ATLANTIC BRIDGE PROJECT

RESOURCE REPORT 11
Reliability and Safety

FERC Docket No. CP16-___-000

October 2015
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<td>LOCATION OF HIGH CONSEQUENCE AREAS ALONG THE ATLANTIC BRIDGE PIPELINE FACILITIES</td>
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<td>Location in Environmental Report</td>
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<tr>
<td>☑ 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))</td>
<td>Section 11.2 to 11.4</td>
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**RESPONSE TO FERC AUGUST 19, 2015 COMMENTS ON ATLANTIC BRIDGE PROJECT RESOURCE REPORT 11 – RELIABILITY AND SAFETY**

<table>
<thead>
<tr>
<th>FERC COMMENTS ON DRAFT RESOURCE REPORT 11</th>
<th>LOCATION OR RESPONSE TO COMMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Identify the types (i.e., manual, remote, automatic shut-off) of any new or modified valves associated with the project.</td>
<td>Section 11.4.1.1</td>
</tr>
<tr>
<td>2. Indicate in section 11.3.1.3 if the natural gas flowing through the proposed facilities would be odorized and identify any new odorization facilities that would be installed at the new or modified facilities.</td>
<td>All gas within the Algonquin system is odorized. As discussed in Section 11.3.1.3, Algonquin will be installing a supplemental odorant system at the new Salem Pike M&amp;R Station. This odorant system as well as any others for customer M&amp;R’s would only be for customer piping and would be owned and operated by the customer for their facilities.</td>
</tr>
<tr>
<td>3. Provide a general discussion in section 11.5.1.1 on what Algonquin’s notification procedures are in the event of a pipeline or compressor station leak or emergency.</td>
<td>For pipeline discussion, see Section 11.5. For compressor station discussion, see Section 11.7.2</td>
</tr>
<tr>
<td>4. Define the potential impact radius for the Weymouth Compressor Station and provide an assessment of the impact of an incident on the Fore River Bridge and the Constellation Energy Power Plant.</td>
<td>Section 11.8.1</td>
</tr>
<tr>
<td>5. Provide the additional details regarding the safety and evacuation measures for the Weymouth Compressor Station that the draft resource report indicated would be filed with the application.</td>
<td>Based on input received from Town of Weymouth public officials and community members, Algonquin has evaluated and made design modifications to the proposed Weymouth Compressor Station to address specific safety concerns. These design modifications include moving the emergency shut down (“ESD”) vent further from the Route 3A/Fore River Bridge and increasing the ESD vent height by adding an ESD silencer. In response to comments from FERC, Algonquin has also accounted for potential storm surge and inundation flooding impacts at the Weymouth Compressor Station site by designing the station based on the most conservative sea level rise projections. See Section 6.6.8 for additional information on sea level rise.</td>
</tr>
<tr>
<td>FERC COMMENTS ON DRAFT RESOURCE REPORT 11</td>
<td>LOCATION OR RESPONSE TO COMMENT</td>
</tr>
<tr>
<td>-------------------------------------------</td>
<td>---------------------------------</td>
</tr>
<tr>
<td>Algonquin will also review and expand its existing public liaison program with Weymouth elected and public safety officials to incorporate the compressor station. This program will include an Emergency Response Plan specific to the Weymouth compressor station. Local public safety officials and first responder organizations will be trained in how Algonquin plans to coordinate a response with public safety and first responder personnel in the unlikely event of an emergency at the Weymouth Compressor Station.</td>
<td></td>
</tr>
<tr>
<td>See Section 11.6 and Section 11.7.2 for additional information.</td>
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</table>
### ACRONYMS AND ABBREVIATIONS

<table>
<thead>
<tr>
<th>Name</th>
<th>Definition</th>
</tr>
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<tbody>
<tr>
<td>AC</td>
<td>alternating current</td>
</tr>
<tr>
<td>Algonquin</td>
<td>Algonquin Gas Transmission, LLC</td>
</tr>
<tr>
<td>Applicants</td>
<td>Algonquin and Maritimes</td>
</tr>
<tr>
<td>CFR</td>
<td>Code of Federal Regulations</td>
</tr>
<tr>
<td>FERC or Commission</td>
<td>Federal Energy Regulatory Commission</td>
</tr>
<tr>
<td>HCA</td>
<td>High Consequence Areas</td>
</tr>
<tr>
<td>hp</td>
<td>horsepower</td>
</tr>
<tr>
<td>M&amp;R</td>
<td>metering and regulating</td>
</tr>
<tr>
<td>Maritimes</td>
<td>Maritimes &amp; Northeast Pipeline, L.L.C.</td>
</tr>
<tr>
<td>PHMSA</td>
<td>Pipeline and Hazardous Materials Safety Administration</td>
</tr>
<tr>
<td>Project</td>
<td>Atlantic Bridge Project</td>
</tr>
<tr>
<td>psig</td>
<td>pounds per square inch gauge</td>
</tr>
<tr>
<td>ROW</td>
<td>right-of-way</td>
</tr>
<tr>
<td>TSA</td>
<td>Transportation Safety Administration</td>
</tr>
<tr>
<td>U.S.</td>
<td>United States</td>
</tr>
<tr>
<td>USDOT</td>
<td>U.S. Department of Transportation</td>
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</table>
11.0 RESOURCE REPORT 11 – RELIABILITY AND SAFETY

11.1 Introduction

Algonquin Gas Transmission, LLC (“Algonquin”) and Maritimes & Northeast Pipeline, L.L.C. (“Maritimes”) (collectively the “Applicants”) are seeking authorization from the Federal Energy Regulatory Commission (“FERC” or “Commission”) pursuant to Section 7(c) of the Natural Gas Act\(^1\) to construct, install, own, operate, and maintain the Atlantic Bridge Project (“Project”). The Applicants are also seeking authorization pursuant to Section 7(b) of the Natural Gas Act\(^2\) to abandon certain facilities as a related component of the Atlantic Bridge Project.

The Atlantic Bridge Project will create additional firm pipeline capacity necessary to deliver natural gas supplies that will meet supply and load growth requirements in the Northeast market area. The Project will create additional capacity between a receipt point on Algonquin’s system at Mahwah in Bergen County, New Jersey and various delivery points on the Algonquin system, including at Beverly, Massachusetts for further transportation and deliveries on the Maritimes system. The Project capacity of up to 132,705 dekatherms per day (“Dth/d”) will be created through pipeline take-up and relay facilities and additional compression on Algonquin’s system. South-to-north transportation on the Maritimes system will be achieved through minor modifications to existing facilities to provide bi-directional flow on the existing Maritimes system. The target in-service date for the Project is November 1, 2017.

As is more fully described in Resource Report 1, the Atlantic Bridge Project includes the construction of approximately 6.3 miles of take-up and relay pipeline facilities on the Algonquin system. These pipeline facilities include the following:

- **New York:**
  - Stony Point Discharge Take-up and Relay – 4.0 miles of 42-inch diameter pipeline.

- **Connecticut:**
  - Southeast Discharge Take-up and Relay – 2.3 miles of 42-inch diameter pipeline.

On the Algonquin and Maritimes systems, the Project also includes aboveground facilities including modifications at three existing compressor stations, five existing metering and regulating (“M&R”) stations, and one existing regulator station, as well as the construction of one new compressor station and one new M&R station. To the extent feasible, existing public and private roads along the proposed Atlantic Bridge Project routes will be used as the primary means of accessing pipeline rights-of-way (“ROW”) and aboveground facilities. These aboveground facilities are listed below and are described in more detail in Resource Report 1.

- **New York:**
  - Stony Point Compressor Station – uprate existing compressor unit\(^3\).
  - Yorktown M&R Station – install over pressure protection facilities for existing station.

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\(^1\) 15 U.S.C. § 717f(c) (2012).


\(^3\) The proposed uprate to the existing Mars 100 compressor unit at the Stony Point Compressor Station in New York will utilize constructed but uncertificated horsepower capacity. The uprate simply requires the removal of a software control, installed previously to limit the horsepower output. As a result, the uprate will not require any facility construction or ground disturbance, and there will be no additional impacts relating to such activities. As a result, the proposed work at the Stony Point Compressor Station is not discussed further in this resource report.
• Connecticut:
  o Oxford Compressor Station – add compression and cooling facilities.
  o Chaplin Compressor Station – add compression and cooling facilities and upgrade existing compressor units.
  o Danbury M&R Station – install over pressure protection facilities for existing station.
  o Salem Pike M&R Station – construct new station to replace existing.

• Massachusetts:
  o Weymouth Compressor Station – construct new station.
  o Needham Regulator Station – modify existing station.
  o Pine Hills M&R Station – rebuild existing station.
  o Plymouth M&R Station – rebuild existing station.

• Maine:
  o Westbrook M&R Station – modify existing station.

This Resource Report 11 describes the reliability and safety aspects of the proposed Atlantic Bridge Project and discusses how the Project will comply with the United States Department of Transportation (“USDOT”) Minimum Federal Safety Standards specified in Title 49 of the Code of Federal Regulations (“CFR”), Part 192.

11.2 Algonquin System Overview

Algonquin owns and operates a natural gas transmission system consisting of approximately 1,129 miles of transmission pipeline, seven compressor stations and numerous delivery points to its customers. Algonquin has provided service since 1953, when the major portion of its transmission system was constructed.

The Algonquin transmission facilities connect with high demand markets in the northeastern United States (“U.S.”) that are located in New Jersey, New York, Connecticut, Rhode Island and Massachusetts. Portions of Algonquin’s pipeline system traverse densely populated regions of these states in close proximity to many population centers.

11.2.1 Historical Operating Record

Generally, the natural gas transmission industry has an excellent record of public safety. Pipelines and related facilities are designed and maintained with strict adherence to USDOT standards to ensure public safety, reliability, and to minimize the opportunity for system failure.

Algonquin has an excellent record of public safety since operations began in 1953. Algonquin will continue to employ similar system design, construction, operation, and maintenance practices to ensure this excellent record is maintained. Algonquin is committed to maintaining the highest standards of safety.

11.3 Safety Overview

The proposed Atlantic Bridge Project facilities constructed by Algonquin will fully adhere to USDOT regulations pertaining to pipeline safety. These safety regulations will be reinforced by the comprehensive and strictly enforced corporate practices of Algonquin and Maritimes. The following information provides a perspective of the Applicants’ experience with respect to safety and reliability compared to industry-wide operational data.
11.3.1 Safety Standards for Pipelines

Under the Natural Gas Pipeline Safety Act, as amended (49 USC 60101 et seq.), the USDOT has promulgated pipeline safety and design standards. The proposed Atlantic Bridge Project facilities will be designed, constructed, operated and maintained to meet or exceed USDOT Minimum Federal Safety Standards set forth in Title 49 CFR Part 192. The areas in which Algonquin specifications exceed those set forth in 49 CFR Part 192 include properties of pipe, valves, pigging facilities, fabrications, pipe fittings, and welding, as well as procedures for pressure testing, corrosion protection, inspection, and record keeping.

Examples of specifications that exceed those required by 49 CFR Part 192 are listed below:

- Minimum cover of 36 inches required at all Class Locations and geological conditions;
- All welding, coating, and backfilling activities are inspected;
- All welds are non-destructively examined by an independent radiographic inspection company, regardless of Class Location;
- Welders must be qualified by destructive testing once every other year, and by non-destructive testing every six months;
- Remote controlled valves and monitoring equipment are expected to be installed for all mainline valves on the Atlantic Bridge Project;
- Valves are typically spaced at closer distances than required;
- All mainline piping must have at least 16 mils nominal thickness of fusion-bonded epoxy coating; and
- The minimum pressure for pressure tests, where piping is tested to a pressure much higher than the pipeline maximum allowable operating pressure, is greater than required by the regulations

11.3.1.1 USDOT Class Locations

Part 192 also defines area classifications based on population density in the vicinity of the pipeline that determine more rigorous safety requirements for populated areas. The class location unit is an area that extends 220 yards on either side of the centerline of any continuous one-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 fewer than 46 buildings intended for human occupancy.
- **Class 3**: Location with 46 or more buildings intended for human occupancy or where pipeline lies within 100 yards of any building or small, well-defined outside area occupied by 20 or more people during normal use.
- **Class 4**: Location where buildings with four or more stories aboveground are prevalent.

Class locations representing more populated areas require higher safety factors in pipeline design, testing and operation. Per USDOT requirements, pipelines constructed in Class 1 locations must be installed with a minimum depth of cover of 30 inches in normal soil and 18 inches in consolidated rock. Class 2, 3 and 4 locations, as well as drainage ditches of public roads and railroad crossings, require a depth of cover of 36 inches in normal soil and 24 inches in consolidated rock. Class locations also specify the maximum distance to a sectionalizing block valve at 10 miles in Class 1, 7.5 miles in Class 2, 4 miles in Class 3, and 2.5 miles in Class 4. Pipeline design pressures, hydrostatic test pressures, maximum allowable operating pressure, inspection and testing of welds, and frequency of pipeline patrols and leak surveys must also conform to higher standards in more populated areas.
Table 11.3-1 shows USDOT area classifications for the Atlantic Bridge Project.

<table>
<thead>
<tr>
<th>State, County, Facility</th>
<th>Beginning and Ending Milepost</th>
<th>Approximate Length (feet)</th>
<th>Class Location (1, 2, 3, or 4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>New York Westchester County</td>
<td>0.00 to 0.28</td>
<td>1,462</td>
<td>2</td>
</tr>
<tr>
<td>Story Point Discharge Take-up and Relay</td>
<td>0.28 to 0.67</td>
<td>2,063</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>0.67 to 4.00</td>
<td>15,318</td>
<td>3</td>
</tr>
<tr>
<td>Connecticut Fairfield County</td>
<td>0.00 to 2.27</td>
<td>11,986</td>
<td>3</td>
</tr>
<tr>
<td>Southeast Discharge Take-up and Relay</td>
<td></td>
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</table>

a/ Minor discrepancies in totals are due to rounding.

11.3.1.2 Pipeline Markers

Markers and signs are posted along the pipeline ROW to inform the public of the presence of the natural gas pipelines. The markers are placed at street and road crossings, railroad crossings and other significantly visible points along the ROW to reduce the possibility of damage to or interference with the pipeline.

In densely populated areas, Algonquin will frequently place the markers within “line of sight” proximity – this means the markers are close enough together that you can see from one marker to the next. Markers and signs include the pipeline name and the phone number to call if any abnormal condition or suspicious activity is detected that would threaten the integrity of the pipeline. In addition, one foot below natural grade, Algonquin will install a bright yellow warning ribbon reflecting the location of the pipeline to notify potential excavators of the pipe location.

11.3.1.3 Pipeline Accident Data

USDOT has set forth certain reporting requirements for natural gas pipelines in 49 CFR Part 191 (“Part 191”). Since June 1984, Part 191 has required all operators of transmission and gathering systems to notify USDOT of any reportable incident, and to submit a written report on form F7100.2 within 30 days of the incident’s occurrence. A reportable incident includes those incidents that involve property damage valued at more than $50,000, injury, death, release of gas, or incidents that are otherwise considered significant by the operator. During the 20 year period from 1995 to 2014 there have been 978 total significant incidents reported to USDOT from all operators of natural gas transmission facilities.

Material Failure Incidents

The category accounting for the most frequent cause of gas transmission incidents is material failure (approximately 31 percent) based on 299 incidents out of 978 total reported (USDOT, 2014). The frequency of material failure-related incidents is largely dependent on material, weld, and/or equipment failure or
malfunctioning equipment. Corrosion was the cause of approximately 17 percent of the gas transmission incidents during the period from 1995 through 2014 (60 internal incidents and 128 external incidents). While pipelines installed since 1950 exhibit a fairly constant frequency of corrosion incidents, pipelines installed before that time have a significantly higher rate. Older pipelines have a higher frequency of corrosion incidents due to corrosion being a time-dependent process. The potential for external corrosion for new pipe is further reduced by use of more advanced coatings and cathodic protection. Prior to 1971, pipelines were not required to use cathodic protection and protective coatings. The use of both an external protective coating and a cathodic protection system significantly reduces the rate of failure compared to unprotected or partially protected pipe. In addition, the Applicants’ pipelines are inspected periodically using modern high-resolution inline inspection tools, in strict compliance with the US DOT integrity regulations, which are run at a frequency to identify and mitigate potential internal or external defects long before there would be any issues.

**Outside Force Incidents**

Outside force incidents result from the following: the encroachment of mechanical equipment such as bulldozers and backhoes; earth movements due to soil settlement, washouts, or geologic hazards; weather effects such as winds, storms and thermal strains; and other forces. The breakdown of outside force incidents in Table 11.3-2 shows that human error in equipment usage was responsible for approximately 17.5 percent of outside force incidents during the 20 year period from 1995 to 2014. Since April 1982, operators have been required to participate in “one call” public utility programs in populated areas to minimize unauthorized excavation activities in the vicinity of pipelines.

<table>
<thead>
<tr>
<th>TABLE 11.3-2</th>
<th></th>
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<tbody>
<tr>
<td>Cause</td>
<td>Percentage</td>
</tr>
<tr>
<td>Third Party Excavation Damage</td>
<td>17.5</td>
</tr>
<tr>
<td>Heavy Rains/Floods</td>
<td>5.1</td>
</tr>
<tr>
<td>Earth Movement</td>
<td>4.5</td>
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<tr>
<td>Lightning</td>
<td>1.7</td>
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<tr>
<td>Other Outside Forces</td>
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Design of the corrosion control systems will be incorporated into the overall construction of the Atlantic Bridge Project pipeline. Once the pipeline has been built, extensive ongoing corrosion control measures will be implemented to monitor and maintain the pipeline integrity, as defined in USDOT regulations and Algonquin’s corrosion control operating procedures.

The pipeline will be coated with an epoxy based coating. As explained in further detail below, a continuous direct current will then be applied to the entire length of the pipeline to manage the potential corrosive nature of the soils and interference potential of nearby underground facilities.

All gas within the Algonquin system is odorized. Algonquin will be installing a supplemental odorant system at the new Salem Pike M&R Station. This odorant system as well as any others for customer M&R’s would only be for customer piping and would be owned and operated by the customer for their facilities.
11.3.2 Safety Standards for Compressor Stations

In addition to pipeline safety standards, 49 CFR Parts 192.163 through 192.173 establish safety guidelines for the design and construction of compressor stations. A typical compressor station consists of yard piping and compressor unit(s), a gas or electric power source, safety systems and personnel, all working together for the safe and efficient transmission of natural gas.

The FERC and USDOT have established rigorous siting and safety requirements for interstate pipeline compressor stations. In addition, the EPA, through the state environmental agencies, strictly regulates compressor station emissions. Location criteria for compressor stations are determined by a number of factors that include: (1) engineering design with favorable pipeline hydraulic performance; (2) geographic suitability; (3) environmental resource impacts; and, (4) constructible terrain. As part of its environmental review, the FERC makes the final decision as to the compressor station location, generally considering these factors. Further details regarding the design and construction of compressor stations including the proposed Weymouth Compressor Station is provided in Section 11.6 of this Resource Report.

11.4 Safety Standards for Pipeline Construction

11.4.1 Public Protection

Public safety is Algonquin’s top priority and will be paramount during all phases of the Atlantic Bridge Project (e.g., construction, operation and maintenance). During construction, special care will be taken in residential and commercial areas to minimize neighborhood and traffic disruption, to control noise and dust to the extent practicable, and to protect the public at large. Measures to be implemented should the pipeline traverse residential areas include, but are not limited to, the following:

- fencing the construction work area boundary to ensure construction equipment, materials, and spoil remain in the construction ROW;
- ensuring piping is welded and installed as quickly as reasonably possible consistent with prudent pipeline construction practices to minimize construction time affecting a neighborhood;
- backfilling the trench as soon as the pipe is laid or temporarily steel plating the trench; and
- completing final cleanup and installation of permanent erosion control measures within 10 days after the trench is backfilled, weather conditions permitting.

For in-street construction, the “stove pipe” construction technique will be used, where a single pipe joint at a time is installed. There will be a defined work area for pipeline construction (300 to 600 feet long) in which all construction activities will occur consistent with all applicable requirements. The in-street construction and traffic management plans will be coordinated with public safety officials. If at all possible, the street will not be closed to traffic. The work area will be separated from traffic, and traffic control will be used to allow traffic to bypass the work area. Ditches will not remain open overnight. The installed pipe will be backfilled to near the end of the section, and the remaining open trench will be plated. The work will be accomplished so that emergency vehicles will be able to pass and homeowners will be able to access their driveways; street plates will be available to ensure access. Algonquin has developed draft site-specific construction plans in areas where residential dwellings are within 50 feet of construction workspace (see Appendix 8F in Resource Report 8 for more information).
11.4.1.1 Cathodic Protection

Algonquin’s transmission system includes many equipment features that are designed to increase the overall safety of the system and protect the public from a potential failure of the system due to accidents or natural catastrophes.

Cathodic protection systems are installed at various points along the pipeline to mitigate corrosion of the pipeline facilities. The cathodic protection system impresses a low voltage current to the pipeline to offset natural soil and groundwater corrosion potential. The functional capability of cathodic protection systems are inspected frequently to ensure proper operating conditions for corrosion mitigation.

Algonquin’s pipeline will be built to meet or exceed the USDOT safety standards. Since the pipeline is buried a minimum of three feet underground, it is relatively immune from direct lightning strikes. Specific site conditions, including earthquakes, are considered in the design of the pipeline. The magnitude of earthquakes in the northeast is relatively low and the ground vibration would not pose a problem for a modern welded-steel pipeline. Even under much higher ground vibrations, the main risk to pipelines would be a slip fault (e.g., San Andreas in California) that displaces laterally during the quake or an area where the pipeline is buried in a hillside that slides down during the quake, taking the pipeline with it. The proposed pipeline route does not cross these types of land features.

Algonquin’s proposed Atlantic Bridge Project pipeline will be equipped with remote control shutoff valves. All new mainline valves along the pipeline will have remote control function. This allows the shutoff valves to be operated remotely by the gas control center in the event of an emergency, usually evidenced by a sudden loss of pressure on the pipeline. Some will be manual, some remote control, and some automatic. Remotely closing the shutoff valve allows the section of pipeline to be isolated from the rest of the pipeline system. Algonquin considers remote control valves to be the most reliable valve configuration for responding to a potential emergency.

As further explained in Section 11.7.2 below, the gas control center in Houston, Texas is staffed 24 hours a day, 365 days a year to monitor system pressures, flows, and customer deliveries. Algonquin also operates area and sub-area offices along the pipeline route with personnel who can provide the appropriate response to emergency situations and direct safety operations as necessary.

11.4.2 Utility Protection

All of the proposed pipeline for the Atlantic Bridge Project will be located within or adjacent to existing ROWs, consisting of Algonquin pipeline ROWs, public roadway, railways, and/or other utility ROWs. Prior to construction, existing utility lines and other sensitive resources, identified in easement agreements or by federal and state agencies, will be located and marked to prevent accidental damage during pipeline construction. Algonquin is a member of “Call Before You Dig” or “One Call” and other related pre-excavation notification organizations in the states in which it operates. Through “Call Before You Dig” or “One Call,” contractors provide notification to a central agency of proposed excavation that in turn notifies Algonquin of the excavation locations. If Algonquin’s facilities are located in the area of proposed contractor activity, they will be marked in the field and a representative will be present during excavation to ensure that the facility is not compromised. Where there is a question as to the location of utilities, such as water, cable, gas, and sewer lines, they will be located by field instrumentation and test pits. Test pits to verify location of utilities will be excavated using “soft digging” techniques, such as rubber buckets on an excavator, vacuum trucks, jetting of the soil, or excavation by hand.
When trenching for construction activities, soft digging methods can be used to excavate fully any foreign line. At minimum, an excavator bucket without teeth or side cutters will be used. Algonquin can also shield sensitive lines using rock shield or plywood. The lines will also be supported, either from below or from a beam installed across the trench.

It is not uncommon for natural gas pipeline facilities to parallel existing utility ROWs, including electric transmissions ROWs. Algonquin will comply with all federal, state, and local regulations applying to construction with regard to structures and underground utilities. As part of Algonquin’s assessment of the reliability and safety of constructing and maintaining its proposed pipeline in proximity to overhead electric facilities, it considered the following.

**Algonquin’s Use of Heavy Construction Equipment in the Vicinity of High Voltage Powerlines**

Algonquin has and continues to meet with electric utilities to obtain information on their requirements for construction activities within the vicinity of their overhead electric transmission lines and structures. Algonquin has conducted surveys and collected information on the location and size of existing powerline structures within the proposed construction corridor, tower footing locations and dimensions, and wire heights (lowest point between towers). Based on its consultations, and construction experience within and adjacent to existing overhead electric transmission lines and structures, Algonquin has designed or will modify its construction technique on the Atlantic Bridge Project with sufficient offsets to eliminate the risk of heavy construction equipment interfering with overhead high voltage electric transmission lines during construction and operation of the Atlantic Bridge Project.

**Potential Structural Impacts to Electric Transmission Towers Due to Nearby Blasting**

Where possible, Algonquin has offset its pipeline trench by 50 feet to avoid any potential damage to electric transmission towers. In areas where this offset could not be achieved, the construction technique will be modified. Algonquin has extensive experience in blasting near structures, including other underground pipelines and overhead powerlines. Algonquin will use a licensed blasting engineer and will follow the Atlantic Bridge Project Rock Removal Plan (see Appendix 6B of Resource Report 6) to avoid damage to overhead electric transmission lines and structures from blasting.

**Effects on the Pipeline Resulting from Lightning Strikes to Electric Transmission Towers**

Algonquin will consult with an engineer that specializes in developing alternating current (“AC”) mitigation systems for pipeline utility companies. An AC mitigation system will be designed and installed to mitigate any adverse effects on the pipeline and deal with any fault current should they occur.

**Effects on the Pipeline Resulting from a Direct Ground Fault Current by a nearby 345-kV Electric Transmission Line**

It is not uncommon for natural gas pipelines to share ROWs with electric transmission and other utilities. Since pipelines and electric transmission lines often share ROWs, there is a need to ground the pipeline to dissipate electrical interference. In these situations, AC voltages are transmitted to the pipeline by conductive or inductive interference. Magnetic induction acts along the pipeline or pipeline segment that is approximately parallel to the powerline and can cause significant pipeline potentials even at relatively large separation distances.

Algonquin has worked with power transmission companies on numerous occasions to design and install appropriate measures that ensure that current interference is properly mitigated along the natural gas...
pipeline, and the systems will in turn be designed to ensure that the pipeline cathodic protection does not interfere with the transmission line. Design drawings and interference studies will be shared between Algonquin and the electric transmission developers.

Consideration must be given to the safety of personnel and the public who may come into contact with aboveground portions of the pipeline such as valves and test stations. These exposed structures can be a potential shock hazard when touched while the soil is at a significantly different potential.

Typically, zinc ribbon is used to mitigate AC voltages to industry acceptable levels. The control method consists of one or more bare zinc conductors buried parallel to and near the pipeline and connected to it at regular intervals through decoupling devices. The zinc ribbon used in this way is very effective in mitigating excessive pipeline potentials due to both inductive and conductive interference. As stated above, Algonquin will consult with an engineer that specializes in developing AC mitigation systems for pipeline utility companies.

Electric Utilities Use of Heavy Construction Equipment and Cranes Directly Above Algonquin’s Pipeline

Algonquin typically works with electric utilities to ensure that the design of its pipeline is compatible with their needs for construction and maintenance of their facilities. This is usually accomplished by separation of the facilities to the extent practicable, increased burial depth of the pipeline, and use of heavier wall pipe in certain areas.

Cumulative Need for ROW access by Electric Utilities and Algonquin during Emergencies Requiring Simultaneous Occupancy

Algonquin currently operates its existing pipeline system in shared ROWs with electric transmission companies. Typically, access points to the ROW are shared and used for normal and routine access to the ROW for maintenance and operation.

11.4.3 Qualification of Pipeline Personnel

Title 49 CFR Part 192.801 through 192.809 (Subpart N) prescribes the minimum requirements for operator qualification of individuals performing covered tasks on a pipeline facility. A list of contractors who are available to respond to Algonquin’s needs in the event of an emergency is available in Algonquin’s Emergency Procedures Manual. Algonquin employs well qualified and licensed field personnel whose credentials are in accordance with New York and Connecticut safety standards and who can be immediately dispatched to the scene of an emergency if the need should arise.

11.5 Safety Standards for Pipeline Operation and Maintenance

Part 192 prescribes the minimum standards for operating and maintaining pipeline facilities, including the requirement to establish a written plan governing these activities. Under Section 192.615, each pipeline operator must also establish an emergency plan that provides written procedures to minimize the hazards from a gas pipeline emergency. Key elements of the plan include procedures for:

1. Receiving, identifying, and classifying emergency events - gas leakage, fires, explosions, and natural disasters;
2. Establishing and maintaining communications with local fire, police, and public officials, and coordinating emergency response;
3. Making personnel, equipment, tools, and materials available at the scene of an emergency;
4. Protecting people first and then property and ensuring safety from actual or potential hazards; and
5. Emergency shutdown of system and safe restoration of service.

Each operator must establish and maintain liaison with appropriate fire, police, first responders and public officials to learn the resources and responsibilities of each organization that may respond to a gas pipeline emergency and to coordinate mutual assistance in responding to emergencies. The operator must also establish a continuing education program to enable customers, the public, government officials, and those engaged in excavation activities to recognize a gas pipeline emergency and report it to appropriate public officials.

The proposed Project pipeline will be operated and maintained to meet or exceed USDOT Minimum Federal Safety Standards set forth in Title 49 of CFR Part 192.

11.5.1 Safety Maintenance Program

Pipelines and related facilities are designed and maintained with strict adherence to USDOT standards to ensure public safety and reliability and to minimize the opportunity for system failure. Algonquin maintains operating policies and procedures that are periodically reviewed by the USDOT. All operating personnel are well qualified to perform their activities in accordance with these policies and procedures. These policies provide specific directions in preventive maintenance and vigilant patrols of facilities, as well as procedures to be followed in the event of an accident or natural catastrophe.

11.5.1.1 Emergency Response Capabilities

Periodic training sessions and review of operating and emergency procedures are conducted for affected operations employees. This training includes safe operation of pipeline valves and equipment; facilities, including metering stations and compressor stations, hazardous material handling procedures, public liaison programs, and general operating procedures. The proposed Project facilities will be operated and maintained in accordance with these procedures.

Algonquin is proactive with various activities and procedures to ensure that the appropriate safeguards are in place to mitigate any potential damages caused by unauthorized excavation in the vicinity of the Algonquin pipeline. The following sections detail emergency response procedures Algonquin currently conducts on its existing pipeline system that will also be employed for the Atlantic Bridge Project.

Key Message from Algonquin to Third-Party Excavators

Algonquin supports and participates in one-call notification programs in all the states in which it operates pipeline facilities. Algonquin encourages those who are going to dig to call their state one-call center, by dialing 811, to report planned digging activities and allow Algonquin and other underground facility operators a chance to mark the facilities in the area before digging begins. Important messages to third party contractors include:

1. **Before digging around or near pipelines, it is very important to contact the state’s one-call center by dialing 811. Mishaps can easily be prevented by knowing exactly where third-party excavators should and should not dig.**

2. **If third-party excavators are not able to reach the state’s one-call center by dialing 811, call 1-888-258-0808 to get a toll-free direct number. For more information on digging and damage prevention, visit www.call811.com.**
Algonquin is also a sponsor of the Common Ground Alliance, a non-profit organization dedicated to shared responsibility in damage prevention to ensure public safety, environmental protection and service integrity. For more information, visit www.commongroundalliance.com.

One-Call Response

When Algonquin receives notification from a one-call center that someone intends to dig near its pipeline facilities, personnel are dispatched to mark the location of the facilities in the vicinity of proposed digging or other earth disturbance activities and to be present on-site when the excavation occurs if the activity poses a potential threat. Algonquin will respond and help excavators and contractors work safely around its pipelines.

Pipeline Safety Brochures

Algonquin mails information brochures to emergency responders, homeowners, businesses, potential excavators and public officials along the pipeline system annually to inform them of the presence of the pipeline and instruct them on how to recognize and react to unusual activity in the area.

Algonquin’s employees routinely meet with excavators and emergency response officials to educate them about its pipeline.

Public education is a primary element of safety efforts by pipeline companies. The importance of education is emphasized in the federal and state programs and legislation described below. Public education and awareness contributes significantly to preventing unintentional third-party excavation damage, the leading cause of pipeline incidents.

More Information

The USDOT and the Pipeline and Hazardous Materials Safety Administration (“PHMSA”) provide transmission pipeline operators with specific guidelines on integrity management programs. These guidelines are publicly available for review. For more details on this regulation and to locate pipelines in the area, the public can use the internet to access www.dot.gov.

11.5.2 Public Awareness Program

As part of its public awareness program, and in accordance with USDOT regulations, Algonquin will establish a working relationship with emergency responders to ensure effective communication, education, and training. The following sections outline procedures Algonquin currently conducts on its existing pipeline system. These same procedures will be implemented for the Project.

11.5.2.1 Interactions with Federal Authorities

Algonquin maintains frequent contacts with the USDOT’s PHMSA. The PHMSA routinely exercises its oversight authority to ensure that facilities under its jurisdiction are safely designed, constructed, and operated.
1. The PHMSA develops regulations and other approaches to risk management to assure safety in design, construction, testing, operation, maintenance, and emergency response of pipeline facilities.

2. The PHMSA administers the USDOT’s national regulatory program to assure the safe transportation of natural gas, petroleum, and other hazardous materials by pipeline. The PHMSA routinely inspects Algonquin’s pipeline facilities and records for compliance with design, construction, testing, operations, maintenance, and integrity regulations. Algonquin’s procedures and practices meet or exceed the pipeline safety regulations and related risk management requirements administered by the PHMSA.

Through its parent, Spectra Energy Partners, LP, Algonquin also participates proactively with various activities in close collaboration with the Department of Homeland Security’s Transportation Safety Administration (“TSA”) and key industry groups in the area of security to accomplish the following:

1. Comply with the TSA’s Pipeline Security Division’s Security Guidelines, which are also known as Smart Practices.

2. Participate in monthly intelligence meetings both with Department of Homeland Security’s Intelligence Program and also with the TSA’s Pipeline Security Division’s monthly update conference calls.

3. Attend classified briefings with the Department of Homeland Security for the industry, annually, and as needed.

4. Actively involved with the Interstate Natural Gas Association of America Security Committee (now cyber) and participate in the American Gas Association Security Committee, as well as the Oil and Natural Gas Sector Coordinating Council’s Pipeline Working Group. All of these activities place Algonquin in frequent liaison with the Department of Homeland Security/TSA.


6. Participate in the production of new videos sponsored by the TSA that are aimed at training law enforcement officers to respond to security events at pipeline facilities.


8. Report every suspicious incident to the Transportation Security Operations Center, which is an arm of the TSA.

9. Conduct major crisis management drills, at least annually, within the company.
11.5.2.2 Liaison Procedures with Local Authorities

Liaison with public authorities and local utilities is maintained in all locations along Algonquin’s pipeline system. A current list of contacts is maintained and includes the Transmission Area Managers at the South Plainfield (New Jersey), Cromwell (Connecticut), and Westwood (Massachusetts) Area Offices (“Areas”). Key components of the liaison program consist of the following:

1. Conduct periodic emergency response drills and tabletop exercises for emergency management organizations to build familiarity and response measures to be taken.

2. Have special informational meetings and training at the initiation of the municipality.

3. Provide literature listing emergency telephone numbers and other pertinent data.

Excerpts of the Liaison Program that will be used for the Atlantic Bridge Project are as follows:

I. Contact is made with the police and fire departments and/or public officials of all communities that contain Algonquin’s facilities in order to accomplish the following:

A. Ascertain how the officials may be able to assist Algonquin during an emergency, including the determination of the jurisdiction and/or responsibility with resources that may be involved in a response to an emergency.

B. Acquaint the officials with how Algonquin responds to an emergency on its pipeline system.

C. Notify the officials of the types of pipeline emergencies for which they will be contacted.

D. Inform them how Algonquin, in working with its departments, will cooperate in mutually assisting in protecting life or property during an emergency.

II. Police and fire departments and public officials are given maps that show the location of Algonquin’s facilities within the boundaries of their towns.

III. In order to enable Algonquin to quickly establish contact with police or fire departments and public officials in the event of an emergency at any location on the pipeline system, a current listing of their telephone numbers is maintained. This listing is reviewed on a periodic basis and necessary revisions are made.

IV. Algonquin invites fire companies to participate in its periodic liaison briefings. Emphasis is placed in the following areas.

A. When and when not to extinguish a natural gas fire during an emergency.

B. How to extinguish different types of natural gas fires.

C. Conduct periodic emergency simulation exercises.

V. Algonquin will continue to participate, on an invitational basis, in meetings with fire departments in communities in which Algonquin’s facilities are located. The following subjects will be emphasized at these meetings:
A. Algonquin’s role in emergencies on its pipeline system.

B. The properties of natural gas and precautionary measures around an emergency.

C. The local fire company’s participation during an emergency on Algonquin’s system.

VI. Liaison with Gas Distribution Utilities and Other Customers.

Because Algonquin will not be performing direct education to the public in areas franchised to gas distribution companies or other customers, a liaison will be maintained with these utilities and customers. The purpose of this liaison is to afford ready contact when they recognize the occurrence of a real or potential emergency on an Algonquin facility. A current listing of each gas distribution utility’s or end use customer’s emergency telephone numbers and key personnel is and will continue to be maintained by Algonquin.

11.5.3 Other Protection Measures

11.5.3.1 Surveys

Algonquin’s operating personnel will perform aerial patrol of the ROW along the new and existing pipeline facilities on a weekly basis, weather permitting. Ground patrols will also occur periodically, and the pipeline is walked with leak detection equipment twice each year in populated areas. When performing these patrols, the technicians will observe surface conditions on and adjacent to the pipeline ROW for indications of leaks, construction activity, and other factors that could potentially affect safety and operation. Any unusual situation or condition will be reported and investigated immediately. Although leaks are very uncommon, these detection surveys are instrumental in early detection of leaks and other factors and can reduce the likelihood for pipeline failure. The Atlantic Bridge Project facilities constructed by Algonquin will use similar field survey procedures. In addition, Algonquin will also utilize the “Call Before You Dig” or “One Call” and related pre-excavation notification organizations in the states in which it operates.

11.6 Safety Standards for Compressor Station Construction

Part 192.163 requires the location of each main compressor building of a compressor station be on property under the control of the operator. The station must also be far enough away from adjacent property, not under control of the operator, to minimize the possibility of fire spreading to the compressor building from structures on adjacent properties.

As reflected in Section 10.8.2 of Resource Report 10, the site of the proposed Weymouth Compressor Station was selected based primarily on engineering and environmental considerations. The proposed site is currently an open 10.0-plus acre parcel within which the station is expected to occupy an approximately 4.3-acre fenced footprint. The remaining 5.7 acreage will remain undeveloped and maintained as a buffer between the water’s edge and the facility. The proposed site is proximate to the existing Algonquin I-10 System pipeline, provides excellent construction and operations access, would largely avoid impacts to natural resources, and is located in an existing industrial area which has been zoned for industry.

Part 192.163 also requires each building on a compressor station site be made of specific building materials and must have at least two separate and unobstructed exits to provide an unobstructed passage to a place of safety. The station must be in an enclosed fenced area and must have at least two gates to provide a safe exit during an emergency.
Based on input received from Town of Weymouth public officials and community members, Algonquin has evaluated and made design modifications to the proposed Weymouth Compressor Station to address specific safety concerns. These design modifications include the following:

- the emergency shut down ("ESD") vent was relocated further from the Route 3A/Fore River Bridge; and
- the ESD vent height was increased and an ESD silencer was added for noise abatement.

In addition, in response to comments from FERC, Algonquin has also accounted for potential storm surge and inundation flooding impacts at the Weymouth Compressor Station site by designing the station based on the most conservative sea level rise projections. See Section 6.6.8 for additional information on sea level rise.

The proposed Weymouth Compressor Station will be designed, constructed, operated, and maintained to meet or exceed Part 192 applicable specifications, as described below.

**Codes, Standards, Specifications and Procedures.** Algonquin will incorporate proven industry standards as published by associations that are recognized world-wide such as the American Society of Mechanical Engineers, the American Petroleum Institute, and the American Society of Testing Materials. Algonquin will also use its own technical specifications and operating procedures which reflect many years of expertise and experience and improvements in designing, constructing, and operating safe and reliable compressor stations.

**Design.** The compressor station will be designed to meet and in many cases exceed the code requirements for station facilities. The Weymouth Compressor Station safety systems will be highly engineered with automated control systems to ensure the station and pipeline pressures are maintained within safe limits, and will have several additional over-pressure protection systems that provide an additional layer of safety to back-up the primary controls. The station will also have an automated emergency system that would shut down the station to prevent an incident should an abnormal operating condition occur, and if appropriate, would evacuate the gas from the station piping at a safe location.

System alarms are designed to notify Algonquin’s Gas Control center (see Section 11.4.3 above and Section 11.7.2 below) should any abnormal conditions occur, allowing them to take appropriate measures using remote control systems if the station operations personnel are unable to respond to a particular situation. The station will have two different, communication systems so that station monitoring and controls would still be operational if the primary communications method were to become disabled. In the event the systems in the station were to become inoperative, remote control valves will also be at the existing nearby pipeline facilities that could be closed.

**Material Selection.** Algonquin material specifications meet and in many cases exceed the federal standards. Algonquin purchases piping materials from manufacturers that have been subject to its stringent qualification and approval process to ensure they meet its quality standards. The pipe material is both high strength and ductile, and the wall thickness for the facilities will meet and in many cases exceed the federal standards. Algonquin routinely sends experienced inspectors to the manufacturers' facilities to conduct quality checks during the manufacturing process.

**Construction.** Prior to beginning construction or operation related work activities, Algonquin conducts safety meetings with all personnel and contractors to make them aware of any changes to the work environment which may pose a safety risk and to review current safety procedures. Algonquin supports
a relentless commitment to a zero work-related injury and illness culture. We also have a "Don't walk by" policy and at any time personnel or contractors can stop work if they feel unsafe activities are underway.

Algonquin will only use the most qualified contractors that are specialized in years of experience in building our projects. These competent contractors provide the first line of quality control to ensure that the project is built to comply with applicable regulations, and Algonquin's technical specifications. Algonquin will also employ a staff of competent on-site inspectors to assure that our requirements are met. Additionally, the compressor station will be subject to inspections and/or audits by various federal agencies including the FERC and the USDOT who will assess the facilities for compliance with the regulations. These audits are typically very detailed and comprehensive.

Each piece of pipe within a compressor station is welded together and each weld is carefully x-rayed to detect and remove any potentially harmful flaws. The welding and x-ray procedures are qualified in accordance with the regulations and company standards, and the welders and x-ray technicians must take and pass the stringent qualifications tests to demonstrate their competencies prior to being allowed to work. Every weld that will see gas pressure in the entire facility is x-rayed to ensure it meets the federal requirements (except alternative test methods must be used with the very small piping due to the limitations of the x-ray methods). Only after all inspection results and corrective measures have been checked and accepted, would the facilities be prepared for the final pressure testing.

**Pressure Testing.** As was done for all of the existing pipelines in the area, the Weymouth Compressor Station piping will be filled with water (or other medium besides natural gas) prior to being placed into gas service and be pressurized to a level that is much higher than the gas operating pressure to verify the integrity of the piping. Algonquin tests most piping to an even higher pressure than is required by the federal regulations.

Further details regarding the final design of the station is provided in Resource Report 1.

### 11.7 Safety Standards for Aboveground Facility Operation and Maintenance

Parts 192.731 through 192.736 establish safety guidelines for inspection, testing, and monitoring at compressor stations and Parts 192.739 through 192.743 establish safety guidelines for inspection, testing and monitoring at pressure limiting and regulating stations. Work at the existing and proposed compressor station and M&R facilities will be designed, constructed, operated, and maintained to meet or exceed applicable specifications. As with pipeline safety operation and maintenance, the Applicants will apply some of the same and/or similar standards to the Projects aboveground facilities. Examples of Parts 192.739 through 192.743 specifications which the Applicants will apply include inspections that will be conducted at intervals not exceeding 15 months, but at least once each calendar year, to determine whether the facilities and pipeline systems are:

- In good mechanical condition;
- Adequate from the standpoint of capacity and reliability of operation for the service in which it is employed;
- Set to control or relieve at the correct pressure consistent with the pressure limits of 192.201(a); and
- Are properly installed and protected from dirt, liquids, or other conditions that might prevent proper operation.

Examples of some of the same and/or similar standards of pipeline safety operation and maintenance the Applicants will apply to the Project aboveground facilities include:
• Weekly Aerial Patrols;
• Above/Below Ground Coating Maintenance;
• Third Party Damage Prevention;
• One-Call Response;
• Aboveground Safety Brochures;
• Public Outreach;
• Emergency Response; and
• Additional Information.

Details on the above operation and maintenance standards are further discussed in various sections of this Resource Report.

11.7.1 Compressor Stations and Emergency Shutdowns

Compressor stations are highly regulated facilities that must meet rigorous siting, safety and environmental standards established respectively by the FERC, the USDOT and the U.S. Environmental Protection Agency. Algonquin’s compressor stations integrate a variety of safety systems and practices designed to protect the public, our employees and the environment.

As an initial, yet important premise, natural gas is lighter than air, and therefore rises and dissipates quickly into the atmosphere. Nevertheless, compressor stations are designed with continuous monitoring devices along with emergency shutdown systems capable of isolating the station and safely venting the gas very quickly in the unlikely event of an emergency. These systems are designed and routinely tested to be reliable, which is why it is extremely rare to have compressor station incidents.

Compressor stations are also designed with various automated shutdowns as well as emergency manual shutdown buttons strategically placed throughout the facility which can be activated by station operators. Every one of our compressor stations is operated and maintained by highly skilled, experienced personnel trained to maintain safely the station and its pipelines.

Part 192.163 requires that each compressor station have an emergency shutdown system (except for unattended field compressor stations of 1,000 horsepower or less) that must meet several specifications. The proposed Weymouth Compressor Station will be equipped with automatic detection and emergency shutdown systems. These systems will include:

• Flame detection that uses ultraviolet sensors;
• Gas detection for detecting low concentrations of natural gas;
• Emergency shutdowns to isolate the gas piping, stop equipment, and safely vent station gas;
• Individual unit shutdown systems in case of mechanical or electrical failure of a compressor unit system or component;
• Emergency shutdowns will be operable from at least two locations; and
• The proposed Weymouth Compressor Station will have pressure relief or other suitable protective devices of sufficient capacity and sensitivity to ensure that the maximum allowable operating pressure of the station piping and equipment will not be exceeded by more than 10 percent.

An emergency shutdown is a very rare occurrence, but one for which Algonquin is well-prepared. In the event of a condition that could potentially involve the public, local public safety and/or emergency management officials are immediately notified and thoroughly briefed so they may respond to the situation as needed.
In the unlikely event of an emergency shutdown, the resulting noise will be reduced considerably since the designs will incorporate silencers that limit the noise at the property line. The release of gas will last anywhere from one to three minutes and is the result of the release of pressure from the compressor station piping. Natural gas is released from a compressor station very quickly in order to clear the natural gas and reduce potential danger.

The natural gas released during an emergency shutdown is not dangerous. Natural gas is odorless, colorless and lighter than air. However, an odorant called mercaptan is injected into the natural gas for safety reasons per USDOT Code. Mercaptan creates a recognizable odor, often compared to rotten eggs, which helps the public identify or detect a leak. It is not harmful and will dissipate. In some cases, the smell of mercaptan may linger if minute traces of the odorant separate from natural gas that has risen and been absorbed into the atmosphere. While release amounts vary from station to station, they fall within strict guidelines mandated by federal regulations. The natural gas release is necessary to reduce potential risk to the facility, employees and the surrounding community. All gas within the Algonquin system is odorized.

Regulations require that compressor stations periodically test or perform maintenance on the emergency shutdown system to ensure reliability. Periodic tests and maintenance cause little or no disruption and are rarely noticed by adjacent neighbors.

**Causes of Emergency Shutdowns**

Natural gas and flame sensors, located inside the compressor building, constantly monitor the station. If a problem is detected, the emergency system will activate automatically in order to protect the community, station personnel and the facility. There are also manual shutdown buttons strategically placed throughout the facility which can be activated by station operators. Every one of Algonquin’s compressor stations is operated and maintained by highly skilled, experienced personnel trained to maintain the safe operation of the station and its pipelines.

**11.7.2 Compressor Station Safety Systems and Equipment**

A gas control center is maintained in Houston, Texas. The gas control center monitors system pressures, flows, and customer deliveries. Further, the gas control center is staffed 24 hours a day, 365 days a year. Data acquisition systems are present at all metering stations along the system. If system pressures fall outside a predetermined range, an alarm is activated and notice is transmitted to the Houston gas control center. The alarm provides notice that pressures at the station are not within an acceptable range. To ensure safe operations, well trained gas controllers work around the clock in a high-tech control center to monitor and control the gas as it travels through all sections of the pipeline network. Compressor stations are maintained by highly skilled and experienced pipeline personnel along Algonquin’s pipeline systems. Spectra Energy’s employees operate over 100 compressor station sites around the clock – with nearly two million horsepower in the United States, 19,100 miles of interstate transmission pipeline, and over 65 years of success.

In addition, safety equipment at the proposed Weymouth Compressor Station will include adequate fire protection systems. Fire protection, first aid, and safety equipment will be maintained at all the Project aboveground facilities at all times. Each compressor station building will be ventilated per USDOT code.

Stakeholders raised concerns regarding the safeguards Algonquin would have in place to respond to the floods, hurricanes, or extreme weather that the Northeast experiences. As described earlier, Algonquin’s safeguard system at the proposed Weymouth Compressor Station will be equipped with a state-of-the-art...
emergency shutdown system that automatically and safely halts operation when the slightest irregularity is detected.

**Public Liaison Program and Emergency Response Plan**

Algonquin is committed to providing pertinent information about its facilities and working with nearby emergency responders. In keeping with USDOT requirements, Algonquin will review and expand its existing public liaison program with Weymouth elected and public safety officials before the facilities are placed in service. This program will include an Emergency Response Plan specific to the Weymouth Compressor Station and local public safety officials and first responder organizations will be trained in how Algonquin plans to coordinate a response with public safety and first responder personnel in the unlikely event of an emergency at the Weymouth Compressor Station.

The Emergency Response Plan will include:

- Details on how to identify and classify emergencies;
- Notification and emergency response procedures including emergency shutdown steps;
- Spectra Energy emergency response personnel phone numbers;
- First Responder (Fire Departments and Law Enforcement) phone numbers;
- Emergency Response Contractor phone numbers;
- Operating maps; and
- Directions to facilities.

The emergency response procedures covered by the plan respond to the following types of emergencies:

- Gas (odorized) detected inside or near a building;
- Fire located near or directly involving a pipeline facility;
- Explosion occurring near or directly involving a pipeline facility;
- Natural disaster, such as an earthquake or hurricane, as required; and
- Bomb threats.

The Emergency Response plan will be reviewed annually and all applicable Algonquin personnel will receive annual training on the Emergency Response Plans. The Area Office will conduct annual emergency response exercises and has previously provided training to the Weymouth Fire Department on Algonquin’s pipeline and our emergency plans. Algonquin also plans to communicate annually with members of the public who live or work near the Weymouth Compressor Station, and is committed to collaborating with organizations who share Algonquin’s dedication to pipeline safety and public awareness.

The need to evacuate the areas surrounding the Weymouth Compressor Station would be very unlikely if an emergency event were to occur, due to the limited extent of any potential emergency. However, if evacuation is warranted, the evacuation zone would depend on the nature, extent and location of the incident. Algonquin accordingly plans to work with the Weymouth Police and Fire personnel to identify reasonable and appropriate evacuation measures. Algonquin will coordinate work with the local authorities to ensure they have prompt and accurate information.

Finally, Algonquin plans to follow its internal Crisis Management Plan and its emergency response plan which will ensure an effective response to pipeline emergencies. Algonquin personnel are trained to work in cooperation with emergency responders to manage these events.
11.8  Integrity Management Plan

USDOT’s PHMSA has promulgated a rule for Pipeline Integrity Management in High Consequence Areas ("HCAs") for Gas Transmission requiring that a facility-specific 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 (49 CFR Part 192 Subpart O). Pipeline integrity management is a systematic approach for identification and mitigation of potential risks to the pipeline. The Pipeline Safety Improvement Act of 2002 mandated that USDOT’s PHMSA issue regulations that require operators of natural gas transmission pipelines to develop and implement Integrity Management Programs for pipelines in HCAs.

Algonquin has implemented a comprehensive Integrity Management Program that meets, and in many cases exceeds, these regulations. While the pipeline integrity management regulations apply only to HCAs, Algonquin has essentially implemented the same rigorous practices across its entire pipeline system. These practices enable Algonquin to identify and mitigate risks for the entire pipeline system, inside and outside of HCAs.

Algonquin’s pipeline integrity management team provides expertise in risk management. Algonquin manages the identification, assessment, and mitigation of risk as related to pipeline design and construction, system operations, and system integrity. Throughout the year, Algonquin’s integrity team works with the various experts throughout the company and beyond to promote the inclusion of appropriate information and data into the integrity management process. Additionally, Algonquin’s integrity team confirms that the technical content of the data is correct through a data validation process, including review by its local field operators and various subject-matter experts.

The following is a brief summary of the key elements of Algonquin’s integrity management program.

**11.8.1  High Consequence Area Identification**

Integrity management regulations require pipeline companies like Algonquin to identify HCAs located along the pipeline. HCAs are designated locations along the pipeline that are near densely populated areas, facilities that would be difficult to evacuate (such as hospitals or schools), or locations where people congregate (such as churches, offices, or parks). The federal regulations include specific criteria for pipeline companies to identify and designate HCAs. HCAs are identified as an area established by one of the methods described below:

- Class 3 and 4 Locations;
- Class 1 or 2 Locations where the potential impact radius is greater than 660 feet, and the area within the potential impact circle contains 20 or more buildings intended for human occupancy; or
- The area within a potential impact circle containing 20 or more buildings intended for human occupancy or an identified site such as (1) an outside area or open structure that is occupied by 20 or more persons for at least 50 days in any 12-month period; (2) a building that is occupied by 20 or more persons for at least 5 days a week for 10 weeks in a 12-month period; or (3) a facility occupied by persons who are confined, are of impaired mobility, or would be difficult to evacuate.

Algonquin uses a number of methods to look for HCAs to assure that it identifies all HCAs along its pipeline, including aerial photography, field surveys, consultation with emergency response officials, and multiple database searches. Algonquin performs a comprehensive review each year to assure that its identification of HCAs is accurate.
Table 11.6-1 shows the potential HCAs along the proposed Atlantic Bridge Project facilities.

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Note: HCA designations are based on the existing Algonquin pipeline facilities and the most recent annual review of HCA’s as defined in Algonquin’s Integrity Management System.

**Potential Impact Radius Around the Weymouth Compressor Station**

As defined in the federal pipeline safety standards set forth at Title 49, Part 192 of the Code of Federal Regulations, the “potential impact radius” is a calculated distance from a natural gas pipeline or facility to the circumference of a circle, where the distance is based on the maximum operating pressure and diameter of the proposed pipeline. This distance is used to assess the population density in an area, and where a higher population density does exist, the regulations then specify that additional inspection or maintenance requirements must be employed by the pipeline operator. The gas piping and facilities must be periodically assessed for a variety of potential risks (e.g., external corrosion, to ensure that all appropriate inspections and controls are in place and are maintained to prevent an incident). Algonquin began performing this type of integrity assessment along various sections of the pipeline system many years before these regulations were put in place.

The radius for determining population density at the Weymouth site will be basically the same radius as it has been for the past 12 years for the existing pipeline facilities at this site, or 786 feet. However, the new compressor station will actually reduce the potential impact of an incident compared to the historical operation. This is because the Weymouth Compressor Station will reduce the operating pressure and operating stress level of the existing pipeline that runs from the power plant, under the bridge, and up to the Weymouth site.

For the past 12 years, the gas has flowed southward through the pipeline from Weymouth toward the power plant, typically in the 650 to 750 pounds per square inch gauge (psig) pressure range, and peaking above 900 psig. However, with the new Weymouth Compressor Station in place, this pipeline will flow in the opposite direction away from the power plant, and will be on the suction side of the new station where the compressor unit will pull the gas pressure down to the 450 to 500 psig range to pump the gas away to the north. The potential impact radius is therefore smaller for flows at a pressure of 500 psig, rather than at a pressure of 750 psig.

A large scale gas release at a compressor station is a very rare occurrence. This could either be for scheduled maintenance or an emergency event. During these limited events, the gas is vented upward, and since natural gas is much lighter than air, the gas rises away harmlessly.
Lightning strikes are also very unlikely, and even more improbable would be a strike to occur at the same moment as a rare gas release. However, this assumption of ignition was modeled to assess the potential impact on the bridge. Based on the current stage of station design, a likely venting point was identified at approximately 450 feet from the east end of the Fore River Bridge. The heat level emitted by this hypothetical event would be 37.5 KW/m² at a distance of 282 feet. Thirty seven and a half (37.5) Kw/m² is a health-based criterion established by the Society of Fire Protection Engineers (SFPE, 1995), and steel strength could be reduced slightly only by a prolonged exposure to this heat level. However, with the greater distance to the bridge and with the venting of gas in the station being completed in about 3 minutes, the bridge would not be at risk. The Constellation Energy Power Plant is at an even greater distance, and would not be affected.

Algonquin recognizes and strongly believes that safety and the wellbeing of the citizens of the communities where we live and operate is of the utmost priority and importance. As a result, the potential risks to the pipelines and facilities must always be identified and mitigated. The probability of an incident at this location is extremely low because Algonquin incorporates multiple safeguards into the design, materials, construction, operation, and maintenance activities associated with its natural gas transmission pipeline system. By itself, each one of these safeguards serves as a well-crafted measure to mitigate a variety of risks. As they are used together, these measures constitute a combined strategy designed to effectively preserve and protect the integrity of the compressor station against risks. These are the primary reasons why the Algonquin pipeline system has not caused a fatality, serious injury or property damage since it began operation in 1953.

Sections 11.6 and 11.7 provide the various aspects of these safeguards relative to the Weymouth Compressor Station.

### 11.8.1.1 Data Gathering

The risk analysis process involves the use of data about the pipeline, potential activities near the pipeline, and potential consequences in the unlikely event of a pipeline failure. These data are needed to identify properly integrity risks and potential consequences and is gathered from a number of sources, including but not limited to:

- Original construction records
- Pipeline alignment sheet records
- Personnel interviews
- Quadrangle United States Geological Survey maps
- Digital elevation models
- Historical data
- Database searches
- Leak and incident data/reports
- Operating characteristics
- Corrosion monitoring
- Cathodic protection surveys
- Subject-matter experts
- One-call notices
- Aerial photography

### 11.8.1.2 Risk Assessment

Each year Algonquin performs a detailed risk analysis for its entire pipeline system to identify potential integrity threats to the pipeline and potential consequences in the unlikely event of a pipeline failure. This risk analysis allows Algonquin to prioritize integrity management activities, such as integrity assessments and additional prevention measures, for those pipeline segments that have higher risks. Examples of potential integrity threats could include:
- Excavation damage;
- Metal loss or corrosion;
- Defects related to pipe manufacturing process; and
- Cracking related to exposure to natural environments.

The risk assessment is performed by subject-matter experts using modern risk management tools and techniques to assure the risk assessment process provides an accurate determination of pipeline risks.

11.8.1.3 Integrity Assessments

Integrity assessments are prioritized based on the risk assessment and are conducted to find pipeline defects well before they could pose a threat. The integrity assessment method for each pipeline segment is selected based on the types of potential integrity threats applicable to that segment. The integrity assessment methods could include the following:

- **In-Line Inspection** – an assessment method that uses an internal inspection tool (commonly referred to as a “Smart Pig”) that is capable of identifying and classifying pipe defects, including metal loss, dents, gouges, and other types of defects. The Smart Pig is inserted into the pipeline and is typically pushed by the flow of natural gas in the pipeline.
- **Direct Assessment** – an assessment method that uses a systematic approach to identifying potential defects through data review, indirect assessments, and targeted hands-on inspections.
- **Pressure Testing** – an assessment method where the pipeline is filled with an inert substance, typically water, and is tested to a pressure that is well above the normal operating pressure to validate the strength of the pipe and identify any smaller defects long before they could become a threat.

11.8.1.4 Response and Remediation

Pipeline defects identified by the integrity assessments are prioritized and scheduled for field investigation and repair, if required, in accordance with the integrity management regulations and standards issued by the American Society of Mechanical Engineers, the National Association of Corrosion Engineers, other consensus standards, and industry best practices. Algonquin schedules and conducts investigations and repairs for any potential defects that exceed specified thresholds. This is done regardless of whether or not the pipeline is located in a designated HCA.

11.8.1.5 Preventive and Mitigative Measures

Preventive measures begin with the design and construction of the Applicants’ facilities. These measures include design specifications, selection of suitable construction materials, development and selection of welding procedures, pipe coatings, and cathodic protection systems. Additionally, manufacturing controls are used to promote high-quality installation of the pipeline and to limit operating stress. During the installation phase, all welders and radiographic technicians performing work on the facilities must take and pass a qualification test. Qualified oversight inspection staff is used to monitor the installation of the facilities.

In roadways, streets, and parking lots, a 15:1 sand to concrete mix called flowable fill (“Controlled Density Fill or CDF”) or clean compacted material will be used as backfill around the pipeline following consultation with municipal and state roadway authorities. A two-foot wide brightly colored warning tape will be placed one-foot below natural grade along the length of the pipeline. A variety of pipeline location
markers (e.g., adhesive decals, marker posts, and signage) will be used to identify clearly the location of the pipeline.

The pipeline will be patrolled on a routine basis and personnel well-qualified to perform both emergency and routine maintenance on interstate pipeline facilities will handle emergencies and maintenance related to:

- Erosion and wash-outs along the ROW;
- Settling, undermining, or degradation of repaired ditch line in streets or parking lots;
- Performance of water control devices such as diversions;
- Condition of banks at stream and river crossings;
- Third-party activity along the pipeline ROW; and
- Any other conditions that could endanger the pipeline.

Algonquin also monitors the pipeline 24 hours a day from its control center. Patrolling is performed regularly to monitor activity near Algonquin’s pipeline. Furthermore, Algonquin maintains a state-by-state partnership with the local One-Call Centers and their “Call Before You Dig” programs as well as the national “Call 811” Program. Algonquin’s staff is dispatched to a site where a one-call is made to mark the location of the pipeline. These personnel stay on-site when any excavation occurs over, under, or adjacent to Algonquin’s facilities.

As part of the risk assessments, integrity assessments, and other activities, Algonquin evaluates if additional preventive and mitigation measures are needed to further enhance the safety of the pipeline due to any site-specific pipeline integrity concerns. Algonquin implements these site-specific enhancements, as warranted, to continually improve the safety of its pipeline system.

11.8.1.6 Continuous Evaluation and Improvement

The Applicants continue to refine and enhance the integrity management techniques as they implement the Integrity Management Programs on their respective pipeline systems. The Applicants are active participants in numerous pipeline standards and research organizations and industry groups organized to share best practices. These efforts provide the Applicants up-to-date information about improvements in integrity management tools and techniques to assure their Integrity Management Programs use the best available tools and the best known practices.

11.9 References

