



# Spire STL Pipeline Project

Resource Report 11  
Reliability and Safety

FERC Docket No. CP17-\_\_\_-\_\_\_

FERC Application  
January 2017

Public



<b>RESOURCE REPORT 11 - RELIABILITY AND SAFETY</b>	
<b>SUMMARY OF FILING INFORMATION</b>	
<b>Information</b>	<b>Found in</b>
<p>1. 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 - Title 18 Code of Federal Regulations (CFR) part (§) 380.12 (m)</p>	Section 11.1 and Section 11.2.
<b>INFORMATION RECOMMENDED OR OFTEN MISSING</b>	
<p>1. Identify by milepost (MP) and in table form, all U.S. Department of Transportation Class Locations, High Consequence Areas (HCA), or areas of concern (as defined in Title 49 CFR § 192.903) for the proposed route, alternate routes, and compressor stations and explain the basis for HCA identification.</p>	Table 11.2-1.
<p>2. Provide a list of mainline valves (MLVs), and for each one indicate whether the applicant proposes to use automatic, remote, or manually operated valves. Provide a justification for the use of each type.</p>	Table 11.2-2.
<p>3. Discuss the outcome of the applicant’s consultations with local fire departments and emergency response agencies relative to whether additional equipment, training, and support are needed in the project area</p>	Section 11.1.1.
<p>4. Provide an analysis or identify/justify mitigation measures the applicant would implement to address electrical arcing or alternating current/direct current interference anywhere a pipeline or compressor station is located adjacent to a high voltage electric transmission line.</p>	Section 11.2.2.1.



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## Acronyms and Abbreviations

CFR	Code of Federal Regulations
HCA	high consequence area
LNG	Liquefied Natural Gas
MAOP	maximum allowable operating pressure
MLV	mainline valves
M&R	metering and regulating
MP	milepost
O&M	operations and maintenance
PHMSA	Pipeline and Hazardous Materials Safety Administration
Project	Spire STL Pipeline Project
SCADA	supervisory control and data acquisition
Spire	Spire STL Pipeline LLC
USDOT	Department of Transportation



# Reliability and Safety

Resource Report 11 describes the reliability and safety of Spire STL Pipeline LLC’s (“Spire’s”) Spire STL Pipeline Project (“Project”) through design, construction, operation, and maintenance. This report includes measures used to minimize potential hazard to the public from the failure of Project components as a result of accidents or natural catastrophes. The Project does not include new Liquefied Natural Gas (“LNG”) facilities or the recommissioning of existing LNG facilities.

## 11.1 Pipeline Safety Regulations

The proposed Project facilities will be designed, constructed, operated, and maintained in accordance with the United States Department of Transportation (“USDOT”) Minimum Federal Safety Standards in Title 49 Code of Federal Regulations (“CFR”) § 192. The regulations are intended to ensure adequate protection for the public from natural gas pipeline failures. Part 192 specifies material selection and qualification, minimum design requirements, and protection from internal, external, and atmospheric corrosion.

### 11.1.1 Emergency Plan

In accordance with § 192.615, Spire will maintain an Emergency Response Plan for the Project facilities. The Federal Safety Regulations require that each pipeline operator:

- establish written procedures to minimize the hazard resulting from a gas pipeline emergency that ensure that personnel who could be involved in an emergency are prepared to recognize an emergency situation and identify personnel to be contacted, equipment to be mobilized, and procedures to be followed to respond to a hazardous condition caused by the pipeline;
- establish and maintain liaison with the appropriate fire, police, and public officials to coordinate mutual assistance during emergencies; and
- establish a written continuing education program to enable the affected public, emergency officials, local public officials, and excavators to recognize a natural gas pipeline emergency and report it to appropriate public officials and the company and what actions to take or not take until the operator can respond.

## 11.2 Class Locations

Part 192 defines area classifications, based on population density in the vicinity of the pipeline, which specify 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. As defined by USDOT at 49 CFR § 192.5, the four area classifications are defined as follows:

- Class 1: Offshore areas and any class location unit with 10 or fewer buildings intended for human occupancy.
- Class 2: Any class location unit with more than 10 but fewer than 46 buildings intended for human occupancy.



- Class 3: Any class location unit with 46 or more buildings intended for human occupancy or areas within 100 yards of either a building or a small, well-defined outside area (such as a playground, recreation area, outdoor theater, or other place of public assembly) that is occupied by 20 or more persons on at least five days a week for 10 weeks in any 12-month period. The days and weeks need not be consecutive.
- Class 4: Any class location unit where buildings with four or more stories are prevalent.

The Project does not cross Class 2 or Class 4 locations. Class location areas are identified by milepost (“MP”) in Table 11.2-1.

**Table 11.2-1. Pipeline Class Locations**

MP Begin	MP End	Class Location Unit
<b>24-Inch Pipeline<sup>1,2</sup></b>		
0.0	58.8	1
<b>Line 880<sup>3</sup></b>		
0.0	7.0	3

Notes:

- <sup>1</sup> Class Location Study classification for the 24-inch pipeline are performed per 49 CFR §192.5 using desktop analysis and subject to additional field survey information as it becomes available.
- <sup>2</sup> Potential impact radius calculated to be 638 feet for the 24-inch pipeline per 49 CFR §192.903.
- <sup>3</sup> For consistency, the entire Line 880 is assumed and considered to be Class 3 due to the number of structures along most of the pipeline.

In accordance with Spire’s operating procedures, the pipelines and adjacent areas will be periodically reviewed to identify new developments. Should the class location or high consequence areas (“HCAs”) change as a result of new developments, Spire will take the appropriate measures to meet Pipeline and Hazardous Materials Safety Administration (“PHMSA”) requirements, such as reducing operating pressure, replacing or modifying the existing pipeline or facilities, or conducting pressure tests at a higher pressure.

Pipelines constructed in Class 1 areas must be installed with a minimum depth of cover of 30 inches in normal soil and 18 inches in consolidated rock. Pipelines constructed in Class 2, 3, and 4 locations, and under drainage ditches of public roads and railroad crossings, must be installed with a minimum depth of cover of 30 inches in normal soil and 18 inches in consolidated rock. Spire proposes to construct the 24-inch pipeline with a minimum 36 inches of cover in normal soil, and a minimum of 24 inches of cover in consolidated rock in Class 1 locations as well.

Class locations also specify requirements for sectionalizing block valves. Each point on the pipeline must be within 10 miles of a valve in a Class 1 location, within 7.5 miles in Class 2, within 4 miles in Class 3, and within 2.5 miles



in Class 4. There are more rigorous standards in more populated areas for pipeline design pressures, hydrostatic test pressures, maximum allowable operating pressure (“MAOP”), inspection and testing of welds, and frequency of pipeline patrols and leak surveys. Spire will adhere to the USDOT Minimum Federal Safety Standards in 49 CFR §192. Locations of proposed mainline valves (“MLVs”) are included in Table 11.2-2. Additionally, all four metering and regulating (“M&R”) stations will have the capability to shutdown the pipeline remotely or manually.

**Table 11.2-2. Proposed MLVs**

MLV Facility	Approximate MP	Type of Operation	Justification
<b>24-Inch Pipeline</b>			
MLV 1	15.7	Remote Actuated MLV	To comply with Title 49 CFR Part 192.179
MLV 2	33.4	Remote Actuated MLV	To comply with Title 49 CFR Part 192.179
MLV 3	46.2	Remote Actuated MLV	To comply with Title 49 CFR Part 192.179
<b>Line 880</b>			
Coldwater Creek MLV Site	1.9	Remote Actuated MLV	To comply with Title 49 CFR Part 192.179
Redman MLV Site	5.3	Remote Actuated MLV	To comply with Title 49 CFR Part 192.179

As part of the modifications to Line 880, seven existing 16-inch valves will be removed in order to allow the pipeline to be inspected via an in-line inspection smart tool. Two remote actuated valves will be installed on the pipeline, including one stand alone Coldwater Creek MLV Site and one installed at the Redman Delivery Station. Each of the M&R stations at the start and terminus of this pipeline will also have a valve that is capable of shutting down Line 880.

### 11.2.1 High Consequence Areas

Part 192 specifies the identification of HCAs, which are specific areas where a release from a natural gas transmission pipeline could have the most adverse consequences.

HCAs are established by one of the methods described below:

- An area defined as:
  - a Class 3 location;
  - a Class 4 location;
  - any area in a Class 1 or Class 2 location where the potential impact radius (which is calculated as the product of 0.69 and the square root of the MAOP multiplied by pipeline diameter squared,  $r = 0.69 \cdot \sqrt{(p \cdot d^2)}$ ) is greater than 660 feet, and the area within a potential impact circle contains 20 or more buildings intended for human occupancy; or
  - any area in a Class 1 or Class 2 location where the potential impact circle contains an identified site.



- The area within a potential impact circle containing:
  - 20 or more buildings intended for human occupancy (exception defined in 49 CFR § 192.903); or
  - an identified site.

Identified site means each of the following areas: (a) an outside area or open structure that is occupied by 20 or more persons on at least 50 days in any 12-month period; (b) a building that is occupied by 20 or more persons on at least five days a week for 10 weeks in any 12-month period; or (c) a facility occupied by persons who are confined, are of impaired mobility, or would be difficult to evacuate. The months, days, and weeks need not be consecutive.

Spire evaluated potential HCAs along the Project. As a result, Spire has identified that a portion of the Project is within a HCA, which is approximately 4 miles of Line 880 as determined by the potential impact circle method.

The USDOT's rule on Pipeline Integrity Management provides enhanced protection for HCAs. The rule requires gas transmission pipeline operations to develop a written facility-specific Integrity Management Plan 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. The Project facilities to be constructed by Spire will adhere to USDOT regulatory requirements pertaining to pipeline safety.

### **11.2.2 Measures to Protect the Public**

Operating personnel will be thoroughly trained to perform their activities in accordance with Spire's operating policies and procedures, which will be established and reviewed periodically by the USDOT. These policies and procedures provide specific directions in inspection and preventive maintenance of facilities, as well as procedures to follow in the event of an accident.

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 meter 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.

Spire will be a participant in the Illinois One-Call ("Julie") system and the Missouri One-Call system. Under these systems, with very limited exceptions, anyone planning excavation activities must call a dedicated telephone number (811) to alert all utility companies. Representatives of the utility companies that may be affected then visit the site and mark their facilities so that the excavation can proceed with relative certainty as to the location of all underground lines. In addition, Spire employs damage-prevention personnel whose job is to monitor, inspect, and assess all third-party activities near Spire's pipeline facilities.



### **11.2.2.1 Equipment**

Spire's proposed pipeline system will include many equipment features designed to increase the overall safety of the system and protect the public from a potential failure within the system due to accidents or natural disasters.

Cathodic protection systems will be installed along the pipeline to mitigate corrosion of the pipeline facility. The cathodic protection system impresses a low voltage current to the pipeline to off-set natural soil and groundwater corrosion potential. The functional capability of cathodic protection systems are inspected frequently to ensure proper operating conditions for corrosion mitigation.

Data acquisition systems will be present at M&R facilities. If system pressures fall outside a predetermined range, an alarm is activated, and notice is transmitted to a monitoring center located in St. Louis, Missouri.

### **11.2.2.2 Surveys**

Each operator must have a procedure for continuing surveillance of its facilities to determine and take appropriate action concerning changes in class location, failures, leakage history, corrosion, substantial changes in cathodic protection requirements, and other unusual operating and maintenance conditions. Periodic surveys of Spire's facilities will be conducted according to USDOT regulations. These will include patrol inspections, leak surveys, and surveys or installation of cathodic protection. Weather permitting, aerial and vehicle patrols are performed, along with scheduled preventative maintenance. Unusual situations or conditions are reported and investigated immediately. The proposed Project facilities will be subject to inspections consistent with the following procedures.

#### **Pipeline Patrols**

The pipeline and right-of-way will be patrolled on a periodic basis. The frequency of the patrol of the pipeline by either aerial or ground surveys is determined by the size, operating pressure, and class location of the pipeline terrain, weather, and other relevant factors. Ground patrols will utilize the permanent right-of-way for inspection of the pipeline. It is not anticipated that any permanent impacts to the right-of-way will result from these patrols. The interval between patrols may not be longer than prescribed Table 11.2-3.



**Table 11.2-3. Maximum Interval between Patrols**

<b>Class Location of Line<sup>1</sup></b>	<b>At Highway and Railroad Crossings</b>	<b>At all Other Places</b>
1 and 2	7½ months, but at least twice each calendar year	15 months, but at least once each calendar year
3	4½ months, but at least four times each calendar year	7½ months, but at least twice each calendar year
4	4½ months, but at least four times each calendar year	4½ months, but at least four times each calendar year

Note:

<sup>1</sup> As defined by USDOT PHMSA at 49 CFR 192.5:

Class 1: Offshore areas and any class location unit with 10 or fewer buildings intended for human occupancy.

Class 2: Any class location unit with more than 10 but fewer than 46 buildings intended for human occupancy.

Class 3: Any class location unit with 46 or more buildings intended for human occupancy or areas within 100 yards of either a building or a small, well defined outside area (such as a playground, recreation area, outdoor theater, or other place of public assembly) that is occupied by 20 or more persons on at least five days a week for 10 weeks in any 12-month period. The days and weeks need not be consecutive.

Class 4: Any class location unit where buildings with four or more stories are prevalent.

Additional ground surveys are conducted on an as-needed basis to respond to issues such as landowner concerns and third-party encroachments. During right-of-way patrols, all permanent erosion control devices that are installed during construction will be inspected to ensure they are functioning properly. Additionally, attention will be given to the following items during right-of-way patrols:

- encroachment;
- existing stormwater outfalls along the alignment;
- erosion and washouts along the right-of-way;
- water control devices such as diversions;
- condition of banks at drainage ditch crossings;
- fallen timber or other threats to the pipeline;
- shrubs and other vegetation planted during construction; and
- other conditions that could endanger the pipeline.

The local operations supervisor will be notified of any conditions that need attention. Corrective measures will be performed as needed.



### **Leak Survey**

Leakage surveys of the pipelines will be conducted at intervals not exceeding 15 months, but at least once each calendar year. However, in the case of a transmission line which transports gas in conformity with §192.625 without an odor or odorant, leakage surveys using leak detector equipment must be conducted in Class 3 locations, at intervals not exceeding 7-1/2 months, but at least twice each calendar year.

### **Cathodic Protection**

Rectifiers will be inspected six times per year, but with intervals not exceeding 2.5 months, to ensure they are operating.

### **Valve Inspections**

Each transmission line valve that might be required during any emergency must be inspected and partially operated at intervals not exceeding 15 months, but at least once each calendar year.

### **Inspections**

Test station readings will be taken annually, and Critical Bond readings six times per year.

#### **11.2.2.3 Aboveground Facilities**

In accordance with USDOT regulations, 49 CFR Part 192, the facilities will be regularly inspected for leakage as part of scheduled operations and maintenance ("O&M"). Spire intends to establish O&M procedures to ensure the M&R facilities operate safely. Standard Spire operations at existing M&R stations include activities such as the calibration, maintenance, and inspection of equipment, as well as the monitoring of pressure and temperature data. Also included is traditional landscape maintenance, such as mowing and as-needed snow removal. Spire's standard operations currently also include the periodic checking of safety and emergency equipment and cathodic protection systems.

Project facilities will be marked and identified in accordance with applicable regulations. A company representative will interact with the public as well as with government agencies regulating activities at M&R stations. Overall maintenance activities will be in compliance with Spire's construction procedures, as well as other applicable regulatory requirements. The M&R stations will be remotely linked to Spire's information and data software networks and infrastructure that monitor the pipeline system on a 24-hour-per-day basis. Spire will monitor the pipeline system 24 hours a day, 365 days a year using a supervisory control and data acquisition ("SCADA") system. If Spire observes an abnormal situation, local company personnel who are responsible for operating the pipeline in that area are contacted immediately. Spire will also be able to isolate and shutdown certain pipeline segments remotely, as necessary. The local company personnel would assess the situation, contact the appropriate emergency responders, and assist with incident response as needed or required. Local company personnel would also monitor the pipeline(s) in their respective areas, both via the same SCADA system and visually, on a periodic basis to ensure safe operation of the facilities. Spire works closely with local emergency responders to ensure coordinated and effective responses to any potential emergency.