MONTANA-DAKOTA UTILITIES CO.
A Division of MDU Resources Group, Inc.

Before the North Dakota Public Service Commission

Case No. PU-17-__

Direct Testimony
of
Patrick C. Darras

Q. Please state your name and business address.

A. My name is Patrick C. Darras and my business address is 400 North Fourth Street, Bismarck, North Dakota 58501.

Q. By whom are you employed and in what capacity?

A. I am the Vice President of Operations for Montana-Dakota Utilities Co. (Montana-Dakota) and Great Plains Natural Gas Co., Divisions of MDU Resources Group, Inc.

Q. Please describe your duties and responsibilities with Montana-Dakota.

A. I have executive responsibility for the development, coordination, and implementation of Company strategies and policies relative to all areas of distribution operations including pipeline integrity and safety along with employee safety.

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Exhibit MDU-1 - Application, Direct Testimony & Exhibits, Statements and Depreciation Study
Montana-Dakota Utilities Co., a Division of MDU Resources Group, Inc.

Q. Please outline your educational and professional background.

A. I am a graduate of North Dakota State University with a Bachelor of Science Degree in Construction Engineering. I also hold an MBA along with a Master's Degree in Management both from the University of Mary. In June of 2014 I attended the Utility Executive Course at the University of Idaho.

I began my career with Montana-Dakota in 2002 as a gas engineer in Bismarck. I held that position for four years primarily working with the construction and service group in day to day operations. In 2006 I was moved into the role of Region Gas Superintendent where I was responsible for the overall gas engineering, construction, and service of the Dakota Heartland Region of Montana-Dakota. I worked in that capacity for two years and was then promoted to Region Director for Montana-Dakota's Dakota Heartland Region and Great Plains Natural Gas, Co. My responsibility in this role was oversight of all gas and electric operations for the Region. In January 2015 I accepted the promotion to Vice President of Operations for Montana-Dakota and Great Plains Natural Gas, Co. In this role I am responsible for gas and electric

distribution operations and engineering across the five states of North Dakota, South Dakota, Montana, Wyoming, and Minnesota.

Prior to joining Montana-Dakota, I worked for a local industrial contractor specializing in refinery and power plant maintenance along with turn-key construction of industrial facilities such as refineries and food processing plants. I spent seven years with this group in various capacities in engineering, construction, and project management.

Q. What is the purpose of your testimony?

A. The purpose of my testimony is to provide an overview of the Company's North Dakota natural gas operations along with our philosophy to be proactive and prudent operators in maintaining a safe and reliable natural gas system. I will discuss in further detail the following:

1. Montana-Dakota's natural gas operations
2. Montana-Dakota's gas organizational structure
3. Montana-Dakota's centralized support departments
4. Montana-Dakota's need for a System Safety and Integrity Program (SSIP)
5. Details and costs associated with the proposed SSIP

6. Need for an adjustment mechanism to recover costs associated with the SSIP.

Q. Please provide a summary of Montana-Dakota's natural gas operations in North Dakota.

A. Montana-Dakota provides natural gas service to approximately 109,000 customers in 74 communities, operating approximately 2,575 miles of distribution mains and approximately 110,000 service lines. The customer base is 86 percent residential customers and 14 percent commercial and industrial customers. As of December 31, 2016 the Company had 562 full and part time employees who live and work throughout the North Dakota gas and electric service area. Montana-Dakota's North Dakota service area is divided into two operating regions of which three operating districts fall under. Further detail is given on the structure of these regions later in my testimony. Montana-Dakota has gas service technicians and gas construction employees headquartered in 18 other North Dakota communities deemed strategic to the safe and reliable operation of the Company's distribution system. There are also electric-only personnel in additional locations in North Dakota. Service technicians and construction employees in South Dakota and Montana

also support operations in North Dakota communities close to the state border. A map of the gas distribution system in North Dakota is included as Exhibit No. ___(PCD-1).

Q. Please describe how Montana-Dakota's North Dakota natural gas operations are structured and managed in the field?

A. Field Operations for North Dakota are split into two "Regions" each led by a Region Director with employees located in a local region office along with district personnel that report to the Region Director. The two Regions and the respective Districts are as follows:

1. Dakota Heartland Region (Bismarck)
    A. Minot District
    B. Jamestown/Devils Lake District
    C. Mobridge District (Linton)
2. Badlands Region (Dickinson)
    A. Williston District
    B. Glendive District (Beach)

Located in each Region office is a Construction Supervisor and a Field Operations Supervisor. Located in each District Office is a District

Manager and either a Construction Supervisor or a Field Operations Supervisor or both.

The Construction Supervisor is responsible for oversight of all construction including third party subcontractor work. Reporting directly to the Construction Supervisor are all gas construction personnel with Engineer Associates assigned to oversee subcontractors also reporting to the Construction Supervisor. All construction including new and replacement projects along with many maintenance activities are handled through this department.

The Field Operations Supervisor has oversight of the Service Department employees which includes all Service Technicians and District Representatives. These employees handle all service calls including first response to emergencies, meter installs, and all day-to day service activities.

Engineering duties in prior years were carried out by field engineers located at the region office. Montana-Dakota recently restructured the Company's engineering group to report directly to the Director of Operations located in the General Office. More detail in regards to this restructuring is given later in my testimony.

There are currently 90 employees dedicated to Field Gas Operations, construction, and maintenance activities. Along with the gas only employees there are also 43 combination employees. These employees are located within the electric and gas combination areas including some smaller towns outside the Region and District Office locations. Combination employees handle the day-to-day activities of both electric and gas.

Q. Please describe the structure of the centralized Engineering and Operations Department and why this structure is integral to ensuring safe and reliable service is provided to customers.

A. Montana-Dakota's Centralized Engineering and Operations Department is located in the General Office in Bismarck. As mentioned earlier, this Department was recently restructured to include all field gas engineers.

The Centralized Engineering and Operations Department includes a Director of Engineering (Gas & Electric) and a Director of Operations. The Director of Operations' primary responsibility is the oversight and support of all gas operations. Reporting directly to the Director of Operations is as follows:

1. Manager of Standards and Compliance

2. Manager of Measurement

3. Manager of Field Operations

4. Supervisor of Engineering Services

5. Corrosion Lead Engineer

There are currently 23 employees that fall under the Centralized Engineering and Operations Department with personnel located in the General Office and in the Region or District offices.

Q. Please describe what other centralized functions support the field natural gas operations group.

A. *1. Safety & Training Department*

The safety of all personnel and customers is Montana-Dakota's top priority. The Safety and Training Department plays an integral part in this safety commitment and is the hub of all training for safety and operations, including training for employees necessary to be Operator Qualification compliant in accordance with Federal Pipeline Regulations. While oversight of the Operator Qualification plan rests in Operations, the administration of the program rests with the Safety and Technical Training Department.

2. Gas Supply

The principal function of Montana-Dakota's Centralized Gas Supply Department is to support the Company's operations by procuring, transporting, and storing natural gas in advance of delivery to the communities and locations served. This is done with consideration to cost and reliability of service. To accomplish this, the department remains apprised of industry trends, actively seeks least cost and most reliable commodity providers pursuant to a competitive proposal process, and continually reviews firm natural gas transportation services to ensure appropriate agreements are available.

The Gas Supply Department is also responsible for the scheduling and balancing activities for city gates associated with served communities. This activity allows for unbundled service customers to take delivery from a supplier other than Montana-Dakota. Accompanying this activity is the administration of customer contracts for those customers who receive service under an interruptible rate schedule. The department determines if and when interruption of service is required to maintain system integrity and deploys interruption plans to applicable personnel and customers.

For select large volume customers such as those receiving unbundled services or those receiving service under multiple rate schedules, the Gas Supply Department is responsible for the measurement information systems and resulting data. This data is used for billing, balancing activities, and forecasting.

3. Human Resources

The Human Resources Department has overall responsibility of Montana-Dakota's DOT Drug and Alcohol program along with the compliance of that program, including monitoring of contractor drug/alcohol programs. The Human Resources Department also manages compensation, benefits, recruitment and advises operations staff on employee relations issues including performance and discipline.

4. GIS

The GIS system and related environment is managed and maintained by the Enterprise GIS group within the centralized Enterprise Information Technology Department. The Enterprise GIS group partners with the Operation and Engineering field personnel to:

1. Perform editing/entry functions through the use of software tool sets within the GIS system. This process is often called

posting which is the editing/entry of new, modified, retired and/or abandoned facilities.

2. Perform editing/entry functions related to posting of landbase information.

3. GIS analysis for Operations, Engineering, Accounting, Tax and Regulatory departments within the company.

4. Analysis and reporting of GIS information related to federal and state regulatory requirements as well as other jurisdictional reporting requirements (tribal governments, cities, counties, taxing districts, etc.).

5. Maintain and manage one call boundaries which are submitted regularly to the various One Call Centers.

6. Maintain and manage the various GIS tools and systems. Support internal and field staff as they utilize these tools.

7. Maintain and manage the GIS system interfaces to other business systems such as PCAD mobile work management system, FCS Meter Reading system, Pipeline Inspection Manager, DOT Web Application compliance system, and the Electric Outage Management System.

The GIS system is used to track, manage and spatially represent the gas and electric facilities for Montana-Dakota. As facilities are installed, modified, retired, and/or abandoned their locations (spatial information such as latitude, longitude, survey points, etc.) as well as attribute information related to the assets (sizes, types, manufacturer, etc.) are managed in the GIS System. The GIS system also contains landbase information which references plats, subdivisions, streets, taxing districts as well as other public landmark reference information in order to provide referencing for these facilities. The GIS system represents the GIS information to employees and contractors utilizing tools such as mobile mapping software, desktop mapping software, and internal web viewable maps.

The software tools within GIS allow for analysis of the data contained within the system. Employees can use these tools to analyze: feet/miles of pipe by different attributes, numbers of valves installed, locations of facility by type, leak survey information, atmospheric corrosion survey information, and distribution integrity management. These are just a few of the many examples of analysis that can be performed. The GIS system also contains tools, which can be utilized during emergencies and

other significant events, to show the impact of closing valves and squeezing lines. This tool set helps the Operations and Engineering staff make decisions about how to best handle these events and the impact of their decisions.

5. Customer Care Center

Montana-Dakota's customers have toll-free access to the Customer Service Center located in Meridian, Idaho, with a backup center in Bismarck, North Dakota, to place routine utility service requests and inquiries from 7:00 am to 7:00 pm local time, Monday through Friday and emergency calls on a 24-hour basis. A Scheduling Center, located in the Meridian, Idaho, facility, transmits electronic service orders to the mobile terminals placed in the Company's service and construction vehicle fleet. This network allows the Company to respond quickly to customer requests and emergency situations.

Q. Please describe the role the centralized Engineering and Operations Department takes in supporting natural gas operations in the field and ensuring Montana-Dakota's natural gas system is safe and reliable.

A. The Engineering and Operations Department has the primary responsibility for the oversight of all gas operations at Montana-Dakota. This group is responsible for overall Department of Transportation (DOT) Pipeline and Hazardous Materials Safety Administration (PHMSA) pipeline safety compliance, managing necessary requirements for compliance, damage prevention, and corrosion control. They also develop and manage the execution of maintenance and investment plans to provide a safe and reliable natural gas system.

Q. Please describe what role Montana-Dakota's North Dakota natural gas field operations group has in ensuring the natural gas system is safe and reliable.

A. The field operations group at Montana-Dakota is tasked with executing the plans laid out by the Engineering & Operations Department. Plans of system betterments, maintenance, and emergency response are the core responsibilities undertaken by field operations to keep the natural gas system safe and reliable. These plans include growth projects, replacement projects, maintenance activities, customer service (connects/disconnects), and emergency response.

Q. Please explain Montana-Dakota's approach to providing safe and reliable service to its North Dakota customers.

A. Montana-Dakota has been successful in finding efficiencies in serving North Dakota customers by continually reviewing its field operations without compromising its objective of providing safe and reliable natural gas service. Much of this has been possible due to the advancement of cost effective technology.

Montana-Dakota completed the implementation of Pragma CAD (PCAD). PCAD is a computer aided dispatching system for utility service orders, which replaced the previous system, Mobile Up. PCAD ensures that Montana-Dakota is able to maintain and improve upon the current level of customer service and pipeline data gathering.

We have also implemented a software solution called Pipeline Inspection Manager (PIM). PIM is designed to schedule, track, execute, and archive field data inspections for a variety of assets that fall under the jurisdiction of regulatory compliance guidelines. Montana-Dakota has implemented PIM for the monitoring of Company assets in corrosion inspection and annually inspected valves. It is the goal of the Engineering and Operations Department to continue to add additional required assets

that fall under the regulatory compliance guidelines to the program such as regulator stations, odorization equipment, and tool calibration.

Montana-Dakota has always worked to provide a safe and reliable natural gas distribution system. In recent years, the predominant view, by both regulators and utilities, is to enhance data collection and analysis in order to further improve safety and reliability. The implementation of both PCAD and PIM has helped to automate, track, and manage distribution operations work flows. They have also allowed for the effective central sharing of data with the appropriate operations groups to make better evaluations and decisions to enhance the safety of customers, the general public, and employees.

Currently both of these systems automate operations and maintenance work orders that are then electronically dispatched to technicians and the resulting data is returned to the system and stored in a central database. The data captured within the system is then used to enhance and support the existing safety programs such as the Distribution Integrity Management Plan (DIMP), the Transmission Integrity Management Plan (TIMP), the Damage Prevention Program, the Public Awareness Plan, and Emergency Response Procedures.

Q. Please describe the challenges that are faced when operating a safe and reliable natural gas system.

A. Federal and State mandates require that minimum standards be met in regards to the operation of a natural gas system. In the recent past there has been an aggressive approach to further enhance system safety as a result of unfortunate pipeline incidents. Montana–Dakota works diligently, on a daily basis, to meet the federal and state safety standards and proactively evaluate its system to further reduce risk and ensure the public has a safe and reliable system.

Montana-Dakota and the natural gas industry in general are faced with an aging infrastructure. This aging infrastructure requires significant investment in order to maintain overall safety and reliability. Approximately 23 percent of Montana-Dakota's distribution mains and 24 percent of Montana-Dakota's service lines were installed prior to 1970. If you look at pre-1980 pipe, which would include pipe identified in the industry as Early Vintage Plastic Pipe these numbers climb significantly to approximately 44 percent and 46 percent, respectively. While there are other factors besides age in determining the overall integrity of a natural gas system, older vintage systems have demonstrated to be at higher risk than newer

systems. This is simply because older facilities have been exposed to more threats and were often constructed without the benefits of today's materials and safety standards.

Federal Code changes related to natural gas pipelines along with a Call to Action issued by United States Secretary of Transportation, Ray LaHood, have resulted in the natural gas industry looking at a more proactive versus reactive approach to pipeline safety. As noted above, Montana-Dakota considers itself proactive in its approach to addressing pipeline safety by repairing and mitigating identified leaks, and identifying pipe and the vintage of pipe material that are prone to developing leaks at a higher rate than average and formulating a plan to mitigate those areas where the risks are higher.

However, this historical approach to integrity management is no longer sufficient. Prudent management of the integrity of the Company's pipeline system now requires a more aggressive approach, which will identify risks and require investment in measures to help mitigate those risks beyond the minimum code requirements. As a result, Montana–Dakota is requesting approval to implement a System Safety and Integrity

Program (SSIP) to enable the Company to further identify and mitigate natural gas system risks on a proactive basis.

Q. Please further describe specific challenges Montana-Dakota faces in operating a safe and reliable natural gas system based on the existing infrastructure.

A. As mentioned, Montana-Dakota is faced with an aging infrastructure. More specifically the Company's natural gas system includes Early Vintage Steel and Plastic Pipe, Low Pressure Systems (distribution pressure), and inside meter sets.

Montana-Dakota defines its Early Vintage Steel Pipe and Low Pressure Systems as steel pipe installed prior to the 1970's. Although the practice was prevalent in those years, today's installation practices and materials are much more resilient. For example, Low Pressure Systems for the most part were constructed with larger bore steel pipe for mains, from 4" – 12" in diameter, either welded or often times joined by mechanical couplings. Service lines again were constructed of steel pipe and connected to the main with a combination of welding and mechanical means. Along with Low Pressure Systems, the historical practice was to install meter sets inside buildings. While Montana-Dakota has worked

towards removing inside meter sets, Montana-Dakota still has approximately 4,000 of these in our North Dakota system.

Montana-Dakota defines its Early Vintage Plastic Pipe as that plastic pipe installed prior to 1982. Falling under the Early Vintage Plastic Pipe definition is a pipe type called “Aldyl A”. The National Transportation Safety Board has advised that there is a potential susceptibility of plastic pipe installed between 1960 and the early 1980’s to premature failure due to brittle-like cracking. Montana-Dakota does have this early vintage plastic Aldyl A pipe in its system.

Q. Has Montana-Dakota made investments in North Dakota to the existing gas distribution system to enhance the safety and reliability in the system?

A. Yes, the Company has made significant investments in natural gas distribution infrastructure, primarily related to the replacement of existing facilities and the investment of new border stations and loop lines, along with the investment in the software systems mentioned above. The investments in the software systems have contributed to the Company’s success in controlling O&M costs per customer, while the investments in infrastructure allow for more efficient, safe, and reliable system operations.

The replacement projects improve safety and reliability by replacing older pipe with new pipe and by re-engineering the system when needed. Currently replacement projects are selected based on prioritizing risks and then choosing the projects that will result in the greatest safety and reliability improvements. As discussed later, the process of selecting areas of the system for replacements has become more standardized and data-driven with the implementation of the Distribution Integrity Management Plan (DIMP).

In addition, the investment in border stations and loop lines improves safety and reliability by providing the customers with a secondary feed to their premises. During emergencies, this allows for quicker restoration of services and potentially no disruption of service.

Q. Please explain the need for Montana-Dakota to develop and implement a structured System Safety and Integrity Program (SSIP).

A. The natural gas industry is undergoing significant changes in the way we approach pipeline safety, integrity, and reliability. Integrity programs are intended to guide utilities to better understand threats associated with their systems and the conditions of their pipelines so that they can proactively address the risks of their natural gas operations.

At Montana-Dakota we recognized the need for better processes to collect system data and analyze the information to make more informed decisions in regards to maintenance and capital investments needed to provide a safe and reliable system. With recent system improvements such as our PIM program along with a centralized approach to the management of data collection and the corresponding process to address risks gathered from that data collection, Montana-Dakota has positioned itself to be proactive in pipeline safety improvements.

The data gathered to date, along with the opinions of subject matter experts within the Company and throughout the industry, points to the need for Montana-Dakota to implement a more systematic pipeline safety and integrity process than has been utilized to date in managing the Company's pipeline safety program. Where risks are identified, we must devote the time and resources needed to help mitigate future problems with the natural gas system. We realize that our infrastructure is aging and that expectations in regards to the safety and reliability of pipelines are being raised. Recent fatal incidents from natural gas pipeline failures such as in San Bruno, California and Allentown, Pennsylvania have appropriately heightened these expectations.

Montana-Dakota strives to be a leader in the industry when it comes to pipeline safety. A single incident is one too many. The goal of a systematic proactive approach of a System Safety and Integrity Program or SSIP is to better provide the safe system our customers and the public expect and deserve.

Q. What is Montana-Dakota proposing in regards to the SSIP?

A. As part of the SSIP, Montana-Dakota is proposing a structured replacement plan for its Early Vintage Steel and Plastic Pipe Systems as described earlier. While our DIMP Model will remain dynamic due to changing risks and regulations, the initial intent for the Company is to focus the SSIP on the replacement of systems in these two categories which have been identified as higher risks within the Company's current DIMP model. In order to fund this more proactive replacement program and to avoid the need for frequent rate cases, Montana-Dakota is proposing a SSIP adjustment mechanism as more fully explained by Mr. Jacobson and Ms. Bosch.

Q. What types of pipe will be replaced as part of the SSIP program?

A. Early Vintage Steel Pipe – Pipe falling under this category will be steel mains, associated fittings, and services installed prior to 1970. Along

with the pipe replacement, inside meter sets connected to the corresponding services will also be removed to a safer outside location.

Early Vintage Plastic Pipe – Pipe falling under this category will be pre 1982 Aldyl A plastic pipe.

Q. How will Montana-Dakota determine what Early Vintage Steel Pipe and Early Vintage Plastic Pipe to replace each year?

A. In the past, Montana-Dakota replaced pipe based on the identified highest risks through either the DIMP model or subject matter expert recommendations. Often times these projects were coordinated with city or state street projects to optimize efficiency gains recognized with these entities. For example if there was a city street rebuild, Montana-Dakota would develop a plan to not only replace the early vintage pipe associated with that specific street project but expand beyond the boundaries to take advantage of efficiencies gained by having staff or contractors on site. Often times we were able to replace higher risk pipe while saving costs on mobilization, street and sidewalk repair, right of way damage, etc. This process was effective but was more of a reactive approach.

As has been mentioned, the SSIP will be a more proactive and accelerated approach to pipeline integrity replacement projects.

Replacement projects will be prioritized based on the highest risk systems and areas identified in the Company's DIMP Model. This process will allow engineers to take a holistic approach in determining areas not only with identified leaks but also with the highest risk pipe that can be removed. This will include the removal of materials prone to leaks and potential failure. Efficiency gains on system design will also be a factor impacting which areas to replace. Our actions will be driven by data analysis and verified with subject matter experts.

The SSIP will be dynamic in that it could change annually based on new findings, data trends, regulations, etc. We will make adjustments to target specific pipeline vintage and components as identified by our DIMP Model. Through improvements in data collection and technology we will continue to promote more efficient planning and execution of our work to provide a safe, reliable, and affordable service to our customers.

As part of the SSIP adjustment mechanism, Montana-Dakota will also provide the Commission with an annual plan for the identified replacement projects as well as cost updates for projects previously approved for recovery under the SSIP adjustment mechanism.

Q. Would you elaborate on the Pipeline and Hazardous Materials Safety Administration's DIMP rule and how Montana-Dakota has responded to this regulation?

A. DIMP is a Federal requirement issued as Subpart P of 49 CFR 192 pertaining to all gas distribution system operators. DIMP requires operators to know the make-up of their distribution system. The objective of the plan is to develop a model to assist in determining which areas of the gas distribution system to focus operation, maintenance, and repair efforts and resources due to known or predicted threats to the distribution system.

The model assesses eight different threat categories: Corrosion, Natural Forces, Equipment Failure, Excavation, Incorrect Operation, Joint Failure, Outside Force, and Other all equally weighted.

A detailed geographical information system (GIS) map, with every piece or component that makes up the gas distribution system, both above and below ground, and with as much information about each piece as is available is used as the basis of the model. Scores for various factors were determined by a group of subject matter experts including engineers and field technicians.

The model sets a 50 foot by 50 foot grid to analyze all components. Each grid is then analyzed by eight individual sub-models with up to 150 calculations in each sub-model. This in turn produces a very comprehensive look at the entire system with each component compared equally to the others across the entire four state operating areas. In North Dakota, 23.4 million feet of pipe was analyzed with approximately 5.16 million calculations to support the risk model.

The results obtained from the DIMP modeling are consistent with what it was expected to produce by subject matter experts. The components that score the highest are generally located near district regulator stations where there are concentrations of different components such as fittings and valves, above ground piping, and elevated pressures.

The DIMP results are used as an operational tool to aid in directing resources to reduce pipeline risks. The results are consistently analyzed to determine accelerated actions to the pipeline so that changes to resource planning and budgeting can be made to carry out the reduction in risks from pipeline threats.

Q. What will be involved in the SSIP in 2017 and 2018 proposed to be recovered as part of this rate case?

A. Several projects included in this rate case have been identified as projects that would fall under the SSIP. Examples of these projects are as follows:

1. Bismarck, ND – 13th St – Replacement of Early Vintage Steel and Plastic pipe and relocating inside meter sets.
2. Williston, ND – 54th St – Replacement of 1950's vintage steel main and services. This project will eliminate approximately a dozen leaks, address local Cathodic Protection (CP) issues, along with converting two separate pressure systems into one, resulting in a more efficient system allowing for more uniform operation.
3. Richardton, ND – Replacement of Bare Steel (CP) issues and Low Pressure Steel mains and services along with relocating inside meter sets.
4. New Salem, ND - Replacement of Low Pressure Steel mains and services along with relocating inside meter sets.
5. Taylor, ND - Replacement of Low Pressure Steel mains and services along with relocating inside meter sets.

Q. What is Montana-Dakota planning for the SSIP program in years 2019-2021?

A. Montana-Dakota plans a structured approach to the replacement of approximately 80,000 feet of main and 1,000 services per year over the years 2019 through 2021 requiring estimated annual funding of approximately $6 million in addition to the $7.6 million investment in SSIP related projects included in this rate case.

Q. Describe how Montana-Dakota would implement and manage its proposed SSIP.

A. Implementation of the System Safety and Integrity Program will utilize the company DIMP Model to identify key risks associated with Montana-Dakota's natural gas system. A sub team from the Centralized Engineering Department referred to as the Engineering Studies Group will identify, assess, prioritize, develop, and schedule a replacement plan for high-risk infrastructure. The Engineering Studies Group will utilize a systematic replacement design process for Early Vintage Steel and Plastic Pipe. Replacement design process format will include the following:

1. Location

- City Name, general work location, class location, etc.

2. Risk Features

- Early Vintage Steel Main Footages
- Pre-1982 Early Vintage Plastic Main Footages
- Post-1982 Early Vintage Plastic Main Footages
- Service Line count within high risk area
- Number of Inside Meters to be relocated
- Leak History

3. Estimated Costs

- An itemized unit format will be used to calculate a high-level cost estimate based on above-mentioned risk features

4. Replacement Plan Support Documentation

- Detailed Scope of Work
- Develop and complete replacement plan documents (maps, permits, applications, work orders, customer letters, etc.)
- Create a detailed construction replacement sequence

5. Management of Physical Replacement

- Identified replacement(s) will be completed by Montana-Dakota, or
- Third Party Contractors under Montana-Dakota's supervision

The above information will also be provided on an annual basis in support of the Company's proposed SSIP adjustment mechanism for the ensuing year along with actual costs provided for the prior year.

Q. Does the SSIP address a safety and reliability concern?

A. Yes it does. Both the Pipeline and Hazardous Materials Safety Administration (PHMSA) and the National Transportation Safety Board (NTSB) have expressed concern in regards to the continued operation of aging natural gas infrastructure along with certain plastic pipe installed between 1960 and the early 1980's which had been previously approved for the natural gas industry. The potential vulnerability of older plastic pipe to brittle-like cracking continues to be a concern for the natural gas industry and both PHMSA and the NTSB have advocated for removal of these facilities.

As mentioned earlier, Montana-Dakota places the safety and reliability of its natural gas system as a top priority. The removal of Early Vintage Steel and Early Vintage Plastic pipe will improve safety and reliability by reducing leaks and system interruptions for customers. As these early vintage materials are replaced, system complexities can be reduced by the standardization of system pressures, pipe sizes, and

design processes such as the looping of systems. Standardization of pressures will allow for the removal of Low Pressure stations and improved sectionalizing plans. Looping of systems eliminates localized single feed areas potentially reducing service interruptions to customers. Overall, the system safety and reliability is improved; therefore, the SSIP and recovery of the associated costs through an adjustment mechanism is in the public interest.

The SSIP, along with the certainty of cost recovery under the SSIP Adjustment Mechanism, may allow Montana-Dakota to enter into longer, multi-year contracts with third party contractors. Past experience has shown that multi-year contracts often times provide for better pricing and enhance the planning and scheduling of our overall construction program.

Finally, the low natural gas prices available to customers today provides a good opportunity to address the pipeline replacement projects proposed to be recovered through the SSIP adjustment mechanism.

Q. Does the SSIP address all pipeline replacement projects?

A. No, it does not. Certain pipeline replacements remain as part of normal day-to-day business activity. Montana-Dakota routinely replaces pipelines based on safety, engineering review, special city/county or public

works projects, developer projects, franchise commitments and obligations, and system improvement or supply concerns.

Examples of projects identified for 2017 and 2018 that will fall under this category are:

1. Downtown Minot, ND – Main and service replacement driven by the City of Minot's water and sewer project. This project is eliminating bare/coated protected steel and several inside meter sets.
2. Minot Floodwall Project - Main and service line relocation as required by the City of Minot's flood wall refurbishment project.
3. Devils Lake Levee/Road Project - Main relocation due to City of Devils Lake's levee/road project and line interference.

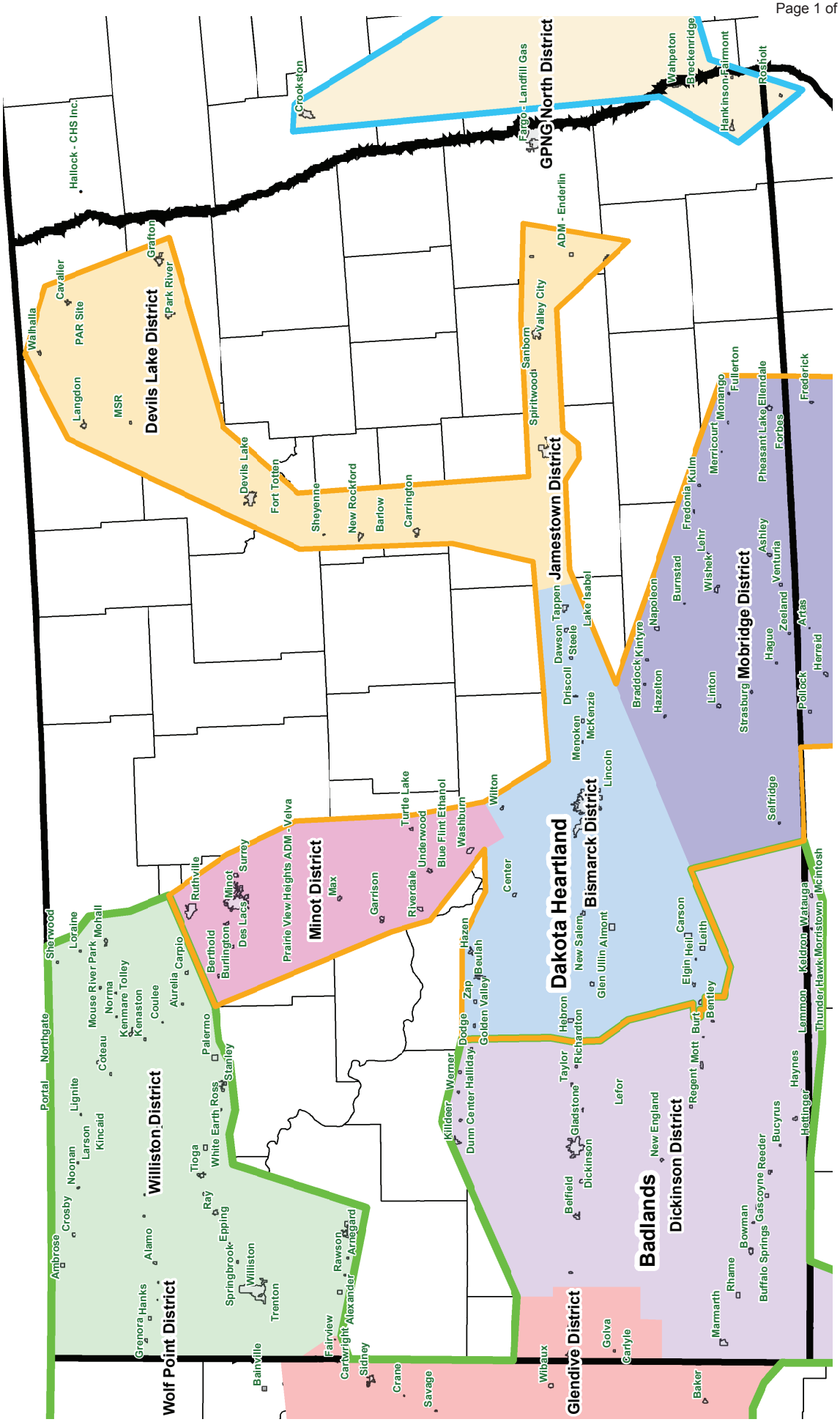
The cost of these types of projects will not be included in the SSIP adjustment mechanism as they are projects that are required because of work being done by the noted communities. While the replacement projects will enhance the safety and reliability of the system, the projects were not identified as a high risk by the Company's DIMP model.

Q. Is Montana-Dakota's natural gas system safe today?

A. Yes, it is. While there will always be a certain amount of risk associated with the operation of a natural gas system, it is our responsibility to identify those risks, monitor those risks, and mitigate them when appropriate. Overall Montana-Dakota's system has proven to be safe and reliable; however, we must remain vigilant in the operation of our system as past success does not guarantee the same future results.

Q. Does this complete your direct testimony?

A. Yes, it does.


GPNG North District
Jamestown District
Devils Lake District
Minot District
Mobridge District
Dakota Heartland
Bismarck District
Williston District
Wolf Point District
Dickinson District
Badlands
Glendive District
Hallock - CHS Inc.
Crookston
Fargo Landfill Gas
Wahpeton
Breckenridge
Fairmont
Hankinson
Rosholt
Grafton
Park River
Cavalier
Walhalla
PAR Site
Langdon
MSR
ADM - Enderlin
Sanborn
Valley City
Spiritwood
Devils Lake
Fort Totten
Sheyenne
New Rockford
Barlow
Carrington
Fullerton
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Hazelton
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Strasburg
Hague
Zeeland
Arlas
Herreid
Pollock
Selfridge
Tappen
Dawson
Steele
Lake Isabel
Driscoll
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Velva
ADM - Velva
Prairie View Heights
Max
Garrison
Riverdale
Underwood
Blue Flint Ethanol
Washburn
Center
Ruthville
Minot
Surrey
Des Lacs
Burlington
Berthold
Sherwood
Loraine
Mohall
Portal
Northgate
Mouse River Park
Norma
Kenmare
Tolley
Kenaston
Coulee
Aurelia
Carpio
Palermo
Stanley
Coteau
Lignite
Kincaid
Larson
Noonan
Crosby
Ambrose
Alamo
Grenora
Hanks
Tioga
White Earth
Ross
Ray
Epping
Springbrook
Williston
Trenton
Rawson
Arnegard
Alexander
Fairview
Bainville
Sidney
Cartwright
Crane
Savage
Wibaux
Golva
Carlyle
Baker
Marmarth
Rhame
Bowman
Buffalo Springs
Gascoyne
Reeder
Bucynus
Haynes
Hettinger
Lefor
New England
Regent
Mott
Burt
Bentley
Elgin
Heil
Carson
Leith
Hazen
Beulah
Zap
Dodge
Golden Valley
Glen Ullin
Almont
New Salem
Hebron
Richardton
Taylor
Gladstone
Dickinson
Belfield
Killdeer
Dunn Center
Halliday
Werner
Lemmon
Keldron
Watauga
McIntosh
Morristown
Hawk
Thunder