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<b>Case Style</b>	Environmental Law and Policy Center, et al. vs. North Dakota Public Service Commission, et al.
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	<b>CONTROLS TECHNOLOGY REVIEW</b>	<b>VEPICA CODE:</b> P-5715043-01-001-18035-I001	
		<b>COMPANY CODE:</b> TBD	
		<b>ISSUE:</b> 0 <b>DATE:</b> 09/21/16	
		<b>SHEET:</b> 23 <b>OF</b> 26	

### 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% SO2 – 99%
Catalytic Reforming Unit	HAPs	NA – minor emissions levels	NA
Sulfur Recovery Plants	SO <sub>2</sub>	Lo-CAT with tail gas treatment (thermal oxidizer) Other pollutants are considered minor	SO <sub>2</sub> - 99.9%
Blowdown System	CO NOx SO <sub>2</sub>	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



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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 <sub>2.5</sub> - 0.00054 lb/vmt PM <sub>10</sub> - 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)**

# 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



201 N. Church Street,  
Suite 300  
Las Cruces, NM 88001  
Phone (505) 532-1526  
Fax (505) 532-1587

# 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*

*Submitted To:* **North Dakota Department of Health  
Air Quality Division**


*On behalf of:* **Vepica USA, Inc.**  
2002 W Grand Parkway North, Suite 200  
Katy, TX 77449


*Submitted by:*

*Author(s):*



201 N. Church Street, Suite 300  
Las Cruces, New Mexico 88001  
(575) 532-1526 voice  
(575) 532-1587 fax

  
Miguel A. Martinez

  
Edward H. Martinez

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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.

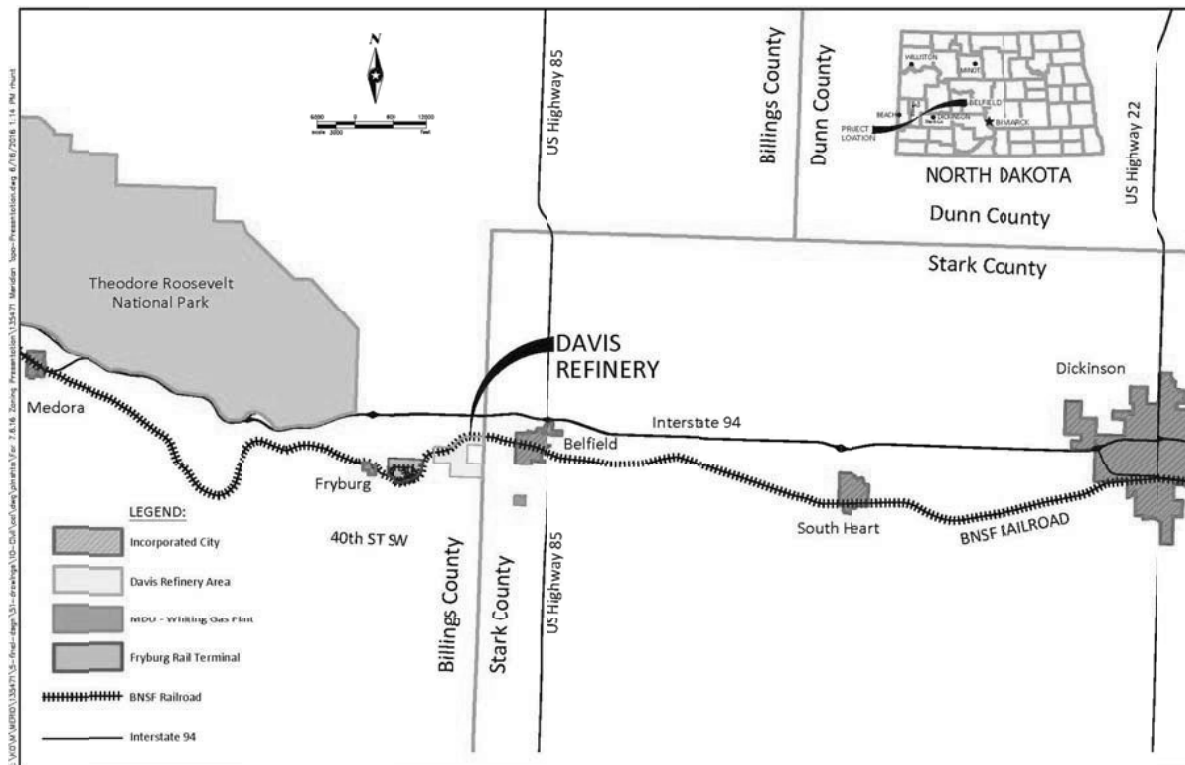


Figure 1: Proposed Site Location Davis Refinery Project, Billings County, ND

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 ( $\mu\text{g}/\text{m}^3$ ) For Preliminary Screening Analysis  
 Davis Refinery Project, Billings County, ND*

Pollutant	1-hour		3-hour		8-hour		24-hour		Annual	
	Class I	Class II	Class I	Class II	Class I	Class II	Class I	Class II	Class I	Class II
SO <sub>2</sub>	--	7.8	1.0	25	--	--	0.2	5	0.1	1
NO <sub>2</sub>	--	7.5	--	--	--	--	--	--	0.1	1
PM <sub>10</sub>	--	--	--	--	--	--	0.2	5	0.1	1
PM <sub>2.5</sub>	--	--	--	--	--	--	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 <sub>2</sub>	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	
<b>Total Short Ton per Year</b>	<b>95.131</b>	<b>0.002</b>	<b>12.266</b>	<b>2.686</b>	<b>8.988</b>	<b>2.596</b>	<b>6.392</b>	<b>54.697</b>	<b>13.969</b>	<b>69.776</b>	<b>10.670</b>	

**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 <sub>2</sub>	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
<b>Total Short Ton per Year</b>	<b>36.594</b>	<b>0.001</b>	<b>5.797</b>	<b>1.218</b>	<b>4.864</b>	<b>1.218</b>	<b>3.646</b>	<b>38.762</b>	<b>3.511</b>	<b>27.716</b>	<b>4.011</b>

## **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 NO<sub>x</sub> 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 BPIP/PRM 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 version 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<sub>2</sub>, NO<sub>2</sub>, PM<sub>10</sub>, PM<sub>2.5</sub>, 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<sub>x</sub> is converted to NO<sub>2</sub>
- 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 BPIPFRM 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 should 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 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 <sup>3</sup> )	Modeled Result (µg/m <sup>3</sup> )	Receptor Location / Coordinate	
			X	Y
PM <sub>10</sub> ; Annual	0.2	6.27E-03	627610.4	5195675.9
PM <sub>10</sub> ; 24 hour	0.2	2.53E-02	622580	5198267
PM <sub>2.5</sub> ; Annual	0.06	2.49E-03	627610.4	5195675.9
PM <sub>2.5</sub> ; 24 hour	0.07	4.69E-02	627610.4	5195675.9
SO <sub>2</sub> ; Annual	0.1	4.92E-03	627610.4	5195675.9
SO <sub>2</sub> ; 24 hour	0.2	1.42E-01	620933.44	5195745.45
SO <sub>2</sub> ; 3 hour	1.0	6.35E-01	627610.4	5195675.9
NO <sub>2</sub> ; 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 <sup>3</sup> )	Modeled Result (µg/m <sup>3</sup> )	Receptor Location / Coordinate	
			X	Y
PM <sub>10</sub> ; Annual	0.2	2.21E-03	627610.4	5195675.9
PM <sub>10</sub> ; 24 hour	0.2	6.32E-02	620933.44	5195745.45
PM <sub>2.5</sub> ; Annual	0.06	1.51E-03	627610.4	5195675.9
PM <sub>2.5</sub> ; 24 hour	0.07	2.46E-02	628110.4	5197675.9
SO <sub>2</sub> ; Annual	0.1	4.53E-02	627610.4	5195675.9
SO <sub>2</sub> ; 24 hour	0.2	8.14E-03	620933.4	5195745.5
SO <sub>2</sub> ; 3 hour	1.0	2.64E-02	620933.4	5195745.5
NO <sub>2</sub> ; 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 <sup>3</sup> )	Modeled Result (µg/m <sup>3</sup> )	Receptor Location / Coordinate	
			X	Y
PM <sub>10</sub> ; Annual	1.0	6.35E-02	634060.375	5193076
PM <sub>10</sub> ; 24 hour	5.0	6.38E-01	633311.375	5192899
PM <sub>2.5</sub> ; Annual	0.3	1.74E-02	634460.4	5192876.0
PM <sub>2.5</sub> ; 24 hour	1.2	1.68E-01	634460.4	5192876.0
SO <sub>2</sub> ; Annual	1.0	2.75E-02	634560.4	5192876.0
SO <sub>2</sub> ; 24 hour	5.0	0.47	634460.4	5192876.0
SO <sub>2</sub> ; 3 hour	25	1.06	627610.4	5193426.0
SO <sub>2</sub> ; 1 hour	7.8	2.17	630960	5195676
NO <sub>2</sub> ; Annual	1.0	2.87E-01	634060.375	5193076
NO <sub>2</sub> ; 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 <sup>3</sup> )	Modeled Result (µg/m <sup>3</sup> )	Receptor Location / Coordinate	
			X	Y
PM <sub>10</sub> ; Annual	1.0	2.21E-02	634060.375	5192876
PM <sub>10</sub> ; 24 hour	5.0	3.31E-01	634060.375	5192876
PM <sub>2.5</sub> ; Annual	0.3	1.28E-02	634060.4	5192976.0
PM <sub>2.5</sub> ; 24 hour	1.2	1.39E-01	634060.4	5192876.0
SO <sub>2</sub> ; Annual	1.0	2.52E-03	634060.4	5192976.0
SO <sub>2</sub> ; 24 hour	5.0	3.55E-02	634060.4	5192876.0
SO <sub>2</sub> ; 3 hour	25	6.82E-02	633372.1	5193743.0
SO <sub>2</sub> ; 1 hour	7.8	1.02E-01	635260.4	5192976
NO <sub>2</sub> ; Annual	1.0	1.27E-01	634060.4	5192976
NO <sub>2</sub> ; 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/m<sup>3</sup>) × weight percentage of each HAP.
  - Maximum 8-hour concentration: Total modeled 8-hour concentration (mg/m<sup>3</sup>) × weight percentage of each HAP.
2. Conducting the MICR analysis using the following equation:
  - $MICR = 1\text{-hour concentration } (\mu\text{g}/\text{m}^3) \times \text{Unit Risk Factor } (\text{m}^3/\mu\text{g})$
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:
  - $\text{Hazard Index} = MC1/GC1 + MC2/GC2 + \dots + MCn/GCn$
  - 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  $4.57 \times 10^{-6}$ , which is less than the NDDH Policy threshold of  $1.00 \times 10^{-5}$ .

The Hazard Index for the proposed new refinery, in aggregate, is  $7.95 \times 10^{-2}$ , 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
- Inventory.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 ANNUAL.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<sup>1</sup>. 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<sup>2</sup> 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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<sup>1</sup> CFR, 2005. EPA Guideline on Air Quality Models. 40 CFR (Code of Federal Regulations) Part 51, Appendix W.

<sup>2</sup> <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 AERSCREEN 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<sup>3</sup>)
- 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)

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<sup>3</sup> EPA, 2009. AERMOD Implementation Guide: March 19, 2009. Accessed at: [http://www.epa.gov/scram001/7thconf/aermod/aermod\\_implmntn\\_guide\\_19March2009.pdf](http://www.epa.gov/scram001/7thconf/aermod/aermod_implmntn_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<sup>4</sup>)
- 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).

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<sup>4</sup> EPA, 2009. AERMOD Implementation Guide: March 19, 2009. Accessed at: [http://www.epa.gov/scram001/7thconf/aermod/aermod\\_implmntn\\_guide\\_19March2009.pdf](http://www.epa.gov/scram001/7thconf/aermod/aermod_implmntn_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<sup>5</sup>.

#### 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 be placed to account for the maximum combined impact of the subject source and the nearby source.

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<sup>5</sup> <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<sub>2</sub>, NO<sub>2</sub>, PM<sub>10</sub>, PM<sub>2.5</sub>, 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<sub>2</sub> and NO<sub>2</sub> are available for several locations on the Department's FTP site<sup>6</sup>. 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<sub>2</sub> Tier 3 analysis.

**NOTE:** The use of hourly background concentration data for SO<sub>2</sub> and NO<sub>2</sub>, 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**  
**( $\mu\text{g}/\text{m}^3$ )**

Pollutant	Averaging Period				
	1-hour	3-hour	8-hour	24-hour	Annual
SO <sub>2</sub>	13	11	---	9	3
NO <sub>2</sub>	35	---	---	---	5
PM <sub>10</sub>	---	---	---	30	15
PM <sub>2.5</sub>	---	---	---	13.7	4.75
CO	1149	---	1149	---	---

<sup>6</sup> <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<sub>2</sub> and NO<sub>2</sub>, and 24-hour NAAQS for PM<sub>10</sub> and PM<sub>2.5</sub>.
  - Use proper settings to implement Tier 3 NO<sub>2</sub> 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<sub>2</sub> to NO<sub>x</sub>. Use of a default value of 0.5 is acceptable without justification.
    - Note that EPA approval is needed regarding protocol for Tier 3 NO<sub>2</sub> 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 times. Location of maximum impact should be subsequent to processing the form of the NAAQS (e.g., 5-year average of annual 99<sup>th</sup> percentile of daily maximum 1-hour average concentration for SO<sub>2</sub>).

**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 include both PDF and MS Word (or other native) versions.

**Table 2**  
**Class II Area Significant Impact Levels**  
**( $\mu\text{g}/\text{m}^3$ )**

Pollutant	Averaging Period				
	1-hour	3-hour	8-hour	24-hour	Annual
SO <sub>2</sub>	7.8	25	---	5	1
NO <sub>2</sub>	7.5	---	---	---	1
PM <sub>10</sub>	---	---	---	5	1
PM <sub>2.5</sub>	---	---	---	1.2	0.3
CO	2000	---	500	---	---

**Table 3**  
**North Dakota and National Ambient Air Quality Standards (AAQS)**  
**Criteria Pollutants ( $\mu\text{g}/\text{m}^3$ )**

<b>Pollutant</b>	<b>Averaging Period</b>	<b>N.D. AAQS</b>	<b>National AAQS</b>
Sulfur Dioxide (SO <sub>2</sub> )	1-hour	196 <sup>2</sup>	196 <sup>2</sup>
	3-hour	1309 <sup>1</sup>	1309 <sup>1</sup>
	24-hour	---	365 <sup>1</sup>
	Annual	---	80
Nitrogen Dioxide (NO <sub>2</sub> )	1-hour	188 <sup>3</sup>	188 <sup>3</sup>
	Annual	100	100
Inhalable Particulate (PM <sub>10</sub> )	24-hour	150 <sup>1</sup>	150 <sup>1</sup>
Particulate (PM <sub>2.5</sub> )	24-hour	35 <sup>4</sup>	35 <sup>4</sup>
	Annual	15 <sup>5</sup>	12 <sup>5</sup>
Carbon Monoxide (CO)	1-hour	40,000 <sup>1</sup>	40,000 <sup>1</sup>
	8-hour	10,000 <sup>1</sup>	10,000 <sup>1</sup>
Lead (Pb)	Quarterly	1.5	1.5

<sup>1</sup> One exceedance per year is permitted.

<sup>2</sup> Based on 3-year average of annual 99<sup>th</sup> percentile (4<sup>th</sup> highest) of daily maximum 1-hour average concentration.

<sup>3</sup> Based on 3-year average of annual 98<sup>th</sup> percentile (8<sup>th</sup> highest) of daily maximum 1-hour average concentration.

<sup>4</sup> Based on 3-year average of annual 98<sup>th</sup> percentile 24-hour concentration.

<sup>5</sup> Based on 3-year average of annual average concentrations.

**Table 4**  
**North Dakota / National Prevention of Significant Deterioration (PSD) Increments**  
**Criteria Pollutants ( $\mu\text{g}/\text{m}^3$ )**

<b>Pollutant</b>	<b>Averaging Period</b>	<b>Class I</b>	<b>Class II</b>	<b>Class III</b>
Sulfur Dioxide (SO <sub>2</sub> )	3-hour	25 <sup>1</sup>	512 <sup>1</sup>	700 <sup>1</sup>
	24-hour	5 <sup>1</sup>	91 <sup>1</sup>	182 <sup>1</sup>
	Annual	2	20	40
Nitrogen Dioxide (NO <sub>2</sub> )	Annual	2.5	25	50
Particulate (PM <sub>10</sub> )	24-hour	8 <sup>1</sup>	30 <sup>1</sup>	60 <sup>1</sup>
	Annual	4	17	34
Particulate (PM <sub>2.5</sub> )	24-hour	2 <sup>1</sup>	9 <sup>1</sup>	18 <sup>1</sup>
	Annual	1	4	8

<sup>1</sup> 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](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](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<sub>2</sub> and SO<sub>2</sub>. HRLYNAAQS provides the annual 98th (NO<sub>2</sub>) or 99th (SO<sub>2</sub>) 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	0.82
117H1701	Isomerization Heater 1 Reactor Charge	633715.339	5193381.258	803.89	10.97	713.04	0.76	1.22
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**

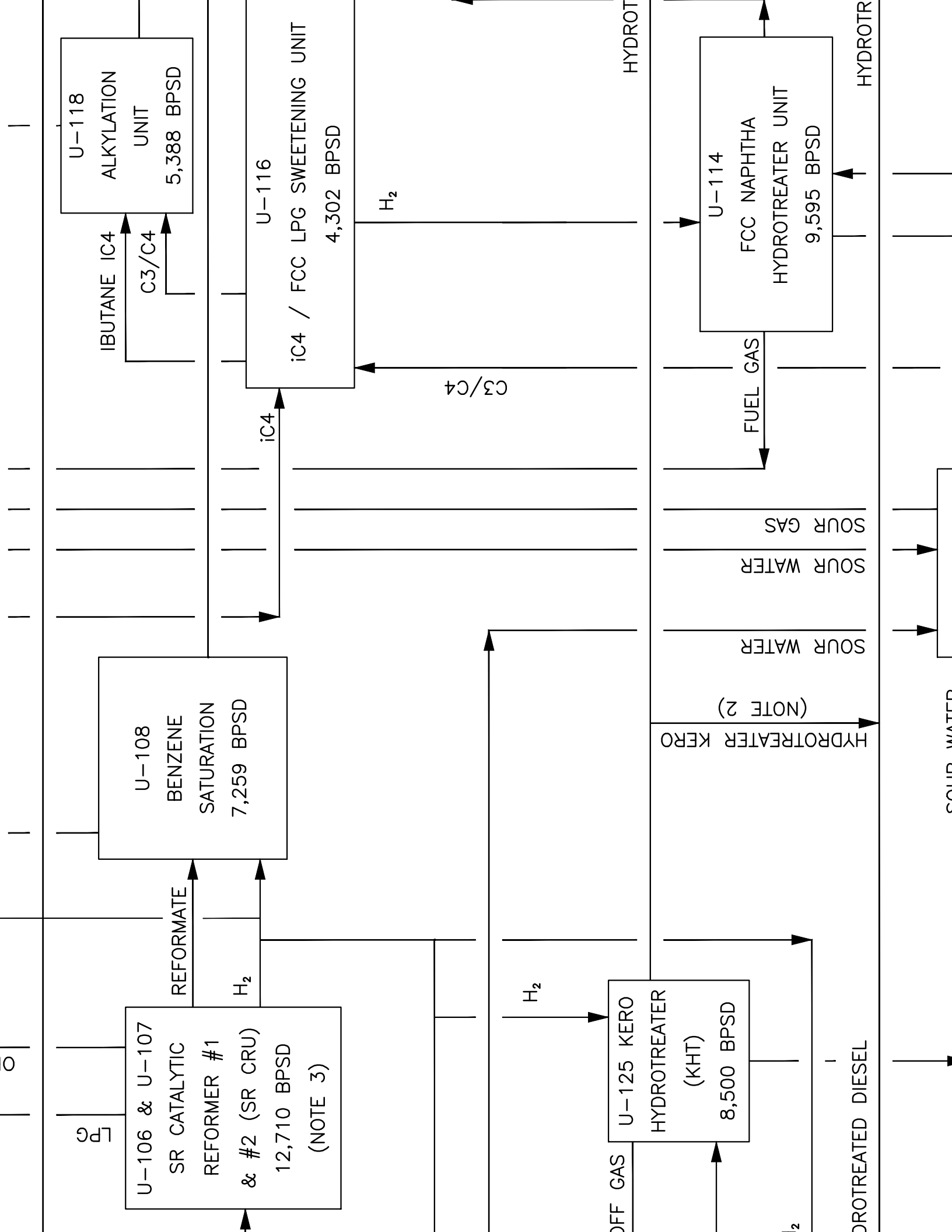
## Air Toxics Analysis Spreadsheets

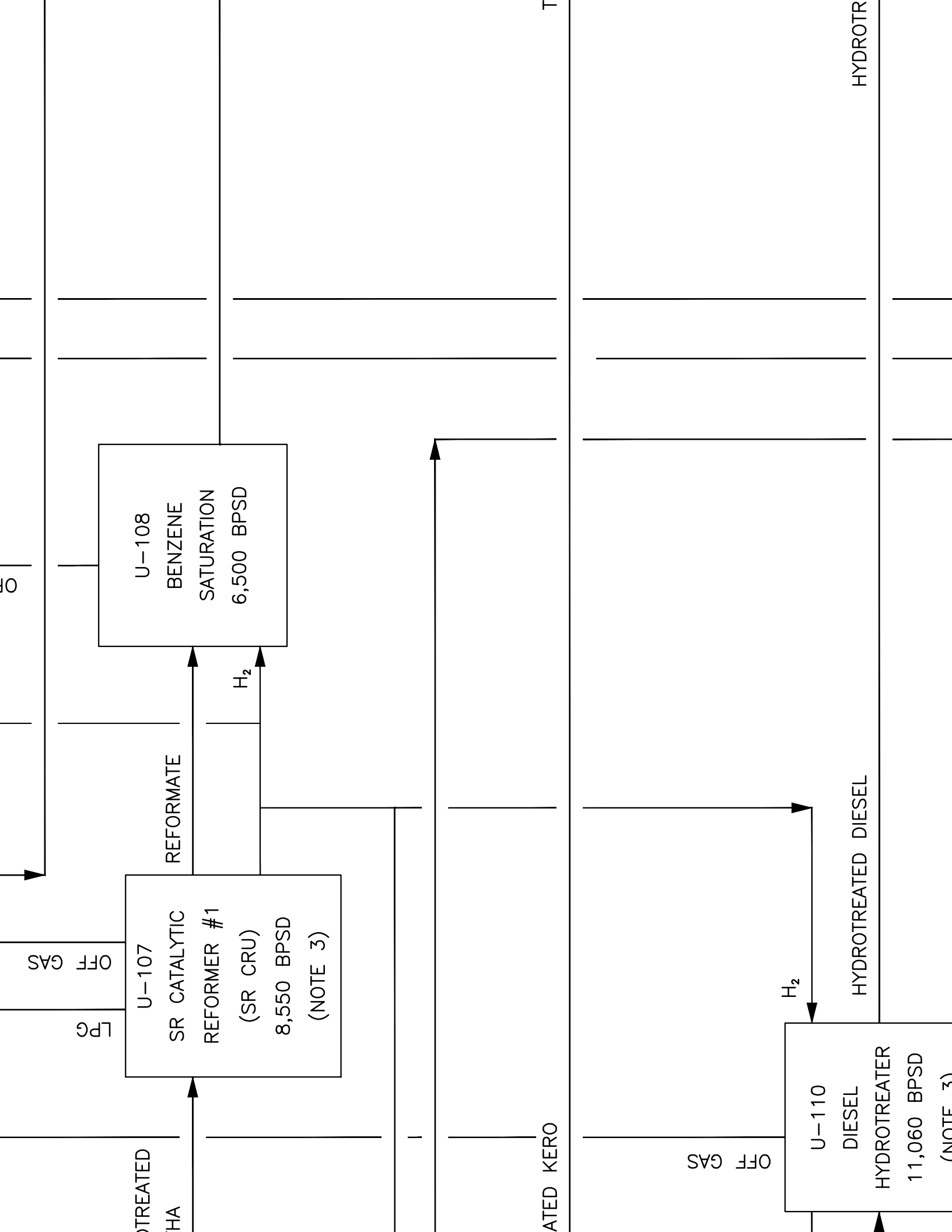
Units	Crude Distillation	Alkylation	Catalytic reforming	Hydrocracking	Hydrotreating/hydrorefining	Catalytic cracking	Hydrogen plant	Product blending	Sulfur plant	Vacuum distillation	Isomerization	Tanks	Crude Oil	Gasoline and Other Light Distillates	Diesel Fuel and Other Middle Distillates	IFR	Cone not connected to VRU	Cone connect ed to VRU	Stationary Combustion Sources	Boilers (Qty: 3)	Heaters (Qty: 16)	Emergency Generator Set
01	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	
	3.98E-02	0.00E+00	7.32E-02		1.15E-02	1.05E-01		0.00E+00		1.19E-03	0.00E+00											
	6.32E-04	5.46E-03	1.12E-04		0.00E+00	6.61E-04		0.00E+00		0.00E+00	0.00E+00											
	3.16E-03	6.20E-01	3.10E-03		0.00E+00	1.65E-02		0.00E+00		1.79E-04	1.53E-04	9.13E-03	0.00E+00	8.43E-03	7.03E-04		2.10E-05	4.73E-06	1.63E-05			
02																		1.58E-06	3.55E-07	1.22E-06		
																		1.40E-05	3.15E-06	1.09E-05		
																		4.60E-05	4.73E-07	1.63E-06	4.07E-05	
																		9.23E-05	1.28E-06	4.42E-06	8.03E-05	
03																		1.08E-02	2.37E-03	8.15E-03	2.19E-04	
																		1.50E-02	3.35E-03	1.15E-02	6.85E-05	
												6.26E-04	0.00E+00	5.78E-04	4.82E-05		4.56E-04	1.02E-04	3.53E-04	1.07E-05		
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		
																		1.93E-05	4.34E-06	1.49E-05		
																		5.24E-05	1.12E-05	3.87E-05	2.23E-06	
																		3.41E-05	5.32E-06	1.83E-05	9.65E-06	
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					
																		0.00E+00				
																		9.64E-04	2.17E-04	7.47E-04		
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		2.45E-04	5.52E-05	1.90E-04			
																		1.23E-03	2.76E-04	9.51E-04		
																		1.58E-05	3.15E-07	1.09E-06	1.33E-05	
																		7.19E-05	1.62E-05	5.57E-05		
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		4.30E-06	2.37E-07	8.15E-07	3.01E-06		
																		1.05E-03	2.37E-04	8.15E-04		
																		1.40E-02	3.15E-03	1.09E-02		
																		4.03E-05	5.72E-07	1.97E-06	3.50E-05	
02	1.58E-02	0.00E+00	1.08E-02															1.22E-04	5.32E-07	1.83E-06	1.11E-04	
																		6.56E-02	1.46E-02	5.03E-02	6.86E-04	
																		1.58E+00	3.55E-01	1.22E+00		
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							
																		6.61E-05	1.40E-05	4.82E-05	3.60E-06	
																		3.24E-04	7.29E-05	2.51E-04		
01																		2.19E-04	4.93E-05	1.70E-04		
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		
																		1.84E-03	4.14E-04	1.43E-03		
																		3.98E-04	3.35E-06	1.15E-05	3.55E-04	
																		3.51E-03	7.88E-04	2.72E-03		
01																		9.91E-05	6.66E-07	3.33E-06	3.23E-05	
																		7.71E-04	1.73E-04	5.98E-04		
																		5.53E-03	6.50E-04	2.24E-03	2.44E-03	



APs	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)		Maximum 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
	1-Hr	8-Hr	1-Hr	8-Hr	1-Hr	8-Hr	1-Hr	8-Hr	1-Hr	8-Hr	Value	Value	Value	Value	Compliance	Compliance
AP01	2.5E+00	2.46E+00	3.00E-05	2.51E-05	9.19E-05	0.00E+00	3.74E-05	0.00E+00	3.74E-05	3.74E-05	3.74E-05	3.74E-05	3.74E-05	3.74E-05	YES	YES
AP02	1.8E-02	8.80E-02	3.00E-05	4.27E-05	1.56E-04	1.28E-06	1.78E-03	1.28E-06	1.78E-03	1.78E-03	1.78E-03	1.78E-03	1.78E-03	1.78E-03	YES	YES
AP03	3.5E-02	2.80E+01	3.00E-05	8.16E-05	2.99E-04	0.00E+00	8.00E+00	0.00E+00	1.07E-05	1.07E-05	1.07E-05	1.07E-05	1.07E-05	1.07E-05	YES	YES
AP04	5.8E-04	5.82E-02		1.01E-06	3.68E-06	0.00E+00	6.33E-05	0.00E+00	6.33E-05	6.33E-05	6.33E-05	6.33E-05	6.33E-05	6.33E-05	YES	YES
AP05	2.5E-07			1.72E-10	6.30E-10	0.00E+00		0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00		
AP06	9.9E-07		7.10E-02	1.53E-09	5.60E-09	1.09E-07		1.09E-07			0.00E+00	0.00E+00	0.00E+00	0.00E+00		
AP07	2.5E-06			6.00E-09	2.20E-08	0.00E+00		0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00		
AP08	3.5E-05			4.49E-08	1.64E-07	0.00E+00		0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00		
AP09	6.6E-03		2.20E-06	6.97E-06	2.55E-05	1.53E-08	7.74E-06	1.53E-08	7.74E-06	7.74E-06	7.74E-06	7.74E-06	7.74E-06	7.74E-06	YES	YES
AP10	7.7E-04			7.14E-07	2.61E-06	0.00E+00	2.00E-08	0.00E+00	2.00E-08	1.10E-07	1.10E-07	1.10E-07	1.10E-07	1.10E-07	YES	YES
AP11	4.5E-03			1.93E-06	7.05E-06	0.00E+00	4.20E-04	0.00E+00	4.20E-04	4.20E-04	4.20E-04	4.20E-04	4.20E-04	4.20E-04	YES	YES
AP12	8.2E-05			9.82E-08	3.59E-07	0.00E+00		0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00		
AP13	1.8E-05			5.16E-08	1.89E-07	0.00E+00		0.00E+00			1.89E-05	1.89E-05	1.89E-05	1.89E-05	YES	YES
AP14	7.5E-05		4.30E-03	1.94E-08	7.11E-08	8.53E-08		8.53E-08			3.55E-04	3.55E-04	3.55E-04	3.55E-04	YES	YES
AP15	1.60E-01		3.02E-02	1.09E-04	4.00E-04	8.53E-07	6.84E-04	8.53E-07	6.84E-04	1.33E-02	1.33E-02	1.33E-02	1.33E-02	1.33E-02	YES	YES
AP16	8.8E-06			1.10E-04	2.27E-09	8.32E-09		2.50E-10			0.00E+00	0.00E+00	0.00E+00	0.00E+00		
AP17	0.5E-06			8.88E-09	3.25E-08	9.77E-09		9.77E-09			0.00E+00	0.00E+00	0.00E+00	0.00E+00		
AP18	3.5E-06		1.10E-04	4.79E-09	1.75E-08	5.26E-10		5.26E-10			0.00E+00	0.00E+00	0.00E+00	0.00E+00		
AP19	3.5E-08			1.47E-10	5.39E-10	0.00E+00		0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00		
AP20	6.6E-06			2.08E-09	7.60E-09	0.00E+00		0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00		
AP21	3.5E-06		1.10E-04	2.65E-09	9.70E-09	2.92E-10		2.92E-10			0.00E+00	0.00E+00	0.00E+00	0.00E+00		
AP22	8.8E-06		2.40E-03	1.25E-08	4.58E-08	3.00E-08		3.00E-08			4.58E-02	4.58E-02	4.58E-02	4.58E-02	YES	YES
AP23	1.8E-03		2.50E-02	4.41E-06	1.61E-05	0.00E+00		0.00E+00			6.46E-04	6.46E-04	6.46E-04	6.46E-04	YES	YES
AP24	8.8E-04			6.25E-07	2.29E-06	6.25E-06		6.25E-06			0.00E+00	0.00E+00	0.00E+00	0.00E+00		
AP25	0.5E-05		1.80E-03	1.06E-07	3.86E-07	1.90E-07		1.90E-07			1.93E-03	1.93E-03	1.93E-03	1.93E-03	YES	YES
AP26	8.8E-04		6.20E-02	1.65E-07	6.04E-07	0.00E+00		0.00E+00			9.74E-06	9.74E-06	9.74E-06	9.74E-06	YES	YES
AP27	2.5E-05		2.90E-02	4.47E-06	1.63E-05	0.00E+00		0.00E+00			5.64E-04	5.64E-04	5.64E-04	5.64E-04	YES	YES
AP28	5.8E-05			1.41E-07	5.17E-07	0.00E+00		0.00E+00			5.17E-05	5.17E-05	5.17E-05	5.17E-05	YES	YES
AP29	8.8E-05		1.10E-05	6.25E-08	2.29E-07	6.87E-10		6.87E-10			0.00E+00	0.00E+00	0.00E+00	0.00E+00		
AP30	4.4E-06		4.00E-04	9.40E-09	3.44E-08	0.00E+00		0.00E+00			8.60E-05	8.60E-05	8.60E-05	8.60E-05	YES	YES
AP31	1.1E-03		4.00E-01	3.68E-06	1.35E-05	0.00E+00		0.00E+00			3.37E-05	3.37E-05	3.37E-05	3.37E-05	YES	YES
AP32	3.5E-03		4.92E+00	7.54E-06	2.76E-05	0.00E+00		0.00E+00			5.61E-06	5.61E-06	5.61E-06	5.61E-06	YES	YES
AP33	2.5E-06		1.20E-03	1.72E-09	6.29E-09	2.06E-09		2.06E-09			0.00E+00	0.00E+00	0.00E+00	0.00E+00		
AP34	0.5E-05		3.01E+00	1.10E-05	1.15E-07	4.20E-07		1.26E-09			1.91E-08	1.40E-07	1.40E-07	1.40E-07	YES	YES
AP35	7.5E-02		8.68E+00	3.16E-05	1.16E-04	7.90E-08		7.90E-08			2.91E-06	1.33E-05	1.33E-05	1.33E-05	YES	YES
AP36	7.5E-05			3.16E-08	1.16E-07	0.00E+00		0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00		
AP37	7.5E-05		3.11E-02	1.26E-07	4.63E-07	0.00E+00		0.00E+00			2.03E-06	1.49E-05	1.49E-05	1.49E-05	YES	YES
AP38	2.5E-10		7.37E-03	8.45E-05	3.09E-04	1.10E-06		1.10E-06			1.15E-02	1.15E-02	1.15E-02	1.15E-02	YES	YES
AP39	1.4E-10			2.50E-13	9.14E-13	3.25E-10		3.25E-10			0.00E+00	0.00E+00	0.00E+00	0.00E+00		
AP40	7.05E+01		3.52E+01	4.65E-04	1.70E-03	0.00E+00		0.00E+00			6.60E-06	4.83E-05	4.83E-05	4.83E-05	YES	YES
AP41	7.5E-02		5.97E-02	9.14E-05	3.34E-04	0.00E+00		0.00E+00			1.53E-03	1.53E-03	1.53E-03	1.53E-03	YES	YES
AP42	3.5E-04		1.04E-01	8.76E-07	3.21E-06	0.00E+00		0.00E+00			3.08E-05	3.08E-05	3.08E-05	3.08E-05	YES	YES
AP43	9.9E-06			8.55E-09	3.13E-08	9.40E-10		9.40E-10			0.00E+00	0.00E+00	0.00E+00	0.00E+00		
AP44	7.5E-05		4.00E-03	3.93E-08	1.44E-07	0.00E+00		0.00E+00			3.59E-05	3.59E-05	3.59E-05	3.59E-05	YES	YES
AP45	0.5E-05			2.44E-08	8.94E-08	0.00E+00		0.00E+00			1.79E-04	1.79E-04	1.79E-04	1.79E-04	YES	YES
AP46	7.5E-04		5.24E+00	1.08E-06	3.96E-06	0.00E+00		0.00E+00			1.65E-07	7.55E-07	7.55E-07	7.55E-07	YES	YES
AP47	6.15E+00		1.64E+00	9.11E-05	3.33E-04	0.00E+00		0.00E+00			2.03E-04	2.03E-04	2.03E-04	2.03E-04	YES	YES
AP48	3.5E-02		3.61E+00	1.00E-04	3.66E-04	2.60E-08		2.60E-08			1.01E-04	1.01E-04	1.01E-04	1.01E-04	YES	YES
AP49	8.8E-03		3.47E+00	1.96E-06	7.18E-06	9.23E-10		9.23E-10			2.07E-06	2.07E-06	2.07E-06	2.07E-06	YES	YES
AP50	1.57E+00		1.05E+00	1.19E-05	4.37E-05	4.06E-07		4.06E-07			4.17E-05	4.17E-05	4.17E-05	4.17E-05	YES	YES
AP51	0.5E-04		3.00E-02	2.31E-07	8.44E-07	5.54E-08		5.54E-08			2.81E-05	2.81E-05	2.81E-05	2.81E-05	YES	YES
AP52	3.5E-11			1.43E-13	5.23E-13	0.00E+00		0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00		
AP53	4.4E-04			5.42E-07	1.98E-06	0.00E+00		0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00		
AP54	3.85E-01			3.57E-06	1.31E-05	0.00E+00		0.00E+00			3.39E-05	3.39E-05	3.39E-05	3.39E-05	YES	YES
AP55	0.5E-05			1.16E-07	4.25E-07	0.00E+00		0.00E+00			0.00E+00	0.00E+00	0.00E+00	0.00E+00		
AP56	5.5E-05		4.00E-03	8.48E-08	3.11E-07	0.00E+00		0.00E+00			7.76E-05	7.76E-05	7.76E-05	7.76E-05	YES	YES
AP57	9.9E-02		3.41E+00	2.13E-05	7.79E-05	0.00E+00		0.00E+00			4.57E-05	4.57E-05	4.57E-05	4.57E-05	YES	YES
AP58	1.1E-01		1.51E+00	1.70E-04	6.23E-04	0.00E+00		0.00E+00			4.13E-04	4.13E-04	4.13E-04	4.13E-04	YES	YES
AP59	1.12E+02			7.14E-07	2.61E-06	0.00E+00		0.00E+00			6.35E-09	6.35E-09	6.35E-09	6.35E-09	YES	YES

## **Exhibit E: Process Block Diagrams**





**Exhibit F: Site Plan**



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.

Addressees:

Regional Counsels  
Regions I-X

Regional Counsel Air Branch Chiefs  
Regions I-X

Air Management Division Directors  
Regions I, III, and IX

Air and Waste Management Division Director  
Region II

Air, Pesticides, and Toxics Management Division Directors  
Regions IV and VI

Air and Radiation Division Director  
Region V

Air and Toxics Division Directors  
Regions VII, VIII and X

Air Compliance Branch Chiefs  
Regions I-X

New Source Review Contacts  
Regions I-X

Alan Eckert  
Associate General Counsel

Greg Foote, OGC  
Gary McCutchen, NSRS, AQMD  
David Solomon, NSRS, AQMD  
Sally Farrell, SSCD  
Judy Katz, AED

David Buente, Chief

Environmental Enforcement Section

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

## Limiting Potential to Emit in New Source Permitting

- I. Introduction
- II. The Louisiana-Pacific Case
- III. Types of Limitations that will Limit Potential to Emit
- IV. Time Periods for Limiting Production and Operation
- V. Sham Operational Limits
  - 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 52.21(r) (4)
    - 2. Sham permits are not allowed by the definition of potential to emit: 40 CFR 52.21(b) (4), 51.165(a) (1) (iii), 51.166(b) (4)
    - 3. Sham permits are not allowed by the Clean Air Act
  - B. Guidelines for determining when minor source construction permits are shams.
    - 1. Filing a PSD or nonattainment NSR application
    - 2. Applications for funding
    - 3. Reports on consumer demand and projected productions levels
    - 4. Statements of authorized representatives of the source regarding plans for operation
- VI. Enforcement Procedures
- VII. Examples
- VIII. Conclusion

## 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 certain 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. If reported 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 requirements 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.