.1	61.0	3.1	7.8	0.39	7.80	0.39	7.80	0.39	183.05	9.15	23.40	1.17	206.45	10.32
SOx	4.05E-06	1.90E-02	9.49E-04	1.90E-02	9.49E-04	1.90E-02	9.49E-04	2.43E-03	1.21E-04	2.43E-03	1.21E-04	2.43E-03	1.21E-04	5.70E-02	2.85E-03	7.28E-03	3.64E-04	6.42E-02	3.21E-03
TOC (as VOC)	7.05E-04	3.31	0.17	3.31	0.17	3.31	0.17	0.42	0.02	0.42	0.02	0.42	0.02	9.93	4.96E-01	1.27	6.35E-02	11.20	5.60E-01
Org HAP (Total)		2.53E-01	1.26E-02	2.53E-01	1.26E-02	2.53E-01	1.26E-02	1.99E-02	9.97E-04	1.99E-02	9.97E-04	1.99E-02	9.97E-04	7.59E-01	3.79E-02	5.98E-02	2.99E-03	8.19E-01	4.09E-02

*Controlled by ignition timing retard

From AP-42 Chapter 3 Section 3.4. Large Stationary Diesel And All Stationary Dual-fuel Engines. Table 3.4-1. GASEOUS EMISSION FACTORS FOR LARGE STATIONARY DIESEL AND ALL STATIONARY DUAL-FUEL ENGINES and Table 3.4-2. PARTICULATE AND PARTICLE-SIZING EMISSION FACTORS FOR LARGE UNCONTROLLED STATIONARY DIESEL ENGINES

	EMERGENCY GENERATOR SET			x 3 Engines	
Volatile HAPS	lb/MMBTU	lb/hr	Emission (STPY)	lb/hr	Emission (STPY)
Benzene	7.76E-04	4.50E-02	2.25E-03	1.35E-01	6.75E-03
Toluene	2.81E-04	1.63E-02	8.14E-04	4.89E-02	2.44E-03
Xylene	1.93E-04	1.12E-02	5.59E-04	3.36E-02	1.68E-03
Propylene	2.79E-03	1.62E-01	8.09E-03	4.85E-01	2.43E-02
Formaldehyde	7.89E-05	4.57E-03	2.29E-04	1.37E-02	6.86E-04
Acetaldehyde	2.52E-05	1.46E-03	7.30E-05	4.38E-03	2.19E-04
Acrolein	7.88E-06	4.57E-04	2.28E-05	1.37E-03	6.85E-05
TOTAL VOLATILE HAPS		**2.41E-01**	**1.20E-02**	**7.22E-01**	**3.61E-02**
PAHs					
Naphthalene	1.30E-04	7.54E-03	3.77E-04	2.26E-02	1.13E-03
Acenaphthylene	9.23E-06	5.35E-04	2.68E-05	1.61E-03	8.03E-05
Acenaphthene	4.68E-06	2.71E-04	1.36E-05	8.14E-04	4.07E-05
Fluorene	1.28E-05	7.42E-04	3.71E-05	2.23E-03	1.11E-04
Phenanthrene	4.08E-05	2.36E-03	1.18E-04	7.09E-03	3.55E-04
Anthracene	1.23E-06	7.13E-05	3.56E-06	2.14E-04	1.07E-05
Fluoranthene	4.03E-06	2.34E-04	1.17E-05	7.01E-04	3.50E-05
Pyrene	3.71E-06	2.15E-04	1.08E-05	6.45E-04	3.23E-05
Benz(a)anthracene	6.22E-07	3.61E-05	1.80E-06	1.08E-04	5.41E-06
Chrysene	1.53E-06	8.87E-05	4.43E-06	2.66E-04	1.33E-05
Benzo(b)fluoranthene	1.11E-06	6.43E-05	3.22E-06	1.93E-04	9.65E-06
Benzo(k)fluoranthene	2.18E-07	1.26E-05	6.32E-07	3.79E-05	1.90E-06
Benzo(a)pyrene	2.57E-07	1.49E-05	7.45E-07	4.47E-05	2.23E-06
Indeno(1,2,3-cd)pyrene	4.14E-07	2.40E-05	1.20E-06	7.20E-05	3.60E-06
Dibenz(a,h)anthracene	3.46E-07	2.01E-05	1.00E-06	6.02E-05	3.01E-06
Benzo(g,h,l)perylene	5.56E-07	3.22E-05	1.61E-06	9.67E-05	4.83E-06
TOTAL PAH	**2.12E-04**	**1.23E-02**	**6.14E-04**	**3.69E-02**	**1.84E-03**

	FIREWATER PUMPS			x 3 Engines	
Volatile HAPS	lb/MMBTU	lb/hr	Emission (STPY)	lb/hr	Emission (STPY)
Benzene	7.76E-04	3.54E-03	1.77E-04	1.06E-02	5.32E-04
Toluene	2.81E-04	1.28E-03	6.42E-05	3.85E-03	1.93E-04
Xylene	1.93E-04	8.82E-04	4.41E-05	2.64E-03	1.32E-04
Propylene	2.79E-03	1.27E-02	6.37E-04	3.82E-02	1.91E-03
Formaldehyd	7.89E-05	3.60E-04	1.80E-05	1.08E-03	5.41E-05
Acetaldehyde	2.52E-05	1.15E-04	5.76E-06	3.45E-04	1.73E-05
Acrolein	7.88E-06	3.60E-05	1.80E-06	1.08E-04	5.40E-06
TOTAL VOLATILE HAPS		**1.90E-02**	**9.48E-04**	**5.69E-02**	**2.84E-03**
PAHs					
Naphthalene	1.30E-04	5.94E-04	2.97E-05	1.78E-03	8.91E-05
Acenaphthyle	9.23E-06	4.22E-05	2.11E-06	1.26E-04	6.32E-06
Acenaphthen	4.68E-06	2.14E-05	1.07E-06	6.41E-05	3.21E-06
Fluorene	1.28E-05	5.85E-05	2.92E-06	1.75E-04	8.77E-06
Phenanthren	4.08E-05	1.86E-04	9.32E-06	5.59E-04	2.80E-05
Anthracene	1.23E-06	5.62E-06	2.81E-07	1.69E-05	8.43E-07
Fluoranthene	4.03E-06	1.84E-05	9.20E-07	5.52E-05	2.76E-06
Pyrene	3.71E-06	1.69E-05	8.47E-07	5.08E-05	2.54E-06
Benz(a)anthr	6.22E-07	2.84E-06	1.42E-07	8.52E-06	4.26E-07
Chrysene	1.53E-06	6.99E-06	3.49E-07	2.10E-05	1.05E-06
Benzo(b)fluo	1.11E-06	5.07E-06	2.54E-07	1.52E-05	7.61E-07
Benzo(k)fluo	2.18E-07	9.96E-07	4.98E-08	2.99E-06	1.49E-07
Benzo(a)pyre	2.57E-07	1.17E-06	5.87E-08	3.52E-06	1.76E-07
Indeno(1,2,3-	4.14E-07	1.89E-06	9.46E-08	5.67E-06	2.84E-07
Dibenz(a,h)a	3.46E-07	1.58E-06	7.90E-08	4.74E-06	2.37E-07
Benzo(g,h,l)p	5.56E-07	2.54E-06	1.27E-07	7.62E-06	3.81E-07
TOTAL PAH	**2.12E-04**	**9.68E-04**	**4.84E-05**	**2.91E-03**	**1.45E-04**

From AP-42 Chapter 3 Section 3.4. Large Stationary Diesel And All Stationary Dual-fuel Engines. Table 3.4-3. SPECIATED ORGANIC COMPOUND EMISSION FACTORS FOR LARGE UNCONTROLLED STATIONARY DIESEL ENGINES and Table 3.4-4. PAH EMISSION FACTORS FOR LARGE UNCONTROLLED STATIONARY DIESEL ENGINES

TANKS 4.09d SOFTWARE RUNS

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Indentification and Physical Characteristics

Identification

User Identification:	203-T-0001
City:	Belfield
State:	North Dakota
Company:	Meridian
Type of Tank:	Internal Floating Roof Tank
Description:	Crude Oil

Tank Dimensions

Diameter (ft):	115.00
Volume (gallons):	4,661,968.00
Turnovers:	60.25
Self Supp. Roof? (y/n):	Y
No. of Columns:	0.00
Eff. Col. Diam. (ft):	0.00

Paint Characteristics

Internal Shell Condition:	Light Rust
Shell Color/Shade:	Gray/Light
Shell Condition	Good
Roof Color/Shade:	Gray/Light
Roof Condition:	Good

Rim-Seal System

Primary Seal:	Mechanical Shoe
Secondary Seal	Rim-mounted

Deck Characteristics

Deck Fitting Category:	Detail
Deck Type:	Welded

Deck Fitting/Status	Quantity
Access Hatch (24-in. Diam.)/Bolted Cover, Gasketed	1
Automatic Gauge Float Well/Bolted Cover, Gasketed	1
Roof Leg or Hanger Well/Fixed	39
Sample Pipe or Well (24-in. Diam.)/Slotted Pipe-Sliding Cover, Gask.	1
Vacuum Breaker (10-in. Diam.)/Weighted Mech. Actuation, Gask.	1

Meterological Data used in Emissions Calculations: Bismarck, North Dakota (Avg Atmospheric Pressure = 13.86 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

203-T-0001 - Internal Floating Roof Tank
Belfield, North Dakota

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Crude oil (RVP 5)	Jan	30.90	24.94	36.87	43.84	1.5709	N/A	N/A	50.0000			207.00	Option 4: RVP=5
Crude oil (RVP 5)	Feb	34.98	28.04	41.91	43.84	1.7173	N/A	N/A	50.0000			207.00	Option 4: RVP=5
Crude oil (RVP 5)	Mar	42.09	33.80	50.39	43.84	1.9992	N/A	N/A	50.0000			207.00	Option 4: RVP=5
Crude oil (RVP 5)	Apr	50.10	39.90	60.29	43.84	2.3601	N/A	N/A	50.0000			207.00	Option 4: RVP=5
Crude oil (RVP 5)	May	56.81	45.06	68.55	43.84	2.7017	N/A	N/A	50.0000			207.00	Option 4: RVP=5
Crude oil (RVP 5)	Jun	61.81	49.29	74.32	43.84	2.9814	N/A	N/A	50.0000			207.00	Option 4: RVP=5
Crude oil (RVP 5)	Jul	64.71	51.53	77.88	43.84	3.1539	N/A	N/A	50.0000			207.00	Option 4: RVP=5
Crude oil (RVP 5)	Aug	62.42	50.31	74.54	43.84	3.0174	N/A	N/A	50.0000			207.00	Option 4: RVP=5
Crude oil (RVP 5)	Sep	55.34	45.27	65.40	43.84	2.6237	N/A	N/A	50.0000			207.00	Option 4: RVP=5
Crude oil (RVP 5)	Oct	48.45	40.33	56.58	43.84	2.2821	N/A	N/A	50.0000			207.00	Option 4: RVP=5
Crude oil (RVP 5)	Nov	39.43	33.50	45.36	43.84	1.8896	N/A	N/A	50.0000			207.00	Option 4: RVP=5
Crude oil (RVP 5)	Dec	32.50	27.06	37.95	43.84	1.6272	N/A	N/A	50.0000			207.00	Option 4: RVP=5

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

203-T-0001 - Internal Floating Roof Tank
Belfield, North Dakota

Month:	January	February	March	April	May	June	July	August	September	October	November	December
Rim Seal Losses (lb):	3.4568	3.8010	4.4754	5.3621	6.2266	6.9539	7.4116	7.0488	6.0270	5.1682	4.2114	3.5887
Seal Factor A (lb-mole/ft-yr):	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000
Seal Factor B (lb-mole/ft-yr (mph)^n):	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000
Value of Vapor Pressure Function:	0.0301	0.0331	0.0389	0.0466	0.0541	0.0605	0.0644	0.0613	0.0524	0.0449	0.0366	0.0312
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	1.5709	1.7173	1.9992	2.3601	2.7017	2.9814	3.1539	3.0174	2.6237	2.2821	1.8896	1.6272
Tank Diameter (ft):	115.0000	115.0000	115.0000	115.0000	115.0000	115.0000	115.0000	115.0000	115.0000	115.0000	115.0000	115.0000
Vapor Molecular Weight (lb/lb-mole):	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000
Product Factor:	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000
Withdrawal Losses (lb):	194.6791	194.6791	194.6791	194.6791	194.6791	194.6791	194.6791	194.6791	194.6791	194.6791	194.6791	194.6791
Number of Columns:	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Effective Column Diameter (ft):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Net Throughput (gal/mo.):	23,406,964.333323	406,964.333323	406,964.333323	406,964.333323	406,964.333323	406,964.333323	406,964.333323	406,964.333323	406,964.333323	406,964.333323	406,964.333323	406,964.3333
Shell Clingage Factor (bbl/1000 sqft):	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060
Average Organic Liquid Density (lb/gal):	7.1000	7.1000	7.1000	7.1000	7.1000	7.1000	7.1000	7.1000	7.1000	7.1000	7.1000	7.1000
Tank Diameter (ft):	115.0000	115.0000	115.0000	115.0000	115.0000	115.0000	115.0000	115.0000	115.0000	115.0000	115.0000	115.0000
Deck Fitting Losses (lb):	2.6853	2.9526	3.4766	4.1653	4.8369	5.4019	5.7574	5.4756	4.6819	4.0147	3.2715	2.7878
Value of Vapor Pressure Function:	0.0301	0.0331	0.0389	0.0466	0.0541	0.0605	0.0644	0.0613	0.0524	0.0449	0.0366	0.0312
Vapor Molecular Weight (lb/lb-mole):	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000
Product Factor:	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000
Tot. Roof Fitting Loss Fact.(lb-mole/yr):	53.6000	53.6000	53.6000	53.6000	53.6000	53.6000	53.6000	53.6000	53.6000	53.6000	53.6000	53.6000
Deck Seam Losses (lb):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Deck Seam Length (ft):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Deck Seam Loss per Unit Length Factor (lb-mole/ft-yr):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Deck Seam Length Factor(ft/sqft):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Tank Diameter (ft):	115.0000	115.0000	115.0000	115.0000	115.0000	115.0000	115.0000	115.0000	115.0000	115.0000	115.0000	115.0000
Vapor Molecular Weight (lb/lb-mole):	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000
Product Factor:	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000
Total Losses (lb):	200.8212	201.4327	202.6311	204.2065	205.7426	207.0348	207.8481	207.2034	205.3880	203.8620	202.1619	201.0555

Roof Fitting/Status	Quantity	Roof Fitting Loss Factors KFa(lb-mole/yr)	KFb(lb-mole/(yr mph^n))	m	Losses(lb)
Access Hatch (24-in. Diam.)/Bolted Cover, Gasketed	1	1.60	0.00	0.00	1.4803
Automatic Gauge Float Well/Bolted Cover, Gasketed	1	2.80	0.00	0.00	2.5905
Roof Leg or Hanger Well/Fixed	39	0.00	0.00	0.00	0.0000
Sample Pipe or Well (24-in. Diam.)/Slotted Pipe-Sliding Cover, Gask.	1	43.00	0.00	0.00	39.7827
Vacuum Breaker (10-in. Diam.)/Weighted Mech. Actuation, Gask.	1	6.20	1.20	0.94	5.7361

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: January, February, March, April, May, June, July, August, September, October, November, December

203-T-0001 - Internal Floating Roof Tank
Belfield, North Dakota

	Losses(lbs)				
Components	Rim Seal Loss	Withdrawl Loss	Deck Fitting Loss	Deck Seam Loss	Total Emissions
Crude oil (RVP 5)	63.73	2,336.15	49.51	0.00	2,449.39

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Indentification and Physical Characteristics

Identification

User Identification:	203-T-0005
City:	Belfield
State:	North Dakota
Company:	Meridian
Type of Tank:	Internal Floating Roof Tank
Description:	Desulfurized Heavy Naphtha

Tank Dimensions

Diameter (ft):	63.00
Volume (gallons):	1,399,104.00
Turnovers:	26.78
Self Supp. Roof? (y/n):	Y
No. of Columns:	0.00
Eff. Col. Diam. (ft):	0.00

Paint Characteristics

Internal Shell Condition:	Light Rust
Shell Color/Shade:	Gray/Light
Shell Condition	Good
Roof Color/Shade:	Gray/Light
Roof Condition:	Good

Rim-Seal System

Primary Seal:	Liquid-mounted
Secondary Seal	Rim-mounted

Deck Characteristics

Deck Fitting Category:	Detail
Deck Type:	Welded

Deck Fitting/Status	Quantity
Access Hatch (24-in. Diam.)/Bolted Cover, Gasketed	1
Automatic Gauge Float Well/Bolted Cover, Gasketed	1
Roof Leg or Hanger Well/Fixed	39
Sample Pipe or Well (24-in. Diam.)/Slotted Pipe-Sliding Cover, Gask.	1
Vacuum Breaker (10-in. Diam.)/Weighted Mech. Actuation, Gask.	1

Meterological Data used in Emissions Calculations: Bismarck, North Dakota (Avg Atmospheric Pressure = 13.86 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

203-T-0005 - Internal Floating Roof Tank
Belfield, North Dakota

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Gasoline (RVP 6)	Jan	30.90	24.94	36.87	43.84	1.5461	N/A	N/A	69.0000			92.00	Option 4: RVP=6, ASTM Slope=3
Gasoline (RVP 6)	Feb	34.98	28.04	41.91	43.84	1.6990	N/A	N/A	69.0000			92.00	Option 4: RVP=6, ASTM Slope=3
Gasoline (RVP 6)	Mar	42.09	33.80	50.39	43.84	1.9957	N/A	N/A	69.0000			92.00	Option 4: RVP=6, ASTM Slope=3
Gasoline (RVP 6)	Apr	50.10	39.90	60.29	43.84	2.3789	N/A	N/A	69.0000			92.00	Option 4: RVP=6, ASTM Slope=3
Gasoline (RVP 6)	May	56.81	45.06	68.55	43.84	2.7449	N/A	N/A	69.0000			92.00	Option 4: RVP=6, ASTM Slope=3
Gasoline (RVP 6)	Jun	61.81	49.29	74.32	43.84	3.0465	N/A	N/A	69.0000			92.00	Option 4: RVP=6, ASTM Slope=3
Gasoline (RVP 6)	Jul	64.71	51.53	77.88	43.84	3.2334	N/A	N/A	69.0000			92.00	Option 4: RVP=6, ASTM Slope=3
Gasoline (RVP 6)	Aug	62.42	50.31	74.54	43.84	3.0855	N/A	N/A	69.0000			92.00	Option 4: RVP=6, ASTM Slope=3
Gasoline (RVP 6)	Sep	55.34	45.27	65.40	43.84	2.6611	N/A	N/A	69.0000			92.00	Option 4: RVP=6, ASTM Slope=3
Gasoline (RVP 6)	Oct	48.45	40.33	56.58	43.84	2.2958	N/A	N/A	69.0000			92.00	Option 4: RVP=6, ASTM Slope=3
Gasoline (RVP 6)	Nov	39.43	33.50	45.36	43.84	1.8800	N/A	N/A	69.0000			92.00	Option 4: RVP=6, ASTM Slope=3
Gasoline (RVP 6)	Dec	32.50	27.06	37.95	43.84	1.6048	N/A	N/A	69.0000			92.00	Option 4: RVP=6, ASTM Slope=3

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

203-T-0005 - Internal Floating Roof Tank
Belfield, North Dakota

Month:	January	February	March	April	May	June	July	August	September	October	November	December
Rim Seal Losses (lb):	3.2120	3.5512	4.2211	5.1115	5.9891	6.7339	7.2056	6.8316	5.7857	4.9159	3.9581	3.3418
Seal Factor A (lb-mole/ft-yr):	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000
Seal Factor B (lb-mole/ft-yr (mph)^n):	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000
Value of Vapor Pressure Function:	0.0296	0.0327	0.0388	0.0470	0.0551	0.0620	0.0663	0.0629	0.0532	0.0452	0.0364	0.0308
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	1.5461	1.6990	1.9957	2.3789	2.7449	3.0465	3.2334	3.0855	2.6611	2.2958	1.8800	1.6048
Tank Diameter (ft):	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000
Vapor Molecular Weight (lb/lb-mole):	69.0000	69.0000	69.0000	69.0000	69.0000	69.0000	69.0000	69.0000	69.0000	69.0000	69.0000	69.0000
Product Factor:	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Withdrawal Losses (lb):	9.3472	9.3472	9.3472	9.3472	9.3472	9.3472	9.3472	9.3472	9.3472	9.3472	9.3472	9.3472
Number of Columns:	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Effective Column Diameter (ft):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Net Throughput (gal/mo.):	3,122,333.7500	3,122,333.7500	3,122,333.7500	3,122,333.7500	3,122,333.7500	3,122,333.7500	3,122,333.7500	3,122,333.7500	3,122,333.7500	3,122,333.7500	3,122,333.7500	3,122,333.7500
Shell Clingage Factor (bbl/1000 sqft):	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015
Average Organic Liquid Density (lb/gal):	5.6000	5.6000	5.6000	5.6000	5.6000	5.6000	5.6000	5.6000	5.6000	5.6000	5.6000	5.6000
Tank Diameter (ft):	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000
Deck Fitting Losses (lb):	9.1092	10.0710	11.9711	14.4961	16.9850	19.0973	20.4350	19.3741	16.4082	13.9415	11.2250	9.4772
Value of Vapor Pressure Function:	0.0296	0.0327	0.0388	0.0470	0.0551	0.0620	0.0663	0.0629	0.0532	0.0452	0.0364	0.0308
Vapor Molecular Weight (lb/lb-mole):	69.0000	69.0000	69.0000	69.0000	69.0000	69.0000	69.0000	69.0000	69.0000	69.0000	69.0000	69.0000
Product Factor:	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Tot. Roof Fitting Loss Fact.(lb-mole/yr):	53.6000	53.6000	53.6000	53.6000	53.6000	53.6000	53.6000	53.6000	53.6000	53.6000	53.6000	53.6000
Deck Seam Losses (lb):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Deck Seam Length (ft):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Deck Seam Loss per Unit Length Factor (lb-mole/ft-yr):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Deck Seam Length Factor(ft/sqft):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Tank Diameter (ft):	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000
Vapor Molecular Weight (lb/lb-mole):	69.0000	69.0000	69.0000	69.0000	69.0000	69.0000	69.0000	69.0000	69.0000	69.0000	69.0000	69.0000
Product Factor:	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total Losses (lb):	21.6684	22.9694	25.5394	28.9548	32.3212	35.1784	36.9878	35.5529	31.5410	28.2046	24.5302	22.1662

Roof Fitting/Status	Quantity	Roof Fitting Loss Factors KFa(lb-mole/yr)	KFb(lb-mole/(yr mph^n))	m	Losses(lb)
Access Hatch (24-in. Diam.)/Bolted Cover, Gasketed	1	1.60	0.00	0.00	5.1610
Automatic Gauge Float Well/Bolted Cover, Gasketed	1	2.80	0.00	0.00	9.0318
Roof Leg or Hanger Well/Fixed	39	0.00	0.00	0.00	0.0000
Sample Pipe or Well (24-in. Diam.)/Slotted Pipe-Sliding Cover, Gask.	1	43.00	0.00	0.00	138.7026
Vacuum Breaker (10-in. Diam.)/Weighted Mech. Actuation, Gask.	1	6.20	1.20	0.94	19.9990

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: January, February, March, April, May, June, July, August, September, October, November, December

203-T-0005 - Internal Floating Roof Tank
Belfield, North Dakota

	Losses(lbs)				
Components	Rim Seal Loss	Withdrawl Loss	Deck Fitting Loss	Deck Seam Loss	Total Emissions
Gasoline (RVP 6)	60.86	112.17	172.59	0.00	345.61

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Indentification and Physical Characteristics

Identification

User Identification:	203-T-0006
City:	Belfield
State:	North Dakota
Company:	Meridian
Type of Tank:	Internal Floating Roof Tank
Description:	Reformate

Tank Dimensions

Diameter (ft):	63.00
Volume (gallons):	1,399,104.00
Turnovers:	46.90
Self Supp. Roof? (y/n):	Y
No. of Columns:	0.00
Eff. Col. Diam. (ft):	0.00

Paint Characteristics

Internal Shell Condition:	Light Rust
Shell Color/Shade:	Gray/Light
Shell Condition	Good
Roof Color/Shade:	Gray/Light
Roof Condition:	Good

Rim-Seal System

Primary Seal:	Liquid-mounted
Secondary Seal	Rim-mounted

Deck Characteristics

Deck Fitting Category:	Detail
Deck Type:	Welded

Deck Fitting/Status	Quantity
Access Hatch (24-in. Diam.)/Bolted Cover, Gasketed	1
Automatic Gauge Float Well/Bolted Cover, Gasketed	1
Roof Leg or Hanger Well/Fixed	18
Sample Pipe or Well (24-in. Diam.)/Slotted Pipe-Sliding Cover, Gask.	1
Vacuum Breaker (10-in. Diam.)/Weighted Mech. Actuation, Gask.	1

Meterological Data used in Emissions Calculations: Bismarck, North Dakota (Avg Atmospheric Pressure = 13.86 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

203-T-0006 - Internal Floating Roof Tank
Belfield, North Dakota

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Gasoline (RVP 7.8)	Jan	30.90	24.94	36.87	43.84	2.1175	N/A	N/A	68.0000			92.00	Option 4: RVP=7.8, ASTM Slope=3
Gasoline (RVP 7.8)	Feb	34.98	28.04	41.91	43.84	2.3194	N/A	N/A	68.0000			92.00	Option 4: RVP=7.8, ASTM Slope=3
Gasoline (RVP 7.8)	Mar	42.09	33.80	50.39	43.84	2.7093	N/A	N/A	68.0000			92.00	Option 4: RVP=7.8, ASTM Slope=3
Gasoline (RVP 7.8)	Apr	50.10	39.90	60.29	43.84	3.2102	N/A	N/A	68.0000			92.00	Option 4: RVP=7.8, ASTM Slope=3
Gasoline (RVP 7.8)	May	56.81	45.06	68.55	43.84	3.6857	N/A	N/A	68.0000			92.00	Option 4: RVP=7.8, ASTM Slope=3
Gasoline (RVP 7.8)	Jun	61.81	49.29	74.32	43.84	4.0761	N/A	N/A	68.0000			92.00	Option 4: RVP=7.8, ASTM Slope=3
Gasoline (RVP 7.8)	Jul	64.71	51.53	77.88	43.84	4.3173	N/A	N/A	68.0000			92.00	Option 4: RVP=7.8, ASTM Slope=3
Gasoline (RVP 7.8)	Aug	62.42	50.31	74.54	43.84	4.1264	N/A	N/A	68.0000			92.00	Option 4: RVP=7.8, ASTM Slope=3
Gasoline (RVP 7.8)	Sep	55.34	45.27	65.40	43.84	3.5770	N/A	N/A	68.0000			92.00	Option 4: RVP=7.8, ASTM Slope=3
Gasoline (RVP 7.8)	Oct	48.45	40.33	56.58	43.84	3.1018	N/A	N/A	68.0000			92.00	Option 4: RVP=7.8, ASTM Slope=3
Gasoline (RVP 7.8)	Nov	39.43	33.50	45.36	43.84	2.5576	N/A	N/A	68.0000			92.00	Option 4: RVP=7.8, ASTM Slope=3
Gasoline (RVP 7.8)	Dec	32.50	27.06	37.95	43.84	2.1952	N/A	N/A	68.0000			92.00	Option 4: RVP=7.8, ASTM Slope=3

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

203-T-0006 - Internal Floating Roof Tank
Belfield, North Dakota

Month:	January	February	March	April	May	June	July	August	September	October	November	December
Rim Seal Losses (lb):	4.4360	4.8994	5.8171	7.0428	8.2595	9.2997	9.9625	9.4366	7.9767	6.7729	5.4563	4.6132
Seal Factor A (lb-mole/ft-yr):	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000
Seal Factor B (lb-mole/ft-yr (mph)^n):	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000
Value of Vapor Pressure Function:	0.0414	0.0457	0.0543	0.0658	0.0771	0.0868	0.0930	0.0881	0.0745	0.0632	0.0509	0.0431
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	2.1175	2.3194	2.7093	3.2102	3.6857	4.0761	4.3173	4.1264	3.5770	3.1018	2.5576	2.1952
Tank Diameter (ft):	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000
Vapor Molecular Weight (lb/lb-mole):	68.0000	68.0000	68.0000	68.0000	68.0000	68.0000	68.0000	68.0000	68.0000	68.0000	68.0000	68.0000
Product Factor:	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Withdrawal Losses (lb):	16.3698	16.3698	16.3698	16.3698	16.3698	16.3698	16.3698	16.3698	16.3698	16.3698	16.3698	16.3698
Number of Columns:	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Effective Column Diameter (ft):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Net Throughput (gal/mo.):	5,468,164.8000	5,468,164.8000	5,468,164.8000	5,468,164.8000	5,468,164.8000	5,468,164.8000	5,468,164.8000	5,468,164.8000	5,468,164.8000	5,468,164.8000	5,468,164.8000	5,468,164.8000
Shell Clingage Factor (bbl/1000 sqft):	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015
Average Organic Liquid Density (lb/gal):	5.6000	5.6000	5.6000	5.6000	5.6000	5.6000	5.6000	5.6000	5.6000	5.6000	5.6000	5.6000
Tank Diameter (ft):	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000
Deck Fitting Losses (lb):	12.5803	13.8945	16.4971	19.9733	23.4237	26.3738	28.2536	26.7621	22.6217	19.2078	15.4740	13.0829
Value of Vapor Pressure Function:	0.0414	0.0457	0.0543	0.0658	0.0771	0.0868	0.0930	0.0881	0.0745	0.0632	0.0509	0.0431
Vapor Molecular Weight (lb/lb-mole):	68.0000	68.0000	68.0000	68.0000	68.0000	68.0000	68.0000	68.0000	68.0000	68.0000	68.0000	68.0000
Product Factor:	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Tot. Roof Fitting Loss Fact.(lb-mole/yr):	53.6000	53.6000	53.6000	53.6000	53.6000	53.6000	53.6000	53.6000	53.6000	53.6000	53.6000	53.6000
Deck Seam Losses (lb):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Deck Seam Length (ft):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Deck Seam Loss per Unit Length Factor (lb-mole/ft-yr):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Deck Seam Length Factor(ft/sqft):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Tank Diameter (ft):	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000
Vapor Molecular Weight (lb/lb-mole):	68.0000	68.0000	68.0000	68.0000	68.0000	68.0000	68.0000	68.0000	68.0000	68.0000	68.0000	68.0000
Product Factor:	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total Losses (lb):	33.3860	35.1636	38.6840	43.3859	48.0529	52.0433	54.5859	52.5685	46.9681	42.3505	37.3001	34.0658

Roof Fitting/Status	Quantity	Roof Fitting Loss Factors KFa(lb-mole/yr)	KFb(lb-mole/(yr mph^n))	m	Losses(lb)
Access Hatch (24-in. Diam.)/Bolted Cover, Gasketed	1	1.60	0.00	0.00	7.1214
Automatic Gauge Float Well/Bolted Cover, Gasketed	1	2.80	0.00	0.00	12.4624
Roof Leg or Hanger Well/Fixed	18	0.00	0.00	0.00	0.0000
Sample Pipe or Well (24-in. Diam.)/Slotted Pipe-Sliding Cover, Gask.	1	43.00	0.00	0.00	191.3864
Vacuum Breaker (10-in. Diam.)/Weighted Mech. Actuation, Gask.	1	6.20	1.20	0.94	27.5952

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: January, February, March, April, May, June, July, August, September, October, November, December

203-T-0006 - Internal Floating Roof Tank
Belfield, North Dakota

	Losses(lbs)				
Components	Rim Seal Loss	Withdrawl Loss	Deck Fitting Loss	Deck Seam Loss	Total Emissions
Gasoline (RVP 7.8)	83.97	196.44	238.14	0.00	518.55

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Indentification and Physical Characteristics

Identification

User Identification:	203-T-0008
City:	Belfield
State:	North Dakota
Company:	Meridian
Type of Tank:	Internal Floating Roof Tank
Description:	Gasoline (RVP 13-15)

Tank Dimensions

Diameter (ft):	88.00
Volume (gallons):	2,729,832.00
Turnovers:	55.73
Self Supp. Roof? (y/n):	Y
No. of Columns:	0.00
Eff. Col. Diam. (ft):	0.00

Paint Characteristics

Internal Shell Condition:	Light Rust
Shell Color/Shade:	Gray/Light
Shell Condition	Good
Roof Color/Shade:	Gray/Light
Roof Condition:	Good

Rim-Seal System

Primary Seal:	Liquid-mounted
Secondary Seal	Rim-mounted

Deck Characteristics

Deck Fitting Category:	Detail
Deck Type:	Welded

Deck Fitting/Status	Quantity
Access Hatch (24-in. Diam.)/Bolted Cover, Gasketed	1
Automatic Gauge Float Well/Bolted Cover, Gasketed	1
Roof Leg or Hanger Well/Fixed	27
Sample Pipe or Well (24-in. Diam.)/Slotted Pipe-Sliding Cover, Gask.	1
Vacuum Breaker (10-in. Diam.)/Weighted Mech. Actuation, Gask.	1

Meterological Data used in Emissions Calculations: Bismarck, North Dakota (Avg Atmospheric Pressure = 13.86 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

203-T-0008 - Internal Floating Roof Tank
Belfield, North Dakota

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Gasoline (RVP 15.0)	Jan	30.90	24.94	36.87	43.84	4.6376	N/A	N/A	60.0000			92.00	Option 4: RVP=15, ASTM Slope=3
Gasoline (RVP 15.0)	Feb	34.98	28.04	41.91	43.84	5.0388	N/A	N/A	60.0000			92.00	Option 4: RVP=15, ASTM Slope=3
Gasoline (RVP 15.0)	Mar	42.09	33.80	50.39	43.84	5.8049	N/A	N/A	60.0000			92.00	Option 4: RVP=15, ASTM Slope=3
Gasoline (RVP 15.0)	Apr	50.10	39.90	60.29	43.84	6.7748	N/A	N/A	60.0000			92.00	Option 4: RVP=15, ASTM Slope=3
Gasoline (RVP 13)	May	56.81	45.06	68.55	43.84	6.5424	N/A	N/A	62.0000			92.00	Option 4: RVP=13, ASTM Slope=3
Gasoline (RVP 13)	Jun	61.81	49.29	74.32	43.84	7.1848	N/A	N/A	62.0000			92.00	Option 4: RVP=13, ASTM Slope=3
Gasoline (RVP 13)	Jul	64.71	51.53	77.88	43.84	7.5796	N/A	N/A	62.0000			92.00	Option 4: RVP=13, ASTM Slope=3
Gasoline (RVP 13)	Aug	62.42	50.31	74.54	43.84	7.2672	N/A	N/A	62.0000			92.00	Option 4: RVP=13, ASTM Slope=3
Gasoline (RVP 13)	Sep	55.34	45.27	65.40	43.84	6.3627	N/A	N/A	62.0000			92.00	Option 4: RVP=13, ASTM Slope=3
Gasoline (RVP 15.0)	Oct	48.45	40.33	56.58	43.84	6.5661	N/A	N/A	60.0000			92.00	Option 4: RVP=15, ASTM Slope=3
Gasoline (RVP 15.0)	Nov	39.43	33.50	45.36	43.84	5.5080	N/A	N/A	60.0000			92.00	Option 4: RVP=15, ASTM Slope=3
Gasoline (RVP 15.0)	Dec	32.50	27.06	37.95	43.84	4.7922	N/A	N/A	60.0000			92.00	Option 4: RVP=15, ASTM Slope=3

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

203-T-0008 - Internal Floating Roof Tank
Belfield, North Dakota

Month:	January	February	March	April	May	June	July	August	September	October	November	December
Rim Seal Losses (lb):	13.3948	14.8452	17.7966	21.9332	21.5928	24.6351	26.6399	25.0448	20.7858	21.0009	16.6229	13.9465
Seal Factor A (lb-mole/ft-yr):	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000
Seal Factor B (lb-mole/ft-yr (mph)^n):	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000
Value of Vapor Pressure Function:	0.1015	0.1125	0.1348	0.1662	0.1583	0.1806	0.1953	0.1836	0.1524	0.1591	0.1259	0.1057
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	4.6376	5.0388	5.8049	6.7748	6.5424	7.1848	7.5796	7.2672	6.3627	6.5661	5.5080	4.7922
Tank Diameter (ft):	88.0000	88.0000	88.0000	88.0000	88.0000	88.0000	88.0000	88.0000	88.0000	88.0000	88.0000	88.0000
Vapor Molecular Weight (lb/lb-mole):	60.0000	60.0000	60.0000	60.0000	62.0000	62.0000	62.0000	62.0000	62.0000	60.0000	60.0000	60.0000
Product Factor:	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Withdrawal Losses (lb):	27.1708	27.1708	27.1708	27.1708	27.1708	27.1708	27.1708	27.1708	27.1708	27.1708	27.1708	27.1708
Number of Columns:	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Effective Column Diameter (ft):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Net Throughput (gal/mo.):	12,677,794.7500	12,677,794.7500	12,677,794.7500	12,677,794.7500	12,677,794.7500	12,677,794.7500	12,677,794.7500	12,677,794.7500	12,677,794.7500	12,677,794.7500	12,677,794.7500	12,677,794.7500
Shell Clingage Factor (bbl/1000 sqft):	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015
Average Organic Liquid Density (lb/gal):	5.6000	5.6000	5.6000	5.6000	5.6000	5.6000	5.6000	5.6000	5.6000	5.6000	5.6000	5.6000
Tank Diameter (ft):	88.0000	88.0000	88.0000	88.0000	88.0000	88.0000	88.0000	88.0000	88.0000	88.0000	88.0000	88.0000
Deck Fitting Losses (lb):	27.1954	30.1402	36.1326	44.5310	43.8400	50.0168	54.0871	50.8485	42.2015	42.6382	33.7496	28.3157
Value of Vapor Pressure Function:	0.1015	0.1125	0.1348	0.1662	0.1583	0.1806	0.1953	0.1836	0.1524	0.1591	0.1259	0.1057
Vapor Molecular Weight (lb/lb-mole):	60.0000	60.0000	60.0000	60.0000	62.0000	62.0000	62.0000	62.0000	62.0000	60.0000	60.0000	60.0000
Product Factor:	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Tot. Roof Fitting Loss Fact.(lb-mole/yr):	53.6000	53.6000	53.6000	53.6000	53.6000	53.6000	53.6000	53.6000	53.6000	53.6000	53.6000	53.6000
Deck Seam Losses (lb):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Deck Seam Length (ft):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Deck Seam Loss per Unit Length Factor (lb-mole/ft-yr):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Deck Seam Length Factor(ft/sqft):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Tank Diameter (ft):	88.0000	88.0000	88.0000	88.0000	88.0000	88.0000	88.0000	88.0000	88.0000	88.0000	88.0000	88.0000
Vapor Molecular Weight (lb/lb-mole):	60.0000	60.0000	60.0000	60.0000	62.0000	62.0000	62.0000	62.0000	62.0000	60.0000	60.0000	60.0000
Product Factor:	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total Losses (lb):	67.7610	72.1562	81.1000	93.6350	92.6036	101.8228	107.8979	103.0641	90.1582	90.8099	77.5434	69.4330

Roof Fitting/Status	Quantity	Roof Fitting Loss Factors KFa(lb-mole/yr)	KFb(lb-mole/(yr mph^n))	m	Losses(lb)
Access Hatch (24-in. Diam.)/Bolted Cover, Gasketed	1	1.60	0.00	0.00	14.4595
Automatic Gauge Float Well/Bolted Cover, Gasketed	1	2.80	0.00	0.00	25.3042
Roof Leg or Hanger Well/Fixed	27	0.00	0.00	0.00	0.0000
Sample Pipe or Well (24-in. Diam.)/Slotted Pipe-Sliding Cover, Gask.	1	43.00	0.00	0.00	388.6003
Vacuum Breaker (10-in. Diam.)/Weighted Mech. Actuation, Gask.	1	6.20	1.20	0.94	56.0307

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: January, February, March, April, May, June, July, August, September, October, November, December

203-T-0008 - Internal Floating Roof Tank
Belfield, North Dakota

	Losses(lbs)				
Components	Rim Seal Loss	Withdrawl Loss	Deck Fitting Loss	Deck Seam Loss	Total Emissions
Gasoline (RVP 15.0)	119.54	190.20	242.70	0.00	552.44
Gasoline (RVP 13)	118.70	135.85	240.99	0.00	495.55

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Indentification and Physical Characteristics

Identification

User Identification:	203-T-0011
City:	Belfield
State:	North Dakota
Company:	Meridian
Type of Tank:	Internal Floating Roof Tank
Description:	Jet Fuel

Tank Dimensions

Diameter (ft):	63.00
Volume (gallons):	1,399,104.00
Turnovers:	23.28
Self Supp. Roof? (y/n):	Y
No. of Columns:	0.00
Eff. Col. Diam. (ft):	0.00

Paint Characteristics

Internal Shell Condition:	Light Rust
Shell Color/Shade:	Gray/Light
Shell Condition	Good
Roof Color/Shade:	Gray/Light
Roof Condition:	Good

Rim-Seal System

Primary Seal:	Liquid-mounted
Secondary Seal	Rim-mounted

Deck Characteristics

Deck Fitting Category:	Detail
Deck Type:	Welded

Deck Fitting/Status	Quantity
Access Hatch (24-in. Diam.)/Bolted Cover, Gasketed	1
Automatic Gauge Float Well/Bolted Cover, Gasketed	1
Roof Leg or Hanger Well/Fixed	18
Sample Pipe or Well (24-in. Diam.)/Slotted Pipe-Sliding Cover, Gask.	1
Vacuum Breaker (10-in. Diam.)/Weighted Mech. Actuation, Gask.	1

Meterological Data used in Emissions Calculations: Bismarck, North Dakota (Avg Atmospheric Pressure = 13.86 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

203-T-0011 - Internal Floating Roof Tank
Belfield, North Dakota

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Jet naphtha (JP-4)	Jan	30.90	24.94	36.87	43.84	0.8000	N/A	N/A	80.0000			120.00	Option 1: VP40 = .8
Jet naphtha (JP-4)	Feb	34.98	28.04	41.91	43.84	0.8000	N/A	N/A	80.0000			120.00	Option 1: VP40 = .8
Jet naphtha (JP-4)	Mar	42.09	33.80	50.39	43.84	0.8418	N/A	N/A	80.0000			120.00	Option 1: VP40 = .8 VP50 = 1
Jet naphtha (JP-4)	Apr	50.10	39.90	60.29	43.84	1.0029	N/A	N/A	80.0000			120.00	Option 1: VP50 = 1 VP60 = 1.3
Jet naphtha (JP-4)	May	56.81	45.06	68.55	43.84	1.2042	N/A	N/A	80.0000			120.00	Option 1: VP50 = 1 VP60 = 1.3
Jet naphtha (JP-4)	Jun	61.81	49.29	74.32	43.84	1.3542	N/A	N/A	80.0000			120.00	Option 1: VP60 = 1.3 VP70 = 1.6
Jet naphtha (JP-4)	Jul	64.71	51.53	77.88	43.84	1.4412	N/A	N/A	80.0000			120.00	Option 1: VP60 = 1.3 VP70 = 1.6
Jet naphtha (JP-4)	Aug	62.42	50.31	74.54	43.84	1.3727	N/A	N/A	80.0000			120.00	Option 1: VP60 = 1.3 VP70 = 1.6
Jet naphtha (JP-4)	Sep	55.34	45.27	65.40	43.84	1.1601	N/A	N/A	80.0000			120.00	Option 1: VP50 = 1 VP60 = 1.3
Jet naphtha (JP-4)	Oct	48.45	40.33	56.58	43.84	0.9691	N/A	N/A	80.0000			120.00	Option 1: VP40 = .8 VP50 = 1
Jet naphtha (JP-4)	Nov	39.43	33.50	45.36	43.84	0.8000	N/A	N/A	80.0000			120.00	Option 1: VP40 = .8
Jet naphtha (JP-4)	Dec	32.50	27.06	37.95	43.84	0.8000	N/A	N/A	80.0000			120.00	Option 1: VP40 = .8

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

203-T-0011 - Internal Floating Roof Tank
Belfield, North Dakota

Month:	January	February	March	April	May	June	July	August	September	October	November	December
Rim Seal Losses (lb):	1.8723	1.8723	1.9734	2.3653	2.8621	3.2375	3.4572	3.2840	2.7527	2.2827	1.8723	1.8723
Seal Factor A (lb-mole/ft-yr):	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000
Seal Factor B (lb-mole/ft-yr (mph)^n):	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000
Value of Vapor Pressure Function:	0.0149	0.0149	0.0157	0.0188	0.0227	0.0257	0.0274	0.0261	0.0218	0.0181	0.0149	0.0149
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.8000	0.8000	0.8418	1.0029	1.2042	1.3542	1.4412	1.3727	1.1601	0.9691	0.8000	0.8000
Tank Diameter (ft):	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000
Vapor Molecular Weight (lb/lb-mole):	80.0000	80.0000	80.0000	80.0000	80.0000	80.0000	80.0000	80.0000	80.0000	80.0000	80.0000	80.0000
Product Factor:	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Withdrawal Losses (lb):	9.2863	9.2863	9.2863	9.2863	9.2863	9.2863	9.2863	9.2863	9.2863	9.2863	9.2863	9.2863
Number of Columns:	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Effective Column Diameter (ft):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Net Throughput (gal/mo.):	2,714,261.7500	2,714,261.7500	2,714,261.7500	2,714,261.7500	2,714,261.7500	2,714,261.7500	2,714,261.7500	2,714,261.7500	2,714,261.7500	2,714,261.7500	2,714,261.7500	2,714,261.7500
Shell Clingage Factor (bbl/1000 sqft):	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015
Average Organic Liquid Density (lb/gal):	6.4000	6.4000	6.4000	6.4000	6.4000	6.4000	6.4000	6.4000	6.4000	6.4000	6.4000	6.4000
Tank Diameter (ft):	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000
Deck Fitting Losses (lb):	5.3099	5.3099	5.5965	6.7079	8.1167	9.1815	9.8046	9.3134	7.8065	6.4736	5.3099	5.3099
Value of Vapor Pressure Function:	0.0149	0.0149	0.0157	0.0188	0.0227	0.0257	0.0274	0.0261	0.0218	0.0181	0.0149	0.0149
Vapor Molecular Weight (lb/lb-mole):	80.0000	80.0000	80.0000	80.0000	80.0000	80.0000	80.0000	80.0000	80.0000	80.0000	80.0000	80.0000
Product Factor:	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Tot. Roof Fitting Loss Fact.(lb-mole/yr):	53.6000	53.6000	53.6000	53.6000	53.6000	53.6000	53.6000	53.6000	53.6000	53.6000	53.6000	53.6000
Deck Seam Losses (lb):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Deck Seam Length (ft):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Deck Seam Loss per Unit Length Factor (lb-mole/ft-yr):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Deck Seam Length Factor(ft/sqft):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Tank Diameter (ft):	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000
Vapor Molecular Weight (lb/lb-mole):	80.0000	80.0000	80.0000	80.0000	80.0000	80.0000	80.0000	80.0000	80.0000	80.0000	80.0000	80.0000
Product Factor:	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total Losses (lb):	16.4686	16.4686	16.8562	18.3595	20.2651	21.7053	22.5482	21.8838	19.8455	18.0426	16.4686	16.4686

Roof Fitting/Status	Quantity	Roof Fitting Loss Factors KFa(lb-mole/yr)	KFb(lb-mole/(yr mph^n))	m	Losses(lb)
Access Hatch (24-in. Diam.)/Bolted Cover, Gasketed	1	1.60	0.00	0.00	2.5188
Automatic Gauge Float Well/Bolted Cover, Gasketed	1	2.80	0.00	0.00	4.4078
Roof Leg or Hanger Well/Fixed	18	0.00	0.00	0.00	0.0000
Sample Pipe or Well (24-in. Diam.)/Slotted Pipe-Sliding Cover, Gask.	1	43.00	0.00	0.00	67.6919
Vacuum Breaker (10-in. Diam.)/Weighted Mech. Actuation, Gask.	1	6.20	1.20	0.94	9.7602

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: January, February, March, April, May, June, July, August, September, October, November, December

203-T-0011 - Internal Floating Roof Tank
Belfield, North Dakota

	Losses(lbs)				
Components	Rim Seal Loss	Withdrawl Loss	Deck Fitting Loss	Deck Seam Loss	Total Emissions
Jet naphtha (JP-4)	29.70	111.44	84.24	0.00	225.38

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Indentification and Physical Characteristics

Identification

User Identification:	203-T-013
City:	Belfied
State:	North Dakota
Company:	Meridian
Type of Tank:	Vertical Fixed Roof Tank
Description:	Undesulfurized Diesel

Tank Dimensions

Shell Height (ft):		60.00
Diameter (ft):		63.00
Liquid Height (ft) :		50.00
Avg. Liquid Height (ft):		20.00
Volume (gallons):		1,165,934.57
Turnovers:		27.61
Net Throughput(gal/yr):		32,196,066.00
Is Tank Heated (y/n):	N	

Paint Characteristics

Shell Color/Shade:	Gray/Light
Shell Condition	Good
Roof Color/Shade:	Gray/Light
Roof Condition:	Good

Roof Characteristics

Type:	Cone	
Height (ft)		5.00
Slope (ft/ft) (Cone Roof)		0.16

Breather Vent Settings

Vacuum Settings (psig):	-0.03
Pressure Settings (psig)	0.03

Meterological Data used in Emissions Calculations: Bismarck, North Dakota (Avg Atmospheric Pressure = 13.86 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

203-T-013 - Vertical Fixed Roof Tank
Belfied, North Dakota

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Distillate fuel oil no. 2	All	48.29	39.09	57.50	43.84	0.0043	0.0031	0.0060	130.0000			188.00	Option 1: VP40 = .0031 VP50 = .0045

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

203-T-013 - Vertical Fixed Roof Tank
Belfied, North Dakota

Annual Emission Calcaulations	
Standing Losses (lb):	326.4459
Vapor Space Volume (cu ft):	129,885.2211
Vapor Density (lb/cu ft):	0.0001
Vapor Space Expansion Factor:	0.0684
Vented Vapor Saturation Factor:	0.9907
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	129,885.2211
Tank Diameter (ft):	63.0000
Vapor Space Outage (ft):	41.6667
Tank Shell Height (ft):	60.0000
Average Liquid Height (ft):	20.0000
Roof Outage (ft):	1.6667
Roof Outage (Cone Roof)	
Roof Outage (ft):	1.6667
Roof Height (ft):	5.0000
Roof Slope (ft/ft):	0.1600
Shell Radius (ft):	31.5000
Vapor Density	
Vapor Density (lb/cu ft):	0.0001
Vapor Molecular Weight (lb/lb-mole):	130.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0043
Daily Avg. Liquid Surface Temp. (deg. R):	507.9647
Daily Average Ambient Temp. (deg. F):	41.5958
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	503.5058
Tank Paint Solar Absorptance (Shell):	0.5400
Tank Paint Solar Absorptance (Roof):	0.5400
Daily Total Solar Insulation Factor (Btu/sqft day):	1,276.2450
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.0684
Daily Vapor Temperature Range (deg. R):	36.8348
Daily Vapor Pressure Range (psia):	0.0029
Breather Vent Press. Setting Range(psia):	0.0600
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0043
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.0031
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.0060
Daily Avg. Liquid Surface Temp. (deg R):	507.9647
Daily Min. Liquid Surface Temp. (deg R):	498.7560
Daily Max. Liquid Surface Temp. (deg R):	517.1734
Daily Ambient Temp. Range (deg. R):	24.3583
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0.9907
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):	0.0043
Vapor Space Outage (ft):	41.6667

Working Losses (lb):	424.6534
Vapor Molecular Weight (lb/lb-mole):	130.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0043
Annual Net Throughput (gal/yr.):	32,196,066.0000
Annual Turnovers:	27.6140
Turnover Factor:	1.0000
Maximum Liquid Volume (gal):	1,165,934.5742
Maximum Liquid Height (ft):	50.0000
Tank Diameter (ft):	63.0000
Working Loss Product Factor:	1.0000
Total Losses (lb):	751.0993

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: Annual

203-T-013 - Vertical Fixed Roof Tank
Belfied, North Dakota

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Distillate fuel oil no. 2	424.65	326.45	751.10

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Indentification and Physical Characteristics

Identification

User Identification:	203-T-0015
City:	Belfield
State:	North Dakota
Company:	Meridian
Type of Tank:	Vertical Fixed Roof Tank
Description:	Desulfurized Diesel

Tank Dimensions

Shell Height (ft):		60.00
Diameter (ft):		88.00
Liquid Height (ft) :		50.00
Avg. Liquid Height (ft):		48.00
Volume (gallons):		2,274,879.65
Turnovers:		56.44
Net Throughput(gal/yr):		128,404,080.00
Is Tank Heated (y/n):	N	

Paint Characteristics

Shell Color/Shade:	Gray/Light
Shell Condition	Good
Roof Color/Shade:	Gray/Light
Roof Condition:	Good

Roof Characteristics

Type:	Cone	
Height (ft)		5.00
Slope (ft/ft) (Cone Roof)		0.15

Breather Vent Settings

Vacuum Settings (psig):	-0.03
Pressure Settings (psig)	0.03

Meterological Data used in Emissions Calculations: Bismarck, North Dakota (Avg Atmospheric Pressure = 13.86 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

203-T-0015 - Vertical Fixed Roof Tank
Belfield, North Dakota

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Distillate fuel oil no. 2	All	48.29	39.09	57.50	43.84	0.0043	0.0031	0.0060	130.0000			188.00	Option 1: VP40 = .0031 VP50 = .0045

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

203-T-0015 - Vertical Fixed Roof Tank
Belfield, North Dakota

Annual Emission Calcaulations	
Standing Losses (lb):	210.2319
Vapor Space Volume (cu ft):	83,122.3527
Vapor Density (lb/cu ft):	0.0001
Vapor Space Expansion Factor:	0.0684
Vented Vapor Saturation Factor:	0.9969
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	83,122.3527
Tank Diameter (ft):	88.0000
Vapor Space Outage (ft):	13.6667
Tank Shell Height (ft):	60.0000
Average Liquid Height (ft):	48.0000
Roof Outage (ft):	1.6667
Roof Outage (Cone Roof)	
Roof Outage (ft):	1.6667
Roof Height (ft):	5.0000
Roof Slope (ft/ft):	0.1500
Shell Radius (ft):	44.0000
Vapor Density	
Vapor Density (lb/cu ft):	0.0001
Vapor Molecular Weight (lb/lb-mole):	130.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0043
Daily Avg. Liquid Surface Temp. (deg. R):	507.9647
Daily Average Ambient Temp. (deg. F):	41.5958
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	503.5058
Tank Paint Solar Absorptance (Shell):	0.5400
Tank Paint Solar Absorptance (Roof):	0.5400
Daily Total Solar Insulation Factor (Btu/sqft day):	1,276.2450
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.0684
Daily Vapor Temperature Range (deg. R):	36.8348
Daily Vapor Pressure Range (psia):	0.0029
Breather Vent Press. Setting Range(psia):	0.0600
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0043
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.0031
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.0060
Daily Avg. Liquid Surface Temp. (deg R):	507.9647
Daily Min. Liquid Surface Temp. (deg R):	498.7560
Daily Max. Liquid Surface Temp. (deg R):	517.1734
Daily Ambient Temp. Range (deg. R):	24.3583
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0.9969
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):	0.0043
Vapor Space Outage (ft):	13.6667

Working Losses (lb):	1,182.4095
Vapor Molecular Weight (lb/lb-mole):	130.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0043
Annual Net Throughput (gal/yr.):	128,404,080.0000
Annual Turnovers:	56.4443
Turnover Factor:	0.6982
Maximum Liquid Volume (gal):	2,274,879.6529
Maximum Liquid Height (ft):	50.0000
Tank Diameter (ft):	88.0000
Working Loss Product Factor:	1.0000
Total Losses (lb):	1,392.6414

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: Annual

203-T-0015 - Vertical Fixed Roof Tank
Belfield, North Dakota

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Distillate fuel oil no. 2	1,182.41	210.23	1,392.64

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Indentification and Physical Characteristics

Identification

User Identification:	203-T-0017
City:	Belfield
State:	North Dakota
Company:	Meridian
Type of Tank:	Vertical Fixed Roof Tank
Description:	Vacuum Gas Oil

Tank Dimensions

Shell Height (ft):	60.00
Diameter (ft):	63.00
Liquid Height (ft) :	50.00
Avg. Liquid Height (ft):	20.00
Volume (gallons):	1,165,934.57
Turnovers:	39.05
Net Throughput(gal/yr):	45,530,100.00
Is Tank Heated (y/n):	N

Paint Characteristics

Shell Color/Shade:	Gray/Light
Shell Condition	Good
Roof Color/Shade:	Gray/Light
Roof Condition:	Good

Roof Characteristics

Type:	Cone
Height (ft)	5.00
Slope (ft/ft) (Cone Roof)	0.16

Breather Vent Settings

Vacuum Settings (psig):	-0.03
Pressure Settings (psig)	0.03

Meterological Data used in Emissions Calculations: Bismarck, North Dakota (Avg Atmospheric Pressure = 13.86 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

203-T-0017 - Vertical Fixed Roof Tank
Belfield, North Dakota

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Residual oil no. 6	All	48.29	39.09	57.50	43.84	0.0000	0.0000	0.0000	190.0000			387.00	Option 1: VP40 = .00002 VP50 = .00003

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

203-T-0017 - Vertical Fixed Roof Tank
Belfield, North Dakota

Annual Emission Calcaulations	
Standing Losses (lb):	3.1880
Vapor Space Volume (cu ft):	129,885.2211
Vapor Density (lb/cu ft):	0.0000
Vapor Space Expansion Factor:	0.0682
Vented Vapor Saturation Factor:	0.9999
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	129,885.2211
Tank Diameter (ft):	63.0000
Vapor Space Outage (ft):	41.6667
Tank Shell Height (ft):	60.0000
Average Liquid Height (ft):	20.0000
Roof Outage (ft):	1.6667
Roof Outage (Cone Roof)	
Roof Outage (ft):	1.6667
Roof Height (ft):	5.0000
Roof Slope (ft/ft):	0.1600
Shell Radius (ft):	31.5000
Vapor Density	
Vapor Density (lb/cu ft):	0.0000
Vapor Molecular Weight (lb/lb-mole):	190.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0000
Daily Avg. Liquid Surface Temp. (deg. R):	507.9647
Daily Average Ambient Temp. (deg. F):	41.5958
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	503.5058
Tank Paint Solar Absorptance (Shell):	0.5400
Tank Paint Solar Absorptance (Roof):	0.5400
Daily Total Solar Insulation Factor (Btu/sqft day):	1,276.2450
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.0682
Daily Vapor Temperature Range (deg. R):	36.8348
Daily Vapor Pressure Range (psia):	0.0000
Breather Vent Press. Setting Range(psia):	0.0600
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0000
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.0000
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.0000
Daily Avg. Liquid Surface Temp. (deg R):	507.9647
Daily Min. Liquid Surface Temp. (deg R):	498.7560
Daily Max. Liquid Surface Temp. (deg R):	517.1734
Daily Ambient Temp. Range (deg. R):	24.3583
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0.9999
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):	0.0000
Vapor Space Outage (ft):	41.6667

Working Losses (lb):	5.4485
Vapor Molecular Weight (lb/lb-mole):	190.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0000
Annual Net Throughput (gal/yr.):	45,530,100.0000
Annual Turnovers:	39.0503
Turnover Factor:	0.9349
Maximum Liquid Volume (gal):	1,165,934.5742
Maximum Liquid Height (ft):	50.0000
Tank Diameter (ft):	63.0000
Working Loss Product Factor:	1.0000
Total Losses (lb):	8.6365

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: Annual

203-T-0017 - Vertical Fixed Roof Tank
Belfield, North Dakota

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Residual oil no. 6	5.45	3.19	8.64

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Indentification and Physical Characteristics

Identification

User Identification:	203-T-0018
City:	Belfield
State:	North Dakota
Company:	Meridian
Type of Tank:	Internal Floating Roof Tank
Description:	FCC Naphtha

Tank Dimensions

Diameter (ft):	63.00
Volume (gallons):	1,399,104.00
Turnovers:	26.78
Self Supp. Roof? (y/n):	Y
No. of Columns:	0.00
Eff. Col. Diam. (ft):	0.00

Paint Characteristics

Internal Shell Condition:	Light Rust
Shell Color/Shade:	Gray/Light
Shell Condition	Good
Roof Color/Shade:	Gray/Light
Roof Condition:	Good

Rim-Seal System

Primary Seal:	Liquid-mounted
Secondary Seal	Rim-mounted

Deck Characteristics

Deck Fitting Category:	Detail
Deck Type:	Welded

Deck Fitting/Status	Quantity
Access Hatch (24-in. Diam.)/Bolted Cover, Gasketed	1
Automatic Gauge Float Well/Bolted Cover, Gasketed	1
Roof Leg or Hanger Well/Fixed	18
Sample Pipe or Well (24-in. Diam.)/Slotted Pipe-Sliding Cover, Gask.	1
Vacuum Breaker (10-in. Diam.)/Weighted Mech. Actuation, Gask.	1

Meterological Data used in Emissions Calculations: Bismarck, North Dakota (Avg Atmospheric Pressure = 13.86 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

203-T-0018 - Internal Floating Roof Tank
Belfield, North Dakota

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Gasoline (RVP 15.0)	Jan	30.90	24.94	36.87	43.84	4.6376	N/A	N/A	60.0000			92.00	Option 4: RVP=15, ASTM Slope=3
Gasoline (RVP 15.0)	Feb	34.98	28.04	41.91	43.84	5.0388	N/A	N/A	60.0000			92.00	Option 4: RVP=15, ASTM Slope=3
Gasoline (RVP 15.0)	Mar	42.09	33.80	50.39	43.84	5.8049	N/A	N/A	60.0000			92.00	Option 4: RVP=15, ASTM Slope=3
Gasoline (RVP 15.0)	Apr	50.10	39.90	60.29	43.84	6.7748	N/A	N/A	60.0000			92.00	Option 4: RVP=15, ASTM Slope=3
Gasoline (RVP 15.0)	May	56.81	45.06	68.55	43.84	7.6833	N/A	N/A	60.0000			92.00	Option 4: RVP=15, ASTM Slope=3
Gasoline (RVP 15.0)	Jun	61.81	49.29	74.32	43.84	8.4212	N/A	N/A	60.0000			92.00	Option 4: RVP=15, ASTM Slope=3
Gasoline (RVP 15.0)	Jul	64.71	51.53	77.88	43.84	8.8740	N/A	N/A	60.0000			92.00	Option 4: RVP=15, ASTM Slope=3
Gasoline (RVP 15.0)	Aug	62.42	50.31	74.54	43.84	8.5158	N/A	N/A	60.0000			92.00	Option 4: RVP=15, ASTM Slope=3
Gasoline (RVP 15.0)	Sep	55.34	45.27	65.40	43.84	7.4767	N/A	N/A	60.0000			92.00	Option 4: RVP=15, ASTM Slope=3
Gasoline (RVP 15.0)	Oct	48.45	40.33	56.58	43.84	6.5661	N/A	N/A	60.0000			92.00	Option 4: RVP=15, ASTM Slope=3
Gasoline (RVP 15.0)	Nov	39.43	33.50	45.36	43.84	5.5080	N/A	N/A	60.0000			92.00	Option 4: RVP=15, ASTM Slope=3
Gasoline (RVP 15.0)	Dec	32.50	27.06	37.95	43.84	4.7922	N/A	N/A	60.0000			92.00	Option 4: RVP=15, ASTM Slope=3

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

203-T-0018 - Internal Floating Roof Tank
Belfield, North Dakota

Month:	January	February	March	April	May	June	July	August	September	October	November	December
Rim Seal Losses (lb):	9.5894	10.6278	12.7408	15.7022	18.8346	21.7009	23.6354	22.0930	18.0870	15.0347	11.9005	9.9845
Seal Factor A (lb-mole/ft-yr):	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000
Seal Factor B (lb-mole/ft-yr (mph)^n):	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000
Value of Vapor Pressure Function:	0.1015	0.1125	0.1348	0.1662	0.1993	0.2296	0.2501	0.2338	0.1914	0.1591	0.1259	0.1057
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	4.6376	5.0388	5.8049	6.7748	7.6833	8.4212	8.8740	8.5158	7.4767	6.5661	5.5080	4.7922
Tank Diameter (ft):	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000
Vapor Molecular Weight (lb/lb-mole):	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000
Product Factor:	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Withdrawal Losses (lb):	9.3472	9.3472	9.3472	9.3472	9.3472	9.3472	9.3472	9.3472	9.3472	9.3472	9.3472	9.3472
Number of Columns:	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Effective Column Diameter (ft):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Net Throughput (gal/mo.):	3,122,333.7500	3,122,333.7500	3,122,333.7500	3,122,333.7500	3,122,333.7500	3,122,333.7500	3,122,333.7500	3,122,333.7500	3,122,333.7500	3,122,333.7500	3,122,333.7500	3,122,333.7500
Shell Clingage Factor (bbl/1000 sqft):	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015
Average Organic Liquid Density (lb/gal):	5.6000	5.6000	5.6000	5.6000	5.6000	5.6000	5.6000	5.6000	5.6000	5.6000	5.6000	5.6000
Tank Diameter (ft):	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000
Deck Fitting Losses (lb):	27.1954	30.1402	36.1326	44.5310	53.4145	61.5432	67.0295	62.6553	51.2944	42.6382	33.7496	28.3157
Value of Vapor Pressure Function:	0.1015	0.1125	0.1348	0.1662	0.1993	0.2296	0.2501	0.2338	0.1914	0.1591	0.1259	0.1057
Vapor Molecular Weight (lb/lb-mole):	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000
Product Factor:	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Tot. Roof Fitting Loss Fact.(lb-mole/yr):	53.6000	53.6000	53.6000	53.6000	53.6000	53.6000	53.6000	53.6000	53.6000	53.6000	53.6000	53.6000
Deck Seam Losses (lb):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Deck Seam Length (ft):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Deck Seam Loss per Unit Length Factor (lb-mole/ft-yr):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Deck Seam Length Factor(ft/sqft):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Tank Diameter (ft):	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000
Vapor Molecular Weight (lb/lb-mole):	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000
Product Factor:	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total Losses (lb):	46.1320	50.1152	58.2205	69.5803	81.5963	92.5912	100.0121	94.0955	78.7286	67.0201	54.9973	47.6473

Roof Fitting/Status	Quantity	Roof Fitting Loss Factors KFa(lb-mole/yr)	KFb(lb-mole/(yr mph^n))	m	Losses(lb)
Access Hatch (24-in. Diam.)/Bolted Cover, Gasketed	1	1.60	0.00	0.00	16.1109
Automatic Gauge Float Well/Bolted Cover, Gasketed	1	2.80	0.00	0.00	28.1940
Roof Leg or Hanger Well/Fixed	18	0.00	0.00	0.00	0.0000
Sample Pipe or Well (24-in. Diam.)/Slotted Pipe-Sliding Cover, Gask.	1	43.00	0.00	0.00	432.9792
Vacuum Breaker (10-in. Diam.)/Weighted Mech. Actuation, Gask.	1	6.20	1.20	0.94	62.4296

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: January, February, March, April, May, June, July, August, September, October, November, December

203-T-0018 - Internal Floating Roof Tank
Belfield, North Dakota

	Losses(lbs)				
Components	Rim Seal Loss	Withdrawl Loss	Deck Fitting Loss	Deck Seam Loss	Total Emissions
Gasoline (RVP 15.0)	189.93	112.17	538.64	0.00	840.74

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Indentification and Physical Characteristics

Identification

User Identification:	203-T-0020
City:	Belfield
State:	North Dakota
Company:	Meridian
Type of Tank:	Internal Floating Roof Tank
Description:	Alkylate

Tank Dimensions

Diameter (ft):	63.00
Volume (gallons):	1,399,104.00
Turnovers:	26.78
Self Supp. Roof? (y/n):	Y
No. of Columns:	0.00
Eff. Col. Diam. (ft):	0.00

Paint Characteristics

Internal Shell Condition:	Light Rust
Shell Color/Shade:	Gray/Light
Shell Condition	Good
Roof Color/Shade:	Gray/Light
Roof Condition:	Good

Rim-Seal System

Primary Seal:	Liquid-mounted
Secondary Seal	Rim-mounted

Deck Characteristics

Deck Fitting Category:	Detail
Deck Type:	Welded

Deck Fitting/Status	Quantity
Access Hatch (24-in. Diam.)/Bolted Cover, Gasketed	1
Automatic Gauge Float Well/Bolted Cover, Gasketed	1
Roof Leg or Hanger Well/Fixed	18
Sample Pipe or Well (24-in. Diam.)/Slotted Pipe-Sliding Cover, Gask.	1
Vacuum Breaker (10-in. Diam.)/Weighted Mech. Actuation, Gask.	1

Meterological Data used in Emissions Calculations: Bismarck, North Dakota (Avg Atmospheric Pressure = 13.86 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

203-T-0020 - Internal Floating Roof Tank
Belfield, North Dakota

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Gasoline (RVP 10)	Jan	30.90	24.94	36.87	43.84	2.8523	N/A	N/A	66.0000			92.00	Option 4: RVP=10, ASTM Slope=3
Gasoline (RVP 10)	Feb	34.98	28.04	41.91	43.84	3.1146	N/A	N/A	66.0000			92.00	Option 4: RVP=10, ASTM Slope=3
Gasoline (RVP 10)	Mar	42.09	33.80	50.39	43.84	3.6191	N/A	N/A	66.0000			92.00	Option 4: RVP=10, ASTM Slope=3
Gasoline (RVP 10)	Apr	50.10	39.90	60.29	43.84	4.2635	N/A	N/A	66.0000			92.00	Option 4: RVP=10, ASTM Slope=3
Gasoline (RVP 10)	May	56.81	45.06	68.55	43.84	4.8723	N/A	N/A	66.0000			92.00	Option 4: RVP=10, ASTM Slope=3
Gasoline (RVP 10)	Jun	61.81	49.29	74.32	43.84	5.3700	N/A	N/A	66.0000			92.00	Option 4: RVP=10, ASTM Slope=3
Gasoline (RVP 10)	Jul	64.71	51.53	77.88	43.84	5.6768	N/A	N/A	66.0000			92.00	Option 4: RVP=10, ASTM Slope=3
Gasoline (RVP 10)	Aug	62.42	50.31	74.54	43.84	5.4341	N/A	N/A	66.0000			92.00	Option 4: RVP=10, ASTM Slope=3
Gasoline (RVP 10)	Sep	55.34	45.27	65.40	43.84	4.7335	N/A	N/A	66.0000			92.00	Option 4: RVP=10, ASTM Slope=3
Gasoline (RVP 10)	Oct	48.45	40.33	56.58	43.84	4.1244	N/A	N/A	66.0000			92.00	Option 4: RVP=10, ASTM Slope=3
Gasoline (RVP 10)	Nov	39.43	33.50	45.36	43.84	3.4231	N/A	N/A	66.0000			92.00	Option 4: RVP=10, ASTM Slope=3
Gasoline (RVP 10)	Dec	32.50	27.06	37.95	43.84	2.9532	N/A	N/A	66.0000			92.00	Option 4: RVP=10, ASTM Slope=3

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

203-T-0020 - Internal Floating Roof Tank
Belfield, North Dakota

Month:	January	February	March	April	May	June	July	August	September	October	November	December
Rim Seal Losses (lb):	5.9802	6.6046	7.8480	9.5249	11.2108	12.6714	13.6121	12.8650	10.8168	9.1539	7.3581	6.2188
Seal Factor A (lb-mole/ft-yr):	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000
Seal Factor B (lb-mole/ft-yr (mph)^n):	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000
Value of Vapor Pressure Function:	0.0575	0.0635	0.0755	0.0916	0.1078	0.1219	0.1309	0.1238	0.1041	0.0881	0.0708	0.0598
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	2.8523	3.1146	3.6191	4.2635	4.8723	5.3700	5.6768	5.4341	4.7335	4.1244	3.4231	2.9532
Tank Diameter (ft):	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000
Vapor Molecular Weight (lb/lb-mole):	66.0000	66.0000	66.0000	66.0000	66.0000	66.0000	66.0000	66.0000	66.0000	66.0000	66.0000	66.0000
Product Factor:	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Withdrawal Losses (lb):	9.3472	9.3472	9.3472	9.3472	9.3472	9.3472	9.3472	9.3472	9.3472	9.3472	9.3472	9.3472
Number of Columns:	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Effective Column Diameter (ft):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Net Throughput (gal/mo.):	3,122,333.7500	3,122,333.7500	3,122,333.7500	3,122,333.7500	3,122,333.7500	3,122,333.7500	3,122,333.7500	3,122,333.7500	3,122,333.7500	3,122,333.7500	3,122,333.7500	3,122,333.7500
Shell Clingage Factor (bbl/1000 sqft):	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015
Average Organic Liquid Density (lb/gal):	5.6000	5.6000	5.6000	5.6000	5.6000	5.6000	5.6000	5.6000	5.6000	5.6000	5.6000	5.6000
Tank Diameter (ft):	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000
Deck Fitting Losses (lb):	16.9598	18.7306	22.2567	27.0124	31.7935	35.9357	38.6037	36.4850	30.6763	25.9602	20.8673	17.6363
Value of Vapor Pressure Function:	0.0575	0.0635	0.0755	0.0916	0.1078	0.1219	0.1309	0.1238	0.1041	0.0881	0.0708	0.0598
Vapor Molecular Weight (lb/lb-mole):	66.0000	66.0000	66.0000	66.0000	66.0000	66.0000	66.0000	66.0000	66.0000	66.0000	66.0000	66.0000
Product Factor:	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Tot. Roof Fitting Loss Fact.(lb-mole/yr):	53.6000	53.6000	53.6000	53.6000	53.6000	53.6000	53.6000	53.6000	53.6000	53.6000	53.6000	53.6000
Deck Seam Losses (lb):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Deck Seam Length (ft):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Deck Seam Loss per Unit Length Factor (lb-mole/ft-yr):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Deck Seam Length Factor(ft/sqft):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Tank Diameter (ft):	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000
Vapor Molecular Weight (lb/lb-mole):	66.0000	66.0000	66.0000	66.0000	66.0000	66.0000	66.0000	66.0000	66.0000	66.0000	66.0000	66.0000
Product Factor:	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total Losses (lb):	32.2872	34.6825	39.4519	45.8845	52.3514	57.9543	61.5630	58.6972	50.8403	44.4613	37.5726	33.2023

Roof Fitting/Status	Quantity	Roof Fitting Loss Factors KFa(lb-mole/yr)	KFb(lb-mole/(yr mph^n))	m	Losses(lb)
Access Hatch (24-in. Diam.)/Bolted Cover, Gasketed	1	1.60	0.00	0.00	9.6567
Automatic Gauge Float Well/Bolted Cover, Gasketed	1	2.80	0.00	0.00	16.8992
Roof Leg or Hanger Well/Fixed	18	0.00	0.00	0.00	0.0000
Sample Pipe or Well (24-in. Diam.)/Slotted Pipe-Sliding Cover, Gask.	1	43.00	0.00	0.00	259.5234
Vacuum Breaker (10-in. Diam.)/Weighted Mech. Actuation, Gask.	1	6.20	1.20	0.94	37.4197

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: January, February, March, April, May, June, July, August, September, October, November, December

203-T-0020 - Internal Floating Roof Tank
Belfield, North Dakota

	Losses(lbs)				
Components	Rim Seal Loss	Withdrawl Loss	Deck Fitting Loss	Deck Seam Loss	Total Emissions
Gasoline (RVP 10)	113.86	112.17	322.92	0.00	548.95

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Indentification and Physical Characteristics

Identification

User Identification:	203-T-0022
City:	Belfield
State:	North Dakota
Company:	Meridian
Type of Tank:	Vertical Fixed Roof Tank
Description:	Diluent - Heavy Intermediates from FCC

Tank Dimensions

Shell Height (ft):	60.00
Diameter (ft):	63.00
Liquid Height (ft) :	50.00
Avg. Liquid Height (ft):	20.00
Volume (gallons):	1,165,934.57
Turnovers:	0.01
Net Throughput(gal/yr):	14,440.86
Is Tank Heated (y/n):	N

Paint Characteristics

Shell Color/Shade:	Gray/Light
Shell Condition	Good
Roof Color/Shade:	Gray/Light
Roof Condition:	Good

Roof Characteristics

Type:	Cone
Height (ft)	5.00
Slope (ft/ft) (Cone Roof)	0.16

Breather Vent Settings

Vacuum Settings (psig):	-0.03
Pressure Settings (psig)	0.03

Meterological Data used in Emissions Calculations: Bismarck, North Dakota (Avg Atmospheric Pressure = 13.86 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

203-T-0022 - Vertical Fixed Roof Tank
Belfield, North Dakota

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Distillate fuel oil no. 2	All	48.29	39.09	57.50	43.84	0.0043	0.0031	0.0060	130.0000			188.00	Option 1: VP40 = .0031 VP50 = .0045

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

203-T-0022 - Vertical Fixed Roof Tank
Belfield, North Dakota

Annual Emission Calcaulations	
Standing Losses (lb):	326.4459
Vapor Space Volume (cu ft):	129,885.2211
Vapor Density (lb/cu ft):	0.0001
Vapor Space Expansion Factor:	0.0684
Vented Vapor Saturation Factor:	0.9907
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	129,885.2211
Tank Diameter (ft):	63.0000
Vapor Space Outage (ft):	41.6667
Tank Shell Height (ft):	60.0000
Average Liquid Height (ft):	20.0000
Roof Outage (ft):	1.6667
Roof Outage (Cone Roof)	
Roof Outage (ft):	1.6667
Roof Height (ft):	5.0000
Roof Slope (ft/ft):	0.1600
Shell Radius (ft):	31.5000
Vapor Density	
Vapor Density (lb/cu ft):	0.0001
Vapor Molecular Weight (lb/lb-mole):	130.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0043
Daily Avg. Liquid Surface Temp. (deg. R):	507.9647
Daily Average Ambient Temp. (deg. F):	41.5958
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	503.5058
Tank Paint Solar Absorptance (Shell):	0.5400
Tank Paint Solar Absorptance (Roof):	0.5400
Daily Total Solar Insulation Factor (Btu/sqft day):	1,276.2450
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.0684
Daily Vapor Temperature Range (deg. R):	36.8348
Daily Vapor Pressure Range (psia):	0.0029
Breather Vent Press. Setting Range(psia):	0.0600
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0043
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.0031
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.0060
Daily Avg. Liquid Surface Temp. (deg R):	507.9647
Daily Min. Liquid Surface Temp. (deg R):	498.7560
Daily Max. Liquid Surface Temp. (deg R):	517.1734
Daily Ambient Temp. Range (deg. R):	24.3583
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0.9907
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):	0.0043
Vapor Space Outage (ft):	41.6667

Working Losses (lb):	0.1905
Vapor Molecular Weight (lb/lb-mole):	130.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0043
Annual Net Throughput (gal/yr.):	14,440.8600
Annual Turnovers:	0.0124
Turnover Factor:	1.0000
Maximum Liquid Volume (gal):	1,165,934.5742
Maximum Liquid Height (ft):	50.0000
Tank Diameter (ft):	63.0000
Working Loss Product Factor:	1.0000
Total Losses (lb):	326.6363

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: Annual

203-T-0022 - Vertical Fixed Roof Tank
Belfield, North Dakota

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Distillate fuel oil no. 2	0.19	326.45	326.64

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Indentification and Physical Characteristics

Identification

User Identification:	203-T-0023
City:	Belfield
State:	North Dakota
Company:	Meridian
Type of Tank:	Vertical Fixed Roof Tank
Description:	Fuel Oil

Tank Dimensions

Shell Height (ft):		60.00
Diameter (ft):		88.00
Liquid Height (ft) :		50.00
Avg. Liquid Height (ft):		48.00
Volume (gallons):		2,274,879.65
Turnovers:		21.16
Net Throughput(gal/yr):		48,136,200.00
Is Tank Heated (y/n):	N	

Paint Characteristics

Shell Color/Shade:	Gray/Light
Shell Condition	Good
Roof Color/Shade:	Gray/Light
Roof Condition:	Good

Roof Characteristics

Type:	Cone	
Height (ft)		6.00
Slope (ft/ft) (Cone Roof)		0.14

Breather Vent Settings

Vacuum Settings (psig):	-0.03
Pressure Settings (psig)	0.03

Meterological Data used in Emissions Calculations: Bismarck, North Dakota (Avg Atmospheric Pressure = 13.86 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

203-T-0023 - Vertical Fixed Roof Tank
Belfield, North Dakota

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Residual oil no. 6	All	48.29	39.09	57.50	43.84	0.0000	0.0000	0.0000	190.0000			387.00	Option 1: VP40 = .00002 VP50 = .00003

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

203-T-0023 - Vertical Fixed Roof Tank
Belfield, North Dakota

Annual Emission Calcaulations	
Standing Losses (lb):	2.0900
Vapor Space Volume (cu ft):	85,149.7272
Vapor Density (lb/cu ft):	0.0000
Vapor Space Expansion Factor:	0.0682
Vented Vapor Saturation Factor:	1.0000
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	85,149.7272
Tank Diameter (ft):	88.0000
Vapor Space Outage (ft):	14.0000
Tank Shell Height (ft):	60.0000
Average Liquid Height (ft):	48.0000
Roof Outage (ft):	2.0000
Roof Outage (Cone Roof)	
Roof Outage (ft):	2.0000
Roof Height (ft):	6.0000
Roof Slope (ft/ft):	0.1400
Shell Radius (ft):	44.0000
Vapor Density	
Vapor Density (lb/cu ft):	0.0000
Vapor Molecular Weight (lb/lb-mole):	190.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0000
Daily Avg. Liquid Surface Temp. (deg. R):	507.9647
Daily Average Ambient Temp. (deg. F):	41.5958
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	503.5058
Tank Paint Solar Absorptance (Shell):	0.5400
Tank Paint Solar Absorptance (Roof):	0.5400
Daily Total Solar Insulation Factor (Btu/sqft day):	1,276.2450
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.0682
Daily Vapor Temperature Range (deg. R):	36.8348
Daily Vapor Pressure Range (psia):	0.0000
Breather Vent Press. Setting Range(psia):	0.0600
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0000
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.0000
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.0000
Daily Avg. Liquid Surface Temp. (deg R):	507.9647
Daily Min. Liquid Surface Temp. (deg R):	498.7560
Daily Max. Liquid Surface Temp. (deg R):	517.1734
Daily Ambient Temp. Range (deg. R):	24.3583
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	1.0000
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):	0.0000
Vapor Space Outage (ft):	14.0000

Working Losses (lb):	6.1614
Vapor Molecular Weight (lb/lb-mole):	190.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0000
Annual Net Throughput (gal/yr.):	48,136,200.0000
Annual Turnovers:	21.1599
Turnover Factor:	1.0000
Maximum Liquid Volume (gal):	2,274,879.6529
Maximum Liquid Height (ft):	50.0000
Tank Diameter (ft):	88.0000
Working Loss Product Factor:	1.0000
Total Losses (lb):	8.2515

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: Annual

203-T-0023 - Vertical Fixed Roof Tank
Belfield, North Dakota

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Residual oil no. 6	6.16	2.09	8.25

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Indentification and Physical Characteristics

Identification

User Identification:	203-T-0031
City:	Belfield
State:	North Dakota
Company:	Meridian
Type of Tank:	Internal Floating Roof Tank
Description:	Light Naphtha

Tank Dimensions

Diameter (ft):	63.00
Volume (gallons):	1,399,104.00
Turnovers:	35.61
Self Supp. Roof? (y/n):	Y
No. of Columns:	0.00
Eff. Col. Diam. (ft):	0.00

Paint Characteristics

Internal Shell Condition:	Light Rust
Shell Color/Shade:	Gray/Light
Shell Condition	Good
Roof Color/Shade:	Gray/Light
Roof Condition:	Good

Rim-Seal System

Primary Seal:	Liquid-mounted
Secondary Seal	Rim-mounted

Deck Characteristics

Deck Fitting Category:	Detail
Deck Type:	Welded

Deck Fitting/Status	Quantity
Access Hatch (24-in. Diam.)/Bolted Cover, Gasketed	1
Automatic Gauge Float Well/Bolted Cover, Gasketed	1
Roof Leg or Hanger Well/Fixed	18
Sample Pipe or Well (24-in. Diam.)/Slotted Pipe-Sliding Cover, Gask.	1
Vacuum Breaker (10-in. Diam.)/Weighted Mech. Actuation, Gask.	1

Meterological Data used in Emissions Calculations: Bismarck, North Dakota (Avg Atmospheric Pressure = 13.86 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

203-T-0031 - Internal Floating Roof Tank
Belfield, North Dakota

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Gasoline (RVP 13)	Jan	30.90	24.94	36.87	43.84	3.9065	N/A	N/A	62.0000			92.00	Option 4: RVP=13, ASTM Slope=3
Gasoline (RVP 13)	Feb	34.98	28.04	41.91	43.84	4.2520	N/A	N/A	62.0000			92.00	Option 4: RVP=13, ASTM Slope=3
Gasoline (RVP 13)	Mar	42.09	33.80	50.39	43.84	4.9133	N/A	N/A	62.0000			92.00	Option 4: RVP=13, ASTM Slope=3
Gasoline (RVP 13)	Apr	50.10	39.90	60.29	43.84	5.7533	N/A	N/A	62.0000			92.00	Option 4: RVP=13, ASTM Slope=3
Gasoline (RVP 13)	May	56.81	45.06	68.55	43.84	6.5424	N/A	N/A	62.0000			92.00	Option 4: RVP=13, ASTM Slope=3
Gasoline (RVP 13)	Jun	61.81	49.29	74.32	43.84	7.1848	N/A	N/A	62.0000			92.00	Option 4: RVP=13, ASTM Slope=3
Gasoline (RVP 13)	Jul	64.71	51.53	77.88	43.84	7.5796	N/A	N/A	62.0000			92.00	Option 4: RVP=13, ASTM Slope=3
Gasoline (RVP 13)	Aug	62.42	50.31	74.54	43.84	7.2672	N/A	N/A	62.0000			92.00	Option 4: RVP=13, ASTM Slope=3
Gasoline (RVP 13)	Sep	55.34	45.27	65.40	43.84	6.3627	N/A	N/A	62.0000			92.00	Option 4: RVP=13, ASTM Slope=3
Gasoline (RVP 13)	Oct	48.45	40.33	56.58	43.84	5.5723	N/A	N/A	62.0000			92.00	Option 4: RVP=13, ASTM Slope=3
Gasoline (RVP 13)	Nov	39.43	33.50	45.36	43.84	4.6568	N/A	N/A	62.0000			92.00	Option 4: RVP=13, ASTM Slope=3
Gasoline (RVP 13)	Dec	32.50	27.06	37.95	43.84	4.0396	N/A	N/A	62.0000			92.00	Option 4: RVP=13, ASTM Slope=3

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

203-T-0031 - Internal Floating Roof Tank
Belfield, North Dakota

Month:	January	February	March	April	May	June	July	August	September	October	November	December
Rim Seal Losses (lb):	8.0629	8.9185	10.6416	13.0123	15.4585	17.6365	19.0718	17.9298	14.8808	12.4828	9.9594	8.3890
Seal Factor A (lb-mole/ft-yr):	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000
Seal Factor B (lb-mole/ft-yr (mph)^n):	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000
Value of Vapor Pressure Function:	0.0826	0.0913	0.1090	0.1333	0.1583	0.1806	0.1953	0.1836	0.1524	0.1278	0.1020	0.0859
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	3.9065	4.2520	4.9133	5.7533	6.5424	7.1848	7.5796	7.2672	6.3627	5.5723	4.6568	4.0396
Tank Diameter (ft):	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000
Vapor Molecular Weight (lb/lb-mole):	62.0000	62.0000	62.0000	62.0000	62.0000	62.0000	62.0000	62.0000	62.0000	62.0000	62.0000	62.0000
Product Factor:	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Withdrawal Losses (lb):	12.4292	12.4292	12.4292	12.4292	12.4292	12.4292	12.4292	12.4292	12.4292	12.4292	12.4292	12.4292
Number of Columns:	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Effective Column Diameter (ft):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Net Throughput (gal/mo.):	4,151,841.0833	4,151,841.0833	4,151,841.0833	4,151,841.0833	4,151,841.0833	4,151,841.0833	4,151,841.0833	4,151,841.0833	4,151,841.0833	4,151,841.0833	4,151,841.0833	4,151,841.0833
Shell Clingage Factor (bbl/1000 sqft):	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015
Average Organic Liquid Density (lb/gal):	5.6000	5.6000	5.6000	5.6000	5.6000	5.6000	5.6000	5.6000	5.6000	5.6000	5.6000	5.6000
Tank Diameter (ft):	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000
Deck Fitting Losses (lb):	22.8661	25.2926	30.1793	36.9027	43.8400	50.0168	54.0871	50.8485	42.2015	35.4009	28.2445	23.7911
Value of Vapor Pressure Function:	0.0826	0.0913	0.1090	0.1333	0.1583	0.1806	0.1953	0.1836	0.1524	0.1278	0.1020	0.0859
Vapor Molecular Weight (lb/lb-mole):	62.0000	62.0000	62.0000	62.0000	62.0000	62.0000	62.0000	62.0000	62.0000	62.0000	62.0000	62.0000
Product Factor:	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Tot. Roof Fitting Loss Fact.(lb-mole/yr):	53.6000	53.6000	53.6000	53.6000	53.6000	53.6000	53.6000	53.6000	53.6000	53.6000	53.6000	53.6000
Deck Seam Losses (lb):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Deck Seam Length (ft):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Deck Seam Loss per Unit Length Factor (lb-mole/ft-yr):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Deck Seam Length Factor(ft/sqft):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Tank Diameter (ft):	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000	63.0000
Vapor Molecular Weight (lb/lb-mole):	62.0000	62.0000	62.0000	62.0000	62.0000	62.0000	62.0000	62.0000	62.0000	62.0000	62.0000	62.0000
Product Factor:	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total Losses (lb):	43.3582	46.6403	53.2500	62.3442	71.7276	80.0825	85.5880	81.2075	69.5115	60.3128	50.6330	44.6093

Roof Fitting/Status	Quantity	Roof Fitting Loss Factors KFa(lb-mole/yr)	KFb(lb-mole/(yr mph^n))	m	Losses(lb)
Access Hatch (24-in. Diam.)/Bolted Cover, Gasketed	1	1.60	0.00	0.00	13.2690
Automatic Gauge Float Well/Bolted Cover, Gasketed	1	2.80	0.00	0.00	23.2208
Roof Leg or Hanger Well/Fixed	18	0.00	0.00	0.00	0.0000
Sample Pipe or Well (24-in. Diam.)/Slotted Pipe-Sliding Cover, Gask.	1	43.00	0.00	0.00	356.6045
Vacuum Breaker (10-in. Diam.)/Weighted Mech. Actuation, Gask.	1	6.20	1.20	0.94	51.4174

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: January, February, March, April, May, June, July, August, September, October, November, December

203-T-0031 - Internal Floating Roof Tank
Belfield, North Dakota

	Losses(lbs)				
Components	Rim Seal Loss	Withdrawl Loss	Deck Fitting Loss	Deck Seam Loss	Total Emissions
Gasoline (RVP 13)	156.44	149.15	443.67	0.00	749.26

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Indentification and Physical Characteristics

Identification

User Identification:	203-T-0033
City:	Belfield
State:	North Dakota
Company:	Meridian
Type of Tank:	Vertical Fixed Roof Tank
Description:	Light Slops

Tank Dimensions

Shell Height (ft):	30.00
Diameter (ft):	25.00
Liquid Height (ft) :	25.00
Avg. Liquid Height (ft):	9.00
Volume (gallons):	91,800.09
Turnovers:	22.96
Net Throughput(gal/yr):	2,107,875.00
Is Tank Heated (y/n):	N

Paint Characteristics

Shell Color/Shade:	Gray/Light
Shell Condition	Good
Roof Color/Shade:	Gray/Light
Roof Condition:	Good

Roof Characteristics

Type:	Cone
Height (ft)	2.00
Slope (ft/ft) (Cone Roof)	0.16

Breather Vent Settings

Vacuum Settings (psig):	-0.03
Pressure Settings (psig)	0.03

Meterological Data used in Emissions Calculations: Bismarck, North Dakota (Avg Atmospheric Pressure = 13.86 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

203-T-0033 - Vertical Fixed Roof Tank
Belfield, North Dakota

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Gasoline (RVP 10)	Jan	30.90	24.94	36.87	43.84	2.8523	2.5010	3.2426	66.0000			92.00	Option 4: RVP=10, ASTM Slope=3
Gasoline (RVP 10)	Feb	34.98	28.04	41.91	43.84	3.1146	2.6793	3.6057	66.0000			92.00	Option 4: RVP=10, ASTM Slope=3
Gasoline (RVP 10)	Mar	42.09	33.80	50.39	43.84	3.6191	3.0366	4.2888	66.0000			92.00	Option 4: RVP=10, ASTM Slope=3
Gasoline (RVP 10)	Apr	50.10	39.90	60.29	43.84	4.2635	3.4572	5.2149	66.0000			92.00	Option 4: RVP=10, ASTM Slope=3
Gasoline (RVP 10)	May	56.81	45.06	68.55	43.84	4.8723	3.8480	6.1049	66.0000			92.00	Option 4: RVP=10, ASTM Slope=3
Gasoline (RVP 10)	Jun	61.81	49.29	74.32	43.84	5.3700	4.1949	6.7953	66.0000			92.00	Option 4: RVP=10, ASTM Slope=3
Gasoline (RVP 10)	Jul	64.71	51.53	77.88	43.84	5.6768	4.3883	7.2515	66.0000			92.00	Option 4: RVP=10, ASTM Slope=3
Gasoline (RVP 10)	Aug	62.42	50.31	74.54	43.84	5.4341	4.2818	6.8223	66.0000			92.00	Option 4: RVP=10, ASTM Slope=3
Gasoline (RVP 10)	Sep	55.34	45.27	65.40	43.84	4.7335	3.8651	5.7521	66.0000			92.00	Option 4: RVP=10, ASTM Slope=3
Gasoline (RVP 10)	Oct	48.45	40.33	56.58	43.84	4.1244	3.4887	4.8504	66.0000			92.00	Option 4: RVP=10, ASTM Slope=3
Gasoline (RVP 10)	Nov	39.43	33.50	45.36	43.84	3.4231	3.0176	3.8716	66.0000			92.00	Option 4: RVP=10, ASTM Slope=3
Gasoline (RVP 10)	Dec	32.50	27.06	37.95	43.84	2.9532	2.6217	3.3181	66.0000			92.00	Option 4: RVP=10, ASTM Slope=3

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

203-T-0033 - Vertical Fixed Roof Tank
Belfield, North Dakota

Month:	January	February	March	April	May	June	July	August	September	October	November	December
Standing Losses (lb):	304.8452	344.4657	517.7923	715.0558	972.7526	1,114.2779	1,293.3938	1,128.5821	779.9994	567.0135	337.2424	284.3041
Vapor Space Volume (cu ft):	10,635.6001	10,635.6001	10,635.6001	10,635.6001	10,635.6001	10,635.6001	10,635.6001	10,635.6001	10,635.6001	10,635.6001	10,635.6001	10,635.6001
Vapor Density (lb/cu ft):	0.0358	0.0387	0.0444	0.0514	0.0580	0.0633	0.0666	0.0640	0.0565	0.0499	0.0422	0.0369
Vapor Space Expansion Factor:	0.1105	0.1367	0.1825	0.2569	0.3354	0.3952	0.4430	0.3871	0.2783	0.1976	0.1236	0.1026
Vented Vapor Saturation Factor:	0.2339	0.2185	0.1940	0.1696	0.1516	0.1395	0.1330	0.1381	0.1554	0.1743	0.2028	0.2277
Tank Vapor Space Volume:												
Vapor Space Volume (cu ft):	10,635.6001	10,635.6001	10,635.6001	10,635.6001	10,635.6001	10,635.6001	10,635.6001	10,635.6001	10,635.6001	10,635.6001	10,635.6001	10,635.6001
Tank Diameter (ft):	25.0000	25.0000	25.0000	25.0000	25.0000	25.0000	25.0000	25.0000	25.0000	25.0000	25.0000	25.0000
Vapor Space Outage (ft):	21.6667	21.6667	21.6667	21.6667	21.6667	21.6667	21.6667	21.6667	21.6667	21.6667	21.6667	21.6667
Tank Shell Height (ft):	30.0000	30.0000	30.0000	30.0000	30.0000	30.0000	30.0000	30.0000	30.0000	30.0000	30.0000	30.0000
Average Liquid Height (ft):	9.0000	9.0000	9.0000	9.0000	9.0000	9.0000	9.0000	9.0000	9.0000	9.0000	9.0000	9.0000
Roof Outage (ft):	0.6667	0.6667	0.6667	0.6667	0.6667	0.6667	0.6667	0.6667	0.6667	0.6667	0.6667	0.6667
Roof Outage (Cone Roof)												
Roof Outage (ft):	0.6667	0.6667	0.6667	0.6667	0.6667	0.6667	0.6667	0.6667	0.6667	0.6667	0.6667	0.6667
Roof Height (ft):	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
Roof Slope (ft/ft):	0.1600	0.1600	0.1600	0.1600	0.1600	0.1600	0.1600	0.1600	0.1600	0.1600	0.1600	0.1600
Shell Radius (ft):	12.5000	12.5000	12.5000	12.5000	12.5000	12.5000	12.5000	12.5000	12.5000	12.5000	12.5000	12.5000
Vapor Density												
Vapor Density (lb/cu ft):	0.0358	0.0387	0.0444	0.0514	0.0580	0.0633	0.0666	0.0640	0.0565	0.0499	0.0422	0.0369
Vapor Molecular Weight (lb/lb-mole):	66.0000	66.0000	66.0000	66.0000	66.0000	66.0000	66.0000	66.0000	66.0000	66.0000	66.0000	66.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	2.8523	3.1146	3.6191	4.2635	4.8723	5.3700	5.6768	5.4341	4.7335	4.1244	3.4231	2.9532
Daily Avg. Liquid Surface Temp. (deg. R):	490.5714	494.6481	501.7622	509.7657	516.4753	521.4772	524.3774	522.0931	515.0067	508.1246	499.0999	492.1748
Daily Average Ambient Temp. (deg. F):	9.2500	15.7500	28.1500	42.9500	55.0000	64.3500	70.4000	68.3000	56.9500	45.6000	28.5500	13.9000
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731	10.731	10.731	10.731	10.731	10.731	10.731	10.731	10.731	10.731	10.731	10.731
Liquid Bulk Temperature (deg. R):	503.5058	503.5058	503.5058	503.5058	503.5058	503.5058	503.5058	503.5058	503.5058	503.5058	503.5058	503.5058
Tank Paint Solar Absorptance (Shell):	0.5400	0.5400	0.5400	0.5400	0.5400	0.5400	0.5400	0.5400	0.5400	0.5400	0.5400	0.5400
Tank Paint Solar Absorptance (Roof):	0.5400	0.5400	0.5400	0.5400	0.5400	0.5400	0.5400	0.5400	0.5400	0.5400	0.5400	0.5400
Daily Total Solar Insulation Factor (Btu/sqft day):	535.2345	820.4602	1,209.1160	1,558.7475	1,888.7083	2,096.8374	2,152.6770	1,833.8206	1,343.3212	900.7295	543.8008	431.4872
Vapor Space Expansion Factor												
Vapor Space Expansion Factor:	0.1105	0.1367	0.1825	0.2569	0.3354	0.3952	0.4430	0.3871	0.2783	0.1976	0.1236	0.1026
Daily Vapor Temperature Range (deg. R):	23.8607	27.7414	33.1858	40.7763	46.9893	50.0642	52.7085	48.4634	40.2550	32.4830	23.7023	21.7881
Daily Vapor Pressure Range (psia):	0.7416	0.9264	1.2522	1.7577	2.2569	2.6004	2.8632	2.5405	1.8870	1.3617	0.8540	0.6964
Breather Vent Press. Setting Range(psia):	0.0600	0.0600	0.0600	0.0600	0.0600	0.0600	0.0600	0.0600	0.0600	0.0600	0.0600	0.0600
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	2.8523	3.1146	3.6191	4.2635	4.8723	5.3700	5.6768	5.4341	4.7335	4.1244	3.4231	2.9532
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	2.5010	2.6793	3.0366	3.4572	3.8480	4.1949	4.3883	4.2818	3.8651	3.4887	3.0176	2.6217
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	3.2426	3.6057	4.2888	5.2149	6.1049	6.7953	7.2515	6.8223	5.7521	4.8504	3.8716	3.3181
Daily Avg. Liquid Surface Temp. (deg R):	490.5714	494.6481	501.7622	509.7657	516.4753	521.4772	524.3774	522.0931	515.0067	508.1246	499.0999	492.1748
Daily Min. Liquid Surface Temp. (deg R):	484.6062	487.7128	493.4657	499.5716	504.7280	508.9611	511.2003	509.9773	504.9429	500.0038	493.1744	486.7278
Daily Max. Liquid Surface Temp. (deg R):	496.5366	501.5835	510.0586	519.9597	528.2226	533.9932	537.5545	534.2090	525.0704	516.2453	505.0255	497.6218
Daily Ambient Temp. Range (deg. R):	21.9000	21.3000	20.7000	23.9000	25.6000	25.5000	28.0000	28.8000	27.7000	26.2000	21.5000	21.2000
Vented Vapor Saturation Factor												
Vented Vapor Saturation Factor:	0.2339	0.2185	0.1940	0.1696	0.1516	0.1395	0.1330	0.1381	0.1554	0.1743	0.2028	0.2277
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):	2.8523	3.1146	3.6191	4.2635	4.8723	5.3700	5.6768	5.4341	4.7335	4.1244	3.4231	2.9532
Vapor Space Outage (ft):	21.6667	21.6667	21.6667	21.6667	21.6667	21.6667	21.6667	21.6667	21.6667	21.6667	21.6667	21.6667

Working Losses (lb):	787.3207	859.7345	998.9842	1,176.8728	1,344.9144	1,482.2997	1,566.9657	1,499.9679	1,306.5805	1,138.4627	944.8849	815.1854
Vapor Molecular Weight (lb/lb-mole):	66.0000	66.0000	66.0000	66.0000	66.0000	66.0000	66.0000	66.0000	66.0000	66.0000	66.0000	66.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	2.8523	3.1146	3.6191	4.2635	4.8723	5.3700	5.6768	5.4341	4.7335	4.1244	3.4231	2.9532
Net Throughput (gal/mo.):	175,656.2500	175,656.2500	175,656.2500	175,656.2500	175,656.2500	175,656.2500	175,656.2500	175,656.2500	175,656.2500	175,656.2500	175,656.2500	175,656.2500
Annual Turnovers:	22.9616	22.9616	22.9616	22.9616	22.9616	22.9616	22.9616	22.9616	22.9616	22.9616	22.9616	22.9616
Turnover Factor:	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Maximum Liquid Volume (gal):	91,800.0893	91,800.0893	91,800.0893	91,800.0893	91,800.0893	91,800.0893	91,800.0893	91,800.0893	91,800.0893	91,800.0893	91,800.0893	91,800.0893
Maximum Liquid Height (ft):	25.0000	25.0000	25.0000	25.0000	25.0000	25.0000	25.0000	25.0000	25.0000	25.0000	25.0000	25.0000
Tank Diameter (ft):	25.0000	25.0000	25.0000	25.0000	25.0000	25.0000	25.0000	25.0000	25.0000	25.0000	25.0000	25.0000
Working Loss Product Factor:	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total Losses (lb):	1,092.1659	1,204.2001	1,516.7764	1,891.9285	2,317.6671	2,596.5776	2,860.3595	2,628.5501	2,086.5799	1,705.4762	1,282.1273	1,099.4895

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: January, February, March, April, May, June, July, August, September, October, November, December

203-T-0033 - Vertical Fixed Roof Tank
Belfield, North Dakota

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Gasoline (RVP 10)	13,922.17	8,359.72	22,281.90

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Indentification and Physical Characteristics

Identification

User Identification:	203-T-0034
City:	Belfield
State:	North Dakota
Company:	Meridian
Type of Tank:	Vertical Fixed Roof Tank
Description:	Heavy Slop

Tank Dimensions

Shell Height (ft):		30.00
Diameter (ft):		25.00
Liquid Height (ft) :		25.00
Avg. Liquid Height (ft):		9.00
Volume (gallons):		91,800.09
Turnovers:		22.96
Net Throughput(gal/yr):		2,107,875.00
Is Tank Heated (y/n):	N	

Paint Characteristics

Shell Color/Shade:	Gray/Light
Shell Condition	Good
Roof Color/Shade:	Gray/Light
Roof Condition:	Good

Roof Characteristics

Type:	Cone	
Height (ft)		2.00
Slope (ft/ft) (Cone Roof)		0.16

Breather Vent Settings

Vacuum Settings (psig):	-0.03
Pressure Settings (psig)	0.03

Meterological Data used in Emissions Calculations: Bismarck, North Dakota (Avg Atmospheric Pressure = 13.86 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

203-T-0034 - Vertical Fixed Roof Tank
Belfield, North Dakota

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Distillate fuel oil no. 2	All	48.29	39.09	57.50	43.84	0.0043	0.0031	0.0060	130.0000			188.00	Option 1: VP40 = .0031 VP50 = .0045

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

203-T-0034 - Vertical Fixed Roof Tank
Belfield, North Dakota

Annual Emission Calcaulations	
Standing Losses (lb):	26.8510
Vapor Space Volume (cu ft):	10,635.6001
Vapor Density (lb/cu ft):	0.0001
Vapor Space Expansion Factor:	0.0684
Vented Vapor Saturation Factor:	0.9951
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	10,635.6001
Tank Diameter (ft):	25.0000
Vapor Space Outage (ft):	21.6667
Tank Shell Height (ft):	30.0000
Average Liquid Height (ft):	9.0000
Roof Outage (ft):	0.6667
Roof Outage (Cone Roof)	
Roof Outage (ft):	0.6667
Roof Height (ft):	2.0000
Roof Slope (ft/ft):	0.1600
Shell Radius (ft):	12.5000
Vapor Density	
Vapor Density (lb/cu ft):	0.0001
Vapor Molecular Weight (lb/lb-mole):	130.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0043
Daily Avg. Liquid Surface Temp. (deg. R):	507.9647
Daily Average Ambient Temp. (deg. F):	41.5958
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	503.5058
Tank Paint Solar Absorptance (Shell):	0.5400
Tank Paint Solar Absorptance (Roof):	0.5400
Daily Total Solar Insulation Factor (Btu/sqft day):	1,276.2450
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.0684
Daily Vapor Temperature Range (deg. R):	36.8348
Daily Vapor Pressure Range (psia):	0.0029
Breather Vent Press. Setting Range(psia):	0.0600
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0043
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.0031
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.0060
Daily Avg. Liquid Surface Temp. (deg R):	507.9647
Daily Min. Liquid Surface Temp. (deg R):	498.7560
Daily Max. Liquid Surface Temp. (deg R):	517.1734
Daily Ambient Temp. Range (deg. R):	24.3583
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0.9951
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):	0.0043
Vapor Space Outage (ft):	21.6667

Working Losses (lb):	27.8020
Vapor Molecular Weight (lb/lb-mole):	130.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0043
Annual Net Throughput (gal/yr.):	2,107,875.0000
Annual Turnovers:	22.9616
Turnover Factor:	1.0000
Maximum Liquid Volume (gal):	91,800.0893
Maximum Liquid Height (ft):	25.0000
Tank Diameter (ft):	25.0000
Working Loss Product Factor:	1.0000
Total Losses (lb):	54.6531

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: Annual

203-T-0034 - Vertical Fixed Roof Tank
Belfield, North Dakota

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Distillate fuel oil no. 2	27.80	26.85	54.65

ENGINEERING CALCULATION NOTES

vepica USA	CALCULATION NOTES	Job No: N/A	
CODE:	UNIT:	Spc. No.:	
N/A	LOCATION: N/A	Sh. 1 of 4	Rev. A

1. FLARE EMISSION

	UNITS	HC Emergency Flare (Phase 1)	Acid Flare (Phase 1)	Enclosed HC Operating Flare (Phase 1)	HC Emergency Flare (Phase 2)
Flare Mass Flow	lb/h	722,000	36,153	150,000	777,437
Flare Vol lFlow	MMSCFD	74.6	15.8	24.4	88.8
Flare MW	lb/lbmol	88.2	20.9	56	79.7
Flowing Temperature	F	382	290	120	389
Molar Flowrate	lbmol/h	8,186	1,730	2,679	9,755
Lower Heating Value	BTU/SCF	4183	441	2951	3780
	BTU/lb	18,000	8000	20000	18,000
Heat Release	MMBTU/h	12,996	289	3,000	13,994
Height	ft	150	150	50	150
Diameter	in	36	10	360	36
Discharge Velocity	ft/s	194	382.2	-	205
Heating Value (Natural Gas)	BTU/SCF	520	520	520	520
Pilots	#	3	2	12	3
Fuel Gas to Pilots/per Pilot	SCFH	100	100	100	100

vepica USA	CALCULATION NOTES	
		Job No: N/A
CODE:	UNIT: N/A	Spc. No.:
N/A	LOCATION: N/A	Sh. 1 of 4 Rev. D

1. PREMISES

- Site Conditions:
  Relative Humidity: 66 % RH
  Pressure: 0 psig
  Temperature (for efficiency): 60 °F
- Radiant Duty Heat loss: 1.5 %
- Heat Efficiency: 80 %
- Excess Air: 20 %

- Fuel Gas Composition (% mass):

Hydrogen	23.2
Methane	13.4
Ethane	27.0
Propane	17.8
Butane	18.6
	100.0

2. DISTILLATION UNIT

- Tag: 101-H-0101					- Fuel Gas:	2610.7	lb/h
- Stack Height:	127.6	ft			- Flue Gas:	66470.6	lb/h
- Stack Diameter (ID):	6' 3 1/2"		6.3	ft	- Flue Gas Temp:	787.7	°F
- Stack Area:	31.1	ft^2			- Density:	0.0296	lb/ft^3
					- Flue Gas Vel:	20.1	ft/s
- Process Duty:	57.6	MM BTU/hr					
- Duty (Heater Fuel Gas):	72.00	MM BTU/hr					
- Tag: 102-H-0201					- Fuel Gas:	2610.7	lb/h
- Stack Height:	127.6	ft			- Flue Gas:	66470.6	lb/h
- Stack Diameter (ID):	6' 3 1/2"		6.3	ft	- Flue Gas Temp:	787.7	°F
- Stack Area:	31.1	ft^2			- Density:	0.0296	lb/ft^3
					- Flue Gas Vel:	20.1	ft/s
- Process Duty:	57.6	MM BTU/hr					
- Duty (Heater Fuel Gas):	72.00	MM BTU/hr					

3. VACUUM UNIT

- Tag: 103-H-0301					- Fuel Gas:	2773.5	lb/h
- Stack Height:	125.0	ft			- Flue Gas:	70380.6	lb/h
- Stack Diameter (ID):	6' 6"		6.5	ft	- Flue Gas Temp:	600.4	°F
- Stack Area:	33.2	ft^2			- Density:	0.0349	lb/ft^3
					- Flue Gas Vel:	16.9	ft/s
- Process Duty:	65.0	MM BTU/hr					
- Duty (Heater Fuel Gas):	76.47	MM BTU/hr					
- Tag: 103-H-0302					- Fuel Gas:	2090.6	lb/h
- Stack Height:	120.0	ft			- Flue Gas:	53050.0	lb/h
- Stack Diameter (ID):	5' 1"		5.1	ft	- Flue Gas Temp:	600.1	°F
- Stack Area:	20.3	ft^2			- Density:	0.0349	lb/ft^3
					- Flue Gas Vel:	20.8	ft/s
- Process Duty:	49.0	MM BTU/hr					
- Duty (Heater Fuel Gas):	57.65	MM BTU/hr					

4. HN HDT

- Tag: 105-H-0501					- Fuel Gas:	498.5	lb/h
- Stack Height:	91.0	ft			- Flue Gas:	12195.0	lb/h
- Stack Diameter (ID):	3'		3.0	ft	- Flue Gas Temp:	787.7	°F
- Stack Area:	7.1	ft^2			- Density:	0.0296	lb/ft^3
					- Flue Gas Vel:	16.2	ft/s
- Process Duty:	11.0	MM BTU/hr					
- Duty (Heater Fuel Gas):	13.75	MM BTU/hr					

- Tag: 105-H-0502
- Stack Height: 91.0 ft
- Stack Diameter (ID): 3' 3.0 ft
- Stack Area: 7.1 ft^2
- Process Duty: 13.0 MM BTU/hr
- Duty (Heater Fuel Gas): 16.25 MM BTU/hr
- Fuel Gas: 589.2 lb/h
- Flue Gas: 14412.8 lb/h
- Flue Gas Temp: 787.7 °F
- Density: 0.0296 lb/ft^3
- Flue Gas Vel: 19.1 ft/s

5. LN HDT

- Tag: 111-H-1101
- Stack Height: 170.0 ft
- Stack Diameter (ID): 3' 6" 3.5 ft
- Stack Area: 9.6 ft^2
- Process Duty: 11.1 MM BTU/hr
- Duty (Heater Fuel Gas): 13.90 MM BTU/hr
- Fuel Gas: 504.0 lb/h
- Flue Gas: 12328.0 lb/h
- Flue Gas Temp: 793.1 °F
- Density: 0.0295 lb/ft^3
- Flue Gas Vel: 12.1 ft/s

6. CATALYTIC REFORMER #1

- Tag: 107-H-0701
- Stack Height: 120.0 ft
- Stack Diameter (ID): 6' 6.0 ft
- Stack Area: 28.3 ft^2
- Process Duty: 74.0 MM BTU/hr
- Duty (Heater Fuel Gas): 92.50 MM BTU/hr
- Fuel Gas: 3354.0 lb/h
- Flue Gas: 82042.0 lb/h
- Flue Gas Temp: 787.7 °F
- Density: 0.0296 lb/ft^3
- Flue Gas Vel: 27.2 ft/s

7. CATALYTIC REFORMER #2

- Tag: 106-H-0601
- Stack Height: 42.0 ft
- Stack Diameter (ID): 4' 4.0 ft
- Stack Area: 12.6 ft^2
- Process Duty: 33.4 MM BTU/hr
- Duty (Heater Fuel Gas): 41.73 MM BTU/hr
- Fuel Gas: 1513.0 lb/h
- Flue Gas: 37012.0 lb/h
- Flue Gas Temp: 786.2 °F
- Density: 0.0297 lb/ft^3
- Flue Gas Vel: 27.5 ft/s

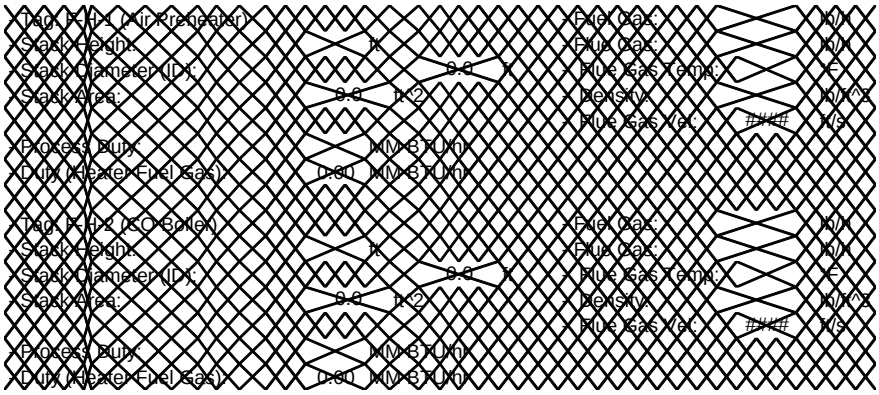
8. DIESEL HDT

- Tag: 110-H-1001
- Stack Height: 96.0 ft
- Stack Diameter (ID): 2' 5 1/2" 2.5 ft
- Stack Area: 4.7 ft^2
- Process Duty: 13.0 MM BTU/hr
- Duty (Heater Fuel Gas): 16.25 MM BTU/hr
- Fuel Gas: 788.0 lb/h
- Flue Gas: 15342.0 lb/h
- Flue Gas Temp: 764.3 °F
- Density: 0.0316 lb/ft^3
- Flue Gas Vel: 28.4 ft/s

9. FCC NAPHTHA HDT

- Tag: 114-H-1401
- Stack Height: 91.0 ft
- Stack Diameter (ID): 3' 3.0 ft
- Stack Area: 7.1 ft^2
- Process Duty: 14.0 MM BTU/hr
- Duty (Heater Fuel Gas): 17.48 MM BTU/hr
- Fuel Gas: 633.0 lb/h
- Flue Gas: 15503.0 lb/h
- Flue Gas Temp: 784.3 °F
- Density: 0.0297 lb/ft^3
- Flue Gas Vel: 20.5 ft/s

10. FLUID CATALYTIC CRACKING (FCC)



- Tag: 112-H-1201					- Fuel Gas:	1028.0	lb/h
- Stack Height:	72.0	ft			- Flue Gas:	25145.0	lb/h
- Stack Diameter (ID):	5' 6"		5.5	ft	- Flue Gas Temp:	785.0	°F
- Stack Area:	23.8	ft^2			- Density:	0.0297	lb/ft^3
					- Flue Gas Vel:	9.9	ft/s
- Process Duty:	22.7	MM BTU/hr					
- Duty (Heater Fuel Gas):	28.35	MM BTU/hr					

11. ALKYLATION UNIT

- Tag: 118-H-1801					- Fuel Gas:	1178.4	lb/h
- Stack Height:	95.0	ft			- Flue Gas:	30004.1	lb/h
- Stack Diameter (ID):	4'		4.0	ft	- Flue Gas Temp:	785.5	°F
- Stack Area:	12.6	ft^2			- Density:	0.0296	lb/ft^3
					- Flue Gas Vel:	22.4	ft/s
- Process Duty:	67.4	MM BTU/hr					
- Duty (Heater Fuel Gas):	84.19	MM BTU/hr					

12. ISOMERIZATION UNIT

- Tag: 117-H-1701					- Fuel Gas:	59.8	lb/h
- Stack Height:	36.0	ft			- Flue Gas:	1463.0	lb/h
- Stack Diameter (ID):	2' 8"		2.7	ft	- Flue Gas Temp:	823.8	°F
- Stack Area:	5.6	ft^2			- Density:	0.0286	lb/ft^3
					- Flue Gas Vel:	2.5	ft/s
- Process Duty:	1.3	MM BTU/hr					
- Duty (Heater Fuel Gas):	1.65	MM BTU/hr					
- Tag: 117-H-1702					- Fuel Gas:	136.0	lb/h
- Stack Height:	46.0	ft			- Flue Gas:	3326.0	lb/h
- Stack Diameter (ID):	4' 7"		4.6	ft	- Flue Gas Temp:	787.7	°F
- Stack Area:	16.5	ft^2			- Density:	0.0296	lb/ft^3
					- Flue Gas Vel:	1.9	ft/s
- Process Duty:	3.0	MM BTU/hr					
- Duty (Heater Fuel Gas):	3.75	MM BTU/hr					

vepica USA	CALCULATION NOTES	Job No: N/A
CODE: N/A	UNIT: N/A	Spc. No.:
	LOCATION: N/A	Sh. 4 of 4 Rev. D

13. Kerosene HDT

- Tag: 125-H-2501
- Stack Height: 96.0 ft
- Stack Diameter (ID): 2' 5 1/2" 2.5 ft
- Stack Area: 4.7 ft^2

- Process Duty: 10.0 MM BTU/hr
- Duty (Heater Fuel Gas): 12.50 MM BTU/hr

- Fuel Gas: 607.0 lb/h
- Flue Gas: 11802.0 lb/h
- Flue Gas Temp: 764.3 °F
- Density: 0.0316 lb/ft^3
- Flue Gas Vel: 21.9 ft/s

vepica USA	CALCULATION NOTES	Job No: N/A	
CODE:	UNIT: Boiler	Spc. No.:	
N/A	LOCATION: N/A	Sh. 1 of 1	Rev. D

Boiler

- Site Conditions:
  - Relative Humidity: 66 % RH
  - Pressure: 0 psig
  - Temperature (for efficiency): 60 °F
- Radiant Duty Heat loss: 1.5 %
- Heat Efficiency: 93 %
- Excess Air: 12 %

-Boiler Capacity
100,100 lb/h

- Fuel Gas Composition (% mass):

Hydrogen	23.2
Methane	13.4
Ethane	27.0
Propane	17.8
Butane	18.6
	100.0

- Tag: Boiler 1
- Stack Height: 100.0 ft
- Stack Diameter (ID): 36" 3.0 ft
- Stack Area: 7.1 ft^2
- Process Duty: 117.7 MM BTU/hr
- Duty (Heater Fuel Gas): 126.54 MM BTU/hr

- Fuel Gas: 4599.2 lb/h
- Flue Gas: 117099.0 lb/h
- Flue Gas Temp: 294.2 °F
- Density: 0.0490 lb/ft^3
- Flue Gas Vel: 93.9 ft/s

Exhibit C: Controls Technology Review

VEPICA CODE : P-5715043-01-001-18035-I001 **SHEET** 1 **OF** 26

COMPANY CODE: TBD

TITLE: EMISSIONS INVENTORY – CONTROLS TECHNOLOGY REVIEW

PROJECT Nº: P-5715043

NAME: PERMITTING SUPPORT – DAVIS REFINERY

CLIENT: MERIDIAN ENERGY GROUP INC.

LOCATION: BILLINGS COUNTY, NORTH DAKOTA

ISSUE	DATE	DESCRIPTION	PREPARED	REVIEWED	APPROVED VEPICA	APPROVED CLIENT
0	9/21/16	ISSUED FOR PTC	E. MARTINEZ (Zia) J. SOLANO	A. PENA-ISEA	C. GARCÍA	T.JOHNSON

INDEX

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1. INTRODUCTION

Meridian Energy Group (MEG) has engaged VEPICA to develop an air permit application for construction of the 55,000 BPD (barrels per day) oil Davis Refinery in Billings County, North Dakota.

Based on the estimated emissions for the facility, the source qualifies as a synthetic minor source under North Dakota Air Quality regulations. As such, formal Best Available Control Technology (BACT) analysis is not applicable for the permitting of the facility. However, this Controls Technology Review generally follows BACT methods for identification of proposed controls. It should be noted that control requirements for a large portion of the air emissions sources for the Davis Refinery plant are specified by EPA regulation under New Source Performance Standards (NSPS), applicable Maximum Achievable Control Technology (MACT) and National Emission Standards for Hazardous Air Pollutants (NESHAP) regulations and/or other applicable regulations.

Final emissions control technologies, control efficiencies, and emissions limits will be specified in permit issued by NDDoH for the Davis Refinery. Upon commencement of operation, Meridian will be required to show compliance with these specified limits and controls and will implement required sampling and reporting to show compliance with permit limits.

1.1. Document Scope

This Control Technologies Review includes a descriptive analysis of the most technologically feasible air pollution control equipment to be considered in the design of Davis Refinery. The determination of which specific technology qualifies and is finally selected as the applicable control to implement is made on a case-by-case basis for each pollutant for each emission unit.

Control selection to be implemented in the facilities design was made under the premise of its technical feasibility and the level of control that can reasonably be expected to be achieved in order to maintain emissions levels of the proposed Davis Refinery at synthetic minor source status. Since formal BACT analysis is not required, analysis for energy, environment and economic impacts was not conducted for proposed emission controls.

1.2. Methodology

While BACT analysis is not specifically required for the proposed Davis Refinery since it qualifies as a minor synthetic source, the methods used for emissions control technology selection have generally followed a BACT analysis approach.

EPA's 1990 Draft Edition of the New Source Review Workshop Manual (NSR Manual) sets forth a standardized procedure for determining BACT. This is the method used by most permitting agencies in the U.S. for compliance analysis. This method is considered to be a "top-down" approach and consists of the following five steps:

1. Identify all control technologies
2. Eliminate technically infeasible options
3. Rank remaining control technologies by control effectiveness
4. Evaluate most effective controls and document results
5. Select BACT

BACT is based primarily on control effectiveness. If a technology providing lesser control is to be utilized, it must be demonstrated that, based on energy, environmental and economic impacts and other costs, it is the best choice.

As previously noted, since formal BACT analysis is not required due to the facility qualifying as a synthetic minor source, analysis for technical feasibility was only cursorily conducted by review of the U.S. EPA RACT/MACT/LAER Clearinghouse database as well as applicable permits from other facilities. In addition, coordination with equipment vendors and suppliers was undertaken for many of the emissions units to obtain project and emissions unit specific guarantees for proposed emissions rates. Analysis of energy, environment and economic impacts was not conducted for the proposed controls since in essentially all instances, the higher level of control available was the one selected.

2. SUMMARY OF CONTROLLED AND UNCONTROLLED EMISSIONS

The inventory of emissions for the identified routine (non-emergency) emissions sources for the proposed Davis Refinery for both, the base case (uncontrolled) and post controls (controlled), are summarized in Tables 1 and 2, respectively for the Primary Operating Scenario (full project build-out) and the controlled emissions for the Alternative Operating Scenario are shown in Table 3. Controlled emission detailed calculations are included in the Emissions Inventory (Exhibit B of the permit application).

Table 1. Davis Refinery Summary of Uncontrolled Emissions

	Criteria Pollutants										HAPs
Emissions Unit	CO	Pb	PM<10	Filerable PM <10	PM <2.5	Filterable PM <2.5	Condensable PM	NO_X (as NO_2)	SO_2	VOC	Total HAPs
Leaks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	243.72	40.35
Tanks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	21.79	14.95
Stationary Combustion Sources	91.42	1.60E-03	13.06	3.26	13.06	3.26	9.79	97.95	1.92	17.61	6.41
Fluid Catalytic Cracking Unit	0.00	2.03E-03	50.14	33.16	45.65	28.67	16.98	186.28	664.88	577.20	5.39
Catalytic Reforming Unit	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.79
Sulfur Recovery Plant	2.15	0.00	0.00	0.00	0.00	0.00	0.00	0.47	0.20	1.50	0.00
Vacuum Systems	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Blowdown System	0.83	0.00	0.01	0.01	0.01	0.01	0.00	3.66	5.20	0.15	0.00
Flares	0.25	4.38E-06	0.04	0.01	0.04	0.01	0.03	0.27	0.005	0.05	0.00
Wastewater	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	210.41	23.28
Cooling Towers	0.00	0.00	24.83	0.00	0.00	0.00	0.00	0.00	0.00	4.73	0.00
Rail Product Loading	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1,713.49	0.00
Truck Product Loading	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	366.76	0.00
Fugitive Dust	0.00	0.00	1.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total STPY	**94.65**	**0.004**	**89.40**	**36.44**	**58.75**	**31.95**	**26.80**	**288.62**	**672.20**	**3,157.45**	**91.17**

Taken from Exhibit B- EMISSIONS INVENTORY FOR DAVIS REFINERY. VEPICA, 2016. Doc. N° P-5715043-01-001-18042-I001.

Table 2: Davis Refinery Summary of Controlled Emissions – Primary Operating Scenario

	Criteria Pollutants										HAPs
Emissions Unit	CO	Pb	PM<10	Filerable PM <10	PM <2.5	Filterable PM <2.5	Condensable PM	NO_X (as NO_2)	SO_2	VOC	Total HAPs
Leaks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	21.06	2.39
Tanks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.17	4.48
Stationary Combustion Sources	91.42	1.60E-03	8.00	2.00	8.00	2.00	6.00	46.40	1.92	17.61	1.62
Fluid Catalytic Cracking Unit	0.00	2.03E-05	1.00	0.66	0.91	0.57	0.34	3.73	6.65	5.77	0.87
Catalytic Reforming Unit	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.79
Sulfur Recovery Plant	2.15	0.00	0.00	0.00	0.00	0.00	0.00	0.47	0.20	1.50	0.00
Vacuum Systems	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Blowdown System	0.83	0.00	0.01	0.01	0.01	0.01	0.00	3.66	5.20	0.15	0.00
Flares	0.25	4.38E-06	0.04	0.01	0.04	0.01	0.03	0.27	0.005	0.05	0.00
Wastewater	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.52	0.52
Cooling Towers	0.00	0.00	1.86	0.00	0.00	0.00	0.00	0.00	0.00	0.35	0.00
Rail Product Loading	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.81	0.00
Truck Product Loading	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.73	0.00
Fugitive Dust	0.00	0.00	1.33	0.00	5.65E-04	0.00	0.00	0.00	0.00	0.00	0.00
Total STPY	**94.65**	**1.62E-03**	**12.24**	**2.68**	**8.96**	**2.59**	**6.37**	**54.53**	**13.97**	**69.78**	**10.67**

Taken from Exhibit B- EMISSIONS INVENTORY FOR DAVIS REFINERY. VEPICA, 2016. Doc. N° P-5715043-01-001-18042-I001.

Table 3: Davis Refinery Summary of Controlled Emissions – Alternative Operating Scenario, Phase I

	Criteria Pollutants										HAPs
Emissions Unit	CO	Pb	PM<10	Filerable PM <10	PM <2.5	Filterable PM <2.5	Condensable PM	NO_X (as NO_2)	SO_2	VOC	Total HAPs
Leaks	0.00	0.0000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.24	0.37
Tanks	0.00	0.0000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.32	2.24
Stationary Combustion Sources	33.82	0.0006	4.83	1.21	4.83	1.21	3.62	36.23	0.71	6.51	0.60
Fluid Catalytic Cracking Unit	0.00	0.0000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Catalytic Reforming Unit	0.00	0.0000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.55
Sulfur Recovery Plant	2.15	0.0000	0.00	0.00	0.00	0.00	0.00	0.47	0.20	0.64	0.00
Vacuum Systems	0.00	0.0000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Blowdown System	0.41	0.0000	0.00	0.00	0.00	0.00	0.00	1.83	2.60	0.08	0.00
Flares	0.21	3.72E-06	0.03	0.01	0.03	0.01	0.02	0.23	0.004	0.04	0.00
Wastewater	0.00	0.0000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.23	0.26
Cooling Towers	0.00	0.0000	0.93	0.00	0.00	0.00	0.00	0.00	0.00	0.18	0.00
Rail Product Loading	0.00	0.0000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.17	0.00
Truck Product Loading	0.00	0.0000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.28	0.00
Fugitive Dust	0.00	0.0000	0.00	0.00	3.13E-04	0.00	0.00	0.00	0.00	0.00	0.00
Total STPY	**36.59**	**0.0006**	**5.80**	**1.22**	**4.86**	**1.22**	**3.65**	**38.76**	**3.51**	**27.72**	**4.01**

3. IDENTIFICATION OF APPLICABLE CONTROL TECHNOLOGIES

Analysis of technical feasibility was generally conducted by review of the U.S. EPA RACT/BACT/LAER Clearing House Databases, EPA guidance documents and general industry literature for each applicable pollutant source. In addition, coordination with equipment vendors and suppliers was undertaken for many of the emissions units to obtain project and emissions unit specific guidance on control implementation as well as guarantees for proposed emissions rates. Based on this review, identification of technically feasible controls and related typical emissions levels was identified. Literature sources are identified by note and references are included in Section 5 of this document

A list of feasible control technologies considered for implementation for each source category and for each applicable pollutant is presented in Tables 4a-4k. Where proposed controls can address multiple pollutants, discussion has been combined to reduce repetitiveness.

Table 4a: Davis Refinery – Summary of Air Pollution Control Technology Analysis by Source Category
Leaks (Fugitive Emissions)

Technically Feasible Control Options	Identified Control Efficiency Ranges	Identified Emissions Ranges	Control Efficiency Used	Controlled Emission Factor Used
VOC's				
Applicable Feasible Technologies		**Selected Technologies – vapor recovery w/ enhanced LDAR (DIAL & OGI) initiated at 500 ppm detection**		
1.0 Gas collection manifold systems (vapor recovery). 2.0 Enhanced valve packing. 3.0 Low threshold on leak detection and repair detection down to 500 ppm. 4.0 LDAR (Leak, Detection and Repair) program with differential light absorption and ranging (DIAL) or optical gas imaging (OGI) technology.	1.0 95% \a 2.0 Inherent in process design 3.0 Inherent in LDAR system design 4.0 97% (valves), 93% pumps, 97% flanges, 97% open ended lines & sample points, (30% heavies) \b, \e	Specified by MACT and 40 CFR 63 Subpart CC, 40 CFR 60 Subpart GGG \c, \d	97% (valves), 93% pumps, 97% flanges, 97% open ended lines & sample points, (30% heavies) \b	500 ppm \d (per MACT std)

\a EPA Notification, [G.S.R 186(E), dt. 18th March, 2008]
\b TCEQ – Control Efficiencies for TCEQ Leak Detection and Repair Programs Revised 07/11 (APDG 6129v2)
\c RACT/BACT/LAER Clearinghouse for Petroleum Refining Equipment Fugitive Leaks
\d 40 CFR 63, Subpart CC & 40 CFR 60, Subpart GGG
\e EPA, Leak Detection and Repair – A Best Practices Guide, EPA-305-D-07-001 October 2007

The controls condition for addressing leaks across the refinery is structured around an aggressive LDAR program. In addition, the base condition for this project is that this is a new facility and thus piping and systems are designed to minimize potential for leaks, packing is new, as well as to allow for easy monitoring through LDAR. In addition sample ports are designed into the systems to eliminate open ended lines. Based on EPA Guidance Document, Leak Detection and Repair – A Best Practices Guide (2007), average control effectiveness of a well implemented LDAR program is over 80% across all areas of the plant with the majority of the plant exceeding 90% control efficiencies for VOC reductions. As shown in the calculation of the facility emissions, the average control efficiency across all areas of the plant that we are proposing is approximately 73% (see Emissions Inventory, Exhibit B). LDAR program will utilize optical sensors which will identify leaks well below 100 ppm, will be confirmed by Method 21 test immediately upon identification by optical meter and will require immediate repair. Optical sensing as well as repair when required will be ongoing and continuous throughout the plant.

Table 4b: Davis Refinery – Summary of Applicable Air Pollution Control Technologies by Source Category Tanks

Technically Feasible Control Options	Identified Control Efficiency Ranges	Identified Emissions Ranges	Control Efficiency Used	Controlled Emission Factor Used
VOC's / HAPs				
Applicable Feasible Technologies		**Selected Technologies – Double seal and wipers (NESHAP std) and Vapor Recovery System**		
1.0 Double Seal and Wipers (part of NESHAP std) 2.0 Vapor Recovery System to Product Recovery	1.0/2.0 (combined) 95 - 98% \a, \b	Limits specified by NESHAP and RACT	95% \a	Calculated using EPA TANKS for each tank unit
\a Control Techniques Guidelines for the Oil and Natural Gas Industry (Draft, 2015) \b 40 CFR 63, Subpart CC & 40 CFR 60, Subpart GGG				

Control requirements and control effectiveness for tanks are specified by 40 CFR Part 60 NSPS as well as by 40 CFR Part 61 and 63 (NESHAP). However, through system design, vapor recovery will be rerouted back to product instead of to flare systems.

Table 4c: Davis Refinery – Summary of Applicable Air Pollution Control Technologies by Source Category
Stationary Sources (Process Heaters and Boilers)

Technically Feasible Control Options	Identified Control Efficiency Ranges	Identified Emissions Ranges	Control Efficiency Used	Controlled Emission Factor Used
CO				
Applicable Feasible Technologies		**Selected Technologies – Good Combustion Practices w/ Low NOx Burners**		
1.0 Regenerative Thermal Or Catalytic Oxidation 2.0 Low NOx Burner 3.0 Good Combustion Practices 4.0 Good Combustion Practices with Low NOx Burner	1.0 75 – 95% \a 2.0 25 - 75% \a 3.0 Base Case 4.0 96 – 99% \b, \c	1.0 0.008 lb/MMbtu 2.0 0.04 lb/MMbtu 3.0 0.08 lb/MMbtu 4.0 0.02 – 0.06 lb/MMbtu	NA	0.028 lb/MMbtu
\a Control Techniques Guidelines for the Oil and Natural Gas Industry (Draft, 2015) \b RACT/BACT/LAER Clearinghouse for Natural Gas Combustion \c The Costs and Benefits of Selective Catalytic Reduction on Cement Kilns for Multi-Pollutant Control (A. Armendariz, 2008)				
NOx				
Applicable Feasible Technologies		**Selected Technologies – SCR w/ Low NOx Burners**		
1.0 SCR w Low NOx Burners 2.0 Low NOx Burners 3.0 SCR's 4.0 SNCR's	1.0 70 – 90% \a 2.0 70 – 90% \a 3.0 70 – 90% \a 4.0 30 – 50% \a	1.0 0.012 – 0.03 lb/MMbtu \c 2.0 0.03 – 0.04 lb/MMbtu 3.0 0.02 – 0.03 lb/MMbtu 4.0 0.04 – 0.09 lb/MMbtu	79% \d	1.0 0.0063 lb/MMbtu 2.0 0.03 lb/MMBTU
\a Control Techniques Guidelines for the Oil and Natural Gas Industry (Draft, 2015) \b RACT/BACT/LAER Clearinghouse for Natural Gas Combustion, Heaters less than 250 MMBtu/hr \c RACT/BACT/LAER Clearinghouse & Permit for Northern Plains Grandforks Plant, Primary Reformer (2015) \d Control effectiveness and emissions levels specified by vendor/supplier guarantee				
VOCs				
Applicable Feasible Technologies		**Selected Technologies – Good Combustion Practices w/ SCR**		
Good Combustion Practices with SCR	50 – 75% \a, \c	0.005 – 0.014 lb/MMbtu \b	75%	0.0054 lb/MMbtu
\a Control Techniques Guidelines for the Oil and Natural Gas Industry (Draft, 2015) \b RACT/BACT/LAER Clearinghouse & Permit for Valero Refinery, New Orleans, LA, Hydrogen Plant, SMR Heaters (2009) \c The Costs and Benefits of SCR on Cement Kilns for Multi-Pollutant Control (A. Armendariz, 2008) (HAP destruction = VOC destruction)				

Technically Feasible Control Options		Identified Control Efficiency Ranges	Identified Emissions Ranges	Control Efficiency Used	Controlled Emission Factor Used
PMs					
Applicable Feasible Technologies			**Selected Technologies – Good Combustion Practices w/ SCR**		
1.0	Good Combustion Practices	1.0 NA	1.0 0.004 lb/MMbtu \b	1.0 NA	1. 0.004 lb/MMbtu \b
2.0	Venturi Scrubbers	2.0 70 – 99% \a	2.0 0.0012 lb/MMbtu \a	2.0 70% \a	2. 0.0012 lb/MMbtu \a
3.0	Catalytic Sorbant (Tri-Mer or equivalent)	3.0 70 – 90%	3.0 0.0012 lb/MMbtu	3.0 70% \b	
\a	EPA Air Pollution Control Fact Sheet for Venturi Scrubber, EPA-452/F-03-017				
\b	Control effectiveness and emissions levels specified by vendor/supplier guarantee				

Best management practices for CO emissions for heaters and boilers are identified within the EPA RACT/BACT/LAER Clearinghouse as good combustion practices. Meridian has received supplier guarantee for CO emissions by implementation of good combustion practices with ultra-low NOx burners. This value is 0.028 lb/MMBTU.

For NOx emissions, Meridian will implement Ultra-Low NOx burners on all units as well as SCR controls on the larger units throughout the facility. Emissions values for both scenarios are based on vendor/supplier guarantees. Emissions for ultra-low NOx burners without SCR control are guaranteed at 0.03 lb/MMBTU. Emissions for low NOx burners with SCR control are guaranteed at 0.0012 lb/MMBTU.

VOC emissions levels and control effectiveness were identified through review of EPA RACT/BACT/LAER Clearinghouse as well as through review of similar permit for hydrogen plant in Louisiana.

For particulate emissions controls, Meridian has obtained a vendor/supplier guarantee for particulate emissions rate for good combustion practices of 0.004 lb/MMBTU. Meridian proposes to further implement venturi scrubber controls on the larger heater and boiler units to further reduce particulate emissions. EPA fact sheet guidance for venturi scrubbers shows a control effectiveness of 70-99% over non-controlled emissions. Meridian is conservatively assuming a 70% control effectiveness for this in stack add on control for the larger heater and boiler units resulting in an emission rate for these units of 0.0012 lb/MMBTU. For all other units, the vendor/supplier guarantee rate of 0.004 lb/MMBTU was utilized.

Table 4d: Davis Refinery – Summary of Applicable Air Pollution Control Technologies by Source Category
Fluidized Catalytic Cracking (FCC) Regeneration Vent

Technically Feasible Control Options	Identified Control Efficiency Ranges	Identified Emissions Ranges	Control Efficiency Used	Controlled Emission Factor Used
CO – note: CO emissions controlled through Best Combustion Practices (full-burn operation) and 100% captured and recirculated through a regenerator resulting in no emissions				
NOx				
Applicable Feasible Technologies [\a]		**Selected Technologies – COP-NP - Non-Platinum CO combustion promoter OR Tri-Mer Catalyst**		
1.0 SNCR, 2.0 SCR, 3.0 LoTOx, 4.0 Catalyst additives (Tri-Mer) 5.0 COP-NP - Non-Platinum CO combustion promoter	1.0 SNCR – 60 - 80% 2.0 SCR - > 90% 3.0 LoTox - >90% (with SCR) 4.0/5.0 Catalyst additives and low NOx combustion - 45-98% [\b]	No significant data available	98% [\b]	1.42 lb/MMbbl fresh feed
\a Utah Division of Air Quality Source Plan Review, Holly Refining Heavy Crude Processing Project, Davis County, UT (2013) \b Upper range of control is based on manufacturer commitments for both COP-NP system as well as for Tri-Mer catalyst usage				
SO_2				
Applicable Feasible Technologies		**Selected Technologies – Wet Scrubber OR Dri-Sorb**		
1.0 Control of sulfur in the FCCU feed 2.0 Wet Gas Scrubbers 3.0 Wellman-Lord Flue Gas Desulfurization Process 4.0 DeSOx Additives (Dri-Sorbant or equivalent)	1.0 90% [\a] 2.0 95 – 99.9% [\a, \c] 3.0 No recent data [\a] 4.0 97% [\b]	25 ppmvd@ 0% O_2 1-yr avg 50 ppmvd@ 0% O_2 7-dy avg	99% [\b]	1.52 lb/hr [\b]
\a Utah Division of Air Quality Source Plan Review, Holly Refining Heavy Crude Processing Project, Davis County, UT (2013) \b Upper range of control is based on manufacturer commitments for wet scrubber \c EPA Air Pollution Control Technology Fact Sheet Spray-Chamber/ Spray Tower Wet Scrubber (control effectiveness for SOx 80-99+%				
PM – since wet scrubber is used for SO_2 control, PM emissions are controlled to de-minimis levels **VOC/HAPs – controlled to de-minimis levels through best combustion practices and flue gas capture to regenerator**				

For CO emissions, Meridian is designing the FCCU with a hot burn regenerator which captures the exhaust and recirculates it through a regenerator system. This has been shown to be a best combustion practice that is essentially 100% effective in reduction of CO emissions from the exhaust.

For NOx emissions controls, Meridian has worked with the manufacturer to implement a COP-NP - Non-Platinum CO combustion promoter or Tri-Mer catalyst. Manufacturer control effectiveness of this approach is guaranteed as 1.42 lb/MMbbl. It should be noted that the FCCU will not be installed as part of the initial Phase I construction.

For SO2 emissions controls, a wet scrubber system will be installed to reduce SO2 emissions to minimal levels. Based on EPA Fact Sheet as well as review of permit support documents for Holly Refining in Utah, Meridian anticipates a removal efficiency of at least 99% for SO2. The FCCU licensor guarantee will result in a maximum emission rate of 1.52 lb/hr.

Table 4e: Davis Refinery – Summary of Applicable Air Pollution Control Technologies by Source Category
Sulfur Recovery Plant

Technically Feasible Control Options	Identified Control Efficiency Ranges	Identified Emissions Ranges	Control Efficiency Used	Controlled Emission Factor Used
SO_2				
Applicable Feasible Technologies [\a]		**Selected Technologies – LO-CAT with vent gases routed to thermal oxidizer**		
1.0 Claus 2 Stages 2.0 Claus 3 Stages 3.0 Claus 4 Stages 4.0 LO-CAT with/ Tail Gas Treatment	1. 93.5% for SO_2 2. 95.5% for SO_2 3. 96.5% for SO_2 4. >98.5% for H_2S in LO-CAT vent[\a] which translates to >99.9% for SO_2 from thermal oxidizer[\b]	1. 278 lb/ton of sulfur product 2. 188 lb/ton of sulfur product 3. 145 lb/ton of sulfur product 4. 4 lb/ton of sulfur product	99.9%[\b]	1.15 ppm
\a Texas Commission on Environmental Quality, Federal Operating Permit, Wasson CO2 Recovery Plant, Yoakum County, TX (2015) \b RACT/BACT/LAER Clearinghouse & Permit for Venoco-Ellwood Onshore Facility, Thermal Oxidizer (LO-CAT oxidation air) (2011)				

Meridian will implement a LO-CAT system with vent gas from the LO-CAT system then routed to a thermal oxidizer. This effectively reduces SO2 emissions to minimal levels. This is identified as BACT by TCEQ and EPA RACT/BACT/LAER Clearinghouse for similar applications. Claus technology although effective at capacities starting at 25 LTPY, will not be effective for the sulfur content loading expected in the Bakken feed. Mass balance calculations for the full capacity refinery indicate an annual production of around 10 LTPY.

Table 4f: Davis Refinery – Summary of Applicable Air Pollution Control Technologies by Source Category
Blowdown System

Technically Feasible Control Options	Identified Control Efficiency Ranges	Identified Emissions Ranges	Control Efficiency Used	Controlled Emission Factor Used
All Emissions				
Applicable Feasible Technologies \a		**Selected Technologies – Vapor Recovery to product capture w/ emergency flaring during upset only**		
1.0 Uncontrolled 2.0 Vapor Recovery to flare 3.0 Vapor Recovery to product capture w/ emergency flaring during upset only	1.0 Base case 2.0 99.8% 3.0 Up to 100%	1.0 0.586 lb/MMbtu (VOC) 2.0 0.0012 lb/MMbtu (VOC) 3.0 0.0 lb/MMbtu (VOC)	99.8% \a	0.0008 lb/MMbtu or 1.8 lb/hr \a
\a Emissions Estimation Protocol for Petroleum Refineries, Version 3. Table 5.12 (RTI International, April 2015) Note: Values in lb/MMbtu are shown for VOC only as example. Other default values for CO, NOx, SO2 are shown in Table 5.12, reference \a				

Meridian will implement an aggressive vapor recovery system for the blowdown system. The captured vapors will be rerouted back into processes/product feed during normal operations. Routing of gases to flare from this unit will only ocurr for upset conditions. This approach is considered state of industry. Analysis of effectiveness of this system is discussed in detail in the referenced document (Emissions Estimation Protocol for Petroleum Refineries) which was completed under EPA contract by RTI International (2015).

Table 4g: Davis Refinery – Summary of Applicable Air Pollution Control Technologies by Source Category
Flares

Technically Feasible Control Options	Identified Control Efficiency Ranges	Identified Emissions Ranges	Control Efficiency Used	Controlled Emission Factor Used
All Emissions				
Applicable Feasible Technologies [\a]		**Selected Technologies – emergency flaring during upset only**		
Flare systems are designed with vapor recovery units to address only upset conditions under minimal hours per year operations. Flare emissions are therefore de-minimus for all pollutants.	98% + [\a]	>300 btu/scf net heating value	Per EPA & NDDoH stds	Per EPA & NDDoH stds
\a AP 42 Emission Factors, Fifth Edition, Section 13.5, Industrial Flares				

For flare systems, the primary control is to structure the facility to utilize the flares only during true upset conditions. All vapor recovery units will collect vapors and route collected materials back to processes/product feed. For this reason flare systems are anticipated to be utilized for maximum of 168 hours per year each. Flare pilots will run full time however and emissions for these pilot units have been taken into account. Flare operation and control are specified by EPA and NDDoH standards
.

Table 4h: Davis Refinery – Summary of Applicable Air Pollution Control Technologies by Source Category
Wastewater Treatment System

Technically Feasible Control Options	Identified Control Efficiency Ranges	Identified Emissions Ranges	Control Efficiency Used	Controlled Emission Factor Used
VOC / HAP				
Applicable Feasible Technologies [\a]		**Selected Technologies – All technologies identified as feasible will be installed in multiple overlay to maximize controls**		
1.0 Enclosed tanks and oil/water separators with vapor recovery 2.0 VESP Unit (or equivalent) with API oil/water separators 3.0 Diffused air flotation (DAF) units	99% [\a] Combined Controls	0.400 TPY [\a]	95% for VOC 55% for HAPs	10.52 TPY VOC 0.52 TPY HAP
\a RACT/BACT/LAER Clearinghouse and Permit Review for Magellan Processing, LP, Corpus Christi, Terminal, TX (2015)				

For the wastewater treatment system, the primary emissions of concern are VOCs and related HAPs. Meridian will implement enclosed tank systems with vapor recovery from the tanks. In addition, waters will be run through a VESP and/or covered oil water separator and a DAF system with vapor recovery from these units to ensure a BWON compliant plant. The combination of these controls is anticipated to remove contaminants by at least 99%. However for calculation purposes, calculations were based on 95% control for VOCs and 55% control for HAPs.

Table 4i: Davis Refinery – Summary of Applicable Air Pollution Control Technologies by Source Category
Cooling Towers

Technically Feasible Control Options	Identified Control Efficiency Ranges	Identified Emissions Ranges	Control Efficiency Used	Controlled Emission Factor Used
PM10 / VOC				
Applicable Feasible Technologies \a, \b		**Selected Technologies – PM10 – drift eliminators. VOC's periodic monitoring of water for hydrocarbons per regs.**		
1.0 PM10 – drift eliminators \a, \b 2.0 VOC – periodic monitoring of flows for VOC's hydrocarbons \a, \b	Controls are inherent in process design for cooling tower for PM10 and are part of hydrocarbon levels monitoring of waters for VOCs.	None specifically identified	Controls are inherent in design for cooling tower for PM10 and are part water level monitoring for VOCs.	Project and site specific.
\a Emissions Estimation Protocol for Petroleum Refineries, Version 3. Table 5.12 (RTI International, April 2015)				

Cooling tower emissions and related controls are considered standard in the industry and are widely recognized as BACT.

Table 4j: Davis Refinery – Summary of Applicable Air Pollution Control Technologies by Source Category
Product Loading

Technically Feasible Control Options	Identified Control Efficiency Ranges	Identified Emissions Ranges	Control Efficiency Used	Controlled Emission Factor Used
VOC				
Applicable Feasible Technologies \a,		**Selected Technologies – vapor recovery to product recycle with upsets to emergency flares**		
1.0 Condensation vapor recovery systems 2.0 Thermal oxidizer VOC / HAP control with low NOx burners. 3.0 Testing of all tanker trucks for leaks 4.0 Pressurized system.	Generally 98% for new facilities \a per Loading Facilities MACT (40 CFR Part 63, Subpart BBBBBB)	limited to 80 milligrams \a of TOCs per liter of gasoline Control	98%	MACT per 40 CFR Part 63, Subpart BBBBBB
\a Emissions Estimation Protocol for Petroleum Refineries, Version 3. (RTI International, April 2015)				

Meridian will implement an aggressive vapor recovery system for the product loading systems. The captured vapors will be rerouted back into product feed. Routing of captured vapors to flaring will only ocurr for upset conditions. This approach is considered state of industry. Analysis of effectiveness of this system is discussed in detail in the referenced document (Emissions Estimation Protocol for Petroleum Refineries) which was completed under EPA contract by RTI International (2015). Maximum allowable emissions and well as controls approaches are specified by MACT standards.

Table 4k: Davis Refinery – Summary of Applicable Air Pollution Control Technologies by Source Category
Fugitive Vehicular Emissions

Technically Feasible Control Options	Identified Control Efficiency Ranges	Identified Emissions Ranges	Control Efficiency Used	Controlled Emission Factor Used
PM				
Applicable Feasible Technologies [a]		**Selected Technologies – Paving of areas of routine vehicle traffic. Maintain vehicle speeds to less than 15 mph**		
1.0 Paving 2.0 Speed Controls	Primary control is paving vs no paving. Base condition is paving	NA	NA	$PM_{2.5}$ - 0.00054 lb/vmt PM_{10} - 0.0022 lb/vmt Silt load = 2.15E-02
\a AP 42 Emission Factors, Fifth Edition, Volume I, Section 13.2.1. Paved Roads, Silt loading factor for limited access roads, page 13.2.1-9				

Control of fugitive area emissions from roadways and parking areas will be through paving of these areas as well as control of vehicle speeds. All routinely traveled roadway areas as well as parking lot areas will be paved. All roadways will be posted to maintain on-site speed limits to below 15 mph. Paving and speed controls are considered BACT for control of emissions from these areas
.

3.1. Summary of Proposed Controls

Since the proposed Davis Refinery is a new refinery, it has allowed Meridian to aggressively pursue emissions controls throughout the plant emissions sources. To assure the level of control required can be achieved, in order to qualify as a Synthetic Minor Source, proposed controls have been "stacked". For this reason, in several instances the facility is redefining what can be achieved as BACT and as a result, there is minimal literature available to confirm some values. In these instances we have relied on mass balance calculations, good engineering practice and speciation analysis of the airstream. Table 5 below presents an overall summary of proposed emission controls across the proposed Davis Refinery.

Table 5. Davis Refinery Summary of Proposed Emissions Controls

Source/Unit	Target Pollutant	Pollution Control Technologies Used	Assumed % Control
Leaks (Fugitive Emissions)	VOC	LDAR (Leak, Detection and Repair) program with 500 ppmv leak definition, and including differential light absorption and ranging (DIAL) or optical gas imaging (OGI) technology	97% valves, 93% pumps, 97% flanges, 97% sample points, (30% heavies). Program baseline/ screen value of 500 ppm
Tanks	VOC	Double Seal and Wipers on IFR Tanks (NESHAP std). Vapor Recovery to product recycle on select fixed roof tanks	95%
Stationary Combustion Sources (Heater and Boilers)	CO NOx VOC/HAPs PM SO2	CO – Best Comb. Practices w/ Ultra Low NOx Burners NOx – SCR's w/ Ultra Low NOx Burners VOC / HAPs – Best Comb. Practices with Ultra Low NOx Burners PM – Venturi Scrubbers on larger heaters	CO–NA vendor guarantee NOx–79% (vendor guar.) VOCs / HAPs – 75% PM - 70% (EPA Fact Sht)
FCC Regeneration Vent	CO NOx SO2	CO– Best Comb. Practices / complete carbon burn regenerator design NOx – COP-NP Combustion Promotor OR Tri-Mer SO2 – Wet Scrubber OR Dri-Sorb Catalyst	CO – 100% NOx – 98% SO_2 – 99%
Catalytic Reforming Unit	HAPs	NA – minor emissions levels	NA
Sulfur Recovery Plants	SO_2	Lo-CAT with tail gas treatment (thermal oxidizer) Other pollutants are considered minor	SO_2 - 99.9%
Blowdown System	CO NOx SO_2	Vapor recovery to product capture and emergency flaring only for upsets	99.8%
Flares	CO NOx VOC HAPs	Lower heating value of feed gases, requirements specified by EPA and NDDoH regulations. Flares will only be used during upset conditions	98% +
Wastewater Treatment System	VOC/HAPs	Covered API/CPI oil/water separators and induced/dissolved air flotation units. Equalization tanks instead of open ponds. Vapor Recovery System	VOC – 95% HAPs – 55%
Cooling Towers	PM VOC	PM10 – drift eliminators VOC – periodic monitoring of flows for VOC's hydrocarbons	Controls are inherent in design for cooling tower for PM10 and are part water level monitoring for VOCs

Source/Unit	Target Pollutant	Pollution Control Technologies Used	Assumed % Control
Product Loading	VOC	Vapor recovery to product recycle with upsets to emergency flares	98%
Fugitive (on-site vehicular) emissions	PM	Paving of areas of routine vehicle traffic. Maintain vehicle speeds to < 15 mph	$PM_{2.5}$ - 0.00054 lb/vmt PM_{10} - 0.0022 lb/vmt Silt load = 2.15E-02
Spent Catalyst	PM	De-minimus	NA – de-minimus

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Exhibit D: Emissions Dispersion Modeling and Air Quality Impact Analysis (submitted under separate cover)

vepica

NHOE-16-001-16-419

Summary Report of Air Dispersion Modeling Results

In Support Of An Application For
Air Contaminant Discharge Permit
Meridian Energy Group, Inc.
Davis Refinery
Billings County, North Dakota

October 2016

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SUMMARY REPORT OF AIR DISPERSION MODELING RESULTS

IN SUPPORT OF AN APPLICATION FOR
AIR CONTAMINANT DISCHARGE PERMIT
MERIDIAN ENERGY GROUP, INC.
DAVIS REFINERY
BILLINGS COUNTY, NORTH DAKOTA

Zia Project # NHOE-16-001
Document # NHOE-16-001-16-419
Submission Date: 14 October 2016

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1.0 INTRODUCTION

1.1 PROPOSED PROJECT

Meridian Energy Group, Inc. (Meridian) has applied for a Permit to Construct (PTC) for the proposed Davis Refinery (the "Project") from the North Dakota Department of Health (NDDoH) Division of Air Quality. The Davis Refinery will be an approximately 55,000 barrels per standard day ("bpsd") high-conversion crude refinery that will produce a full slate of refined products and specialty chemicals. Meridian has initiated engineering plans and the Refinery design is based upon the availability of process equipment that will shorten the schedule and reduce costs while ensuring environmental compliance.

The project location is a 620-acre site in Billings County, North Dakota (see Figure 1 - the "Site") where Meridian has entered into an option-purchase agreement with the owner. On July 5th, 2016 the Billings County Board of Commissioners unanimously approved a rezoning permit to industrial use that will allow the construction of the Davis Refinery on this property. Figure 1 provides a map of the proposed project site and immediate area.

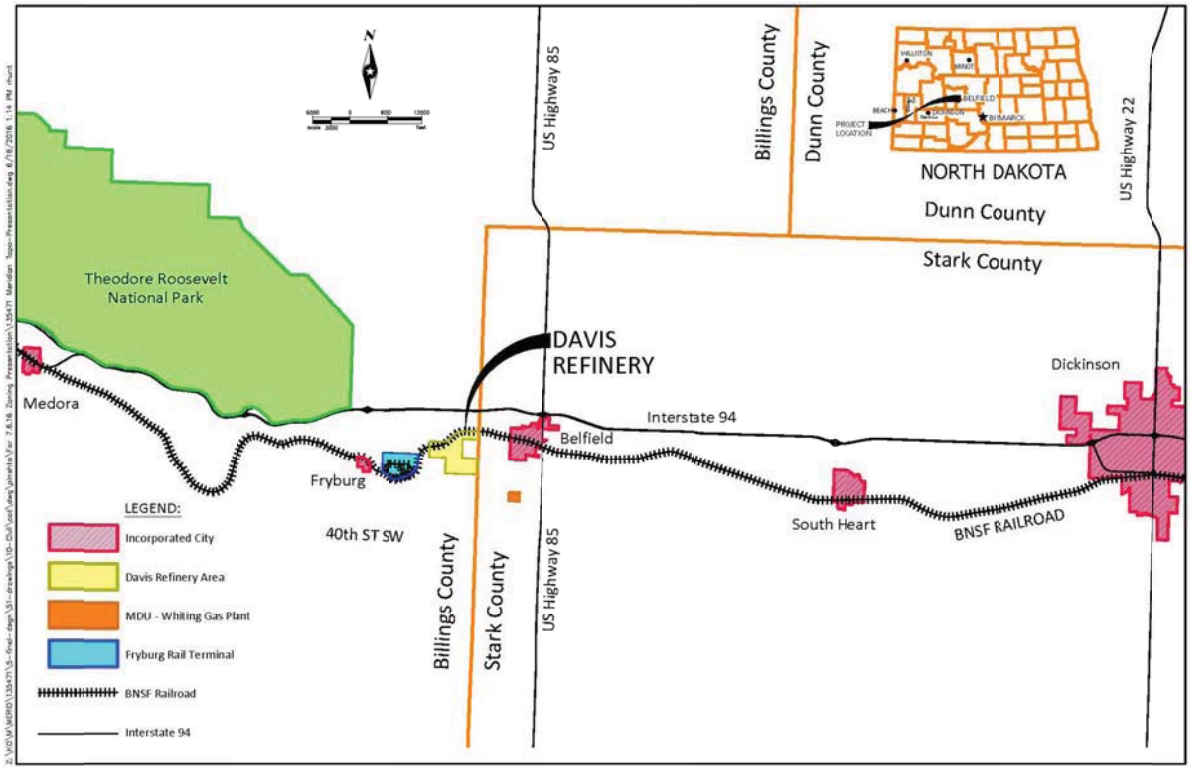

Figure 1: Proposed Site Location Davis Refinery Project, Billings County, ND

Terrain generally rises to the north and west and falls away to the south and east from the site, with the highest locations in proximity to the site being approximately 8-12 miles away and within the boundaries of the nearby Theodore Roosevelt National Park (TRNP) to the west. A review of the land use in the immediate area (3 kilometers) indicates that the subject site is in a rural, farmland area.

1.2 GENERAL REGULATORY OVERVIEW

As noted, Meridian has submitted a PTC for this project to the NDDoH in October 2016. As part of the process of obtaining a PTC and based on review of NDDoH guidance and criteria, the NDDoH is requiring air impacts modeling of the facility's potential impacts to surrounding lands. This is due to the proximity to the TRNP and the high level of public interest in the project. This "Summary Report of Model Results" describes the refined analysis that Zia Engineering and Environmental (Zia), on behalf of Meridian and their primary consultant Vepica USA, Inc. (Vepica), has performed.

The proposed subject site is located in an air attainment area for all criteria pollutants. The project triggers the new source review requirements of the NDDoH under "Designated Air Contaminant Sources Permit to Construct" rules (Chapter 33-15-14) as well as related NDDoH permitting and modeling guidance.

Included in this report is discussion of the analysis and modeling approach as well as summary discussion of results. Specifically, this document summarizes the modeling evaluation of the facility's short range (20 kilometer) air quality impacts in Class II areas as well as the preliminary analysis of impacts to the nearby Class I area (Theodore Roosevelt National Park – South Unit).

As stated in the New Source Review Workshop Manual (Draft 1990): "Class I areas are areas of special national or regional natural, scenic, recreational, or historic value for which the PSD regulations provide special protection." "One way in which air quality degradation is limited in all Class I areas is by stringent limits defined by the Class I increments for sulfur dioxides, particulate matter and nitrogen dioxide. In addition, the Federal Land Manager (FLM) of each Class I area is charged with the affirmative responsibility to protect that area's unique attributes, expressed generically as air quality related values (AQRV's)".

The proposed project location is approximately 2.5 miles southeast of the South Unit of Theodore Roosevelt National Park, a designated Class I area. Due to the close proximity of the project to the Class I area, air dispersion modeling of potential impacts to the Class I area is required by NDDoH in accordance the "Site Specific Modeling Guidance" issued for the project and dated June 20, 2016.

This model analysis has been prepared based on the NDDoH's requirements defined in the "Criteria Pollutant Modeling Requirements for a Permit to Construct" memo dated October 6, 2014 as well as the project specific NDDoH "Site Specific Modeling Guidance" issued for the project and dated June 20, 2016. Also included with the Summary Report submittal are electronic copies of all input and output files of the model analysis as well as related electronic copies of spreadsheets used to support the analysis. File name references and file titles are included as Attachment A of this document. This report includes analysis and discussion both of criteria pollutant impacts under New Source Review Standards (NSR) as well as analysis of air toxics impacts required under the NDDoH Air Toxics Policy and specifically under Section 33-15-02-04, subsection 3 of the North Dakota Air Pollution Control Rules.

2.0 CRITERIA POLLUTANTS ANALYSIS REQUIREMENTS

The NDDoH Division of Air Quality (DAQ) has primary jurisdiction for permitting and operating issues involving air quality at the subject site. As such, the Project is required to comply with the applicable sections of the NDDoH "Criteria Pollutant Modeling Requirements for a Permit to Construct" memo dated October 6, 2014 as well as the project specific NDDoH "Site Specific Modeling Guidance" issued for the project and dated June 20, 2016, as applicable. In addition, Zia prepared and submitted a "Modeling Protocol" document dated August 2016 that summarized proposed approach and methods for the modeling analysis.

The Project is a 55,000 bpd oil refinery facility. However, as shown in Table 2 and based on the proposed level of controls, the facility qualifies as a synthetic minor source. More detailed discussions of emissions estimates and facility and emissions controls is included in the PTC document and related supporting submittals. As a synthetic minor source, it does not meet PSD major source triggers for any of the criteria pollutants. However, based on its location near a Class I area, as well as the general level of public interest, the NDDoH is requiring at least screen modeling analysis for both Class I and Class II National Ambient Air Quality Standards (NAAQS) Significant Impact Levels (SILs). Shown in Table 1 is a summary of the NAAQS SILs that the facility is required to meet for preliminary screening analysis.

Initially, Class I and Class II Significant Impact Level (SIL) modeling is conducted. If the initial screen modeling passes Class I and Class II SILs, further dispersion modeling is not required. If the initial screen modeling exceeds Class I or Class II SILs, then refined dispersion modeling must be conducted for PSD increment consumption and Federal and State Ambient Air Quality Standards (AAQS).

Table 1 – Summary of NAAQS Significant Impact Levels ($\mu g/m^3$) For Preliminary Screening Analysis
Davis Refinery Project, Billings County, ND

	1-hour		3-hour		8-hour		24-hour		Annual	
Pollutant	**Class I**	**Class II**	**Class I**	**Class II**	**Class I**	**Class II**	**Class I**	**Class II**	**Class I**	**Class II**
SO_2	--	7.8	1.0	25	--	--	0.2	5	0.1	1
NO_2	--	7.5	--	--	--	--	--	--	0.1	1
PM_{10}	--	--	--	--	--	--	0.2	5	0.1	1
$PM_{2.5}$	--	--	--	--	--	--	0.07	1.2	0.06	0.3
CO		2,000	--	--	--	500	--	--	--	--

Table 2a – Preliminary Summary of Potential to Emit – Primary Operating Scenario
Davis Refinery Project, Billings County, ND

Unit	Criteria Pollutants										HAPs
	CO	Pb	PM<10	Filterable PM <10	PM <2.5	Filterable PM <2.5	Condensable PM	NOx	SO_2	VOC	Total HAP
Leaks	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	21.061	2.389
Tanks	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	9.174	4.479
Stationary Combustion Sources	91.418	0.002	8.003	2.001	8.003	2.001	6.002	46.404	1.921	17.605	1.620
Fluid Catalytic Cracking Unit	0.000	0.000	1.003	0.663	0.913	0.573	0.340	3.726	6.649	5.772	0.866
Catalytic Reforming Unit	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.043	0.793
Sulfur Recovery Plant	2.149	0.000	0.000	0.000	0.000	0.000	0.000	0.471	0.197	1.502	0.000
Vacuum Systems	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Blowdown System	0.828	0.000	0.005	0.005	0.005	0.005	0.000	3.658	5.198	0.154	0.000
Flares	0.736	0.000	0.067	0.017	0.067	0.017	0.050	0.438	0.005	0.048	0.000
Wastewater	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	10.520	0.524
Cooling Towers	0.000	0.000	1.863	0.000	0.000	0.000	0.000	0.000	0.000	0.355	0.000
Rail Product Loading	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.809	0.000
Truck Product Loading	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.734	0.000
Fugitive Dust	0.000	0.000	1.326	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000
Total Short Ton per Year	**95.131**	**0.002**	**12.266**	**2.686**	**8.988**	**2.596**	**6.392**	**54.697**	**13.969**	**69.776**	**10.670**

Table 2b – Preliminary Summary of Potential to Emit – Alternative Operating Scenario
Davis Refinery Project, Billings County, ND

Unit	Criteria Pollutants										HAPs
	CO	Pb	PM<10	Filterable PM <10	PM <2.5	Filterable PM <2.5	Condensable PM	NOx	SO_2	VOC	Total HAP
Leaks	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	7.237	0.366
Tanks	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	6.320	2.240
Stationary Combustion Sources	33.818	0.001	4.831	1.208	4.831	1.208	3.623	36.234	0.710	6.513	0.599
Fluid Catalytic Cracking Unit	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Catalytic Reforming Unit	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.029	0.546
Sulfur Recovery Plant	2.149	0.000	0.000	0.000	0.000	0.000	0.000	0.471	0.197	0.637	0.000
Vacuum Systems	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Blowdown System	0.414	0.000	0.003	0.003	0.003	0.003	0.000	1.829	2.599	0.077	0.000
Flares	0.213	0.000	0.030	0.008	0.030	0.008	0.023	0.228	0.004	0.041	0.000
Wastewater	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	5.234	0.261
Cooling Towers	0.000	0.000	0.932	0.000	0.000	0.000	0.000	0.000	0.000	0.177	0.000
Rail Product Loading	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.172	0.000
Truck Product Loading	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.279	0.000
Fugitive Dust	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Short Ton per Year	**36.594**	**0.001**	**5.797**	**1.218**	**4.864**	**1.218**	**3.646**	**38.762**	**3.511**	**27.716**	**4.011**

3.0 CRITERIA POLLUTANT MODEL APPROACH

3.1 INTRODUCTION

Zia conducted the air quality modeling using applicable sections of the NDDoH "Criteria Pollutant Modeling Requirements for a Permit to Construct" memo dated October 6, 2014 as well as the project specific NDDoH "Site Specific Modeling Guidance" issued for the project and dated June 20, 2016, as applicable. In addition, Zia had previously prepared and submitted a "Modeling Protocol" document dated August 2016 that summarized proposed approach and methods for the modeling analysis. Discussion of Zia's approach is included in subsequent sections of this document and compliance with guidance criteria is structured per the NDDoH, "Air Quality Dispersion Modeling Analysis Guide" (June 21, 2013). A copy of this document is included in Attachment B.

Model analysis results are detailed in Section 3.3 of this report. These results show that preliminary screen modeling shows impacts below the identified Class I and Class II SILs. Thus, analysis approach and results are structured to support discussion of the comparison to the SILs since no further criteria pollutant modeling analysis is otherwise required.

3.2 SCREENING ANALYSIS

Based on the level of modeling required by the NDDoH as well as the anticipated heightened level of interest related to the project and it's potential impacts, screening analysis using either AERSCREEN or SCREEN3 was not conducted for this project.

3.3 REFINED ANALYSES (SIL AND CUMULATIVE)

3.3.1 Model Selection

The air dispersion model used for the screen analysis was AERMOD with the BREEZE Software graphic user interface to load the data into the applicable EPA modules. The module versions used are as follows:

- AERMOD 15181 (Recommended)
- AERMET 15181
- AERMAP 11103
- AERSURFACE 13016
- BPIPPRM 040421

The proposed refinery site will be located 2.2 miles west of Belfield, ND. The geometric mean of the battery limits for the facility is:

UTM Coordinates, WGS84 datum
13T (Northern Hemisphere)
633538.294 m E
5193515.636 m N

The proposed site was surveyed and the resulting plot plan was referenced to UTM coordinates using AUTOCAD. The model used the georeferenced plot plan to determine the coordinate of the individual sources, stacks, and points of interest.

3.3.2 Emissions Inventory

Point Source Characteristics

Included in Attachment C are the Source Characteristics with the applicable physical characteristics of the point sources modeled in this analysis.

The model used National Elevation Data (NED) data downloaded from the USGS Nation Map website to determine the elevation of the sources and receptors. The USGS returned a .TIFF file bound by the following coordinates:

- North 46.628 N -103.25 E
- South 46.628 N -103.30 E
- West 46.876 N -103.61 E
- East 46.8346 N -103.609 E

The elevation data extends 110 km by 93 km in the easterly and northern directions, respectively. The proposed NDDR site and the Theodore Roosevelt National Park (TRNP) are within the boundaries of the downloaded elevation data. The extent of the region allows the variable receptor grid to extend 25 kilometers from fence line of the site in the direction of each compass point. The data were processed with AERMAP to extract the elevation of all sources and the park receptors, as well as their hill height scale.

Source Variable Stack Characteristics

There are two operating scenarios included in the analysis for this project. The Primary Operating Scenario includes full build-out of the project at a total maximum production capacity of 55,000 bpd with all anticipated emissions units and controls included. The Alternative Operating Scenario is described as Phase I build-out of the project, which is anticipated for the first 2-3 years of operation. The Phase I operation is proposed to be approximately 27,500 BPD. Besides overall production capacity, the primary difference between the Primary Operating Scenario and the Alternative Scenario includes several units, which will not be installed until Phase II and the delay of some proposed add-on pollution controls for NOx or PM in heaters and boilers until Phase II.

Both operating scenarios were separately modeled for this analysis and results of each analysis were compared to applicable SILs. Discussion of results is included in Section 3.5.

Stack Exit Velocity Adjustments

All the stacks in the NDDR proposed site are vertical. Thus, the adjustments for horizontal or capped stacks prescribed in the AERMOD Implementation Guide (08/03/2015) were not necessary.

Flare Point Source Characteristics

The flare characteristics were calculated using the November 10, 2010 NDDoH "Model Inputs for Flare" guideline. The results of the calculations are:

Table 3 – Calculation of Virtual Stack Model Characteristics
Davis Refinery Project, Billings County, ND#

ID	FLARE	X	Y	Elevation	Flare LHV		Net Heat Release	Stack Height	Flame Length	Virtual Stack Height	Virtual Stack Diameter
				(m)	MMBTU/h	Qt(Cal/s)	Q (cal/s)	hs (m)	hf (m)	hse (m)	Ds (m)
FL1701	#1 HC Emergency Flare	63350	5193594	810.8	0.156	10920.0	4914.0	45	0.39	45.4	0.05
FL1702	#2 HC Emergency Flare	633492	5193666	809.0	0.156	10920.0	4914.0	45	0.39	45.4	0.05
FL1703	#3 Acid Flare	633495	5193666	808.9	0.104	7280.0	3276.0	45	0.32	45.3	0.04
FL1704	#4 Enclosed HC Operating Flare	633601	5193607	808.9	0.624	43680.0	19656.0	15	0.75	15.8	0.10

Source: Flare Dimension Calculations.xlsx

The virtual stack characteristics were then entered into the model, along with the recommendation of a stack velocity of 40 m/s, and a stack temperature of 1000 K.

Table 4 – Virtual Stack Modeled Characteristics
Davis Refinery Project, Billings County, ND

ID	FLARE	X	Y	Elevation	Stack Model Characteristics			
				(m)	Height (m)	Diameter (m)	Velocity (m/s)	Temperature (k)
FL1701	#1 HC Emergency Flare	63350	5193594	810.8	45.4	0.05	40	1000
FL1702	#2 HC Emergency Flare	633492	5193666	809.0	45.4	0.05	40	1000
FL1703	#3 Acid Flare	633495	5193666	808.9	45.3	0.04	40	1000
FL1704	#4 Enclosed HC Operating Flare	633601	5193607	808.9	15.8	0.10	40	1000

Source: Flare Dimension Calculations.xlsx

Area Sources

No area volume sources were modeled.

Volume Sources

No volume sources were modeled.

Building Downwash

AERMOD and BPIPPRM were used together to determine the Good Engineering Practice Stack Heights (GEP Stack) and the building downwash. BPIP calculated the building height, length, and effective building width for 36 wind directions and provided the X and Y offsets for the adjustment routines. The model also included the storage tanks for the refinery as buildings.

This enabled the model to consider the possible contribution of the storage tanks to building downwash. The model files for the BPIP analysis are as follows:

- *BPIPIN.txt*
- *BPIPOUT.txt*
- *BPIPSUMMARY.txt*

Electronic copies of these files are provided with this report.

Off Site Sources

The *ND Air Dispersion Modeling Guide* does not require the consideration of off-site sources when modeling for Significant Impact Levels (SIL) or Air Toxics.

3.3.3 Meteorological Data

Selection of Meteorological Observations

AERMET version 15181 was used to process five consecutive years of meteorological data for the period of 01/01/2009 to 12/31/2013 from the following stations:

24012 KDIK DICKINSON THEODORE ROOSEVELT R UNITED STATES NORTH DAKOTA
+46.799 -102.797 +786.4
24011 KBIS BISMARCK UNITED STATES NORTH DAKOTA
+46.774 -100.75 +506

Application of AERSURFACE to Process Land Surface Characteristics

The *AERSURFACE Input Recommendations* (09/16/2010) provided by the NDDoH were used in conjunction with AERSURFACE 13016 to generate the SURFACE and PROFILE files. The month to season assignment used was the Southwest North Dakota distribution.

The applicable and resulting files of the *AERSURFACE* program are listed below. Electronic copies of these files are provided with this report.

- *AERMET0913SFC.SFC*
- *AERMET0913PFL.PFL*
- *AERMET0913MRG.MRG*

3.3.4 Receptor Locations

Primary Receptor Network

The refinery site will be fenced at the approximate property boundary to limit public access. As such, for modeling purposes it was modeled as a closed polygon. Per direction from NDDoH guidance, fence line receptors were set apart at 25 meter intervals. The datum for the receptor intervals was placed on the geometric mean of the site. Additional grid receptors were then spaced out per the distances below up to a maximum distance of approximately 23.85 km from the property boundaries (see Table 5).

Table 5 – Non-Uniform Cartesian Grid, Distance and Interval Distribution
Davis Refinery Project, Billings County, ND

Sector	Distance (m)	Interval (m)
1	0-1500m	100
2	1500-10000	250
3	10000-18500	500
4	18500-23850	1000

Additional Receptors Requested

The NDDoH requested that additional receptors be placed in the model for the following locations:

Table 6 – Requested Additional Receptors
Davis Refinery Project, Billings County, ND

Receptor Name	X	Y	Elevation (m)
Painted Canyon Visitor Center	623269.0	5194740.0	847.91
Buckhill Trail Parking Area	622580.0	5198267.0	851.56
TRNP Amphitheater	610813.0	5196768.0	763.33
TRNP Visitor Center	612373.0	5196908.0	691.23

Source: Additional Receptors.xlsx

While individual receptors for these points were established in the model, the highest modeled impacts within the Class I area was not identified in any instance as being close to these receptors and all levels at these receptor points were identified as being significantly below the applicable Class I SIL levels. Impact levels at these specific receptors are identified in the model output files.

Nearby Sources

Per NDDoH guidelines, no nearby sources were included in the preliminary modeling for comparison to SILs. Thus, no receptors associated with nearby sources are included.

Application of AERMAP

The model used National Elevation Data (NED) data downloaded from the USGS Nation Map website to determine the elevation of the sources and receptors. The USGS returned a .TIFF file bound by the following coordinates:

- North 46.628 N -103.25 E
- South 46.628 N -103.30 E
- West 46.876 N -103.61 E
- East 46.8346 N -103.609 E

The elevation data extends 110 km by 93 km in the easterly and northern directions, respectively. The proposed NDDR site and the Theodore Roosevelt National Park (TRNP) are within the boundaries of the downloaded elevation data. The extent of the region allows the variable receptor grid to extend 25 kilometers from fence line of the site in the direction of each

compass point. The data were processed with AERMAP verseion 11103 to extract the elevation of all sources and the park receptors, as well as their hill height scale.

3.3.5 Background Concentrations

Per NDDoH modeling guidelines, the background concentration of SO_2, NO_2, PM_{10}, $PM_{2.5}$, and CO were not applicable to the Significant Impact Level (SIL) analysis for the proposed facility.

3.4 AERMOD EXECUTION

A model analysis was run for each of the criteria pollutants that have a corresponding SIL value for both Class I and Class II areas. This was done for both the primary (full production operating scenario as well as the alternative (Phase I = 27,500 bpd) scenario. The following options and assumptions were used in execution of the AERMOD model:

- Pollutant concentrations were calculated to match the frequencies of the SIL values listed in Table 1.
- Based on development on the adjacent properties and the planned use of the Project site area, the model was run using a rural option.
- Five year of representative hourly meteorological data was used (2009 – 2013). Per the Dispersion Modeling Guidelines, the MAKEMET interface was utilized in AERMET for processing of meteorological data.
- it was assumed that 80% of NO_x is converted to NO_2
- Emissions rates were assumed constant.
- Emissions for all stack locations will be modeled as point sources.
- Flare sources were modeled using AERMET flare source option in order to model as point sources.
- Building wake downwash was analyzed, as applicable, based on facility site designs using the BPIPPRM to automate the processing of terrain and building information.
- AERMOD was run using site specific terrain using AERMAP to process DEM data using obtained Geo-TIF data.

3.5 INTERPRETATION OF AERMOD MODEL OUTPUT

To identify the potential near source impacts of the project, the U.S. EPA's AERMOD dispersion model was used for modeling of project only preliminary estimates of pollutant emission rates and stack exit conditions. These results were compared to NAAQS SILs shown in Table 1. Determination of compliance with the SILs within the established receptor grid was conducted for all criteria pollutants. Since the NAAQS SILs are met for both Class I and Class II areas, then no further dispersion modeling shouldl be required. A summary of the highest modeled result for each of the SIL values is shown in Table 7a and 7b for both the primary and alternative operating scenarios, respectively. Identification of the location of each of the highest values for the Class I and Class II SIL comparisons is shown in Tables 8 and 9.

Table 7a – Summary of Modeled Highest Values Compared to NDDoH SILs – Primary Operating Scenario
Davis Refinery Project, Billings County, ND

	1-Hour				3-Hour				8-Hour				24-Hour				Annual			
	Limits		Results		Limits		Results		Limits		Results		Limits		Results		Limits		Results	
Pollutant	Class I	Class II	Class I	Class II	Class I	Class II	Class I	Class II	Class I	Class II	Class I	Class II	Class I	Class II	Class I	Class II	Class I	Class II	Class I	Class II
SO2	-	7.8	-	2.17	1.0	25	0.635	1.06	-	-	-	-	0.2	5	0.142	0.469	0.1	1	0.005	0.028
NO2	-	7.5	-	7.1	-	-	-	-	-	-	-	-	-	-	-	-	0.1	1	0.025	0.287
PM10	-	-	-		-	-	-	-	-	-	-	-	0.2	5	0.025	0.638	0.2	1	0.006	0.064
PM2.5	-	-	-	-	-	-	-	-	-	-	-		0.07	1.2	0.047	0.168	0.06	0.3	0.002	0.017
CO	-	2000	-	2.17	-	-	-	-	-	500	-	0.65	-	-	-	-	-	-	-	-

Table 7b – Summary of Modeled Highest Values Compared to NDDoH SILs – Alternative Operating Scenario
Davis Refinery Project, Billings County, ND

	1-Hour				3-Hour				8-Hour				24-Hour				Annual			
	Limits		Results		Limits		Results		Limits		Results		Limits		Results		Limits		Results	
Pollutant	Class I	Class II	Class I	Class II	Class I	Class II	Class I	Class II	Class I	Class II	Class I	Class II	Class I	Class II	Class I	Class II	Class I	Class II	Class I	Class II
SO2	-	7.8	-	0.102	1.0	25	0.026	0.068	-	-	-	-	0.2	5	0.008	0.036	0.1	1	0.045	0.003
NO2	-	7.5	-	3.72	-	-	-	-	-	-	-	-	-	-	-	-	0.1	1	0.015	0.127
PM10	-	-	-		-	-	-	-	-	-	-	-	0.2	5	0.063	0.331	0.2	1	0.002	0.022
PM2.5	-	-	-	-	-	-	-	-	-	-	-		0.07	1.2	0.025	0.140	0.06	0.3	0.002	0.013
CO	-	2000	-	4.88	-	-	-	-	-	500	-	2.33	-	-	-	-	-	-	-	-

Table 8a – Class I Areas PSD Increments and Significant Impact Levels
Primary Operating Scenario
Davis Refinery Project, Billings County, ND

Pollutant / Averaging Time	Significant Impact Level (μg/m^3)	Modeled Result (μg/m^3)	Receptor Location / Coordinate	
			X	Y
PM_{10}; Annual	0.2	6.27E-03	627610.4	5195675.9
PM_{10}; 24 hour	0.2	2.53E-02	622580	5198267
$PM_{2.5}$; Annual	0.06	2.49E-03	627610.4	5195675.9
$PM_{2.5}$; 24 hour	0.07	4.69E-02	627610.4	5195675.9
SO_2; Annual	0.1	4.92E-03	627610.4	5195675.9
SO_2; 24 hour	0.2	1.42E-01	620933.44	5195745.45
SO_2; 3 hour	1.0	6.35E-01	627610.4	5195675.9
NO_2; Annual	0.1	2.54E-02	627860.4	5195425.9

Table 8b – Class I Areas PSD Increments and Significant Impact Levels
Alternative Operating Scenario
Davis Refinery Project, Billings County, ND

Pollutant / Averaging Time	Significant Impact Level (μg/m^3)	Modeled Result (μg/m^3)	Receptor Location / Coordinate	
			X	Y
PM10; Annual	0.2	2.21E-03	627610.4	5195675.9
PM10; 24 hour	0.2	6.32E-02	620933.44	5195745.45
PM2.5; Annual	0.06	1.51E-03	627610.4	5195675.9
PM2.5; 24 hour	0.07	2.46E-02	628110.4	5197675.9
SO2; Annual	0.1	4.53E-02	627610.4	5195675.9
SO2; 24 hour	0.2	8.14E-03	620933.4	5195745.5
SO2; 3 hour	1.0	2.64E-02	620933.4	5195745.5
NO2; Annual	0.1	1.50E-02	627610.4	5195675.9

Table 9a – Class II Areas PSD Increments and Significant Impact Levels
Primary Operating Scenario
Davis Refinery Project, Billings County, ND

Pollutant / Averaging Time	Significant Impact Level (µg/m^3)	Modeled Result (µg/m^3)	Receptor Location / Coordinate	
			X	Y
PM_{10}; Annual	1.0	6.35E-02	634060.375	5193076
PM_{10}; 24 hour	5.0	6.38E-01	633311.375	5192899
$PM_{2.5}$; Annual	0.3	1.74E-02	634460.4	5192876.0
$PM_{2.5}$; 24 hour	1.2	1.68E-01	634460.4	5192876.0
SO_2; Annual	1.0	2.75E-02	634560.4	5192876.0
SO_2; 24 hour	5.0	0.47	634460.4	5192876.0
SO_2; 3 hour	25	1.06	627610.4	5193426.0
SO_2; 1 hour	7.8	2.17	630960	5195676
NO_2; Annual	1.0	2.87E-01	634060.375	5193076
NO_2; 1 hour	7.5	7.10	630360.375	5192176
CO; 8 hour	500	0.65	634360.375	5193476
CO: 1 hour	2000	2.17	630960.375	5195676

Table 9b – Class II Areas PSD Increments and Significant Impact Levels
Alternative Operating Scenario
Davis Refinery Project, Billings County, ND

Pollutant / Averaging Time	Significant Impact Level (µg/m^3)	Modeled Result (µg/m^3)	Receptor Location / Coordinate	
			X	Y
PM10; Annual	1.0	2.21E-02	634060.375	5192876
PM10; 24 hour	5.0	3.31E-01	634060.375	5192876
$PM_{2.5}$; Annual	0.3	1.28E-02	634060.4	5192976.0
$PM_{2.5}$; 24 hour	1.2	1.39E-01	634060.4	5192876.0
SO_2; Annual	1.0	2.52E-03	634060.4	5192976.0
SO_2; 24 hour	5.0	3.55E-02	634060.4	5192876.0
SO_2; 3 hour	25	6.82E-02	633372.1	5193743.0
SO_2; 1 hour	7.8	1.02E-01	635260.4	5192976
NO_2; Annual	1.0	1.27E-01	634060.4	5192976
NO_2; 1 hour	7.5	3.72	627610.4	5193426
CO; 8 hour	500	2.33	633354.7	5193725.0
CO: 1 hour	2000	4.88	635260.4	5192976.0

4.0 AIR TOXICS ANALYSIS

4.1 DAVIS REFINERY TIER 3 ANALYSIS

To determine compliance with the applicable Guideline Concentration (GC) (8-hour GC, 1-hour GC, or carcinogenic risk criteria) of the policy of the Control of Hazardous Air Pollutant Emissions in North Dakota (NDDH policy), the maximum off-property, ground-level ambient concentration of each Hazardous Air Pollutant (HAP) emitted from an affected HAP source was calculated using the Tier 3 approach as outlined by the NDDoH Air Toxics Policy. The candidate model used for the Tier 3 procedure was BREEZE AERMOD. AERMOD was utilized to model the highest 1-hour and 8-hour HAP concentration beyond project boundaries. These values were then used for further analysis using the Tier 3 approach per the Air Toxics Policy.

For HAPs with known or possible carcinogenic health effects (i.e., those HAPs for which a unit risk factor has been developed in Appendix B of the NDDH policy), the maximum individual carcinogenic risk (MICR) associated with emissions from the source was calculated as outlined in the Determination of Compliance section of the NDDH policy. Similarly, the non-carcinogenic health effects of HAPs emitted from a source was evaluated by determining the hazard index for the HAPs for which an 8-hour GC or 1-hour GC has been established in Appendix A of the NDDH policy.

The following calculations have been performed:

1. Estimating the maximum 1-hour and 8-hour concentrations using the following formula:
   - Maximum 1-hour concentration: Total modeled 1-hour concentration (mg/m3) × weight percentage of each HAP.
   - Maximum 8-hour concentration: Total modeled 8-hour concentration (mg/m3) × weight percentage of each HAP.

2. Conducting the MICR analysis using the following equation:
   - MICR = 1-hour concentration (µg/m3) × Unit Risk Factor (m3/µg)

3. Determining the hazard index for HAPs for which a Guideline Concentration has been established in Appendix A of the NDDH policy. For the HAPs which have both 1-hour and 8-hour GCs, the higher of the two ratios (MC/GC) was utilized in the following equation:
   - Hazard Index = MC1/GC1 + MC2/GC2 + … + MCn/GCn
   - Where MC1, MC, …, MCn are the modeled concentrations for HAPs 1, 2, …, n and GC1, GC2, …, GCn are Guideline Concentration for HAPs 1, 2, …, n.

4.2 AIR TOXICS ANALYSIS RESULTS

The MICR of all HAPs emitted by point sources at the proposed new refinery, in aggregate, is 4.57×10-6, which is less than the NDDH Policy threshold of 1.00×10-5.

The Hazard Index for the proposed new refinery, in aggregate, is 7.95×10-2, which is less than the maximum hazard index of 1.00 for a new source.

The MICR and the hazard index are below the respective thresholds for each chemical category; therefore, the proposed Davis Refinery is in compliance with the NDDH air toxics policy. Emission calculations and the details of the air toxics analysis can be found in Attachment D.

ATTACHMENT A

Electronic Files Lists and Titles

ATTACHMENT A

ELECTRONIC FILES LIST FOR MODELING AND ANALYSIS
DAVIS REFINERY PROJECT, BILLINGS COUNTY, ND

AERMET PROCESSED FILES

- AERMET0913MRG.MRG
- AERMET0913PFL.PFL
- AERMET0913SFC.SFC
- NDDR2009-2013.atz

Bismarck Upper Air Data

- BIS24011-072016.144.txt
- BIS24011-072016.DAT
- BIS24011-072016.txt
- BIS24011FSL.txt

BPIP

- BPIPIN.txt
- BPIPOUT.txt
- BPIPSUMMARY.txt

Dickinson Upper Air Data

- 2013data
- 2013data,inp
- 2013data.inp,txt
- Description.txt
- Invntory.txt
- Station.txt

ELEVATION DATA

- 10012016.bhm
- 10012016.jpg
- NED07192016
- NED072061367.zip

ATTACHMENT A

ELECTRONIC FILES LIST FOR MODELING AND ANALYSIS
DAVIS REFINERY PROJECT, BILLINGS COUNTY, ND

Output Files

Phase I Files

- SOX PHASE I ANNUAL.txt
- SOX PHASE I 24-H.txt
- SOX PHASE I 3-H.txt
- SOX PHASE I 1-H.txt
- PM 25 PHASE I ANNUAL.txt
- PM 25 PHASE I 24-H.txt
- PM 10 PHASE I ANNUAL.txt
- PM 10 PHASE I 24-H.txt
- NO2 PHASE I ANNUAL.txt
- NO2 PHASE I 1-H.txt
- CO PHASE I 8-HL.txt
- CO PHASE I 1-HL.txt

Phase II Files

- SOX PII 3-H.txt
- SOX PII 1-H.txt
- SOX PII 24-H.txt
- SOX PII ANNUAL.txt
- NO2 PII ANNUAL.txt
- NO2 PII 1-H.txt
- PM 10 PII ANNUAL.txt
- PM 10 PII 24-H.txt
- PM 2.5 PII AANUAL.txt
- PM 2.5 PII 24-H.txt
- CO PII 1-H.txt
- CO PII 8H.txt

ATTACHMENT A

ELECTRONIC FILES LIST FOR MODELING AND ANALYSIS
DAVIS REFINERY PROJECT, BILLINGS COUNTY, ND

Phase I In/Out Model Files

CO Phase I
- COPHASE110082016.ami
- COPHASE110082016.amz

NO2 Phase I
- NO2PHASE110082016.ami
- NO2PHASE110082016.amz

PM 2.5 Phase I
- PM25PHASE110082016.ami
- PM25PHASE110082016.amz

PM 10 Phase I
- PM10 PI 10132016.ami
- PM10 PI 10132016.amz

SO2 Phase I
- SOXPHASE110082016.ami
- SOXPHASE110082016.amz

Phase II In/Out Model Files

CO Phase II
- CO Phase II.ami
- CO Phase II.amz

NO2 Phase II
- NO2 Phase II.ami
- NO2 Phase II.amz

PM 2.5 Phase II
- PM25 Phase II.ami
- PM25 Phase II.amz

PM 10 Phase II
- PM10 Phase II.ami
- PM10 Phase II.amz

SO2 Phase II
- SO2 Phase II.ami
- SO2 Phase II.amz

Air Toxics Analysis
- Tier 3 Analysis.xlsx
- Air Toxics Analysis.xlsx

ATTACHMENT B

Air Quality Dispersion Analysis Guide

North Dakota Department of Health, Division of Air Quality
Air Quality Dispersion Modeling Analysis Guide
June 21, 2013

The following Air Quality Modeling Analysis Guide is provided by the North Dakota Department of Health (Department) to aid air permit applicants in the process of developing an air dispersion modeling protocol and in conducting an air dispersion modeling analysis. This general Guide outlines common topics that should be addressed in a dispersion modeling analysis and report for projects located in North Dakota. As each project is unique, the Guide should not be considered "all inclusive" and some important items for a given project may not be reflected in the itemized list below. The Department should be consulted at an early stage in the project to assure that essential items are addressed in any final modeling analysis.

The Department strongly encourages the development of a pre-application dispersion modeling protocol in consultation with the Department in order to expedite the ultimate project review process. This Guide will aid in the development of that protocol.

A list of applicable State issued modeling guidance documents covering specific issues is included at the end of this Guide. Note that these documents include criteria to determine whether modeling will be required for a permit-related project. Also included is guidance related to air toxics analyses. Please contact the Department with any project-specific questions or concerns by calling 701.328.5188.

To the extent applicable, the information in this Guide is consistent with the EPA Guideline on Air Quality Models[1]. The Department Guide is intended to clarify EPA Guidance for applicability to North Dakota regulatory projects, and to supplement EPA guidance on issues where guidance is not specifically provided. This Guide assumes basic familiarity with regulatory air quality modeling applications on the part of the reader.

It is expected that the information contained in this Guide will be updated frequently, so the Department's Web site[2] should be actively monitored for the most recent version. At this time, the Guide applies primarily to local scale modeling analyses for NAAQS, PSD Class II increments, and air toxics thresholds. Future updates to this Guide or supplemental documents will include modeling guidance for Class I PSD increments and air quality related values (AQRVs). If you anticipate that your project will need to address one of these two conditions or any other item not specifically covered by the Guide at this time, please consult with the Department directly for further information and guidance.

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[1] CFR, 2005. EPA Guideline on Air Quality Models. 40 CFR (Code of Federal Regulations) Part 51, Appendix W.

[2] http://www.ndhealth.gov/AQ/DispersionModeling.htm

I. Modeling for NAAQS, NDAAQS, PSD Class II increments, Air Toxics thresholds

A. Screening Analyses (optional for isolated single source)

1. Model selection:

☐ AERSCREEN – applicable if significant terrain height variations involved. Because of the relative complexity (for a screening tool) involved in executing and reviewing AERCREEN analyses, the NDDH discourages the use and submittal of AERSCREEN screening techniques for projects in North Dakota. Direct application of refined modeling using AERMOD is recommended if significant terrain height variations are associated with an isolated single source.

☐ SCREEN3 – applicable only in relatively level terrain.

2. Model input/execution:

☐ AERSCREEN – Refer to AERSCREEN User's Guide for information on input data and execution for AERMOD. As noted above, the NDDH discourages the use of AERSCREEN for projects in North Dakota.

☐ SCREEN3 - Command line program which prompts user for all necessary input data (EPA version).

B. Refined Analyses (SIL and cumulative)

1. Model selection:

☐ AERMOD (provide version number)

2. Emission inventory:

☐ Subject source

- ☐ Point source fixed stack characteristics for each emission unit:
  - ○ Location (e.g., UTM coordinates)
  - ○ Stack height
  - ○ Stack base elevation (above MSL)

- Stack exit diameter
- Stack orientation (e.g., vertical up, vertical down, horizontal, rain caps, etc.)

☐ Point source variable stack characteristics for each emission unit. Ensure that worst case emission scenarios are accounted for (i.e., consider multiple operating loads, start-up, shut-down) For combustion turbines, where emissions are particularly sensitive to ambient temperature, emission scenarios should also account for a range of ambient temperatures.

- Emission rate for each applicable pollutant species
- Stack exit velocity
- Stack exit temperature

☐ Appropriate adjustment of stack exit velocity based on stack orientation (See AERMOD Implementation Guide[3])

☐ Appropriate determination of point source stack characteristics for flares (See Flare Guidance). Stack characteristics which are adjusted for flares include stack height, stack diameter, exit velocity, and exit temperature.

☐ Area source characteristics for each emission unit (if any):

- Emission rate for each applicable pollutant species
- Boundary of area
- Effective height of area emissions

☐ Volume source characteristics for each emission unit (if any):

- Emission rate for each applicable pollutant species
- Effective dimensions
- Height of center of volume source
- The NDDH does not require inclusion of paved road fugitive emissions in modeling analyses.

☐ Building downwash characteristics for each affected (less than GEP height) point-source stack, developed using the EPA BPIPPRM program (include a plant layout drawing):

- Building height for 36 wind directions
- Effective building width for 36 wind directions
- Building length for 36 wind directions
- X offset for 36 wind directions (XBADJ)
- Y offset for 36 wind directions (YBADJ)

[3] EPA, 2009. AERMOD Implementation Guide: March 19, 2009. Accessed at: http://www.epa.gov/scram001/7thconf/aermod/aermod_implmtn_guide_19March2009.pdf. June 20, 2013

☐ Off-site (nearby) sources (not applicable for SILs or Air Toxics analyses). For PSD projects, the impact of emissions from all sources located within 50 km of the subject source should generally be included in the modeling analysis. For non-PSD projects, the impact of emissions from all sources located within 20 km of the subject source should generally be included in the modeling analysis. Impact from sources not explicitly modeled will be accounted for with the background concentration(s).

- ☐ Point source stack characteristics for each nearby-source unit:
  - ○ Emission rate for each applicable pollutant species. Emission rate should reflect maximum allowable (permitted). For PSD increment analyses, or if maximum allowable not available for AAQS analyses, actual emission rate may be used.
  - ○ Location (e.g., UTM coordinates)
  - ○ Stack height
  - ○ Stack base elevation (above MSL)
  - ○ Stack exit diameter
  - ○ Stack exit velocity
  - ○ Stack exit temperature
  - ○ Stack orientation (e.g., vertical up, vertical down, horizontal, rain caps, etc.)
- ☐ Appropriate adjustment of stack exit velocity based on stack orientation (See See AERMOD Implementation Guide[4])
- ☐ Appropriate determination of point source stack characteristics for flares (See Flare Guidance). Stack characteristics which are adjusted for flares include stack height, stack diameter, exit velocity, and exit temperature.
- ☐ The NDDH should be consulted regarding the need for including building downwash effects for nearby sources.

NOTE: Stack characteristics for nearby sources can typically be obtained from the Department. Please contact the Department for more information.

3. Meteorological data:

☐ Selection of meteorological observations:

- ☐ Five consecutive years of recent representative National Weather Service (NWS) hourly surface observations (identify station).

[4] EPA, 2009. AERMOD Implementation Guide: March 19, 2009. Accessed at: http://www.epa.gov/scram001/7thconf/aermod/aermod_implmtn_guide_19March2009.pdf. June 20, 2013

- ☐ Five concurrent years of NWS twice-daily upper-air observations (identify station).
- ☐ Surface observations from non-NWS sites may be considered as an option (e.g., on-site, Department monitoring sites), but the Department should be contacted regarding the availability and acceptability of such data, as well as pairing such data with NWS upper-air observations.

☐ Application of AERSURFACE (specify version number) to process land surface characteristics for use with AERMET. (See Department guidance for AERSURFACE input settings.)

☐ Application of AERMET (specify version number) to process surface observations, upper-air observations, and AERSURFACE output in order to create the SURFACE and PROFILE files required by AERMOD.

NOTE: AERMET-compatible surface and upper-air five-year meteorological data sets for a number of NWS stations located in and near North Dakota are available via the Department's FTP site[5].

4. Receptor locations:

☐ Specify primary receptor network (a case-by-case determination will likely be required, but the following is a typical configuration for medium-buoyancy sources):

- ☐ Receptors spaced at 25 m along the limited access (fenced) boundary (ambient air boundary). If access is not limited, receptor coverage must include entire property area.
- ☐ Nested Cartesian receptor grids outside of the fenced boundary. Resolution of nested receptor grids should proceed in a geometric pattern, e.g., 50 m for the inner grid, 100 m for the next grid, 250 m for the next grid, and 500 m for the outside grid. The maximum extent of the outside grid will depend on the buoyancy (plume height) of the source. Generally, a grid extending out to 10 km from the source will be adequate for a medium-buoyancy source.

☐ In addition to the primary network, additional receptors may be needed to address isolated terrain features, impact from low-level sources located near the facility fence line, and to refine predictions when the maximum modeled impact occurs at a receptor located in a relatively coarse portion of the primary receptor network.

☐ If the analysis includes nearby sources, the Department may request that additional receptors are placed to account for the maximum combined impact of the subject source and the nearby source.

[5] ftp://ftp.state.nd.us/AirQuality/AERMOD/

☐ Obtain digital elevation data (e.g., NED) for the modeling domain.

☐ Application of AERMAP (specify version number) to receptor locations and digital elevation data in order to determine receptor elevation and hill-height scale needed for AERMOD.

☐ Provide map showing receptor locations and elevation with respect to source location(s).

5. Background concentrations (account for contribution of natural and non-modeled anthropogenic sources, not applicable for SILs or Air Toxics analyses):

☐ Fixed background concentrations for SO_2, NO_2, PM_{10}, $PM_{2.5}$, and CO (all averaging times) are provided in Table 1. These fixed background levels reflect default values which are representative for the entire State of North Dakota. The Department should be contacted regarding representativeness and current status of these values for a particular modeling project.

☐ Variable (hourly) background concentration files for SO_2 and NO_2 are available for several locations on the Department's FTP site[6]. These hourly background files cover a five-year period and are concurrent with the meteorological data sets also provided on the FTP site.

☐ Hourly ozone background concentration files are also provided on the Department's FTP site for several locations. These ozone data sets are provided to implement the Ozone Limiting Method (OLM) for NO_2 Tier 3 analysis.

NOTE: The use of hourly background concentration data for SO_2 and NO_2, if representative data are available for the project location, will produce the least conservative results when added to model output (i.e., less conservative than use of fixed background concentrations).

Table 1
Fixed Background Concentrations for North Dakota
(µg/m^3)

Pollutant	Averaging Period				
	1-hour	**3-hour**	**8-hour**	**24-hour**	**Annual**
SO_2	13	11	---	9	3
NO_2	35	---	---	---	5
PM_{10}	---	---	---	30	15
$PM_{2.5}$	---	---	---	13.7	4.75
CO	1149	---	1149	---	---

[6] ftp://ftp.state.nd.us/AirQuality/AERMOD/

6. AERMOD execution:

☐ Execute AERMOD for emission inventory, meteorological data, receptor locations, and with background concentrations, as outlined above:

- ☐ Use regulatory default option.
- ☐ Specify rural source (urban may be appropriate in rare cases).
- ☐ Use appropriate options for processing form of new 1-hour NAAQS for SO_2 and NO_2, and 24-hour NAAQS for PM_{10} and $PM_{2.5}$.
- ☐ Use proper settings to implement Tier 3 NO_2 analysis (if applicable):
  - The Department prefers the OLM option to PVMRM.
  - With OLM, use setting "OLMGROUP ALL".
  - Use hourly ozone background data file (above).
  - Contact vendor and Department for appropriate in-stack ratios of NO_2 to NO_X. Use of a default value of 0.5 is acceptable without justification.
  - Note that EPA approval is needed regarding protocol for Tier 3 NO_2 analysis.
- ☐ Add background concentrations to model results (not applicable for SILs or Air Toxics analyses, and generally not applicable for PSD increment analyses).

7. Interpretation of model output:

☐ Comparison of results with acceptable air quality thresholds:

- ☐ Significant impact levels (see Table 2)
- ☐ NAAQS/NDAAQS (see Table 3)
- ☐ PSD Class II increments (see Table 4)
- ☐ Air Toxics thresholds (MICR and Hazard Index, see State Air Toxics Policy)

☐ Provide receptor location of maximum impact for each species and averaging time~~s~~. Location of maximum impact should be subsequent to processing the form of the NAAQS (e.g., 5-year average of annual 99th percentile of daily maximum 1-hour average concentration for SO_2).

8. Submittal of modeling report:

☐ A modeling report, including a detailed description of all input data, model execution, and results, should be prepared and provided with the permit application.

☐ All computer modeling files should be submitted along with the modeling report.

☐ An electronic copy of the modeling report should be submitted along with at least three hard copies. Electronic submittal should included both PDF and MS Word (or other native) versions.

Table 2
Class II Area Significant Impact Levels
(µg/m^3)

	Averaging Period				
Pollutant	**1-hour**	**3-hour**	**8-hour**	**24-hour**	**Annual**
SO_2	7.8	25	---	5	1
NO_2	7.5	---	---	---	1
PM_{10}	---	---	---	5	1
$PM_{2.5}$	---	---	---	1.2	0.3
CO	2000	---	500	---	---

Table 3
North Dakota and National Ambient Air Quality Standards (AAQS)
Criteria Pollutants (µg/m^3)

Pollutant	Averaging Period	N.D. AAQS	National AAQS
Sulfur Dioxide (SO_2)	1-hour	196[2]	196[2]
	3-hour	1309[1]	1309[1]
	24-hour	---	365[1]
	Annual	---	80
Nitrogen Dioxide (NO_2)	1-hour	188[3]	188[3]
	Annual	100	100
Inhalable Particulate (PM_{10})	24-hour	150[1]	150[1]
Particulate ($PM_{2.5}$)	24-hour	35[4]	35[4]
	Annual	15[5]	12[5]
Carbon Monoxide (CO)	1-hour	40,000[1]	40,000[1]
	8-hour	10,000[1]	10,000[1]
Lead (Pb)	Quarterly	1.5	1.5

[1] One exceedance per year is permitted.
[2] Based on 3-year average of annual 99th percentile (4th highest) of daily maximum 1-hour average concentration.
[3] Based on 3-year average of annual 98th percentile (8th highest) of daily maximum 1-hour average concentration.
[4] Based on 3-year average of annual 98th percentile 24-hour concentration.
[5] Based on 3-year average of annual average concentrations.

Table 4
North Dakota / National Prevention of Significant Deterioration (PSD) Increments
Criteria Pollutants (µg/m^3)

Pollutant	Averaging Period	Class I	Class II	Class III
Sulfur Dioxide (SO_2)	3-hour	25[1]	512[1]	700[1]
	24-hour	5[1]	91[1]	182[1]
	Annual	2	20	40
Nitrogen Dioxide (NO_2)	Annual	2.5	25	50
Particulate (PM_{10})	24-hour	8[1]	30[1]	60[1]
	Annual	4	17	34
Particulate ($PM_{2.5}$)	24-hour	2[1]	9[1]	18[1]
	Annual	1	4	8

[1] One exceedance per year is permitted.

II. Guidance Documents

The North Department has developed the following guidance and policy documents to assist permit applicants in the process of drafting complete permit applications.

The first three documents referenced below can be accessed via the links posted under the document title. The remainder of the documents can be found on the Department's FTP site under "Guidance and Policy Documents".

To request access to the FTP site, or for more information on Dispersion Modeling, please direct questions or comments to the North Dakota Department of Health at 701.328.5188.

Intradepartmental Memorandum - Criteria Pollutant Modeling Requirements for a Permit to Construct: September 12, 2006
http://www.ndhealth.gov/AQ/AirPermitting_files/Modeling%20Memo.pdf

> The Department has developed a set of guidelines to determine what modeling requirements apply to a facility as part of the application for a Permit to Construct (PTC). This document outlines the requirements for projects subject to the Prevention of Significant Deterioration of Air Quality (PSD) rules and for projects not subject to PSD; and also includes additional information applicable to all projects (both PSD and non-PSD).

Policy for the Control of Hazardous Air Pollutant Emissions in North Dakota (Air Toxics Policy): August 25, 2010
http://www.ndhealth.gov/AQ/Toxics/North%20Dakota%20Air%20Toxics%20Policy.pdf

> This document establishes the policy for the evaluation of sources emitting Hazardous Air Pollutants (HAPs) into the ambient air. It includes a description of the three-tiered approach to calculating the maximum off-property ground-level ambient concentration of each HAP.

Dispersion Modeling Requirements, Compressor Engines and Glycol Dehydration Units
May 16, 2011
http://www.ndhealth.gov/AQ/AirPermitting_files/Compressor%20Engine%20&%20Dehydrator%20Policy.pdf

This document clarifies when dispersion modeling is required to be submitted for facilities which include compressor engine(s) and/or glycol dehydration unit(s) as the primary source(s) of emissions. Both criteria pollutants and hazardous air pollutants (air toxics) are addressed.

Model Input Parameters for Flares
November 10, 2010
Flare Plume Rise.pdf

This document outlines the Department recommended approach for developing the model input parameters of stack temperature, diameter, exit velocity, and stack height to allow a given refined air quality model (e.g. AERMOD, ISC-PRIME) to accurately calculate a buoyancy representative of the conditions above the flare.

Recommended AERSURFACE Inputs (North Dakota)
September 16, 2010
AERSURFACE Inputs.pdf

This document provides Department recommended inputs for AERSURFACE, a surface land cover characteristics preprocessor for AERMOD, appropriate for modeling in North Dakota.

User's Instructions for HRLYNAAQS.
September 24, 2010
HRLYNAAQS User's Guide.pdf

The software program HRLYNAAQS is provided by the Department (on request) to assist permit applicants and consultants in the demonstration of modeled compliance with the new 1-hour National Ambient Air Quality Standards (NAAQS) for NO_2 and SO_2. HRLYNAAQS provides the annual 98th (NO_2) or 99th (SO_2) percentile of maximum daily 1-hour concentrations averaged across five years, for each receptor location. Along with the total concentration, HRLYNAAQS also provides individual contributions for up to five source groups.

AERMET Surface Meteorology Stations (2004-2008)
AERMET Upper-Air Meteorology Stations (2004-2008)
Met Stations 2004-2008 WBAN.pdf

This document provides the locations of surface and upper-air meteorology stations in North Dakota for which meteorological data suitable for use with AERMET is provided by the Department (available on request).

Hourly Ozone Sites (2004-2008)
Ozone Sites 2004-2008.pdf

This document provides the locations within North Dakota of hourly ozone ambient monitoring sites as well as information on the formatting of the hourly ozone source data files (available on request).

ATTACHMENT C

Emissions Sources Characteristics

ID	DESCRIPTION	X	Y	Elevation (m)	Stack Height (m)	Stack temperature (K)	Stack Velocity (m/s)	Stack Diameter (m)
101H0101	Atmospheric Distillation Unit Heater	633487.731	5193293.244	808.38	38.89	692.98	6.13	1.92
102H0201	Atmospheric Distillation A Heater	633559.049	5193295.392	806.57	38.89	693.15	6.13	1.92
103H0301	Vacuum Distillation Unit Heater 1	633656.032	5193379.472	804.96	38.1	588.71	5.15	1.98
103H0302	Vacuum Distillation Unit Heater 2	633656.452	5193373.402	804.93	25.91	588.71	6.34	1.55
112H1201	FCCU Raw Charge Heater	633689.597	5193286.628	805	21.95	691.48	3.02	1.68
112V1201	FCCU Vent Stack	633689.662	5193326.618	804.59	36.58	522.04	19.7	1.22
117H1701	Isomerization Heater 1 Reactor Charge	633715.339	5193381.258	803.89	10.97	713.04	0.76	0.82
117H1702	Isomerization Heater 2	633715.777	5193375.233	803.93	14.02	692.98	0.58	1.4
105H0501	Heavy Naphtha 1 Charge Heater	633435.314	5193367.913	811.04	27.74	692.98	4.94	0.91
105H0502	Heavy Naphtha 2 Strip Reboiler	633444.492	5193368.211	810.98	27.74	692.98	5.82	0.91
106H0601	Catalytic Reformer 2 Heater	633428.819	5193260.307	809.28	12.8	692.15	2.95	1.22
107H0701	Catalytic Reformer 1 Heater	633362.297	5193241.365	811.68	36.58	692.98	8.29	1.83
111H1101	Light Naphthat HDT Charge Heater	633524.931	5193369.69	808.91	51.82	695.98	3.69	1.07
118H1801	Alkylation Unit Heater	633768.252	5193378.01	803	28.96	691.76	6.83	1.22
110H1001	Diesel Hydrotreater Treater Heater	633435.753	5193425.2	813.02	51.82	693.15	6.31	1.07
122H2201	SRU Thermal Oxidizer	633353.807	5193364.491	811.73	18.29	485.65	15.24	0.52
114H1401	FCC Naphtha Hydrotreater Heater	633606.041	5193371.555	805.99	27.74	691.09	6.25	0.91
202B0201	Boiler #1	633461.315	5193193.92	810.06	45	418.71	28.62	0.91
202B0202	Boiler #2	633473.501	5193194.281	809.82	45	418.71	28.62	0.91
202B0203	Boiler #3	633485.688	5193194.643	809.6	45	418.71	28.62	0.91
125H2501	Kerosene Hydrotreater Heater	633523.246	5193427.747	809.63	29.26	679.98	6.68	0.76
CT1501	Cooling Tower 1501	633503.235	5193157.875	810.4	21.34	302.59	1.52	10.97
CT1502	Cooling Tower 1502	633507.481	5193158.001	810.35	21.34	302.59	1.52	10.97
CT1503	Cooling Tower 1503	633511.728	5193158.127	810.3	21.34	302.59	1.52	10.97
FL1701	#1 HC Emergency Flare Conversion to Point Source	633506.045	5193593.555	810.79	47.06	1000	40	0.4
FL1702	#2 HC Emergency Flare Conversion to Point Source	633492.242	5193666.168	808.99	47.06	1000	40	0.4
FL1703	#3 Acid Flare Conversion to Point Source	633495.291	5193666.263	808.93	47.03	1000	40	0.11
FL1704	#4 Enclosed HC Operating Flare Conversion to Point Source	633600.65	5193607.193	808.9	17.86	1000	40	0.79
FLPILOT1	#1 HC Emergency Flare (3 Pilots)	633495.291	5193666.263	808.93	45.72	810	4.75	0.4
FLPILOT2	#2 HC Emergency Flare (3 Pilots)	633600.65	5193607.193	808.9	45.72	810	4.75	0.4
FLPILOT3	#3 Acid Flare (2 Pilots)	633492.242	5193666.168	808.99	45.72	811	4.75	0.11
FLPILOT4	#4 Enclosed HC Operating Flare (12 Pilots)	633506.045	5193593.555	810.79	15.24	811	4.75	0.79

ATTACHMENT D

Air Toxics Analysis Spreadsheets

Emission Rates are shown based on STPY

Unit	Leaks	Crude Distillation	Alkylation	Catalytic reforming	Hydrocracking	Hydrotreating/ hydrorefining	Catalytic cracking	Hydrogen plant	Product blending	Sulfur plant	Vacuum distillation	Isomerization	Tanks	Crude Oil	Gasoline and Other Light Distillates	Diesel Fuel and Other Middle Distillates	IFR	Cone not connected to VRU	Cone connected to VRU	Stationary Combustion Sources	Boilers (Qty: 3)	Heaters (Qty: 16)	Emergency Generator Set	FireWater Pump	Fluid Catalytic Cracking Unit	FCCU
Total/ Unit (STPY)	3.19E+00	6.74E-01	7.17E-01	6.88E-01		2.06E-01	8.13E-01		0.00E+00		2.06E-02	6.84E-02	4.48E+00	4.50E-01	3.82E+00	2.14E-01				1.74E+00	3.87E-01	1.33E+00	1.37E-02	1.08E-03	9.39E-01	9.39E-01
1,2,4-trimethyl benzene	2.30E-01	3.98E-02	0.00E+00	7.32E-02		1.15E-02	1.05E-01		0.00E+00		1.19E-03	0.00E+00														
1,3-Butadiene	6.86E-03	6.32E-04	5.46E-03	1.12E-04		0.00E+00	6.61E-04		0.00E+00		0.00E+00	0.00E+00													8.18E-05	8.18E-05
2,2,4-Trimethyl pentane	6.43E-01	3.16E-03	6.20E-01	3.10E-03		0.00E+00	1.65E-02		0.00E+00		1.79E-04	1.53E-04														
2-Methyl naphthalene													9.13E-03	0.00E+00	8.43E-03	7.03E-04				2.10E-05	4.73E-06	1.63E-05			7.37E-05	7.37E-05
3-Methylchloranthrene																				1.58E-06	3.55E-07	1.22E-06				
7,12-Dimethylbenz(a) anthracene																				1.40E-05	3.15E-06	1.09E-05				
Acenaphthene																				4.60E-05	4.73E-07	1.63E-06	4.07E-05	3.21E-06	9.00E-06	9.00E-06
Acenaphthylene																				9.23E-05	1.28E-06	4.42E-06	8.03E-05	6.32E-06	3.19E-04	3.19E-04
Acetaldehyde																				1.08E-02	2.37E-03	8.15E-03	2.19E-04	1.73E-05	5.32E-02	5.32E-02
Acetone																									6.55E-03	6.55E-03
Acrolein																				1.50E-02	3.35E-03	1.15E-02	6.85E-05	5.40E-06	2.70E-03	2.70E-03
Anthracene													6.26E-04	0.00E+00	5.78E-04	4.82E-05							1.07E-05	8.43E-07	2.74E-04	2.74E-04
Antimony																				4.56E-04	1.02E-04	3.53E-04			1.79E-05	1.79E-05
Arsenic																				1.75E-04	3.94E-05	1.36E-04			2.75E-06	2.75E-06
Benzene	2.09E-01	5.69E-02	7.44E-04	7.82E-02		1.06E-02	5.51E-02				1.79E-04	7.67E-03	2.20E-01	4.02E-02	1.69E-01	1.08E-02				9.12E-03	4.14E-04	1.43E-03	6.75E-03	5.32E-04	4.50E-02	4.50E-02
Benzo(a)anthracene																				1.93E-05	4.34E-06	1.49E-05			1.55E-06	1.55E-06
Benzo(a)pyrene																				5.24E-05	1.12E-05	3.87E-05	2.23E-06	1.76E-07	2.91E-05	2.91E-05
Benzo(b)fluoranthene																				3.41E-05	5.32E-06	1.83E-05	9.65E-06	7.61E-07	9.82E-06	9.82E-06
Benzo(e)pyrene																									1.35E-06	1.35E-06
Benzo(g,h,i)perylene																				6.35E-06	2.56E-07	8.83E-07	4.83E-06	3.81E-07	1.27E-05	1.27E-05
Benzo(k)fluoranthene																				1.69E-05	3.35E-06	1.15E-05	1.90E-06	1.49E-07	7.37E-06	7.37E-06
Beryllium																				1.14E-04	2.56E-05	8.83E-05			8.25E-07	8.25E-07
Biphenyl	3.91E-02	3.79E-03	0.00E+00	0.00E+00		6.31E-03	2.37E-02				5.36E-03	0.00E+00	1.21E-03	8.03E-04	4.10E-04	0.00E+00				0.00E+00						
Bromomethane																				0.00E+00					5.73E-03	5.73E-03
Cadmium																				9.64E-04	2.17E-04	7.47E-04			3.57E-06	3.57E-06
Carbon disulfide																									1.51E-03	1.51E-03
Chlorine																										
Chromium (hexavalent)																				2.45E-04	5.52E-05	1.90E-04				
Chromium (total)																				1.23E-03	2.76E-04	9.51E-04			6.87E-05	6.87E-05
Chrysene													5.48E-04	0.00E+00	5.06E-04	4.22E-05				1.58E-05	3.15E-07	1.09E-06	1.33E-05	1.05E-06	9.41E-06	9.41E-06
Cobalt																				7.19E-05	1.62E-05	5.57E-05			1.43E-05	1.43E-05
Cresol													3.38E-02	2.41E-03	3.13E-02	3.81E-05										
Cumene	2.03E-02	7.59E-03	0.00E+00	5.21E-03		2.01E-03	5.51E-03				0.00E+00	0.00E+00	4.02E-02	2.01E-03	3.61E-02	2.01E-03										
Dibenz(a,h)anthracene																				4.30E-06	2.37E-07	8.15E-07	3.01E-06	2.37E-07	1.15E-05	1.15E-05
Dichlorobenzene																				1.05E-03	2.37E-04	8.15E-04				
Ethylbenzene	1.61E-01	3.98E-02	0.00E+00	4.84E-02		1.06E-02	6.06E-02				1.19E-03	0.00E+00	8.47E-02	6.42E-03	7.47E-02	3.61E-03				1.40E-02	3.15E-03	1.09E-02			6.55E-04	6.55E-04
Fluoranthene																				4.03E-05	5.72E-07	1.97E-06	3.50E-05	2.76E-06	2.50E-04	2.50E-04
Fluorene													9.40E-04	0.00E+00	8.67E-04	7.23E-05				1.22E-04	5.32E-07	1.83E-06	1.11E-04	8.77E-06	9.82E-05	9.82E-05
Formaldehyde																				6.56E-02	1.46E-02	5.03E-02	6.86E-04	5.41E-05	6.55E-01	6.55E-01
Heptachlorodibenzo-p-dioxin																									2.29E-09	2.29E-09
Hexachlorodibenzofuran																									2.58E-09	2.58E-09
Hexane	5.06E-01	2.72E-01	3.97E-02	3.48E-02		5.45E-02	5.51E-02				5.96E-04	4.91E-02	1.45E+00	3.37E-01	1.01E+00	9.64E-02				1.58E+00	3.55E-01	1.22E+00				
Hydrogen chloride																									9.00E-02	9.00E-02
Hydrogen cyanide****																									8.03E-03	8.03E-03
Indeno(1,2,3-c,d)pyrene																				6.61E-05	1.40E-05	4.82E-05	3.60E-06	2.84E-07	1.23E-05	1.23E-05
Manganese																				3.24E-04	7.29E-05	2.51E-04			3.57E-05	3.57E-05
Mercury																				2.19E-04	4.93E-05	1.70E-04			4.91E-06	4.91E-06
Methanol													9.92E-03	0.00E+00	9.15E-03	7.63E-04										
Methyl isobutyl ketone													8.35E-01	0.00E+00	7.71E-01	6.42E-02										
Methyl tertiary-butyl ether													7.47E-01	0.00E+00	7.47E-01	0.00E+00										
Methylene chloride																									1.80E-02	1.80E-02
Naphthalene	8.06E-02	1.58E-02	0.00E+00	1.08E-02		7.17E-03	3.96E-02				7.15E-03	0.00E+00	2.15E-02	2.41E-03	1.83E-02	8.03E-04				1.75E-03	1.18E-04	4.08E-04	1.13E-03	8.91E-05	2.86E-03	2.86E-03
Nickel																				1.84E-03	4.14E-04	1.43E-03			2.75E-04	2.75E-04
Pentachlorodibenzofurans																									1.31E-09	1.31E-09
Phenanthrene													3.91E-03	0.00E+00	3.61E-03	3.01E-04				3.98E-04	3.35E-06	1.15E-05	3.55E-04	2.80E-05	6.55E-04	6.55E-04
Phenol													5.92E-03	3.61E-03	2.17E-03	1.35E-04				3.51E-03	7.88E-04	2.72E-03			2.33E-02	2.33E-02
Pyrene													1.02E-03	0.00E+00	9.40E-04	7.83E-05				3.91E-05	9.66E-07	3.33E-06	3.23E-05	2.54E-06	9.00E-06	9.00E-06
Selenium																				7.71E-04	1.73E-04	5.98E-04			6.87E-06	6.87E-06
Styrene													1.59E-01	0.00E+00	1.59E-01	0.00E+00										
Toluene	6.15E-01	1.08E-01	4.96E-02	2.16E-01		4.88E-02	1.82E-01				2.38E-03	9.20E-03	4.84E-01	3.01E-02	4.34E-01	2.01E-02				5.53E-03	6.50E-04	2.24E-03	2.44E-03	1.93E-04	8.59E-03	8.59E-03
Trichlorofluoromethane																									6.55E-03	6.55E-03
Vanadium																									3.63E-04	3.63E-04
Xylenes (total)	6.76E-01	1.26E-01	1.98E-03	2.18E-01		5.45E-02	2.70E-01				2.38E-03	2.30E-03	3.76E-01	2.49E-02	3.37E-01	1.41E-02				2.37E-02	4.93E-03	1.70E-02	1.68E-03	1.32E-04	8.59E-03	8.59E-03
Zinc																									2.03E-04	2.03E-04

Emission Rates are shown based on STPY

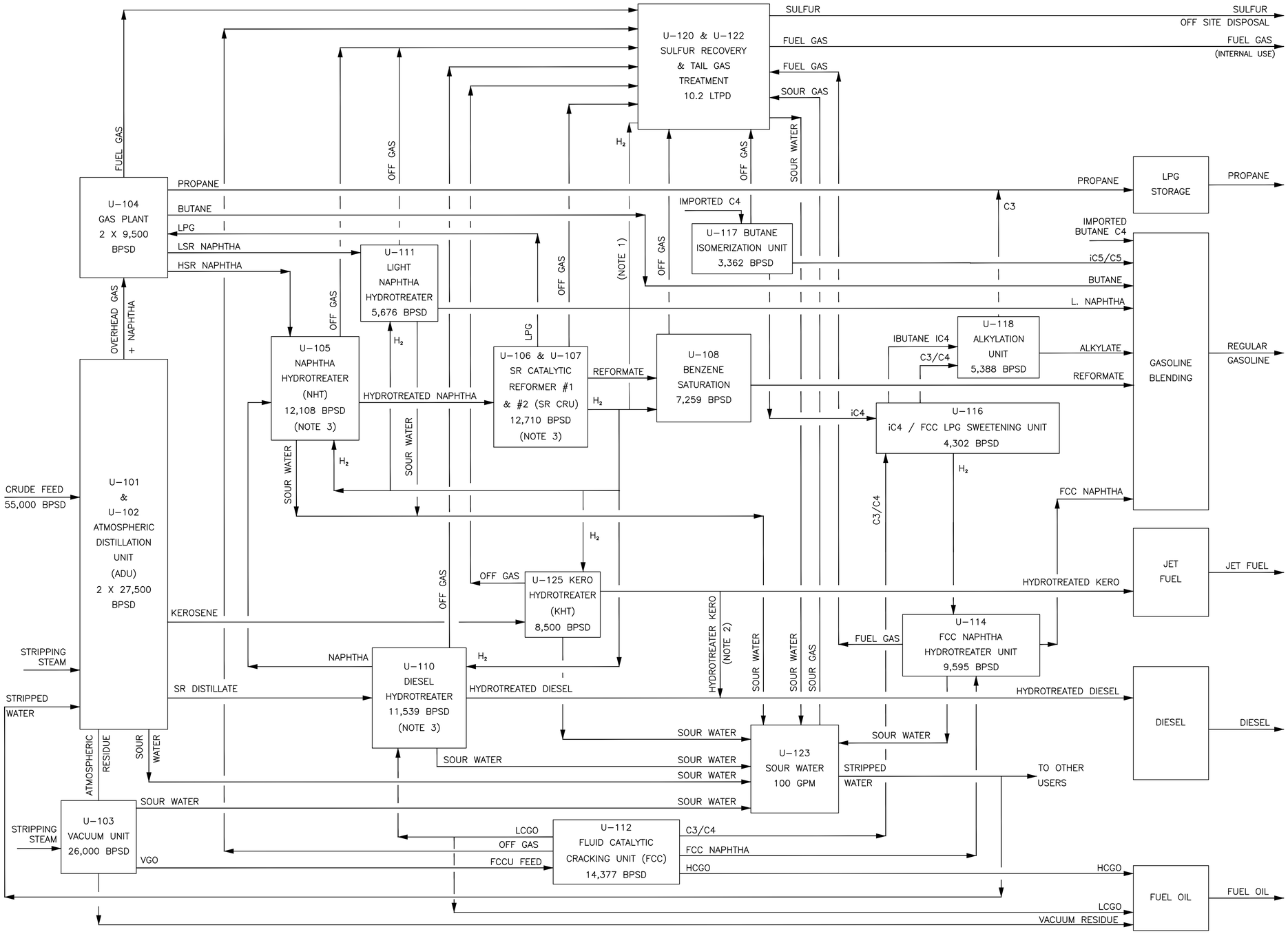
Unit	**Catalytic Reforming Unit**	Catalytic Reformer #2	Catalytic Reformer #1	**Sulfur Recovery Plant**	SRU + Tail Gas System	**Vacuum Systems**	Vacuum Distillation	**Blowdown System**	Blowdown	**Flares**	General	Flare operation	**Wastewater**	Wastewater System	**Cooling Towers**	Cooling Towers	**Rail Product Loading**	Crude oil	Gasoline +butane	Jet Kerosene	Diesel	Fuel Oil	**Truck Product Loading**	Crude oil	Gasoline +butane	Jet Kerosene	Diesel	Fuel Oil	**Fugitive Dust**	Paved Roads	Catalyst handling
Total/ Unit (STPY)	7.92E-01	2.47E-01	5.46E-01							2.38E+00	2.38E+00		5.24E-01	5.24E-01																	
1,2,4-trimethyl benzene																															
1,3-Butadiene										3.85E-01	3.85E-01		4.38E-05	4.38E-05																	
2,2,4-Trimethyl pentane													1.06E-01	1.06E-01																	
2-Methyl naphthalene	2.32E-07	7.21E-08	1.59E-07																												
3-Methylchloranthrene																															
7,12-Dimethylbenz(a) anthracene																															
Acenaphthene	7.66E-09	2.38E-09	5.27E-09																												
Acenaphthylene	5.34E-09	1.66E-09	3.68E-09																												
Acetaldehyde																															
Acetone																															
Acrolein																															
Anthracene	1.62E-08	5.05E-09	1.12E-08																												
Antimony																															
Arsenic																															
Benzene	7.12E-04	2.22E-04	4.91E-04							4.95E-01	4.95E-01		2.44E-02	2.44E-02																	
Benzo(a)anthracene	1.60E-10	4.99E-11	1.10E-10																												
Benzo(a)pyrene																															
Benzo(b)fluoranthene	2.67E-10	8.32E-11	1.84E-10																												
Benzo(e)pyrene	5.16E-10	1.61E-10	3.56E-10																												
Benzo(g,h,i)perylene	7.12E-10	2.22E-10	4.91E-10																												
Benzo(k)fluoranthene	1.34E-10	4.16E-11	9.20E-11																												
Beryllium																															
Biphenyl													1.03E-04	1.03E-04																	
Bromomethane																															
Cadmium																															
Carbon disulfide																															
Chlorine	4.10E-02	1.28E-02	2.82E-02																												
Chromium (hexavalent)																															
Chromium (total)																															
Chrysene	5.16E-10	1.61E-10	3.56E-10																												
Cobalt																															
Cresol													0.00E+00	0.00E+00																	
Cumene													8.65E-03	8.65E-03																	
Dibenz(a,h)anthracene	1.39E-10	4.32E-11	9.57E-11																												
Dichlorobenzene																															
Ethylbenzene										1.10E-02	1.10E-02		1.89E-02	1.89E-02																	
Fluoranthene	1.78E-08	5.54E-09	1.23E-08																												
Fluorene	3.56E-08	1.11E-08	2.45E-08																												
Formaldehyde										5.50E-02	5.50E-02																				
Heptachlorodibenzo-p-dioxin																															
Hexachlorodibenzofuran																															
Hexane										5.50E-01	5.50E-01		1.88E-01	1.88E-01																	
Hydrogen chloride	7.48E-01	2.33E-01	5.15E-01																												
Hydrogen cyanide****																															
Indeno(1,2,3-c,d)pyrene	3.03E-10	9.42E-11	2.08E-10																												
Manganese																															
Mercury																															
Methanol																															
Methyl isobutyl ketone																															
Methyl tertiary-butyl ether										1.65E-01	1.65E-01		5.14E-03	5.14E-03																	
Methylene chloride																															
Naphthalene	6.23E-06	1.94E-06	4.29E-06										2.77E-03	2.77E-03																	
Nickel																															
Pentachlorodibenzofurans																															
Phenanthrene	1.09E-07	3.38E-08	7.48E-08																												
Phenol													0.00E+00	0.00E+00																	
Pyrene	2.67E-09	8.32E-10	1.84E-09																												
Selenium																															
Styrene													3.62E-02	3.62E-02																	
Toluene	1.57E-03	3.88E-04	1.18E-03							3.85E-01	3.85E-01		6.11E-02	6.11E-02																	
Trichlorofluoromethane																															
Vanadium																															
Xylenes (total)	1.25E-03	3.88E-04	8.58E-04							3.30E-01	3.30E-01		7.36E-02	7.36E-02																	
Zinc																															

Modeled Results

1 hr. max =	**1.53E+00**	**ug/m3**					**Total MICR**	**4.57E-06**	**Total Hazard Index**		**7.95E-02**		
8 hr. max =	**5.60E+00**	**ug/m3**					**Compliant**	**YES**	**Compliant**		**YES**		

HAP Name	Total (STPY)	Wt % (HAPs)	1-Hr Guideline Concentration (mg/m3)	8-Hr Guideline Concentration (mg/m3)	APP B Unit Risk Factor (m3/µg)	Model Results based on % HAP 1-hr max (mg/m3)	Model Results based on % HAP 8-hr max (mg/m3)	Maxium Individual Carcinogenic Risk (MICR)	Hazard Index Value 1-hr	Hazard Index Value 8-hr	Highest Haz Index	1-Hr Guideline Concentration Compliance	8-Hr Guideline Concentration Compliance
Total/ Unit (STPY)	1.40E+01	1.00E+00											
1,2,4-trimethyl benzene	2.30E-01	1.64E-02		2.46E+00		2.51E-05	9.19E-05	0.00E+00		3.74E-05	3.74E-05		YES
1,3-Butadiene	3.92E-01	2.79E-02		8.80E-02	3.00E-05	4.27E-05	1.56E-04	1.28E-06		1.78E-03	1.78E-03		YES
2,2,4-Trimethyl pentane	7.49E-01	5.33E-02		2.80E+01		8.16E-05	2.99E-04	0.00E+00		1.07E-05	1.07E-05		YES
2-Methyl naphthalene	9.23E-03	6.58E-04		5.82E-02		1.01E-06	3.68E-06	0.00E+00		6.33E-05	6.33E-05		YES
3-Methylchloranthrene	1.58E-06	1.12E-07				1.72E-10	6.30E-10	0.00E+00			0.00E+00		
7,12-Dimethylbenz(a) anthracene	1.40E-05	9.99E-07			7.10E-02	1.53E-09	5.60E-09	1.09E-07			0.00E+00		
Acenaphthene	5.50E-05	3.92E-06				6.00E-09	2.20E-08	0.00E+00			0.00E+00		
Acenaphthylene	4.11E-04	2.93E-05				4.49E-08	1.64E-07	0.00E+00			0.00E+00		
Acetaldehyde	6.39E-02	4.56E-03	9.01E-01		2.20E-06	6.97E-06	2.55E-05	1.53E-08	7.74E-06		7.74E-06	YES	
Acetone	6.55E-03	4.67E-04	3.56E+01	2.37E+01		7.14E-07	2.61E-06	0.00E+00	2.00E-08	1.10E-07	1.10E-07	YES	YES
Acrolein	1.77E-02	1.26E-03	4.59E-03			1.93E-06	7.05E-06	0.00E+00	4.20E-04		4.20E-04	YES	
Anthracene	9.01E-04	6.42E-05				9.82E-08	3.59E-07	0.00E+00			0.00E+00		
Antimony	4.74E-04	3.38E-05		1.00E-02		5.16E-08	1.89E-07	0.00E+00		1.89E-05	1.89E-05		YES
Arsenic	1.78E-04	1.27E-05		2.00E-04	4.30E-03	1.94E-08	7.11E-08	8.35E-08		3.55E-04	3.55E-04		YES
Benzene	1.00E+00	7.15E-02	1.60E-01	3.02E-02	7.80E-06	1.09E-04	4.00E-04	8.53E-07	6.84E-04	1.33E-02	1.33E-02	YES	YES
Benzo(a)anthracene	2.08E-05	1.48E-06			1.10E-04	2.27E-09	8.32E-09	2.50E-10			0.00E+00		
Benzo(a)pyrene	8.14E-05	5.80E-06			1.10E-03	8.88E-09	3.25E-08	9.77E-09			0.00E+00		
Benzo(b)fluoranthene	4.39E-05	3.13E-06			1.10E-04	4.79E-09	1.75E-08	5.26E-10			0.00E+00		
Benzo(e)pyrene	1.35E-06	9.63E-08				1.47E-10	5.39E-10	0.00E+00			0.00E+00		
Benzo(g,h,i)perylene	1.90E-05	1.36E-06				2.08E-09	7.60E-09	0.00E+00			0.00E+00		
Benzo(k)fluoranthene	2.43E-05	1.73E-06			1.10E-04	2.65E-09	9.70E-09	2.92E-10			0.00E+00		
Beryllium	1.15E-04	8.18E-06		1.00E-06	2.40E-03	1.25E-08	4.58E-08	3.00E-08		4.58E-02	4.58E-02		YES
Biphenyl	4.05E-02	2.88E-03		2.50E-02		4.41E-06	1.61E-05	0.00E+00		6.46E-04	6.46E-04		YES
Bromomethane	5.73E-03	4.08E-04				6.25E-07	2.29E-06	0.00E+00			0.00E+00		
Cadmium	9.68E-04	6.90E-05		2.00E-04	1.80E-03	1.06E-07	3.86E-07	1.90E-07		1.93E-03	1.93E-03		YES
Carbon disulfide	1.51E-03	1.08E-04		6.20E-02		1.65E-07	6.04E-07	0.00E+00		9.74E-06	9.74E-06		YES
Chlorine	4.10E-02	2.92E-03	5.80E-02	2.90E-02		4.47E-06	1.63E-05	0.00E+00	7.70E-05	5.64E-04	5.64E-04	YES	YES
Chromium (hexavalent)	2.45E-04	1.75E-05		1.00E-03	1.20E-02	2.68E-08	9.79E-08	3.21E-07		9.79E-05	9.79E-05		YES
Chromium (total)	1.30E-03	9.23E-05		1.00E-02		1.41E-07	5.17E-07	0.00E+00		5.17E-05	5.17E-05		YES
Chrysene	5.73E-04	4.08E-05			1.10E-05	6.25E-08	2.29E-07	6.87E-10			0.00E+00		
Cobalt	8.62E-05	6.14E-06		4.00E-04		9.40E-09	3.44E-08	0.00E+00		8.60E-05	8.60E-05		YES
Cresol	3.38E-02	2.41E-03		4.00E-01		3.68E-06	1.35E-05	0.00E+00		3.37E-05	3.37E-05		YES
Cumene	6.91E-02	4.93E-03		4.92E+00		7.54E-06	2.76E-05	0.00E+00		5.61E-06	5.61E-06		YES
Dibenz(a,h)anthracene	1.58E-05	1.12E-06			1.20E-03	1.72E-09	6.29E-09	2.06E-09			0.00E+00		
Dichlorobenzene	1.05E-03	7.50E-05	6.01E+00	3.01E+00	1.10E-05	1.15E-07	4.20E-07	1.26E-09	1.91E-08	1.40E-07	1.40E-07	YES	YES
Ethylbenzene	2.90E-01	2.07E-02	1.09E+01	8.68E+00	2.50E-06	3.16E-05	1.16E-04	7.90E-08	2.91E-06	1.33E-05	1.33E-05	YES	YES
Fluoranthene	2.90E-04	2.07E-05				3.16E-08	1.16E-07	0.00E+00			0.00E+00		
Fluorene	1.16E-03	8.27E-05	6.22E-02	3.11E-02		1.26E-07	4.63E-07	0.00E+00	2.03E-06	1.49E-05	1.49E-05	YES	YES
Formaldehyde	7.75E-01	5.52E-02	7.37E-03		1.30E-05	8.45E-05	3.09E-04	1.10E-06	1.15E-02		1.15E-02	YES	
Heptachlorodibenzo-p-dioxin	2.29E-09	1.63E-10			1.30E+00	2.50E-13	9.14E-13	3.25E-10			0.00E+00		
Hexachlorodibenzofuran	2.58E-09	1.84E-10				2.81E-13	1.03E-12	0.00E+00			0.00E+00		
Hexane	4.27E+00	3.04E-01	7.05E+01	3.52E+01		4.65E-04	1.70E-03	0.00E+00	6.60E-06	4.83E-05	4.83E-05	YES	YES
Hydrogen chloride	8.38E-01	5.97E-02	5.97E-02			9.14E-05	3.34E-04	0.00E+00	1.53E-03		1.53E-03	YES	
Hydrogen cyanide****	8.03E-03	5.73E-04		1.04E-01		8.76E-07	3.21E-06	0.00E+00		3.08E-05	3.08E-05		YES
Indeno(1,2,3-c,d)pyrene	7.84E-05	5.59E-06			1.10E-04	8.55E-09	3.13E-08	9.40E-10			0.00E+00		
Manganese	3.60E-04	2.57E-05		4.00E-03		3.93E-08	1.44E-07	0.00E+00		3.59E-05	3.59E-05		YES
Mercury	2.24E-04	1.60E-05		5.00E-04		2.44E-08	8.94E-08	0.00E+00		1.79E-04	1.79E-04		YES
Methanol	9.92E-03	7.07E-04	6.55E+00	5.24E+00		1.08E-06	3.96E-06	0.00E+00	1.65E-07	7.55E-07	7.55E-07	YES	YES
Methyl isobutyl ketone	8.35E-01	5.95E-02	6.15E+00	1.64E+00		9.11E-05	3.33E-04	0.00E+00	1.48E-05	2.03E-04	2.03E-04	YES	YES
Methyl tertiary-butyl ether	9.17E-01	6.53E-02		3.61E+00	2.60E-07	1.00E-04	3.66E-04	2.60E-08		1.01E-04	1.01E-04		YES
Methylene chloride	1.80E-02	1.28E-03		3.47E+00	4.70E-07	1.96E-06	7.18E-06	9.23E-10		2.07E-06	2.07E-06		YES
Naphthalene	1.09E-01	7.80E-03	1.57E+00	1.05E+00	3.40E-05	1.19E-05	4.37E-05	4.06E-07	7.59E-06	4.17E-05	4.17E-05	YES	YES
Nickel	2.12E-03	1.51E-04		3.00E-02	2.40E-04	2.31E-07	8.44E-07	5.54E-08		2.81E-05	2.81E-05		YES
Pentachlorodibenzofurans	1.31E-09	9.33E-11				1.43E-13	5.23E-13	0.00E+00			0.00E+00		
Phenanthrene	4.97E-03	3.54E-04				5.42E-07	1.98E-06	0.00E+00			0.00E+00		
Phenol	3.27E-02	2.33E-03		3.85E-01		3.57E-06	1.31E-05	0.00E+00		3.39E-05	3.39E-05		YES
Pyrene	1.07E-03	7.60E-05				1.16E-07	4.25E-07	0.00E+00			0.00E+00		
Selenium	7.78E-04	5.55E-05		4.00E-03		8.48E-08	3.11E-07	0.00E+00		7.76E-05	7.76E-05		YES
Styrene	1.95E-01	1.39E-02	3.41E+00	1.70E+00		2.13E-05	7.79E-05	0.00E+00	6.24E-06	4.57E-05	4.57E-05	YES	YES
Toluene	1.56E+00	1.11E-01		1.51E+00		1.70E-04	6.23E-04	0.00E+00		4.13E-04	4.13E-04		YES
Trichlorofluoromethane	6.55E-03	4.67E-04	1.12E+02			7.14E-07	2.61E-06	0.00E+00	6.35E-09		6.35E-09	YES	
Vanadium	3.63E-04	2.59E-05				3.96E-08	1.45E-07	0.00E+00			0.00E+00		
Xylenes (total)	1.49E+00	1.06E-01	1.30E+01	8.68E+00		1.62E-04	5.94E-04	0.00E+00	1.25E-05	6.84E-05	6.84E-05	YES	YES
Zinc	2.03E-04	1.45E-05				2.22E-08	8.12E-08	0.00E+00			0.00E+00		

Exhibit E: Process Block Diagrams



NOTES:

1. H_2 RICH GAS FROM SR CATALYTIC REFORMER IS DIRECTLY SENT TO NAPHTHA HYDROTREATER, DIESEL HYDROTREATER, AND BENZENE SATURATION UNIT. BALANCE GAS IS SENT TO FUEL GAS SYSTEM.
2. TO ACHIEVE WINTER GRADE ULSD SPECIFICATION, PARTIAL OR TOTAL KEROSENE STREAM MUST BE BLENDED INTO DIESEL, VIA KERO HYDROTREATER UNIT.
3. UNIT CAPACITIES ARE BASED ON THE NAME PLATE CAPACITY AND BAKKEN CRUDE ASSAY.
4. DURING PHASE 1, U-109 KEROSENE SWEETENING UNIT WILL BE INSTALLED WITH A CAPACITY OF 3,920 BPSD. FOR PHASE 2 IT WILL BE REPURPOSED TO U-116 FCC LPG SWEETENING UNIT.
5. BLOCK FLOW DIAGRAM FOR PERMITING PURPOSE ONLY.

REFERENCE DRAWINGS		
REFERENCE DRAWING. No.	DESCRIPTION	REV.

REVISION					
No.	DATE	DESCRIPTION	BY	CHK	APP.
0	08/24/16	ISSUED FOR PERMIT TO CONSTRUCT	J. F.	M. M.	C. G.

REVISION					
No.	DATE	DESCRIPTION	BY	CHK	APP.

ENGINEER'S RECORD		
	NAME	DATE
DRAWN	M. JOVER	06/27/16
DESIGNED	J. FLORES	06/24/16
CHECKED	M. MOSSUTO	08/19/16
VEPICA APP.	C. GARCIA	08/24/16
CLIENT APP.	T. JOHNSON	
FILE NAME:	P-5715043-01-000-16103-D001_0.dwg	

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Meridian Energy Group Inc.

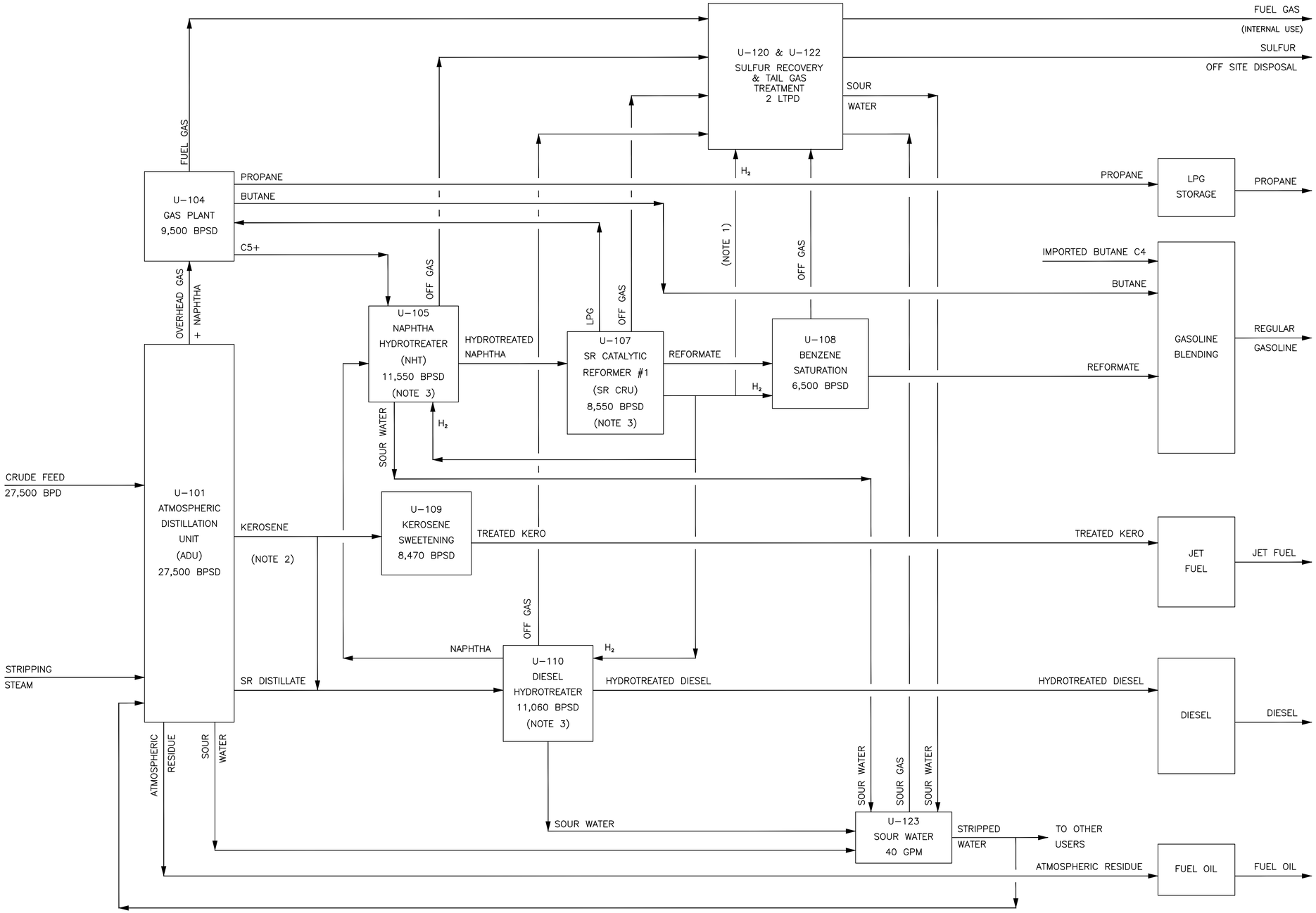
vepica

MERIDIAN DAVIS REFINERY
PERMITS SUPPORT

BLOCK FLOW DIAGRAM
DAVIS REFINERY

VEPICA PROJECT No.	VEPICA DRAWING No.				
P-5715043-01	P-5715043-01-000-16103-D001				
CLIENT PROJECT No.	SCALE	CLIENT DRAWING No.	SHEET:	OF:	REV:
TBD	NONE	TBD	1	1	0

D 34" x 22"



NOTES:

1. H_2 RICH GAS FROM SR CATALYTIC REFORMER IS DIRECTLY SENT TO NAPHTHA HYDROTREATER, DIESEL HYDROTREATER, AND BENZENE SATURATION UNIT. BALANCE GAS IS SENT TO FUEL GAS SYSTEM.
2. TO ACHIEVE WINTER GRADE ULSD SPECIFICATION, PARTIAL OR TOTAL KEROSENE STREAM MUST BE BLENDED INTO DIESEL, VIA DIESEL HYDROTREATER UNIT.
3. UNIT CAPACITIES ARE BASED ON THE NAME PLATE CAPACITY AND BAKKEN CRUDE ASSAY.

REFERENCE DRAWINGS		
REFERENCE DRAWING. No.	DESCRIPTION	REV.

REVISION					
No.	DATE	DESCRIPTION	BY	CHK	APP.
0	09/22/16	ISSUED FOR PERMIT TO CONSTRUCT	J. F.	M. M.	R. L.

REVISION					
No.	DATE	DESCRIPTION	BY	CHK	APP.

ENGINEER'S RECORD		
	NAME	DATE
DRAWN	M. JOVER	06/27/16
DESIGNED	J. FLORES	06/24/16
CHECKED	M. MOSSUTO	06/28/16
VEPICA APP.	R. LEAL	06/28/16
CLIENT APP.	T. JHONSON	
FILE NAME:	P-5715043-01-000-16103-D002.dwg	

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Meridian Energy Group Inc.

vepica

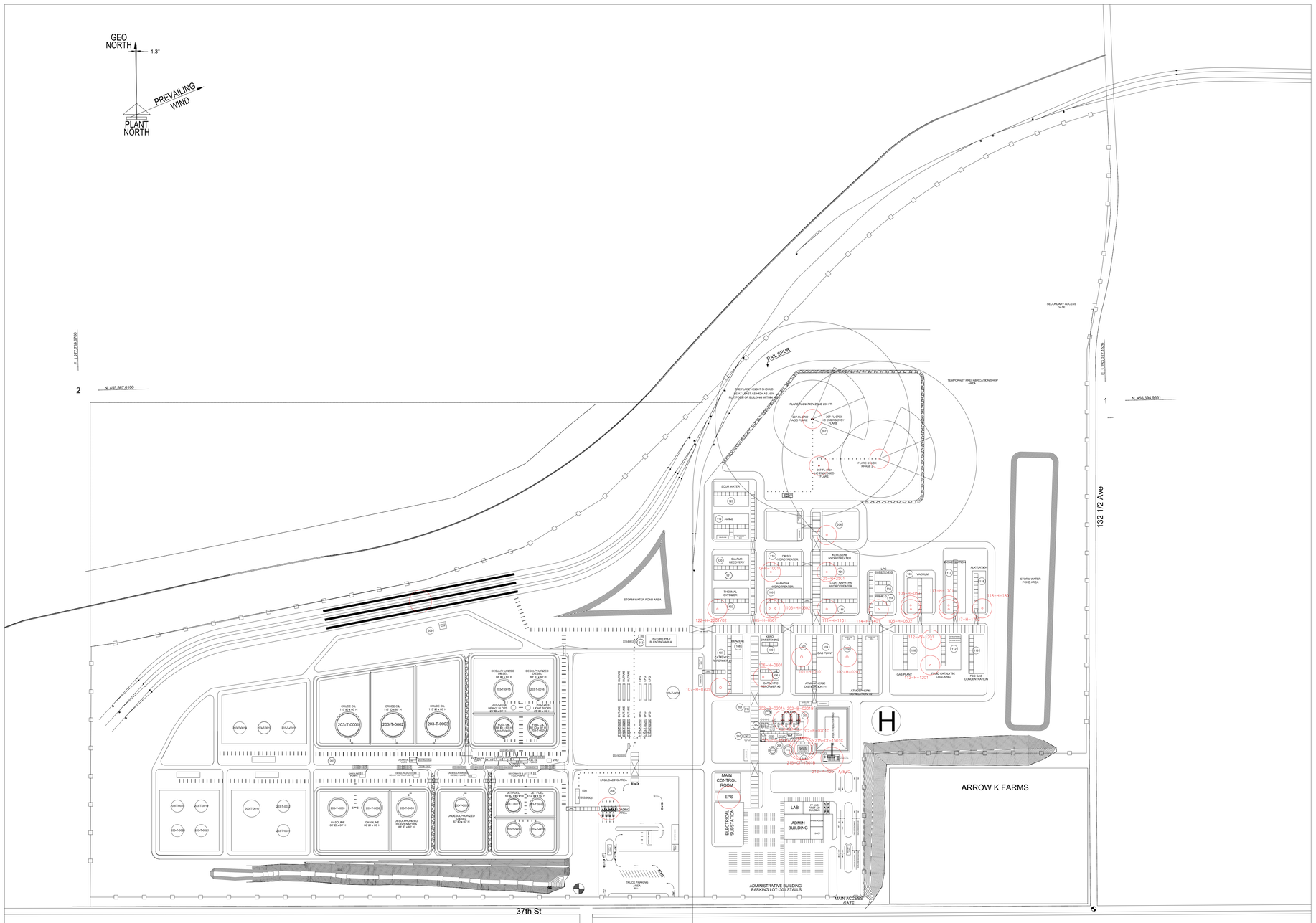
MERIDIAN DAVIS REFINERY
ENGINEERING DEFINITION AND DEFINITIVE ESTIMATE (EDDE)

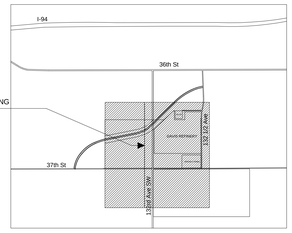
BLOCK FLOW DIAGRAM
DAVIS REFINERY PHASE 1

VEPICA PROJECT No.	VEPICA DRAWING No.				
P-5715043-01	P-5715043-01-000-16103-D002				
CLIENT PROJECT No.	SCALE	CLIENT DRAWING No.	SHEET:	OF:	REV:
TBD	NONE	TBD	1	1	0

D 34" x 22"

Exhibit F: Site Plan





VICINITY MAP

BILLINGS COUNTY, ND

	EMISSION SOURCES ISBL				
UNIT No	UNIT DESCRIPTION	TAG	EQUIPMENT DESCRIPTION	COORDINATES - UTM	
				N	E
101	ATMOSPHERIC DISTILLATION UNIT #1	101-H-0101	ADU #1 HEATER	5,193,290.7200	633,486.0500
102	ATMOSPHERIC DISTILLATION UNIT #2	102-H-0201	ADU #2 HEATER	5,193,293.2900	633,557.5100
103	VACUUM DISTILLATION UNIT	103-H-0301	VDU HEATER #1	5,193,377.6900	633,653.9400
		103-H-0302	VDU HEATER #2	5,193,371.6400	633,654.4600
104	GAS PLANT	-	-	-	-
105	HEAVY NAPHTHA HYDROTREATER	105-H-0501	HNHT HEATER #1	5,193,365.1100	633,433.3200
		105-H-0502	HNHT HEATER #2	5,193,365.4700	633,442.4700
106	CATALYTIC REFORMER UNIT #2	106-H-0601	CRU #2 HEATER	5,193,257.5000	633,427.2400
107	CATALYTIC REFORMER UNIT # 1	107-H-0701	CRU #1 HEATER	5,193,238.2600	633,361.0500
108	BENZENE SATURATION UNIT	-	-	-	-
109	KEROSENE SWEETENING	-	-	-	-
110	DIESEL HYDROTREATER	110-H-1001	DIESEL HDT HEATER	5,193,422.2700	633,433.4500
111	LIGHT NAPHTHA HYDROTREATER	105-H-0501	LNHT HEATER	5,193,367.4000	633,522.8500
112	FLUID CATALYTIC CRACKING (FCC) UNIT	112-H-1201	FCCU HEATER	5,193,285.0300	633,687.8900
		112-VS-1201	GENERATOR VENT STACK	5,193,325.0500	633,687.7600
113	FFC GAS CONCENTRATION	-	-	-	-
114	FCC NAPHTHA HYDROTREATER	114-H-1401	FCC NAPTHA HYDROTREATER HEATER	5,193,369.6100	633,604.0000
115	FCC NAPHTHA SWEETENING	-	-	-	-
116	LPG SWEETENING UNIT	-	-	-	-
117	ISOMERIZATION UNIT	117-H-1701	ISOMERIZATION HEATER #1	5,193,379.7800	633,713.2700
		117-H-1702	ISOMERIZATION HEATER #2	5,193,373.7000	633,713.6900
118	ALKYLATION UNIT	118-H-1801	ALKYLATION HEATER	5,193,376.7600	633,766.1900
119	AMINE UNIT	-	-	-	-
120	SULFUR RECOVERY UNIT # 1	-	-	-	-
121	SULFUR RECOVERY UNIT #2	-	-	-	-
122	SRU THERMAL OXIDIZER	122-H- 2201	THERMAL OXIDIZER	5,193,361.4000	633,351.7900
		122-H-2202	THERMAL OXIDIZER	-	-
123	SOUR WATER UNIT	-	-	-	-
125	KEROSENE HYDROTREATER	125-H-2501	KEROSENE HDT HEATER	5,193,425.2500	633,520.8900

	EMISSION SOURCES OSBL				
UNIT No	UNIT DESCRIPTION	TAG	EQUIPMENT DESCRIPTION	COORDINATES - UTM	
				N	E
201	FUEL GAS SYSTEM	-	-	-	-
202	STEAM/BFW/CONDESATE	202-B-0201A	BOILER #1	5,193,191.440	633,459.970
		202-B-0201B	BOILER #2	5,193,191.860	633,472.150
		202-B-0201C	BOILER #3	5,193,192.280	633,484.340
203	STORAGE	203-T-0001	CRUDE OIL TANK #1	5,193,160.170	632,780.440
		203-T-0002	CRUDE OIL TANK #2	5,193,162.600	632,850.490
		203-T-0003	CRUDE OIL TANK #3	5,193,165.020	632,920.550
		203-T-0005	DESULFURIZED HEAVY NAPHTHA TANK	5,193,030.030	632,769.270
		203-T-0006	REFORMATE TANK #1	5,193,004.960	633,044.800
		203-T-0007	REFORMATE TANK #2	5,193,006.260	633,082.260
		203-T-0008	GASOLINE TANK #1	5,193,031.880	632,822.870
		203-T-0009	GASOLINE TANK #2	5,193,033.740	632,876.480
		203-T-0010	MID GASOLINE TANK #1	5,193,024.030	632,633.940
		203-T-0011	JET FUEL TANK #1	5,193,043.340	633,043.470
		203-T-0012	JET FUEL TANK #2	5,193,044.630	633,080.930
		203-T-0013	UNDESULPHURIZED DIESEL TANK #1	5,193,033.700	632,969.460
		203-T-0014	UNDESULPHURIZED DIESEL TANK #2	5,193,149.510	632,610.910
		203-T-0015	DESULFURIZED DIESEL TANK #1	5,193,218.100	633,022.230
		203-T-0016	DESULFURIZED DIESEL TANK #2	5,193,219.950	633,075.840
		203-T-0017	LVGO TANK	5,193,150.840	632,649.290
		203-T-0018	FCC NAPHTHA TANK #1	5,193,023.750	632,517.660
		203-T-0019	FCC NAPHTHA TANK #2	5,193,025.040	632,555.130
		203-T-0020	ALKYLATE TANK #1	5,192,985.370	632,518.990
		203-T-0021	ALKYLATE TANK #2	5,192,986.670	632,556.460
		203-T-0022	DILUENT TANK	5,193,152.160	632,687.660
		203-T-0023	FUEL OIL TANK #1	5,193,164.490	633,024.090
		203-T-0024	FUEL OIL TANK #2	5,193,166.350	633,077.700
		203-T-0025	LPG BULLET #1	5,193,169.810	633,191.010
		203-T-0026	LPG BULLET #2	5,193,170.060	633,198.310
		203-T-0027	LPG BULLET #3	5,193,170.250	633,205.720
		203-T-0028	LPG BULLET #4	5,193,170.970	633,224.440
		203-T-0029	LPG BULLET #5	5,193,171.240	633,231.650
		203-T-0030	LPG BULLET #6	5,193,171.470	633,239.210
		203-T-0031	LIGHT NAPHTHA TANK #1	5,192,991.190	632,684.940
		203-T-0032	LIGHT NAPHTHA TANK #2	5,193,029.560	632,683.610
		203-T-0033	LIGHT SLOPS TANK	5,193,190.740	633,061.040
		203-T-0034	HEAVY SLOPS TANK	5,193,189.950	633,038.200
		203-T-0035	ETHANOL TANK	5,193,227.690	633,273.340
		203-T-0036	BUTANE BULLET #1	5,193,225.510	633,189.030
		203-T-0037	BUTANE BULLET #2	5,193,225.790	633,196.320
		203-T-0038	BUTANE BULLET #3	5,193,226.070	633,203.740
		203-T-0039	BUTANE BULLET #4	5,193,226.720	633,222.540
		203-T-0040	BUTANE BULLET #5	5,193,226.960	633,229.810
		203-T-0041	BUTANE BULLET #6	5,193,227.210	633,237.220
204	PLANT AND INSTRUMENT AIR	-	-		
205	POTABLE AND PROCESS WATER SYSTEM	-	-		
206	WASTE WATER TREATMENT PLANT	-	-	5,193,483.160	633,518.900
207	REFINERY FLARES	207-FL-1701	HC ENCLOSED FLARE	5,193,591.060	633,502.990
		207-FL-1702	ACID FLARE	5,193,663.840	633,490.080
		207-FL-1703	HC EMERGENCY FLARE	5,193,663.840	633,490.080
		207-FL-1704	FLARE	5,193,605.350	633,597.250
208	TRUCK LOADING/UNLOADING	-	-	5,193,042.980	633,192.900
209	RAIL LOADING/UNLOADING	-	-	5,193,357.420	632,886.880
210	NITROGEN SYSTEM	-	-		
211	WASTE TREATMENT	-	-		
212	FIRE PROTECTION SYSTEM	212-P-1201 A/B/C	FIREWATER DIESEL PUMP	5,193,133.810	633,539.330
213	BLENDING AREA	-	-		
214	HOT OIL	214-H-1401	-		
215	COOLING WATER	215-CT-1501A	COOLING TOWER	5,193,147.060	633,488.940
		215-CT-1501B	COOLING TOWER	5,193,147.210	633,493.180
		215-CT-1501C	COOLING TOWER	5,193,147.360	633,497.430
216	POWER DISTRIBUTION	215-EG-1601	EMERGENCY GENERATOR STACK	5,139,066.950	633,380.690

NOTES:

1. THE REFERENCE POINT INDICATED ON THIS DRAWING IS THE CENTROID OF SECTION 1 OF THE PUBLIC LAND SURVEY GRID IN TOWNSHIP ONE HUNDRED THIRTY NINE (139) NORTH OF RANGE ONE HUNDRED (100) WEST OF THE 5TH PRINCIPAL MERIDIAN, NORTH OF RANGE ONE HUNDRED (100) WEST OF THE 5TH PRINCIPAL MERIDIAN, BILLINGS COUNTY, NORTH DAKOTA. THE COORDINATES VALUES ARE IN ACCORDANCE WITH STATE MAP SYSTEM US SURVEY FT.

FOR PERMIT PURPOSES ONLY

Meridian Energy Group Inc.

vepica USA

PROCESS STUDY FOR THE 55,000 BPSD
REFINERY IN BILLINGS COUNTY, ND

OVERALL PLOT PLAN
DAVIS REFINERY

REFERENCE DRAWINGS		
REFERENCE DRAWING. No.	DESCRIPTION	REV.
NA	CERTIFICATE OF SURVEY	

REFERENCE DRAWINGS		
REFERENCE DRAWING. No.	DESCRIPTION	REV.

REVISION					
No.	DATE	DESCRIPTION	BY	CHK	APP.
0	09/23/16	ISSUED FOR PTC	P.CASTRILLON	A. PENA	C. GARCIA

REVISION					
No.	DATE	DESCRIPTION	BY	CHK	APP.

ENGINEER'S RECORD		
	NAME	DATE
DRAWN	L.VIVAS	09/23/16
DESIGNED	P. CASTRILLON	09/23/16
CHECKED	A. PENA	09/23/16
VEPICA APP.	C. GARCIA	09/23/16
CLIENT APP.	T. JONHSON	

FILE NAME: P-5715043-00-001-12101-P001.dwg

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P-5715043	P-5715043-00-001-12101-P001				
CLIENT PROJECT No.	SCALE	CLIENT DRAWING No.	SHEET:	OF:	REV:
TBD	1/16" - 1'	TBD	1	1	0

ARCH E 48" x 36"

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Washington, D.C. 20460

JUN 13 1989

MEMORANDUM

SUBJECT: Guidance on Limiting Potential to Emit in New Source Permitting

FROM: Terrell E. Hunt
Associate Enforcement Counsel
Air Enforcement Division
Office of Enforcement and Compliance Monitoring

John S. Seitz, Director
Stationary Source Compliance Division
Office of Air Quality Planning and Standards

TO: Addressees

This memorandum transmits the final guidance on conditions in construction permits which can legally limit a source's potential to emit to minor or de minimis levels. We received many helpful comments on the January 24, 1989 draft of this guidance, and have incorporated the comments into the final document wherever possible. A summary of the major changes which have been made to the guidance in response to these comments is provided below.

Several commenters noted that the draft guidance used the term "federally enforceable" to mean both federally enforceable as defined in the new source regulations (40 C.F.R. Sections 52.21(b) (17), 51.165(a) (1) (xiv), 51.166(b) (17)), and enforceable as a practical matter. We have tried to distinguish the places where each term should be used, explained the relationship between the two terms, and indicated that in order to properly restrict potential to emit, limitations must be both federally enforceable as defined in the regulations and practically enforceable.

Some commenters requested that the section on averaging times for production limits be more specific as to when it is appropriate to use limitations which exceed a one month time basis. We have tried to explain why it is not possible to develop generic criteria for making this distinction, and to indicate situations where exceptions to the policy that production and operation limitations not exceed one month may be warranted.

There were some requests for a section on enforcement. We have included a new Section VI which addresses this topic. We also received many good suggestions on the example permit limitations. The section on examples has been substantially reworked to reflect your comments.

Finally, we learned through the comments that in two specific circumstances, short term emission limits are the most useful and reasonable way to restrict and verify limits on potential to emit. These circumstances are: 1) when control equipment is installed but control equipment operating parameters are difficult to measure during enforcement inspections; and 2) in surface coating operations with numerous and unpredictable use of coatings containing varying VOC content, where add-on control equipment is not employed. Therefore, we have made a narrow exception to the flat prohibition on use of emission limits to restrict potential to emit for these specific circumstances, and only when certain additional conditions have been met.

Again, we appreciate the thoughtful comments we have received on this guidance. Please insert this document into your Clean Air Act Compliance/Enforcement Policy Compendium as Item Number H.3. If you have any questions, please contact Judith Katz in the Air Enforcement Division at FTS 382-2843, or Sally Farrell in the Stationary Source Compliance Division at FTS 382-2875.

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DOJ

LIMITING POTENTIAL TO EMIT IN NEW SOURCE PERMITTING

JUNE 13, 1989

AIR ENFORCEMENT DIVISION
OFFICE OF ENFORCEMENT AND COMPLIANCE MONITORING

STATIONARY SOURCE COMPLIANCE DIVISION
OFFICE OF AIR QUALITY PLANNING AND STANDARDS

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Limiting Potential to Emit in New Source Permitting

I. Introduction

Whether a new source or modification is major and subject to new source review under Parts C and D of the Clean Air Act is dependent on whether that source or modification has or will have the potential to emit major or significant amounts of a regulated pollutant. Therefore, the definition of "potential to emit" under the new source regulations is extremely important in determining the applicability of new source review to a particular source. The federal regulations define "potential to emit" as:

> the maximum capacity of a stationary source to emit a pollutant under its physical and operational design. Any physical or operational limitation on the capacity of the source to emit a pollutant, including air pollution control equipment and restrictions on hours of operation or on the type or amount of fuel combusted, stored or processed, shall be treated as part of its design if the limitation or the effect it would have on emissions is federally enforceable.

40 C.F.R Sections 52.21(b) (4), 51.165(a) (1) (iii), 51.166(b) (4).

Permit limitations are very significant in determining whether a source is subject to major new source review. This is because they are the easiest and most common way for a source to obtain restrictions on its potential to emit. A permit does not

have to be a major source permit to legally restrict potential emissions. A minor source construction permit issued pursuant to a state program approved by EPA as meeting the requirements of 40 C.F.R. Section 51.160 is federally enforceable. In fact, any permit limitation can legally restrict potential to emit if it meets two criteria: 1) it is federally enforceable as defined by 40 C.F.R. Sections 52.21(b) (17), 51.165(a) (1) (xiv), 51.166(b) (17), i.e., contained in a permit issued pursuant to an EPA-approved permitting program or a permit directly issued by EPA, or has been submitted to EPA as a revision to a State Implementation Plan and approved as such by EPA; and 2) it is enforceable as a practical matter. The second criterion is an implied requirement of the first criterion. A permit requirement may purport to be federally enforceable, but, in reality cannot be federally enforceable if it cannot be enforced as a practical matter.

Non-permit limitations can also legally restrict potential to emit. These limitations include New Source Performance Standards codified at 40 C.F.R. Part 60 and National Emission Standards for Hazardous Air Pollutants codified at 40 C.F.R. Part 61.

The appropriate means of restricting potential to emit through permit conditions has been an issue in recent enforcement cases. Through these cases and through guidance issued by EPA, the Agency has addressed three questions: what types of permit

limitations can legally limit potential to emit; whether long averaging times for production limitations are enforceable as a practical matter; and whether sources may limit potential to emit to minor source levels as a means of circumventing the preconstruction review requirements of major source review.

II. The Louisiana-Pacific Case

In United States v. Louisiana-Pacific Corporation, 682 F. Supp. 1122 (D. Colo. Oct. 30, 1987) and 682 F. Supp. 1141 (D. Colo. March 22, 1988), Judge Alfred Arraj discussed the type of permit restrictions which can be used to limit a source's potential to emit. The Judge concluded that:

> ... not all federally enforceable restrictions are properly considered in the calculation of a source's potential to emit. While restrictions on hours of operation and on the amount of materials combusted or produced are properly included, blanket restrictions on actual emissions are not.

682 F. Supp. at 1133.

The Court held that Louisiana-Pacific's permit conditions which limited carbon monoxide emissions to 78 tons per year and volatile organic compounds to 101.5 tons per year should not be considered in determining "potential to emit" because these blanket emission limits did not reflect the type of permit conditions which restricted operations or production such as limits on hours of operation, fuel consumption, or final product.

The Louisiana-Pacific court was guided in its reasoning by the D.C. Circuit's holding in Alabama Power v. Costle, 636 F. 2d 323 (D.C. Circuit 1979). Before Alabama Power, EPA regulations required potential to emit to be calculated according to a source's maximum uncontrolled emissions. In Alabama Power, the D. C. Circuit remanded those regulations to EPA with instructions that the Agency include the effect of in-place control equipment in defining potential to emit. EPA went beyond the minimum dictates of the D.C. Circuit in promulgating revised regulations in 1980 to include, in addition to control equipment, any federally enforceable physical or operational limitation. The Louisiana-Pacific court found that blanket limits on emissions did not fit within the concept of proper restrictions on potential to emit as set forth by Alabama Power.

Moreover, Judge Arraj found that:

> ...a fundamental distinction can be drawn between the federally enforceable limitations which are expressly included in the definition of potential to emit and (emission) limitations.... Restrictions on hours of operation or on the amount of material which may be combusted or produced ... are, relatively speaking, much easier to "federally enforce." Compliance with such conditions could be easily verified through the testimony of officers, all manner of internal correspondence and accounting, purchasing and production records. In contrast, compliance with blanket restrictions on actual emissions would be virtually impossible to verify or enforce.

Id. Thus, Judge Arraj found that blanket emission limits were not enforceable as a practical matter.

Finally, the Court reasoned that allowing blanket emission limitation to restrict potential to emit would violate the intent of Congress in establishing the Prevention of Significant Deterioration (PSD) program.

III. Types of Limitations that will Restrict Potential to Emit

As an initial matter in this discussion, a few important terms should be defined. Emission limits are restrictions over a given period of time on the amount of a pollutant which may be emitted from a source into the outside air. Production limits are restrictions on the amount of final product which can be manufactured or otherwise produced at a source. Operational limits are all other restrictions on the manner in which a source is run, including hours of operation, amount of raw material consumed, fuel combusted, or conditions which specify that the source must install and maintain add-on controls that operate at a specified emission rate or efficiency. All production and operational limits except for hours of operation are limits on a source's capacity utilization. Potential emissions are defined as the product of a source's emission rate at maximum operating capacity, capacity utilization, and hours of operation.

To appropriately limit potential to emit consistent with the opinion in Louisiana-Pacific, all permits issued pursuant to 40 C.F.R. Sections 51.160, 51.166, 52.21 and 51.165 must contain a

production or operational limitation in addition to the emission limitation in cases where the emission limitation does not reflect the maximum emissions of the source operating at full design capacity without pollution control equipment. Restrictions on production or operation that will limit potential to emit include limitations on quantities of raw materials consumed, fuel combusted, hours of operation, or conditions which specify that the source must install and maintain controls that reduce emissions to a specified emission rate or to a specified efficiency level. Production and operational limits must be stated as conditions that can be enforced independently of one another. For example, restrictions on fuel which relates to both type and amount of fuel combusted should state each as an independent condition in the permit. This is necessary for purposes of practical enforcement so that, if one of the conditions is found to be difficult to monitor for any reason, the other may still be enforced.

When permits contain production or operational limits, they should also have recordkeeping requirements that allow a permitting agency to verify a source's compliance with its limits. For example, permits with limits on hours of operation or amount of final product should require an operating log to be kept in which the hours of operation and the amount of final product produced are recorded. These logs should be available

for inspection should staff of a permitting agency wish to check a source's compliance with the terms of its permit.

When permits require add-on controls operated at a specified efficiency level, permit writers should include, so that the operating efficiency condition is enforceable as a practical matter, those operating parameters and assumptions which the permitting agency depended upon to determine that the control equipment would have a given efficiency.

An emission limitation alone would limit potential to emit only when it reflects the absolute maximum that the source could emit without controls or other operational restrictions. When a permit contains no limits on capacity utilization or hours of operation, the potential to emit calculation should assume operation at maximum design or achievable capacity (whichever is higher) and continuous operation (8760 hours per year).

The particular circumstances of some individual sources make it difficult to state operating parameters for control equipment limits in a manner that is easily enforceable as a practical matter. Therefore, there are two exceptions to the absolute prohibition on using blanket emission limits to restrict potential to emit. If the permitting agency determines that setting operating parameters for control equipment is infeasible in a particular situation, a federally enforceable permit

containing short term emission limits (e.g. lbs per hour) would be sufficient to limit potential to emit, provided that such limits reflect the operation of the control equipment, and the permit includes requirements to install, maintain, and operate a continuous emission monitoring (CEM) system and to retain CEM data, and specifies that CEM data may be used to determine compliance with the emission limit.

Likewise, for volatile organic compound (VOC) surface coating operations where no add-on control is employed but emissions are restricted through limiting VOC contents and quantities of coatings used, emission limits may be used to restrict potential to emit under the following limited circumstances. If the permitting agency determines for a particular surface coating operation that operating and production parameters (e.g. gallons of coating, quantities produced) are not readily limited due to the wide variety of coatings and products and due to the unpredictable nature of the operation, emission limits coupled with a requirement to calculate daily emissions may be used to restrict potential to emit. The source must be required to keep the records necessary for this calculation, including daily quantities and the VOC content of each coating used. Emission limits may be used in this limited circumstance to restrict potential to emit since, in this case, emission limits are more easily enforceable than operating or production limits.

IV. Time Periods For Limiting Production and Operation

As discussed above, a limitation specifically recognized by the regulations as reducing potential to emit is a limitation on production or operation. However, for these limitations to be enforceable as a practical matter, the time over which they extend should be as short term as possible and should generally not exceed one month. This policy was explained in a March 13, 1987 memorandum from John Seitz to Bruce Miller, Region IV. The requirement for a monthly limit prevents the enforcing agency from having to wait for long periods of time to establish a continuing violation before initiating an enforcement action.

EPA recognizes that in some rare situations, it is not reasonable to hold a source to a one month limit. In these cases, a limit spanning a longer time is appropriate if it is a rolling limit. However, the limit should not exceed an annual limit rolled on a monthly basis. EPA cannot now set out all inclusive categories of sources where a production limit longer than a month will be acceptable because every situation that may arise in the future cannot now be anticipated. However, permits where longer rolling limits are used to restrict production should be issued only to sources with substantial and unpredictable annual variation in production, such as emergency

boilers. Rolling limits could be used as well for sources which shut down or curtail operation during part of a year on a regular seasonal cycle, but the permitting authority should first explore the possibility of imposing a month-by-month limit. For example, if a pulp drier is periodically shut down from December to April, the permit could contain a zero hours of operation limit for each of those months, and then the appropriate hourly operation limit for each of the remaining months. Under no circumstances would a production or operation limit expressed on a calendar year annual basis be considered capable of legally restricting potential to emit.

V. Sham Operational Limits

In the past year, several sources have obtained purportedly federally enforceable permits with operating restrictions limiting their potential to emit to minor or de minimis levels for the purpose of allowing them to commence construction prior to receipt of a major source permit. In such cases where EPA can demonstrate an intent to operate the source at major source levels, EPA considers the minor source construction permit void ab initio and will take appropriate enforcement action to prevent the source from constructing or operating without a major source permit.

The following example illustrates the kind of situation addressed in this section: An existing major stationary source proposes to add a 12.5 megawatt electric utility steam generating unit, and applies for a federally enforceable minor source permit which restricts operation at the unit to 240 hours per year. Because the project is designed as a baseload facility, EPA does not believe that the source intends to operate the facility for only 240 hours a year. Further investigation would probably uncover documentation of the source's intent to operate at higher levels than those for which it is permitted.

This situation raises the question of whether a source can lawfully bypass the preconstruction or premodification review requirements of Prevention of Significant Deterioration (PSD) and nonattainment New Source Review by committing to permit conditions which restrict production to a level at which the source does not intend to operate for any extensive time. If, after constructing and commencing operation, the source obtains a relaxation of its original permit conditions prior to exceeding them, does this constitute a violation of the preconstruction review requirements? This section discusses why it is improper to construct a source with a minor source permit when there is intent to operate as a major source, and provides guidelines for identifying these "sham" permits.

A. Permits with conditions that do not reflect a source's planned mode of operation are void ab initio and cannot act to shield the source from the requirement to undergo preconstruction review.

1. Sham permits are not allowed by 40 CFR Section 52.21(r) (4) Section

52.21(r) (4) states:

> At such time that a particular source or modification becomes a major stationary source or major modification solely by virtue of a relaxation in any enforceable limitation which was established after August 7, 1980 on the capacity of the source or modification otherwise to emit a pollutant, such as a restriction on hours of operation, then (PSD) shall apply to the source or modification as though construction had not yet commenced on the source or modification.

When a source that is minor because of operating restrictions in a construction permit later applies for a relaxation of that construction permit which would make the source major, Section 52.21(r) (4) prescribes the methodology for determining best available control technology (BACT). However, it does not foreclose EPA's ability, in addition to the retroactive application of BACT and other requirements of the PSD program, to pursue enforcement where the Agency believes that the initial minor source permit was a sham. EPA will limit its activity to requiring application of 40 CFR 52.21(r) (4) only for the cases where a source legitimately changes a project after finding that the operating restrictions which were taken in good faith cannot be complied with. Whether a source has acted in good faith is a factual question which is answered by available evidence in the particular case.

2. Sham permits are not allowed by the definition of potential to emit:

40 C.F.R. Sections 52.21(b) (4), 51.165(a) (1) (iii), 51.166(b) (4).

The definition of potential to emit enables sources to obtain federally enforceable permits with operational restrictions as a means of limiting emissions to minor source levels. However, implicit in the application of these limitations is the understanding that they comport with the true design and intended operation of the project.

3. Sham permits are not allowed by the Clean Air Act

Parts C and D of the Clean Air Act exhibit Congress's clear intent that new major sources of air pollution be subject to preconstruction review. The purposes for these programs cannot be served without this essential element. Therefore, attempts to expedite construction by securing minor source status through the receipt of operational restrictions from which the source intends to free itself shortly after operation are to be treated as circumvention of the preconstruction review requirements.

B. Guidelines for determining when minor source construction permits are shams.

EPA's determination that a purportedly federally enforceable construction permit is a sham is made based on an evaluation of specific facts and evidence in each individual case. The following are criteria which should be scrutinized when making such a determination:

1. Filing a PSD or nonattainment NSR permit application

If a major source or major modification permit application is filed simultaneously with or at approximately the same time as the minor source construction permit, this is strong evidence of an intent to circumvent the requirements of preconstruction review. Even a major source application filed after the minor source application, but either before operation has commenced or after less than a year of operation should be looked at closely.

2. Applications for funding

Applications for commercial loans or, for public utilities, bond issues, should be scrutinized to see if the source has guaranteed a c ertain level of operation which is higher than that in its construction permit. If the project would not be funded or if it would not be economically viable if operated on an extended basis

(at least a year) at the permitted level of production, this should be considered as evidence of circumvention.

3. Reports on consumer demand and projected production levels.

Stockholder reports, reports to the Securities and Exchange Commission, utility board reports, or business permit applications should be reviewed for projected operation or production levels. Ifreported levels are necessary to meet projected consumer demand but are higher than permitted levels, this is additional evidence of circumvention.

4. Statements of authorized representatives of the source regarding plans for operation.

Statements by representatives of the source to EPA or to state or local permitting agencies about the source's plans for operation can be evidence to show intent to circumvent preconstruction review requirements.

Note that if a determination is made that a permit is a "sham" for one pollutant and, therefore, the source is a major source or major modification, the permit may possibly still contain valid limits on potential to emit for other pollutants.

In such cases, the entire source must still go through new source review, during which, for PSD review, all pollutants for which there is a net significant increase must be analyzed for BACT. In nonattainment new source review, new sources must have LAER determinations only for pollutants for which they are major. Major modifications, however, must have LAER determinations for all nonattainment pollutants emitted in significant amounts. If the valid limits in a partially void minor source construction permit keep certain pollutants below significance levels, then those pollutants would not have to be analyzed for BACT or LAER. However, if a source or modification is determined to be major for PSD or NSR because part of its minor permit is deemed void, it would have to undergo BACT or LAER analysis for all significant pollutants.

VI. Enforcement Procedures

This guidance has discussed permit conditions which will legally restrict potential to emit, shielding a source from the requirement to comply with major new source permitting regulation. Failure by a permitting agency to adhere to these guidelines may result in a permit that does not legally restrict potential to emit, thereby subjecting a source to major new source review. If that source has not gone through preconstruction review, it is a significant violator of the Clean Air Act and is subject to enforcement for constructing or

modifying without a major new source permit.

The enforcement options available to EPA in these situations include administrative action under Sections 167 or 113 (a) (5) of the Act or federal judicial action under Sections 113 (b) (2), 113 (b) (5), 113(c), or 167. Which enforcement option is selected depends on the facts of the particular situation. (See July 15, 1988 guidance on EPA Procedures for Addressing Deficient New Source Permits.)

VII. Examples

The following examples are provided to illustrate the type of permit restrictions which would and would not legally limit potential to emit to less than major source thresholds. These examples are provided for purposes of clarifying the potential to emit and averaging time guidance only. They are not intended to reflect all the permit conditions necessary for a valid permit. Specific test methods, compliance monitoring and recordkeeping and reporting requirements are necessary to make permit limitations enforceable as a practical matter. The use of examples where averaging times are the longest times allowed under EPA policies is not intended to necessarily condone the selection of the longest averaging times; averaging times should in practice be as short as possible.

1. The minor source construction permit for a boiler contains the following restrictions: 250,000 gal fuel/month; 0.8% S fuel; 8000 hours/year.

These conditions are federally enforceable production and operation limits, but do not limit potential to emit because one of them does not meet EPA policies on enforceability as a practical matter. The averaging time for hours of operation, one of the operational limits necessary to restrict emissions to less than 250 tpy, exceeds a monthly or rolling yearly limit. If, instead of 8000 hours/year, the hourly restriction were stated as 666 hours/month, the permit would serve to keep the source a minor source, assuming the permit contains appropriate recordkeeping provisions.

2. A waferboard plant which has the physical capacity to emit over 300 tpy of carbon monoxide in the absence of using specific combustion techniques has the following permit restriction as the sole emission limitation: 249 tpy.

This does not limit potential to emit since an operational or production restriction is necessary for the source to be restricted to 249 tpy. The permit must contain a restriction on hours of operation or capacity utilization which, when multiplied by the maximum emission rate for the CO sources at the plant, results in emissions of 249 tpy. Additionally, while the

emission limit alone cannot restrict potential to emit, the emission limit is unenforceable as a practical matter since it is limited on an annual basis. The permit should contain a short term emission limit (in addition to the annual emission limit), consistent with the compliance period or parameter in the applicable test method for determining compliance.

3. A small scale rock crushing plant that cannot emit more than 240 tpy under maximum operation without controls (including plant-wide particulate emissions from transfer and storage operations) has the following permit restriction as the sole emission limitation: 240 tpy particulate matter.

Since no operational limitations are necessary for the source to emit below 250 tpy, no operational restrictions need be in the permit to limit potential to emit. However, although this is not a major source, the state agency should express the emission limit in this permit as a lb/hour measure or gr/dscf so that it will be enforceable as a practical matter.

4. A plant consisting solely of a small rock crusher has the following permit restrictions: 0.05 lb gr PM/dscf; fabric filter must be employed and maintained at 99% efficiency.

Assuming that maintaining the fabric filter at 99% efficiency will result in emissions of less than 250 tpy, this permit would limit

potential to emit if it also contained either 1) parameters that allowed the permitting agency to verify the fabric filter's operating efficiency or 2) a requirement to install and operate continuous opacity monitors (COMs) and a specification that COM data may be used to verify compliance with emission limits. Note that if this second alternative were adopted, it would not be necessary to require that the fabric filter be maintained at 99% efficiency.

To determine potential to emit, the efficiency rate of the fabric filter would be multiplied by the maximum uncontrolled emission rate, the maximum number of operating hours and maximum throughput capacity since there are no other operating or production limits. However, the efficiency rate of the fabric filter would not be enforceable as a practical matter unless there were an enforceable means to monitor ESP performance on a short term basis. The two alternatives mentioned above would satisfy this requirement.

5. A surface coating operation has the capability of utilizing 15,000 gal coating/month, with the following permit restrictions: 3.0 lb VOC/gal coating minus water; 20.5 tons VOC/month; monthly VOC emissions to be determined from records of the daily volumes of coatings used times the manufacturers specified VOC content.

This does not limit potential to emit since the source has the physical capacity to exceed 250 tpy of VOC, and the permit does not contain a production or an operational limitation. A monthly limit on gallons of coating used which when multiplied by 3.0 lb/gal equates to less than the 250 tpy threshold 13,500 gallons/month), with appropriate recordkeeping, would generally be necessary to limit potential to emit. If, however, the permitting agency determines, due to the wide variety of coatings employed and products produced, that restrictions on operation or production are not practically enforceable, then the above emission limits could restrict potential to emit if there are requirements that the source calculate emissions daily, and keep the appropriate records.

If the source was alternatively to meet the 20.5 ton/month limit by employing add-on controls, the permit would need to contain an operational limit, such as the requirement to install and operate an incinerator at 99% efficiency. A requirement to monitor incinerator efficiency (either directly or indirectly via temperature monitoring for example), and appropriate recordkeeping retirements to verify compliance with each of the permit conditions would also be necessary to make the permit conditions enforceable as a practical matter. Note, however, that in the case where add-on controls are employed, the source may be able to meet a shorter term emission limit than the ton per month figure.

VIII. Conclusion

We hope this guidance will help EPA Regions identify sources which have the potential to emit major amounts of an air pollutant which will subject those sources to the requirements of preconstruction new source review. Every source which is subject to these requirements but has not obtained a major new source permit should be seriously considered for enforcement action.

Public Service Commission
State of North Dakota

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March 1, 2017

Lawrence Bender
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Subject: Meridian Energy Group, Inc. – Davis Refinery

Dear Mr. Bender:

This letter concerns current plans for the Davis Refinery in Billings County, North Dakota. Your July 20, 2016 letter indicates that Fredrikson & Byron, P.A. represents Meridian Energy Group, Inc. and has been advising Meridian with respect to various permits required from state and local governmental entities prior to construction of a refinery. Your letter stated that, at the time of your letter, there was no design in existence nor plans by Meridian to propose a design capable of refining more than twenty seven thousand five hundred (27,500) barrels per day of oil and that, consequently, Meridian did not intend to file an application with the Commission for a certificate of site compatibility for the proposed refinery.

Since the time of your letter, the Commission has received information that Meridian's application to the State Water Commission for a Water Appropriation Permit is based on a facility capable of refining 55,000 barrels per day of oil. Further, Meridian's applications to the North Dakota Department of Health for the construction of a new crude oil refinery are based on a facility with a nominal processing capacity of fifty five thousand (55,000) barrels per day.

Since Meridian is filing applications with other state agencies for permits based on a facility that can refine up to 55,000 barrels per day of oil, and since an oil refinery of that capacity is jurisdictional to the Commission for siting under North Dakota Century Code chapter 49-22, it appears that the proposed refinery is jurisdictional under the siting law. Please let us know whether Meridian agrees and if so, when we can expect an application. If Meridian does not agree that the Davis Refinery is jurisdictional under the siting law, please provide specific information and justification for that conclusion.

Best regards

Patrick Fahn
Director, Public Utilities Division

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Letter re inquiry on jurisdictional determination
Public Service Commission
Patrick Fahn

Fredrikson & BYRON, P.A.

March 24, 2017

VIA EMAIL & U.S. MAIL

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Public Service Commission
State of North Dakota
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Re: Meridian Energy Group, Inc. – Davis Refinery

Dear Mr. Fahn:

I am writing in response to your letter of March 1, 2017. In your letter, you indicate that it appears that the proposed construction of the Davis Refinery in Billings County, North Dakota (the "Refinery") by Meridian Energy Group, Inc. ("Meridian") falls under the jurisdiction of North Dakota's Energy Conversion and Transmission Facility Siting Act. You further indicate that this appearance is based on the fact that Meridian has filed applications with the State Water Commission and the North Dakota Department of Health based on a facility capable of refining 55,000 barrels of oil per day. Although some of the permitting documents allow for a facility of that size, the current facility design is not capable of refining 55,000 barrels of oil per day and there are no current plans to build such a facility.

As indicated in my letter of July 20, 2016, Meridian's current plans for construction of the Refinery contemplate a facility capable of refining up to 27,500 barrels of oil per day. N.D.C.C. § 49-22-07 requires an entity to obtain a certificate of site compatibility before the entity may begin construction of an "energy conversion facility." N.D.C.C. § 49-22-03 defines an "energy conversion facility" as a "plant, addition, or combination of plant and addition, designed for or capable of . . . [m]anufacture or refinement of fifty thousand barrels . . . or more of liquid hydrocarbon products per day." Because the Refinery is not designed for or capable of refining more than 27,500 barrels of oil per day, Meridian maintains its position that it is not required to obtain a certificate of site compatibility at this time.

As noted in your letter, Meridian has filed applications with other agencies based on a Refinery capable of refining up to 55,000 barrels of oil per day. Though Meridian does not presently have any designs or plans to propose a Refinery with capacity beyond 27,500 barrels of

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oil per day, Meridian considers it a possibility that such addition could be made at a later date, and that after such addition the Refinery could be capable of refining more than 50,000 barrels of oil per day. I specifically noted this possibility in my letter of July 20, 2016. Meridian chose to account for this possibility of addition to the Refinery in its applications to the North Dakota Department of Health and the State Water Commission so that expansion at some future date might be possible. It was not a reflection on current capability or plans.

Applications for permits to construct an air contaminant source under Chapter 33-15-14 of the North Dakota Administrative Code specifically contemplate the identification of "alternative operating scenarios" as part of a permit application. *See, e.g.*, N.D.A.C. § 33-15-14-02(3)(b)(2)(c). To this end, Meridian was directed by Health Department personnel to use the 55,000 barrel-per-day capacity estimate in its application under Chapter 33-15-14, despite its immediate plans to only construct a 27,500 barrel-per-day facility. This is explained in Section 4.20 of Meridian's application, in which Meridian detailed its "Phase 1" plan to construct a hydroskimming refinery capable of processing 27,500 barrels of oil per day. The application went on to state, "[a]dditional distillation, hydrotreatment and conversion units will be added during subsequent construction in order to increase the crude feedstock processing capacity to 55,000 BPD to augment the gasoline and middle distillates yields and reduce fuel oil production." Furthermore, applications to different state agencies concerning the same energy conversion facility need not be identical. *See* N.D. Op. Atty. Gen. 76-130 (Apr. 29, 1976). Meridian therefore does not believe that its applications to the State Water Commission and the North Dakota Department of Health in connection with the Refinery triggers Meridian to obtain a certificate of site compatibility from the Commission.

Finally, N.D.C.C. ch. 49-22 does not provide that the Commission's jurisdiction is dependent upon possible future additions to a given facility. Section 49-22-07 provides that a utility "may not begin construction of an energy conversion facility . . . in the state without first having obtained a certificate of site compatibility." Thus until Meridian plans to "begin construction" of any addition to the Refinery that would trigger the Commission's jurisdiction, Meridian is not required to obtain a certificate of site compatibility. Also, Chapter 69-06-02.1 of the North Dakota Administrative Code permits a utility to request a determination as to whether a planned facility is within the Commission's jurisdiction. For purposes of such a determination, the requesting utility is not required to identify or describe any possible future additions to its facility. N.D.A.C. § 69-06-02.1-02. For this further reason, Meridian does not believe that the possibility of future addition to the Refinery requires it to obtain a certificate of site compatibility at this time. If and when the decision is made to move forward with an addition to the Refinery, Meridian will immediately seek a siting permit from the PSC.

If you should have any further questions regarding Meridian's proposed construction of the Refinery and its decision not to seek a certificate of site compatibility, please advise.

Sincerely,

LAWRENCE BENDER

61038302_1.docx

-Info-Public Service Commission

From: -Info-Public Service Commission
Sent: Wednesday, September 20, 2017 10:39 AM
To: Eberl, Stacy L.
Subject: FW: Oil Refinery

From: dan rice [mailto:danielroyrice@gmail.com]
Sent: Wednesday, September 20, 2017 10:27 AM
To: -Info-Public Service Commission <ndpsc@nd.gov>
Subject: Oil Refinery

CAUTION: This email originated from an outside source. Do not click links or open attachments unless you know they are safe.

I am requesting that the following letter be provided to the Commissioners.

As citizens of North Dakota, we must act to inform our elected officials that we object to the building of an oil refinery just two and one-half miles from our most valuable and cherished natural resource, the Badlands and the Teddy Roosevelt National Park. Time is short. Meridian Energy, with its Financial and Administrative Office in Irvine, California, has applied for permits to build the refinery with the ND Departments of Health and the Public Service Commission. We must let these two important state agencies know that we oppose this reckless proposal. We should also make our objections known to Governor Burgum.

The financial interests of a private company should not be allowed to trample on the values of the people of North Dakota. We value the beauty and integrity of these pristine and irreplaceable natural treasures and have a moral obligation to protect them for future generations. The negative impacts of the refinery on the area, which also includes the National Grasslands, could be horrible.

Jim Fuglie, whose articles about this issue may be found online, has reported that a study by Dr. Phyllis Fox, an environmental and chemical engineer, concluded that the refinery "is almost certainly a 'major' source of pollution that would release substantial amounts of carbon monoxide, volatile organic compounds, and hazardous air pollution—all harmful to human and ecological health."

Harold Shafer must be turning over in his grave! He had the vision for the development of Medora as a tourist and family vacation and recreation area for North Dakota and he certainly recognized the natural beauty and priceless value of the North Dakota Badlands. He was a very successful business person who understood that money was not the only important value in our lives.

If North Dakota needs another refinery, which is debatable, there must be dozens of other possible locations that would not pose a threat to the Badlands and National Grasslands. Act today to let our state officials know that their first obligation is to the people of North Dakota and our values and require Meridian Energy to move its refinery to a more responsible location.

Dan Rice and Amy Phillips

1420 3rd Ave. South

Fargo, ND 58103

701-330-3380

Thank you.

Hamre, John G.

From: Eberl, Stacy L.
Sent: Wednesday, December 06, 2017 11:33 AM
To: Hamre, John G.
Subject: RE: Meridian's Davis Refinery

Hi John,
Can you please add this public input to the I-case for this (I-16-0188)…..thanks!

From: -Info-Public Service Commission
Sent: Wednesday, December 06, 2017 9:47 AM
To: Eberl, Stacy L. <steberl@nd.gov>
Subject: FW: Meridian's Davis Refinery

From: Kathy Davis [mailto:kdavis@fisherind.com]
Sent: Wednesday, December 06, 2017 9:45 AM
To: -Info-Public Service Commission <ndpsc@nd.gov>
Subject: Meridian's Davis Refinery

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Dear Commissioners –

Having traveled many places over my life time, I have always been blessed to call North Dakota my home and brag about our beautiful Badlands and our TR National Park. I am also a supporter of local jobs and have said for many years that we should have local refineries to help out our economy, HOWEVER the placement of the refinery is NOT in the best interest of North Dakota or its citizens.

I travel to the park frequently for drives along the loop and to ride horse with friends and I often speak to other visitors. Recently I spoke to four visitors who have been friends for many years, who live in different States and have ridden their horses in parks and open range areas all over the western United States. Their favorite place to ride is the TR Park as it is in their words "unspoiled" and "the beautiful views". These men are retired and plan several trips a year but rarely ride in the same area twice but one of the stops EVERY YEAR is our beautiful park in the badlands. It is a place where you can imagine being a Native American or an old cowboy "ridin' the range".

The idea of a plant is great, that it is a “clean” plant is GREAT, but it will be an eye sore for visitors to the park and those traveling along I-94.

Please vote NO on this proposal!

Kathy Davis
951 Franklin Street
Dickinson, ND 58601

"A government that is large enough to supply everything you need is large enough to take everything you have"
Thomas Jefferson
“There are two ways to conquer and enslave a nation. One is by the sword. The other is by debt.” - John Adams, 1826

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December 11, 2017

To: Public Service Commissioners of North Dakota

DECEMBER 19, PSC MEETING WITH MERIDIAN ENERGY GROUP - **URGENT** - PLEASE READ

Like a coin, there are two sides, and the following attached articles have issues that local residents next to the proposed Davis Refinery site are concerned about. With appreciation please read.

After following the discussion meetings for two years, there have been many changes in the Davis refinery design and numbers of this facility. So far, the plan is still incomplete with more questions than answers dealing with Meridian Energy Group – Bill Prentice.

Zoning meetings have the acreage listed as 715 industrial acres with some articles saying the site will consume 620 up to 1900 acres. The water permit started at 100 Gal per minute and grew to 400 Gal per minute. The barrels per day started out with two phases with the first at 27,00 BBLs per day and to grow to 55,000 BBLs per day. The final production is still unclear with many articles saying 49,500 or no expansion at all. In a recent news audio with Rob Port on Dec 9, 2017 found on Meridian Energy Group's website, Bill Prentice is quoted that the facility will be 50,000 or less. The rail service at one time was incorporated into the design and eliminated in the April 2017 PTC. An increase of trucks has been tallied to 170 of product moving from the facility with more trucks delivering crude feedstock and natural gas. Again, in the news audio with Rob Port on Dec 9, 2017, Bill Prentice is quoted that there WILL be shipment by rail, truck and pipeline.

There has been no public knowledge of any pipeline projects with Meridian Energy Group or sales of pipeline contracts. Pipelines surrounding the Fryburg area are under Tesoro management along with the Fryburg Railroad Spur. Tesoro recently purchased the struggling refinery in Dickinson and has ownership of the Mandan refinery also.

This design is clearly a computer model and a theory with no error or malfunction of how a refinery should operate. Texas EPA information is referenced and not Region 8 EPA data.

Area residents are confused about the actual construction of this facility and if there is any concrete proven data to back up the design.

Many projects concerning Hwy 85 and the Fryburg/Belfield area are planned, and if all projects occur at one time, this area will be full of traffic hazards. Fryburg overpass reconstruction, 4-lane proposal of Hwy 85, OIT Bakken kiln on 125th St and assumed 170 trucks transporting refined crude products from refinery site, natural gas trucks from the Gas Plant located on 38th street, and other oil field truck traffic.

With the national unemployment rate of 4 % and the state average in Billings County unemployment rate of 2% - more jobs is not a critical issue. Billings County has one of the lowest tax rates in North Dakota with a sparse population and a National Park.

PLEASE – take the time to read the attached articles and gain a full picture of this project and it does **NOT** fit into our rural area.

Meridian Energy Group is **NOT** the neighbor we want in the area do to the rapid changes of design to fit under regulations and insufficient data.

Regulation is only as good as it officials enforcing.

Thank you for your time.

Laura Grzanic 701 290 4483

PO Box 161

Belfield, ND 58622

Laura Grzanic

13392 38th St SW Sec 14 139N 100 W

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LAURA GRZANIC
PO BOX 161
BELFIELD ND 58622-0161

The Billings County Pioneer

The official newspaper of Billings County, North Dakota USPS 056-180 Vol. 101, No. 10 75 cents November 16, 2017

Refinery water permit sent to judge

By Richard Volesky
Editor/Reporter

BISMARCK - A decision that a proposed Billings County refinery should receive a groundwater use permit will be heard by a state administrative law judge.

The North Dakota State Water Commission (SWC) in June recommended that Meridian Energy Group should receive a permit for a well that would be drilled for the Davis Refinery. The refinery would be located between Fryburg and Belfield.

Meridian asked for a permit with an annual usage of 645-acre feet of water to be pumped at 400 gallons per minute from the Dakota aquifer, which is about 4,000 feet below that land surface. Objections to the SWC's decision filed in August were subsequently reviewed by the North Dakota Attorney General's Office, and that resulted in the matter being sent to an administrative law judge.

As of press time, it wasn't clear if the judge would decide the matter based on the documents submitted, or if a hearing will be held.

In deciding to issue the water appropriation permit, the SWC determined that no prior permit holders would be adversely affected by the new permit, and that the proposed means of construction of the well were adequate. The SWC also said the use of the water would be beneficial - that water used for the refining of oil is a beneficial use consistent with the best interest of the people of North Dakota. The oil refinery would be in the public interest because it would positively affect the economy, the SWC decision said.

As for whether the refinery would have a negative effect on visitors' experiences in Theodore Roosevelt National Park, which is a few miles away, that may be the case, but visual effects are outside of the SWC's scope of authority, the SWC decision said.

The SWC also noted Meridian had applied for a water permit to be used in a refinery that handles up to 55,000 barrels of oil per day. However, a N.D. Public Service Commission representative has since said Meridian does not intend to apply for a PSC siting permit, which would ensure the refinery would produce minimal adverse impacts on the environment and people. A PSC permit isn't needed if the refinery is at a capacity that is below 50,000 barrels per day. The SWC water permit decision therefore involves reducing the water volume to 90 percent, or 586-acre feet annually.

The objections to the SWC's decision, which have resulted in the matter going before the administrative law judge, came from area landowners Linda Weiss, Laura Grzanic and Pat Hedstrup, who are represented by Bismarck attorney J.J. England.

In a letter to the SWC, England said one of the issues is that the SWC doesn't have legal authority to provide a permit for an amount of water less than what Meridian originally requested.

England also argued that the permit would harm the interests of his clients because even a small drawdown of water could still affect water that might one day be appropriated to the use of Grzanic, Hedstrup and Weiss.

England also said a concern is that after the Dakota aquifer water is treated, the result will still be wastewater, and how this "concentrated waste" would be discharged into the environment. The water permit and the waste are not just related but are "directly causally connected," said England.

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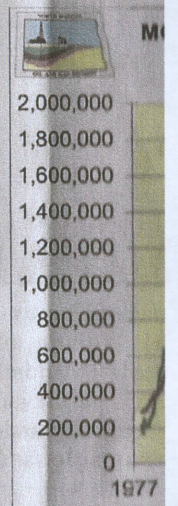

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Meridian CEO responds to refinery's critics

By Richard Volesky
Editor/Reporter

MEDORA - William Prentice, CEO of Meridian Energy Group of I r vine, Calif., is offering a number of responses following a meeting earlier this month when residents questioned changes in Meridian's proposed Davis Refinery plans.

The Davis Refinery would be located between Fryburg and Belfield . The company submitted a refinery-related application to the county in March 2016, and later received county approval. The company is now awaiting air quality and other state permits.

Meridian's 2016 application with the county said that truck traffic for supplying crude oil and shipping refined products will be minimized in favor of rail and pipeline transportation.

Laura Grzanic, who lives along a road that would lead to the refinery, told the County Commission on Sept. 7 that she has studied documents related to Meridian's requests for permits. A few other residents who indicated they shared Grzanic's concerns attended the meeting, but no one from Meridian attended.

Refinery paperwork sent to the state regarding emissions and road dust in September 2016 labeled as being from Meridian and Vepica USA, an engineering firm, states what are referred to as "assumptions" that crude oil would be brought into the refinery by rail, not trucking. Twenty-five percent of the liquid products, except fuel oil, would be sent out by trucks. The estimated number of trucks per day was listed at 81.

The same type of paperwork in March 2017 stated it was assumed that crude oil would arrive by pipeline, not trucking or rail. However, with refinery products considered, the number of trucks was revised to 170.

Grzanic told commissioners that her concern was that Belfield and the surrounding area would become bumper to bumper with trucks. Grzanic also said her concern was that Meridian presented its plans one way to the county, but differently to the state.

In a written reply to the Billings County Pioneer, Prentice said the zoning and conditional use permit that the County Commission approved last summer didn't indicate a preferred method of crude oil supply or for finished product shipment.

"The combination of rail, truck and pipeline for receipt of crude and distribution of refined product is an ongoing operational consideration, but the emphasis will be on moving crude oil and products by pipeline whenever possible," Prentice wrote. "The shipment of crude oil to the Davis Refinery will be predominantly by pipeline through the extensive crude gathering systems already in place in the Bakken. Pipelines are the safest and most economical method of shipping Bakken crude. However, Meridian has made a commitment to serve small, local, crude producers, and some of them are only able to get to us by truck, so we will accept those deliveries."

As for shipping refined products, by pipeline is also the safest and most economical method, so the refinery will maximize the pipeline shipment of products, said Prentice.

"But we have also made a commitment to serve the local distributors and retailers of gasoline and diesel fuel, and some of them can only obtain deliveries from the Davis Refinery by truck, so that is what we will do. It should also be noted that it takes time to install pipelines, so the proportion of refined products that are shipped by pipeline from the Davis Refinery will change over time as that capacity is increased," said Prentice.

"As pointed out by (Commission Chairman) Mr. (Jim) Arthaud in the meeting referred to in the Billings County Pioneer story on

Sept . 14, the county has turned down projects in the past that have had significant negative impacts on the local community, including

TR National Park," said Prentice. "The county undertook an exhaustive review of the Davis Refinery before granting the conditional

use permit for the refinery, and Meridian will fulfill the conditions that were placed on that permit by the county when it was granted. As stated in the original application documents, Meridian will seek to minimize the amount of both crude oil and refined products that are moved by truck. Not only is that the right thing to do as a member of the community that cares about its neighbors, but it is also true that of all possible modes of transportation, truck is the least cost effective. "

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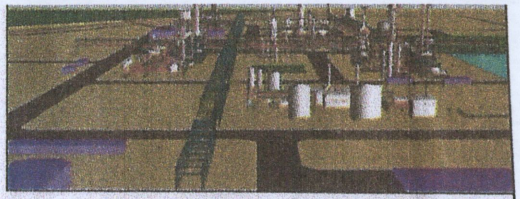

Submitted photo

A rendering of the proposed Davis Refinery to be built near Belfield, N.D., and Theodore Roosevelt National Park.

ND regulators to discuss oil refinery project

12-5-17

By John Hageman
Forum News Service

BISMARCK — State regulators want to sit down with company officials behind a proposed oil refinery in western North Dakota to understand why they're not going through the Public Service Commission's siting process.

The commission has scheduled a meeting for Dec. 19 regarding Meridian Energy Group's plans for a refinery in Billings County near Theodore Roosevelt National Park. Company CEO Bill Prentice plans to attend.

"We ... really just an opportunity to sit down face-to-face with the company and talk through what their plans are," Public Service Commissioner Julie Fedorchak said.

Fedorchak said she understands the project will be built below the 50,000 barrels-per-day threshold that prompts requirements for a siting permit, but a potential expansion would bring its capacity above that later. A website for the Davis Refinery states that in order "to ensure that Meridian is in compliance with North Dakota laws and regulations, Meridian has restricted the design capacity of the Davis Refinery to 49,500" barrels per day.

"Decisions on any potential future expansion of the Davis Refinery will be made after Davis is in operation, and would not proceed unless and until Meridian has received a siting certificate" from the PSC,

REFINERY: Page A4

REFINERY

From Page A1

the website states.

Fedorchak hesitated to say whether she felt Meridian was purposefully avoiding additional regulatory scrutiny because she hasn't talked to company officials directly.

"I just continue to feel that the appropriate course would be to go for the whole siting on the front end," she said. "There isn't a whole lot of downside to doing that in terms of being a good corporate citizen."

Prentice said they're "just trying to stay within the law" and "show an abundance of caution." Although Meridian has previously described the refinery as a 55,000 barrel-per-day facility, he said there was "absolutely no design or present intent associated with that statement."

"If we decide to expand beyond the 50,000 barrel-per-day limit, that'll probably be in about four or five years," he said. "We're going to stop at 49,500, take a big deep breath and look at all our options at that point."

The project is slated for a 715-acre site west of Belfield. The refinery has already drawn criticism for its location just a few miles away from the national park, but project planners have said they want to build the "cleanest refinery in the world."

Meanwhile, the North Dakota Department of Health plans to solicit public comments on an air quality permit for the project soon. State Water Commission staff is also recommending approval on a water permit for the project, but that's being contested and a hearing will be held, said State Engineer Garland Erbele.

Call Hageman at (701) 255-5607 or send email to jhageman @forumcomm.com

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The BILLINGS COUNTY PIO

The official newspap County, North Dakota USPS 056-180 Vol. 101, No. 1 75 cents September 14,

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Change in refinery plans

By Richard Volesky
Editor/Reporter

MEDORA - With an armload of photocopies and printed documents, Laura Grzanic on Sept. 7 approached the Billings County Commission regarding her concern s about a change that developers of a proposed refinery made.

The Davis Refinery, which would be located between Fryburg and Belfield, is planned by Meridian Energy Group of Irvine, Calif. The company submitted a refinery-related application to the county in March 2016, and later received county approval. The company is now awaiting air quality and other state permits.

Meridian's 2016 application with the county said that truck traffic for supplying crude oil and shipping refined products "will be minimized in favor of rail and pipeline transportation."

Grzanic, who lives along a road that would lead to the refinery, told the County Commission on Sept. 7 that she has been studying documents related to Meridian's requests for permits. A few other residents who indicated they shared Grz a nic's concerns attended the meeting, but no one from Meridian attended. The meeting's agenda stated only that Grzanic would talk about "road concerns."

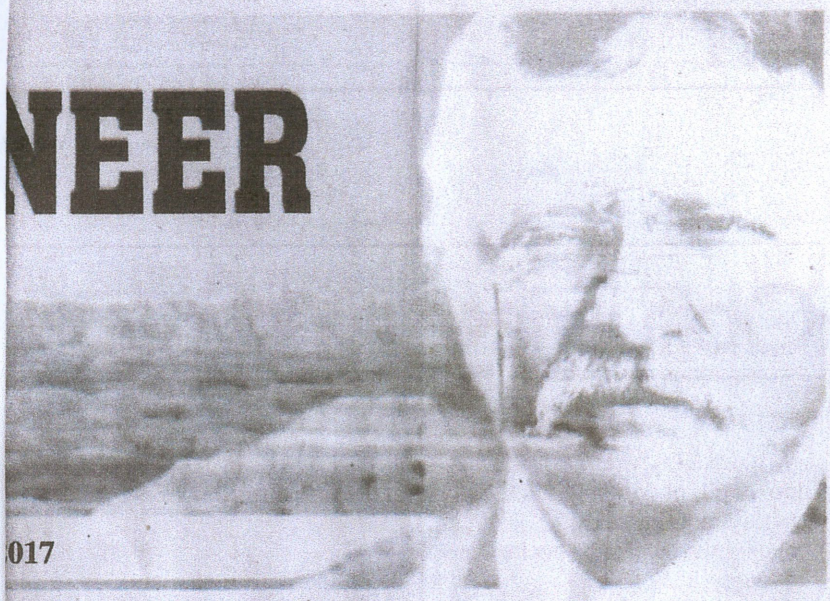
Refinery paperwork sent to the state regarding emissions and road dust in September 2016 labeled as being from Meridian and Vepica USA, an engineering firm, states what are referred to as "assumptions" that crude oil would be brought into the refinery by rail, not trucking. Twenty-five percent of the liquid products, except fuel oil, would be sent out by trucks. The estimated number of trucks per day was listed at 81.

> **"With that many trucks, I'm afraid that Belfield and the surrounding area is going to be bumper to bumper ...,"**
>
> **Laura Grzanic**

Refinery products sent from the facility would include gasoline, diesel, jet fuel, fuel oil, butane and others.

The same type of paperwork in March 2017 stated it was assumed that crude oil would arrive by pipeline, not trucking or rail. However, with refinery products considered, the number of trucks was revised to 170.

Grzanic in May contacted Craig Thorstenson, permitting supervisor for the N.D. Department of Health's Division of Air Quality, about the change in the number of trucks. Ac-



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cording to an e-mail she sent to him, she said it was her understanding that trucks would be used until a pipeline system is created. She asked him to consider the dust raised by trucks if they travelled unpaved roads, emissions created by idling trucks, failure of roads due to truck weights and speeding by drivers trying to meet schedules. Thorstenson replied to Graznic that such issues were important, but truck traffic, speed and road maintenance were under the purview of local officials. Grzanic therefore took that matter to the Sept. 7 meeting.

"With that many trucks, I'm afraid that Belfield and the surrounding area is going to be bumper to bumper ...," Grzanic told the commissioners.

She also reminded commissioners of the county's comprehensive plan, a document intended to guide development in the county. The plan includes promoting a safe and adequate transportation system and providing a healthy and safe environment, and promoting small town and rural lifestyles.

Commission Chairman Jim Arthaud told Grzanic that county roads are capable of handling the traffic.

A woman who didn't identify herself asked who would be responsible for road damage.

Refinery
(Continued on Page 8)

Refinery

(Continued from Page 1)

Arthaud said the county would take care of it.

"My concern is they (Meridian) presented it one way to the county, and one way to the state," Grzanic then said.

Arthaud said the concern for the county is whether Meridian is successful with getting an air quality permit.

Resident Ruth Molm told commissioners she was "all for the refinery." However, she also said it would be a "dangerous precedent" to have a refinery close to Theodore Roosevelt National Park. She said she wondered if there could be a different refinery site.

Arthaud replied that the county doesn't have an application for another site.

"We've been a very good neighbor to the park," said Arthaud. The county has roads near the park, and when a wind farm was proposed earlier this year, with some of it s turbines visible from the park, the county turned that project down, he explained.

Commissioners Joe L. Kessel and Mike Kasian made no comments to Grzanic or the others at the meeting.

The Billings County Pioneer attempted on Sept. 11 to contact Tom Williams, Meridian's executive vice president for planning and permitting. Williams signed off on or submitted the March 2016 application that the county reviewed. The Pioneer also attempted to contact Meridian CEO William Prentice. Neither were available for comment.

However, Adam Williams, Meridian's director of corporate communications, said he would contact Meridian management and develop a response to the truck traffic issue. Due to the short notice, Adam Williams said he'd need more time to prepare an accurate reply. The Pioneer then told Williams that any replies from Meridian would be welcomed for use in an upcoming followup story.

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Meridian Energy Group Inc.
@Meridianenergygroupinc

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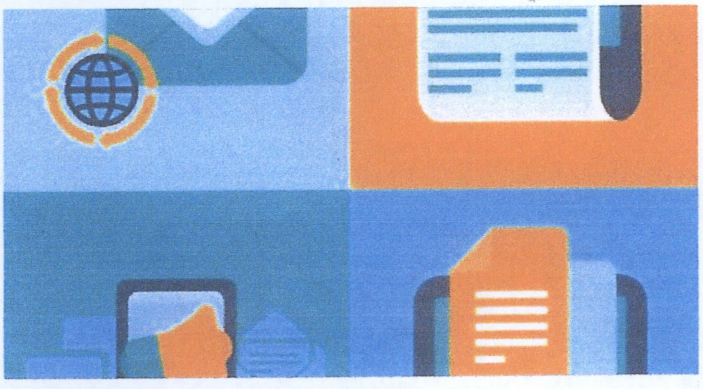
Dave Cole Sr. Why so close to https://www.nps.gov/thro/index.htm ???
Like · Reply · 1 · November 15 at 11:54am

Laurie Hodgson Prentice Mr. Cole, it isn't a matter of being close to the TRNP, it's a matter of being in the right location for the needs of the refinery, the oil business, and the state and its people. • The site Meridian selected is a perfect location from the point of view of proximity to the Bakken fields and gathering pipelines, and for access to road, rail and pipeline transportation of refined products. This is the culmination of the BakkenLink crude oil gathering system. Our location eliminates the need to transport the crude by rail, and it reduces the length of pipeline needed to transport the crude to refinery.
• The site chosen has prevailing winds that blow downwind of TRNP the vast majority of the time. Absolutely no proven environmental impact on the Park at all.
• As shown in the Meridian air quality permit application for the Davis Refinery, Davis will be the cleanest refinery in the world, and demonstrates that a facility like this can essentially be placed anywhere and meet the local standards. Meridian resents the implication that facilities like this should be moved to some industrial ghetto where it can presumably pollute all that it wants to. The local residents need and want the high paying jobs that the Davis refinery project will provide.
• The Park's Management evidently has a history of being against local industrial development, and of trying to bully and impose its will & opinion way past their own borders.
• The main recent objection from Park "defenders" is that people traveling on I-94 to visit the Park will be upset when they drive by Davis. This doesn't credit the measures being taken to ease visual impacts, including the natural and agricultural buffers around the site. Nor does this seem credible given the other things visible on their way to the Park, including water tanks, cell towers, bill boards, other oil facilities, and the freeway itself. Those large wind turbines everywhere are incredibly unsightly. Why are those more acceptable to be seen by Davis refinery opposition when driving than a green refinery that sits two miles away from the Interstate Highway?
• The truth is that it wouldn't matter if Meridian had moved the Davis Refinery further away – the Park people would still vehemently oppose it, like they have opposed anything like this as far away as Dickinson. The Davis refinery high paying jobs will attract more families to the local area, and result in increased tourism to Medora and TRNP. That should be regarded as a win-win situation!
Like · Reply · 1 · November 16 at 4:54pm · Edited

Write a comment...

Meridian Energy Group Inc.
November 9 at 12:30pm ·

Meridian Confident of Draft Permit to Construct Issuance



Meridian Confident of Draft Permit to Construct Issuance

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OIL&GAS JOURNAL

Meridian Energy Group plans refinery for North Dakota

HOUSTON, Dec. 23

12/23/2015

By Roberrt Brelsford

OGJ Downstream Technology Editor

Meridian Energy Group Inc., Irvine, Calif., has let a contract to Vepica CA, Caracas, and BASIC Equipment, Houston, to provide preliminary studies for its proposed 55,000-b/sd Davis refinery to be built on 620 acres near Belfield, ND, in the heart of southwestern North Dakota's Bakken shale region.

As part of the contract, Vepica and BASIC Equipment will perform a series of engineering studies to define the design basis, costs, and schedule for the planned high-conversion refinery, which would serve Bakken crude oil producers and local liquid fuels and chemicals markets, the service companies said.

Upon completion of the studies, the two service providers additionally will work with Meridian to complete permitting and approval requirements as well as finalize full-project financing for the refinery, including support services during the project's detailed design, procurement, construction, and startup phases.

A value of the contract was not disclosed.

While Vepica and BASIC Equipment did not reveal a specific timeframe for execution of preliminary studies for the grassroots refinery, the companies said Meridian recently has undertaken a series of scoping and optimization studies based on crude assays provided by its likely tolling partners and expects to begin detailed design and engineering on the project during early first-quarter 2016.

according to Vepica and BASIC Equipment.

Meridian, which expects to receive expedited permitting for the proposed plant, currently is finalizing plans to break ground on the project during first-half 2016, the company said.

Pending permit and regulatory approvals, the refinery would enter operation sometime in 2018, according to Meridian.

If approved, the Davis refinery would become North Dakota's third, as well as only the second greenfield construction in the US since 1976 (OGJ Online, May 4, 2015).

With proximity to nearby crude feedstock and ample supplies of low-cost natural gas supplies to fuel processing activities, the Davis plant also would have direct access to major transportation infrastructure, including two main highways, oil and gas pipelines, and the Burlington Northern Santa Fe (BNSF) rail line, which runs directly through the refinery site, according to Meridian.

As part of the proposed construction plan, Meridian said it also intends to build a crude oil feedstock offloading and refined fuels uploading terminal to take advantage of BNSF rail line access.

A first phase of the refinery's construction would feature at least a 20,000-b/sd processing plant as well as associated terminal installations, according to the company's web site.

Meridian's move to advance the Davis refinery follows a July announcement from Quantum Energy Inc., Tempe, Ariz., and joint-venture partner Native Son Holdings LLC, The Woodlands, Tex., that the pair will build a new 40,000-b/d refinery in Berthold, ND (OGJ Online, July 21, 2015).

While the partnership already has filed a minor-source air quality construction permit application for the proposed Berthold plant with the North Dakota Health Department's division of air quality (OGJ Online, July 30, 2015), a specific timeline construction of the planned $645 million refinery has yet to be released.

Contact Robert Brelsford at rbrelsford@ogjonline.com.

Building the Bakken continues with a new refinery near Belfield

On the cusp of the new Dakota Refinery's losses and potential sale, the Bakken's long term vision and plans continue. The Meridian Energy Group is continuing their plans to construct a state of the art refinery near Belfield, ND.

JASON SPIESS
For Bakken Breakout Weekly

"Meridian Energy Group is a development stage company that was formed to build and operate a refinery in western North Dakota," William Prentice, chairman and CEO, Meridian Energy Group.

Currently the Meridian Group is doing the lion's share of their work both in Houston and California, however, as the project date nears the offices will be moving to the Bakken.

"We are a North Dakota corporation," Prentice said. "Our headquarters will be up here."

Prentice said they began detailed engineering and permitting on the project last January and have been pushing the new Davis Refinery through the various state agencies. The refinery is scheduled to begin construction and operation sometime in 2017.

"Upon release of the air quality, probably in February this coming year, we will start construction and the first phase will be operation by the end of 2017," Prentice said. "We have a site located just west of Belfield."

To the casual observer this may appear to be a risky venture, but to the Meridian Energy Group, it is a perfect opportunity to satisfy a growing need in the country's constant quest to become energy independent.

"It's much easier to take an existing refinery and modify it or expand it that it is to start with a blank piece of ground and go from there," Prentice said. "I think the Dakota Prairie refinery and one or two smaller plants in the Houston area are the only brand new grassroots refineries in the past 30 years. The Davis refinery we are building will be the fourth such new plant, but it is substantially bigger than the other ones that have been out there."

According to Prentice, the Davis Refinery will take Bakken crude from the surrounding area and refine it, then ship the products by rail and pipeline to market.

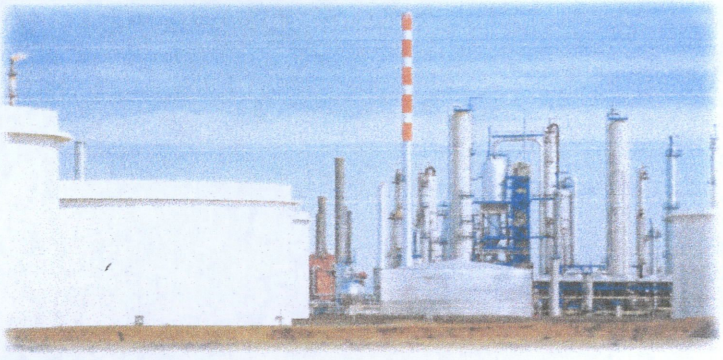
"Some of the markets are here in the Dakotas, otherwise generally speaking those products go east and south," Prentice said.

The Davis Refinery will be different than the Dakota Refinery, which opened last summer. Prentice said the Davis Refinery will refine a variety of finished products, like gasoline, jet fuel and other petrochemical starting points for other products.

"The Dakota Prairie refinery, which we know quite a bit about because we are the in industry, was built to take Bakken crude and distill out of it the diesel that was used in the local market," Prentice said. "They were looking to serve the drilling industry primarily as I understand it. And since that has fallen off, the local market has been more difficult for them."

Prentice continued explaining the specifics on how the Davis Refinery differs from Dakota Prairie, and how more opportunity will be presented to oil and gas production in western North Dakota and the nation.

"(Dakota Prairie is) a topping facility, not a true refinery," Prentice said. "Our refinery is much more complex plant. Much bigger. And we will produce all the products a refinery typically produces."



"For years and years we have seen refineries cluster in on the coast feeding off oil tankers from everybody from Venezuela to Saudi Arabia, the Bakken has brought back the domestic industry."

— William Prentice, chairman and CEO, Meridian Energy Group

The Meridian Group has committed to a total 1900 acreage of the sites with Burlington Northern Santa Fe rail line running directly through the site. Prentice believes this will facilitate the construction of a crude oil feedstock offloading and refined fuels uploading terminal.

The Davis Refinery will not need the total 1900 acres for operation and the extra acreage will act as geographical cushion for the area.

"Quite a bit of that acreage will be devoted to agriculture buffers, new tree lines and some programs we are discussing with the local university," Prentice said. "Things like woody plant development ash tree, beetle resistance kind of species. It just makes it a more attractive site for the surrounding community."

The initial phase of the Davis Refinery will be 27,500 barrels per day and doubling by the end of 2018 to 55,000 barrels per day, according to Prentice. The total investment will be just under a billion dollars over the next 4-5 years.

"The construction will peak out at about 500 people. Permanent employees will ramp up to just under 200 over a two year period," Prentice said.

"The state of Washington did a study on the total impact of a refinery, looking at the refineries in Anacortes (WA), and they determined every refinery job created total employment from 10-12 other jobs. So at 200 employees we will be producing a total of 2200 to 2400 new jobs."

Prentice was quick to point out their primary objective will be to hire local rather than import workers in from other parts of the country..

"We are not bringing in a whole bunch of refinery people from the Gulf Coast," Prentice said. "We are going to start here where the labor pool is exceptionally well qualified from an agricultural based economy. The work ethic is great and there is a familiarity with machines and tools. We are going to start our labor pool here in western North Dakota."

Another unique aspect of the Davis Refinery is the technology. Prentice appeared proud of the "new type of refinery" and believes it is going to impact the industry "that'll become standard for the next 10 to 20 years".

"We are structuring this as a tolling services refinery, in that we entering into long term agreements with crude producers and product off-takers, where they actually pay us a fee to produce those refined products," Prentice said. "There are a number of firms we are in discussion with but I cannot publicize those at this time."

Over the past ten years, with the advent of shale oil, the technology and innovation has created new markets giving the industry a rebirth of the domestic energy industry. Prentice sees the Davis Refinery as another means to energy independence and global capitalism, a choice the U.S. has not seen in quite some time.

"For years and years we have seen refineries cluster in on the coast feeding off oil tankers from everybody from Venezuela to Saudi Arabia, the Bakken has brought back the domestic industry. We are going to be upstream to where the oil is, not down on the coast trying to feed on foreign stuff."

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Jason Spiess is an award-winning journalist, talk show host, publisher, author and executive producer. Spiess is a North Dakota native and NDSU graduate. He currently creates multimedia content for newspapers, magazines, and online news services. He is also the host of Building the Bakken, MonDak OilField Review and Coffee & Capitalism Radio. Spiess also is author of the book Building the Bakken. For more information or to contact Spiess, email jason@buildingthebakken.com.

Meridian Energy Group, Inc: Application to rezone 717.06 acres in sections 1, 2, and 12 139-100 to Industrial. Current Zoning varies from Agricultural and Residential. Conditional Use Permit requested for the Davis Refinery, an approximately 55,000 barrel per day petroleum refinery. The proposed refinery and associated structures will be constructed in two phases, with the initial design capacity of 27,500 bpd capacity. Description of parcels included in the request:

1. 1 acre residence in the NE1/4 1-139-100 (3634 132nd ½ Ave SW), Residential zoning. Property is currently owned by Bonnie L. Heiser;
2. 61.30 acres in the NE1/4 1-139-100 (3636 132nd ½ Ave SW), Agricultural zoning. Property is currently owned by Bonnie L. Heiser;
3. 24.4 acre parcel in the NW1/4 1-139-100, Ag w/ 1 acre Residential spot zoning. Donald Heiser;
4. 176.2 acre parcel in the W1/2 1-139-100 (13261 37th St SW), Ag w/ 10 acres Residential spot zoning. Property is currently owned by Greg & Stacey Kessel;
5. SE1/4 S OF BNRR LESS RR ARW 2-139-100, 104.36 acres, Agricultural zoning. Property is currently owned by Greg Kessel;
6. N1/2SE1/4 N OF BNRR LESS RR ARW 2-139-100, 29.8 acres, Agricultural zoning. Property is currently owned by Greg Kessel;
7. N1/2 12-139-100, 320 acres, Agricultural zoning. Property is currently owned by Greg Kessel.

Tax and Zoning Director Swanson introduced the application. Don and Bonnie Heiser and Greg and Stacey Kessel own the properties. Swanson stated that Meridian would present the project and then other interested parties would have the opportunity to comment. Dan Hedrington from SEH Engineering presented the project, that it was to provide connectivity to rail and pipelines. Bill Prentice stated that they felt that Billings County was the best place for the project. Dan Hedrington presented a map of the project and stated that the southern portion of the property would be held for storage and possible future expansion. He also stated that Burlington Northern has been contacted and is in support of the project and that they have been in communication with State agencies regarding the Air and Water permitting process. The wastewater treatment plan would be a closed loop system and they are trying to mitigate any visual impact by using earth tone structures and NDSU is working on screening and blending ideas for the project. They are planning on using downcast lights anywhere possible. Scott Lang from SEH stated that environmental reviews have begun and the wildlife, wetlands and cultural studies have been sent to the agencies. Initial review didn't show any threatened species. They will be working with the Army Corp of Engineers on any wetlands mitigation. Discussion ensued regarding the sources of water that they will be using and that has not been finalized. They have discussed with Roughrider and MDU and stated that no issues are expected with power. They stated that 38th street has been built up and paved and they are planning on upgrading the roads to accommodate 105,500 weight. All access will be from the south. They are working with emergency services on a local plan, but they would have trained emergency management on staff.

John Tczap opened the floor to adjacent landowners. Swanson did a roll call of landowners that had been sent a letter of notification of the project. Karen O'Brien stated that she approved of the project. Heiser – not present. Doug Kessel - Karen O'Brien was present and stated that she was representing them also. Erickson – not present. Redmond – not present. Bill Reis – not present. John & Nancy Duletski – not present. Dave Jurgens – not present. Joseph Schmidt – not present. Loren Bock – stated that his only concern is dust control on 132nd . George Hoffman – not present. Allan Richard – stated that he approved if paved.

John Tczap then opened the floor to other county residents – Laura Grzanic questioned where the well would be located and whether it would affect her aquifer and whether dust would affect her animals. Dan Hedrington stated that it would be a completely separate aquifer and there would be dust control in place. Wendy Ross, Superintendent of Theodore Roosevelt National Park stated concern was the resource impacts on the National Park, the visitor experience and the Class 1 airspace. Dan Hedrington stated that the operation would meet the requirements. Pat Hedstrup questioned the telephone lines in the area and stated that since rail facility was built they have had many problems with the phone system. Dan stated that surveys

BILLINGS COUNTY BOARD OF COUNTY COMMISSIONERS
REGULAR MEETING – MAY 3, 2016

The meeting was called to order at 9:00 A.M. with Commissioners Kasian, and Kessel in attendance. Chairman Arthaud was present by teleconference.

Others present during portions of the meeting were: Anita Adams, Allan Richard, Margie Lindbo, Kevin Uttech, Pat Hedstrup, Lili Stewart, Steven Klym, Andrew Haffner, Karen O'Brien, Beau O'Brien, John Tczap, Kevin Hachfeld, Tracy Schmidt, Josh Waclawik, Rob Knight, Jodi Wilson, Jacob Baumler, Rob Sand, Ashley Ross, Corie Greth, Tina Thornton, Macario Herrera, Shannon Boehm, Jeff Iverson, Greg Kessel, Stacey Kessel, Carlos Garcia, Corinne Lee, Jan Swenson, Steven Klym, Tama Smith, Wally Owen, Tom Williams, Leona Hibl, Larry Heilmann, Jason Ehlert, Valerie Naylor, Jim Fugle, Scott Lange, Dan Hedrington, Linda Weiss, Lillian Crook, Ruth Malm, Ray Strickland, Tim Hendricks, Nathen Julansen, Brian Rosendahl, Wendy Ross, Amy McCann, Laura Thomas, Pat Rummel, Rick Kramlich, Silas Harris, Shannon Hanson, Jennifer Hiser, David Shepherd, Jeff Haapapuro, Mike Cavanaugh, Andrew Krebs, Rhonda King

Kessel moved to approve the minutes from the April 5, 2016 regular meeting. Kasian seconded. All voted aye.

Auditor Lamb presented the annual Clerk of Court funding agreement with the State Supreme Court. Kessel moved to approve the reimbursement agreement. Kasian seconded. All voted aye.

Shannon Boehm & Tina Thornton from the Forest Service were present to discuss the Myers pit and a permitting system that was put in place after the original approval to respond to issues regarding federally owned minerals on private surface ownership. When application was made by Billings County, Game and Fish was not notified and when they reintroduced the approved application through the permitting process, it was discovered that the private surface area is in a Bighorn Sheep lambing area. They introduced Mac Herrera who is the acting grasslands supervisor. They had reviewed the proposal and looked for ways to mitigate, however they decided they would need to revoke the permit. In the future, all applications will go through the newly addressed permitting process.

Sheriff Pat Rummel was present to discuss the Multi Hazard Mitigation plan which will expire in 2018. In the past, Billings County was the fiscal agent, but now Dunn County will be the lead on the plan. Kessel moved to approve entering into the plan with Dunn and Stark County. Kasian seconded. All voted Aye. Sheriff Rummel also shared with the board that the week of May 19th will be EMS week and they will be holding another Community Health Fair and Blood Drive on the 19th of May.

Road Superintendent Jeff Iverson presented his monthly report.

The board reviewed zoning requests that had been addressed by the zoning board at their April 21, 2016 meeting as follows:
Meridian Energy Group, Inc: Application to rezone 717.06 acres in sections 1, 2, and 12 139-100 to Industrial. Current Zoning varies from Agricultural and Residential. Conditional Use Permit requested for the Davis Refinery, an approximately 55,000 barrel per day petroleum refinery. The proposed refinery and associated structures will be constructed in two phases, with the initial design capacity of 27,500 bpd capacity. Description of parcels included in the request:

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7. N1/2 12-139-100, 320 acres, Agricultural zoning. Property is currently owned by Greg Kessel.

Tax & Zoning Director Swanson presented the applications and discussed her staff report. Chairman Arthaud made a statement that he would like to see the application tabled until the findings from the staff report are addressed. Some of the issues as related to the ordinance are 5.5B section lines do not comply with setbacks. 6.1.5.1 amount and suitability of the water. 6.1.5.1 sewer service, county will need to see engineered design. 6.1.15.1 – management plan needs to be more defined. Meridian has met with emergency services but the county will need to see a plan in place on paper. Storm Water – county will need to see engineered design. 6.15.2 county would like to see the screen design. Chairman Arthaud also stated that he would like to see two phases of bonding, one during construction and the other for after construction. They will also need to address the road right of ways within the project. Dan Hedrington, engineer from SEH was present and stated that he

Billings County Zoning Meeting
July 21, 2016

Members present: Connie Kasian, Cathy Cerkoney, Joe Kessel, Anita Kessel, Steve Klym, and John Tczap

Members absent: Karen Putnam

Others present: Deputy Tax & Zoning Director Juliana Hammerstrom, Scott Lange, Linda Weiss

The meeting was called to order by Chairman John Tczap at 1:00 P.M.

Connie Kasian moved to approve the minutes from the June 16, 2016 regular zoning meeting. Anita Kessel seconded. All voted aye.

Meridian Energy Group: Application for a Variance to construct within the 250' setback requirement from 133rd Ave SW in the SW1/4 of Section 1 & SE1/4 Section 2-139-100, north of 37th St SW within the proposed Davis Refinery project boundary. Scott Lange was present on behalf of SEH Inc. Mr. Lange explained construction within the 250' setback would allow tanks to be closer to the plant. Future closure of the section line would be addressed per the proper procedure from the Board of County Commissioners. Anita Kessel made a motion to approve the variance. Steve Klym seconded. All voted aye.

With there being no further business, Anita Kessel moved to adjourn at 1:07 P.M. Steve Klym seconded. All voted aye.

John Tczap, Chairman

Connie Hartman, Acting Secretary

BILLINGS COUNTY BOARD OF COUNTY COMMISSIONERS
REGULAR MEETING – AUGUST 1, 2017

The meeting was called to order at 9:00A.M. with Commissioners Arthaud, Kasian and Kessel in attendance.

Others present during portions of the meeting were: Deb Theurer, Pat Rummel, Dan Hedrington, Scott Lange, Linda Weiss, Denice Aaron, Ruth Malm, Jason Kastrow, Holly Praus, Amber Hofstad, Barry Wegner, Randy Varner, Keri Rummel, Justin Hyndman, Jack Marquart, Clarence Sitter, John Hild, Kyle Shockley.

Kessel moved to approve the minutes from the July 5, 2017 regular meeting and the July 12 and 17, 2017 special meetings. Kasian seconded. All voted aye.

Auditor Lamb presented the following budget amendments and transfers:

- Human Services to General Fund for State Aid received in 2017 - $16,383.01
- 911 Wireless to E 911 to close out the Fund - $1,890.74
- Operating and Maintenance to Extension Service budgeted transfer - $1,357.12
- Operating and Maintenance to Weed budgeted transfer - $58,601.00

Kessel moved to approve the budget amendments and fund transfers. Kasian seconded. All voted aye.

The delegate for the North Dakota Association of Counties needs to be appointed for a two year term. Kessel moved to appoint Tax & Zoning Director Stacey Swanson. Kasian seconded. All voted aye.

Deb Theurer, representative of the West Dakota Parent and Family resource center was in attendance to present the 2018 request. The request is the same as last year $1,300.00. This will be included in the preliminary budget.

Auditor Lamb presented a request from the courthouse employees that the hours worked during the summer be extended until daylight savings ends. This would be 7am - 4pm Monday through Thursday and 8am – 12pm Friday. Kessel moved to allow this request. Kasian seconded. All voted aye.

A Transportation Alternatives grant was received by the City of Medora with Billings County as the sponsoring agent for a walking path from Pacific Avenue to the Medora campground on land in the county. Arthaud moved to approve $27K for this request. Kasian seconded. All voted aye.

Tax & Zoning Director Stacey Swanson went over the Billings County Land Use Plan revision status and requested that the board appoint a steering committee comprised of H. P. Weir, Jim Bridger, Jim Arthaud, John Hild, Marcia Lamb and Stacey Swanson. Kessel moved to appoint the steering committee. Kasian seconded. All voted aye.

Dan Hedrington and Scott Lange were present as representatives of SEH for Meridian Energy. Tax & Zoning Director Swanson went over permit status reports. Dan and Scott went over the various permits and updates. They provide updates monthly to Director Swanson. The Air Quality permit is still under review by the North Dakota Department of Health. The Water permit has been recommended for approval by the State Water Commission and is out for public comment. Discussion ensued regarding the bond requirements and they requested a phased bonding. This will be discussed after permits have been received. Chairman Arthaud made it clear to the representatives that no dirt was to be moved until the permit to construct is issued from the state and bonding is in place.

The board received and approved the following permits with road superintendent conditions:
PIPELINE Permits:

- ONEOK Rockies Midstream, LLC – Sections 9,15,16-143-102 crossing 147th Ave SW and 14th St SW for a poly gas gathering line.

Holly Praus and Amber Hofstad were present from the Sunrise Youth Bureau to thank the board for past support of the program and went over the diversion program, crisis intervention, out of school suspension program, bullying, drugs, alcohol, tobacco prevention and their attendant care program. The board stated that they are very supportive of the Sunrise Youth Bureau.

States Attorney Brovold was present to open the equipment bids at 11:00AM.
Belly Dump trailers – 2 bids were received:
Westlie – 42' belly dump - $48,000 – midland
Wallwork – r-way 42' belly dump - $42,595

Trucks
Westlie – Western Star 13sp trans - $114,764, Automatic - $123,735
Wallwork – Kenworth 13sp - $117,200, Automatic - $128,915

Meridian Energy Group Inc.

	instance, the Davis Refinery will be using special "down reflecting" lighting for its - construction and operational lighting. We will also use the latest LED technology which is not only safer than traditional bulbs, but have proprietary optics designed to focus light directionally so they illuminate only the required area within the refinery, such as straight walkways, avoiding adjacent and upward spill.
What impact will construction and operation of the Davis Refinery have on the neighboring communities in terms of: - **Water supply due to waste disposal?**	The Davis Refinery will be using more than one source of water for its process water requirements. The waste disposal of solids and liquids from the refinery operations will be processed by latest technology treatments before disposal. The Refinery will not be negatively impacting water supply or water quality in the area, and the presence of the Refinery might enable certain local problems in water supply and disposal to be eliminated. Meridian has engaged SEH, Inc. who will be performing site surveying and geotechnical analysis for the Davis Refinery to undertake a thorough water availability study, and has indicated the unique opportunity of using reclaimed waste water from a nearby sewage treatment plant in Belfield for our process water.
What impact will construction and operation of the Davis Refinery have on the neighboring farms and livestock near the grounds?	A large percentage of the traffic into and out of the Refinery, both during construction and operations, will be by rail, which will reduce dust and other emissions substantially. And finally, we consider dust control on the site during construction to be a construction safety hazard and a health issue for our own employees, and therefore we will be controlling it both through paving on the site and by liberal use of water trucks where paving is not possible.

A.9.1. PAVED ROADS DUST

BASIS

It is assumed that crude oil inlet is via pipeline, not trucking or rail. Also, it is assumed that the same volume of products obtained in Phase 1 are loaded and transported via trucking, and the difference produced in Phase 2 will be loaded and transported via pipeline.

Refinery production	bbl/d	gal/d	Notes	Truck Capacity (gallon)	trips/day
Gasoline	9,100	382,200		10,000	38
Diesel / Jet	9,550	401,100		6,000	67
LS Fuel Oil	8,400	352,800		6,000	59
LPG / Butane					6
				Total	170

Truck Round Trip Distance/1 0.0379 mile

5280 feet / mile

200 feet traveled

TRUCK LOADING VMT

$$\frac{169.87\ \text{Trip}}{\text{day}} \times \frac{0.04\ \text{mile}}{\text{Round Trip}} \times \frac{365\ \text{day}}{\text{year}} = 2{,}349\ \frac{\text{VMT}}{\text{year}}$$

$$= 6.43\ \frac{\text{VMT}}{\text{d}}$$

Maximum Gross Weight for USDOT tractor trailer

80000 lb

40 ton

Average Speed

5 mile / hr

Wet days (Mean) 90 day

P (Value) 2160 hour

N (Value) 8760 hour

TRUCK VMT IN LIMITED ACCESS ROAD

Pollutant	k (lb/VMT)	Silt L (grain/sq ft) [2]	W (ST)	N (hour)	P (hour)	Emission Factor (lb/VMT)
PM 2.5	0.00054	2.15E-02	40	8760	2160	0.001
PM 10	0.0022	2.15E-02	40	8760	2160	0.003

	Light Slop
	Heavy Slop
	Vacuum Gasoil
	FCC Naphtha
Blend stocks:	Reformate
	Hydrotreated FCC Naphtha
	Butane
Final Products:	LPG
	Regular Gasoline
	Jet-Fuel
	ULSD
	Fuel Oil

Crude, Naphtha, Reformate and Gasoline storage tanks will be Internal Floating Roof type. Diesel, fuel oil and slop oil tanks will be cone roof. Butane and LPG will be stored in bullet type tanks. A vapor recovery system is contemplated to ensure emissions from the tank farm area do not exceed permissible levels.

4.19.2 Loading / Unloading Facilities

The Bakken crude will be initially shipped to the Davis Refinery by rail. Direct access from the refinery to the BNSF rail system, will allow the shipment or receipt of products or raw materials via rail tank car. To supply the local market with refined products, and accommodate raw material receipt from the nearby areas, the refinery will also have a tanker truck loading/unloading facility. During Phase II, a product pipeline system could be available to move product into common carrier pipeline systems in the Midwest.

Rail Loading/Unloading

A Rail Loading/Unloading Facility will be required for crude, gasoline, jet fuel, diesel and fuel oil. The loading/unloading rack is designed as a multispot area for the loading and unloading system.

The crude oil transfer station, designed to unload 55,000 BPSD of Bakken Crude, would include the rail car unloading rack, vent headers, a containment area, drain connections and

Final Products: Propane grade LPG

Tier 3 Regular Gasoline

Jet-Fuel

ULSD

Low-sulfur Fuel Oil

Crude, Naphtha, Reformate and Gasoline storage tanks will be Internal Floating Roof type. Diesel, fuel oil and slop oil tanks will be cone roof. Butane and LPG will be stored in bullet type tanks. A vapor recovery system is contemplated to ensure emissions from the tank farm area do not exceed permissible levels.

4.12.2 Loading / Unloading Facilities

The Bakken crude will arrive to the Davis Refinery via pipeline. To supply the local market with refined products, and accommodate raw material receipt from the nearby areas, the refinery will also have a tanker truck loading/unloading facility. During Phase II, a product pipeline system is expected to be available to move part of the production into common carrier pipeline systems in the Midwest.

A Tank Truck Loading Facility will be required to ship finished products, and will be the principle mode of transport for first phase product. Tank trucks will be loaded at island-type racks, equipped with several islands, each of which will have loading positions equipped with several product loading arms. A vapor recovery connection will be provided at each loading island for VOC control.

4.12.3 Fuel Gas System

The Davis Refinery heaters, boilers and thermal oxidizers will be designed to burn refinery fuel gas. The fuel gas system will operate under pressure control and will be designed to collect light ends from the gas plant and off gases from the refinery processes and distribute treated fuel gas to low pressure consumers. Before being routed to the fuel gas distribution system, sour gas streams will be treated in the SRU to remove H_2S. The totality of the fuel gas will be treated to meet hydrocarbon and water dew point required by the consumers.

All fuel gas streams will be sent to a central collection drum to dampen the effect of fluctuations in stream composition and thermal content. The drum is the pressure control

Davis Refinery FAQ Document

Question	Answer
What is the expected output of the Davis Refinery?	The Davis Refinery will process approximately 55,000 barrels per day ("bpd") of crude oil, and will refine that oil into a full slate of liquid fuels and specialty chemicals, including a substantial amount of Gasoline, Kerosene (jet fuel) and Diesel. The exact quantities of each product will depend upon a number of things, including the mix or blend of crude oils that are used as the feedstock for the Refinery, and upon other issues that are currently the subject of the ongoing design of the Refinery.
What is the current refinery output in the Bakken today?	Currently, only 94,000 barrels per day of refining capacity exists in North Dakota – the 74,000 bpd Tesoro Refinery in Mandan and the 20,000 bpd Dakota Prairie Refinery in Dickinson. The rest of the crude oil produced in the Bakken has to be shipped out of North Dakota to distant refineries.
How much crude oil is currently produced in the Bakken Region requiring a refinery?	The Bakken Formation currently produces over one million barrels per day ("bpd"). Crude oil has no economic value unless it is run through a refinery.
What products will the Davis Refinery produce?	The Davis Refinery is a high-conversion refinery having Nelson Complexity Index of 9, and will create a full range of refined products, including: • Gasoline, Jet Fuel, Diesel, #6 Fuel Oil (All Low Sulfur)
Permitting	
Has Meridian received approval for the site location of the Davis Refinery?	Yes, in July of 2016, the location of the Davis Refinery was unanimously approved by Billings County Board of Commissioners after careful review, consideration, and public hearing within the community.
What are the key advantages to building a refinery within the Bakken?	By building the Davis Refinery close to the oil producers, Meridian can enter into long-term supply arrangements with producers that make them stronger financially, and at the same time reduce its feedstock costs substantially. This will also enable Meridian to provide local and regional fuel consumers with additional competitive choices, which will result in reduced costs and increased service levels to those consumers. The existing practice of exporting Bakken crude to distant refineries and then transporting the refined products back into the area results in waste, inefficiency and needless pollution.
Has Meridian applied for a Permit to Construct the Davis Refinery?	Yes, in October 2016, Meridian Energy submitted its application for a Permit to Construct to the North Dakota Department of Health – Air Quality Division, which reflected significantly improved emission levels from any existing refinery initiatives in the past five years. In April, 2017, recognizing its technology can be even cleaner, Meridian amended that application to further improve the design of the Davis Refinery, and even further improve on emissions.

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What are the p uired for Meridian get th efinery constructed and approved for operation?	Current permitting requirements for the Davis Refinery: • Rezoning and Conditional Use Permit: granted July 2016 • Water Appropriation Permit: expected approval by State Engineer in 2-3Q 2017 • Permit to Construct [Air Quality]: application submitted October 2016; amended April 2017 • Permit to Operate (Air): to be filed upon project completion • Industrial Storm Water Discharge Permit: application submittal in 2-3Q 2017
Has the Davis Refinery acquired any permitting at this point?	Yes, Meridian has been granted both its Zoning and Conditional Use Permits from Billings County. It has filed its Air Quality Permit to Construct applications with the North Dakota Department of Health in October of 2016 and filed an amendment to further reduce emissions in April 2017.
What is a Synthetic Minor Source permit, and why is it important? Do all refineries apply as a Synthetic Minor Source?	-A Synthetic Minor Source Permit to Construct, which has a significant "air dispersion modeling" requirement, is not reviewable by the EPA or Department of Interior (National Park Service) because of its significantly decreased impact on the environment. The agencies specified can only comment on the modeling. However, a Major Source Permit to Construct is reviewable by EPA & DOI, and air dispersion modeling is much more extensive, therefore an application deemed complete as a Synthetic Minor Source is significant in terms of cost and longer review & public comment periods. -No, not to date, The Davis Refinery will be the first greenfield refinery of its complexity to be clean enough to be submitted as a Synthetic Minor Source.
How long is the Permit to Construct application review period once its submitted?	The North Dakota Department of Health – Air Quality Department has a standard 120-day review period for all refinery projects submitted as Synthetic Minor Sources.
How is the EPA involved?	Regarding permits and approvals, the Davis Refinery is only subject to state and local jurisdiction, not federal jurisdiction, including those permits relating to air and water quality. Although the EPA can comment on our permit applications, and almost certainly will, the permits do not require their approval. On air quality, the full Davis Refinery qualifies as a Synthetic Minor Source, allowing for expedited permit review and approval.
What about delays?	Major projects such as Davis are always subject to circumstances that could cause substantial delays. To manage this risk, the Meridian project execution plan includes measures that ensure that there are no such delays that are caused by circumstances that are within our control, and that our plan always seeks to identify and mitigate any circumstances that are outside of our control. For example, we cannot control the

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	speed of the North Dakota Department of Health in processing the air quality permit, but we can ensure that we always provide NDDH with the information that they need so they are never waiting for us. We organize the project schedule such that any delays in obtaining the air quality permit cause the minimum in delay to the overall project.
Partners	
Who is Vepica and what is your relationship with them?	Meridian has entered into an engineering services agreement with Vepica USA, Inc., an international engineering firm specializing in - the energy and refinery industry, to provide process engineering, detailed design, equipment procurement, construction and equipment inspection and other related services to Meridian in connection with the Davis Refinery.
Who is BASIC Equipment and what is your relationship with them?	BASIC is a fully-integrated design, fabrication, construction and logistics firm that serves the oil & gas, refining, petrochemical and specialty process industries worldwide. Among other things, BASIC recently completed the design, installation, construction and start-up of a 25,000-bpd refinery Houston. Meridian has entered into a MOU with BASIC under which BASIC will provide a wide range of services to Meridian, up to and potentially including turnkey design-construction services in connection with the Refinery.
Who is Axens and what is your relationship with them?	Axens is an international provider of advanced technologies, catalysts, adsorbents and services, with a global reputation for basic engineering design excellence. Axens will define the underlying proprietary process technology for several of the Davis Refinery process unit operations, and grant a license to Meridian to implement the project using Axens' know-how.
Who is Short Elliott Hendrickson and what is your relationship with them?	Meridian's principal site planning and engineering firm. SEH recently began an additional round of geotechnical investigations, site grading plans, and a water use and management program for the project site.
Who is Zia Engineering and Environmental Consultants and what is your relationship with them?	ZIA is the air quality emissions control engineer and emissions dispersion modeling firm for the project, and made a major contribution to the recent PTC amendment filed with NDDH.
Who is Brookline Capital Markets and what is your relationship with them?	Brookline Capital Markets, LLC is a leader in growth finance, providing advisory and investment banking services to emerging growth companies. They have a strong track record *of structuring financings for both private and emerging public* companies. Meridian has established a Placement Agency Agreement with Brookline, under which Brookline will be the exclusive placement agent and principal financial advisor to Meridian in connection with the project financing of the Davis Refinery.

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Community Impact	
Where is the Davis Refinery and how much land will it occupy?	The Davis Refinery will be located on the 700+-acre property that Meridian has acquiring for the Refinery in Billings County, North Dakota, just west of the town of Belfield.
What is a greenfield plant and why is it important?	The Davis Refinery will be only the second Greenfield Refinery built in the US since 1976. A Greenfield plant is a brand-new facility, as opposed to a facility that requires an addition to or a modification to an existing facility – in other words, when construction starts, it is on a "green field." A greenfield refinery like the Davis Refinery is not burdened with the need to make the new operating units work in conjunction with pre-existing legacy operating units that might also represent old technology. This will insure that the Davis plant can leverage the latest technology from the ground up, and can much more easily and efficiently comply with modern environmental or safety requirements.
How long will construction of the Davis Refinery take?	Field construction of a large complex refinery such as the Davis Refinery would typically require two years or longer, but Meridian is working on innovative ways to shorten that construction schedule substantially.
How many jobs will the Davis Refinery create, both short- and long-term?	Construction of the Refinery may require as many as 500 people, with that number peaking sometime during 2017. Permanent employment at the Davis Refinery will be about 225 to 250. Meridian will take steps to maximize the proportion of Refinery jobs, at all levels in the organization, that come from the local pool of potential employees. This includes supporting local training and apprenticeship programs. Studies conducted by the State of Washington of the social impact of a refinery in Anacortes showed that each permanent job at the refinery created an additional 9.18 jobs in the local community. In other words, the permanent jobs at the Davis Refinery may create over 2,000 additional jobs in North Dakota, and those jobs would be primarily in Billings and Stark Counties.
When is the Davis Refinery expected to begin operation?	Meridian expects that mechanical completion of the Refinery will be achieved within two years of commencing construction. Full commercial operation of a facility this large and complex may require from six months to a year following mechanical completion.
How will the Davis Refinery impact the cost of crude oil refining and transport in the Bakken?	The Davis Refinery will substantially increase the number of competitive choices to the oil producers in the Bakken, and to the local and regional consumers of refined products
How will the Davis Refinery remain profitable?	Meridian expects the Davis Refinery to operate successfully and profitable for decades to come because of the manner in

	which it is being designed, the manner in which it will be constructed, and the long-term relationships that Meridian is establishing with selected crude oil producers. The wide array of high-quality finished product will allow Meridian to be flexible with a variety of demand.
How will local crude be transported to/from the Davis site for refining?	The Davis Refinery will initially accept crude oil shipments by truck, rail and pipeline, but will gradually migrate the vast majority of its crude-shipments to pipeline gathering systems, which are safer and more cost effective.
What is clean fuels technology?	Clean fuels technology refers to the application of modern chemical and process design, information and controls technology, and environmental engineering to ensure that the Refinery operates with minimal waste and inefficiency. Clean fuels technology leveraged in the Davis Refinery will ensure its operation and products comply with all applicable environmental and safety requirements.
Has the Davis Refinery met all energy and environmental requirements?	The Davis Refinery is being designed to meet the requirements of the State of North Dakota's Department of Health in connection with all - areas of environmental concern, including air and water quality and waste disposal.
Has the Davis Refinery met all clean fuels standards?	The Davis Refinery is being designed to do so, and must do so in order to operate.
Will the Davis Refinery reduce our dependence on foreign oil?	Indirectly it will. First of all, note that because of the Bakken and the other unconventional oil development in the US, our nation is once again the world's largest oil producer. However, during the many decades during which the US imported most of its oil, the refining industry concentrated its assets in major coastal port areas so that they could source their crude from world markets – and that is why Bakken producers suffer such a price disadvantage compared to other producers that can readily access, for instance, Gulf Coast refineries. By locating a major refinery close to the Bakken producers, Meridian will make those producers more competitive, and as more refinery operators do the same, the incentives to further develop US energy resources rather than rely on imported oil will increase.
What is a tolling agreement?	A tolling agreement is a commercial arrangement under which a commodity producer, like a Bakken oil producer, and a commodity processor, such as Meridian, share the risks and benefits of a processing facility such as the Davis Refinery, in a way that benefits both parties financially. By contracting with Meridian to process a substantial amount of his production into refined product for a fee, an oil producer can ensure a long-term sustainable profit margin for that increment of production – he might make higher profits in some years by playing the market, but he establishes a secure long-term commercial base through his Meridian tolling deal. By committing a substantial

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	proportion of its capacity to tolling arrangements, Meridian - ensures a long-term supply of crude oil for the Davis Refinery at a secure and sustainable margin – Meridian might be able to make more money in some years by buying crude in the spot market and selling the products, but the tolling arrangements provide Meridian with a profitable long-term sustainable resource base.
How will the Davis Refinery impact the price of oil?	By locating a major refinery in the Bakken, Meridian will remove inefficiencies and increase competitive choices. The net result will be that the crude suppliers that work with Meridian will be more profitable and financially stable and the consumers and businesses that rely on refined products will benefit from a more competitive market.
What is a topping plant?	Essentially, they are simple atmospheric distillation units that produce hydrocarbon boiling point cuts, typically focusing on diesel fuels. A topping unit is an inexpensive, technically simple means to enhance the value of crude oil near the source of production.
What impact will construction and operation of the Davis Refinery have on the neighboring communities in terms of: • Noise due to transport and construction?	During the two-year construction period of the Refinery there will be some noise from the heavy equipment used in building the facility, but most of that will be focused on the site work during the first year of the schedule. When the Refinery is in operation, there will be noise – not a few big noises, but an accumulation of smaller noises – that we will take steps to minimize. Noise is typically a function of line of sight and weather conditions, and there is a lot we can and will do to isolate and reduce the auditory impact of rotating machinery like pumps and compressors in a facility like the Refinery.
What impact will construction and operation of the Davis Refinery have on the neighboring communities in terms of: • Bright lighting during late-night/overnight construction?	It would be unsafe to our employees to eliminate lighting, and of course there will be some taller structures that must follow legal requirements intended to protect aircraft. However, lighting is something that can be minimized though good engineering. For instance, the Davis Refinery will be using special "down reflecting" lighting for its - construction and operational lighting. We will also use the latest LED technology which is not only safer than traditional bulbs, but have proprietary optics designed to focus light directionally so they illuminate only the required area within the refinery, such as straight walkways, avoiding adjacent and upward spill.
What impact will construction and operation of the Davis Refinery have on the neighboring communities in terms of: • Water supply due to waste disposal?	The Davis Refinery will be using more than one source of water for its process water requirements. The waste disposal of solids and liquids from the refinery operations will be processed by latest technology treatments before disposal. The Refinery will not be negatively impacting water supply or water quality in the area, and the presence of the Refinery might enable certain local problems in water supply and disposal to be eliminated. Meridian has engaged SEH, Inc. who will be

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	performing site surveying and geotechnical analysis for the Davis Refinery to undertake a thorough water availability study, and has indicated the unique opportunity of using reclaimed waste water from a nearby sewage treatment plant in Belfield for our process water.
What impact will construction and operation of the Davis Refinery have on the neighboring farms and livestock near the grounds?	A large percentage of the traffic into and out of the Refinery, both during construction and operations, will be by rail, which will reduce dust and other emissions substantially. And finally, we consider dust control on the site during construction to be a construction safety hazard and a health issue for our own employees, and therefore we will be controlling it both through paving on the site and by liberal use of water trucks where paving is not possible. We will not be hauling a significant amount of aggregate to the site from the quarry or borrow pit near neighboring property. It appears that our earthwork on the site is very nearly balanced, so we do not need to build things up substantially. If we do need to haul substantial amounts of aggregate, then we will simply have to extend our dust control measures to the haul roads that serve our sites.
What does zero-sulfur diesel and jet fuel mean, and why is that important?	The EPA has promulgated regulations on the content of liquids transportation fuels that the Refinery must meet in order to market its products. These regulations not only mandate current requirements, but also require that certain changes take place over time. The Refinery is being designed to be able to meet these requirements.
What is gas flaring, and how does the Davis Refinery intend to address the issue of gas-flaring emissions?	The flaring of low-value natural gas at the wellhead, which results in the release of a large amount of carbon dioxide into the atmosphere, has created an ongoing environmental crisis in the Bakken. The Davis Refinery will reduce flaring emissions by over 50% for every cubic foot of gas that it consumes. Flare stacks will be equipped with air assisted blowers to help ensure cleaner complete combustion of flare gas and smokeless operation. Flare emissions will be analyzed by monitoring equipment.
Profitability	
How soon do you expect to generate revenue?	Davis Light is expected to be in full commercial operation in the second or third quarter of 2018.
What is the project going to be worth?	Using a valuation of 10 times EBITDA in year 4 of operations, Davis Full will be worth $29.29 per share.
What makes you think this project will succeed?	We have already done all of the heavy lifting on the major areas of project development and risk mitigation, and because our management team knows what it is doing. Our business plan, and the way we do things, is entirely different than Dakota Prairie.
How will oil refinery remain competitive in	Even with domestic oil at over $100, green technology has

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relation to other energy sources as oil costs continue to rise?	required, and still needs, large & unsustainable subsidies. Peak Oil is a bankrupt theory, as market conditions show: • Green Tech will never be able to compete with traditional fuels • Subsidies would have to become permanent and are unsustainable • Demand for oil/gas will grow 28% from 2020 to 2040 The Davis Refinery is a very competitive player in domestic liquid fuels with its low costs and geographical advantages
Is domestic oil refining already over capacity?	Global utilization has dipped to below 70% recently, but domestic utilization holds steady at over 90%. Global demand for refined products continues to grow. Even if the macro view showed overcapacity, the micro view favors Meridian, in terms of: • Competitive geographical position • Competitive cost structure • Tolling secures markets and margins
Why can we expect the Davis Refinery to be economically competitive?	The Davis Refinery has substantial competitive advantages, such as: • Geographical advantages for crude and product market access • Capital efficiency Davis financial analysis shows very strong performance: • Basic project IRR of nearly 20% • Investor return of 5Xs to 10Xs in 3 to 5 years Risk mitigation: Fixed price performance guaranteed design-construct agreement • Crude-product tolling agreements • Risk management platform through major insurance-surety firms
How will an oil refinery as small as Davis remain competitive?	The Davis Refinery will remain competitive given three factors: **Capital Efficiency -** Davis has lower unit capital cost than bigger plants, negating the Economy of Scale argument. **Complexity -** Davis' Nelson Complexity Index is >9, higher than most larger plants. **Location -** Refinery is sited in an area where a larger facility would suffer significant diseconomies of scale.
The Davis Refinery has not received its air quality permit to construct (PTC) from the North Dakota Department of Health (NDDH) – how confident are you in receiving approval?	Meridian received its toughest permit – rezoning & conditional use permit (CUP) - from Billings County on 06-Jul-16. Davis waited for the CUP to perform the engineering to prepare the PTC application and ensure compliance. Meridian has reviewed its modeling and designs with NDDH, and knows that its application and backup documents are complete. The full 55,000 bpd Davis Refinery will quality as a Minor Source! As a Minor Source, the PTC is non-discretionary – we meet the requirements so we will get the permit

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Will the Davis Refinery remain compliant with the ever-tightening EPA fuel standards?	Yes - Davis Refinery already meets EPA standards thru 2020: • Gasoline, aviation fuel & diesel already exceed EPA specs • Even tank bottoms would quality as low-sulfur fuel oil The Davis Refinery has high Nelson Complexity (>9), enabling the Refinery to respond to further tightening of regulations as well as even the most complex domestic refiners.
Will the Davis Refinery be proximal enough to the demand for refined products?	Most Bakken crude – 1mm bpd currently, 2mm bpd eventually – is shipped to distant refineries, with refined products shipped back to the region. The Davis Refinery accesses inexpensive local crude, some that cannot connect to crude pipelines – big cost advantage. Davis will ship high-value products to local & regional markets – not all products go to the same place. Some markets are close enough for local truck delivery, others will be served by accessing product pipelines.
How equipped will the David Refinery be to deal with a natural disaster?	Resiliency in event of disaster will be ensured by training the entire work-force in security, fire and medical response as if the Refinery were a ship at sea. The Davis Refinery participates in local emergency management authority activities, and has engaged the former head of local emergency management as its liaison to local agencies and member of its advisory board.
Why will the Davis Refinery succeed given that Calumet and MDU could not make the Dakota Prairie Refinery work?	Meridian studied Dakota Prairie closely, and has taken steps, thru contracting & project management strategy, to ensure Davis maintains advantages with regard to: • Design and constructed • Project management practices • Greatly reduced capital costs, and strict adherence to the project timeline Tesoro recently acquired Dakota Prairie, and Meridian believes Tesoro will be able to operate the facility profitably.
Technology	
How will the Davis Refinery technology deal with the issue of tank vapors?	Storage tank vapor emissions will be collected by vapor recovery systems that can recover over 95% of tank vapors. These high BTU value vapors can be put into the refinery fuel gas system and reduce the amount of purchased natural gas.
What will be done to control the concentration of Hydrogen Sulfides being emitted from the Davis Refinery?	Wet gas compressor flare controls will have scrubbers to ensure very low H2S ppm concentration is in the emissions.
What is being done to ensure the fuel gas has clean burn quality?	Davis Refinery fuel gas will be scrubbed by amine contactors to ensure the fuel gas quality has clean burning quality.
How will the Davis Refinery maintain acceptable levels of NOx during combustion?	Heaters will be equipped with low NOx burners that will greatly reduce NOx during the combustion process. Additionally, Heater stacks will have Selective Catalytic Reduction converters that uses a catalyst reaction technology to greatly reduce the NOx emissions in the flue gas. Those heater stacks

	will have flue gas analyzers equipped with zirconium oxide sensors that will help monitor and control heater stack emissions.
How will the Davis Refinery control VOC emissions from the site?	Davis Refinery piping & equipment flanges will be torqued per API torqueing specs to help greatly reduce the amount of VOC emissions from the site. Further, pump suction strainer piping will have 2" drains to enable debris to be quickly & easily washed off the screen rather than have to steam the pump hydrocarbons to the flare before physically taking the piping apart to remove the screen for cleaning.

Refinery: Davis, near Belfield, North Dakota
Owner: Meridian Energy Group, Inc.
Capacity (b/d): 55,000 b/d

Notes: Meridian Energy Group expects to start selling gasoline and diesel in the first half of 2018 from its new-build 55,000 b/d refinery in North Dakota, CEO Bill Prentice said Tuesday.

Plans to build the refinery have changed in the last two years, Prentice said. The refinery will still run local Bakken crude and will still be built in two phases. But the second phase will have a different configuration, be less carbon intensive and have "substantially lower capital costs" than originally anticipated, he said.

The first phase will still be comprised of a 27,500 b/d hydroskimmer, a diesel hydrotreater, a naphtha hydrotreater and a salt water treatment plant. It is still waiting for final permitting from the state of North Dakota. Because of its low carbon footprint, it qualifies for a minor source emissions permit.

Meridian originally expected to break ground in 2016 but, like many other companies with refining projects, found the process delayed by permitting taking longer than expected.

Prentice said work on the site and off-site fabrication of units can be done prior to getting the permit. He anticipates once the permit is received, the first phase of the refinery will be online in the first half of 2018.

However, the second phase will no longer have a fluid catalytic cracking unit. Instead it will have a catalytic reforming unit, which is feasible because of the low sulfur content of Bakken crude.

Prentice said the refinery will produce about one-third gasoline, one-third diesel with a bit of jet fuel, and one-third low sulfur fuel oil, which can be shipped by rail to the Great Lakes, where it can be blended in marine fuel.

Courtesy of:

Janet McGurty, janet.mcgurty@spglobal.com

Social Share

The top executive for Meridian Energy Group said the refinery it is planning for Belfield will be the "cleanest refinery ever built" and answered environmentalists' concerns about air quality. "Even the people at the park (Theodore Roosevelt National Park) will be surprised at what we end up with," said Chairman and CEO William Prentice. Environmentalists had questioned the re the national park.

How can we help you?

Speaking at the Williston Basin Petroleum Conference, Prentice said fuels produced at the first phase of the refinery will be sold to regional markets, and can initially leave by rail. "Burlington (BNSF Railway) is starved for business and would be happy to be part of this," he said.

Pipelines will also be designated for delivery from the initial phase which will produce 27,500 bpd. As soon as the air quality permit approved by the ND Dept. of Health, construction will be underway and the refinery will be able to start up within a year.

"By building the Davis Refinery close to the oil producers, Meridian can enter into long-term process tolling agreements with producers," Prentice said, "and at the same time substantially reduces the refinery's feedstock costs."

The refinery will eventually be expanded to process 55,000 bpd and Meridian is partnering with BASIC Equipment of Houston for onsite fabrication.

Read Source (DigitalRefining.com)

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Contact Us

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1.2. Methodology

While BACT analysis is not specifically required for the proposed Davis Refinery since it qualifies as a minor synthetic source, the methods used for emissions control technology selection have generally followed a BACT analysis approach.

EPA's 1990 Draft Edition of the New Source Review Workshop Manual (NSR Manual) sets forth a standardized procedure for determining BACT. This is the method used by most permitting agencies in the U.S. for compliance analysis. This method is considered to be a "top-down" approach and consists of the following five steps:

1. Identify all control technologies
2. Eliminate technically infeasible options
3. Rank remaining control technologies by control effectiveness
4. Evaluate most effective controls and document results
5. Select BACT

BACT is based primarily on control effectiveness. If a technology providing lesser control is to be utilized, it must be demonstrated that, based on energy, environmental and economic impacts and other costs, it is the best choice.

As previously noted, since formal BACT analysis is not required due to the facility qualifying as a synthetic minor source, analysis for technical feasibility was only cursorily conducted by review of the U.S. EPA RACT/MACT/LAER Clearinghouse database as well as applicable permits from other facilities. In addition, coordination with equipment vendors and suppliers was undertaken for many of the emissions units to obtain project and emissions unit specific guarantees for proposed emissions rates. Analysis of energy, environment and economic impacts was not conducted for the proposed controls since in essentially all instances, the higher level of control available was the one selected.

(5)

7/28/2017

t for Davis Refinery SEH report to Billings County.

Comments	Permit Status	Last Update
Rezone property to industrial use - with conditions	Approved by Billings County 7/6/2016.	7/29/2016
CUP for approved conditional use as a refinery.	Approved by Billings County 7/6/2016.	7/29/2016
Building permits to meet County requirements.	The buildings are being defined and design to follow.	
For use of County roads for construction, as well as the agreement for the upgrade and maintenance of 132 Ave, 37th St, and 132 1/2 Ave.	Discussions with the County Highway Supt on the requirements of the road use agreement are underway. The draft agreement is expected to be forwarded to other County staff for review this Fall/Winter.	7/27/2017
Construction within a County ROW.	To follow the approved Haul Road Agreement.	
Application for a pipeline.	Will apply as needed. The pipeline related to the refinery have not been defined yet.	
Weed control plan already submitted to County.	Weed control plan submitted. Plan will be followed as construction starts. The property currently in ag production. Site development will include NDSU advice of vegetation use and management practices.	7/27/2017
To obtain an address.	Will be requested after final entrance locations defined (37th St or 132 1/2 Ave).	
This permit will include federally enforceable emission limits for sources of air emissions.	The Meridian Team is actively working with the NDDH in the review of the permit to construct application. The discussions with the NDDH over the past few months have proceeded well. We are hopeful for a draft permit soon. The draft permit will initiate a public comment period.	7/27/2017
This permit sets operational and emission limits, monitoring, record-keeping, and reporting requirements for sources of air emissions.	This permit will follow completion of construction and verification the emissions control devices included in the permit to construct are working as expected.	
Requires yearly reporting of hazardous and toxic chemicals stored on site.	The chemicals to be used on site will be determined during the design process.	
Required for the use of water from Dakota Formation to be treated in reverse osmosis plant for use as plant makeup water.	The State Engineer's office has issued a Recommended Decision for the water appropriation request from Meridian. The recommendation is to allow use of water from at least 4000 ft. below the surface with some conditions on volume, well construction, and water measurement. Public comments are being accepted by the State Engineer until August 9, 2017. After which, the need for an additional hearing will be evaluated.	7/27/2017
Temporary permit for water use during construction.	Will obtain prior to construction.	
For discharge of stormwater.	The stormwater systems are currently under design, will apply for permit when they are completed.	4/26/2017
Required as part of the stormwater discharge permits.	Will be completed prior to plant being placed in operation.	
Required for construction.	Will be obtained prior to construction.	
Required for on-site hydrostatic testing of equipment during construction	Will be completed prior to equipment hydrostatic testing.	

Unit Number	Original Unit	Current Unit	Main change
117	Isomerization Unit	N/A	Eliminated.
118	Alkylation Unit	N/A	Eliminated.
120 & 122	SRU & Thermal Oxidizer	SRU & Thermal Oxidizer	Increased SRU capacity from 10.2 to 11.2 LTPD. No changes to thermal oxidizer.
125	Kerosene Hydrotreater	N/A	Eliminated.
202	Boilers	Boilers	Decreased overall total steam generation capacity from 180 MMBTU of medium pressure steam to 114 MMBTU of combined medium/high pressure steam.
203	Tank Farm	Tank Farm	Reduction of on-site storage capacity which resulted in elimination of 7 feedstock, intermediates and finished product storage tanks.
206	Wastewater Treatment Plant	Wastewater Treatment Plant	Increased design capacity from 140 gpm to 180 gpm.
207	Flare System	Flare System	No changes.
208	Truck Loading-Unloading System	Truck Loading-Unloading System	Increased capacity to handle about half of the full refinery's production. Balance via future pipelines.
	Rail Loading-Unloading System	Rail Loading-Unloading System	Eliminated.
212	Firewater Pumps	Firewater Pumps	No changes
215	Cooling Towers	Cooling Towers	Increased capacity from 3-1,500 gpm cooling tower cells to 5-2,500 gpm cooling tower cells.
216	Emergency Power Generator (EPS) System	Emergency Power Generator (EPS) System	No changes
FUGITIVE	Process equipment leaks in VOC and Natural Gas service	Process equipment leaks in VOC and Natural Gas service	Adjusted to units in current process scheme.

Comments received from Jim Arthaud, May 3, 2016: Via Email

Here are my thoughts for today.

After spending a good part of yesterday with the zoning director, zoning board president, county road superintendent and myself doing a thorough examination of Meridian's refinery application I would recommend to table the application for the following reasons:

A. 5.5.5.b. Roads and sections lines under the current configuration do not comply with current county setbacks. A reconfigured plan has not been resubmitted showing compliance.

B. Zoning condition on their approval of application under 6.15.1 - Requested more documentation on amount, source and availability of water. (Nothing has been submitted to answer these questions).

C. 6.15.1 Sewer service. I believe the county needs to see an engineered design to show how sewer will be handled in compliance with health dept.

D. 6.15.1(3) I believe emergency plan needs to be more refined then it is working in conjunction with our emergency manger to move this along.

E. 6.15.1 Has BNSF been contacted and crossing issue addressed? Nothing has been resubmitted to show how this can be resolved.

F. 6.15.2(1) Stormwater: I believe county needs to see a engineered design that will be submitted to agency in charge.

G. 6.15.2(2) would like to see the plan to screen the development from the surrounding areas.

H. Last but not least, I believe the county must find a common ground on bonding of this project in conjunction with Meridian. I believe that we need a two phase bonding – a construction and an operating bond.

Now with all of that being said I have read and heard a lot of testimony for the refinery and against the refinery as I would believe my fellow county commissioners have as Mr. Kessel sits on the zoning board and Mr. Kasian's wife sits on the board. I do not believe the county commissioners can make the best decision for the county based on the information we currently have. I believe the information that I feel like I need to see, could and should be provided to the county timely in junction with zoning director and road superintendent to resolve these questions. Then I believe it is best we reschedule a meeting to take input and approve or disapprove application.

CREDIT DAVE THOMPSON / PRAIRIE PUBLIC

Listening...

1:08 / 1:39

The CEO of Meridian Energy said a proposed oil refinery to be built near the Bakken will be – as he put it – the "cleanest refinery on this planet."

The Davis refinery is proposed for a site near Belfield.

"We have taken every bit of technology that's been invented over the last 50 years," said Meridian CEO William Prentice. "As a result, the emissions per 1000 barrels per day will be a fraction of the industry average."

Prentice said work on the Davis Refinery will begin soon after an air quality permit is issued.

"We're hoping that will happen in the next two months or so," Prentice said in an interview. "In two or three months, we can go into the ground. Once that happens, we should be in operation during late 2018."

The Davis Refinery will be only the second so-called "Greenfield" refinery permitted since 1976. Prentice said the plan is to build it in two phases – the first phase will be 27,500 barrels per day, and a second phase would essentially double the size – to 55,000 barrels per day. But Prentice said there is no guarantee the second phase would be built.

"If the capital markets and the appetite of the permitting agencies are such that it's not the right time to do it, we won't don it," Prentice said.

But Prentice said the refinery will be profitable.

"There are parts of the world I've worked in where people would put this (Bakken crude) right into their trucks," Prentice said. "It's beautiful crude oil."

North Dakota currently has two other refineries – the 74,000 barrel per day Mandan refinery ,and the 20,000 barrel per day Dakota Prairie Refinery in Dickinson. Both are owned by Tesoro.

TAGS: OIL REFINERY (/TERM/OIL-REFINERY)

Tweet (http://twitter.com/intent/tweet?

Laura Grzanic
PO Box 161
Belfield, ND 58622

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MEETING - DECEMBER 19th.
URGENT

To: Julie Fedorchak
N. Dakota PSC.
600 E. Boulevard
Bismarck, ND
~~58505~~
58505

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December 12, 2017

Via Email & U.S. Mail

Patrick Fahn
Director, Public Utilities Division
Public service Commission
State of North Dakota

Dear Mr. Fahn:

I am sending this to you to comment on the attempt of Meridian Energy to slip under the PSC review of the site compatibility of the proposed refinery located in Billings County near Theodore Roosevelt Park and Belfield, ND. Reviewing the facts I have read and heard first hand, concerning the statements that Meridian Energy has made no plans to propose a design for a refinery for more than 27,500 barrels a day are misleading lies.

Having been at the public meetings and meet and greets that has been hosted by Meridian Energy, they have continually stated "the refinery will be a 55,000 plus barrel per day refinery". That comment was also said to the attendees at the Belfield theater meet and greet. In their investment packet sent to prospective investors , "it states specifically that the refinery will be a 55,000 plus barrel per day operation", on the radio, in meetings with the county commissioners, it goes on and on. Meridian Energy touts the refinery would, refine 55,000 plus barrels per day, starting with the first stage at 27,500 and increasing to 55,000 plus barrels a day in the second stage. They, Meridian Energy, submitted a water permit seeking a water allocation for a 55,000 plus barrel per day refinery. In the last radio interview on the Crude Life with Jason Spiess, Mr. Prentice's stated that the refinery would be "50,000 barrels per day or just a little under that amount ". That statement now is being made because they have realized they must be 50,000 or under to slip under the law and avoid the ND PSC review. The magic 49,500 barrels per day number did not exist and is a direct result to bypass the North Dakota PSC law. These above statements are not just beliefs or off the wall conjectures but are in black and white print and have been recorded on the radio and at the public gatherings.

The Public Service Commission should review the site for this refinery no ifs ands or buts, period. Even if Mr. Prentice, who quotes on Wday with Rob Port, "that the refinery should not cause any concerns as it is the same as if they were to build a Taco Bell in that area", is a propaganda lie. Disagreement with that absurd statement is mute, as this refinery will adversely affect not only the elderly citizens residing near the proposed site, but the area as a whole, which includes a National park. One of many reasons why I am saying it will adversely affect the area is that in Meridian Energies PTC application it was indicated that the refinery would be serviced by rail and pipeline, but, the April amended PTC permit removed the rail service and with no pipeline available, the truck traffic would be increased to 170 trucks per day. That huge increase on the public roads and interstate 94 would adversely affect traffic as the trucks will have to travel through Belfield on highway 85 or highway 10 or will clog the

Fryburg exit off interstate 94. Also, the toxic air pollution this refinery will emit out into the area will cause health problems. Even though Mr. Prentice touts "it will be the cleanest refinery in the world" it will not be a good neighbor no matter how much propaganda Meridian Energy is trying to shove down the throats of the citizens of western North Dakota.

In conclusion, having studied the purpose of the Public Service Commission's mandate, I can't see how the PSC can do a review of the compatibility of the refinery or any other project after it is already constructed? With this refinery project, once the phase one construction is completed, the damage is done and the PSC review on phase two is worthless. The Public Service Commission is set up to protect all of the public, not just the individuals that are pushing the project because they will make money from it. So, I humbly request that the PSC does it job.

Respectfully,

Kevin Uttech
701-523-6452

Cc: Juli Fedorchak PSC

Petition to protect Theodore Roosevelt National Park from building of an oil refinery within 2 ½ miles of the Park.

Petition summary and background	Currently Meridian has submitted a request for a permit from the Health Department and an oversight by the Public Service Commission to build a industrial oil refinery within 3 miles of the Theodore Roosevelt National Park. This petition requests that these permits be denied because it is too close to the park.
Action petitioned for	We, the undersigned, are concerned citizens who urge our leaders specifically the ND Health Department and the ND Public Service Commission to reject all permits required to construct any oil refinery within 3 miles of Theodore Roosevelt National Park.

Printed Name	Signature	Address	Comment	Date
STEVE SEBELIUS	[signature]	416 5TH ST S MOORHEAD MN		12/16/17
PAMELA HARPER	Pamela Harper	107 2nd St NW Dilworth, MN		12/16/17
OMAR Griffin Jr.	[signature]	11377 Hwy 10 Glyndon, MN		12/16/17
Joseph Cahill	Joseph Cahill	1203 7th St. N Moorhead		12/16/17
Abby Frink	[signature]	3242 Hwy 9 S Glyndon, MN		12/16/17
Kevin Beganovic	[signature]	5310 5th St S Moorhead MN		12/16/17
SCOTT MORRISSY	[signature]	PO Box 1164 Mhd MN 56561		12/16/17
Shawn Vasichek	[signature]	1202 6 St S Fargo ND 58103		17 Dec 2017
Fred HAUGO	Fred Haugo	378 15th Ave SO Fargo ND		12-17-2017
Judy Haugo	Judy Haugo	378-15th Ave S Fargo ND 58103		12-17-17
Charles Axness	Charles Axness	3516 South 7th St. Moorhead MN		12-17-17
LINDA J Axness	Linda J Axness	3516 7th St South Moorhead MN		12-17-17

15 I-16-0188 Filed 12/19/2017 Pages: 8
Informational meeting sign in sheet

Printed Name	Signature	Address	Comment	Date
Aaron Nissen	[illegible]	513 24 AVS FARGO ND 58103		12/17/17
Elwood Rieke	Elwood M. Rieke	3608 28th ST. So, FARGO 58104		12/17/17
LaVon M. Rieke	LaVon M. Rieke	3608 28th St. S. Fargo ND 58104		12/17/17
Rachel Flores	Rachel [illegible]	4114 16th Avenue S. Mpls, MN 58407		12/17/17
Jane Nissen	Jane Nissen	1200 Harwood Ave. S. #283 Fgo		12/17/17
SYLVAN MELNE	Sylvan Melne	525 24th Ave. So Fargo		12/17/17
Judith Peterson	Judith Peterson	7009 Horseshoe Bend Horace		12-17-17
Allan Peterson	[illegible]	7009 Horseshoe Bend, Horace Fargo ND		
Wayne Anderson	Wayne Anderson	355 4th Ave N Apt 106		12-17-17
Warren Swenson	Warren J Swenson	1706 South 6th Fargo		12-17-17
Vivian Radi	Vivian E Radi	602 12½ Ave E #2 West Fargo		12-18-17
Joan Bishoff	Joan A Bishoff	1656 W Gateway Cir. Fargo		12/18/17
Olivia Scully	OLIVIA SCULLY	1101-32 AVE SOUTH, FARGO		12/18/17
Lorraine Schmaltz	LORRAINE Schmaltz	1101-32 Ave S, Fargo, N. Dak		12/18/17
Lois Brown	Lois M Brown	3301-W Prairiewood Dr S		12/18/17

Petition to protect Theodore Roosevelt National Park from building of an oil refinery within 2 ½ miles of the Park.

Petition summary and background	Currently Meridian has submitted a request for a permit from the Health Department and an oversight by the Public Service Commission to build a industrial oil refinery within 3 miles of the Theodore Roosevelt National Park. This petition requests that these permits be denied because it is too close to the park.
Action petitioned for	We, the undersigned, are concerned citizens who urge our leaders specifically the ND Health Department and the ND Public Service Commission to reject all permits required to construct any oil refinery within 3 miles of Theodore Roosevelt National Park.

Printed Name	Signature	Address	Comment	Date
Larry Heilmann	Larry Heilmann	3535 31st St. S Fargo, ND 58104		12/14/17
Gail T. Rogne	Gail T. Rogne	5477 Co RD 1, Kindred ND 58051		12-14-17
Robyn Bagu	Rob Bagu	4259 31 Ave S, Fargo ND 58104		12-14-17
John Bagu	John Bagu	4259 31 Ave S, Fargo, ND 58104		12-14-17
Todd Leake	Todd Leake	2371 10th Ave. NE Emerado ND 58228		12-14-17
Bette Stieglitz	Bette Stieglitz	1115 9th Ave So, Fargo		12/14/17
PAUL JENSEN	[illegible]	326 10TH AVE S #6 FARGO 58103		12/14/17
Rennae Sinchatta	Rennae Sinchatta	3256 Evergreen Cir. 58102		12/14/17
Susan Leake	Susan Leake	2371 10th Ave NE, Emerado ND 58228		12/14/17
Robert Stieglitz	Robert Stieglitz	1115 Ninth Ave S, Fargo, ND		12/14/17
Alex's Potter	Alex Potter	118 9th St. N Moorhead, MN		12/15/17
Lorentz Olson	Lorentz Olson	1721 - 5th St So Mhd MN 56560		12/15/17

Printed Name	Signature	Address	Comment	Date
Orlan Loraas	ORLAN LORAAS	1420 3RD ST N FARGO, ND 58102		12/18/17
Duane R. Olschlager	DUANE R. OLSCHLAGER	3616-29 ave so moorhead M.N. 56560		12/18/17
Linda Olschlager	Linda Olschlager	3616 29 ave S mhd MN 56560		12/18/17
Argell Laddusaw	Argell Laddusaw Argel-Ladd@hotm	3220 12th ave N		12/18/17

Petition to protect Theodore Roosevelt National Park from building of an oil refinery within 2 ½ miles of the Park.

Petition summary and background	Currently Meridian has submitted a request for a permit from the Health Department and an oversight by the Public Service Commission to build a industrial oil refinery within 3 miles of the Theodore Roosevelt National Park. This petition requests that these permits be denied because it is too close to the park.
Action petitioned for	We, the undersigned, are concerned citizens who urge our leaders specifically the ND Health Department and the ND Public Service Commission to reject all permits required to construct any oil refinery within 3 miles of Theodore Roosevelt National Park.

Printed Name	Signature	Address	Comment	Date
Tracy McKinnon		308 3rd St 58005		12-14-17
Duane (DUANE) STRAUB	Duane Straub	PO Box 9905, FARGO ND 58106		12-14-17
PATRICIA STRAUB	Patricia Straub	4310 10th Ave SW, FARGO ND 58103		12-14-17
BARRETT SOMDAHL	Barrett Somdahl	15258 W. LAKELAND DR (HUDUBON, MN		12-14-17
A W POYZER	A.W Poyzer	4267 39th Ave Fgo		12-14-17
Corry R. Wenger	C R. W	1915 Kyle Ln Mandan ND		12-14-17
Lass K Scheuffele		2821 8th St. N. Apt 18 Fargo, N.D.		12-1-17
Kathy Sandness	Kathy Sandness	2916 35th Ave S Fgo		12/14/17
Marilyn Hensch	Marilyn Hensch	1812 - 34th St So Fgo		12/14/17
Neil Sandness	Neil Sandness	2916 35th Ave S Fargo		12/14/17
Jean Griffin	Jean Griffin	1525 17th St So Fargo		12-14-17
Frank Cordahl	Frank Cordahl	2607 25th St. So. Fgo		12-14-17

Printed Name	Signature	Address	Comment	Date
Donald Griffin	Donald Griffin	12 ~~14~~ Fargo 17 (1525 - 17th St So.		12/14/17
Beverly Cordan	Beverly Cordan	2607 25th Ave S. Fargo		12/14/17
DONALD HENSCH	Donald Hensch	1812 34 St So 750		12-14-17
Ray Clark	Ray Clark	1415-8 12 St S FGO		12-14-17
Elgin McDaniel	Elgin McDaniel	1430 34th St So Fgo 58103		12-14-17
Vern Wickoren	Vern Wickoren	1812-14 Ave Fargo		11/14/17
Dan Kittelson	Dan Kittelson	1216 8th St North Fargo		12/14/17
Anthony J. Steidl	Anthony Steidl	341 Prairiewood Cir, #201		12/14/17
Andrea Samsten ↔	Andrea Samsten	1430 10th Street W West Fargo (58078)		12/14/17
JACK MALUSKY	J Malusky	814 OAK ST W FARGO 58078		12/14/17
Marcene Malusky	Marcene Malusky	814 Oak St West Fargo 58078		12/14/17
Robert Reierson	[illegible]	705 Elizabeth St Tower City ND		12-14-17
Edmund GRUCHALLA	[illegible]	3236 EVERGREEN CIRCLE FARGO ND		12-14-17
GERALD JERNBERG	Gerald Jernberg	2207-18th AV. SO.		12/14/17
Mavis Coen	Mavis J. Coen	1534 30th Ave. So.		12-14-17
DAVID A. COEN	David Coen	1534-30th AVE. S. FARGO, ND.		12-14-17
TRANA ROGHE	Trana Roghe	5477 Co Rd #1 Kindred ND		12-14-17

Petition to protect Theodore Roosevelt National Park from building of an oil refinery within 2 ½ miles of the Park.

Petition summary and background	Currently Meridian Oil company has submitted a request to the Public Service Commission and the Health Department for permits to build a oil refinery within 3 miles of the Theodore Roosevelt National Park. This petition requests that these permits be denied because it is too close to the park.
Action petitioned for	We, the undersigned, are concerned citizens who urge our leaders specifically the ND Public Service Commission and the to act now to prohibit the building of a oil refineries by rejecting the permits for the Davis Refinery within 3 miles of Theodore Roosevelt National Park.

Printed Name	Signature	Address	Comment	Date
DAVE ANDERSON	Dave Anderson	2306 Chakery St S		12/13/17
BRAD W PAVEK	Brad W Pavek	1045 1st St N. FARGO		12-13-17
Christina Hammer		541 4th Ave nw, WF		12/13/17
RICHARD LARSON	Richard Larson	1714-11 ST. S. Fargo		12-13-17
ERIN FELTZ		114 5th Ave E. WF		12-13-17
EDWARD BERDAHL	Edward Berdahl	4389 16th AVE SE, Horace		12/13/17
MARGARET HAGLUND Margaret Haglund	Margaret Haglund	6304 BROADWAY ST NW MHD MN		12/13/17
Cheryl Zimprich	Cheryl Zimprich	2806 9th St. N Fgo		12/13/17
Roger Haglund	Roger Haglund	6304 Broadway St NW, Moorhead, MN		12/13/17
Barbara Rising	Barbara Rising	1446 6th St S Fgo		12/13/17
Ronald Zimprich	Ronald Zimprich	2806 9th ST N Fargo		12/13/17
David Dehoff	David Dehoff	1019 9Ave S Moorhead MN		12/13

Printed Name	Signature	Address	Comment	Date
Joseph Gonzales	Joseph Gonzales	826 27th St. N		12/13/17
Jolene Gonzales		826 27th ST N FARGO	HELP KEEP OUR PARKS CLEAN & SAFE!	12/13/17
Katie Preston		604 1/2 Main Ave, Fargo, ND 58102		12/13/17
Sarah Hewitt	Sarah Hewitt	901 9th St N Moorhead, MN 56560		12/13/17
Lucy Love	Lucy Love	4240 17th Ave. S Apt. 9 Fargo, ND 58103		12/13/17
Amber Erbes		726 Sunset Dr. Mapleton, ND 58059		12/13/17
LIDIA KRASNIEWSKA		26 Briarwood pl. Fargo ND		12/13/17
KATHY LUTHER	Kathy Luther	5501 32nd Str S Fargo		12/13/17
Jaclyn Hanson	Jaclyn Hanson	66 32nd Ave NE Fargo		12/13/17
Brooke Rogers		3622 Harrison St S Fargo, ND 58104		12/13/17
Steve Miller		1002 47th Ave N Fargo ND 58102		12/13/17
Brooke Anglin		2001 23rd St S #203 Fargo ND 58103		12/13/17
Phyllis Crowe		3040 10th St N #208 Fargo, ND 58102		12/13/17
LARRY WURGLER	Larry Wurgler	1518 12th St N. FARGO, ND 58102		12/14/17
Deborah Tight	Deborah Tight	3213 Park St. N Fargo 58102		12/14/17
Laurie Paisley	Laurie Paisley	979 14th Ave E W. Fgo ND 58078		12/14/17

Hamre, John G.

From: Fedorchak, Julie L.
Sent: Tuesday, December 19, 2017 2:37 PM
To: Hamre, John G.
Subject: Fwd: Dec 19, 2017 Meridian Meeting

For the I File. Thanks.

Sent from my iPhone

Begin forwarded message:

From: Kevin Uttech <bararrow.ranch@gmail.com>
Date: December 19, 2017 at 12:47:46 PM CST
To: pfahn@nd.gov, jfedorchak@nd.gov
Subject: Dec 19, 2017 Meridian Meeting

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December 19, 2017

Via Email & U.S. Mail

Patrick Fahn
Director, Public Utilities Division
Public Service Commission
State of North Dakota

Dear Mr. Fahn,

I spent this morning watching the meeting with Meridian Energy via the internet on the siting of the proposed Davis Refinery. Watching and listening to the responses, I had to email a rebuttal to a few propaganda lies that are bothering me.

First off, I am the power of attorney for a senior citizen living one mile from the proposed site. Mr. Kessel flat out lied when he stated he was the only one that lived near the refinery site. There are residences within 200 yards to one half mile from the proposed site. Mr. Kessel is on the Meridian Board, an investor and will make approximately 9 (nine) to 10 (ten) million for his property, thus he has a large monetary stake to get this refinery constructed. Second, Mr. Kessel stated a large percentage of the people in the area are for the construction of the refinery. This is not true! Not everyone is on board for the siting of the refinery. Thirdly, it will bring tax revenue to Billings County as stated, but, Billings County taxes are extremely affordable for agricultural land and are the lowest in the state. 40 acres is about 450 dollars per year and that is with the current increase.

It was mentioned that the Dakota aquifer formation has a bit more salt than sea water. That is a lie! The Dakota formation has been used by the oil industry for a disposal formation for oil field waste, and salt water for decades. The water being removed would not be like sea water, but a combination of brine and oil field wastes. After this water has been treated and approximately only 40 percent of the usable water removed, the rest would have to be classified as an industrial waste stream. Industrial wastes can only be injected back into an aquifer by a class 1 injection well, it can not be treated like oil field waste and put down a salt water disposal well or evaporated in ponds. Also, Meridian always states they will use the municipal sewer water or run off from rain storms. It's plain to see that Belfield is not large enough to have the proposed Davis refinery utilizing the water from the sewer lagoon. As for run off, this area is semi arid and lately very dry. A 100 year rain storm might produce enough water for part of a day, if that, and collecting the rain run off could affect the Belfield recreational dam used by the community located just east of the proposed site.

As for the pipeline to feed the proposed refinery, looking at a map of the pipelines in the state of North Dakota, there are none that could feed this without digging in a new feed line. The existing pipelines that are close, the rail spur/Bakken Link are owned or operated by Tesoro to feed their Dickinson, Mandan and St. Paul Park Refinery as far as my research can tell. Why would Tesoro pump oil to a competitor which would be the Davis refinery? So, it seems that since the rail option has been eliminated from their amended permit and a pipeline is nonexistent, it only can mean allot of trucks on the road.

As I am an advocate for a Senior citizen, I have to say the odor and emission will definitely affect this individuals quality of life. As an example, when a farmer is going to spray crops close to the property, this Senior has to ether leave home or be confined to the house as the odor affects the breathing and heart rate. Living close to the refinery which will emit tons of VOC, NOx, and SO2 and other gasses each year, as well as the increase in truck traffic, will be very detrimental to this Senior citizen's health and not to mention quality of life. Is this individual supposed to sell and move or be confined to the house just so Meridian can make a buck? This is why it infuriates me to no end that a group like Meridian Energy which includes Mr. Kessel, can move in and ruin peoples lives and think nothing about it? This is a typical case of the powerful stepping on the weak. I hope that the PSC will seriously push to have a siting review so public comments can be made on this proposed disaster.

Respectfully,

Kevin Uttech
701-523-6452

Cc: Julie Fedorchak

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Hamre, John G.

From: Fedorchak, Julie L.
Sent: Thursday, December 21, 2017 3:57 PM
To: Hamre, John G.
Subject: FW: Tuesday's PSC Hearing

HI John – Here is a note that should probably be added to the I-File on the Meridian/Davis Refinery.

Thanks . Julie

From: William Prentice [mailto:wprentice@MegiCorp.com]
Sent: Wednesday, December 20, 2017 9:08 PM
To: Fedorchak, Julie L.
Subject: Tuesday's PSC Hearing

CAUTION: This email originated from an outside source. Do not click links or open attachments unless you know they are safe.

Wednesday, December 20, 2017

Dear Commissioner Fedorchak,

I just wanted to send you a note thanking you, and the other Commissioners and PSC Staff, for taking the time on Tuesday to meet with me and the other members of the Meridian family. We are very grateful for the opportunity to discuss the Davis Refinery project, and our immediate plans.

Although we disagree on the efficacy of an early siting process for the initial phases of Davis, it is obvious to me that you have the best interests of the State of North Dakota at heart, and the citizens of this state are very fortunate to have you on the Commission.

I would like to keep the dialogue open, and hope that you are amenable to meeting again in the near future to continue the discussions.

Thank you again for your interest and consideration.

Sincerely,

Bill

William C. Prentice
Chairman and Chief Executive Officer
MERIDIAN ENERGY GROUP, INC.
2070 Business Center Drive, Irvine CA 92612
949.207.3815 (o) 949.981.4404 (m)
WPrentice@MegiCorp.Com
www.meridianenergygroupinc.com

18 I-16-0188 Filed 12/20/2017 Pages: 2
Follow up comments regarding 19 Dec. 2017 informational meeting
Meridian Energy Group, Inc.
William Prentice, Chairman

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-Info-Public Service Commission

From: DONALD MARGIE JABLONSKY <donaldjablonsky@msn.com>
Sent: Thursday, January 25, 2018 8:42 AM
To: -Info-Public Service Commission
Subject: Davis Refinery

***** CAUTION: This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****

To the Public Service Commissioners:
I am a resident of Belfield for mover 70 years. In regard to the Davis Refinery, I urge you to approve the Refinery application.
The application and scrutiny should be based on the findings and not on personal feelings expressed at various meetings.

Sincerely
Donald Jablonsky

-Info-Public Service Commission

From: Marylu Weber <marylu.weber@gmail.com>
Sent: Friday, January 26, 2018 1:29 PM
To: DOH, Air Quality
Cc: -Info-State Water Commission; -Info-Public Service Commission; Wendy Ross; jroswick2@bis.midco.net; Cailey Hippe
Subject: location of refinery near TRNP
Attachments: refinery letter, January 26, 2018.docx

CAUTION: This email originated from an outside source. Do not click links or open attachments unless you know they are safe.

Thank you for the opportunity to comment on the location of the proposed refinery. Attached is a letter from the board of Directors of North Dakota Badlands Horse.

Marylu Weber

January 26, 2018

North Dakota Department of Health
Division of Air Quality
918 E. Divide Avenue
Bismarck, ND 58501-1947

RE: Location of the proposed Davis Refinery near Theodore Roosevelt National Park

Dear North Dakota Department of Health, Division of Air Quality:

I am writing on behalf of North Dakota Badlands Horse, a 501 (c) (3) nonprofit, registered in North Dakota, which advocates for the wild horses in Theodore Roosevelt National Park (TRNP) and assists park staff with capture, care, and placing of wild horses when they are culled from the herd. Several of our followers regularly hike and ride in the park and work with the captured horses in the handling facility on the east side of the park, only a few miles from the proposed site of this refinery.
I would like to express our opposition to the current proposed site of the Davis Refinery near TRNP based on the following concerns:

1. **Meridian's avoidance of a comprehensive site approval by the North Dakota Public Service Commission**

   By reducing their proposed output from 55,000 to just under 50,000 barrels per day, Meridian is avoiding a more in-depth study into the appropriateness of this site.

2. **Air, light, noise, and view, pollution**

   TRNP is home to thousands of wild animals besides the horses. Those beautiful animals bring in tourists from all over the world and regular visitors who return to the park again and again to view, photograph, and enjoy the animals and the unique landscapes. Particles released into the air along with the exhaust of additional truck traffic will impact the air all animals and visitors will have to breath. TRNP has already been greatly impacted by light and view pollution from the encroaching oil industry. When we look around the park from various highpoints, we can already see wells and flares that pollute the air and the night skies. Large trucks are

constantly rumbling past the park. This refinery will increase all these types of pollution to one of the most pristine wilderness areas in North Dakota.

3. **Water usage**

   Is there enough water in that area to support the use of 50,000 gallons of water per day? When drought lowers the water supply in aquifers, will there be enough water for area ranches that depend on that water for their livestock and livelihood and for the wildlife in the park?

North Dakota is blessed to have this beautiful park in the midst of the unique Badlands. Yet much of the Badlands have already been marred by oil production. Is there not a site farther from the park that would allow this refinery and the jobs it creates without having such an impact on the park? Please do not let the desire for profits destroy this beautiful place loved by so many. Please see that the Public Service Commission has the responsibility and the opportunity to study the site proposal for this refinery and see that a cherished icon of North Dakota history and tourism is preserved for generations to come.

Respectfully submitted,

Marylu Weber, President, North Dakota Badlands Horse

The Board of Directors of North Dakota Badlands Horse

Roger O. and Patricia D. Ashley, 11720 30th Street SW, Dickinson, ND 58601

January 25, 2018

Julie Fedorchak
Public Service Commission
600 E. Boulevard, Dept. 408
Bismarck, ND 58505-0480

Dear Commissioner Fedorchak,

Please find enclosed comments we made to the North Dakota Department of Health on Meridian Energy Group Inc.'s proposed Davis Refinery.

We feel a project such as this with its close proximity to Theodore Roosevelt National Park should have an overarching review such as can be provided by the Public Service Commission.

Thank you.

Sincerely,

Roger O. Ashley

Patricia D. Ashley

Roger O. and Patricia D. Ashley, 11720 30th Street SW, Dickinson, ND 58601

January 23, 2018

Terry O'Clair, P.E., Director
North Dakota Department of Health
Division of Air Quality
918 E. Divide Ave., 2nd floor
Bismarck, ND 58501-1947

RE: Meridian Energy Group Inc.'s Davis Refinery Air Quality Application

Dear Mr. O'Clair,

We value clean air and open spaces and are blessed to have Theodore Roosevelt National Park with its Class I airshed designation. In today's built environment, places like the National Park should receive even more protection from development within and outside the park. In addition to Class I airshed designation the area is North Dakota's number one tourist attraction, drew 760,458 visitors in 2016, provided employment for 654 people within a 50-mile radius and generated $47.8 million in economic activity.[1]

Meridian is asking to establish the Davis Refinery, an industrial complex, on the doorstep of Theodore Roosevelt National Park that will dump tons of pollutants into the air we breathe, affecting our health as well as contributing to visibility issues. Refineries release toxins including benzene, hydrogen cyanide and lead which can cause cancer, birth defects, and chronic conditions such as asthma.[2] Billings and Stark Counties are currently high-risk counties, above the EPA level of concern for cancer risk, with a county-wide average cancer risk equal to or greater than 1 in 1 million. And Divide, Dunn, McKenzie, Mountrail and Williams counties have cancer risks over 1 in 250,000.[3] This study was based on EPA's most recent National Air Toxics Assessment (NATA) analysis and only includes toxic air emissions from the oil and gas industry it does not include health impacts from particulate matter and ozone-related air emissions, nor does it include health impacts of water contamination cause by the oil and gas industry. Nor does it include the increased truck traffic and changes in land use. The North Dakota Department of Health should be protecting its citizens from unnecessary health risks posed by refineries.

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[1] "Visitation at Theodore Roosevelt National Park last year sets attendance record," *Bismarck (North Dakota) Tribune*, 10 May 2017; electronic edition, *Bismarck Tribune* (http://bismarcktribune.com/news/state-and-regional/visitation-at-theodore-roosevelt-national-park-last-year-sets-attendance/article_c7991ad6-e060-552d-9401-34bbe2026a68.html : verified 23 January 2018).

[2] Lesley Fleischman and Marcus Franklin, *Fumes Across the Fence-Line: The Health Impacts of Air Pollution from Oil & Gas Facilities on African American Communities* (n.p.: NAACP, 2017), 21; digital images, NAACP (http://www.naacp.org/climate-justice-resources/fumes-across-fence-line/ : accessed 9 January 2018).

[3] Lesley Fleischman, *Fossil Fumes: A public health analysis of toxic air pollution from the oil and gas industry* (n.p.: Clean Air Task Force, 2016), 5; digital images, *Clean Air Task Force* (http://www.catf.us/resources/publications/view/221 : accessed 9 January 2018).

In addition to health risks associated with this type of development negative impact to air quality will create issues with smog. The mixing of ozone, NOx, SOx, particulate matter and volatile organic compounds will create a brown cloud and haze that will decrease visibility within the National Park and adjacent areas. We have experienced smog in western North Dakota particularly at the height of flaring. Even now with a reduction in flaring there are still some days when we see smog. The nearby Belfield gas plant located south of Belfield also contributes pollutants into the air but this is partially offset by a reduction in flaring and off gassing that was being done prior to the natural gas plant construction. The proposed Davis Refinery will increase the level of pollutants in the air without any reduction in air pollutants from oil wells in adjacent areas around the plant. Various sources big and small contribute to smog. The refinery is expected to generate at least 170 round trips per day for trucks hauling refined products.[4] With the addition of the air pollutants from the proposed Davis Refinery to the Belfield gas plant, the oil-loading rail facility, traffic on I-94 and U.S. Highway 85, flaring from nearby oil wells, the soon to be constructed OIT thermal treatment facility, etc. the area will have a considerable amount of pollutants that will mix causing an increase in health and visibility issues. Why isn't the North Dakota Department of Health considering the entire load of pollutants in the air? No barrier can be built to keep pollutants from various sources separate. There are many areas within North Dakota that have roads, rails and pipelines that can host a refinery without being sited next to a Class I airshed, a National Park and North Dakota's number 1 tourist attraction.

Meridian has touted the proposed Davis Refinery will use technology that has never been integrated as it is in this proposed project. This technology is unproven as a whole system, yet they have arrived at an estimated tons of pollutants generated. In Vepica, USA, Inc's Emissions Inventory Document dated 03/17/17, Sheet 19 of 35 the company states in Section 5.2 Emission Estimation – Basis and Assumptions in the first bulleted paragraph, ***Since this is a new refinery, and site-specific measurement or test data are not available, default emission factors (Methodology Ranks 5, or 4, as applicable) were used to estimate criteria pollutant and HAPs emissions, unless noted otherwise. For new industrial sources with no actual monitoring or direct measurements, the methodology ranks above mentioned were used since they are based on typical refinery average stream concentrations and statistical default process compositions. Also, when available, actual engineering/licensor data or vendor guarantees were used as preferred emissions factors.***

In several sections of Meridian's application Meridian has stated that they will use "fuel gas" in processes that require heaters. A letter dated March 22, 2017 from Born Inc., Tulsa, 5410 S 49th W Avenue, Tulsa, Oklahoma 74107, Subject: Emissions From Born Heaters supporting the Meridian application, was used as one of the guarantee or manufacturers specifications. This

[4] Vepica USA, Inc., "Emissions Inventory," A.9.1 Paved Roads Dust, Section 9: Fugitive Dust, sheet A-31 of A-34.

guarantee of specification has five footnotes. The 5th footnote reads, ***Above emissions are valid for clean natural gas firing only. If available fuel is not natural gas, detailed composition is required to analyze and provide emission values.*** If the modelers for this project used vendor or manufacturer guarantee/specification where did the detailed composition of the fuel gas come from that was used in generating the mean values published in the application? Apparently Born Inc., Tulsa has some reservations using other fuel gases to specify natural gas in their equipment performance data. Vendor guarantees and engineering/licensor data are very specific. Variations can significantly impact performance of equipment.

Estimated values generated by models is dependent upon assumptions and data used. Table 4c: Davis Refinery – Summary of Applicable Air Pollution Control Technologies by Source Category Stationary Sources (Process Heaters and Boilers) on page 12 of Controls Technology Review indicates a rating of 79% for SCR w/Low NOx burners. We are not sure how the value 79% was arrived at given the values shown in the Born Inc., Tulsa specifications/guarantee. Values such as 79% tend to impart the idea that the value generated is more precise than what it really is. Considering that the NO_2 rate reported as "result" (the author must have meant estimated) is only 4% less than the one-hour SIL set by the North Dakota Department of Health for Class II air, there is no room for error.[5]

Assumptions, guarantees and data used to generate the estimated levels of pollutants emitted into the air should be scrutinized by independent experts hired by the state. Considering the air quality application of 55,000 bpd exceeds the Public Service Commission review limit of 50,000 bpd the North Dakota Department of Health should withhold the permit to construct until Meridian submits and passes a review by the Public Service Commission. Meridian's application states that they will first build to 27,500 bpd and then in two to three years build the proposed refinery to 55,000 bpd. Even if it takes them 10 years to build up to 55,000 bpd it is still the same project. William Prentice, CEO for Meridian, told investors in a webinar in early 2017 "We fully expect that the finalized refinery will be well above 55,000 barrels per day in capacity."[6]

For a state agency to participate in helping a company circumvent a part of the regulatory process is unethical. Since Meridian is telling one agency one thing and turning around and telling the Public Service Commission something else, should the North Dakota Department of Health believe the application Meridian submitted?

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[5] Miguel A. Martinez and Edward H. Martinez, "Table 7A. Summary of Modeled Highest Values Compared to NDDoH SILS (ug/m^3) Primary Operating Scenario Davis Refinery Project, Billings, County, ND," *in* "Summary Report of Air Dispersion Modeling Results in support of an application for air contaminate discharge permit Meridian Energy Group Inc., Davis Refinery, Billings County, North Dakota," April 2017, p. 12.

[6] Amy Dalrymple and Jessica Holdman, "Regulators get 'mixed message' from refinery developer," *Bismarck (North Dakota) Tribune*, 2 July 2017, p. 1.

Meridian describes itself as a "development state firm that has no operating history."[7] Why should they be trusted to build and operate a refinery next to a National Park? This is unproven technology and the place to test it is not next door to a National Park that was named for, and honors, this country's greatest conservationist.

We have lived in large cities and major metropolitan areas but over 20 years ago we chose to live in western North Dakota because of its clean air and open spaces. We are concerned about the addition of the proposed Davis Refinery's HAP, VOCs, O_3, NOx, SOx and particular matter to an already impacted air quality by industrial development, primarily the result of oil and gas development, that will affect our health and the enjoyment of the National Park and the National Grasslands. If NDDoH issues this permit as proposed we believe that through this exposure we are likely to experience long term respiratory problems and/or cancer from air pollutants emitted by Davis Refinery.

We urge you to deny this permit, but if you must approve it please put a condition on it that Meridian will have to obtain a siting permit from the Public Service Commission. Thank you.

Sincerely,

Roger O. Ashley

Patricia D. Ashley

cc: Governor Doug Burgum
Julie Fedorchak, Public Service Commissioner

COPY

[7] Meridian Energy Group, Inc., "Confidential Private Placement Offering Memorandum," January 27, 2017; digital images, (http://gatekeeper.itexange.com/proadmin/docs/1a-$5-meriidan-ppm-rev-01.27.2017-1486491882.pdf : accessed 10 January 2018).

Fredrikson & BYRON, P.A.

February 1, 2018

HAND-DELIVERED

Mr. Randy Christmann
Ms. Julie Fedorchak
Mr. Brian Kroshus
North Dakota Public Service Commission
600 E. Boulevard, Dept. 408
Bismarck, ND 58505-0480

RE: December 19, 2017 Meeting Concerning Davis Refinery

Dear Commissioners Christmann, Fedorchak and Kroshus:

Indroduction

I write on behalf of Meridian Energy Group, Inc. ("Meridian") as a follow up to the meeting had on December 19, 2017 between representatives of Meridian and you as Commissioners of the North Dakota Public Service Commission ("Commission") and your staff relative to Meridian's plans to construct the Davis Refinery in Billings County, North Dakota. This letter is to thank you for the meeting and to augment the letters dated July 20, 2016 and March 14, 2017 and the discussions had on December 19, 2017.

Background

Meridian was formed to build and operate the Davis Refinery an advance technology crude oil refinery proposed to be constructed near Belfield, North Dakota. Currently, Meridian's plans are to construct the Davis Refinery with a capacity of 27,500 barrels of Bakken crude oil per day. Depending upon the success of the refinery, at a later date, the Davis Refinery may be expanded. At this time there are no plans to design or construct a refinery capable of refining greater than 49,500 barrels of oil per day.

Handing Over Jurisdiction to the PSC

Opponents of the Davis Refinery make unfounded and unsupported accusations about the Commission's jurisdiction over construction of the Davis Refinery. Those misrepresentations do the public disservice by only serving to confuse the public as to the Commission's role with respect to regulating energy conversion facilities. Those misrepresentations also fail to recognize, or indeed ignore, the plain language of Section 49-22.1-03 of the North Dakota

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Century Code. Section 49-22.1-03 defines "energy conversion facility" as a "plant, addition, or combination of plant and addition, designed for or capable of . . . [m]anufacture or refinement of 50,000 barrels . . . or more of liquid hydrocarbon products per day." Because the Davis Refinery is not being designed nor will it be capable of refining more than 27,500 barrels of oil per day, the Commission, contrary to those who oppose the Davis Refinery, does not have jurisdiction over construction of the refinery.

Reducing Local Control

Those who oppose the Davis Refinery also seek to override the local procedural steps that have already been secured by Meridian. In the event Meridian were to agree to PSC jurisdiction, local political subdivisions would likely conclude that their previous decisions were meaningless and a total waste of time. As such, requesting Meridian to ignore the plain language of North Dakota's Energy Conversion and Transmission Facilities Act and submitting to Commission jurisdiction as suggested by those opposed to the Davis Refinery, is unfair, unrealistic and ultimately counterproductive to Meridian as well as the local subdivisions who have already passed judgment on the refinery. Moreover, it favors those who oppose the construction of any energy conversion facility over the regulated entity seeking approval. The implications of this sort of favoritism is clear. Even the smallest of projects will be subject to more criticism by out-of-state groups, more protests, more litigation, and more delay. The likely result is that energy conversion projects that would otherwise be constructed in North Dakota will be constructed elsewhere.

Conclusion

North Dakota is on the cusp of history as Meridian proposes to locate in Billings County the world's cleanest refinery. The Davis Refinery will be the first digital refinery and when completed will set new standards for pollution control. The Davis Refinery will create up to 200 high pay, highly skilled direct jobs and based on Washington State studies showing a multiplier effect of over 12:1, total increased employment of up to 2,400 in the area. Because the Davis Refinery is not designed for, nor will it be capable of refining more than 50,000 barrels of oil per day, it need not be sited by the Commission under the provisions of Chapter 49.22.1 of the North Dakota Century Code.

Once again, thank you for granting Meridian the opportunity on December 19, 2017 to meet with you and hopefully clarify, and explain Meridian's plans with respect to construction of the Davis Refinery.

Sincerely,

LAWRENCE BENDER

LB/ed
63184894.2

Hamre, John G.

From: Fedorchak, Julie L.
Sent: Wednesday, February 28, 2018 5:03 PM
To: Hamre, John G.
Subject: FW: BCA Comments to DOH re: proposed Meridian Refinery
Attachments: BCA Comments Draft DOH PtC.pdf

This should be added to the I-File on Davis/Meridian refinery. tHANKS!

-----Original Message-----
From: Jan Swenson [mailto:bcajan@bis.midco.net]
Sent: Thursday, January 25, 2018 8:07 PM
To: Fedorchak, Julie L.
Subject: BCA Comments to DOH re: proposed Meridian Refinery

***** CAUTION: This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****

Commissioner Fedorchak,

Please find attached the comments Badlands Conservation Alliance submitted to the ND Department of Health-Air Quality Division as regards Meridian Energy's proposed refinery next to Theodore Roosevelt National Park. BCA thanks you and your fellow PSC Commissioners for the leadership you have shown on this issue and encourage your continued engagement.

For those of us that hold the Park and its integrity as key to our pride and love for our state of North Dakota, your actions and words have been greatly appreciated. Keep it up. Again, thank you.

Respectfully,
Jan

Jan Swenson
Badlands Conservation Alliance
701-255-4958
bcajan@bis.midco.net

_____
This transmission, email and any files transmitted with it, may be: (1) subject to the Attorney-Client Privilege, (2) an attorney work product, or (3) strictly confidential under federal or state law. If you are not the intended recipient of this message, you may not use, disclose, print, copy or disseminate this information. If you have received this transmission in error, notify the sender (only) and delete the message. This message may also be subject to disclosure under the North Dakota Open Records Laws.

BADLANDS CONSERVATION ALLIANCE
A VOICE FOR WILD NORTH DAKOTA PLACES

801 N 10 ST
Bismarck, ND 58501
701-255-4958
BadlandsConservationAlliance.org.

North Dakota Department of Health
Air Quality Division
Terry L. O'Clair, PE, Director
1918 E Divide AVE
Bismarck, ND 585501-1947

January 23, 2018

Dear Mr. O'Clair:

Badlands Conservation Alliance (BCA) is a western North Dakota based non-profit organization focused on public lands and public natural resources in western North Dakota, particularly Theodore Roosevelt National Park and the Little Missouri National Grassland. Many of our members live in or originated in the small communities and rural landscapes surrounding these public lands. Members hold significant familiarity with these lands and value them for a host of ecological, heritage and personal reasons, frequently through multiple generations.

BCA members have participated in the public process for Meridian Energy's proposed Davis Refinery from the beginning. BCA members locally resident to the proposed site within 3 miles of Theodore Roosevelt National Park as well as those from across the state have attended all related meetings and hearings, commencing with Billings County Planning & Zoning and the three hearings held by the Billings County Commission. BCA has submitted formal comment at every public opportunity, as we did at last week's Department of Health hearing and as we do today.

Throughout this process we have watched Meridian change its numbers and development plan dependent on whom they are talking to and what best fits Meridian's own self-interest - be that government entities at local and state levels, potential investors, the local community or the general public. BCA finds it particularly egregious that Meridian is avoiding the ND Public Service Commission's (PSC) siting review by claiming a 49,500 BBL per day capacity while all other applications have clearly stated an intended 55,000 BBL per day.

BCA has consistently opposed the proposed location of a refinery at such near proximity to the state and nation's Theodore Roosevelt National Park and cannot help but wonder how a company could rationalize such a siting. To select such an obviously contentious site is beyond our understanding of good business practice and common sense. A refinery can be located elsewhere; the existing National Park cannot.

It is BCA's position that the ND DOH Air Quality Division has the authority, and should in good conscience deny the application for a Permit to Construct at this location. Such an action would save time, money, and angst for all involved and ultimately allow Meridian to apply its energy toward a more suitable location for an oil refinery.

ND Century Code 23-25-01.1 states: *It is hereby declared to be the public policy of this state and the legislative intent of this chapter to achieve and maintain the best air quality possible, consistent with the best available control technology, to protect human health, welfare, and property, to prevent injury to plant and animal life, to promote the economic and social development of this state, to foster the comfort and convenience of the people, and to facilitate the enjoyment of the natural attractions of this state.* This declaration of public policy clearly allows you the authority to deny this application.

Theodore Roosevelt National Park is the number one tourist destination in North Dakota with 753,880 visitors in 2016. That is 1500 short of the US Census Bureau's 2017 estimate of the entire population of our state. BCA members with cars bearing ND license plates often report being approached by Park visitors questioning our state's seemingly casual siting of industrial development visible within Park boundaries.

There are circumstances when this is inescapable. The proposed Meridian refinery is not one of them.

The *Cooling Tower Plume Visibility Analysis* cited by Meridian as to whether the proposed refinery will have visual impacts on the Park is less than adequate. Meridian's frequent reference to it as proof that the refinery will not be visible from the Park is misleading and simply wrong. The four locations chosen for analysis omit the most obvious eastern boundary area of the Park closest to the refinery. Many Park visitors do not limit themselves to the "public gathering places" representative of the four locations, but use the trail system that includes the east boundary Rim Trail clearly delineated on official South Unit maps. Furthermore, visitors are not limited to trails and many seek-off trail experience, BCA among them.

BCA members have firsthand, on the ground experience with that eastern portion of the Park and can readily claim that the proposed refinery site is visible to the naked eye from the Park. To say otherwise is a lie. Table 7 on page 5 of the *Cooling Tower Plume Visibility Analysis* charts the 15 top measurements for <u>Visible Plumes Above the Buckhill Trail Horizon</u>. If one were to transpose the height of the tallest plume (175.48 feet) to the eastern portion of the Park where the refinery site is clearly visible and add the fifty-foot tall cooling tower, total plume blight could reach 225.48 feet, or 16 feet short of the height of the ND Capitol Building. This is no small impact on the Park.

Furthermore, Meridian has again provided mixed messages as to how frequently that maximum plume blight might occur, with no mention of frequency at lesser visible heights. At the December 19, 2017 PSC meeting with Meridian, William Prentice stated that there was potential for the maximum-rated plume to be visible from Buck Hill 30 days per year. In a January 14, 2018 Bismarck Tribune that number was an estimated 15 daylight hours per year as attributed to Meridian's Dan Hedrington. Do they actually know?

BCA questions whether we can trust any of Meridian's numbers and calculations, including those submitted in their application to the Health Department for a Permit to Construct. While Meridian appears ready to use advanced technologies, individual components have not been tested previously as an integrated system. DOH comments in phone conversations with staff suggest that operations will have to be "very stringent, of course…and expensive" and that

maintaining equipment to continue to meet requirements will be equally costly. BCA is not confident that Meridian has either the experience or the deep pockets necessary to meet those standards.

Beyond our lack of confidence in Meridian as a corporate neighbor, we hold great concern for the integrity of Theodore Roosevelt National Park and proliferating industrialization necking in on it. Our concern includes this specific project as well as the growing cumulative impacts that threaten the very reason the Park exists. BCA opposed construction of the Fryburg Rail Loading Facility when it came before the Billings County Commission on the grounds of proximity to the Park and its potential to encourage further industrialization in the area. The County approved that project completed in 2013 citing local jobs and increased income for county tax rolls, just as it has done here.

However, we must point out that one of the justifications at Billings County hearing in favor of this current Meridian proposal was slumping employment opportunity and decreasing tax income from the Fryburg Rail Facility. How short our memories, and with the potential for repetition here.

Meanwhile, we must also consider potential economic impacts to the Park itself, North Dakota's tourist mecca of Medora, and Park associated businesses and services.

BCA's concerns about cumulative impacts are not unsubstantiated. Again, at the December 2017 PSC meeting with Meridian, Mr. Prentice referenced refinery by-products as potential feedstock for additional area development and it is our understanding Meridian currently holds an option on up to 2000 acres. ND could be well on our way to facilitating an industrial zone as the gateway to our National Park. With Meridian's continued refusal to submit application to the broader PSC site review process, we can only speculate on the aggressiveness of any larger plans. This is unacceptable.

With the coming of the Bakken Boom, North Dakota saw opportunity. Immediate and legitimate concerns with out-migration and insufficient income to feed state budget needs created a political climate where state departments and entities holding conflict with the rate and scale of development were squelched.

No longer in boom times, state government should be exercising a degree of hard gained maturity. A new Governor and state administration needs to re-evaluate what we want for North Dakota's future - what values and key natural, cultural, historic and social treasures we want to hang on to, and which we are willing to sacrifice. We are making that choice right now on our National Park.

Departments and agencies within ND's state government have a wealth of scientific and institutional knowledge. To compartmentalize that expertise is a strategic error. It is coordinated opportunity missed and wise decision-making denied. Consultation and collaboration do not defy authority, they enhance it, as Public Service Commissioners continue to stress to both Meridian and the public.

Humans are biological beings. Advancing technologies and increasing urbanization have had a tendency to separate us from our roots. However, recent studies of human health issues are encouraging a reconnection with nature for the greater well being of both adults and children.

One cannot look at a discussion of modern day ills without the iteration of non-drug treatments that include exercise, mindfulness and sunlight, all of which are enhanced by our presence in nature.

Theodore Roosevelt National Park is not a sought destination merely for recreational pursuits. It is a source of physical, mental and spiritual well-being. It is a place to not only re-make connection with the environment that surrounds us, but with ourselves; and with our place in the larger community, world and universe.

With each infringement on that unique setting and landscape, the power of that place to heal both itself and us is diminished. ND Century Code 23-25-01.1 recognizes that interconnected relationship. BCA opposes the siting of a refinery that impinges on that power to heal. Meridian must seek an alternative location for their refinery. The ND DOH Air Quality Division has a responsibility to deny Meridian's application for a Permit to Construct at this location.

BCA copied and saved the Meridian statement below earlier in the DOH permitting process. It is the final item on their webpage titled Permits and is the only one in quotation marks, italics and highlighted in bold. In recently revisiting that page, BCA found that Meridian has made an edit adding a single word to their statement, a word that reflects the company's proclivity to say anything that will further their self-interest, even when it is not true.

The Environment

"Meridian Energy Group, Inc. is committed to building the cleanest refinery in the world, and has engineered Davis Refinery to the highest environmental standards, including the ability to meet the very strict Class 1 emissions standards which qualifies its proximity to Theodore Roosevelt National Park. Meridian has taken extensive measures to ensure that the Davis Refinery will not negatively impact the natural landscape of the surrounding terrain both during the day and at night, and has <u>conclusively</u> demonstrated that the Refinery will not be seen from the National Park."

https://www.meridianenergygroupinc.com/permits/

BCA can <u>conclusively</u> say otherwise. Air quality will be cleaner in Theodore Roosevelt National Park without the proposed Davis Refinery than with it; even if it were to be "the cleanest refinery on the planet." Deny the Permit to Construct.

Respectfully,

Jan Swenson, ED
Badlands Conservation Alliance

cc: Governor Doug Burgum
ND Public Service Commission

-Info-Public Service Commission

From:	jroswick2@bis.midco.net
Sent:	Thursday, January 25, 2018 9:20 PM
To:	DOH, Air Quality
Cc:	-Info-State Water Commission; -Info-Public Service Commission; wendy_ross@nps.gov
Subject:	DeMores Riders Comments on Proposed Davis Refinery near Theodore Roosevelt National Park

CAUTION: This email originated from an outside source. Do not click links or open attachments unless you know they are safe.

Dear North Dakota Department of Health, Division of Air Quality:

On behalf of the DeMores Riders Board of Directors, we would like to express our opposition to the current proposed site of the Davis Refinery near Theodore Roosevelt National Park (TRNP). The DeMores Riders is a fifty-member horse club which owns forty acres of land adjacent to the eastern border of TRNP. The club has been in existence for fifty years, and was established with the express purpose of providing an opportunity and venue for horse enthusiasts to enjoy trail riding in the beautiful North Dakota Badlands.

Our opposition to the proposed site is based on the following concerns:

1. Lack of a comprehensive siting approval process by the ND-PSC.
It seems clear that Meridian Energy is trying to avoid a comprehensive, coordinated siting process by the North Dakota Public Service Commission, as evidenced by their proposed capacity reduction in the second phase of the project from 55,000 barrels per day to 49,500, thus staying just under the 50,000 threshold which would trigger the more thorough process. Commissioner Fedorchak has spoken on the record in favor of this coordinated siting process. Meridian Energy may be following the letter of the law, but certainly not the spirit. If they want to be good corporate citizens in North Dakota, why not go through the complete, transparent process? It would likely avoid more conflicts in the future and could prevent costly mistakes which would be nearly impossible to undo.

2. Adverse effect on air quality in TRNP.
Our concerns are not only related to the hazardous chemicals released from the refinery during normal operation, flaring, and unforeseen malfunction, but also related to dust from increased truck traffic.

3. Negative effect on views from TRNP.
Meridian's claim that the refinery won't be seen from the Park is based on evaluating four locations: Buck Hill, Painted Canyon Overlook, the Main Visitor Center, and the Amphitheatre. While these are all popular visitor destinations, they are by no means the only ones! Many park visitors explore off-road areas, such as the eastern Rim Trail, both on foot and horseback. The DeMores Riders property is on the east side of the Park, and according to an evaluation by the National Park

Service, the refinery will be visible from about 630 acres on the eastern side of the Park. No amount of tree planting will hide a 150' stack! Additionally, the significant amount of lighting attached to the refinery will negatively impact the dark night skies, a precious resource valued by our members.

4. Noise pollution from both construction and ongoing truck traffic.
Without a comprehensive siting process through the PSC, this factor won't even be evaluated.

5. Water usage.
Meridian's application to the State Water Commission for a permit supporting 55,000 barrels per day processing capacity reflects a lack of transparency in what their actual, long-term intentions really are.

In 1910, Theodore Roosevelt stated "Of all the questions which can come before this nation, there is none which compares in importance with the great central task of leaving this land even a better land for our descendants than it is for us." TRNP is the crown jewel for North Dakota's outdoor recreation and tourism, and a major contributor to western North Dakota's economy. It is unique in its geography, geology, plant and wildlife diversity, and history. Theodore Roosevelt was the ultimate conservationist, and to tarnish the landscape next to a park bearing his name is a betrayal of his legacy and our heritage.

As long-time and consistent stakeholders in TRNP, and landowners in close proximity to the proposed site, we are opposed to construction of a refinery on the front porch of North Dakota's only national park. No doubt the state agencies involved are doing the best they can with the disjointed and incomplete process currently in place. We strongly urge you to use every possible means to utilize the Public Service Commission siting process to evaluate **all** aspects of the project in a thorough, comprehensive manner. In the long run, it's the best way to serve the citizens of North Dakota.

Respectfully submitted,

DeMores Riders Board of Directors
Gary Bach, President 701-799-9476 garybach@rrt.net
Walter Samuel, Vice President
Wendy Wollmuth, Treasurer
Julie Roswick, Secretary 701-220-6400 jroswick2@bis.midco.net
John Lamsters, Board Member
Dave Hoiby, Board Member
Charles Schaefbauer, Board Member
Rod Wagner, Board Member
Henry Weber, Board Member

January 26, 2018

North Dakota Department of Health
Division of Air Quality
918 E. Divide Avenue
Bismarck, ND 58501-1947

RE: DeMores Riders Comments on Proposed Davis Refinery near Theodore Roosevelt National Park

Dear North Dakota Department of Health, Division of Air Quality:

On behalf of the DeMores Riders Board of Directors, we would like to express our opposition to the current proposed site of the Davis Refinery near Theodore Roosevelt National Park (TRNP). The DeMores Riders is a fifty-member horse club which owns forty acres of land adjacent to the eastern border of TRNP. The club has been in existence for fifty years, and was established with the express purpose of providing an opportunity and venue for horse enthusiasts to enjoy trail riding in the beautiful North Dakota Badlands.

Our opposition to the proposed site is based on the following concerns:

1. **Lack of a comprehensive siting approval process by the ND-PSC.**
   It seems clear that Meridian Energy is trying to avoid a comprehensive, coordinated siting process by the North Dakota Public Service Commission, as evidenced by their proposed capacity reduction in the second phase of the project from 55,000 barrels per day to 49,500, thus staying just under the 50,000 threshold which would trigger the more thorough process. Commissioner Fedorchak has spoken on the record in favor of this coordinated siting process. Meridian Energy may be following the letter of the law but certainly not the spirit. If they want to be good corporate citizens in North Dakota, why not go through the complete, transparent process? It would likely avoid more conflicts in the future and could prevent costly mistakes which would be nearly impossible to undo.

2. **Adverse effect on air quality in TRNP.**
   Our concerns are not only related to the hazardous chemicals released from the refinery during normal operation, flaring, and unforeseen malfunction, but also related to dust from increased truck traffic.

3. **Negative effect on views from TRNP.**
   Meridian's claim that the refinery won't be seen from the Park is based on evaluating four locations: Buck Hill, Painted Canyon Overlook, the Main Visitor Center, and the Amphitheatre. While these are all popular visitor destinations, they are by no means the only ones! Many park visitors explore off-road areas, such as the eastern Rim Trail, both on foot and horseback. The DeMores Riders property is on the east side of the Park, and according to an evaluation by the National Park Service, the refinery will be visible from about 630 acres on the eastern side of the Park. No amount of tree planting will hide a 150' stack! Additionally, the significant amount of lighting attached to the refinery will negatively impact the dark night skies, a precious resource valued by our members.

4. **Noise pollution from both construction and ongoing truck traffic.** Without a comprehensive siting process through the PSC, this factor won't even be evaluated.

5. **Water usage.** Meridian's application to the State Water Commission for a permit supporting 55,000 barrels per day processing capacity reflects a lack of transparency in what their actual, long-term intentions really are.

In 1910, Theodore Roosevelt stated "Of all the questions which can come before this nation, there is none which compares in importance with the great central task of leaving this land even a better land for our descendants than it is for us." TRNP is the crown jewel for North Dakota's outdoor recreation and tourism and a major contributor to western North Dakota's economy. It is unique in its geography, geology, plant and wildlife diversity and history. Theodore Roosevelt was the ultimate conservationist, and to tarnish the landscape next to a park bearing his name is a betrayal of his legacy and our heritage.

As long-time and consistent stakeholders in TRNP, and landowners in close proximity to the proposed site, we are opposed to construction of a refinery on the front porch of North Dakota's only national park. No doubt the state agencies involved are doing the best they can with the disjointed and incomplete process currently in place. We strongly urge you to use every possible means to utilize the Public Service Commission siting process to evaluate all aspects of this project in a thorough, comprehensive manner. In the long run, it's the best way to serve the citizens of North Dakota.

Respectfully submitted,

Julie Roswick for

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CC: State of North Dakota, Governor's Office
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North Dakota Public Service Commissioners
Julie Fedorchak, Randy Christmann, Brian Kroshus
Wendy Ross, Superintendent, Theodore Roosevelt National Park