Resource Report 11
Reliability and Safety

Resource Report No. 11

Reliability and Safety

Central Mainline Corridor Expansion Project

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RESOURCE REPORT 11 – RELIABILITY AND SAFETY
SUMMARY OF FILING INFORMATION

MINIMUM REQUIREMENT	LOCATION ADDRESSED
Describe how the project facilities would be designed, constructed, operated, and maintained to minimize potential hazard to the public from the failure of project components as a result of accidents or natural catastrophes. (§ 380.12(m))	Sections 11.4, 11.5, and 11.6
ADDITIONAL INFORMATION	
Identify by milepost and in table form, all U.S. Department of Transportation class locations and areas of concern (for example, high consequence areas), as defined in Title 49 CFR § 192.903, for the proposed route, alternative routes, and compressor stations and explain the basis for high consequence area identification.	Sections 11.3.1 and 11.3.2
Discuss the outcome of the consultations with local fire departments and emergency response agencies relative to whether additional equipment, training, and support are needed in the project area.	Section 11.6.5

Table of Contents

List of Tables

Abbreviations and Acronyms

API	American Petroleum Institute
CFR	Code of Federal Regulations
CP	cathodic protection
DOT	Department of Transportation
ETWS	Extra temporary workspace
FERC	Federal Energy Regulatory Commission
HCA	high consequence area
HDD	Horizontal directional drill
IDOT	Iowa Department of Transportation
LEPC	local emergency planning committees
MCA	Moderate consequence area
NDOT	Nebraska Department of Transportation
MAOP	maximum allowable operating pressure
MP	milepost
Northern	Northern Natural Gas
NPPD	Nebraska Public Power District
OCC	Northern's Operations Communication Center
OQP	Operator Qualification Plan
OSHA	Occupational Safety and Health Administration
PHMSA	Pipeline and Hazardous Materials Safety Administration
PIR	potential impact radius
Project	Central Mainline Corridor Expansion Project
RMV	rupture mitigation valve
ROW	right of way
SCADA	supervisory control and data acquisition

11.0 RESOURCE REPORT 11 – RELIABILITY AND SAFETY

Resource Report 11 describes the reliability and safety aspects of Northern's Project. The report addresses the potential hazard to the public from failure of facility components resulting from accidents or natural catastrophes, how these events may affect reliability, and what procedures and design features have been used to reduce potential hazards.

Northern owns and operates a natural gas transmission pipeline system and associated aboveground facilities, including pipelines and facilities in Iowa and Nebraska. Northern is proposing to construct the Project, which will consist of (1) install 9.03 miles of 20-inch-diameter Omaha 3rd branch line loop, (2) install 14.64 miles of 30-inch-diameter NPPD Princeton Road power station branch line, (3) install 2.48 miles extension of the 20-inch-diameter Des Moines C-line, (4) uprate of the 20-inch-diameter Des Moines C-line south loop, (5) install new compressor station near Clarion, Iowa, (6) modify five compressor stations in Iowa and Nebraska allowing bidirectional flow, (7) install NPPD Princeton Road power station meter station, (8) install aboveground facilities including a launcher, receiver, tie-in valve settings, and uprate ancillary equipment. All Project components are located in various counties in Nebraska and Iowa.

Table 11.0-1 provides a list of Project components along with their associated counties.

Table 11.0-1 Project Facilities and Location

Component	Project Facility	Facility Description	County, State
Omaha 3rd branch line loop	9.03-mile pipeline	20-inch-diameter loop	Cass and Sarpy, NE
	Palmyra compressor station	Temporary compression site	Otoe, NE
NPPD Princeton Road power station branch line	14.64-mile pipeline	30-inch-diameter branch line	Gage and Lancaster, NE
	Beatrice to Palmyra D-line and Beatrice to Palmyra E-line Block Valve 5 Setting	Temporary compression site	Lancaster, NE
Des Moines C-line branch line extension	2.48-mile pipeline	20-inch-diameter extension	Dallas, IA
	Ogden compressor station	Temporary compression site	Boone, IA
Des Moines C-line south loop uprate	Royal Estates reducing station	Disconnect existing MAOP control valve	Polk, IA
	Grimes Iowa Town Border Station	New MAOP regulator	Polk, IA
	Des Moines A-line launcher	New control valve	Polk, IA
Clarion compressor station	Proposed compressor station	ISO-rated 20,500-horsepower	Wright, IA
Beatrice compressor station	Facility modification	New scrubber install	Gage, NE
Guthrie Center compressor	Facility modification	New piping and valves	Guthrie, IA

Component	Project Facility	Facility Description	County, State
Oakland compressor station	Facility modification	New piping and valves	Pottawattamie, IA
Ogden compressor station	Facility modification	New piping and valves	Boone, IA
Palmyra compressor station	Facility modification	New piping, valves and regulation	Otoe, NE

11.1 Hazards

The transportation of natural gas by pipeline potentially generates some risk to the public in the event of an incident and subsequent release of gas. Historically, impacts on public safety from pipeline transportation of natural gas have been directly related to leaks or line breaks, often due to corrosion; leaks or line breaks due to external forces not associated with pipeline operations, including seismic forces and/or damage from third-party excavation near buried pipeline sections; or equipment malfunctions (PHMSA 2025).

The composition of natural gas in interstate pipeline systems can vary depending on the geologic formation where the gas is sourced. The primary component of the natural gas transported in interstate transmission pipelines is methane, a colorless, odorless, and tasteless gas. In Northern's pipeline system, the volume of methane ranges from 74% to 98%; the volume of ethane ranges from 0% to 13%; and the volume of propane ranges from 0% to 7% (Northern 2025). Isobutane, butane, isopentane, pentane, and other light hydrocarbons each range from 0% to less than 1% of the overall composition of Northern's natural gas.

Although not chemically toxic, methane is classified as a simple asphyxiant with a slight inhalation hazard. Exposure to high concentrations can result in serious injury or death due to oxygen deficiency. The specific gravity of methane is 0.55, which is lighter than air. This means methane tends to rise at normal atmospheric temperatures and disperses rapidly in the atmosphere. In general, unconfined mixtures of methane in air are not flammable or explosive because of the dilution of the methane by air. However, mixtures of methane in air are flammable at concentrations between 5% and 15% methane by volume. Methane has an ignition temperature above 1,000 degrees Fahrenheit (Northern 2021b). An unconfined mixture of methane and air is not explosive; however, it may ignite and burn if there is an ignition source. A flammable concentration within an enclosed space in the presence of an ignition source can explode. Methane is buoyant at atmospheric temperatures and disperses rapidly in air. Methane would not pool in low-lying areas under normal atmospheric conditions.

Ethane and propane can constitute up to 14% and 7% of natural gas by volume, respectively, in Northern's pipeline system. Ethane and propane are, generally, not toxic. As with methane, ethane and/or propane are classified as simple asphyxiates, possessing slight inhalation hazards. Mixtures of ethane in air are flammable at concentrations between 3.0% and 12.4% ethane by volume, and mixtures of propane in air are flammable at concentrations between 2.1% and 9.5% propane by volume. Ethane and propane represent a small percentage of the natural gas in Northern's pipeline system and would

constitute a small percentage of an accidental release. Although these compounds are heavier than air and could pool in low lying areas, the pooling effect would be temporary. As with natural gas in general, these compounds would mix and disperse rapidly into the atmosphere during a release under normal atmospheric conditions.

11.2 Pipeline Accident Data

Since 1970, the DOT, PHMSA has collected pipeline incident reports and combined them to provide 20-year trend data to the public. Natural gas pipeline operators have been required to report incidents that involve fatalities, property damage of more than $50,000, injury requiring in-patient hospitalization, release of gas, or those considered significant by the operator ("significant" incidents). A total of 291 onshore natural gas pipeline transmission incidents meeting these criteria were reported from 2022 through 2024 (PHMSA 2025).

Table 11.2-1 presents the primary causes of reported significant onshore natural gas transmission pipeline incidents, along with the percentage distribution compared to the total number of incidents for the time period from 2022 to 2024 (PHMSA 2025). The most common pipeline incidents reported during 2022 to 2024 were caused by material/weld/equipment failure. Corrosion remains a major concern for gas transmission pipelines. However, the use of an external protective coating and a CP system required on all pipelines installed after July 1971 significantly reduces the rate of failure compared to unprotected or partially protected pipe. Historically, excavation damage was the most common incident; however, since April 1982, operators and contractors have been required to participate in One Call public utility locate programs. These locate programs have minimized pipeline incidents caused by excavation damage by reducing unauthorized excavation activities near pipelines and allowing authorized excavations to be conducted in a safe manner by locating pipelines and utilities in the excavation area.

Table 11.2-1 Natural Gas Transmission Incidents by Cause[1]

Cause	Number of Incidents – Onshore Transmission 2022	Number of Incidents – Onshore Transmission 2023	Number of Incidents – Onshore Transmission 2024	Percentage of Total for 2024
Corrosion	13	14	10	10.2
Excavation damage	10	9	10	10.2
Incorrect operation	7	7	5	5.0
Equipment failure or material failure of pipe or weld	64	43	55	57.0
Natural force damage	4	6	3	3.0
Other outside force damage	9	3	5	5.4
All other causes	3	1	9	9.2
Total	**110**	**83**	**97**	**100**

[1] DOT PHMSA Pipeline Incidents, Onshore transmission from 2022 to 2024.

11.3 Safety Standards for Pipelines

The proposed Project pipelines will be designed, constructed, operated, and maintained in accordance with the PHMSA 49 CFR Part 192. The PHMSA regulations in 49 CFR Part 192 specify material selection and qualification, minimum design requirements, operating and maintenance schedules, and protection from internal, external, and atmospheric corrosion. These federal safety standards, together with pipeline integrity management programs and recent advances in pipeline manufacturing, construction, and inspection techniques, minimize the potential for pipeline failure. Pipelines and facilities also will be abandoned in accordance with PHMSA 49 CFR § 192.727.

The construction details for the proposed pipeline segments and uprate are discussed in Resource Report 1, Section 1.3.

11.3.1 DOT Class Locations

PHMSA regulations in 49 CFR § 192.5 define area classifications based on population density near the pipeline. Areas of higher population face more stringent requirements. A "class location unit" is defined as an area that extends 220 yards (660 feet) on either side of the centerline of any continuousone-mile length of pipeline. The four area classifications are defined as follows.

- Class 1: Location with 10 or fewer buildings intended for human occupancy
- Class 2: Location with more than 10 but less than 46 buildings intended for human occupancy
- Class 3: Location with 46 or more buildings intended for human occupancy or where the pipeline lies within 100 yards of either a building, or small, well-defined outside area (e.g., playground, recreational area, outdoor theater, or place of public assembly) that is occupied by 20 or more people at least 5 days a week for 10 weeks in any 12-month period
- Class 4: Location ends 220 yards from the nearest building with four or more stories above ground or when a cluster of buildings intended for human occupancy requires a Class 2 or 3 location, the class location ends 220 yards from the nearest building in the cluster

Class locations representing more populated areas require higher safety factors in pipeline design, testing, and operation. Pipelines constructed within a Class 1 location must be installed with a minimum depth of cover of 30 inches in normal soil and 18 inches in consolidated rock. Class 2, Class 3, and Class 4 locations, as well as drainage ditches of public roads and railroad crossings, require a minimum cover of 36 inches in normal soil and 24 inches in consolidated rock. Class locations also specify the maximum distance of a specific point on the pipeline and a mainline block valve (e.g., 10.0 miles in Class 1; 7.5 miles in Class 2; 4.0 miles in Class 3; and 2.5 miles in Class 4). Table 11.3-1 summarizes the existing and design class locations crossed by the Project pipeline facilities by MP, respectively.

Table 11.3-1 Class Locations for the Project Pipeline Facilities

Beginning MP	Ending MP	Existing Class for Proposed Facilities	Design Class for Proposed Facilities
Omaha 3rd branch line loop			
0.00	9.03	Class 1	Class 3
NPPD Princeton Road power station branch line			
0.00	14.64	Class 1	Class 3
Des Moines C-line branch line extension			
16.07	18.55	Class 1	Class 3
Des Moines C-line south loop uprate			
18.55	25.38[1]	Class 1	Class 3

[1] There is an approximate 4.47-mile gap between the end of the Des Moines C-line branch line extension and the start of the Des Moines C-line south loop uprate; Northern's current MPs do not reflect this gap.

Pipe design regulations for steel pipe are contained in 49 CFR Part 192, Subpart C, section 192.105, and specify a formula for the pipeline's design pressure. Sections 192.107 through 192.115 contain the components of the design formula, including yield strength, wall thickness, design factor, longitudinal joint factor, and temperature derating factor. Component design will be adjusted based on specific conditions.

11.3.2 HCAs and Integrity Management Planning

PHMSA promulgated a rule for pipeline integrity management in high consequence areas for gas transmission pipelines that has been incorporated into 49 CFR Part 192, Subpart O. This rule requires that an integrity management plan be developed to document procedures under which pipeline integrity will be monitored and maintained for those areas where the pipeline traverses' lands or facilities that are considered HCAs.

PHMSA regulations in 49 CFR § 192.903 identify a formula that is utilized to estimate the distance from a potential explosion at which death, injury, or significant property damage may occur adjacent to natural gas transmission pipelines and associated facilities. This distance is known as the potential impact radius and is defined as the radius of a circle within which potential failure of a pipeline could have significant impact on people or property.

Potential impact circles that contain 20 or more structures intended for human occupancy; buildings housing populations of limited mobility; buildings that would be hard to evacuate (e.g., nursing homes or schools); or buildings and outside areas occupied by more than 20 persons on a specified minimum number of days each year, are defined as HCAs (PHMSA 2011). Criteria to define an MCA is outlined under PHMSA's 49 CFR Part 192.3.

Northern has calculated the PIR for all points along the Project, respectively to determine the presence of HCAs and MCAs. There is one new HCA impacted by the NPPD Princeton Road power station branch line from a proposed NPPD office building at MP 14.64. There are five MCAs affected by the project.

- MP 7.65 on the NPPD Princeton Road power station branch line at the Highway 77 crossing
- MP 18.24, 18.96, 19.37, and 22.01 on the Des Moines C-line south loop uprate

11.3.3 Pipeline Markers

In accordance with PHMSA regulations in 49 CFR § 192.707, Northern will clearly and frequently mark its pipelines along the ROW, including at intersections with roadways, railroads, and other utilities; waterbody crossings; and other important areas. These markers will alert the public to the general location of the pipeline to help prevent encroachment and potential damage caused by third-party excavation. Markers are typically offset from the physical pipe centerline. Northern participates in state One Call systems to help ensure the safety of anyone excavating near existing pipelines.

Northern will install markers for newly installed pipelines, compressor stations, and aboveground facilities (meter station, launchers and receivers).

11.3.4 Operations, Maintenance and Emergency Planning

Pipeline operating regulations contained in 49 CFR § 192.615, Subpart L, requires each pipeline operator to establish an operation and maintenance plan and an emergency plan that includes procedures to minimize hazards in a natural gas pipeline emergency. Key elements of the plans include the procedures listed below.

- Responding to and managing an emergency incident (i.e., gas leakages, fires, explosions, and natural disasters)
- Establishing and maintaining communication, as well as notifying local fire, police, and public officials, of incidents and coordinating emergency response
- Promptly and effectively responding to emergencies
- Ensuring Northern personnel are properly trained and supplied with the appropriate equipment, tools, and materials for dealing with an emergency
- Protecting and securing life over property when dealing with hazards
- Performing an emergency shutdown of the system when necessary and safely restoring service following outages

Northern will design the pipelines with a 0.5 design factor to protect against future class location changes. Changes in population density near the proposed facilities will be monitored to document that the new facilities meet the appropriate design criteria and safety standards where class locations change. When changes in population density occur, Northern may replace sections of pipe, reduce the operating pressure in the line or take other similar safety measures to achieve the required measure of safety. The new class location also may require an increase in the frequency of inspection.

Northern's emergency response program and other pipeline safety monitoring program aspects are summarized in Section 11.6.

11.4 Safety Standards for Aboveground Facilities

Separate subparts of 49 CFR Part 192 address the design of additional pipeline components, including valves. The proposed Project requires installation of a proposed compressor station, a meter facility, launchers, receivers, and control valves. Construction and operation of the new facilities will occur within the confines of the workspace boundaries of the Project and associated facility easements will be acquired. All Project components will conform to the safety standards.

Fire protection, first aid and safety equipment will be installed and maintained at the new Clarion compressor station. Northern's emergency response personnel are trained in first aid and proper equipment use as specified under 29 CFR Part 1910. Fire-fighting equipment, consisting primarily of hand-held dry chemical fire extinguishers and a fire and gas detection system, will be located at the new Clarion compressor station. The emergency shut-down systems at the Clarion compressor station will comply with DOT regulations set forth in 49 CFR § 192.167 and with additional safety systems addressed in 49 CFR §§ 192.169 and 192.171.

The NPPD Princeton Road power station meter station will not have safety systems or fire-fighting equipment. Fire-fighting equipment is standard in Northern company vehicles and is utilized if needed at locations along the pipeline ROW.

11.5 Safety Standards for Construction

During construction, the applicable requirements of OSHA will be followed. All applicable requirements for construction set forth under 49 CFR Part 192 and 29 CFR Parts 1910 and 1926 will be emphasized by Northern to all employees and contractors as part of general practices. Additional safety standards requiring training during construction are further outlined below.

11.5.1 Traffic Control

Fifteen gravel public roads are proposed for open-cut crossing methods for the Project. In general, the impact on traffic and transportation facilities and public inconvenience at crossings will be minimized by Northern's Traffic Control Plan. Northern will coordinate with local highway departments in advance of construction of each pipeline component and develop and post detours in advance of the open-cut crossings. For the private driveways being crossed via open cut methods, Northern will coordinate with the landowners regarding the specific timing of the crossings at least three days in advance and will minimize any restrictions to the landowners by maintaining access as much as possible with steel plates. Northern has developed traffic control plans for the Project. A traffic control plan is included in Resource Report 1, Appendix 1G.

The remaining public roads will be crossed via HDD, which will not restrict access for the general public and eliminate the need for any detours. Normal traffic flow can be maintained. Northern's construction contractor will provide traffic warning signs along road crossings as recommended by the Iowa and Nebraska Manual(s) of Uniform Traffic Control Devices (IDOT 2009, NDOT 2025) and required by local and/or state road encroachment permits.

Northern will utilize tanker trucks to transport water for hydrostatic testing. Hydrostatic testing is a limited-time construction activity and the impacts are expected to be temporary and of short duration. Northern expects the truck driver will have a commercial driver's license, and the truck will have normal safety features for a vehicle of its size.

Further, Northern will coordinate with local authorities, as required by local and/or state road permits before construction begins to ensure that both Northern and representatives of the local authorities have appropriate contact information.

11.5.2 Affected Residences

Construction activities in residential areas will be temporary and limited to the time required to safely install the pipelines. Northern will install safety fences along its workspace, as needed, and where there is potential for public access. A church is located near MP 4.37 on the Omaha 3rd branch line loop; the church will not be affected due to the presence large coniferous trees and a fenceline. A second church is located 0.22 mile east of MP 1.41 of the Omaha 3rd branch line loop. This Project is not located in proximity (0.25-mile) to any other schools, churches, nursing homes, or childcare organizations that may warrant additional safety precautions. The Project will not affect any residences.

11.5.3 Working Over Existing In-service Pipelines

Northern avoids construction activities over existing operating pipelines whenever possible but is capable of safely doing so when subsurface conditions allow. Northern will cross in-service pipelines via both open cut and trenchless methods. Northern's engineers will assess the potential stresses imposed by equipment and materials traveling over existing pipelines and make recommendations as necessary (e.g., additional soil cover, timber mats, minimal separation distance) for protecting the in-service pipeline and public from potential hazards. Northern has included ETWS workspace where these crossovers occur along HDDs, specifically at public road crossings. Northern also employs spotters for large equipment. As part of Northern's damage prevention procedure, the contractor will hydro-excavate a pothole or excavate a small trench to locate the existing pipeline and then install a poly-vinyl chloride pipe in the ground recording depth, MP and other relevant information on the pipe.

11.5.4 Minimum Distances Between Pipelines

Northern will maintain a 25-foot offset between existing pipelines and the proposed pipelines except for areas with deviations due to landowner requests and/or environmental and engineering constraints. These deviations are further discussed in Resource Reports 8 and 10.

11.5.5 Public Access

Northern will restrict the public from easily accessible workspaces (e.g., road crossings) by installing temporary safety fencing and barriers around areas of active construction on the Project.

11.5.6 Utility Crossovers

Crossing over or under existing pipelines or other utility infrastructure is common for all types of utilities and will be completed in a safe manner. Northern and its contractors will avoid unnecessary crossings of foreign lines when possible and will follow existing safety procedures in areas where crossovers are unavoidable.

Typically, crossovers are installed under existing pipelines. Some crossovers require deeper excavation, additional workspace, and exposure of the crossed utility. All of these factors increase impacts on the surrounding land and require extra care during installation of the new pipeline. Before a crossover is allowed, Northern will work with the utility owner to agree upon a crossing method that satisfies both companies' policies and public safety codes. Northern's construction inspectors and pipeline construction contractors have

extensive experience and knowledge of the proper means and methods for safely installing pipeline crossovers.

The Project, as designed, will cross foreign in-service pipelines, utilities and other Northern pipelines. Northern's engineers will assess the potential stresses imposed by equipment and materials on the existing pipeline and make recommendations as necessary (e.g., additional soil cover, timber mats) for protecting the in-service pipelines and public from potential hazards. ETWS has been included in the Project workspaces to allow for potholing to expose utility infrastructure during construction, specifically during HDDs of public road crossings.

11.5.7 Welding

Northern's policy is that only company-approved and certified welders are permitted to work on its facilities. The welding activities are carried out under the supervision of a Northern welding inspector and follow Northern's welding procedures. Additionally, the qualified welders meet the standards of American Society of Mechanical Engineers, Boiler and Pressure Vessel Code § IX, American Petroleum Institute 1104 (API 1999), and 49 CFR Part 192. All contract welders will be required to comply with applicable OSHA rules specified under 29 CFR Parts 1910 and 1926.

11.5.8 Blasting

Based on collected geologic, geophysical, and geotechnical data, Northern does not anticipate blasting will be required for the Project. Resource Report 6, Section 6.3 provides additional discussion about the potential for blasting during construction.

11.6 Pipeline Safety Monitoring Program

11.6.1 Material Construction

Safety begins at the pipe mill or manufacturer where the piping and other facility components are manufactured. Northern representatives inspect the piping, coating, and other components to document that it meets quality control standards and specifications. During construction, the integrity of pipeline coatings (which are designed to protect the pipeline against corrosion) are inspected, examined, corrected, or repaired if necessary and are verified on-site by qualified inspectors. Pipe girth welds will be non-destructively tested in accordance with PHMSA requirements before installation is considered complete. In addition, proposed piping for the Project will be pressure tested to a pressure 1.25 to 1.50 times higher than its maximum allowable operating pressure according to class locations and before being placed in service.

11.6.2 Observations and Inspections

Once the pipelines and facilities are installed, Northern will implement a number of routine monitoring measures, including the following:

- Monitoring CP periodically
- Testing relief valves
- Testing fire and gas systems annually
- Observing surface conditions on and near the property for indications of leaks, construction activity, or any other factors which may affect safety and operation

- Inspecting valve settings and observing area construction activities
- Conducting leak surveys at least once every calendar year or as required by regulations

During inspections of the Northern system, Northern employees look for signs of unusual activity on the ROW. Upon discovery of an unusual activity, Northern personnel will respond immediately to assess the nature of the activity and remedy with prescribed corrective action. Additional tests may be conducted using analyzers to verify the effectiveness of the CP system. Any missing or damaged pipeline markers used to identify the location of the pipeline will be promptly replaced or repaired.

11.6.3 SCADA Monitoring

In addition to the PHMSA-required actions listed above, Northern will monitor the pipeline systems using a supervisory control and data acquisition system. SCADA systems are used to monitor and control facilities or equipment in industries such as telecommunications, water and waste control, energy, oil and gas refining, and transportation. A SCADA system gathers information year-round 24 hours per day and transfers the information back to Northern's Operations Communication Center, which is described in Section 11.6.5 below. The system alerts Northern personnel that a leak may have occurred and carries out the necessary analysis and control.

Northern's pipeline system is monitored by a gas control department located in Omaha, Nebraska. The Project facilities will be monitored for flow and pressure with data communicated to the gas control department. Alarms, which include high- and low-pressure indicators, also are monitored by the system and activated at the gas control department.

11.6.4 Employee Qualification Program

As part of the requirements of 49 Part CFR 192, Subpart N, Northern also maintains and follows a written employee qualification program. This program includes training to ensure that Northern employees have the necessary knowledge and skills to perform their tasks in a manner that ensures the safe operation of pipeline facilities. The program also includes an OQP to ensure that individuals who perform covered tasks on the system are qualified in accordance with 49 CFR Part 192, Subpart N. The OQP requires all individuals who perform covered tasks on the system, including contractors, be qualified to perform the covered tasks and be able to recognize and react to abnormal operating conditions. Elements of the OQP include the following:

- Identification of the covered tasks
- Evaluation and qualifications of individuals
- Presence of non-qualified individuals
- Performance contributing to an incident
- Reasonable cause to verify qualification
- Communication of change
- Subsequent qualification intervals
- Recordkeeping
- Training requirements
- Regulatory agency notification

11.6.5 Emergency Response

Northern has designated the OCC to manage its 24-hour emergency response capabilities. The OCC's toll-free number (1-888-367-6671) will be included in all communications with property owners and other identified stakeholders, posted on all pipeline markers, and provided to local emergency agencies in the vicinity of the pipeline facilities. The OCC is staffed year-round 24 hours per day. When a call is received regarding the Project, trained OCC personnel will record the information and notify the Project manager, who will either address the concern or contact the appropriate company subject matter expert to provide a timely response.

Northern has a Public Awareness and Damage Prevention Program that calls for communication with emergency responders on an annual basis. Communication revolves around pipeline safety: how to identify a pipeline marker, what a pipeline ROW is and looks like, who to call in case of an emergency, physical properties of natural gas, and what is expected of first responders during an emergency.

Northern employs an emergency management response team to respond to pipeline leaks and other emergencies. Team members conduct regular mock and table-top drills. In the event of a leak or emergency, a "call burst" is sent to team members. Response to the situation is conducted using a command and control system and is directed from a state-of-the-art command center in Northern's Omaha, Nebraska, headquarters building. Northern has established an alternate command center in south Omaha, Nebraska.

Northern has developed emergency response plans for its entire system. Operating personnel attend training for emergency response procedures and plans, pursuant to OSHA regulations in 29 CFR Part 1910. Northern will review, revise, and develop new emergency response plans as necessary before placing the new facilities in operation. Northern will meet with LEPCs, including fire departments and police departments, to review their plans. Northern will work with these LEPCs to communicate the specifics about the pipeline facilities in the area and the need for emergency response. Northern also will meet periodically with these entities to review and revise their plans when necessary. LEPC personnel will be involved in any operator-simulated emergency exercises and post-exercise critiques, if conducted. Northern will use all available, reasonable, and relevant means to support the continued operation of the pipelines and facilities if an emergency occurs.

Other than what is discussed in Section 11.4 for the Clarion compressor station, no special fire-fighting apparatus is required to fight a high-pressure natural gas fire at the proposed facilities. The most effective and immediate way to begin to address a high-pressure gas pipeline rupture is to shut off the gas source. Northern has valves spaced along the pipelines that can be used to isolate each pipeline segment.

11.7 Integrity Management Program

Northern has developed a pipeline integrity management program to improve pipeline safety along its entire pipeline system. This program was implemented to comply with the prescriptively based requirements of 49 CFR Part 192, Subpart O. Northern implements the program through the following:

- Assessing the integrity of pipelines in HCAs, MCAs and other areas
- Improving integrity management data systems within the company

- Increasing the integrity and reliability of the pipeline system
- Improving the government's role in reviewing the adequacy of integrity programs and plans

The new pipelines will be incorporated into Northern's integrity management program. The information that Northern gathers about its system is incorporated into the integrity management program. Northern decides where and when to internally inspect the pipeline based on accumulated data. Risk assessment of the pipeline system determines what inspection criteria are required. This may include in-line inspection tools (e.g., smart pigs) that are designed to provide specific integrity information about the condition of the pipe, as well as inspection tools and practices that Northern has determined will be the most effective.

11.7.1 Pressure Testing

Pressure tests are an integral part of Northern's pipeline integrity management program. Pipelines are designed to operate at certain pressures based on the pipe metal's yield strength, diameter, and wall thickness. Hydrostatic pressure testing or pneumatic pressure testing will be conducted in accordance with 49 CFR Part 192, Subpart J, to verify the integrity of the pipeline before being placed into service. The components (pipelines and aboveground facilities) installed for the Project will be tested between one and eight hours. Any significant loss of pressure will indicate that a leak may have occurred and warrant further inspection and, where necessary, repair. Additional information on hydrostatic or pneumatic pressure testing is located in Resource Report 1, Sections 1.3.3 and 1.4.2.

11.7.2 Periodic Inspections

As part of regular operation and maintenance practices, Northern will periodically inspect its pipelines for leaks and safety hazards by walking, driving, flying, or other appropriate means of traversing the ROW. Northern also will inspect its CP anode beds to verify adequate corrosion protection. Inspectors will access the ROW using public roads and acquire permission from affected landowners before entering their properties.

11.7.3 Cathodic Protection

The new underground structures that are used to transport natural gas are required by the PHMSA regulations in 49 CFR Part 192, Subpart I, to have an external protective coating (Section 192.461) and must have a CP system (Section 192.463) designed to work with the coating to protect the underground structures from corrosion. Following construction and installation of the facilities required for the Project, Northern will install low-voltage CP systems at optimal locations to help protect buried pipelines from corrosion. Northern intends to install its CP systems within certified construction workspaces and in accordance with FERC's regulations. All rectifiers and electrical equipment will be enclosed inside locked metal boxes. Additional mitigation systems will be installed to protect the piping and associated facilities from corrosion caused by induced alternating current. Aboveground structures will be coated to prevent atmospheric exposure and corrosion.

Northern is required by PHMSA to assess the actual pipe-to-soil potentials of newly installed underground structures. Northern will disconnect the existing pipelines from the ground beds and connect the proposed pipeline to this existing system. Northern will then monitor the areas to determine where additional CP may be required. If monitoring shows

that additional CP is required or modifications are needed, Northern will complete this work within one year of the in-service date in accordance with PHMSA regulations in 49 CFR Part 192, Subpart I, Section 192.455.

Northern also is required by the PHMSA regulations in 49 CFR Part 192, Subpart I, Section 192.465, to constantly monitor the effectiveness of the CP systems and promptly correct any deficiencies found. Following the modification and balancing of the CP system, Northern personnel will routinely check the voltage and amperage of the rectifiers as well as the pipe-to-soil potentials. Adjustments will be made as conditions change. In addition to maintenance activities, annual CP surveys will be completed to determine pipe-to-soil potentials. Close-interval surveys also will be conducted on a periodic basis.

11.8 Public Education Program

Northern complies with API 1162 (API, 2003) for its Public Awareness Program. Following this guidance, Northern identifies the target audiences (e.g., general public, libraries, affected landowners, local public officials, emergency responders, LEPC, media, and One Call centers) that should receive correspondence and provides information, as appropriate, to ensure adequate reporting to Northern or the appropriate emergency response organization.

Northern will minimize the possibility of excavation-related damage to the pipelines by adhering to the damage prevention requirements listed below:

- General notification of the public in the vicinity of the pipeline, in addition to notification of individuals or companies engaged in excavation activities, to make them aware of how to determine the general location of underground pipelines before excavation activities begin.
- Participating in One Call systems and maintaining responsibility to mark and prevent damage to pipelines for excavation activities by:
  - Temporarily marking the buried pipeline in the excavation area prior to any work being done
  - Inspecting the pipeline during and after excavation activities to verify the integrity of the pipeline. Northern will have personnel observe all excavations that occur on the ROW to document that no damage occurs during excavations

Northern may perform a targeted mail program to communicate public awareness and damage prevention information to residences, businesses, and places of congregation. Mailings will occur if:

- The area is located in what has been designated as an HCA or MCA
- Conditions exist that elevate the potential for third-party damage
- Specific local conditions warrant more frequent communication

11.9 Security and Terrorism

Safety and security concerns have changed the way pipeline operators and regulators must consider terrorism, both in approving new projects and in operating existing facilities. The Department of Homeland Security is tasked with the mission of coordinating the efforts of all executive departments and agencies to prevent, prepare for, protect against, respond to, and recover from terrorist attacks within the U.S. The FERC, in cooperation with other federal agencies, industry trade groups, and interstate natural gas companies, is working to

improve pipeline security practices, strengthen communications within the industry, and extend public outreach in an ongoing effort to secure pipeline infrastructure.

The likelihood of future acts of terrorism or sabotage occurring on the Project facilities is unpredictable given the disparate motives and abilities of terrorist groups. The continuing need to construct facilities to support the future natural gas pipeline infrastructure is not diminished from the threat of any such acts. Northern is committed to cooperating with FERC, along with other federal, state, and local agencies to protect its energy facilities, employees, and the neighboring public.

11.10 Valve Isolation Safety

Northern will install and operate a number of valves for the Project to allow for isolation of facilities and segments of pipelines for maintenance or in event of an emergency. Valves at pipeline facilities will be manually operated except for those that are required to be remotely controlled in accordance with PHMSA 49 CFR Part 192.

11.11 References

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