SABAL TRAIL PROJECT

DRAFT RESOURCE REPORT 11

Reliability and Safety

FERC Docket No. PF14-1-000

June 2014

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Filing Requirement	**Location in Environmental Report**
☒ Describe how the project facilities would be designed, constructed, operated, and maintained to minimize potential hazard to the public from the failure of project components as a result of accidents or natural catastrophes. (§ 380.12(m))	Sections 11.2 to 11.4

ACRONYMS AND ABBREVIATIONS

AC	alternating current
CFR	Code of Federal Regulations
FBE	fusion-bonded epoxy
FERC	Federal Energy Regulatory Commission
FGT	Florida Gas Transmission Company, LLC
FSC	Florida Southeast Connection, LLC
Gulfstream	Gulfstream Natural Gas System, LLC
HCA	High Consequence Areas
M&R	meter and regulating
MP	milepost
Part 192	Title 49 of the CFR Part 192
PHMSA	Pipeline and Hazardous Materials Safety Administration
Project	Sabal Trail Project
ROW	right of way
Sabal Trail	Sabal Trail Transmission, LLC
Spectra Energy	Spectra Energy Partners, LP
Transco	Transcontinental Gas Pipe Line Company, LLC
USDOT	U.S. Department of Transportation

11.0 RESOURCE REPORT 11 – RELIABILITY AND SAFETY

11.1 Introduction

Sabal Trail Transmission, LLC ("Sabal Trail"), a joint venture between affiliates of Spectra Energy Partners, LP ("Spectra Energy") and NextEra Energy, Inc., is seeking a Certificate of Public Convenience and Necessity from the Federal Energy Regulatory Commission ("FERC") pursuant to Section 7 (c) of the Natural Gas Act authorizing the construction and operation of the Sabal Trail Project ("Project").

The Project is a new natural gas transmission pipeline that will be constructed, owned and operated by Sabal Trail, extending from Tallapoosa County, Alabama to a new interconnection hub ("the Central Florida Hub") in Osceola County, Florida. At the Central Florida Hub, the Project will connect with the Florida Southeast Connection Pipeline Project, currently being proposed by Florida Southeast Connection, LLC ("FSC") (FERC Docket No. PF14-2-000). In addition, at or near the Central Florida Hub, the Project will interconnect with Gulfstream Natural Gas System, LLC ("Gulfstream") and Florida Gas Transmission Company, LLC ("FGT"). Sabal Trail will also lease capacity from Transcontinental Gas Pipe Line Company, LLC ("Transco") on facilities Transco is proposing to construct for its Hillabee Expansion Project (FERC Docket No. PF14-6-000). The Project will have an initial capacity of 800,000 dekatherms per day with a proposed in-service date of May 1, 2017. Through a series of phased compressor station expansions to meet the future capacity needs of Sabal Trail's customers, the Project capacity will increase to approximately 1,100,000 dekatherms per day by 2021.

The proposed Project consists of the following facilities:

Pipeline Facilities

The Project includes construction of approximately 462.9 miles of new 36-inch diameter natural gas transmission pipeline (the "Mainline Route"), approximately 13.3 miles of new 36-inch diameter natural gas pipeline ("Hunters Creek Line"), and approximately 22.3 miles of new 24-inch diameter natural gas pipeline (the "Citrus County Line"). A summary of the Project pipeline facilities is provided in Table 1.2-1 (*see* Tables section of Resource Report 1). A location map of the Project pipeline facilities is provided as Figure 1.1-1 (*see* Figures section of Resource Report 1).

- Mainline Route – Originates in Tallapoosa County, Alabama near Transco milepost ("MP") 944 and ends at an interconnection with the Florida Southeast Connection Pipeline Project at the Central Florida Hub in Osceola County, Florida;
- Hunters Creek Line – Connects at the proposed Reunion Compressor Station located at approximately MP 462.9 to FGT's existing 30-inch diameter mainline natural gas pipeline in Orange County, Florida; and
- Citrus County Line – Located in Marion and Citrus Counties, Florida, extending from Sabal Trail's facilities at approximately MP 384.2 to a new electric generation plant proposed by Duke Energy Florida, Inc. to be located in Citrus County, Florida.

Aboveground Facilities

Five new compressor stations are proposed to be constructed along the Mainline Route. Three compressor stations would have a 2017 in-service date, followed by two additional compressor stations with a 2020 in-service date. Expansion work (i.e., additional compression) at two of these five new compressor stations would then be completed with an in-service date of 2021. Natural gas will be the proposed fuel source for the facilities within each compressor station. A summary of the Project aboveground facilities is provided in Table 1.2-2 of Resource Report 1. Aboveground facility plot plans

are provided in Appendix 1A, Volume II-B of Resource Report 1. United States ("U.S.") Geological Survey ("USGS") topographic location excerpts and aerial photography are provided as Figures 1.1-2 and 1.1-3 of Resource Report 1.

- Compressor Stations
  - Alexander City Compressor Station (approximate MP 0.0) – In service 2017. Construction of a compressor station near Alexander City in Tallapoosa County, Alabama. The compressor station will include two Solar Titan 130 and one Solar Titan 250 compressor units;
  - Albany Compressor Station (approximate MP 157.7) – In service 2020. Construction of a compressor station near Albany in Dougherty County, Georgia after the initial Project in-service date. The compressor station will include one Solar Titan 130 compressor unit. An additional Solar Titan 130 compressor unit will be constructed in a later phase of the Project with an in-service date of 2021;
  - Hildreth Compressor Station (approximate MP 292.7) – In service 2017. Construction of a compressor station near Lake City in Suwannee County, Florida, consisting of one Solar Titan 130 compressor unit. An additional Solar Titan 130 compressor unit will be constructed in a later phase of the Project with an in-service date of 2021;
  - Dunnellon Compressor Station (approximate MP 384.2) – In service 2020. Construction of a compressor station near Ocala in Marion County, Florida after the initial in-service date. The compressor station will include one Solar Titan 130 compressor unit; and
  - Reunion Compressor Station (approximate MP 462.9) – In service 2017. Construction of a compressor station near Intercession City in Osceola County, Florida, consisting of one Titan 130 compressor unit and one Solar Mars 100 compressor unit.

In addition, six meter and regulating ("M&R") stations are proposed for the Project.

- M&R Stations
  - Mainline Route M&R Stations
    - Transco Hillabee M&R Station in Tallapoosa County, Alabama (MP 0.0)
    - FGT Suwannee M&R Station in Suwannee County, Florida (MP 296.2)
    - FSC M&R Station in Osceola County, Florida (MP 462.9)
    - Gulfstream M&R Station in Osceola County, Florida (MP 462.9)
  - Hunters Creek Line M&R Station
    - FGT Hunters Creek M&R Station in Orange County, Florida (MP 13.3)
  - Citrus County Line M&R Station
    - Duke Energy Citrus County M&R Station in Citrus County, Florida (MP 22.3)

Proposed Mainline Capacity Lease

Transco Lease – Mainline capacity lease on Transco's existing pipeline facilities extending from Transco's Zone 4 Pool and Transco's interconnections with Midcontinent Express Pipeline, LLC and Gulf South Pipeline Company, LP, all located near Transco MP 784 in Choctaw County, Alabama to the point of interconnection with the proposed Sabal Trail facilities to be located near Transco MP 944 in Tallapoosa County, Alabama.

This draft Resource Report 11 describes the reliability and safety aspects of the proposed Project. Tables for this resource report are provided in the Tables section appended to this report.

Refer to Resource Report 1, Appendix 1A for the Project drawings, maps, alignment sheets, and aerials.

11.2 Natural Gas Pipeline Industry Safety Overview

The following information provides a perspective of Sabal Trail's experience with respect to safety and reliability compared to industry-wide operational data. The information presented also helps to define for the reviewer the key industry related safety issues.

11.2.1 Pipeline Safety

11.2.1.1 Hazards

According to the *Pipeline and Hazardous Materials Safety Administration* ("PHMSA"), the federal agency with authority for regulating oil and gas pipelines, there are 2.6 million miles of pipelines across the United States, and those pipelines offer the safest and most cost-efficient way to transport hazardous materials. The risk of pipeline incidents with death or major injury have decreased over the past two decades, however, by approximately 10 percent every three years (PHMSA, 2013). As presented in subsequent sections of this report, through the application of federal law there are multiple layers of safeguards built into the design, construction and operation of the proposed pipeline. As the risk of accidents has declined steadily over the past two decades, the probability of risk for new pipelines is even less.

Methane, the primary component of natural gas, is colorless, odorless, and tasteless. It is not toxic, but is classified as an asphyxiant, possessing only an inhalation hazard. If breathed in high concentration, oxygen deficiency can result in serious injury or death. Methane has an ignition temperature of 1,000 degrees Fahrenheit and is flammable at concentrations between five percent and 15.0 percent in air. Unconfined mixtures of methane in air are generally not explosive or a significant health hazard. However, a flammable concentration within an enclosed space in the presence of an ignition source can result in a fire or explosion. The specific gravity of methane is 0.55; therefore, it is buoyant at atmospheric temperatures and disperses readily in ambient air.

11.2.1.2 Safety Standards

Under the Pipeline Safety Act, as amended (49 USC 60101 *et seq*.), the U.S. Department of Transportation ("USDOT") is exclusively authorized to promulgate pipeline safety and design standards for pipelines and transportation facilities. The proposed Project facilities will be designed, constructed, operated, and maintained to meet or exceed USDOT minimum federal safety standards set forth in Title 49 of the Code of Federal Regulations ("CFR") Part 192 ("Part 192"). Sabal Trail safety specifications for the following equipment exceed the minimum standard set forth in Part 192: 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 Part 192 are listed below:

- Minimum cover of 36-inches are 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;
- Remote controlled valves and monitoring equipment will be installed for all mainline valves on the 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 is greater than the operating pressure of the pipeline.

Part 192 defines area classifications, based on population density in the vicinity of the pipeline, which determine more rigorous safety requirements for populated areas. The Class Location Unit is an area that extends 220 yards (660 feet) on either side of the centerline of any continuous 1-mile length of pipeline. The four Class Location Units defined by federal law are 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 on at least five days a week for 10 weeks in any 12 month period.
- 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 (Sabal Trail will use 36 inches as a minimum depth of cover in Class 1 areas). 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 between sectionalizing block valves with intervals of 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 11.2-1 shows USDOT area classifications for the Project.

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 making them safe 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, and public officials to learn the resources and responsibilities of each organization that may respond to a gas pipeline emergency, and 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.

11.2.1.3 High Consequence Areas

USDOT's PHMSA has promulgated a rule for Pipeline Integrity Management in High Consequence Areas ("HCAs") for Gas Transmission, which requires 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 (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. HCAs are defined and discussed further in Section 11.4.1.

Sabal Trail will implement a comprehensive Integrity Management Program that meets or exceeds these regulations. While the pipeline integrity management regulations apply only to HCAs, Sabal Trail will implement the same rigorous practices across its entire pipeline system. These practices will enable Sabal Trail to identify and mitigate risks for the entire pipeline system, inside and outside of HCAs.

11.2.2 Pipeline Accident Data

USDOT has set forth certain reporting requirements for operators of natural gas pipelines in 49 CFR Part 191. Since June 1984, 49 CFR 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 7100.2 within 30 days after detection of the incident's occurrence. A reportable incident includes incidents that involve property damage valued at more than $50,000, injury, death, unintentional loss of 3,000,000 cubic feet or more of gas, or incidents that are otherwise considered significant by the operator. Table 11.2-2 summarizes reported national gas transmission incidents and accidents by category from 1994 to 2013. As evidenced in Table 11.2-2, the highest percentage of gas transmission fatalities is caused by excavation damage by third parties (approximately 38 percent).

The most frequent cause of gas transmission incidents is material failure (approximately 28 percent). The frequency of material failure related incidents is largely dependent on material, weld, and/or equipment failure or malfunctioning equipment. Corrosion is the cause of approximately 17 percent of the gas transmission incidents. The frequency of corrosion-related incidents is largely dependent on internal corrosion. 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 because corrosion is a time-dependent process. The corrosion potential for new pipe over time is further reduced by the 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 material failure compared to unprotected or partially protected pipe (*see* Section 11.4.15.5 below on Sabal Trail's corrosion control).

Outside force incidents result from excavation damage (i.e., encroachment of mechanical equipment such as bulldozers and backhoes), natural force damage (i.e., earth movements due to soil settlement, washouts, or geologic hazards, and weather effects such as winds, storms and thermal strains), and other outside forces. The breakdown of outside force incidents in Table 11.2-3 shows that human error associated with excavation damage was responsible for 15.1 percent of all onshore incidents from 1994 to 2013. 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. State laws

also require excavators to call their state "One Call" centers well in advance of digging (*see* Section 11.4.15.3 below on Sabal Trail's pipeline markers).

11.2.3 Impact on Public Safety

The reported incident data summarized in Table 11.2-2 includes pipeline failures of all magnitudes with widely varying consequences. The majority of incidents were attributed to material, welding, or equipment failure and excavation damage. Table 11.2-4 presents the annual fatalities and injuries which occurred on natural gas transmission lines from 1994 through 2013.

Table 11.2-5 presents the 2012 nationwide totals of transportation-related fatalities and injuries, broken down by mode of transportation. This table provides a relative measure of the industry-wide safety of natural gas transmission pipelines. Direct comparisons between modes of transportation categories should be made cautiously since individuals are not uniformly exposed to hazards from all of the modes. Nevertheless, the average number of fatalities resulting from natural gas transmission pipelines is proportionally small considering the 320,500 miles of onshore and offshore transmission lines in service nationwide. A more recent comparison from USDOT is not available. However, Table 11.2-5 shows that the average number of fatalities and injuries resulting from natural gas transmission pipelines is small.

11.3 Safety Overview

The Project facilities constructed by Sabal Trail will, at a minimum, adhere to USDOT regulations pertaining to pipeline safety. These safety regulations will be reinforced by the comprehensive and strictly enforced corporate practices of Sabal Trail. The effectiveness of the federal and corporate requirements in ensuring reliability and safety is illustrated by the following operating experience profile of Sabal Trail. The empirical information presented illustrates the low potential for public hazard from accidents associated with the operation of the proposed Project facilities.

11.3.1 System Overview

One of Sabal Trail's parent companies, Spectra Energy, owns and operates a natural gas transmission system consisting of approximately 13,827 miles of transmission pipeline in the U.S., as well as natural gas gathering, processing, and local distribution assets. Spectra Energy, and its predecessor companies, have been providing service since the early 1940s when the major portion of its transmission system was constructed.

11.3.2 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. Sabal Trail's parent companies have an excellent record of public safety. Over the past five years, the incident rate for Spectra Energy's onshore pipelines in the U.S. is half that of the industry as a whole. However, no incident is acceptable. Spectra Energy works closely with federal and state regulators to ensure safe, reliable natural gas for Americans and inspects more pipeline annually than required by state and federal regulations. Spectra Energy is also committed to being a good neighbor in the communities that host our facilities. Sabal Trail will continue to employ similar system design, construction, operation, and maintenance practices to ensure this excellent record is maintained.

11.4 Measures to Protect the Public and Utilities

11.4.1 High Consequence Area Identification

Integrity management regulations require pipeline companies like Sabal Trail to identify HCAs located along the pipeline. HCAs are designated locations along the pipeline that are near either 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.

Sabal Trail uses a number of methods to identify for HCAs to ensure that it identifies all HCAs along its pipeline, including aerial photography, field surveys, consultation with emergency response officials, and multiple database searches. Sabal Trail will perform a comprehensive review each year, or as frequently as needed to meet the requirements of Part 192 to assure that its identification of HCAs is accurate.

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 a potential impact circle contains 20 or more buildings intended for human occupancy; or
- An identified site such as:
    - An outside area or open structure that is occupied by 20 or more persons for at least 50 days in any 12-month period;
    - A building that is occupied by 20 or more persons for at least five days a week for 10 weeks in a 12-month period; or
    - A facility occupied by persons who are confined, are of impaired mobility, or would be difficult to evacuate.

The potential impact radius means the radius of a circle within which the hypothetical failure of a pipeline could have significant impact on people or property. The potential impact radius is determined by the formula $r = 0.69 \times (\text{square root of } (p \times d^2))$, where 'r' is the radius of a circular area surrounding the point of hypothetical failure, 'p' is the maximum allowable operating pressure in the pipeline segment in pounds per square inch, and 'd' is the nominal diameter of the pipeline in inches.

Table 11.4-1 contains a listing of the identified HCAs along the proposed Project facilities.

As discussed above, the Project facilities will be designed, constructed, operated, and maintained to meet or exceed USDOT Minimum Federal Safety Standards in Part 192.

11.4.2 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. This data is needed to properly identify integrity risks and potential consequences and is gathered from a number of sources, including but not limited to:

- Original construction records;
- Quadrangle United States Geological Survey maps;
- Pipeline alignment sheet records;
- Digital elevation models;
- Personnel interviews;
- Historical data;
- Database searches;

- Cathodic protection surveys
- Leak and incident data/reports;
- Subject matter experts;
- Operating characteristics;
- One-call notices;
- Corrosion monitoring; and
- Aerial photography.

11.4.3 Risk Assessment

In accordance with Part 192.917, Sabal Trail will routinely perform 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 Sabal Trail to prioritize integrity management activities, such as integrity assessments and additional prevention measures, to those pipeline segments that have higher risks. Examples of potential integrity threats could include:

- Excavation damage by third parties;
- 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.

11.4.4 Integrity Assessments

Integrity assessments are prioritized based on the risk assessment, and are conducted to find pipeline defects well before they could become 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:

- 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.

11.4.5 Response and Remediation

Pipeline defects identified by the integrity assessments are prioritized and scheduled for field investigation and repair, if required, in accordance with Part 192.933 and 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. Sabal Trail will schedule and conduct investigations and repairs for any potential defects that exceed specified thresholds. This will be done regardless of whether or not the pipeline is located in a designated HCA.

11.4.6 Preventive and Mitigative Measures

Preventive measures begin with the design and construction of Sabal Trail's facilities. These measures include design specifications, selection of suitable construction materials, development and selection of welding procedures, pipe coatings and cathodic protection systems, as set forth in Part 192.935. 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, in-streets, and parking lots, a 15:1 sand to concrete mix called flowable fill, or Controlled Density Fill, or clean compacted material will be used as backfill around the pipeline following consultation with municipal, county, and state roadway authorities. A two-foot wide brightly colored warning tape is 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 clearly identify the location of the pipeline and provide contact information for the public and parties excavating in the area.

The pipeline will be patrolled in accordance with the requirements of Part 192.705 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 right-of-way ("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;
- Evidence of subsidence, surface cracks or depressions which could indicate sinkhole formation; and
- Any other conditions that could endanger the pipeline.

Sabal Trail will also monitor the pipeline 24 hours a day, seven days a week, from Spectra Energy's Gas Control Center. This high-tech computer control center monitors the flow of gas throughout Spectra Energy's approximately 19,100 miles of interstate transmission pipeline. The center collects data from all of these pipelines to ensure they are operating within their design parameters. The Gas Control Center monitors and reacts to equipment anomalies and, when necessary, dispatches employees who live and work along the pipeline to respond. As an added safety measure, remote control equipment is installed along the pipeline system, enabling remote operation of the pipeline valves from the Gas Control Center (*see* Section 11.4.15.2 below). Patrolling will also be performed regularly to monitor activity near Sabal Trail's pipeline, and Sabal Trail will become a member of the "Call Before You Dig" or "One Call" and related pre-excavation notification organizations in the states of Alabama, Georgia, and Florida (*see* Section 11.4.15.1 below).

11.4.7 Continuous Evaluation and Improvement

As required by PHMSA Integrity Management Program regulations, Sabal Trail will continually refine and enhance the integrity management techniques as it implements the Integrity Management Program on its pipeline system.

11.4.8 Public Safety

Sabal Trail is committed to safety, protecting the environment, preventing accidents/incidents, and maintaining the highest standards for its pipeline operation and maintenance. Sabal Trail will accomplish this goal through routine preventative maintenance, pipeline patrols, solid emergency response plans and a strong pipeline integrity management program. Sabal Trail will establish and maintain strict operating and maintenance policies and procedures that will be audited periodically by the PHMSA and are in compliance with Part 192.

Trained and qualified pipeline personnel will operate and maintain the pipeline in accordance with Subpart N of Part 192. The training program will ensure all personnel possess the knowledge and competency necessary to efficiently operate and maintain the pipeline in a manner that protects the environment, the public and the health and safety of all employees. More specifically, personnel are trained to: execute normal operating and maintenance procedures; recognize abnormal conditions and take appropriate corrective actions; predict consequences of malfunctions or failures; recognize conditions likely to cause emergencies; respond to emergency situations; control accidental releases of gas; and recognize characteristics and hazards of gas.

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 where the pipeline traverses near residential areas include, but are not limited to:

- 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.

No open ditch will remain open overnight, the installed pipe will be backfilled to near the end of the section, and the remaining open trench will be covered with temporary steel plating. The work will be accomplished so that emergency vehicles will be able to pass and homeowners will be able to access their driveways; steel plates will be available to insure access. Sabal Trail has developed residential construction plans in areas where residential dwellings are within 25 feet of construction workspace. These plans are included in Resource Report 8, Appendix 8A.

11.4.9 Emergency Response

Consistent with Part 192.615, Sabal Trail will establish an emergency action plan that provides written procedures to minimize the hazards from a pipeline emergency. Key features will include:

- Receiving, identifying, verifying and classifying emergency events – leaks, fires, explosions or natural disasters;

- Managing communications with emergency responders and public officials to establish incident command and coordinate response efforts;
- Making personnel, equipment, tools and materials available for emergencies;
- Ensuring that response efforts focus on public safety first; and
- Ensuring emergency shutdown actions are taken in a timely manner.

Should the need arise, Sabal Trail will have field service personnel and repair contractors available that are capable of completing emergency repairs and restoration.

11.4.10 Public Awareness Program

Sabal Trail will develop a Public Awareness Program as outlined in Part 192.616, which will provide outreach measures to the affected public, and emergency responders and public officials. This program will use multi-media channels (direct mail, e-mail, social networking, public service announcements, print advertisement, and public meetings, etc.) to engage these core audiences.

Sabal Trail's objective is to educate the public on how to recognize the presence of pipelines; understand the potential hazards and safe actions they should take; recognize and report abnormal conditions; and encourage the safe behavior of calling for buried facility location before digging.

11.4.11 One-Call Response

When Sabal Trail 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. Sabal Trail will have company employees on-site when the excavation occurs to ensure that the facility is not compromised.

11.4.12 Pipeline Safety Brochures

Sabal Trail will mail informational brochures to homeowners, businesses, potential excavators and public officials along the pipeline system each year to inform them of the presence of the pipeline and instruct them on how to recognize and react to unusual activity in the area. These brochures provide emergency contact phone numbers available 24/7 and reinforces the need for excavators to "call before you dig".

In addition to these public awareness outreach efforts, Sabal Trail will also provide pipeline location information in the National Pipeline Mapping System to inform the public and others as to the general location of their pipeline facilities.

11.4.13 Contact Information

Sabal Trail will provide contact information as part of its Emergency Response Plan.

11.4.13.1 Interactions with Federal Authorities

Sabal Trail will be required by law to maintain frequent contact with USDOT's PHMSA. In fact, PHMSA will review the design of the Project facilities prior to construction. 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. PHMSA

routinely inspects pipeline facilities and records for compliance with design, construction, testing, operations, maintenance, and integrity regulations. Sabal Trail's procedures and practices will be prepared in a manner to meet or exceed the pipeline safety regulations and related risk management requirements administered by PHMSA.

11.4.13.2 Liaison Procedures with Local Authorities

Sabal Trail's personnel involved with public awareness will ensure that appropriate liaisons and public education is established and maintained in the communities within which Sabal Trail operates. Sabal Trail will establish open relationships with local fire, police, and other governmental leaders in order to efficiently respond in a cooperative manner to pipeline emergencies.

To accomplish this Sabal Trail, on an annual basis, will:

- Have informational meetings and training with local fire and police departments, and other concerned government agencies at their request;
- Conduct periodic emergency response drills and table top exercises to build familiarity with emergency response personnel and response measures to be taken; and
- Provide literature listing emergency contact phone numbers and other pertinent information.

In addition to maintaining contact with local governmental and emergency response agencies along the pipeline, Sabal Trail's liaison efforts will allow Sabal Trail to:

- Determine how local officials may be able to assist Sabal Trail during an emergency with the determination of jurisdiction and resources that may be involved in responding to an emergency;
- Familiarize local officials with how Sabal Trail responds to an emergency on its pipeline system;
- Verify notification preferences for pipeline emergencies; and
- Review with local officials the use of incident command system to cooperate and assist with response to an emergency.

Outreach to emergency responders will be conducted by Sabal Trail on a periodic basis. Sabal Trail's focus with these organizations is to review firefighting methods and techniques for natural gas fires to conduct periodic emergency drills and exercises.

11.4.14 Utility Protection

The majority of the proposed pipeline segments for the Project will be within or adjacent to existing ROWs, consisting of pipeline ROWs, public roadway, and/or other utility ROWs. Some portions of the pipeline segments deviate from existing ROWs, generally to avoid specific construction constraints, provide adequate separation from existing residences, or to reduce impacts to sensitive resources.

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. Sabal Trail's contractors will contact the "Call Before You Dig" or "One Call" system, or state or local utility operators, to verify and mark all utilities along the Project workspaces to minimize the potential for damage to other buried facilities in the area. 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 fully excavate any foreign line. At minimum, an excavator bucket without teeth or side cutters will be used. Sabal Trail 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. As part of Sabal Trail's assessment of the reliability and safety of constructing and maintaining its proposed pipeline in proximity to overhead electric facilities, it considered the following.

Sabal Trail's Use of Heavy Construction Equipment in the Vicinity of High Voltage Powerlines

Sabal Trail 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. Sabal Trail 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, Sabal Trail has designed or will modify its construction technique on the 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 Project.

Potential Structural Impacts to Electric Transmission Towers Due to Nearby Blasting

Where possible Sabal Trail has offset its pipeline trench by 50 feet to avoid any potential damage to electric transmission towers and, in those areas that this offset could not be achieved the construction technique will be modified. Sabal Trail has extensive experience in blasting near structures including other underground pipelines and overhead powerlines. Sabal Trail will use a state licensed blasting engineer and will follow the Project Blasting Plan (refer to Resource Report 6) to avoid damage to overhead electric transmission lines and structures from blasting.

Effects on the Pipeline Resulting from Lighting Strikes to the Electric Transmission Towers

As required by federal law, Sabal Trail 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 the steady state induced AC on the pipeline and deal with any fault current should they occur. Typically lightning arrestors along with decoupling devices are employed on the pipeline to protect against any electrical surges.

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

As previously stated, 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 potential 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.

Sabal Trail is also aware of proposals to construct direct current voltage transmission lines near the Project. Such new transmission lines will be designed so as to ensure there in no direct current interference with the natural gas pipeline, and the pipeline will be designed to ensure its cathodic protection does not interfere with the transmission line. Design drawings and interference studies will be shared between Sabal Trail and the electric transmission developers.

Consideration must be given to 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.

As stated above, Sabal Trail will consult with an engineer that specializes in developing AC mitigation systems for pipeline utility companies. 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.

11.4.15 Other Protection Measures

11.4.15.1 Surveys

Sabal Trail will employ an array of patrol methods to conduct comprehensive and effective patrols, again as required by federal law. Aerial, driving, or foot patrols will be used to physically inspect the pipeline facilities. Sabal Trail will have line field service crews that perform the ground based patrols and facility inspections. When performing patrols, technicians will observe surface conditions on and adjacent to the pipeline right-of-way for indications of leaks, construction activity, and other factors affecting safety and operation. Conditions identified during patrols will be entered into Sabal Trail's work management system and remedial actions taken. Preventative maintenance checks shall be performed on the pipeline at a set frequency and shall be compliant with Part 192 safety regulations.

Sabal Trail will become a member of the "Call Before You Dig" or "One Call" and related pre-excavation notification organizations in the states in which it operates, as required by law. Through "Call Before You Dig" or "One Call," contractors provide notification to a central agency of proposed excavation that in turn notifies Sabal Trail of the excavation locations. If Sabal Trail'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.

11.4.15.2 Equipment

Sabal Trail's pipeline 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 will be 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 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.

Sabal Trail'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 southeast 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 steep hillside in an area of moderate to high landslide incidence. The proposed pipeline route does not cross these types of land features.

Sabal Trail's proposed Project pipeline will be equipped with remote control shutoff valves as required by the USDOT regulations. This allows the shutoff valves to be operated remotely by Sabal Trail's gas control center in the event of an emergency, usually evidenced by a sudden loss of pressure on the

pipeline. Remotely closing the shutoff valve allows the section of pipeline to be isolated from the rest of the pipeline system.

Data acquisition systems will be installed at all M&R stations along the system. If system pressures fall outside a predetermined range, an alarm is activated alerting Sabal Trail's Gas Control Center.

11.4.15.3 Pipeline Markers

PHMSA regulations at Part 192.707 also requires pipeline operators to place pipeline markers at frequent intervals along the pipeline ROW, particularly at prominent points along the route, such as where a pipeline intersects a street, highway, railway, waterway, or other significant feature. Pipeline markers will be placed in line of sight along the upland portion of pipeline installed by horizontal directional drill and will be even with the ground or placed on a short pole. At locations where the pipeline is under pavement, circular decals will be adhesively attached to the surface over the pipeline. In addition, approximately 12 inches below the natural grade, bright yellow ribbon, 24-inches in width, will be installed over the pipeline providing another set of warning of a natural gas pipeline and a toll free number to contact. Pipeline ROW markers can help prevent encroachment and excavation-related damage to pipelines. Since the pipeline ROW is much wider than the pipeline itself, and a pipeline can be located anywhere within the ROW, state laws require excavators to call their state One-Call center well in advance of digging to locate underground utilities, to ensure it is safe for the contractor to dig in that location.

11.4.15.4 Operations and Maintenance

The Sabal Trail Gas Control Center will be located in Houston, Texas and will be staffed continuously by qualified pipeline operators. Operators will monitor all aspects of the pipeline including system pressures, temperatures, flows, and valve positions (open or closed). A secondary Pipeline Control Center will be available in cases of an emergency Nashville, Tennessee.

The pipeline will be monitored for leaks continuously using the data acquisition system. Operators will use pressures, flows and rate of change alarms to monitor for leaks or other abnormal operating conditions. In the unlikely case that a shutdown of the pipeline system is needed, the Sabal Trail pipeline system will be equipped with remotely controlled sectionalizing block valves to isolate the affected pipeline segment.

Part 192 prescribes the minimum standards for operating and maintaining pipeline facilities, including the establishment of a written plan governing these activities. Sabal Trail will develop an Operations & Maintenance Manual for the facility during the construction phase and this Operations & Maintenance Manual will be in effect prior to initial filling of the pipeline system with natural gas.

Sabal Trail will have field services crews to perform Part 192 required operations, maintenance and inspection tasks along the 498.5 mile long pipeline. All personnel will have the proper training and qualifications as required by Part 192.

11.4.15.5 Corrosion Control

Design of the corrosion control systems is incorporated into the overall construction of the Project pipeline. The Project pipeline will have cathodic protection and will be closely monitored and maintained in compliance with Part 192 Subpart I and National Association of Corrosion Engineers International recommended practice RP-0169-96. The pipeline will have a high quality fusion-bonded epoxy ("FBE") coating systems which will be applied during the pipe manufacturing process. Girth welds will be sandblasted and coated with a field applied FBE coating. Together, the combination of Cathodic Protection and FBE coating system provide excellent corrosion control. 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. The corrosion control system will also include anodes strategically placed within the easements to manage and harmlessly disperse stray currents.

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 Sabal Trail's corrosion control operating procedures. In addition to the other measures, Sabal Trail will also inspect the pipeline using devices known in the industry as "smart pigs" every seven years, or more frequently as Integrity Assessment may require. These devices run inside the pipe and provide indications of internal and external metal loss, deformation, ovalities, dent detection; valve, fitting and casing locations; pipe repairs; casing ovalities; and external metal objects in the vicinity of the pipeline.

11.5 References

[PHMSA] – Pipeline and Hazardous Materials Safety Administration. 2013. Written Statement of Cynthia L. Quarterman, Administrator PHMSA, Before the Committee on Commerce, Science, and Transportation United States Senate. Field Hearing—Charleston, WV. *Pipeline Safety: An On-the-Ground Look at Safeguarding the Public*. January 28, 2013.

TABLES

TABLE 11.2-1

Area Classifications along the Sabal Trail Project Pipeline Facilities

State/Facility	County	Begin Milepost	End Milepost	Class a/
Alabama				
Mainline	Tallapoosa	0.0	4.1	1
	Tallapoosa	4.1	4.4	2
	Tallapoosa	4.4	4.6	1
	Tallapoosa	4.6	4.8	2
	Tallapoosa	4.8	4.9	1
	Tallapoosa	4.9	5.3	2
	Tallapoosa	5.3	20.4	1
	Chambers	20.4	26.0	1
	Chambers	26.0	26.3	2
	Chambers	26.3	27.0	1
	Chambers	27.0	27.4	2
	Chambers	27.4	27.6	1
	Chambers	27.6	27.8	2
	Chambers	27.8	27.9	1
	Chambers	27.9	28.0	2
	Chambers	28.0	28.2	1
	Chambers	28.2	28.2	2
	Chambers	28.2	40.0	1
	Lee	40.0	44.8	1
	Lee	44.8	44.8	2
	Lee	44.8	44.8	1
	Lee	44.8	45.2	2
	Lee	45.2	45.7	1
	Lee	45.7	45.8	2
	Lee	45.8	45.8	1
	Lee	45.8	46.1	2
	Lee	46.1	47.5	1
	Lee	47.5	47.5	2
	Lee	47.5	47.6	1
	Lee	47.6	48.3	2
	Lee	48.3	48.4	1
	Lee	48.4	48.5	2
	Lee	48.5	48.6	3
	Lee	48.6	48.7	2
	Lee	48.7	48.9	1
	Lee	48.9	49.0	2
	Lee	49.0	60.3	1

TABLE 11.2-1

Area Classifications along the Sabal Trail Project Pipeline Facilities

State/Facility	County	Begin Milepost	End Milepost	Class a/
	Russell	60.3	61.0	1
	Russell	61.0	61.5	2
	Russell	61.5	61.5	1
	Russell	61.5	61.7	2
	Russell	61.7	61.7	1
	Russell	61.7	62.6	2
	Russell	62.6	62.6	1
	Russell	62.6	62.7	2
	Russell	62.7	62.8	1
	Russell	62.8	63.0	2
	Russell	63.0	64.8	1
	Russell	64.8	65.0	2
	Russell	65.0	65.1	1
	Russell	65.1	66.4	2
	Russell	66.4	66.9	1
	Russell	66.9	67.2	2
	Russell	67.2	73.6	1
	Russell	73.6	74.9	3
	Russell	74.9	74.9	1
	Russell	74.9	75.3	2
	Russell	75.3	75.3	1
	Russell	75.3	75.4	2
	Russell	75.4	75.6	1
	Russell	75.6	76.6	3
	Russell	76.6	76.8	1
	Russell	76.8	77.5	2
	Russell	77.5	85.9	1
Georgia				
Mainline	Stewart	85.9	109.5	1
	Webster	109.5	119.7	1
	Terrell	119.7	140.5	1
	Lee	140.5	141.1	1
	Terrell	141.1	145.1	1
	Lee	145.1	145.4	2
	Terrell	145.4	146.0	2
	Terrell	146.0	146.0	1
	Dougherty	146.0	146.0	1
	Dougherty	146.0	146.2	2
	Dougherty	146.2	160.0	1

TABLE 11.2-1

Area Classifications along the Sabal Trail Project Pipeline Facilities

State/Facility	County	Begin Milepost	End Milepost	Class a/
	Dougherty	160.0	160.3	2
	Dougherty	160.3	160.4	1
	Dougherty	160.4	161.0	2
	Dougherty	161.0	162.8	1
	Dougherty	162.8	163.0	2
	Dougherty	163.0	163.1	1
	Dougherty	163.1	163.4	2
	Dougherty	163.4	163.5	1
	Dougherty	163.5	163.7	2
	Dougherty	163.7	165.2	1
	Dougherty	165.2	165.7	2
	Dougherty	165.7	165.7	1
	Dougherty	165.7	166.7	2
	Dougherty	166.7	167.2	1
	Dougherty	167.2	167.5	2
	Dougherty	167.5	168.2	1
	Mitchell	168.2	180.2	1
	Colquitt	180.2	186.5	1
	Colquitt	186.5	187.2	2
	Colquitt	187.2	187.4	1
	Colquitt	187.4	188.1	2
	Colquitt	188.1	188.2	1
	Colquitt	188.2	188.4	2
	Colquitt	188.4	188.5	1
	Colquitt	188.5	188.8	2
	Colquitt	188.8	191.6	1
	Colquitt	191.6	191.8	2
	Colquitt	191.8	191.8	1
	Colquitt	191.8	191.8	2
	Colquitt	191.8	191.9	1
	Colquitt	191.9	193.3	2
	Colquitt	193.3	194.0	1
	Colquitt	194.0	195.4	2
	Colquitt	195.4	197.2	1
	Colquitt	197.2	197.5	2
	Colquitt	197.5	197.5	1
	Colquitt	197.5	197.5	2
	Colquitt	197.5	197.5	1
	Colquitt	197.5	197.7	2

TABLE 11.2-1

Area Classifications along the Sabal Trail Project Pipeline Facilities

State/Facility	County	Begin Milepost	End Milepost	Class a/
	Colquitt	197.7	197.9	1
	Colquitt	197.9	198.1	2
	Colquitt	198.1	198.2	1
	Colquitt	198.2	198.3	2
	Colquitt	198.3	198.5	3
	Colquitt	198.5	198.9	2
	Colquitt	198.9	206.2	1
	Brooks	206.2	228.4	1
	Brooks	228.4	228.8	2
	Brooks	228.8	229.0	1
	Lowndes	229.0	231.0	1
	Lowndes	231.0	231.6	2
	Lowndes	231.6	231.8	1
	Lowndes	231.8	232.3	2
	Lowndes	232.3	233.5	1
	Lowndes	233.5	233.8	2
	Lowndes	233.8	233.9	1
	Lowndes	233.9	235.2	2
	Lowndes	235.2	237.7	1
	Lowndes	237.7	237.9	2
	Lowndes	237.9	238.5	1
	Lowndes	238.5	239.3	2
	Lowndes	239.3	239.3	1
	Lowndes	239.3	239.5	2
	Lowndes	239.5	242.9	1
	Lowndes	242.9	243.2	2
	Lowndes	243.2	243.4	1
	Lowndes	243.4	243.8	2
	Lowndes	243.8	244.8	1
Florida				
Mainline	Hamilton	244.8	261.1	1
	Madison	261.1	263.9	1
	Suwannee	263.9	271.1	1
	Suwannee	271.1	271.2	2
	Suwannee	271.2	271.5	1
	Suwannee	271.5	272.7	2
	Suwannee	272.7	272.7	1
	Suwannee	272.7	272.9	2
	Suwannee	272.9	272.9	1

TABLE 11.2-1

Area Classifications along the Sabal Trail Project Pipeline Facilities

State/Facility	County	Begin Milepost	End Milepost	Class a/
	Suwannee	272.9	273.0	2
	Suwannee	273.0	273.0	1
	Suwannee	273.0	273.5	2
	Suwannee	273.5	274.6	1
	Suwannee	274.6	275.5	2
	Suwannee	275.5	276.0	1
	Suwannee	276.0	276.3	2
	Suwannee	276.3	276.3	1
	Suwannee	276.3	276.8	2
	Suwannee	276.8	276.9	1
	Suwannee	276.9	277.7	2
	Suwannee	277.7	282.3	1
	Suwannee	282.3	282.5	2
	Suwannee	282.5	282.8	1
	Suwannee	282.8	283.8	2
	Suwannee	283.8	284.1	1
	Suwannee	284.1	285.1	2
	Suwannee	285.1	287.3	1
	Suwannee	287.3	287.8	2
	Suwannee	287.8	287.8	1
	Suwannee	287.8	288.0	2
	Suwannee	288.0	288.0	1
	Suwannee	288.0	288.7	2
	Suwannee	288.7	288.8	1
	Suwannee	288.8	288.8	2
	Suwannee	288.8	289.0	1
	Suwannee	289.0	289.1	2
	Suwannee	289.1	293.7	1
	Suwannee	293.7	294.0	2
	Suwannee	294.0	294.1	1
	Suwannee	294.1	294.4	2
	Suwannee	294.4	294.5	1
	Suwannee	294.5	295.0	2
	Suwannee	295.0	295.0	1
	Suwannee	295.0	295.2	2
	Suwannee	295.2	299.8	1
	Suwannee	299.8	300.4	2
	Suwannee	300.4	300.5	1
	Suwannee	300.5	301.0	2

TABLE 11.2-1

Area Classifications along the Sabal Trail Project Pipeline Facilities

State/Facility	County	Begin Milepost	End Milepost	Class a/
	Suwannee	301.0	302.9	1
	Suwannee	302.9	303.5	2
	Suwannee	303.5	303.6	1
	Suwannee	303.6	303.9	2
	Gilchrist	303.9	304.3	2
	Gilchrist	304.3	306.1	1
	Gilchrist	306.1	306.3	2
	Gilchrist	306.3	306.4	1
	Gilchrist	306.4	307.1	2
	Gilchrist	307.1	307.2	1
	Gilchrist	307.2	308.6	2
	Gilchrist	308.6	327.4	1
	Gilchrist	327.4	327.8	2
	Gilchrist	327.8	327.9	1
	Gilchrist	327.9	328.0	2
	Gilchrist	328.0	328.0	1
	Gilchrist	328.0	328.4	2
	Gilchrist	328.4	329.0	1
	Gilchrist	329.0	329.4	2
	Gilchrist	329.4	331.5	1
	Gilchrist	331.5	331.8	2
	Alachua	331.8	332.5	2
	Alachua	332.5	332.6	1
	Alachua	332.6	332.9	2
	Alachua	332.9	335.8	1
	Levy	335.8	354.0	1
	Levy	354.0	354.3	2
	Levy	354.3	354.6	1
	Levy	354.6	355.5	2
	Levy	355.5	362.1	1
	Levy	362.1	362.4	2
	Levy	362.4	362.4	1
	Levy	362.4	363.1	2
	Levy	363.1	363.3	1
	Levy	363.3	364.0	2
	Levy	364.0	364.5	1
	Marion	364.5	369.5	1
	Marion	369.5	370.2	2
	Marion	370.2	389.0	1

TABLE 11.2-1

Area Classifications along the Sabal Trail Project Pipeline Facilities

State/Facility	County	Begin Milepost	End Milepost	Class a/
	Sumter	389.0	395.9	1
	Sumter	395.9	396.2	2
	Sumter	396.2	396.2	1
	Sumter	396.2	396.9	2
	Sumter	396.9	397.1	1
	Sumter	397.1	397.6	2
	Sumter	397.6	418.3	1
	Sumter	418.3	418.5	2
	Sumter	418.5	418.6	1
	Sumter	418.6	418.7	2
	Sumter	418.7	418.9	1
	Sumter	418.9	419.3	2
	Sumter	419.3	419.5	1
	Sumter	419.5	419.6	2
	Sumter	419.6	425.1	1
	Lake	425.1	425.4	1
	Sumter	425.4	425.5	1
	Lake	425.5	430.6	1
	Lake	430.6	430.8	2
	Lake	430.8	430.9	1
	Lake	430.9	431.0	2
	Lake	431.0	431.1	1
	Lake	431.1	431.2	2
	Lake	431.2	431.3	1
	Lake	431.3	431.9	2
	Lake	431.9	431.9	1
	Lake	431.9	432.1	2
	Lake	432.1	446.9	1
	Polk	446.9	452.6	1
	Polk	452.6	454.1	3
	Polk	454.1	454.4	1
	Osceola	454.4	455.4	1
	Osceola	455.4	456.6	2
	Osceola	456.6	456.7	1
	Osceola	456.7	456.8	2
	Osceola	456.8	457.1	1
	Osceola	457.1	457.4	2
	Osceola	457.4	457.5	1
	Osceola	457.5	457.7	2

TABLE 11.2-1

Area Classifications along the Sabal Trail Project Pipeline Facilities

State/Facility	County	Begin Milepost	End Milepost	Class a/
	Osceola	457.7	457.7	1
	Osceola	457.7	457.9	2
	Osceola	457.9	458.0	1
	Osceola	458.0	458.5	2
	Osceola	458.5	458.6	1
	Osceola	458.6	459.0	2
	Osceola	459.0	459.2	1
	Osceola	459.2	459.3	2
	Osceola	459.3	461.8	1
	Osceola	461.8	462.0	3
	Osceola	462.0	462.4	1
	Osceola	462.4	462.7	3
	Osceola	462.7	462.9	1
Hunters Creek Line	Osceola	0.0	0.2	1
	Osceola	0.2	0.7	2
	Osceola	0.7	5.4	1
	Osceola	5.4	5.6	2
	Osceola	5.6	5.7	1
	Osceola	5.7	7.8	3
	Osceola	7.8	8.0	1
	Osceola	8.0	8.5	3
	Osceola	8.5	9.9	1
	Osceola	9.9	11.1	3
	Osceola	11.1	11.2	1
	Osceola	11.2	12.2	3
	Osceola	12.2	12.2	1
	Osceola	12.2	12.5	3
	Osceola	12.5	12.7	1
	Osceola	12.7	12.9	3
	Osceola	12.9	13.0	1
	Osceola	13.0	13.2	2
	Osceola	13.2	13.2	1
	Orange	13.2	13.3	1
Citrus County Line	Marion	0.0	2.2	1
	Marion	2.2	2.3	2
	Citrus	2.3	2.9	2
	Citrus	2.9	3.0	1
	Citrus	3.0	3.1	2

TABLE 11.2-1

Area Classifications along the Sabal Trail Project Pipeline Facilities

State/Facility	County	Begin Milepost	End Milepost	Class a/
	Citrus	3.1	3.1	1
	Citrus	3.1	3.2	2
	Citrus	3.2	6.6	1
	Citrus	6.6	7.0	2
	Citrus	7.0	7.5	3
	Citrus	7.5	7.7	1
	Citrus	7.7	8.2	3
	Citrus	8.2	8.3	1
	Citrus	8.3	9.2	3
	Citrus	9.2	9.2	2
	Citrus	9.2	9.4	1
	Citrus	9.4	10.0	2
	Citrus	10.0	10.0	1
	Citrus	10.0	11.1	2
	Citrus	11.1	11.2	1
	Citrus	11.2	11.9	2
	Citrus	11.9	13.0	1
	Citrus	13.0	13.3	2
	Citrus	13.3	13.4	1
	Citrus	13.4	16.2	2
	Citrus	16.2	16.4	1
	Citrus	16.4	16.7	2
	Citrus	16.7	22.3	1

a/ 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.

TABLE 11.2-2

Office of Pipeline Safety – 1994 through 2013 Incident Summary (by cause)

Reported Cause of Incident	Number of Incidents a/	Fatalities	Injuries
Corrosion	255	13	6
Excavation Damage	346	15	42
Human Error	45	0	9
Material Failure	429	8	70
Natural Force Damage	133	0	2
Other Outside Force Damage	96	0	13
Other Causes	228	3	46
TOTALS	**1532**	**39**	**188**

a/ Includes all reported incidents.

Source: U.S. Department of Transportation. Pipeline and Hazardous Materials Safety Administration ("PHMSA") internet site: http://primis.phmsa.dot.gov/comm/reports/safety/Allpsi.html?nocache=8154#_ngtranson

TABLE 11.2-3

Outside Force Incidents on Onshore Natural Gas Transmission Pipelines by Cause 1994 - 2013

Cause	Percentage
Third Party Excavation Damage	15.1
Earth Movement	2.4
Heavy Rains/Floods	1.8
Other Outside Forces	5.0

Source: U.S. Department of Transportation. Pipeline and Hazardous Materials Safety Administration. Online: http://primis.phmsa.dot.gov/comm/reports/safety/ALLPSIDet_1994_2013_US.html?nocache=1048#_ngtranson

TABLE 11.2-4

Natural Gas Transmission Systems Fatalities and Injuries - 1994 - 2013

Year	Fatalities	Injuries
1994	0	22
1995	2	7
1996	1	5
1997	1	5
1998	1	11
1999	2	8
2000	15	16
2001	2	5
2002	1	4
2003	1	8
2004	0	2
2005	0	5
2006	3	3
2007	2	7
2008	0	5
2009	0	11
2010	10	61
2011	0	1
2012	0	7
2013	0	2
Total	**41**	**195**

Source: U.S. Department of Transportation. Pipeline and Hazardous materials Safety Administration. Online: http://primis.phmsa.dot.gov/comm/reports/safety/SerPSI.html?nocache=7105#_ngtrans

TABLE 11.2-5

Transportation Fatalities and Injuries in the US by Mode in 2012

Mode	Fatalities	Injuries
Highway	32,367	2,217,000
Railroad	570	7,520
Waterborne	820	3,840
Air	485	360
Transit	106	6,519
Pipeline (All)	12	56
Gas Transmission Pipelines	0	7

Source: U.S. Department of Transportation Bureau of Transportation Statistic, Research and Innovation Technology Administration. Pipeline data updated with 2012 statistics.
http://www.rita.dot.gov/bts/sites/rita.dot.gov.bts/files/publications/national_transportation_statistics/html/table_02_01.html
http://www.rita.dot.gov/bts/sites/rita.dot.gov.bts/files/publications/national_transportation_statistics/html/table_02_02.html

TABLE 11.4-1

Location of High Consequence Areas along the Sabal Trail Project Pipeline Facilities a/

State/Facility	County	Begin Milepost	End Milepost	Approximate Length (feet)
Alabama				
Mainline	Lee	48.2	48.4	853.86
	Lee	48.4	48.8	2060.06
	Lee	48.8	49.0	1118.80
	Russell	61.7	62.2	2605.86
	Russell	72.3	72.8	2520.42
	Russell	73.6	74.3	3631.14
	Russell	75.6	76.4	4526.10
Georgia				
Mainline	Dougherty	158.1	158.9	4373.06
	Dougherty	163.0	163.1	81.01
	Dougherty	163.1	163.5	2193.58
	Dougherty	163.5	163.9	2549.27
	Dougherty	165.9	166.5	3165.13
	Mitchell	173.5	174.2	3642.71
	Mitchell	179.9	180.2	1590.13
	Colquitt	180.2	180.5	1806.70
	Colquitt	198.0	198.4	2112.55
	Colquitt	198.4	199.0	3177.55
	Colquitt	199.0	199.5	2653.53
Florida				
Mainline	Gilchrist	327.1	327.9	3946.50
	Gilchrist	329.0	329.5	2628.89
	Levy	350.4	351.2	4041.04
	Sumter	402.3	402.7	2245.60
	Sumter	404.6	405.1	2487.76
	Sumter	418.7	418.8	509.23
	Sumter	418.8	419.5	3823.64
	Sumter	419.5	419.6	442.71
	Polk	452.4	453.1	3637.71
	Polk	453.1	453.8	3928.39
	Polk	453.8	454.3	2634.85
	Osceola	458.4	459.5	5702.56
	Osceola	462.1	462.2	285.80
	Osceola	462.2	462.9	3874.04
Hunters Creek Line	Osceola	0.3	0.7	2541.43
	Osceola	6.0	6.7	3711.45
	Osceola	6.7	8.5	9351.28
	Osceola	8.5	8.7	1097.69
	Osceola	9.8	10.8	5431.58
	Osceola	10.8	12.0	6682.12
	Osceola	12.0	12.2	788.75

TABLE 11.4-1

Location of High Consequence Areas along the Sabal Trail Project Pipeline Facilities a/

State/Facility	County	Begin Milepost	End Milepost	Approximate Length (feet)
	Osceola	12.2	12.7	2478.45
	Osceola	12.7	13.2	2878.29
	Orange	13.2	13.3	467.68
Citrus County Line	Citrus	6.8	7.0	1300.02
	Citrus	7.0	7.3	1697.35
	Citrus	7.3	7.6	1235.86
	Citrus	7.6	7.7	281.93
	Citrus	7.7	8.3	3383.74
	Citrus	8.3	8.3	286.49
	Citrus	16.3	16.6	1758.45

a/ High Consequence Areas (HCAs) are designated locations along the pipeline that are near either 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).