GUNSTER
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May 23, 2023

VIA E-PORTAL

Mr. Adam Teitzman, Clerk
Office of the Commission Clerk
Florida Public Service Commission
2540 Shumard Oak Boulevard
Tallahassee, FL 32399-0850

Re: Docket No. 20230029 – GU: Petition for approval of gas utility access and replacement directive, by Florida Public Utilities Company.

Dear Mr. Teitzman:

Attached for filing, please find Florida Public Utilities Company's Supplemental Responses to Staff's Second Data Requests, which include certain referenced attachments not provided with the Company's response on May 17.

Thank you for your assistance with this filing. As always, please don't hesitate to let me know if you have any questions whatsoever.

Sincerely,

/s/Beth Keating
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Tallahassee, FL 32301
(850) 521-1706

MEK
CC: (Office of Public Counsel)
(Office of General Counsel – Dose)

FLORIDA PUBLIC UTILITIES

Gas Distribution Integrity Management Program 2022

(5 YEAR DIMP REVIEW for 2017 to 2021 data)

Revised 12/21/2022

REVISION CONTROL SHEET

Title: Distribution Integrity Management Plan

Section	Pages	Revision	Date	Comments
8.2.1	9	1	12/24/2012	Added a paragraph to clarify the highest risk to the distribution system.
App. E. SEC. 1	113-115	1	12/21/2012	Calculated new 5-year average 2007-2011.
App. E. SEC. 2	116	1	12/21/2012	Calculated new 5-year average 2007-2011.
App. E. SEC. 4 & 5	117-122	1	12/21/2012	Calculated new 5-year average 2007-2011.
App. F	125	1	12/21/2012	Completed table 10-1.

App. E. SEC. 1	113 - 115	1	12/30/2013	Calculated new 5-year average 2008-2012.
App. E. SEC. 2	116	1	12/30/2013	Calculated new 5-year average 2008-2012.
App. E. SEC. 4 & 5	117 – 122	1	12/30/2013	Calculated new 5-year average 2008-2012.
App. F	125	1	12/30/2013	Completed table 10-1.

Sec 7.1	6	3	11/20/14	Added a paragraph to clarify, Evaluation & Ranking of risk.
App. C Sec. 2	75-96	3	11/20/14	Reviewed & re-performed Risk calculations.
App. D Sec. 3	107	3	11/20/14	Added atmospheric corrosion to table 8-3
App. E Sec. 1	113	3	11/20/14	Calculated new 5-year average 2009-2013
App. E Sec. 2	121	3	11/20/14	Calculated new 5-year average 2009-2013
App. E Sec.4 & 5	122		11/20/14	Calculated new 5 year average 2009-2013
App. F	130	3	11/20/14	Updated table 10-1. Documentation of re-evaluation of threats & risks.
App. E Sec. 1-5	113-122	**4**	12/17/15	Calculated new 5-year averages 2010-2014
App. F	130	**4**	12/17/15	Updated table 10-1. Documentation of re-evaluation of threats & risks.
Sec 7.2	7	**4**	12/17/15	Revised to clarify the process used for risk assessment.
5 YEAR DIMP REVIEW		**5**	12/18/16	5 YEAR DIMP REVIEW

App. D		**6**	11/30/2017	Updated action plans.
App. E		**6**	11/30/2017	Updated measurement performance tables
App. F		**6**	11/30/2017	Updated evaluation performance tables
App. F	Page 139	**6**	11/30/2017	Updated Program Re-evaluation Element
App. E		**7**	11/30/2018	Updated measurement performance tables
App. F		**7**	11/30/2018	Updated evaluation performance tables
App. F	Page 139	**7**	11/30/2018	Updated Program Re-evaluation Element
App. E		**8**	11/22/2019	Updated measurement performance tables
App. F		**8**	11/22/2019	Updated evaluation performance tables
App. F	Page 139	**8**	11/22/2019	Updated Program Re-evaluation Element
App. D		**9**	11/05/2020	Updated action plan. Sec 3 Tbl 8-3.
App. E		**9**	10/22/2020	Updated measurement performance tables
App. F		**9**	10/22/2020	Updated evaluation performance tables

App. F	Page 139	**9**	10/22/2020	Updated Program Re-evaluation Element
5 YEAR DIMP REVIEW		10	12/16/2021	5 YEAR DIMP REVIEW for 2016 to 2020 data.
App. A	**Page 25 – 62**	**11**	**12/21/2022**	**Updated Leak Data**

REVISION CONTROL SHEET

Title: Distribution Integrity Management Plan for PHMSA Jurisdictional Liquefied Propane Gas Systems.

Section	Pages	Revisions	Date	Comments
Supplemental Section "A"	128 - 180	1	01/05/2015	Updated Propane section.
Supplemental Section "A" Tbl S-6 to S-9	160 - 173	**2**	12/18/2015	Calculated new 5-year averages 2010-2014
Supplemental Section "A" Tbl S-10	175	**2**	12/18/2015	Updated table S-10 Documentation of re-evaluation of threats & risks.
Supplemental Section "A"		3	08/01/2016	Updated Propane section.
Supplemental Section "A" Tbl S-2		**2**	08/01/2016	Calculated new Risk assessments
Supplemental Section "A" Tbl S-3		**2**	08/01/2016	New Summary of LP Risk Evaluation & ranking results
Supplemental Section "A" Tbl S-5		**2**	08/01/2016	Action plans
Supplemental Section "A" Tbl S-6 to S-9		**3**	08/01/2016	Calculated new 5-year averages 2011-2015

Supplemental Section “A” Tbl S-10		**3**	08/01/2016	Updated table S-10 Documentation of re-evaluation of threats & risks.
Supplemental Section “C”		**4**	11/30/2017	Updated measurement performance tables
Supplemental Section “C”		**4**	11/30/2017	Added “leaks categorized by material” tables
		4	11/30/2017	Updated evaluation performance tables
Tbl S-1		**4**	12/14/2017	Updated SME evaluation of threats applicable to LP distribution system.
5 YEAR DIMP LP REVIEW 2013-2017		**5**	11/28/18	5 YEAR DIMP REVIEW
Supplemental Section-App E (Propane)		**6**	11/26/2019	Updated Measurement Performance Tables
Supplemental Section-App F (Propane)		**6**	11/26/2019	Updated Evaluation Performance Tables
Supplemental Section-App F (Propane)		**6**	11/26/2019	Updated Program Re-evaluation Element
Supplemental Section-App D (Propane)		**7**	11/05/2020	Updated Action plans. Sec 3 Tbl 8-3.
Supplemental Section-App E (Propane)		**7**	10/23/2020	Updated Measurement Performance Tables
Supplemental Section-App F (Propane)		**7**	10/23/2020	Updated Evaluation Performance Tables
Supplemental Section-App F (Propane)		**7**	10/23/2020	Updated Program Re-evaluation Element

Supplemental Section-App D (Propane)		**8**	12/05/2020	Updated Action plans. Sec 3 Tbl 8-3.
Supplemental Section-App E (Propane)		**8**	12/05/2020	Updated Measurement Performance Tables
Supplemental Section-App E (Propane)		**9**	12/16/2021	Updated Measurement Performance Tables
Supplemental Section-App A (Propane)	**161 & 162**	**10**	**12/21/2022**	**Updated Leak Data**

Table of Contents

1.0 COMPANY OVERVIEW

Headquartered in Fernandina Beach, Florida, Florida Public Utilities (including Central Florida Gas Company) delivers natural gas and liquefied petroleum gas (propane) to more than ninety two thousand (92,000) residential, commercial and industrial customers.

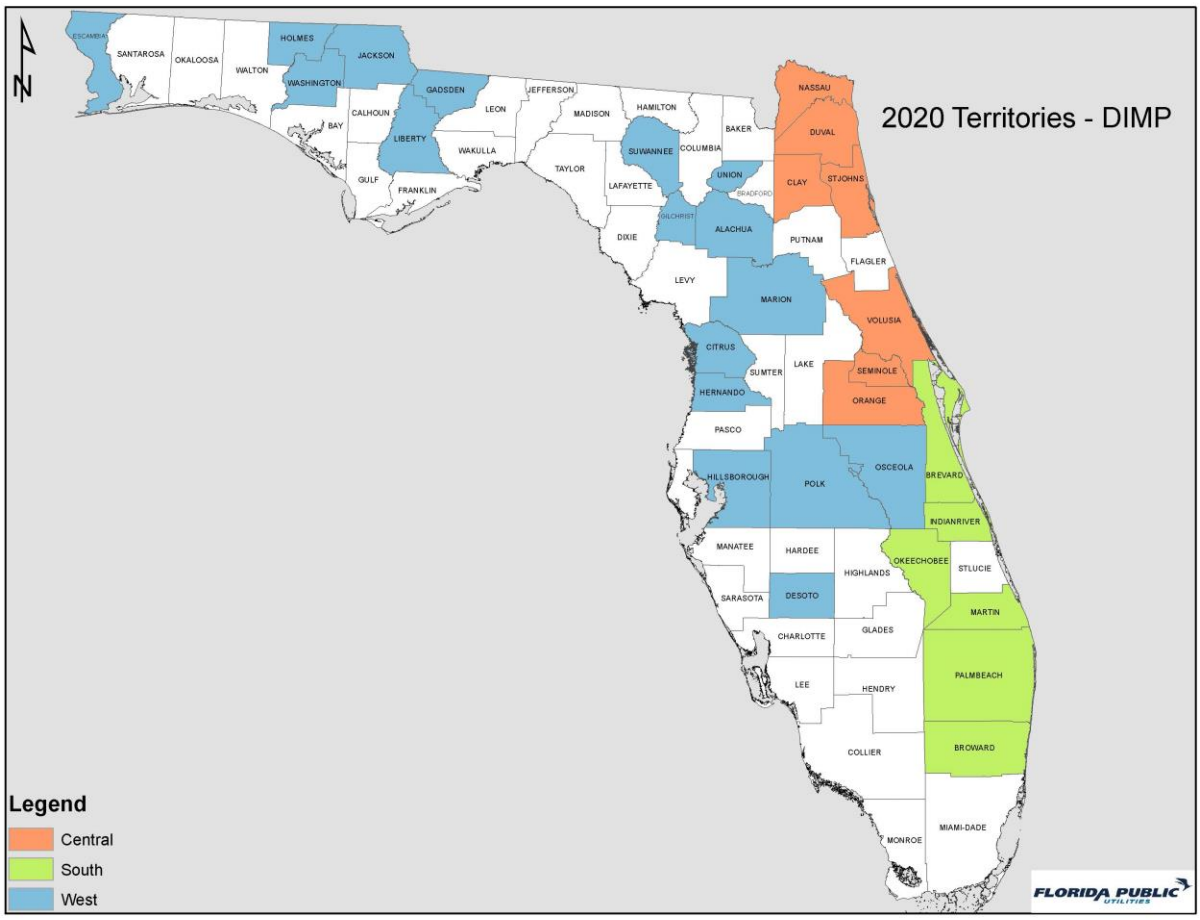
Florida Public Utilities Company is divided into three operational divisions. The systems that comprise each division are as follows:

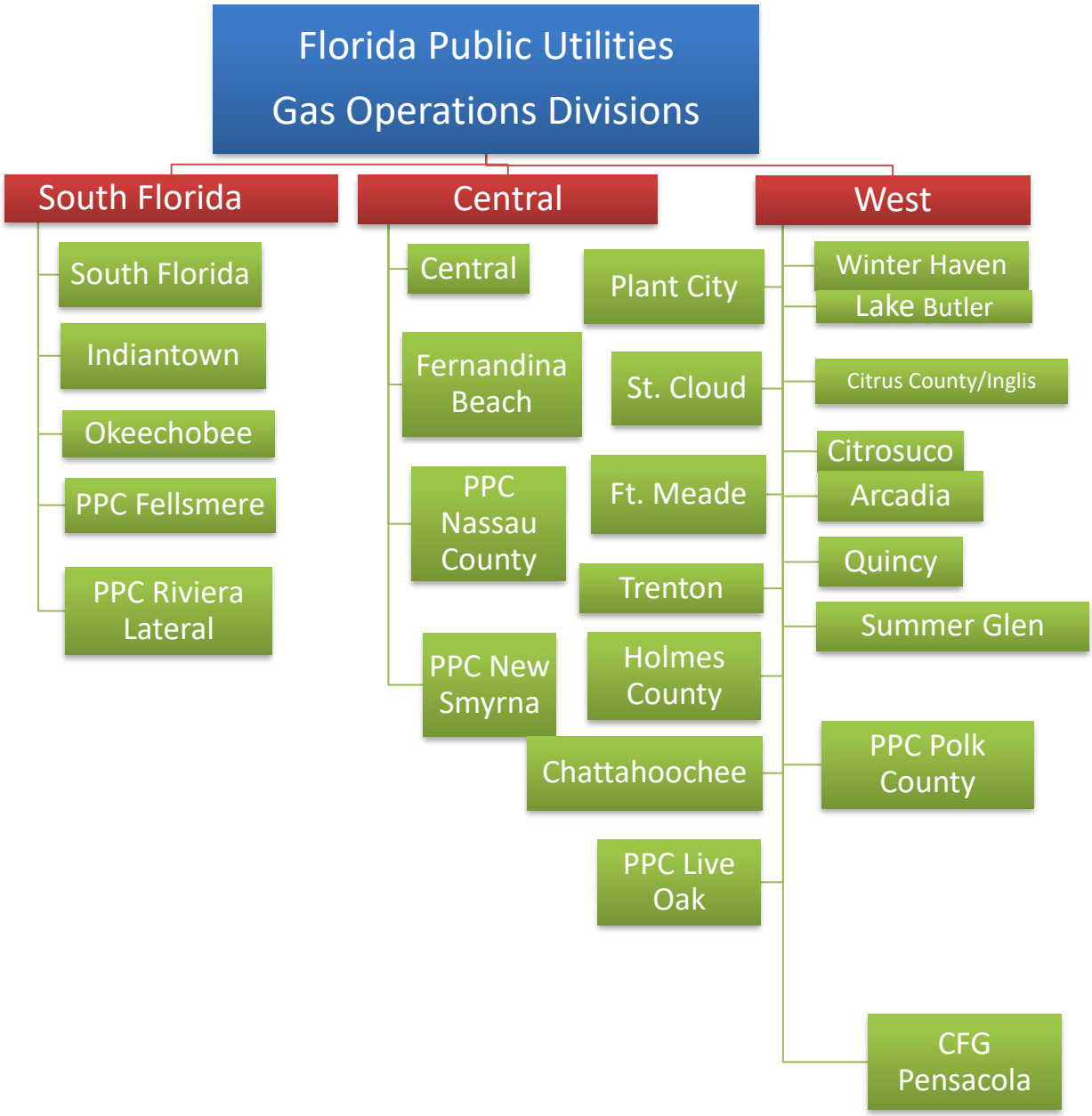
South Florida Division includes South Florida Division distribution systems, Indiantown, Okeechobee, Peninsula Pipeline Fellsmere, and Peninsula Pipeline Riviera Beach Lateral.

Central Division includes Central Division distribution systems, Fernandina Beach, and Peninsula Pipeline's Nassau County.

West Division includes West Division distribution systems, Lake Butler, Ft. Meade, Citrus County, Trenton, Holmes County, Arcadia, Chattahoochee, Quincy, Live Oak, Summer Glen and Polk County.

The service territory and organizational chart is depicted below




Florida Public Utilities
Gas Operations Divisions
South Florida
Central
West
South Florida
Indiantown
Okeechobee
PPC Fellsmere
PPC Riviera Lateral
Central
Fernandina Beach
PPC Nassau County
PPC New Smyrna
Plant City
St. Cloud
Ft. Meade
Trenton
Holmes County
Chattahoochee
PPC Live Oak
Winter Haven
Lake Butler
Citrus County/Inglis
Citrosuco
Arcadia
Quincy
Summer Glen
PPC Polk County
CFG Pensacola

2.0 SCOPE

The U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration (PHMSA) amended the Federal Pipeline Safety Regulations on December 4, 2009 to require operators of gas distribution pipelines to develop and implement an integrity management (IM) program that includes a written integrity management plan. This plan was to be implemented by August 2, 2011.

PHMSA also requires operators to re-evaluate their entire plan at least every five years, taking into account the results of performance monitoring. This plan update includes the program re-evaluation.

The IM approach was designed to promote continuous improvement in pipeline safety by requiring operators to identify and invest in risk control measures beyond previously established regulatory requirements.

This written IM Plan addresses the IM Rule which requires operators to develop and implement an IM program that addresses the following elements:

- Knowledge
- Identify Threats
- Evaluate and Rank Risks
- Identify and Implement Measures to Address Risks
- Measure Performance, Monitor Results, and Evaluate Effectiveness
- Periodic Evaluation and Improvement
- Report results

Because of the significant diversity among distribution pipeline operators and pipelines, the requirements in the IM Rule are high-level and performance-based. The IM Rule specifies the required program elements but does not prescribe specific methods of implementation.

3.0 PURPOSE AND OBJECTIVES

The purpose of the IM program is to enhance safety by identifying and reducing gas distribution integrity risks. Managing the integrity and reliability of the gas distribution pipeline has always been a primary goal for Florida Public Utilities; with design, construction, operations and maintenance activities performed in compliance with CFR Part 192 requirements. The objective of this IM Plan is to establish the requirements to comply with the Code of Federal Regulations (CFR 49) §§ 192.1005, 192.1007, 192.1009 and 192.1011, pertaining to integrity management for gas distribution pipelines. This IM Plan does not address how an operator may deviate from the required periodic inspections as provided for in §192.1013.

The IM Plan is comprised of seven elements depicted in Figure 3-1.

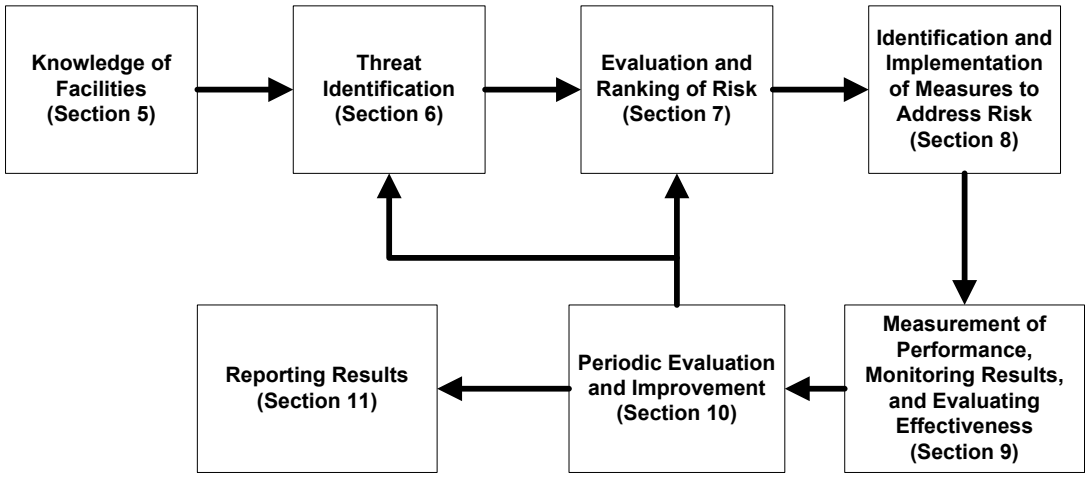


Figure 3-1 DIMP Elements

In addition to the key elements shown in Figure 3-1, the IM Plan also establishes requirements for reporting of mechanical coupling failures (Section 11.1) and maintaining records (Section 12).

All elements of this IM Plan where implemented by **August 2, 2011.**

4.0 DEFINITIONS

The definitions provided in 49 CFR, §192.3 and §192.1001 shall apply to this IM Plan. The following additional definitions and acronyms shall also apply to this IM Plan.

DIMP: Distribution Integrity Management Program

Distribution Integrity Management Program Files: operator records, databases, and/or files that contain either material incorporated by reference in the Appendices of the IM Plan or outdated material that was once contained in the IM Plan Appendices but is being retained in order to comply with record keeping requirements.

EFV: Excess Flow Valve. An Excess Flow Valve is a safety device that is designed to shut off flow of natural gas automatically if the service line breaks.

FOF: Frequency of failure.

COF: Consequence of failure.

IM Rule: 49 CFR Part 192, Subpart P

PHMSA: The U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration.

Risk: A relative measure of the likelihood of a failure associated with a threat and the potential consequences of such a failure.

Ticket: A notification from the one-call notification center to the operator providing information of pending excavation activity for which the operator is to locate and mark its facilities.

5.0 KNOWLEDGE OF FACILITIES

The objective of this section is to assemble as complete of an understanding of the company's infrastructure as possible using reasonably available information from past and ongoing design, operations and maintenance activities. In addition, this plan will identify what additional information is needed and provide a plan for gaining that information over time through normal activities.

5.1 Type and Location of Records

A summary of the existing records that are utilized by the IM Plan and where they are located is documented in Appendix A, Section 1. These records include, but are not limited to, incident and leak history, corrosion control records, continuing surveillance records, patrolling records, maintenance history and excavation damage experience.

5.2 Overview of Past Design, Operations and Maintenance

Record reviews, interviews with SMEs and other means were used to gain an understanding of past design, operations and maintenance history of the distribution system. This information includes operating pressures, materials used in construction and construction practices. This information is documented, or included by reference, in Appendix A, Section 2.

5.3 Characteristics of Design, Operations and Environmental Factors

Characteristics of the pipeline's design, operations and environmental factors that are necessary to assess the applicable threats and risks are documented, or included by reference, in Appendix A, Section 3.

5.4 Additional Information Needed

Additional information needed to support the IM plan (information that is not reasonably available today) is identified in Appendix A, Section 4. Plans for gaining additional information over time through normal activities conducted on the pipeline are documented, or included by reference, in Appendix A, Section 4.

5.5 Data Capture for New Construction and Ongoing O&M

Data is continuously collected for both construction of new facilities, reconstruction of existing facilities and ongoing operations and maintenance. In particular, the standard or procedure that require data capture for the location where the new pipeline is installed and the material of which it is constructed is contained in FPU Operations and Maintenance Manual Section 16.0.1.

5.6 Knowledge Capture – Subject Matter Experts

In addition to maps, records, and databases, valuable information for this IM plan was gathered and captured from SMEs. SMEs are individuals who have specialized knowledge based on their experience or training. SMEs were used to supplement existing, incomplete, or missing records and were the best source of information in subjects such as historical operations, maintenance, and construction practices. SME interviews were also utilized to ensure that all threats have been identified.

New SME interviews were conducted for this 5 year plan update and are documented and stored in the Distribution Integrity Management Program files.

A form documenting SME interviews is presented in Appendix A, Section 5.

6.0 THREAT IDENTIFICATION

The objective of this section of the plan is to identify existing and potential threats to the gas distribution pipeline.

For this plan update mains and services were separated in order to provide a more precise sense of where the highest risks are. Based on plan performance monitoring this separation can be particularly helpful in threat areas such as corrosion and excavation damages. In the previous DIMP plan mains & services were grouped together.

The following categories of threats shall be considered for each gas distribution pipeline:

- Corrosion
- Natural Forces
- Excavation Damage
- Other Outside Force
- Material, Weld or Joint Failure
- Equipment Failure
- Incorrect Operation
- Other concerns that could threaten the integrity of the pipeline.

A review of information gathered for Section 5 and interviews with Subject Matter Experts were used to identify existing and potential threats to the distribution system. **A description of the process used to identify threats is referenced in Appendix B, Section 1**. The threats identified as applicable to the gas distribution pipeline are documented in Appendix B, Section 2. Prior versions of the threat identification process and results that are no longer current shall be retained and stored in the Distribution Integrity Management Program files.

7.0 EVALUATION AND RANKING OF RISK

7.1 Objective

Risk analysis is an ongoing process of understanding what factors affect the risk posed by threats to the gas distribution pipeline and where they are relatively more important than others. The primary objectives of the evaluation and ranking of gas distribution pipeline risk are:

- Consider each applicable current and potential threat
- Consider the likelihood of failure associated with each threat
- Consider the potential consequences of such a failure
- Estimate and rank the risks (i.e. determine the relative importance) posed to the pipeline
- Consider the relevance of threats in one location to other areas

NOTE: There were several potential threats identified for the distribution system, but no previous incidents of these threats have occurred. Because there have been no previous incidents of these potential threats, their frequency is zero, thus resulting in a risk calculation of zero. However, some of these potential threats appear in the risk ranking tables with a risk ranking of zero as we are cognizant that they are a potential threat.

7.2 Risk Assessment Process

The current process used for Risk Assessment **(Blended Risk (Subject Matter Expert & data) Evaluation and Ranking Process)** shall be documented, or included by reference, in Appendix C, Section 1. Prior risk assessment processes shall be retained and stored in the Distribution Integrity Management Program files.

7.3 Risk Assessment

The current risk assessment **(likelihood, consequence, and resultant risk ranking)** shall be documented, or included by reference, in Appendix C, Section 2. Prior risk assessment results shall be retained and stored in the Distribution Integrity Management Program files.

RISK = Consequence (COF) x Likelihood (FOF)

8.0 IDENTIFICATION AND IMPLEMENTATION OF MEASURES TO ADDRESS RISKS

The objective of this section of the IM Plan is to describe existing and proposed measures to address the risks that have been evaluated and prioritized in Section 7.

8.1 Leak Management Program

The Leak Management program is established in the Florida Public Utilities Procedure Manual in the section entitled “Leak Control”.

8.1.1 Description of Existing Program

Florida Public Utilities Leak Management Program contains all the essential elements for an effective program. Procedures are in place to 1) Locate the leak, 2) Evaluate its severity, 3) Act appropriately to mitigate the leak, 4) Keep records; and 5) Self assess to determine if additional actions are necessary.

Florida Public Utilities Operations and Maintenance Manual and Emergency Manual address necessary components of effective leak control including, prompt and effective response to gas odor calls, classification of gas leaks, performing leakage surveys at prescribed regulatory intervals and system patrols.

Leaks are repaired in compliance with the prescribed time frames of Chapter 25-12.040 of the Florida Administrative Code.

A summary of the key elements of the Leak Management Program are documented, or included by reference, in Appendix D, Section 1.

8.2 Other Additional or Accelerated Actions

At this time no accelerated actions beyond the minimum code requirements specified outside of Part 192 subpart P are planned. However, one significant additional action is currently in place. Our initial risk ranking in the original DIMP plan identified corrosion on bare steel facilities as our highest system risk. This risk ranking contributed to the company seeking and subsequently being granted approval by the Florida Public Service Commission for a ten year bare steel

replacement program. This replacement program is referred to as our Gas Reliability Infrastructure Program (GRIP) and will be discussed further in this plan.

In the event accelerated actions more additional actions are planned in the future, procedures to implement these will be identified.

8.2.1 Corrosion

Corrosion on bare steel mains is no longer the highest ranking system risk, primarily due to FPUC's bare steel replacement plan. It is now the third highest ranking system risk. As of 2021, three hundred and thirty seven (337) miles of a total of three hundred fifty (350) miles of bare steel mains have been replaced. As this replacement program continues, this risk will continue to steadily decline and eventually go away as no bare steel facilities will remain in the system.

Atmospheric corrosion leaks on services is now the highest ranking system risk in FPU's gas distribution system (Ref. Appendix C. Section 2. Table 7-22: Summary of Risk Evaluation and Ranking Results). This is reflected in the number of leaks and the risk rankings. These atmospheric corrosion leaks on polyethylene services was due to the practice of cold wrapping anodeless risers for installation, and this practice was only used in the South Florida Division. This practice has been discontinued, and risers are being replaced as leaks are discovered. Additional or Accelerated Actions that are currently scheduled or in place in order to reduce the risks associated with corrosion are documented, or included by reference, in Appendix D, Section 3. Prior documentation shall be retained and stored in the Distribution Integrity Management Program files.

Corrosion on bare steel services is the second highest ranking system risk. As of 2021, there are two thousand three hundred and twenty eight (2,328) bare steel services remaining, these bare steel services are being replaced as part of FPUC's bare steel replacement plan. As this replacement program continues, this risk will continue to steadily decline and eventually go away as no bare steel services will remain in the system.

8.2.2 Natural Forces

Leaks in FPU's gas distribution system due to the threat of natural forces are minimal and risk rankings are so low that they are negligible (Ref. Appendix A. Section 3. Table 5-8). In the whole FPUC gas system, natural forces on mains & services accounted for less than 1% of hazardous leaks in 2020 and less than 1% of total leaks for the five year period of 2016 through 2020.

Because the number of leaks from natural forces is low, and risks rankings from this threat were minimal, no Additional or Accelerated Actions are scheduled. Prior documentation shall be retained and stored in the Distribution Integrity Management Program files.

8.2.3 Excavation Damage

Excavation Damage on services is the leading cause of leaks in FPU's gas distribution system (Ref. Appendix A. Section 3. Table 5-8). This is reflected in the number of leaks and the risk rankings. In FPU's South Division, excavation damages on services accounted for 37% of the total leaks in 2020 and 40% of the total service leaks for the five year period from 2016 through 2020. In FPU's Central Division excavation damages on services accounted for 44% of the total leaks in 2020 and 37% of the total service leaks for the five year period from 2016 through 2020. In FPU's West Division, excavation damages on services accounted for 22 % of the total leaks in 2020 and 17% of the total service leaks for the five year period from 2016 through 2020.

It is important to note that while excavation leaks on services represent the largest number of leaks in FPU's distribution system, it does not represent the highest risk to the distribution system based on the risk module formula.

Additional or Accelerated Actions that are currently scheduled or in place in order to reduce the risks associated with excavation damage are documented, or included by reference, in Appendix D, Section 5. Prior documentation shall be retained and stored in the Distribution Integrity Management Program files.

8.2.4 Other Outside Force

Leaks in FPU's gas distribution system due to the threat of other outside forces are minimal and risk rankings are so low that they are negligible. (Ref. Appendix A. Section 3. Table 5-8). In the

whole FPUC gas system, other outside forces on mains & services accounted for less than 2% of hazardous leaks in 2020 and less than 2% of total leaks for the five year period of 2016 through 2020.

Because the number of leaks from natural forces is low, and risks rankings from this threat were minimal, no Additional or Accelerated Actions are scheduled. Prior documentation shall be retained and stored in the Distribution Integrity Management Program files.

8.2.5 Material, Weld or Joint Failure

Leaks in FPU's gas distribution system due to the threat of material, weld or joint failure are minor and risk rankings are also low (Ref. Appendix A. Section 3. Table 5-8). As a whole, Material, Weld or Joint Failure accounts for 2% of the total leaks in 2020, & less than 2% of total leaks for the five year period of 2016 through 2020.

The number of leaks and risk rankings are low for the threat of material, weld, or joint failure; however, additional actions are scheduled in an effort to identify where certain materials are in the gas distribution system in order to gain a better understanding of the risks associated with material, weld or joint failure. These actions are documented, or included by reference, in Appendix D, Section 7. Prior documentation shall be retained and stored in the Distribution Integrity Management Program files.

8.2.6 Equipment Failure

Equipment failure leaks on services is the second leading cause of leaks in FPU's gas distribution system. In FPU's South Division, equipment failure on services accounted for 25% of leaks in 2020 and 20% of total leaks for the five year period of 2016 through 2020. In FPU's Central Division equipment failure accounted for 27% of the total leaks in 2020 and 25% of the total leaks for the five year period of 2016 through 2020. In FPU's West Division equipment failure accounted for 54% of the total leaks for 2020 and 30% of the total leaks for the five year period of 2016 through 2020.

Equipment failure is significantly higher in the South Division, service regulators continue to be a source, were venting due to sand or debris in the distribution system, and not from a defective service regulator. Virtually all of those were due to service regulators venting.

Additional or Accelerated Actions that are currently scheduled or in place in order to reduce the risks associated with equipment failure are documented, or included by reference, in Appendix D, Section 8. Prior documentation shall be retained and stored in the Distribution Integrity Management Program files.

8.2.7 Incorrect Operation

Leaks in FPU's gas distribution system due to the threat of incorrect operation tended to be higher among services than compared to mains. In FPU's South Division, incorrect operation on services accounted for 5% of leaks in 2020 and 2% of total leaks for the five year period of 2016 through 2020. In FPU's Central Division incorrect operation accounted for 0% of the total leaks in 2020 and 0.1% of the total leaks for the five year period of 2016 through 2020. In FPU's West Division incorrect operation accounted for 11% of the total leaks for 2020 and 4% of the total leaks for the five year period of 2016 through 2020.

Incorrect operation is significantly higher in the West and South Divisions.

Additional or Accelerated Actions that are currently scheduled or in place in order to reduce the risks associated with incorrect operation are documented, or included by reference, in Appendix D, Section 8. Prior documentation shall be retained and stored in the Distribution Integrity Management Program files.

8.2.8 Other

Leaks in FPU's gas distribution system due to Other causes, have significantly reduced compared to the last DIMP review. In the 2011 – 2015 DIMP plan, Other, accounted for 4% of total hazardous leaks, compared to the 2016-2015 DIMP plan were Other accounts for less then 1% of the total hazardous leaks.

The primary reason for this was training employees on the classification of leak causes on the leak investigations and classifying the leak in a more appropriate cause than *Other*.

Additional or Accelerated Actions that are currently scheduled or in place in order to reduce the risks associated with other causes are documented, or included by reference, in Appendix D,

Section 10. Prior documentation shall be retained and stored in the Distribution Integrity Management Program files.

9.0 MEASUREMENT OF PERFORMANCE, MONITORING RESULTS, AND EVALUATING EFFECTIVENESS

The objective of this section of the plan is to establish performance measures that shall be monitored from an established baseline in order to evaluate the effectiveness of the IM program. The performance measures detailed in Sections 9.1 through 9.5 have been established in order to monitor performance and assist in the ongoing evaluation of threats.

9.1 Number of Hazardous Leaks either Eliminated or Repaired, per §192.703(c), Categorized by Cause

The baseline and ongoing performance of the number of hazardous leaks either eliminated or repaired, per §192.703(c), categorized by cause, shall be documented, or included by reference, in Appendix E, Section 1.

9.2 Number of Excavation Damages

The baseline and ongoing performance of the number of excavation damages shall be documented, or included by reference, in Appendix E, Section 2.

9.3 Number of Excavation Tickets (received from the Sunshine State One Call of Florida notification center)

The baseline and ongoing performance of the number of excavation tickets received from the notification center(s) shall be documented, or included by reference, in Appendix E, Section 3.

9.4 Total Number of Leaks either Eliminated or Repaired, Categorized by Cause

The baseline and ongoing performance of the total number of leaks either eliminated or repaired, categorized by cause, shall be documented, or included by reference, in Appendix E, Section 4.

9.5 Number of Hazardous Leaks Either Eliminated or Repaired, per §192.703(c), Categorized by Material

The baseline and ongoing performance of the number of hazardous leaks either eliminated or repaired, per §192.703(c), categorized by material, shall be documented, or included by reference, in Appendix E, Section 5.

10.0 PERIODIC EVALUATION AND IMPROVEMENT

The objective of this section of the plan is to periodically re-evaluate threats and risks on the entire pipeline and periodically evaluate the effectiveness of its program.

10.1 Plan Updating, Review Frequency and Documentation

This written integrity management plan shall be reviewed annually and updated as required to reflect changes and improvements that have occurred in process, procedures and analysis for each element of the program. A complete program re-evaluation shall be completed every five years. All changes to the written plan, inclusive of material from the appendices, shall be recorded on the Revision Control Sheet on page ii. However, changes to material in the appendices that is included by reference need not be recorded on the Revision Control Sheet.

10.2 Effectiveness Review

An assessment of the performance measures described in Sections 9.1 through 9.6 shall be performed. In cases where the re-evaluation criteria specified is met or exceeded, a re-evaluation of the associated threats and risks shall be completed. An emerging threat in one or more location shall be evaluated for relevance to other areas. The re-evaluation of threats and risks shall be documented in Appendix F and the results of the re-evaluation shall be documented in Appendices B and C. The review shall also establish whether a complete program re-evaluation shall be completed in a shorter timeframe than five years; this decision shall also be documented. Past effectiveness reviews that are no longer current shall be retained and stored in the Distribution Integrity Management Program files.

11.0 REPORTING RESULTS

11.1 State & Federal Annual Reporting Requirements

The following four measures shall be reported, annually by March 15, to PHMSA as part of the annual report required by 49 CFR, § 191.11:

- Number of hazardous leaks either eliminated or repaired (or total number of leaks if all leaks are repaired when found), per § 192.703(c), categorized by cause
- Number of excavation damages

- Number of excavation tickets (receipt of information by the underground facility operator(Florida Public Utilities) from the Sunshine State One Call of Florida notification center)

- Total number of leaks either eliminated or repaired, categorized by cause

- Information related to failure of mechanical couplings, excluding those that result only in nonhazardous leaks, shall be reported to PHMSA as part of the annual report required by §191.11 beginning with the report submitted March 15, 2011. This information must include, as available, location of the failure in the pipeline, nominal pipe size, material type, nature of failure including any contribution of local pipeline environment, coupling manufacturer, lot number and date of manufacture, and other information that can be found in markings on the failed coupling.

The State of Florida also exercises jurisdiction over the pipeline; therefore, these five measures shall also be reported to the Florida Public Service Commission. A copy of the reports shall be maintained in the Distribution Integrity Management Program files.

12.0 DOCUMENT AND RECORD RETENTION

The following records shall be retained in the Distribution Integrity Management Program files.

- The most current as well as prior versions of this written IM Plan
- Documents supporting Knowledge of Facilities (material supporting Appendix A of the IM Plan)
- Documents supporting threat identification (material supporting Appendix B of the IM Plan)
- Documents supporting risk evaluation and ranking (material supporting Appendix C of the IM Plan)
- Documents supporting the identification and implementation of measures to address risks (material supporting Appendix D of the IM Plan)
- Documents supporting measurement of performance, monitoring results and evaluating effectiveness (material supporting Appendix E of the IM Plan)
- Effectiveness Reviews (material supporting Appendix F of the IM Plan)
- Annual Reports to PHMSA (as required by §191.11) and State pipeline safety authorities
- Mechanical Coupling Failure Reports

Documentation demonstrating compliance with the requirements of 49 CFR, Part 192, Subpart P shall be retained for at least 10 years.

APPENDIX A
KNOWLEDGE OF FACILITIES

Appendix A. Section 1. Table 5-1: IM Program Records Summary

Record	Record Type – Database, Electronic Record, Paper Record	Applicable Standard, Policy, or Guideline	Extent of Missing Records	Location of Records	Key Contact
Graphic Information System (GIS) database	Database		Largely Unpopulated	FPU Server	GIS Administrator
Wall Maps / Plats	Paper Record		Fairly Complete	Division Offices	Division Operations Supervisors
Gas Service Record Cards	Paper Record		Fairly Complete	Division Offices	Division Operations Supervisors
As-Built Construction Drawings / records	Electronic Record, Paper Record		Much data is missing	Division Offices	Division Engineering Departments
Gas Leak Repair Records	Paper Record / Electronic		Fairly Complete	Division Offices / FPU servers.	Division Operations Supervisors / GIS Administrator
Gas Leak Repair Database	NA		NA	NA	NA
Gas Leak Survey Records	Paper Record		Fairly Complete	Division Offices	Division Operations Supervisors
DOT/PHMSA Incident Reports	Paper Records		Fairly Complete	Division Offices	Division Operations Manager
Other Incident Reports	Paper Records		Fairly Complete	Division Offices	Division Operations Manager

Appendix A. Section 1. Table 5-1: IM Program Records Summary (continued)

Record	Record Type – Database, Electronic Record, Paper Record	Applicable Standard, Policy, or Guideline	Extent of Missing Records	Location of Records	Key Contact
CP Maintenance of Isolated Mains and Services subject to 10% annual inspection	Paper Record		Fairly Complete	Division Offices	Division Operations Supervisors
Cathodic Protection Maintenance Areas (Rectifier and Pipe-to-Soil inspection)	Paper Records		Fairly Complete	Division Offices	Division Operations Supervisors
Atmospheric Corrosion Inspection Records	Paper Record		Fairly Complete	Division Offices	Division Operations Supervisors
Patrol Records	Paper Record		Fairly Complete	Division Offices	Division Operations Supervisors
Valve Maintenance Records	Paper Record		Fairly Complete	Division Offices	Division Operations Supervisors
Regulator Station Maintenance Records	Paper Record		Fairly Complete	Division Offices	Division Operations Supervisors
Requests to Locate Gas Facilities	Electronic Record		Fairly Complete	Division Offices	Division Operations Supervisors
3rd Party Damage Claims	Paper Record		Fairly Complete	Division Offices	Division Operations Supervisors
Pipe Type Maps	Paper Record		South and Central Divisions only, marginal information	Division Offices	Division Operations Supervisors
Exposed Main & Services Reports	Paper Record		Much Data Missing	Division Offices	Division Operations Supervisors

Appendix A. Section 1. Table 5-1: IM Program Records Summary (continued)

Record	Record Type – Database, Electronic Record, Paper Record	Applicable Standard, Policy, or Guideline	Extent of Missing Records	Location of Records	Key Contact
Environmental Factor: Areas subject to flood	NA		NA	NA	NA
Environmental Factor: Areas subject to landslide	NA		NA	NA	NA
Environmental Factor: Population Density Records	NA		NA	NA	NA
Environmental Factor: Areas of Wall-to-Wall Paving	NA		NA	NA	NA
SME Interview Records	Paper Record		Complete	DIMP Master File	Gas standards Engineer.

Appendix A. Section 2. Table 5-2: Summary of System Design by Operating Pressure

Maximum Operating Pressure	Miles of Main
Intermediate Pressure – 2 psig to 60 psig	Unknown
High Pressure – greater than 60 psig	Unknown

Appendix A. Section 2. Table 5-3: Summary of Material Types and Years Installed (all divisions)

Material Type	Mains		Services	
	Current Miles of Main	Years Installed (of remaining)	Number of Services	Years Installed (of remaining)
Cast Iron	0	0	0	0
Wrought Iron	0	0	0	0
Bare Steel – with CP	0	0	0	0
Bare Steel – No CP	20	Unknown	1762	Unknown
Coated Steel – with CP	1089	Unknown	11,280	Unknown
Coated Steel – no CP	0	0	0	0
Ductile Iron	0	0	0	0
Copper	0	0	0	0
Plastic - PVC	0	0	0	0
Plastic - ABS	0	0	0	0
Plastic – Century MDPE 2306	0	0	0	0
Plastic – Aldyl-A	Unknown	Unknown	Unknown	Unknown
Plastic – HDPE 3306	0	0	0	0
Plastic – All Others	2,036	~1980 Thru Present	92,363	~1980 Thru Present

Appendix A. Section 2. Table 5-4: Example Summary of Construction Practices

Material Type	Year first deployed	Year Ceased
Replacement via insertion of Copper	NA	NA
Replacement via Insertion of Plastic	~1976	Practice Continues
Replacement via insertion and pipe bursting/splitting	NA	NA
Internal lining / slip-lining	NA	NA
Joint Trench with other utilities	Not Used (West) ~1965 (South) ~1985 (Central)	Practice Continues in Central and South Divisions
Unguided Bore – soil displacement/ram	~1985	Practice Continues
Guided Directional Bore / Drill	~1990	Practice Continues
Blasting	NA	NA
Plow-in	NA	NA

Appendix A. Section 3. Table 5-5: Miles of Mains and Number of Services by Material Type

[Part B1 of PHMSA Form F 7100.1-1 incorporated by reference (all divisions)]

Appendix A. Section 3. Table 5-6: Miles of Mains and Number of Service lines by material and nominal diameter

[Part B2 & B3 of PHMSA Form F 7100.1-1 incorporated by reference (all divisions)]

Appendix A. Section 3. Table 5-7: Miles of Mains and Number of Services by material and decade

[Part B4 of PHMSA Form F 7100.1-1 incorporated by reference (all divisions)]

Appendix A. Section 3. Table 5-8: Number of hazardous leaks either eliminated or repaired, per §192.703(c), categorized by cause (all divisions)

Cause of Leak	Number of Hazardous Leaks – 2021	
	MAINS	SERVICES
Corrosion	4	79
Natural Forces	2	2
Excavation	108	310
Other Outside Force	1	18
Material, Weld or Joint Failure	2	7
Equipment Failure	1	83
Incorrect Operation	0	7
Other	1	2

Appendix A. Section 3. Table 5-9: Number of Excavation Damages (all divisions)

Year	Number of Excavation Damages	
	MAINS	SERVICES
2021	111	319
2020	101	315
2019	99	293
2018	87	280
2017	87	287

Appendix A. Section 3. Table 5-10: Number of Excavation Tickets (all divisions)

Year	Number of Excavation Tickets
2021	178,488
2020	147,503
2019	142,549
2018	144,684
2017	129,806

Appendix A. Section 3. Table 5-11: Number of leaks either eliminated or repaired, categorized by cause (all divisions)

Cause of Leak	Number of leaks eliminated or repaired– 2021	
	MAINS	SERVICES
Corrosion	8	273
Natural Forces	2	2
Excavation	111	319
Other Outside Force	2	21
Material, Weld or Joint Failure	5	15
Equipment Failure	3	259
Incorrect Operation	2	35
Other	1	14

Appendix A. Section 3. Table 5-20: Corrosion Threat – Frequency and Trend (South Florida Division)

Threat / Sub-Threat	2021						
	Quantity		Leaks Repaired		Frequency of Failure		
	Miles Main	# Services	Mains	Services	Main Leaks/Mile	Service Leaks/100	Total Leaks / Facility Mile (mains & svcs)
Corrosion							
Cast Iron	0	0	0	0	0	0	0
Bare Steel	20	1,762	3	2	0.1498	0.1135	0.00866
Ductile Iron	0	0	0	0	0	0	0
Copper	0	0	0	0	0	0	0
Coated Steel (with CP)	501	5,650	1	7	0.0020	0.1239	0.013855
Coated Steel (No CP)	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0

Threat / Sub-Threat	Leak Ratio						Is Leak Frequency Increasing? Y/N
	2017	2018	2019	2020	2021	5-Year Average	
Corrosion (MAINS)							
Cast Iron	0	0	0	0	0	0	NA
Bare Steel		6	16	5	3		Y
Coated Steel (with CP)		5	4	2	1		N
Coated Steel (No CP)	0	0	0	0	0	0	NA
Other	0	0	0	0	0	0	NA
Corrosion (SERVICES)							
Bare Steel		7	17	14	2		N
Coated Steel (with CP)		38	22	32	7		N

Appendix A. Section 3. Table 5-21: Natural Forces Threat – Frequency and Trend (South Florida Division)

Threat / Sub-Threat	2021									
	Quantity			Leaks Repaired			Frequency of Failure			
	Miles Main	# Services	# of Units	Mains	Services	Units	Main Leaks/Mile	Service Leaks/100	Equip/ Fitting Leaks/ 100	Total Leaks / Facility Mile (mains & svcs)
Natural Forces										
Earth Movement / Landslide	1,440	51,683		0	0		0	0		0
Tree Roots	1,440	51,683		0	0		0	0		0
Frost Heave / Temperature	1,440	51,683		0	0		0	0		0
Flood	1,440	51,683		0	0		0	0		0
Ice/Snow Blockage of Control Equip			NA							
Other	1,440	51,683		0	0		0	0		0

Threat / Sub-Threat	Leak Ratio						Is Leak Frequency Increasing? Y/N
	2017	2018	2019	2020	2021	5-Year Average	
Natural Forces (MAINS)							
Seismic	NA	NA	NA	NA	NA	NA	NA
Earth Movement / Landslide	0	0	0	1	0	0.2	Y
Tree Roots	1	0	0	1	0	0.4	Y

Frost Heave / Temperature	NA	NA	NA	NA	NA	NA	NA
Flood	0	0	0	0	0	0	N
Ice/Snow Blockage of Control Equip	NA	NA	NA	NA	NA	NA	NA
Other	2	0	0	0	0	0.4	N
Natural Forces (SERVICES)							
Tree Roots	5	1	0	0	0	1.2	N
Other	3	1	3	1	0	1.6	N

Appendix A. Section 3. Table 5-22: Excavation Damage Threat – Frequency and Trend (South Florida Division)

Threat / Sub-Threat	2021							
	Quantity			Leaks Repaired			Frequency of Failure	
	System Miles Main	System Number of Services	System Number of Tickets	Number of Main Repairs	Number of Service Repairs	Total System Repairs	Leaks per 1000 Tickets	Leaks per System Mile
Excavation Damage - All	1,440	51,683	90,054	67	206	273	3.0315	0.1279

Threat / Sub-Threat	Leak Ratio						Is Leak Frequency Increasing? Y/N
	2017	2018	2019	2020	2021	5-Year Average	
Excavation Damage							
Tickets	63643	65712	65020	71196	90054	71125	y
Leaks (mains)	48	57	60	60	67	58.4	y
Leaks (services)	193	193	196	197	206	197	y
Leaks per 1000Tickets	3.7867	3.8045	3.9373	3.6098	3.0315	3.63396	n
Leaks per System Mile	0.1281	0.1311	0.1313	0.1274	0.1279	0.12916	n

Appendix A. Section 3. Table 5-23: Outside Force Threat – Frequency and Trend (South Florida Division)

Threat / Sub-Threat	2021									
	Quantity			Leaks Repaired			Frequency of Failure			
	Miles Main	# Services	# of Units	Mains	Services	Units	Main Leaks/Mile	Service Leaks/100	Equip/ Fitting Leaks/100	Total Leaks / Facility Mile (mains & svcs)
Outside Force										
Vehicle Damage	1,440	51,683	0	0	0		0	0	NA	0
Vandalism	1,440	51,683	0	0	0		0	0	NA	0
Fire / Explosion	1,440	51,683	0	0	0		0	0	NA	0
Previous Damage	1,440	51,683	0	0	0		0	0	NA	0
Other	1,440	51,683	0	1	15		0.000694	0.029023	NA	0.007499

Threat / Sub-Threat	Leak Ratio						Is Leak Frequency Increasing? Y/N
	2017	2018	2019	2020	2021	5-Year Average	
Outside Force (MAINS)							
Vehicle Damage	0	0	0	0	0	0	N
Vandalism	0	0	0	0	0	0	N
Fire / Explosion	2	0	0	0	0	0.4	N
Previous Damage	0	0	0	0	0	0	N

Other	2	0	0	1	1	0.8	Y
Outside Force (SERVICES)							
Vehicle Damage	6	1	6	8	0	4.2	Y
Vandalism	0	1	0	2	0	0.6	Y
Other	8	9	1	7	15	8.0	N

Appendix A. Section 3. Table 5-24: Material, Weld or Joint Failure Threat – Frequency and Trend (South Florida Division)

Threat / Sub-Threat	2021						
	Quantity		Leaks Repaired			Frequency of Failure	
	Miles Main	# Services	Mains	Services	Main Leaks/Mile	Service Leaks/100	Total Leaks / Facility Mile (mains & svcs)
Material, Weld or Joint Failure							
PVC	0	0	0	0	0	0	0
ABS	0	0	0	0	0	0	0
Aldyl A	Unk	Unk	Unk	Unk	Unknown	0	0
Century Products (incl PE 2306)	0	0	0	0	0	0	0
PE 3306	0	0	0	0	0	0	0
Other Plastic Pipe	0	0	0	0	0	0	0
Delrin Insert Tap Tees	Unk	Unk	Unk	Unk	Unk	Unk	Unk
Plexco Service Tee Celcon Caps	Unk	Unk	Unk	Unk	Unk	Unk	Unk
Pre 1940 OA girth welds	Unk	0	0	0	0	0	0
Other	1440	51683	1	9	0.000694	0.01741	0.004687

Appendix A. Section 3. Table 5-24: Material, Weld or Joint Failure Threat – Frequency and Trend (continued South Florida Division)

Threat / Sub-Threat	Leak Ratio						Is Leak Frequency Increasing? Y/N
	2017	2018	2019	2020	2021	5-Year Average	
Material, Weld or Joint Failure (MAINS)							
PVC	0	0	0	0	0	0	NA
ABS	0	0	0	0	0	0	NA
Aldyl A	Unk	Unk	Unk	Unk	Unk	Unk	Unk
Century Products (incl PE 2306)	0	0	0	0	0	0	NA
PE 3306	0	0	0	0	0	0	NA
Other Plastic Pipe	0	0	0	0	0	0	NA
Delrin Insert Tap Tees	Unk	Unk	Unk	Unk	Unk	Unk	Unk
Plexco Service Tee Celcon Caps	Unk	Unk	Unk	Unk	Unk	Unk	Unk
Pre 1940 OA girth welds	0	0	0	0	0	0	0
Other	1	1	2	4	1	1.8	Y
Material, Weld or Joint Failure (SERVICES)							
Aldyl A	0	0	4	0	0	0.8	N
Other	0	5	6	6	9	5.2	Y

Appendix A. Section 3. Table 5-25: Equipment Failure Threat – Frequency and Trend (South Florida Division)

Threat / Sub-Threat	2021									
	Quantity			Leaks Repaired			Frequency of Failure			
	Miles Main	# Services	# of Units	Mains	Services	Units	Main Leaks/Mile	Service Leaks/100	Equip/Fitting Leaks/100	Total Leaks / Facility Mile (mains & svcs)
Equipment Failure										
Valves	1,440	51,683	Unk	0	5	Unk	0	0.009674	NA	0.002344
Service Regulators	1,440	51,683	Unk	0	99	Unk	0	0.191552	NA	0.046402
Control/Relief Station	1,440	51,683	0	1	0	0	0.000694	0	NA	0.000469
Mechanical Couplings	1,440	51,683	Unk	1	3	Unk	0.000694	0.005805	NA	0.001875
Other	1,440	51,683	0	0	2	Unk	0	0.00387	NA	0.000937

Threat / Sub-Threat	Leak Ratio						Is Leak Frequency Increasing? Y/N
	2017	2018	2019	2020	2021	5-Year Average	
Equipment Failure (MAINS)							
Valves	1	2	2	1	0	1.2	N
Control/Relief Station	0	0	0	0	1	0.2	N
Mechanical Couplings	4	0	2	0	1	1.4	N
Other	0	0	0	0	0	0	N
Equipment Failure (SERVICES)							
Valves	3	0	7	12	5	5.4	Y
Service Regulators	87	59	73	110	99	85.6	Y
Mechanical Couplings	3	3	3	6	3	3.6	Y
Other	2	1	3	4	2	2.5	Y

Appendix A. Section 3. Table 5-26: Incorrect Operation Threat – Frequency and Trend (South Florida Division)

Threat / Sub-Threat	2021									
	Quantity			Incidents			Frequency of Failure			
	Miles Main	# Services	# of Units	Mains	Services	Units	Main Incidents/Mile	Service Incidents/100	Equip/Fitting Incidents/100	Total Incidents / Facility Mile (mains & svcs)
Incorrect Operation										
Operating Error	1,440	51,683		0	0		0	0	NA	0
Service Line bored thru Sewer	1,440	51,683		0	0		0	0	NA	0
Other	1,440	51,683		1	26		0.000694	0.050307	NA	0.01266

Threat / Sub-Threat	Leak Ratio						Is Leak Frequency Increasing? Y/N
	2017	2018	2019	2020	2021	5-Year Average	
Incorrect Operation (MAINS)							
Operating Error	0	0	0	0	0	0	N
Service Line bored thru Sewer	0	0	0	0	0	0	N
Other	5	2	2	2	1	2.4	N
Incorrect Operation (SERVICES)							
Other	4	6	11	12	26	11.8	Y

Appendix A. Section 3. Table 5-27: Other Threat – Frequency and Trend (South Florida Division)

Threat / Sub-Threat	2021								
	Quantity			Leaks Repaired		Frequency of Failure			
	Miles Main	Number Services	Number Copper Services	Mains	Services	Main Leaks/Mile	All Services Leaks / 100	Copper Services Only Leaks / 100	Total Leaks / Facility Mile (mains & svcs)
Other									
Bell Joint leaks	0	0	0	0	0	0	0	0	0
Copper Pipe Puncture	0	0	0	0	0	0	0	0	0
Other	1,440	51,683	0	0	0	0	0	0	0

Threat / Sub-Threat	Leak Ratio						Is Leak Frequency Increasing? Y/N
	2017	2018	2019	2020	2021	5-Year Average	
Other (MAINS)							
Bell Joint Leaks	Unk	Unk	Unk	Unk	Unk	Unk	Unk
Copper Pipe Puncture	NA	NA	NA	NA	NA	NA	NA
Other	0	0	0	1	0	0.2	N
Other (SERVICES)							
Other	6	1	2	1	0	2	N

Appendix A. Section 3. Table 5-28: Corrosion Threat – Frequency and Trend (West Division)

Threat / Sub-Threat	2021						
	Quantity		Leaks Repaired		Frequency of Failure		
	Miles Main	# Services	Mains	Services	Main Leaks/Mile	Service Leaks/100	Total Leaks / Facility Mile (mains & svcs)
Corrosion							
Cast Iron	0	0	0	0	0	0	0
Bare Steel	0	0	0	0	0	0	0
Ductile Iron	0	0	0	0	0	0	0
Copper	0	0	0	0	0	0	0
Coated Steel (with CP)	299.079	3,444	2	1	0.0067	0.02904	0.008711
Coated Steel (No CP)	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0

Threat / Sub-Threat	Leak Ratio						Is Leak Frequency Increasing? Y/N
	2017	2018	2019	2020	2021	5-Year Average	
Corrosion (mains)							
Cast Iron	0	0	0	0	0	0	NA
Bare Steel	18	3	1	3	3	5.6	N
Ductile Iron	0	0	0	0	0	0	NA
Copper	0	0	0	0	0	0	NA
Coated Steel (with CP)	0	2	0	5	2	0.7	Y
Coated Steel (No CP)	0	0	0	0	0	0	NA
Other	0	0	0	0	0	0	NA
Corrosion (services)							
Bare Steel	6	3	0	4	0	2.6	N
Coated Steel (with CP)	11	10	2	1	1	5	N

Appendix A. Section 3. Table 5-29: Natural Forces Threat – Frequency and Trend (West Division)

Threat / Sub-Threat	2021									
	Quantity			Leaks Repaired			Frequency of Failure			
	Miles Main	# Services	# of Units	Mains	Services	Units	Main Leaks/Mile	Service Leaks/100	Equip/Fitting Leaks/100	Total Leaks / Facility Mile (mains & svcs)
Natural Forces										
Tree Roots	960	25,870		0	0		0	0		0
Flood	NA	NA		0	0		0	0		0
Other	960	25,870		2	2		0	0.007731		0.003036

Threat / Sub-Threat	Leak Ratio						Is Leak Frequency Increasing? Y/N
	2017	2018	2019	2020	2021	5-Year Average	
Natural Forces (MAINS)							
Tree Roots	2	0	0	0	0	0.4	N
Flood	0	0	0	0	0	0	N
Other	0	0	0	0	2	0.4	N
Natural Forces (SERVICES)							
Other	1	3	2	1	2	1.8	N

Appendix A. Section 3. Table 5-30: Excavation Damage Threat – Frequency and Trend (West Division)

Threat / Sub-Threat	2021							
	Quantity			Leaks Repaired			Frequency of Failure	
	System Miles Main	System Number of Services	System Number of Tickets	# of Main repairs	# of Services repairs	Total System repairs	Leaks per 1000 Tickets	Leaks per System Mile
Excavation Damage - All	960	25,870	46770	25	42	67	1.4325	0.0509

Threat / Sub-Threat	Leak Ratio						Is Leak Frequency Increasing? Y/N
	2017	2018	2019	2020	2021	5-Year Average	
Excavation Damage							
Tickets	33,222	39,643	40,311	39,094	46,770	39,808	Y
Leaks (MAIN)	22	15	23	21	25	21.2	Y
Leaks (SERVICES)	61	27	29	35	42	38.8	N
Leaks per 1000 Tickets	2.4983	1.0595	1.2900	1.4324	1.4325	1.5425	N
Leaks per System Mile	0.0674	0.0332	0.0402	0.0422	0.0509	0.04678	Y

Appendix A. Section 3. Table 5-31: Outside Force Threat – Frequency and Trend (West Division)

Threat / Sub-Threat	2021									
	Quantity			Leaks Repaired			Frequency of Failure			
	Miles Main	# Services	# of Units	Mains	Services	Units	Main Leaks/Mile	Service Leaks/100	Equip/ Fitting Leaks/100	Total Leaks / Facility Mile (mains & svcs)
Outside Force										
Vehicle Damage	960	25,870		0	0		0	0	0	0
Vandalism	960	25,870		0	0		0	0	0	0
Fire / Explosion	960	25,870		0	0		0	0	0	0
Previous Damage	960	25,870		0	0		0	0	0	0
Other	960	25,870		1	6		0.001041	0.023193	0	0.005313

Threat / Sub-Threat	Leak Ratio						Is Leak Frequency Increasing? Y/N
	2017	2018	2019	2020	2021	5-Year Average	
Outside Force (Main)							
Vehicle Damage	0	0	0	0	0	0	N
Vandalism	0	0	0	0	0	0	N
Fire / Explosion	0	0	0	0	0	0	N
Other	1	1	1	0	1	0.8	N
Outside Force (Service)							

Other	4	2	2	5	6	3.8	Y

Appendix A. Section 3. Table 5-32: Material, Weld or Joint Failure Threat – Frequency and Trend (West Division)

Threat / Sub-Threat	2021						
	Quantity		Leaks Repaired			Frequency of Failure	
	Miles Main	# Services	Mains	Services	Main Leaks/Mile	Service Leaks/100	Total Leaks / Facility Mile (mains & svcs)
Material, Weld or Joint Failure							
PVC	0	NA	NA	NA	NA	NA	NA
ABS	0	NA	NA	NA	NA	NA	NA
Aldyl A	0	NA	NA	NA	NA	NA	NA
Century Products (incl PE 2306)	0	NA	NA	NA	NA	NA	NA
PE 3306	0	NA	NA	NA	NA	NA	NA
Other Plastic Pipe	0	NA	NA	NA	NA	NA	NA
Delrin Insert Tap Tees	0	NA	UNK	UNK	UNK	UNK	UNK
Plexco Service Tee Celcon Caps	0	NA	UNK	UNK	UNK	UNK	UNK
Pre 1940 OA girth welds	0	NA	NA	NA	NA	NA	NA
Other	960	25,870	1	2	0.001041	0.00773	0.002277

Appendix A. Section 3. Table 5-32: Material, Weld or Joint Failure Threat – Frequency and Trend (West Division continued)

Threat / Sub-Threat	Leak Ratio						Is Leak Frequency Increasing? Y/N
	2017	2018	2019	2020	2021	5-Year Average	
Material, Weld or Joint Failure (mains)							
PVC	NA	NA	NA	NA	NA	NA	NA
ABS	NA	NA	NA	NA	NA	NA	NA
Aldyl A	NA	NA	NA	NA	NA	NA	NA
Century Products (incl PE 2306)	NA	NA	NA	NA	NA	NA	NA
PE 3306	NA	NA	NA	NA	NA	NA	NA
Other Plastic Pipe	NA	NA	NA	NA	NA	NA	NA
Delrin Insert Tap Tees	Unk	Unk	Unk	Unk	Unk	Unk	Unk
Plexco Service Tee Celcon Caps	Unk	Unk	Unk	Unk	Unk	Unk	Unk
other	1	1	0	0	1	0.6	N
Material, Weld or Joint Failure (services)							
Other	0	89	4	0	2	22.8	N

Appendix A. Section 3. Table 5-33: Equipment Failure Threat – Frequency and Trend (West Division)

Threat / Sub-Threat	2021									
	Quantity			Leaks Repaired			Frequency of Failure			
	Miles Main	# Services	# of Units	Mains	Services	Units	Main Leaks/Mile	Service Leaks/100	Equip/Fitting Leaks/100	Total Leaks / Facility Mile (mains & svcs)
Equipment Failure										
Valves	960	25,870		0	6		0	0.023193	0	0.004554
Service Regulators	960	25,870		0	34		0	0.131426	0	0.025806
Control/Relief Station	960	25,870		0	0		0	0	0	0
Mechanical Couplings	960	25,870		0	0		0	0	0	0
Other	960	25,870		0	63		0	0.243525	0	0.047817

Threat / Sub-Threat	Leak Ratio						Is Leak Frequency Increasing? Y/N
	2017	2018	2019	2020	2021	5-Year Average	
Equipment Failure (main)							
Valves	0	0	1	0	0	0.2	N
Service Regulators	0	0	0	0	0	0	N
Control/Relief Station	1	0	0	0	0	0.2	N
Mechanical Couplings	1	0	1	0	0	0.4	N
Other	0	0	0	0	0	0	N

Equipment Failure (services)							
Other	31	24	76	87	103	64.2	Y

Appendix A. Section 3. Table 5-34: Incorrect Operation Threat – Frequency and Trend (West Division)

Threat / Sub-Threat	2021									
	Quantity			Incidents			Frequency of Failure			
	Miles Main	# Services	# of Units	Mains	Services	Units	Main Incidents/Mile	Service Incidents/100	Equip/Fitting Incidents/100	Total Incidents / Facility Mile (mains & svcs)
Incorrect Operation										
Operating Error	960	25,870		0	0		0	0	NA	0
Service Line bored thru Sewer	960	25,870		0	0		0	0	NA	0
Other	960	25,870		1	9		0.001041	0.034789	NA	0.00759

Threat / Sub-Threat	Leak Ratio						Is Leak Frequency Increasing? Y/N
	2017	2018	2019	2020	2021	5-Year Average	
Incorrect Operation (MAINS)							
Operating Error	0	0	0	0	0	0	N
Service Line bored thru Sewer	0	0	0	0	0	0	N
Other	0	0	1	0	1	0.4	N
Incorrect Operation (SERVICES)							
Other	0	0	17	18	9	8.8	Y

Appendix A. Section 3. Table 5-35: Other Threat – Frequency and Trend (West Division)

Threat / Sub-Threat	2021								
	Quantity			Leaks Repaired		Frequency of Failure			
	Miles Main	Number Services	Number Copper Services	Mains	Services	Main Leaks/Mile	All Services Leaks / 100	Copper Services Only Leaks / 100	Total Leaks / Facility Mile (mains & svcs)
Other									
Bell Joint leaks	960	25,870	0	0	0	0	0	0	0
Copper Pipe Puncture	960	25,870	0	0	0	0	0	0	0
Copper Sulfide	0	0	0	0	0	0	0	0	0
Other	960	25,870	0	0	7	0	0.027058	0	0.005313

Threat / Sub-Threat	Leak Ratio						Is Leak Frequency Increasing? Y/N
	2017	2018	2019	2020	2021	5-Year Average	
Other (MAINS)							
Bell Joint Leaks	0	0	0	0	0	0	N
Copper Pipe Puncture	0	0	0	0	0	0	N
OTHER	3	12	0	0	0	3	N
Other (SERVICES)							

OTHER	13	150	30	0	7	40	N

Appendix A. Section 3. Table 5-36: Corrosion Threat – Frequency and Trend (Central Division)

Threat / Sub-Threat	2021						
	Quantity		Leaks Repaired		Frequency of Failure		
	Miles Main	# Services	Mains	Services	Main Leaks/Mile	Service Leaks/100	Total Leaks / Facility Mile (mains & svcs)
Corrosion							
Cast Iron	0	0	0	0	0	0	0
Bare Steel	0	0	0	0	0	0	0
Coated Steel (with CP)	288.416	2186	0	1	0	0.0457	0.00314
Coated Steel (No CP)	0	0	0	0	0	0	0

Threat / Sub-Threat	Leak Ratio						Is Leak Frequency Increasing? Y/N
	2017	2018	2019	2020	2021	5-Year Average	
Corrosion (mains)							
Cast Iron	0	0	0	0	0	0	NA
Bare Steel	0	0	0	0	0	0	NA
Coated Steel (with CP)	0	0	1	1	0	0.4	Y
Coated Steel (No CP)	0	0	0	0	0	0	NA
Corrosion (services)							
Bare Steel	0	0	0	0	0	0	NA
Coated Steel (with CP)	31	39	53	44	1	33.6	Y
Others	0	0	0	0	0	0	NA

Appendix A. Section 3. Table 5-37: Natural Forces Threat – Frequency and Trend (Central Division)

Threat / Sub-Threat	2021									
	Quantity			Leaks Repaired			Frequency of Failure			
	Miles Main	# Services	# of Units	Mains	Services	Units	Main Leaks/Mile	Service Leaks/100	Equip/Fitting Leaks/100	Total Leaks / Facility Mile (mains & svcs)
Natural Forces										
Tree Roots	744.643	27,852		0	0		0	0		0
Flood	744.643	27,852		0	0		0	0		0
Other	744.643	27,852		0	0		0	0		0

Threat / Sub-Threat	Leak Ratio						Is Leak Frequency Increasing? Y/N
	2017	2018	2019	2020	2021	5-Year Average	
Natural Forces (Mains)							
Tree Roots	0	0	0	0	0	0	N
Flood	0	0	0	0	0	0	N
Other	0	0	1	1	0	0.4	Y
Natural Forces (Services)							
Tree Roots	1	1	0	0	0	0.4	N
Flood	0	0	0	0	0	0	N
Other	6	2	0	1	0	1.8	N

Appendix A. Section 3. Table 5-38: Excavation Damage Threat – Frequency and Trend (Central Division)

Threat / Sub-Threat	2021							
	Quantity			Leaks Repaired			Frequency of Failure	
	System Miles Main	System Number of Services	System Number of Tickets	# of main repairs	# of Services repairs	Total System Miles	Leaks per 1000 Ticket	Leaks per System Mile
Excavation Damage - All	744.643	27,852	41,664	19	71	90	2.1601	0.07972

Threat / Sub-Threat	Leak Ratio						Is Leak Frequency Increasing? Y/N
	2017	2018	2019	2020	2021	5-Year Average	
Excavation Damage							
Tickets	32,941	39,329	37,218	37,213	41,664	37,673	
Leaks (Mains)	17	15	16	20	19	17.4	Y
Leaks (Services)	33	60	68	83	90	66.8	Y
Leaks per 1000 Tickets	1.5179	1.9070	2.2570	2.7678	2.1601	2.12196	Y
Leaks per System Mile	0.0499	0.0725	0.0789	0.0938	0.07972	0.074964	Y

Appendix A. Section 3. Table 5-39: Outside Force Threat – Frequency and Trend (Central Division)

Threat / Sub-Threat	2021									
	Quantity			Leaks Repaired			Frequency of Failure			
	Miles Main	# Services	# of Units	Mains	Services	Units	Main Leaks/Mile	Service Leaks/100	Equip/ Fitting Leaks/100	Total Leaks / Facility Mile (mains & svcs)
Outside Force										
Vehicle Damage	744.643	27,852		0	0		0	0	NA	0
Vandalism	744.643	27,852		0	0		0	0	NA	0
Fire / Explosion	744.643	27,852		0	0		0	0	NA	0
Other	744.643	27,852		0	0		0	0	NA	0

Threat / Sub-Threat	Leak Ratio						Is Leak Frequency Increasing? Y/N
	2017	2018	2019	2020	2021	5-Year Average	
Outside Force (Main)							
Vehicle Damage	0	0	0	0	0	0	N
Vandalism	0	0	0	0	0	0	N
Other	1	0	0	1	0	0.4	Y
Outside Force (Services)							
Vehicle Damage	0	1	3	1	0	1	N
other	4	1	3	0	0	1.6	N

Appendix A. Section 3. Table 5-40: Material, Weld or Joint Failure Threat – Frequency and Trend (Central Division)

Threat / Sub-Threat	2021						
	Quantity		Leaks Repaired			Frequency of Failure	
	Miles Main	# Services	Mains	Services	Main Leaks/Mile	Service Leaks/100	Total Leaks / Facility Mile (mains & svcs)
Material, Weld or Joint Failure							
PVC	NA	NA	NA	NA	NA	NA	NA
ABS	NA	NA	NA	NA	NA	NA	NA
Aldyl A	Unk	Unk	Unk	Unk	Unk	Unk	Unk
Century Products (incl PE 2306)	NA	NA	NA	NA	NA	NA	NA
PE 3306	NA	NA	NA	NA	NA	NA	NA
Other Plastic Pipe	NA	NA	NA	NA	NA	NA	NA
Delrin Insert Tap Tees	Unk	Unk	Unk	Unk	Unk	Unk	Unk
Plexco Service Tee Celcon Caps	Unk	Unk	Unk	Unk	Unk	Unk	Unk
Pre 1940 OA girth welds	NA	NA	NA	NA	NA	NA	NA
Other	744.643	27,852	3	4	0.004029	0.01436	0.0062

Appendix A. Section 3. Table 5-41: Material, Weld or Joint Failure Threat – Frequency and Trend (Central Division continued)

Threat / Sub-Threat	Leak Ratio						Is Leak Frequency Increasing? Y/N
	2017	2018	2019	2020	2021	5-Year Average	
Material, Weld or Joint Failure (Mains)							
PVC	NA	NA	NA	NA	NA	NA	NA
ABS	NA	NA	NA	NA	NA	NA	NA
Aldyl A	Unk	Unk	Unk	Unk	Unk	Unk	Unk
Century Products (incl PE 2306)	NA	NA	NA	NA	NA	NA	NA
PE 3306	NA	NA	NA	NA	NA	NA	NA
Other Plastic Pipe	NA	NA	NA	NA	NA	NA	NA
Delrin Insert Tap Tees	Unk	Unk	Unk	Unk	Unk	Unk	Unk
Plexco Service Tee Celcon Caps	Unk	Unk	Unk	Unk	Unk	Unk	Unk
Other	2	2	1	3	3	2.2	Y
Material, Weld or Joint Failure (Services)							
Other	5	5	3	4	4	4.2	N

Appendix A. Section 3. Table 5-42: Equipment Failure Threat – Frequency and Trend (Central Division)

Threat / Sub-Threat	2021									
	Quantity			Leaks Repaired			Frequency of Failure			
	Miles Main	# Services	# of Units	Mains	Services	Units	Main Leaks/Mile	Service Leaks/100	Equip/Fitting Leaks/100	Total Leaks / Facility Mile (mains & svcs)
Equipment Failure										
Valves	744.643	27,852		1	3		0.001343	0.010771	0	0.003543
Service Regulators	744.643	27,852		0	36		0	0.129255	0	0.031888
Control/Relief Station	744.643	27,852		0	0		0	0	0	0
Mechanical Couplings	744.643	27,852		0	1		0	0.00359	0	0.000886
Other	744.643	27,852		0	7		0	0.025133	0	0.0062

Threat / Sub-Threat	Leak Ratio						Is Leak Frequency Increasing? Y/N
	2017	2018	2019	2020	2021	5-Year Average	
Equipment Failure (Mains)							
Valves	1	0	0	0	0	0.2	N
Mechanical Couplings	0	0	0	0	0	0	N
Other	0	0	0	0	0	0	N
Equipment Failure (Services)							
Valves	0	0	0	0	3	0.6	
Service Regulators	31	44	45	47	36	40.6	Y

Other	0	0	0	5	8	2.6	Y

Appendix A. Section 3. Table 5-43: Incorrect Operation Threat – Frequency and Trend (Central Division)

Threat / Sub-Threat	2021									
	Quantity			Incidents			Frequency of Failure			
	Miles Main	# Services	# of Units	Mains	Services	Units	Main Incidents/Mile	Service Incidents/100	Equip/Fitting Incidents/100	Total Incidents / Facility Mile (mains & svcs)
Incorrect Operation										
Operating Error	744.643	27,852		0	0		0	0	0	0
Service Line bored thru Sewer	744.643	27,852		0	0		0	0	0	0
Other	744.643	27,852		0	0		0	0	0	0

Threat / Sub-Threat	Leak Ratio						Is Leak Frequency Increasing? Y/N
	2017	2018	2019	2020	2021	5-Year Average	
Incorrect Operation (Mains)							
Operating Error	0	0	0	0	0	0	N
Service Line bored thru Sewer	0	0	0	0	0	0	N

Other	0	0	4	0	0	0.8	N
Incorrect Operation (Services)							
Other	0	0	1	0	0	0.2	N

Appendix A. Section 3. Table 5-44: Other Threat – Frequency and Trend (Central Division)

Threat / Sub-Threat	2021								
	Quantity			Leaks Repaired		Frequency of Failure			
	Miles Main	Number Services	Number Copper Services	Mains	Services	Main Leaks/Mile	All Services Leaks / 100	Copper Services Only Leaks / 100	Total Leaks / Facility Mile (mains & svcs)
Other									
Bell Joint leaks	744.643	27,852		0	0	0	0	0	0
Copper Pipe Puncture	744.643	27,852		0	0	0	0	0	0
Copper Sulfide	744.643	27,852		0	0	0	0	0	0
Other	744.643	27,852		1	7	0.001343	0.025133	0	0.007086

Threat / Sub-Threat	Leak Ratio						Is Leak Frequency Increasing? Y/N
	2017	2018	2019	2020	2021	5-Year Average	
Other (Mains)							
Bell Joint Leaks	0	0	0	0	0	0	NA
Copper Pipe Puncture	0	0	0	0	0	0	NA
Other	1	3	1	0	1	1.2	N
Other (Services)							
Other	1	9	13	1	7	6.2	N

Appendix A. Section 4. Table 5-36: Identification of Additional Information Needed for IM Program

Area of incomplete records or Knowledge	Can it be acquired over time through normal activities? Y / N	Does Action Plan Exist? Y / N
Vintage years of facilities	No	Yes
Exact location of pipe facilities including Aldyl A, Mechanical Couplings, Delrin Insert Tap Tees, Plexco Celcon Tap Service Tees, Pre 1940 OA Girth Welds	Yes	Yes
Information on pipe materials currently in the ground.	Yes	Yes
Greater detail on Subthreats of Causes	Yes	Yes

Appendix A. Section 4. Table 5-37: Action Plans to Gain Additional Information Over Time

Action Plan Scope Gaining Additional Information	Schedule	Completion Date	Officer / Manager Responsible
Vintage years of facilities -Leak report card was revised in 2020 to capture more detail or leaks. -information of new pipe facilities being installed is being captured on FPUC's GIS.		Ongoing project	Division Operations Managers, GIS technicians, & Gas Standards Engineer.
Exact location of pipe facilities including Aldyl A, Mechanical Couplings, Delrin Insert Tap Tees, Plexco Celcon Tap Service Tees, Pre 1940 OA Girth Welds -Gained through Exposed Piping Reports and Leak Reports -Leak reports are to be uploaded to GIS which will make it easier to analyze leak report data.		Ongoing Project	Division Operations Managers, GIS technicians, Manager of Engineering, & Gas Standards Engineer
Greater detail on Subthreats of Causes – Gained through modified Leak Reports and additional training on their completion.		Ongoing Project	Division Operations Managers & Gas Standards Engineer

Appendix A. Section 5. Sample of Subject Matter Expert Information Interview Form

SME Name	Current Job Title Role	Yrs Experience	Comment(s) re: Qualification & Experience

Written record

Describe nature of information (First Hand witness or direct experience vs. Second Hand)

Date:	

Interviewer Name:	
Interviewer Title:	

Signature of Interviewer (Reqd):	
Signature of SMEs (Optional):	

APPENDIX B
THREAT IDENTIFICATION

Appendix B. Section 1.

Section 1. Threat Identification Process

[Southern Gas Association, Northeast Gas Association and Structural Integrity Associates, Inc. Subject Matter Expert(SME) Evaluation of Threats Applicable to the Gas Distribution System, incorporated by reference (all divisions)]

Appendix B. Section 2.

Threats Identified as applicable to the gas distribution system

Appendix B. Section 2. Table 6-3: Summary SME Evaluation of Threats Applicable to the Gas Distribution System

Service territory covered by this Assessment: All Divisions				
Primary Threat Category	**Sub-Threat**	**SME's to Consider the following**	**SME Evaluation/Answer**	**Threat Applicable? SME – Yes / No**
Corrosion	Cast Iron Pipe	Does Cast Iron pipe exist in the system?	NO	NO
		Is there a known history of body-of-pipe leaks, fractures, or graphitization?	N/A	
		Are certain diameters or parts of the system known to be more prone to failure and leakage than others?	N/A	
	Bare Steel Pipe (no CP)	Do bare (uncoated) steel main or services exist in the system that are not under CP?	Yes – South, Divisions	Yes – South, Division
		Is there known evidence of active external corrosion on bare steel pipes not under CP?	Yes	
		Is there a history of leakage on bare steel pipes not under CP?	Yes	
	Bare Steel Pipe (with CP)	Do bare (uncoated) steel main or services exist in the system that are under CP?	No	No
		Is there known evidence of active external corrosion on bare steel pipes under CP?	No	
		Is there a known history of leakage on bare steel pipes under CP?	No	

Appendix B. Section 2. Table 6-3: Summary SME Evaluation of Threats Applicable to the Gas Distribution System (continued)

Service territory covered by this Assessment: All Divisions				
Primary Threat Category	**Sub-Threat**	**SME's to Consider the following**	**SME Evaluation/Answer**	**Threat Applicable? SME – Yes / No**
Corrosion	Coated Steel with CP	Is there known evidence of active external corrosion on coated steel pipe with CP?	Yes – South, Central West Divisions	Yes – All Divisions
		Is there a known history of leakage on coated steel pipe with CP?	Yes – South, Central West Divisions	
		Are some CP systems frequently down (not achieving the required level of protection); more than 10% of the time?	No	
	Coated Steel w/o CP	Is there known evidence of active external corrosion on coated steel pipe without CP?	No	No
		Is there a known history of leakage on coated steel pipe without CP?	No	
	Copper Services	Are direct buried or inserted copper services known to exist in the system?	No	No
		Is there a known history of leakage on copper services?	No	
	Stray Current	Do distribution facilities exist near DC transit systems, high voltage DC transmission systems or other known sources of DC current?	Yes – All Divisions	Yes – All Divisions
		Are any facilities known to be impacted by sources of stray DC current that has or may result in corrosion?	YES – Central division	
	Internal Corrosion	Are liquids known to exist within any portions of the distribution system?	No	No
		Is there known evidence of past or active internal corrosion on steel pipe?	No	
		Is there a known history of leakage caused by internal corrosion of steel pipe?	No	

Appendix B. Section 2. Table 6-3: Summary SME Evaluation of Threats Applicable to the Gas Distribution System (continued)

Service territory covered by this Assessment: All Divisions				
Primary Threat Category	**Sub-Threat**	**SME's to Consider the following**	**SME Evaluation/Answer**	**Threat Applicable? SME – Yes / No**
Corrosion	Atmospheric Corrosion	Do above ground distribution facilities exist in areas exposed to marine atmosphere, high humidity, atmospheric pollutants or agricultural chemicals?	Yes – All Divisions	Yes – All Divisions
		Is there known evidence of past or active external atmospheric corrosion on exposed steel pipe, equipment or fittings?	Yes – All Divisions	
		Is there a known history of leakage caused by atmospheric corrosion of steel pipe?	Yes – All Divisions	
	Corrosion of carrier pipe in Cased Crossing	Do steel carrier pipes exist within cased crossings?	Yes – All Divisions	Yes – All Divisions
		Are there any existing known contacts between carrier pipes and casings?	Yes – South Division	
		Is there known evidence of past or active external corrosion on cased steel pipe?	No	
		Is there a known history of leakage caused by corrosion on cased steel pipe?	No	
Natural Forces	Seismic Activity	Are there any seismically active zones or fault lines that exist in the area?	No	No
		Is there a history of leakage associated with Seismic activity?	No	
	Earth Movement / Landslide	Are there any areas susceptible to earth movement or landslide in the area?	No	No
		Is there a known history of leakage associated with landslide or earth movement?	No	
	Frost Heave	Are there any areas susceptible to frost heave that exist in the area?	No	No

Appendix B. Section 2. Table 6-3: Summary SME Evaluation of Threats Applicable to the Gas Distribution System (continued)

Service territory covered by this Assessment: All Divisions				
Primary Threat Category	**Sub-Threat**	**SME's to Consider the following**	**SME Evaluation/Answer**	**Threat Applicable? SME – Yes / No**
Natural Forces	Frost Heave	Is there a known history of leakage associated with frost heave?	No	No
	Flooding	Are there any areas within the gas system that are subject to flooding?	Yes – All Divisions	Yes – All Divisions
		Is there a known history of leakage or damage associated with flooding?	No	
	Over-pressure due to snow/ice blockage	Are pressure control equipment vents subject to ice blockage during the winter?	No	No
		Is there a known history of over-pressure events as a result of snow/ice blockage?	No	
	Tree Roots	Is there a known history of leakage to pipe or fittings as a result of tree root damage?	Yes – All Divisions	Yes – All Divisions
	Other	Is there a known history of leakage or damage due to other natural force causes; including but not limited to lightning, wild fire or high winds (tornados)?	Yes – All Divisions	Yes – All Divisions
Excavation Damage	Improper Excavation Practice	Has damage requiring repair or replacement occurred on properly marked facilities due to the failure of the excavator to follow proper excavation rules and procedures?	Yes – All Divisions	Yes – All Divisions
	Facility not located or marked	Has damage requiring repair or replacement occurred due to failure to locate a valid and timely locate request?	Yes – All Divisions	
	One-call notification center error	Has damage requiring repair or replacement occurred due to an error made at the one-call notification center?	Yes – All Divisions	

Appendix B. Section 2. Table 6-3: Summary SME Evaluation of Threats Applicable to the Gas Distribution System (continued)

Service territory covered by this Assessment: All Divisions				
Primary Threat Category	**Sub-Threat**	**SME's to Consider the following**	**SME Evaluation/Answer**	**Threat Applicable? SME – Yes / No**
Excavation Damage	Mis-Marked Facilities	Has damage requiring repair or replacement occurred due to the mis-marking of facilities?	Yes – All Divisions	Yes – All Divisions
	Incorrect Facility Records	Has damage requiring repair or replacement occurred due incorrect facility records?	Yes – All Divisions	Yes – All Divisions
	Other	Has damage requiring repair or replacement occurred due other causes including the inability to locate facility (e.g. no locating wire on plastic main), wrong or incorrect information provided to the one call center, deteriorated facilities and previous damage?	Yes – All Divisions	
Other Outside Force Damage	Vehicle Damage to Riser/Meter	Are existing risers and/or meters exposed to damage from vehicular damage that do not have barriers or other protection conforming to current design requirements?	Yes – All Divisions	Yes – All Divisions
		Has known leakage occurred due to vehicle damage to risers/meters.	Yes – All Divisions	
	Vehicle Damage to above-ground equip/station	Are HPRs and/or regulator stations exposed to damage from vehicular damage that do not have barriers or other protection conforming to current design requirements?	No	Yes – All Divisions
		Has known leakage occurred due to vehicle damage to HPRs and/or regulator stations?	Yes – South Division	

Appendix B. Section 2. Table 6-3: Summary SME Evaluation of Threats Applicable to the Gas Distribution System (continued)

Service territory covered by this Assessment: All Divisions				
Primary Threat Category	**Sub-Threat**	**SME's to Consider the following**	**SME Evaluation/Answer**	**Threat Applicable? SME – Yes / No**
Other Outside Force Damage	Vandalism	Are gas valves or station equipment susceptible to damage by vandalism that has the potential to pose a risk to employees or the public?	No	No
		Has leakage or other unsafe condition been created by vandalism?	No	NO
Other Outside Force Damage	Structure Fire	Is there a history of damage to gas meters or other equipment due to structure fires?	Yes – All Divisions	Yes – All Divisions
		Is there a history of lack of properly designed or maintained service shut-off valves resulting in a delay in inability to shut off gas service to structures that are on fire?	No	
Material, Weld or Joint Failure	Century Products (MDPE 2306)	Is Century Products (MDPE 2306) pipe known to exist in the system?	No	No
		Is there a history of leakage of Century Products (MDPE 2306) pipe?	No	
	Aldyl A	Is Aldyl A pipe known to exist in the system?	Yes – South and Central Divisions	Yes – South and Central Divisions
		Is there a history of leakage of Aldyl A pipe?	Yes – South and Central Divisions	

Appendix B. Section 2. Table 6-3: Summary SME Evaluation of Threats Applicable to the Gas Distribution System (continued)

Service territory covered by this Assessment: All Divisions				
Primary Threat Category	**Sub-Threat**	**SME's to Consider the following**	**SME Evaluation/Answer**	**Threat Applicable? SME – Yes / No**
Material, Weld or Joint Failure	HDPE 3306	Is HDPE 3306 pipe known to exist in the system?	Yes – South and Central Divisions	Yes – South and Central Divisions
		Is there a history of leakage of HDPE 3306 pipe?	Yes – South and Central Divisions	
	PVC – Polyvinyl Chloride	Is PVC pipe known to exist in the system?	No	No
		Is there a history of leakage of PVC pipe?	No	
	ABS – Acrylonitrile Butadiene Styrene	Is ABS pipe known to exist in the system?	No	No
		Is there a history of leakage of ABS pipe?	No	
	CAB – Cellulose Acetate Butyrate	Is CAB A pipe known to exist in the system?	No	No
		Is there a history of leakage of CAB pipe?	No	
	PB - Polybutylene	Is PB pipe known to exist in the system?	No	No
		Is there a history of leakage of PB pipe?	No	
	Delrin Insert Tap Tees	Are Delrin Insert Tap Tees known to exist in the system?	Yes – All Divisions	Yes – All Divisions
		Is there a history of leakage of Delrin Insert Tap Tees?	Yes – All Divisions	

Appendix B. Section 2. Table 6-3: Summary SME Evaluation of Threats Applicable to the Gas Distribution System (continued)

Service territory covered by this Assessment: All Divisions				
Primary Threat Category	**Sub-Threat**	**SME's to Consider the following**	**SME Evaluation/Answer**	**Threat Applicable? SME – Yes / No**
Material, Weld, or Joint Failure	Plexco Service Tee Celcon Caps	Are Plexco Service Tee Celcon Caps known to exist in the system?	Yes – All Divisions	Yes – All Divisions
		Is there a history of leakage of Plexco Service Tee Celcon Caps?	Yes – All Divisions	
	PE Fusion failure	Is there a history of PE Fusion Failures or leakage in the system?	Yes – South and Central Divisions	Yes – All Divisions
		Are any types of PE fusion (type, material, size, age, process, geographic area) more prone to leakage or failure?	No	
	Pre-1940 Oxy-Acetylene Girth Weld	Do pre-1940 Oxy-Acetylene Girth Welds exist on pipe greater than 4 inch?	NO	NO
		Is there a history of pre-1940 Oxy-Acetylene Girth Weld failures or leakage in the system?	NO	
	Other	Do other material failures occur that present a possible current or future risk? (Kerotest Gate Valves	Yes – South and Central Divisions	Yes – South And Central
	Mechanical Couplings	Is there a history of Mechanical Coupling failures or leakage in the system due to pullout?	No	No
		Is there a history of Mechanical Coupling failures or leakage in the system due to seal leakage?	Yes – All Divisions	Yes – South, Central, West
		Are any types of mechanical coupling (type, material, size, age, manufacturer, geographic area) more prone to leakage or failure due to seal leakage?	No	No

Appendix B. Section 2. Table 6-3: Summary SME Evaluation of Threats Applicable to the Gas Distribution System (continued)

Service territory covered by this Assessment: All Divisions				
Primary Threat Category	**Sub-Threat**	**SME's to Consider the following**	**SME Evaluation/Answer**	**Threat Applicable? SME – Yes / No**
Equipment Failure	Valves	Are valves inoperable, inaccessible and or paved over without timely identification and repairs?	Yes – All Divisions	Yes – All Divisions
		Are certain types or makes of valves more likely to leak? Kerotest Gate Valves	Yes – All Divisions	Yes – All Divisions
	Service Regulators	Is there a history of service regulator failures that present a threat to the public or employees?	Yes – All Divisions	Yes – All Divisions
		Are certain types or makes of service regulator more likely to create a risk?	No	
	Control/Relief Station Equipment	Is there a history of control or relief station equipment failures that present a threat to the public or employees?	No	No
		Are certain types or makes of station equipment more likely to create a risk?	No	
	Other	Is there a history of other equipment failures that present a threat to the public or employees?	No	No
		Are certain types or makes of other equipment more likely to create a risk?	No	
Incorrect Operations	Operating Error	Have leaks or other safety incidents been caused by an inadequate procedure?	Yes – South Division	Yes – All Divisions
		Have leaks or other safety incidents been caused by failure to follow an adequate procedure?	Yes – South Division	
		Have bypass valves or MAOP separation valves been found to not have proper locks after maintenance?	No	

Appendix B. Section 2. Table 6-3: Summary SME Evaluation of Threats Applicable to the Gas Distribution System (continued)

Service territory covered by this Assessment: All Divisions				
Primary Threat Category	**Sub-Threat**	**SME's to Consider the following**	**SME Evaluation/Answer**	**Threat Applicable? SME – Yes / No**
Incorrect Operations	Operating Error	Have employees been found to have falsified maintenance documents and thus not have completed operations and maintenance tasks in the manner or timeframe required?	No	No
		Has improper regulator station maintenance ever resulted in an overpressure incident?	No	No
		Have butt-fusions been found to be leaking due to improper fusion due to failure to follow the correct procedure?	Yes – All Divisions	Yes – All Divisions
		Have leak repairs or other mandated maintenance not been made in the time required by standard due to a process breakdown or ineffective process?	No	No
		Has gas leak detection equipment used for a leak survey been found afterwards to be out of calibration?	No	No
		Has the failure to accurately or timely record or map facilities resulted in failure to perform mandated maintenance or locates?	No	No
	Gas lines bored through Sewers	Have pipes been installed via unguided or guided bore without proper procedures to ensure other facilities are not damaged?	Yes – All Divisions	Yes – All Divisions
		Have pipes unknowingly bored through sewer lines been damaged by sewer line cleaning operations?	Yes – All Divisions	

Appendix B. Section 2. Table 6-3: Summary SME Evaluation of Threats Applicable to the Gas Distribution System (continued)

Service territory covered by this Assessment: All Divisions				
Primary Threat Category	**Sub-Threat**	**SME's to Consider the following**	**SME Evaluation/Answer**	**Threat Applicable? SME – Yes / No**
Other	Bell Joint Leakage	Does Cast Iron pipe exist in the system?	NO	NO
		Is there a history of bell joint leaks?	NO	NO
		Are certain diameters or parts of the system known to be more prone to bell joint failure or leakage than others?	No	
	Inserted Copper Puncture	Do copper services inserted in steel exist in the system?	No	No
		Is there a history of leakage of copper services due to galvanic action between the copper and steel?	No	
	Copper Sulfide	Do copper services exist in the system and is there a history of hydrogen sulfide greater than 0.3 grains per 100 standard cubic feet of gas?	No	No
		Have any safety incidents occurred as a result of copper sulfide in copper services or service regulators?	No	
	Construction over gas mains & services	Have others constructed over gas facilities or taken other action that prevents effective leak survey and other maintenance?	Yes- South Division	Yes – All Divisions
		When identified, is construction that impacts required maintenance corrected in a timely manner?	Yes – South Division	

APPENDIX C
EVALUATION AND RANKING OF RISK

Appendix C. Section 1.

Section 1. Risk Assessment Process

[Southern Gas Association, Northeast Gas Association and Structural Integrity Associates, Inc.

Blended Risk (Subject Matter Expert & data) Evaluation and Ranking Process*,*

incorporated by reference (all divisions)]

Appendix C. Section 2. Table 7-1: Documentation of Risk Assessment Results (South Division)

Region	Primary Threat	Sub-Threat	Facility Type	FOF Score	COF Score	Relative Risk
South	Corrosion	Cast Iron		NA	NA	NA
		Bare Steel (No CP) - mains		0.675	0.61	0.41175
		Bare Steel (No CP) - services		1.125	0.61	0.68625
		Bare Steel (w/CP)		NA	NA	NA
		Coated Steel (No CP)		NA	NA	NA
		Coated Steel (w/CP) - mains		0.1125	0.48	0.054
		Coated Steel (w/CP) - services		0.5625	0.61	0.343125
		Copper Services		NA	NA	NA
		Stray Current		0	0.61	0
		Internal Corrosion		0	0.61	0
		Atmospheric Corrosion (Services)		4.95	0.35	1.7325

Appendix C. Section 2. Table 7-2: Documentation of Risk Assessment Results (South Division)

Region	Primary Threat	Sub-Threat	Facility Type	FOF Score	COF Score	Relative Risk
South	Natural Forces	Seismic Activity		NA	NA	NA
		Earth Movement/ Landslide		0	0.35	0
		Frost Heave		NA	NA	NA
		Flooding		0	0.65	0
		Overpressure due to Snow-Ice Blockage		NA	NA	NA
		Tree Roots (mains)		0.0625	0.61	0.038125
		Tree Roots (svs)		0.0625	0.65	0.040625

Appendix C. Section 2. Table 7-3: Documentation of Risk Assessment Results (South Division)

Region	Primary Threat	Sub-Threat	Facility Type	FOF Score	COF Score	Relative Risk
South	Excavation Damage (Mains & svs)	Improper Excavation Practice		0.25	0.61	0.1525
		No Call for Locate		0.25	0.61	0.1525
		Late or No Locate		0.055	0.61	0.03355
		Mis-marked Facilities		0.05	0.61	0.0305
		Incorrect Facility Records		0.05	0.61	0.0305

Appendix C. Section 2. Table 7-4: Documentation of Risk Assessment Results (South Division)

Region	Primary Threat	Sub-Threat	Facility Type	FOF Score	COF Score	Relative Risk
South	Other Outside Force (svs)	Vehicle Damage to Riser		0.05	0.61	0.0305
		Vehicle Damage to above ground equipment or station (not risers)		0	0.61	0
		Vandalism		0	0.61	0
		Structure Fire		0.0045	0.61	0.002745

Appendix C. Section 2. Table 7-5: Documentation of Risk Assessment Results (South Division)

Region	Primary Threat	Sub-Threat	Facility Type	FOF Score	COF Score	Relative Risk
South	Material, Weld or Joint Failure	MDPE 2306 - mains		NA	NA	NA
		MDPE 2306 - services		NA	NA	NA
		Aldyl A - mains		0.09	0.48	0.0432
		Aldyl A - services		3.6	0.48	0.0432
		HDPE 3306 (Mains)		NA	NA	NA
		HDPE 3306 (svs)		NA	NA	NA
		PVC		NA	NA	NA
		ABS		NA	NA	NA
		CAB		NA	NA	NA
		PB		NA	NA	NA
		Delrin Insert Tap Tees and/or Plexco Service Tee Celcon Caps (svs)		0.03375	0.61	0.0205875
		PE Fusion Failure-(mains)		0.0386	0.61	0.02353
		PE Fusion Failure-services		0.045	0.61	0.02745
		Pre 1940 Oxy-Acetylene Girth Welds		NA	NA	NA

Appendix C. Section 2. Table 7-6: Documentation of Risk Assessment Results (South Division)

Region	Primary Threat	Sub-Threat	Facility Type	FOF Score	COF Score	Relative Risk
South	Equipment Failure	Valves (mains)		0	0.7	0
		Valves (svs)		0.0225	0.7	0.01575
		Service Regulators (svs)		0.2475	0.61	0.151
		Control or Relief Station Equipment		0	0.61	0
		Mechanical Couplings (svs)		0.0045	0.61	0.002745

Appendix C. Section 2. Table 7-7: Documentation of Risk Assessment Results (South Division)

Region	Primary Threat	Sub-Threat	Facility Type	FOF Score	COF Score	Relative Risk
South	Incorrect Operation	Operating Errors (mains)		0.0225	0.61	0.013725
		Operating Errors (svs)		0.045	0.61	0.02745
		Service Lines Bored Thru Sewer (mains)		0	1.26	0
		Service Lines Bored Thru Sewer (svs)		0.0009	1.26	0.001134
	Other	Bell Joints		NA	NA	NA
		Copper Services Pipe Puncture		NA	NA	NA

Appendix C. Section 2. Table 7-8: Documentation of Risk Assessment Results (West Division)

Region	Primary Threat	Sub-Threat	Facility Type	FOF Score	COF Score	Relative Risk
West	Corrosion	Cast Iron		NA	NA	NA
		Ductile Iron		NA	NA	NA
		Bare Steel (No CP) - mains		1.125	0.45	0.50625
		Bare Steel (No CP) - services		0.09	0.45	0.0405
		Bare Steel (w/CP)		NA	NA	NA
		Coated Steel (No CP)		NA	NA	NA
		Coated Steel (w/CP) - mains		0.34375	0.35	0.1203125
		Coated Steel (w/CP) - services		0.405	0.55	0.22275
		Copper Services		NA	NA	NA
		Stray Current		0	0.55	0
		Internal Corrosion		0	0.55	0
		Atmospheric Corrosion (SVS)		0.9	0.55	0.495

Appendix C. Section 2. Table 7-9: Documentation of Risk Assessment Results (West Division)

Region	Primary Threat	Sub-Threat	Facility Type	FOF Score	COF Score	Relative Risk
West	Natural Forces	Seismic Activity		NA	NA	NA
		Earth Movement/ Landslide		NA	NA	NA
		Frost Heave		NA	NA	NA
		Flooding (mains & svs)		0	0.35	0
		Overpressure due to Snow-Ice Blockage		NA	NA	NA
		Tree Roots (mains)		0	0.35	0
		Tree Roots (svs)		0.225	0.61	0.13725

Appendix C. Section 2. Table 7-10: Documentation of Risk Assessment Results (West Divison)

Region	Primary Threat	Sub-Threat	Facility Type	FOF Score	COF Score	Relative Risk
West	Excavation Damage (mains & svs)	Improper Excavation Practice		0.1375	0.61	0.083875
		No Call for Locate		0.125	0.61	0.07625
		Late or No Locate		0.0225	0.61	0.013725
		Mis-marked Facilities		0.125	0.61	0.07625
		Incorrect Facility Records		0	0.61	0

Appendix C. Section 2. Table 7-11: Documentation of Risk Assessment Results (West Division)

Region	Primary Threat	Sub-Threat	Facility Type	FOF Score	COF Score	Relative Risk
West	Other Outside Force (svs)	Vehicle Damage to Riser or meter		0.081	0.61	0.04941
		Vehicle Damage to above ground equipment or station (not risers)		0	0.35	0
		Vandalism		0	0.61	0
		Structure Fire		0	0.61	0

Appendix C. Section 2. Table 7-12: Documentation of Risk Assessment Results (West Division)

Region	Primary Threat	Sub-Threat	Facility Type	FOF Score	COF Score	Relative Risk
West	Material, Weld or Joint Failure	MDPE 2306 - mains		NA	NA	NA
		MDPE 2306 - services		NA	NA	NA
		Aldyl A		NA	NA	NA
		HDPE 3306		NA	NA	NA
		PVC		NA	NA	NA
		ABS		NA	NA	NA
		CAB		NA	NA	NA
		PB		NA	NA	NA
		Delrin Insert Tap Tees and/or Plexco Service Tee Celcon Caps (SVS)		0	0.35	0
		PE Fusion Failure (mains & svs)		0	0.61	0
		Pre 1940 Oxy-Acetylene Girth Welds		NA	NA	NA

Appendix C. Section 2. Table 7-13: Documentation of Risk Assessment Results (West Division)

Region	Primary Threat	Sub-Threat	Facility Type	FOF Score	COF Score	Relative Risk
West	Equipment Failure	Valves (mains)		0	0.7	0
		Valves (svs)		0.01125	0.70	0.007875
		Service Regulators (svs)		0.2475	0.61	0.150975
		Control or Relief Station Equipment (mains)		0	0.48	0
		Mechanical Couplings		0	0.61	0

Appendix C. Section 2. Table 7-14: Documentation of Risk Assessment Results (West Division)

Region	Primary Threat	Sub-Threat	Facility Type	FOF Score	COF Score	Relative Risk
West	Incorrect Operation	Operating Errors (mains)		0	0.61	0
		Operating Errors (svs)		0.1375	0.61	0.083875
		Service Lines Bored Thru Sewer (mains & svs)		0	1.26	0
	Other	Bell Joints		NA	NA	NA
		Copper Services Pipe Puncture		NA	NA	NA

Appendix C. Section 2. Table 7-15: Documentation of Risk Assessment Results (Central Division)

Region	Primary Threat	Sub-Threat	Facility Type	FOF Score	COF Score	Relative Risk
Central	Corrosion	Cast Iron		NA	NA	NA
		Ductile Iron		NA	NA	NA
		Bare Steel (No CP)		0	0	0
		Bare Steel (w/CP)		NA	NA	NA
		Coated Steel (No CP)		NA	NA	NA
		Coated Steel (w/CP) - mains		0	0.55	0
		Coated Steel (w/CP) - services		0.405	0.55	0.12375
		Copper Services		NA	NA	NA
		Stray Current (mains & svs)		0	0.55	0
		Internal Corrosion (mains & svs)		0	0.55	0
		Atmospheric Corrosion (svs)		2.025	0.55	1.11375

Appendix C. Section 2. Table 7-16: Documentation of Risk Assessment Results (Central Division)

Region	Primary Threat	Sub-Threat	Facility Type	FOF Score	COF Score	Relative Risk
Central	Natural Forces	Seismic Activity		NA	NA	NA
		Earth Movement/ Landslide		NA	NA	NA
		Frost Heave		NA	NA	NA
		Flooding (mains & svs)		0	0.35	0
		Overpressure due to Snow-Ice Blockage		NA	NA	NA
		Tree Roots (mains & svs)		0	0.61	0

Appendix C. Section 2. Table 7-17: Documentation of Risk Assessment Results (Central Divison)

Region	Primary Threat	Sub-Threat	Facility Type	FOF Score	COF Score	Relative Risk
Central	Excavation Damage (mains & svs)	Improper Excavation Practice		0.25	0.55	0.1375
		No Call for Locate		0.25	0.55	0.1375
		Late or No Locate		0.055	0.55	0.03025
		Mis-marked Facilities		0.05	0.55	0.0275
		Incorrect Facility Records		0.05	0.55	0.0275

Appendix C. Section 2. Table 7-18: Documentation of Risk Assessment Results (Central Division)

Region	Primary Threat	Sub-Threat	Facility Type	FOF Score	COF Score	Relative Risk
Central	Other Outside Force (svs)	Vehicle Damage to Riser		0.081	0.61	0.04941
		Vehicle Damage to above ground equipment or station (not risers)		0	0.61	0
		Vandalism		0	0.61	0
		Structure Fire		0.081	0.61	0.04941

Appendix C. Section 2. Table 7-19: Documentation of Risk Assessment Results (Central Division)

Region	Primary Threat	Sub-Threat	Facility Type	FOF Score	COF Score	Relative Risk
Central	Material, Weld or Joint Failure	MDPE 2306 - mains		NA	NA	NA
		MDPE 2306 - services		NA	NA	NA
		Aldyl A		NA	NA	NA
		HDPE 3306		NA	NA	NA
		PVC		NA	NA	NA
		ABS		NA	NA	NA
		CAB		NA	NA	NA
		PB		NA	NA	NA
		Delrin Insert Tap Tees and/or Plexco Service Tee Celcon Caps (SVS)		0	0.61	0
		PE Fusion Failure (mains)		0.04	0.61	0.0244
		PE Fusion Failure (svs)		0.03	0.61	0.0183
		Pre 1940 Oxy-Acetylene Girth Welds		0	0	0

Appendix C. Section 2. Table 7-20: Documentation of Risk Assessment Results (Central Division)

Region	Primary Threat	Sub-Threat	Facility Type	FOF Score	COF Score	Relative Risk
Central	Equipment Failure	Valves (svs)		0.01125	0.7	0.007875
		Valves (mains)		0	0.7	0
		Service Regulators (svs)		0.1875	0.61	0.114375
		Control or Relief Station Equipment		0	0.48	0
		Mechanical Couplings		0	0.61	0

Appendix C. Section 2. Table 7-21: Documentation of Risk Assessment Results (Central Division)

Region	Primary Threat	Sub-Threat	Facility Type	FOF Score	COF Score	Relative Risk
Central	Incorrect Operation	Operating Errors (mains & svs)		0	0.61	0
		Service Lines Bored Thru Sewer (mains & svs)		0	1.26	0
	Other	Bell Joints		NA	0.61	NA
		Copper Services Pipe Puncture		NA	NA	NA

Appendix C. Section 2. Table 7-22: Summary of Risk Evaluation and Ranking Results

Threat	Max Risk Score in any Region	Min Risk Score in any Region	% of Regions in System with Risk Score Range			
			0.76 – 1.00	0.51 – 0.75	0.26 – 0.50	0.10 – 0.25
Corrosion						
Cast Iron Mains	0	0	0	0	0	0
Bare Steel with no CP - mains	0.50625	0.41175	0	33	33	0
Bare Steel with no CP - services	0.68625	0.0405	0	33	0	33
Bare Steel Mains with CP	NA	NA	NA	NA	NA	NA
Atmospheric Corrosion - services	1.7325	0.495	66	0	33	0
Copper Services	NA	NA	NA	NA	NA	NA
Coated Steel Mains(with CP)	0.1203	0	0	0	0	33
Coated Steel services (with CP)	0.343125	0.12375	33	0	66	0
Coated Steel Mains (No CP)	NA	NA	NA	NA	NA	NA
Coated Steel Svcs (No CP)	NA	NA	NA	NA	NA	NA
Other Mains	NA	NA	NA	NA	NA	NA
Stray current	0.04375	0	0	0	0	33
Natural Forces						
Seismic	NA	NA	NA	NA	NA	NA
Earth Movement / Landslide	NA	NA	NA	NA	NA	NA
Tree Roots - mains	0.038125	0	0	0	0	33
Tree Roots - svs	0.13725	0	0	0	0	33
Frost Heave / Temperature Mains	NA	NA	NA	NA	NA	NA
Flood Mains	0	0	0	0	0	0
	0	0	0	0	0	0

Appendix C. Section 2. Table 7-22: Summary of Risk Evaluation and Ranking Results (Continued)

Threat	Max Risk Score in any Region	Min Risk Score in any Region	% of Regions in System with Risk Score Range			
			0.76 – 1.00	0.51 – 0.75	0.26 – 0.50	0.10 – 0.25
Ice/Snow Blockage of Control Equip - Mains	NA	NA	NA	NA	NA	NA
Ice/Snow Blockage of Control Equip - Services	NA	NA	NA	NA	NA	NA
Excavation Damage						
Excavation Damage – Improper Excavation Practice	0.1525	0.083875	0	0	0	100
Excavation Damage – No Call for Locate	0.1525	0.07625	0	0	0	100
Excavation Damage – Late or No Locate	0.03355	0.013725	0	0	0	100
Excavation Damage – Mis-marked Facilities	0.07625	0.0305	0	0	0	100
Excavation Damage – Incorrect Facility Records	0.0305	0	0	0	0	100
Other Outside Force						
Vehicle Damage (svs)	0	0	0	0	0	0
Vehicle Damage (svs)	0.04941	0.0305	0	0	0	100
Vandalism (svs)	0	0	0	0	0	0
	0	0	0	0	0	0
Fire / Explosion (svs)	0.04941	0	0	0	0	66
Material, Weld or Joint Failure						
PVC Mains	NA	NA	NA	NA	NA	NA
ABS Mains	NA	NA	NA	NA	NA	NA

Appendix C. Section 2. Table 7-22: Summary of Risk Evaluation and Ranking Results (Continued)

Threat	Max Risk Score in any Region	Min Risk Score in any Region	% of Regions in System with Risk Score Range			
			0.76 – 1.00	0.51 – 0.75	0.26 – 0.50	0.10 – 0.25
Material, Weld or Joint Failure (continued)						
Aldyl A Mains	0.0432	0	0	0	0	33
Aldyl A Services	0.0432	0	33	0	0	0
MDPE 2306 Mains	NA	NA	NA	NA	NA	NA
MDPE 2306 Services	0	0	0	0	0	0
HDPE 3306 Mains	NA	NA	NA	NA	NA	NA
Other Plastic Pipe Mains	NA	NA	NA	NA	NA	NA
Delrin Insert Tap Tees Fittings	0	0	0	0	0	0
Plexco Service Tee Celcon Caps Fittings	0.0011	0	0	0	0	0
Pre 1940 OA girth welds	NA	NA	NA	NA	NA	NA
PE Fusion failure - mains	0.0244	0	0	0	0	33
PE Fusion failure - services	0.02745	0	0	0	0	33
Equipment Failure						
Valves Mains	0	0	0	0	0	0
Valves svs	0.007875	0.01575	0	0	0	100
Service Regulators svs	0.151	0.11435	0	0	0	100
Control/Relief Station	0	0	0	0	0	0
Mechanical Couplings	0.002745	0	0	0	0	33
Other	0	0	0	0	0	0

Appendix C. Section 2. Table 7-22: Summary of Risk Evaluation and Ranking Results

(Continued)

Threat	Max Risk Score in any Region	Min Risk Score in any Region	% of Regions in System with Risk Score Range			
			0.76 – 1.00	0.51 – 0.75	0.26 – 0.50	0.10 – 0.25
Incorrect Operation						
Operating Error (mains)	0.013725	0	0	0	0	33
Operating Error (svs)	0.083875	0	0	0	0	66
Service Line bored thru Sewer	0.001134	0	0	0	0	33
Other	0	0	0	0	0	0
Other						
Bell Joint Leakage	0	0	0	0	0	0
Copper Pipe Puncture - Svcs	NA	NA	NA	NA	NA	NA
Other	0	0	0	0	0	0

APPENDIX D
IDENTIFICATION AND IMPLEMENTATION OF MEASURES TO ADDRESS RISKS

Appendix D. Section 1. Table 8-1: Key Requirements of the Leak Management Program

Program Element	Reference to Requirement Established in the Standard or Procedure
Qualification/Training requirements for personnel conducting leak survey	FPU Operator Qualification Program
Auditing and Quality Assurance of Leak Survey Equipment	FPU Procedure LC-5
Criteria for leak severity classification	FPU Procedure LC-4
Established Frequency of Leak Survey in Business Districts, at intervals not exceeding 15 months, but at least once each calendar year.	FPU O&M Manual Section 1.2.1.1
Established Frequency of Leak Survey for Cathodically Unprotected Lines subject to §192.465(e) on which electrical surveys for corrosion are impractical, at least once every 3 calendar years at intervals not exceeding 39 months.	FPU O&M Manual Section 1.2.1.2
Established Frequency of Leak Survey of Remaining Lines at least once every 5 calendar years at intervals not exceeding 63 months.	FPU O&M Manual Section 1.2.1.2
Hazardous Leaks Requiring Immediate Repair – Ongoing action required	FPU Procedure LC-4, FPU O&M Manual Section 1.2.2.1
Non-hazardous Leaks Requiring Scheduled Repair – Time limit is established to Eliminate Leak	FPU Procedure LC-4, FPU O&M Manual Section 1.2.2.1
Non-Hazardous Leak NOT requiring scheduled repair– Monitoring Requirements established	FPU Procedure LC-4, FPU O&M Manual Section 1.2.2.1
Records and Data Management procedures defined	Florida Administrative Code Chapter 25-12, 12.060

Appendix D. Section 3. Table 8-3: Corrosion Action Plans

Sub-Threat	Corrosion Action Plan Scope	Status	Officer / Manager Responsible
Cast Iron Pipe	No Additional or Accelerated Actions Planned	As of 2019, no known cast iron in system.	South Division Operations Managers
Bare Steel (No CP)	FPUC has a ten year bare steel replacement program in place known as Gas Reliability Infrastructure Program (GRIP) which began in 2012. As of 2020, approximately 337 miles of a total of 351 miles of bare steel pipe has been replaced.	In progress	South Division Operations Manager

Appendix D. Section 3. Table 8-3: Corrosion Action Plans (continued)

Sub-Threat	Corrosion Action Plan Scope	Status	Officer / Manager Responsible
Coated Steel with CP	No Additional or Accelerated Actions Planned		

Appendix D. Section 3. Table 8-3: Corrosion Action Plans (continued)

Sub-Threat	Corrosion Action Plan Scope	Status	Officer / Manager Responsible
Atmospheric Corrosion (South and Central Division)	Atmospheric corrosion surveys will be conducted quarterly by meter readers. In addition, operation technicians will be instructed to inspect for atmospheric corrosion in the course of normal duties. If identified, atmospheric corrosion should be corrected on site, or a work order generated and a crew to be scheduled to address/correct the deficiency.	In Progress	Division Operations Manager.

Appendix D. Section 5. Table 8-5: Excavation Damage Action Plans

Sub-Threat	Excavation Damage Action Plan Scope	Status	Officer / Manager Responsible
Improper Excavation Practice (All Divisions)	Track dig-ins and identify problem excavators. Provide targeted education, & field inspections. Meet with repeat offenders if deemed necessary.	In progress	Division Operations Managers
	Provide One Call literature to Equipment Rental Companies, etc. to increase awareness	In progress	Division Operations Managers
	Conduct pre-construction meeting or site-visits for excavation near critical or high risk facilities.	In Progress	Division Operations Managers
	To augment our damage prevention program, as of 2021, Chesapeake has created positons for a damage prevention manager and damage prevention coordinators which will benefit FPUC damage prevention efforts.	In Progress	Division Operations Managers
Facility Not Located or Marked (All Divisions)	Analyze root cause and implement corrective action when identified. Require written investigation of each damaged facility.	In progress	Division Operations Managers

Appendix D. Section 5. Table 8-5: Excavation Damage Action Plans (continued)

Sub-Threat	Excavation Damage Action Plan Scope	Status	Officer / Manager Responsible
Lack of Tracer Wire (All Divisions)	Contact excavator regarding the pertinent facilities and pothole if necessary. Attempt to create records of said facilities for future excavation. Utilize alternative methods to locate facilities.	In Progress	Division Operations Managers.
Mis-marked Facilities (All Divisions)	Monitor and track for dig-ins resulting from mis-marked facilities. Analyze root cause and implement corrective action, including procedure reviews. Requires written investigation of each incident.	In Progress	Division Operations Managers.
Incorrect Facility Records			
	Monitor timeliness of as-built mapping for new and/or reconstructed facilities. Continue process for indicating existence of plans for new construction or reconstruction on facility maps/records.	In Progress	Division Operations Managers

Table 8-7: Example Material, Weld or Joint Failure Action Plans

Sub-Threat	Material, Weld or Joint Failure Action Plan Scope	Status	Officer / Manager Responsible
Aldyl A	Continue documenting Aldyl A locations with stress or brittle like cracking.	In Progress	Division Operations Managers
	Determine whether leak history on Aldyl A warrants additional or accelerated actions.	In Progress	Division Operations Managers
Delrin Insert Tap Tees	No additional or accelerated actions planned.		
Plexco Service Tee Celcon Caps	No additional or accelerated actions planned.		

Appendix D. Section 8. Table 8-8: Equipment Failure Action Plans

Sub-Threat	Equipment Failure Action Plan Scope	Status	Officer / Manager Responsible
Valves – Kerotest Gate Valves, South and Central Division	Monitor these valves during normal maintenance activities and records review.	In Progress	Division Operations Managers
		In Progress	Division Operations Managers
Service Regulators (All Divisions)	Due to an increased number of leaks on regulators, a data base has been created in a central location in order to capture data on regulator failures. Failed regulators will be stored at each operational center for further investigation/review. Establish replacement program if failure history warrants. All leak causes will be based on the PHMSA definitions and the Compliance Manager or Operations Supervisor responsible for the compliance Tracker will review each Leak Report for accuracy. Review will be conducted with operation technicians and support staff to insure the data and material is collected.	In Progress	Division Operations Managers

Appendix D. Section 10. Table 8-10: Other Action Plans

Sub-Threat	Other Action Plan Scope	Status	Officer / Manager Responsible
Incorrect operation (South and West Divisions)	Review Leak Cause definitions and explanations on pages 6 – 8 of the Instructions for Completing PHMSA Form F 7100.1-1 (rev. 5/2021) with all technicians and contractors completing FPU Leak Reporting form and each administrative person or supervisor entering data in the Leak Reports tab on the Compliance Tracker. All leak causes will be based on the PHMSA definitions and the Compliance Manager or Operations Supervisor responsible for the compliance Tracker will review each Leak Report for accuracy. In addition, technicians should be instructed to use thread sealant (pipe dope or tape) and to tighten fittings and nipples with force sufficient to mitigate leaks.	In Progress	Division Operations Managers

APPENDIX E
MEASUREMENT OF PERFORMANCE, MONITORING RESULTS, AND EVALUATION EFFECTIVENESS

Appendix E. Section 1. Table 9-1: Number of **hazardous leaks** either eliminated or repaired, per §192.703(c), categorized by cause

(South Division)

Performance Measure	5-Year Average 2016-20	Year 2020	Established Baseline	Criteria for Re-evaluation of Threats and Risks	Re-Evaluation Required? Y / N
Number of Hazardous Leaks Eliminated or Repaired – Corrosion - **MAINS**	0.00287	0.00217	5-Yr Average Leaks/Mile/Yr 0.00371	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Corrosion - SERVICES	0.10142	0.0887	5-Yr Average Leaks/Mile/Yr 0.11	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Natural Forces - **MAINS**	0.00044	0.00144	5-Yr Average Leaks/Mile/Yr 0.00031	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Natural Forces - SERVICES	0.0052	0.00202	5-Yr Average Leaks/Mile/Yr 0.006	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Excavation Damage - **MAINS**	0.03793	0.04190	5-Yr Average Leaks/Mile/Yr 0.03481	Moving 5-Yr Average is an increase of 5% or more from established baseline	**YES** – Continue with action plans. (Ref. Appendix D. Section 5. Table 8-5)
Number of Hazardous Leaks Eliminated or Repaired – Excavation Damage - SERVICES	0.40	0.39	5-Yr Average Leaks/Mile/Yr 0.4	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Other	0.00077	0.00072	5-Yr Average Leaks/Mile/Yr 0.00078	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO

Outside Force Damage – **MAINS**					
Number of Hazardous Leaks Eliminated or Repaired – Other Outside Force Damage – SERVICES	0.02121	0.02822	5-Yr Average Leaks/Mile/Yr 0.01824	Moving 5-Yr Average is an increase of 5% or more from established baseline	An increase of over 5%, but no additional actions taken due to small # of leaks.
Number of Hazardous Leaks Eliminated or Repaired – Material, Weld or Joint Failure - **MAINS**	0.00076	0.00144	5-Yr Average Leaks/Mile/Yr 0.00079	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Material, Weld or Joint Failure - SERVICES	0.00422	0.006	5-Yr Average Leaks/Mile/Yr 0.005	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Equipment Failure - **MAINS**	0.00094	0	5-Yr Average Leaks/Mile/Yr 0.00142	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Equipment Failure - SERVICES	0.08212	0.07861	5-Yr Average Leaks/Mile/Yr 0.06952	Moving 5-Yr Average is an increase of 5% or more from established baseline	**YES** –Reference additional actions in appendix D. Section 8 Table 8-8
Number of Hazardous Leaks Eliminated or Repaired – Incorrect Operation - **MAINS**	0.00059	0.00144	5-Yr Average Leaks/Mile/Yr 0.00046	Moving 5-Yr Average is an increase of 5% or more from established baseline	An increase of over 5%, but no additional actions taken due to small # of leaks.

Number of Hazardous Leaks Eliminated or Repaired – Incorrect Operation - SERVICES	0.006	0.006	5-Yr Average Leaks/Mile/Yr 0.009	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Other - **MAINS**	0.00014	0.00072	5-Yr Average Leaks/Mile/Yr 0.00016	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Other - SERVICES	0.004	0	5-Yr Average Leaks/Mile/Yr 0.0044	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO

Appendix E. Section 1. Table 9-1: Number of **hazardous leaks** either eliminated or repaired, per §192.703(c), categorized by cause

(Central Division)

Performance Measure	5-Year Average 2016-20	Year 2020	Established Baseline	Criteria for Re-evaluation of Threats and Risks	Re-Evaluation Required? Y / N
Number of Hazardous Leaks Eliminated or Repaired - Corrosion-**MAINS**	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired - Corrosion-Services	0.042	0.067	5-Yr Average Leaks/Mile/Yr 0.032	Moving 5-Yr Average is an increase of 5% or more from established baseline	**YES** –Reference additional actions in appendix D. Section 8 Table 8-8
Number of Hazardous Leaks Eliminated or Repaired – Natural Forces-**Mains**	0.00027	0.0137	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Natural Forces-Services	0.00812	0.00374	5-Yr Average Leaks/Mile/Yr 0.00823	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Excavation Damage-**Mains**	0.026	0.028	5-Yr Average Leaks/Mile/Yr 0.026	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Excavation Damage-Services	0.26	0.31	5-Yr Average Leaks/Mile/Yr 0.26	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO

Number of Hazardous Leaks Eliminated or Repaired – Other Outside Force Damage-**Mains**	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Other Outside Force Damage-Services	0.014	0.00374	5-Yr Average Leaks/Mile/Yr 0.0138	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Material, Weld or Joint Failure-**Mains**	0.00476	0.00374	5-Yr Average Leaks/Mile/Yr 0.00571	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Material, Weld or Joint Failure-Services	0.00485	0.00384	5-Yr Average Leaks/Mile/Yr 0.00494	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Equipment Failure-**Mains**	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Equipment Failure-Services	0.042	0.0711	5-Yr Average Leaks/Mile/Yr 0.0274	Moving 5-Yr Average is an increase of 5% or more from established baseline	**YES** –Reference additional actions in appendix D. Section 8 Table 8-8
Number of Hazardous Leaks Eliminated or Repaired – Incorrect Operation-**Mains**	0.00057	0	5-Yr Average Leaks/Mile/Yr 0.00057	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Incorrect Operation-Services	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO

Number of Hazardous Leaks Eliminated or Repaired – Other - **Mains**	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Other - Services	0.00659	0	5-Yr Average Leaks/Mile/Yr 0.019	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO

Appendix E. Section 1. Table 9-1: Number of **hazardous leaks** either eliminated or repaired, per §192.703(c), categorized by cause

(West Division)

Performance Measure	5-Year Average 2016-20	Year 2020	Established Baseline	Criteria for Re-evaluation of Threats and Risks	Re-Evaluation Required? Y / N
Number of Hazardous Leaks Eliminated or Repaired – Corrosion - **Mains**	0.00362	0.00521	5-Yr Average Leaks/Mile/Yr 0.00433	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired - Corrosion-Services	0.026	0.0159	5-Yr Average Leaks/Mile/Yr 0.0287	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Natural Forces-**Mains**	0.00043	0	5-Yr Average Leaks/Mile/Yr 0.00043	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Natural Forces-Services	0.00502	0.00396	5-Yr Average Leaks/Mile/Yr 0.00514	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Excavation Damage-**Mains**	0.018	0.021	5-Yr Average Leaks/Mile/Yr 0.017	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Excavation Damage-Services	0.121	0.13	5-Yr Average Leaks/Mile/Yr 0.13	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Other Outside Force Damage-**Mains**	0.00106	0	5-Yr Average Leaks/Mile/Yr 0.00106	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO

Number of Hazardous Leaks Eliminated or Repaired – Other Outside Force Damage-Services	0.00993	0.0198	5-Yr Average Leaks/Mile/Yr 0.0069	Moving 5-Yr Average is an increase of 5% or more from established baseline	An increase of over 5%, but no additional actions taken due to small # of leaks.
Number of Hazardous Leaks Eliminated or Repaired – Material, Weld or Joint Failure-**Mains**	0.00043	0	5-Yr Average Leaks/Mile/Yr 0.00043	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Material, Weld or Joint Failure-Services	0	0	5-Yr Average Leaks/Mile/Yr 0.00366	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Equipment Failure-**Mains**	0.00064	0	5-Yr Average Leaks/Mile/Yr 0.00086	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Equipment Failure-Services	0.09015	0.139	5-Yr Average Leaks/Mile/Yr 0.069	Moving 5-Yr Average is an increase of 5% or more from established baseline	**YES** –Reference additional actions in appendix D. Section 8 Table 8-8
Number of Hazardous Leaks Eliminated or Repaired – Incorrect Operation-**Mains**	0.00064	0	5-Yr Average Leaks/Mile/Yr 0.0009	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Incorrect Operation-Services	0.018	0.024	5-Yr Average Leaks/Mile/Yr 0.013	Moving 5-Yr Average is an increase of 5% or more from established baseline	**YES** –Reference additional actions in appendix D. Section 8 Table 8-8

Number of Hazardous Leaks Eliminated or Repaired – Other-**Mains**	0.0015	0	5-Yr Average Leaks/Mile/Yr 0.00171	Moving 5-Yr Average is an increase of 5% or more from established baseline	**NO**
Number of Hazardous Leaks Eliminated or Repaired – Other-Services	0.03134	0.00411	5-Yr Average Leaks/Mile/Yr 0.03240	Moving 5-Yr Average is an increase of 5% or more from established baseline	**NO**

Appendix E. Section 2. Table 9-2: Number of Excavation Damages **(All Divisions)**

Performance Measure	5-Year Average 2016-20	Year 2020	Established Baseline	Criteria for Re-evaluation of Threats and Risks	Re-Evaluation Required? Y / N
Number of Excavation Damages - **Mains**	86.8	101	**2019** damages resulting in need to repair or replace 99	Increase of 5% or more from established baseline	**YES** – Continue with action plans. (Ref. Appendix D. Section 5. Table 8-5)
Number of Excavation Damages - Services	290	315	**2019** damages resulting in need to repair or replace 293	Increase of 5% or more from established baseline	NO

Appendix E. Section 3. Table 9-3: Number of Excavation Tickets **(All Divisions)**

Performance Measure	5-Year Average 2016-20	Year 2020	Established Baseline	Criteria for Re-evaluation of Threats and Risks	Re-Evaluation Required? Y / N
Number of Excavation Tickets received from the notification center	136,759.6	147,503	**2019** number of excavation tickets 142,549	Increase of 5% or more from established baseline	NO

Appendix E. Section 4. Table 9-4: Number of **leaks** either eliminated or repaired, categorized by cause **(South Division)**

Performance Measure	5-Year Average 2016-20	Year 2020	Established Baseline	Criteria for Re-evaluation of Threats and Risks	Re-Evaluation Required? Y / N
Total Number of Leaks Eliminated or Repaired – Corrosion - **MAINS**	0.011	0.00506	5-Yr Average Leaks/Mile/Yr 0.0124	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total Number of Leaks Eliminated or Repaired – Corrosion – Services	0.325	0.288	5-Yr Average Leaks/Mile/Yr 0.332	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total Number of Leaks Eliminated or Repaired – Natural Forces- **MAINS**	0.00105	0.00217	5-Yr Average Leaks/Mile/Yr 0.00094	Moving 5-Yr Average is an increase of 5% or more from established baseline	An increase of over 5%, but no additional actions taken due to small # of leaks.
Total Number of Leaks Eliminated or Repaired – Natural Forces– Services	0.00602	0.00202	5-Yr Average Leaks/Mile/Yr 0.00695	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total Number of Leaks Eliminated or Repaired – Excavation Damage- **MAINS**	0.0396	0.0434	5-Yr Average Leaks/Mile/Yr 0.0362	Moving 5-Yr Average is an increase of 5% or more from established baseline	**YES** – Continue with action plans. (Ref. Appendix D. Section 5. Table 8-5)
Total Number of Leaks Eliminated or Repaired – Excavation Damage– Services	0.416	0.397	5-Yr Average Leaks/Mile/Yr 0.413	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total Number of Leaks Eliminated or Repaired – Other Outside Force Damage- **MAINS**	0.00092	0.00072	5-Yr Average Leaks/Mile/Yr 0.00093	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total Number of Leaks Eliminated or Repaired – Other Outside Force Damage– Services	0.024	0.0343	5-Yr Average Leaks/Mile/Yr 0.02	Moving 5-Yr Average is an increase of 5% or more from established baseline	An increase of over 5%, but no additional actions taken due to small # of leaks.

Total Number of Leaks Eliminated or Repaired – Material, Weld or Joint Failure- **MAINS**	0.00198	0.00289	5-Yr Average Leaks/Mile/Yr 0.00315	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total Number of Leaks Eliminated or Repaired – Material, Weld or Joint Failure– Services	0.0102	0.0121	5-Yr Average Leaks/Mile/Yr 0.0131	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total Number of Leaks Eliminated or Repaired – Equipment Failure- **MAINS**	0.00403	0.00072	5-Yr Average Leaks/Mile/Yr 0.00548	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total Number of Leaks Eliminated or Repaired – Equipment Failure– Services	0.203	0.266	5-Yr Average Leaks/Mile/Yr 0.156	Moving 5-Yr Average is an increase of 5% or more from established baseline	**YES** –Reference additional actions in appendix D. Section 8 Table 8-8
Total Number of Leaks Eliminated or Repaired – Incorrect Operation- **MAINS**	0.00182	0.00144	5-Yr Average Leaks/Mile/Yr 0.00185	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total Number of Leaks Eliminated or Repaired – Incorrect Operation– Services	0.0237	0.0585	5-Yr Average Leaks/Mile/Yr 0.0178	Moving 5-Yr Average is an increase of 5% or more from established baseline	**YES** –Reference additional actions in appendix D. Section 8 Table 8-8
Total Number of Leaks Eliminated or Repaired – Other- **MAINS**	0.00078	0.00072	5-Yr Average Leaks/Mile/Yr 0.00111	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total Number of Leaks Eliminated or Repaired – Other– Services	0.00962	0.00202	5-Yr Average Leaks/Mile/Yr 0.01055	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO

Appendix E. Section 5. Table 9-5: Number of hazardous leaks either eliminated or repaired, per §192.703(c), categorized by **material**

(South Division)

Performance Measure	5-Year Average 2016-20	Year 2020	Established Baseline	Criteria for Re-evaluation of Threats and Risks	Re-Evaluation Required? Y / N
Number of Hazardous Leaks Eliminated or Repaired – Cast Iron- **MAINS**	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO. As of 2019 FDOT 7100 report. No cast iron in system
Number of Hazardous Leaks Eliminated or Repaired – Bare Steel- **MAINS**	0.00499	0.00578	5-Yr Average Leaks/Mile/Yr 0.00575	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Bare Steel- SERVICES	0.05061	0.0383	5-Yr Average Leaks/Mile/Yr 0.05278	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Coated Steel with CP- **MAINS**	0.0038	0.00217	5-Yr Average Leaks/Mile/Yr 0.00448	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Coated Steel with CP- Services	0.03976	0.03628	5-Yr Average Leaks/Mile/Yr 0.04323	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Polyethylene All other - **MAINS**	0.0352	0.03973	5-Yr Average Leaks/Mile/Yr 0.03160	Moving 5-Yr Average is an increase of 5% or more from established baseline	**YES** – Continue action plans. See action plans. (Ref. Appendix D. Section 5. Table 8-5)
Number of Hazardous Leaks Eliminated or Repaired – Polyethylene All other - services	0.42793	0.4193	5-Yr Average Leaks/Mile/Yr 0.42361	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO

Number of Hazardous Leaks Eliminated or Repaired – Aldyl A - **MAINS**	0.00074	0.00144	5-Yr Average Leaks/Mile/Yr 0.00045	Moving 5-Yr Average is an increase of 5% or more from established baseline	**YES** – Continue action plans. See action plans. (Ref. Appendix D. Section 5. Table 8-7)
Number of Hazardous Leaks Eliminated or Repaired – Aldyl A - Services	0.00596	0.00605	5-Yr Average Leaks/Mile/Yr 0.00873	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO

Appendix E. Section 4. Table 9-4: Number of leaks either eliminated or repaired, categorized by cause **(Central Division)**

Performance Measure	5-Year Average 2016-20	Year 2020	Established Baseline	Criteria for Re-evaluation of Threats and Risks	Re-Evaluation Required? Y / N
Total Number of Leaks Eliminated or Repaired – Corrosion – **MAINS**	0.00056	0.00137	5-Yr Average Leaks/Mile/Yr 0.00029	Moving 5-Yr Average is an increase of 5% or more from established baseline	An increase of over 5%, but no additional actions taken due to small # of leaks.
Total Number of Leaks Eliminated or Repaired – Corrosion - Services	0.1656	0.165	5-Yr Average Leaks/Mile/Yr 0.154	Moving 5-Yr Average is an increase of 5% or more from established baseline	**YES** –Reference additional actions in appendix D. Section 8 Table 8-8
Total Number of Leaks Eliminated or Repaired – Natural Forces– **mains**	0.00056	0.0137	5-Yr Average Leaks/Mile/Yr 0.00029	Moving 5-Yr Average is an increase of 5% or more from established baseline	An increase of over 5%, but no additional actions taken due to small # of leaks.
Total Number of Leaks Eliminated or Repaired – Natural Forces– services	0.00973	0.00374	5-Yr Average Leaks/Mile/Yr 0.00985	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total Number of Leaks Eliminated or Repaired – Excavation Damage– **mains**	0.0259	0.0275	5-Yr Average Leaks/Mile/Yr 0.0268	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total Number of Leaks Eliminated or Repaired – Excavation Damage– services	0.2594	0.2844	5-Yr Average Leaks/Mile/Yr 0.263	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total Number of Leaks Eliminated or Repaired – Other Outside Force Damage– **mains**	0.00058	0.00137	5-Yr Average Leaks/Mile/Yr 0.00030	Moving 5-Yr Average is an increase of 5% or more from established baseline	An increase of over 5%, but no additional actions taken due to small # of leaks.
Total Number of Leaks Eliminated or Repaired – Other Outside Force Damage– services	0.01531	0.00374	5-Yr Average Leaks/Mile/Yr 0.0154	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO

Total Number of Leaks Eliminated or Repaired – Material, Weld or Joint Failure– **mains**	0.00355	0.00413	5-Yr Average Leaks/Mile/Yr 0.00305	Moving 5-Yr Average is an increase of 5% or more from established baseline	An increase of over 5%, but no additional actions taken due to small # of leaks.
Total Number of Leaks Eliminated or Repaired – Material, Weld or Joint Failure– services	0.0134	0.015	5-Yr Average Leaks/Mile/Yr 0.0197	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total Number of Leaks Eliminated or Repaired – Equipment Failure– **mains**	0.00030	0	5-Yr Average Leaks/Mile/Yr 0.0003	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total Number of Leaks Eliminated or Repaired – Equipment Failure– services	0.1717	0.1721	5-Yr Average Leaks/Mile/Yr 0.139	Moving 5-Yr Average is an increase of 5% or more from established baseline	**YES** –Reference additional actions in appendix D. Section 8 Table 8-8
Total Number of Leaks Eliminated or Repaired – Incorrect Operation– **mains**	0.00115	0	5-Yr Average Leaks/Mile/Yr 0.00115	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total Number of Leaks Eliminated or Repaired – Incorrect Operation– services	0.00777	0	5-Yr Average Leaks/Mile/Yr 0.00077	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total Number of Leaks Eliminated or Repaired – Other– **mains**	0.00365	0	5-Yr Average Leaks/Mile/Yr 0.00814	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total Number of Leaks Eliminated or Repaired – Other– services	0.044	0.00374	5-Yr Average Leaks/Mile/Yr 0.06	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO

Appendix E. Section 5. Table 9-5: Number of hazardous leaks either eliminated or repaired, per §192.703(c), categorized by material

(Central Division)

Performance Measure	5-Year Average 2016-20	Year 2020	Established Baseline	Criteria for Re-evaluation of Threats and Risks	Re-Evaluation Required? Y / N
Number of Hazardous Leaks Eliminated or Repaired – Bare Steel – **MAINS**	0.00000	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO. Bare steel removed from Central Division
Number of Hazardous Leaks Eliminated or Repaired – Bare Steel – services	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO. Bare steel removed from Central Division
Number of Hazardous Leaks Eliminated or Repaired – Coated Steel with CP – **MAINS**	0.00144	0.00275	5-Yr Average Leaks/Mile/Yr 0.00217	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Coated Steel with CP – services	0.04782	0.04865	5-Yr Average Leaks/Mile/Yr 0.03896	Moving 5-Yr Average is an increase of 5% or more from established baseline	**YES** –Reference additional actions in appendix D. Section 8 Table 8-8
Number of Hazardous Leaks Eliminated or Repaired – Polyethylene All other– **MAINS**	0.02591	0.0261	5-Yr Average Leaks/Mile/Yr 0.0249	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Polyethylene All other– services	0.26657	0.341	5-Yr Average Leaks/Mile/Yr 0.258	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO

Appendix E. Section 4. Table 9-4: Number of leaks either eliminated or repaired, categorized by cause **(West Division)**

Performance Measure	5-Year Average 2016-20	Year 2020	Established Baseline	Criteria for Re-evaluation of Threats and Risks	Re-Evaluation Required? Y / N
Total Number of Leaks Eliminated or Repaired – Corrosion – **mains**	0.0107	0.0073	5-Yr Average Leaks/Mile/Yr 0.0127	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total Number of Leaks Eliminated or Repaired - Corrosion-Services	0.0598	0.055	5-Yr Average Leaks/Mile/Yr 0.0579	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total Number of Leaks Eliminated or Repaired – Natural Forces– **mains**	0.00065	0	5-Yr Average Leaks/Mile/Yr 0.00065	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total Number of Leaks Eliminated or Repaired – Natural Forces-Services	0.00583	0.00396	5-Yr Average Leaks/Mile/Yr 0.006	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total Number of Leaks Eliminated or Repaired – Excavation Damage– **mains**	0.01779	0.02189	5-Yr Average Leaks/Mile/Yr 0.01692	Moving 5-Yr Average is an increase of 5% or more from established baseline	**YES** – Continue with action plans. (Ref. Appendix D. Section 5. Table 8-5)
Total Number of Leaks Eliminated or Repaired – Excavation Damage-Services	0.12	0.14	5-Yr Average Leaks/Mile/Yr 0.134	Moving 5-Yr Average is an increase of 5% or more from established baseline	**NO**
Total Number of Leaks Eliminated or Repaired – Other Outside Force Damage– **mains**	0.00128	0	5-Yr Average Leaks/Mile/Yr 0.00128	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total Number of Leaks Eliminated or Repaired – Other Outside Force Damage-Services	0.01078	0.01981	5-Yr Average Leaks/Mile/Yr 0.0073	Moving 5-Yr Average is an increase of 5% or more from established baseline	An increase of over 5%, but no additional actions taken due to small # of leaks.
Total Number of Leaks Eliminated or Repaired –	0.00043	0	5-Yr Average Leaks/Mile/Yr 0.00065	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO

Material, Weld or Joint Failure– **mains**					
Total Number of Leaks Eliminated or Repaired – Material, Weld or Joint Failure-Services	0.078	0	5-Yr Average Leaks/Mile/Yr 0.082	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total Number of Leaks Eliminated or Repaired – Equipment Failure– **mains**	0.00149	0	5-Yr Average Leaks/Mile/Yr 0.00237	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total Number of Leaks Eliminated or Repaired – Equipment Failure-Services	0.214	0.345	5-Yr Average Leaks/Mile/Yr 0.183	Moving 5-Yr Average is an increase of 5% or more from established baseline	**YES** –Reference additional actions in appendix D. Section 8 Table 8-8
Total Number of Leaks Eliminated or Repaired – Incorrect Operation– **mains**	0.00064	0	5-Yr Average Leaks/Mile/Yr 0.00086	Moving 5-Yr Average is an increase of 5% or more from established baseline	**NO**
Total Number of Leaks Eliminated or Repaired – Incorrect Operation-Services	0.028	0.071	5-Yr Average Leaks/Mile/Yr 0.014	Moving 5-Yr Average is an increase of 5% or more from established baseline	**YES** –Reference additional actions in appendix D. Section 8 Table 8-8
Total Number of Leaks Eliminated or Repaired – Other– **mains**	0.00362	0	5-Yr Average Leaks/Mile/Yr 0.00384	Moving 5-Yr Average is an increase of 5% or more from established baseline	**NO**
Total Number of Leaks Eliminated or Repaired – Other-Services	0.19	0	5-Yr Average Leaks/Mile/Yr 0.189	Moving 5-Yr Average is an increase of 5% or more from established baseline	**NO**

Appendix E. Section 5. Table 9-5: Number of **hazardous** leaks either eliminated or repaired, per §192.703(c), categorized by material

(West Division)

Performance Measure	5-Year Average 2016-20	Year 2020	Established Baseline	Criteria for Re-evaluation of Threats and Risks	Re-Evaluation Required? Y / N
Number of Hazardous Leaks Eliminated or Repaired – Bare Steel - **MAINS**	0.00448	0.00313	5-Yr Average Leaks/Mile/Yr 0.00676	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Bare Steel– Services	0.01296	0.00396	5-Yr Average Leaks/Mile/Yr 0.02040	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Coated Steel with CP- **MAINS**	0.0021	0.00626	5-Yr Average Leaks/Mile/Yr 0.00085	Moving 5-Yr Average is an increase of 5% or more from established baseline	An increase of over 5%, but no additional actions taken due to small # of leaks.
Number of Hazardous Leaks Eliminated or Repaired – Coated Steel with CP– Services	0.01375	0.00396	5-Yr Average Leaks/Mile/Yr 0.01296	Moving 5-Yr Average is an increase of 5% or more from established baseline	An increase of over 5%, but no additional actions taken due to small # of leaks.
Number of Hazardous Leaks Eliminated or Repaired – Polyethylene All other- **MAINS**	0.0189	0.01564	5-Yr Average Leaks/Mile/Yr 0.0187	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Polyethylene All other – Services	0.146	0.13866	5-Yr Average Leaks/Mile/Yr 0.15784	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO

APPENDIX F
PERIODIC EVALUATION AND IMPROVEMENT

Appendix F. Table 10-1: Documentation of Re-evaluation of Threats and Risks

Performance Measures that Exceeded Baseline				
Region	**Performance Measure**	**Actual Performance for Year 2016 - 2020**	**Established Baseline**	**Re-evaluation criteria**
SOUTH DIVISION	# of Hazardous Leaks Eliminated or Repaired – other outside force - **services**	0.02121	0.01824	Moving 5-Yr Average is an increase of 5% or more from established baseline
SOUTH DIVISION	# of Hazardous Leaks Eliminated or Repaired – Equipment failure - **services**	0.08212	0.06952	Moving 5-Yr Average is an increase of 5% or more from established baseline
SOUTH DIVISION	# of Hazardous Leaks Eliminated or Repaired – Excavation damage - **mains**	0.03793	0.03481	Moving 5-Yr Average is an increase of 5% or more from established baseline
SOUTH DIVISION	# of Hazardous Leaks Eliminated or Repaired – Incorrect operation - **mains**	0.00059	0.00046	Moving 5-Yr Average is an increase of 5% or more from established baseline
CENTRAL DIVISION	# of Hazardous Leaks Eliminated or Repaired – Corrosion – **services**	0.04243	0.03231	Moving 5-Yr Average is an increase of 5% or more from established baseline
CENTRAL DIVISION	# of Hazardous Leaks Eliminated or Repaired – Equipment failure – **services**	0.04162	0.02740	Moving 5-Yr Average is an increase of 5% or more from established baseline
WEST DIVISION	# of Hazardous Leaks Eliminated or Repaired –Incorrect operation- **services**	0.01790	0.01314	Moving 5-Yr Average is an increase of 5% or more from established baseline
West DIVISION	# of Hazardous Leaks Eliminated or Repaired – Other Outside Force damage – **services**	0.00993	0.00689	Moving 5-Yr Average is an increase of 5% or more from established baseline

West DIVISION	# of Hazardous Leaks Eliminated or Repaired – Equipment failure – **services**	0.09015	0.06883	Moving 5-Yr Average is an increase of 5% or more from established baseline
SOUTH DIVISION	Total # of Leaks Eliminated or Repaired – Excavation damage – **mains**	0.03621	0.03275	Moving 5-Yr Average is an increase of 5% or more from established baseline
SOUTH DIVISION	Total # of Leaks Eliminated or Repaired – NF– **mains**	0.0105	0.00094	Moving 5-Yr Average is an increase of 5% or more from established baseline
SOUTH DIVISION	Total # of Leaks Eliminated or Repaired – Equipment failure – **services**	0.2030	0.1560	Moving 5-Yr Average is an increase of 5% or more from established baseline
SOUTH DIVISION	Total # of Leaks Eliminated or Repaired – Incorrect operation – **services**	0.0237	0.0178	Moving 5-Yr Average is an increase of 5% or more from established baseline
SOUTH DIVISION	Total # of Leaks Eliminated or Repaired – Other Outside Force – **services**	0.02417	0.02	Moving 5-Yr Average is an increase of 5% or more from established baseline
CENTRAL DIVISION	Total # of Leaks Eliminated or Repaired – Corrosion - **Mains**	0.00056	0.00029	Moving 5-Yr Average is an increase of 5% or more from established baseline
CENTRAL DIVISION	Total # of Leaks Eliminated or Repaired – Other Outside Force damage - **Mains**	0.00058	0.00030	Moving 5-Yr Average is an increase of 5% or more from established baseline
CENTRAL DIVISION	Total # of Leaks Eliminated or Repaired – NF- **Mains**	0.00056	0.00029	Moving 5-Yr Average is an increase of 5% or more from established baseline
CENTRAL DIVISION	Total # of Leaks Eliminated or Repaired – Material weld or joint - **Mains**	0.00355	0.00305	Moving 5-Yr Average is an increase of 5% or more from established baseline
CENTRAL DIVISION	Total # of Leaks Eliminated or Repaired – Equipment Failure - **services**	0.1717	0.139	Moving 5-Yr Average is an increase of 5% or more from established baseline

CENTRAL DIVISION	Total # of Leaks Eliminated or Repaired – Corrosion – **services**	0.1656	0.1543	Moving 5-Yr Average is an increase of 5% or more from established baseline
WEST DIVISION	Total # of Leaks Eliminated or Repaired – Excavation - **MAINS**	0.01779	0.01692	Moving 5-Yr Average is an increase of 5% or more from established baseline
WEST DIVISION	Total # of Leaks Eliminated or Repaired – other outside force - **services**	0.01078	0.00773	Moving 5-Yr Average is an increase of 5% or more from established baseline
WEST DIVISION	Total # of Leaks Eliminated or Repaired – Equipment Failure - **services**	0.214	0.183	Moving 5-Yr Average is an increase of 5% or more from established baseline
SOUTH DIVISION	# of Hazardous Leaks Eliminated or Repaired categorized by matl. – Polyethylene - **mains**	0.03524	0.03160	Moving 5-Yr Average is an increase of 5% or more from established baseline
SOUTH DIVISION	# of Hazardous Leaks Eliminated or Repaired categorized by matl. – Aldyl A - **mains**	0.00074	0.00045	Moving 5-Yr Average is an increase of 5% or more from established baseline
CENTRAL DIVISION	# of Hazardous Leaks Eliminated or Repaired categorized by matl. – Coated steel - **services**	0.04782	0.03896	Moving 5-Yr Average is an increase of 5% or more from established baseline
WEST DIVISION	# of Hazardous Leaks Eliminated or Repaired categorized by matl. – steel - **mains**	0.00210	0.00085	Moving 5-Yr Average is an increase of 5% or more from established baseline
WEST DIVISION	# of Hazardous Leaks Eliminated or Repaired categorized by matl. – steel - **services**	0.01375	0.01296	Moving 5-Yr Average is an increase of 5% or more from established baseline
ALL DIVISION	# of Excavation Damages - MAINS	86.8	101	Moving 5-Yr Average is an increase of 5% or more from established baseline
NOTES:				
Existing Date for Complete Program re-evaluation: 2021. Is a shorter timeframe for complete program re-evaluation warranted? : NO				

Required frequency	Program Re-evaluation Element	Date Completed
Required Annually	5 year DIMP review update	12/06/2021
Required Annually	Annual meeting with Compliance Manager – Mike McCarty (West Division) to review DIMP (TEAMS Video call)	12/02/2021
Required Annually	Annual meeting with Operations Supervisor – Glenn Pendleton (Central Division) to review DIMP	10/22/2020
Required Annually	Annual meeting with Compliance Manager – Walter Rossetto, Doug Moreland & James Rolle (South Division) to review DIMP (TEAMS Video call)	12/02/2021
As needed*		
As needed*		
As needed*		
As needed*		
As needed*		

** as needed to address the risk category whose performance measure was exceeded*

SUPPLEMENTAL SECTION

PHMSA JURISDICTIONAL LIQUEFIED PROPANE GAS SYSTEMS

THREAT IDENTIFICATION

13.0 PURPOSE AND OBJECTIVES

The objective of this IM Plan is to establish the requirements to comply with the Code of Federal Regulations (CFR 49) §§ 192.1015 pertaining to integrity management for small LPG operators. This IM Plan does not address how an operator may deviate from the required periodic inspections as provided for in §192.1013.

This is the 5 year review of FPUC's jurisdictional liquefied propane gas systems for the years 2013 - 2017.

Florida Public Utilities Company is divided into three operational divisions. The systems that comprise each division are as follows:

South Florida Division includes Barefoot Bay.

Central Division consists of Veranda Park

And the West Division consists of Newberry and Newton.

(Villas at Lake Smart has been converted to natural gas as of 08/10/2021)

Individual DIMP plans have been created for FPUCs jurisdictional Community Gas Systems and are available upon request.

The IM Plan is comprised of seven elements

-Knowledge of Facilities (Section 14)

-Threat Identification (Section 15)

-Evaluation & Ranking of Risk (Section 16)

- Identification & Implementation of Measures to address risk (Section 17)

- Measurement of performance, monitoring results, & evaluating effectiveness (Section 18)

-Periodic evaluation & improvement (Section 19)

- Reporting results (Section 20)

In addition to the key elements, the IM Plan also establishes requirements for reporting of mechanical coupling failures (Section 20)

All elements of this IM Plan where implemented by **August 2, 2011.**

14.0 KNOWLEDGE OF FACILITIES

The objective of this section is to assemble as complete of an understanding of the company's infrastructure as possible using reasonably available information from past and ongoing design, operations and maintenance activities. In addition, this plan will identify what additional information is needed and provide a plan for gaining that information over time through normal activities.

14.1 Type and Location of Records

A summary of the existing records that are utilized by the IM Plan and where they are located is documented in Appendix A, Section 1 (Propane). These records include, but are not limited to, incident and leak history, corrosion control records, continuing surveillance records, patrolling records, maintenance history and excavation damage experience.

14.2 Overview of Past Design, Operations and Maintenance

Record reviews, interviews with SMEs and other means were used to gain an understanding of past design, operations and maintenance history of the distribution system. This information includes operating pressures, materials used in construction and construction practices. This information is documented, or included by reference, in Appendix A, Section 2 (Propane).

14.3 Characteristics of Design, Operations and Environmental Factors

Characteristics of the pipeline's design, operations and environmental factors that are necessary to assess the applicable threats and risks are documented, or included by reference, in Appendix A, Section 3 (Propane).

14.4 Additional Information Needed

Additional information needed to support the IM plan (information that is not reasonably available today) is identified in Appendix A, Section 4 (Propane). Plans for gaining additional information over time through normal activities conducted on the pipeline are documented, or included by reference, in Appendix A, Section 4 (Propane).

14.5 Data Capture for New Construction and Ongoing O&M

Data is continuously collected for both construction of new facilities, reconstruction of existing facilities and ongoing operations and maintenance. In particular, the standard or procedure that require data capture for the location where the new pipeline is installed and the material of which it is constructed is contained in FPU Operations and Maintenance Manual Section 16.0.1.

14.6 Knowledge Capture – Subject Matter Experts

In addition to maps, records, and databases, valuable information for this IM plan was gathered and captured from SMEs. SMEs are individuals who have specialized knowledge based on their experience or training. SMEs were used to supplement existing, incomplete, or missing records and were the best source of information in subjects such as historical operations, maintenance, and construction practices. SME interviews were also utilized to ensure that all threats have been identified.

New SME interviews were conducted for this 5 year plan update and are documented and stored in the Distribution Integrity Management Program files and are available upon request.

15.0 THREAT IDENTIFICATION

The objective of this section of the plan is to identify existing and potential threats to the gas distribution pipeline.

The following categories of threats shall be considered for each gas distribution pipeline:

- Corrosion
- Natural Forces
- Excavation Damage
- Other Outside Force
- Material, Weld or Joint Failure
- Equipment Failure
- Incorrect Operation
- Other concerns that could threaten the integrity of the pipeline.

A review of information gathered for Section 14 and interviews with Subject Matter Experts were used to identify existing and potential threats to the distribution system. **A description of the process used to identify threats is referenced in Appendix B, Section 1 (Propane)**. The threats identified as applicable to the gas distribution pipeline are documented in Appendix B, Section 2 (Propane). Prior versions of the threat identification process and results that are no longer current shall be retained and stored in the Distribution Integrity Management Program files.

16.0 EVALUATION AND RANKING OF RISK

16.1 Objective

Risk analysis is an ongoing process of understanding what factors affect the risk posed by threats to the gas distribution pipeline and where they are relatively more important than others. The primary objectives of the evaluation and ranking of gas distribution pipeline risk are:

- Consider each applicable current and potential threat
- Consider the likelihood of failure associated with each threat
- Consider the potential consequences of such a failure
- Estimate and rank the risks (i.e. determine the relative importance) posed to the pipeline
- Consider the relevance of threats in one location to other areas

NOTE: There were several potential threats identified for the distribution system, but no previous incidents of these threats have occurred. Because there have been no previous incidents of these potential threats, their frequency is zero, thus resulting in a risk calculation of zero. However, some of these potential threats appear in the risk ranking tables with a risk ranking of zero as we are cognizant that they are a potential threat.

16.2 Risk Assessment Process

The current process used for Risk Assessment **(Blended Risk (Subject Matter Expert & data) Evaluation and Ranking Process)** shall be documented, or included by reference, in Appendix C, Section 1 (Propane). Prior risk assessment processes shall be retained and stored in the Distribution Integrity Management Program files.

16.3 Risk Assessment

The current risk assessment **(likelihood, consequence, and resultant risk ranking)** shall be documented, or included by reference, in Appendix C, Section 2 (Propane). Prior risk assessment results shall be retained and stored in the Distribution Integrity Management Program files.

RISK = Consequence (COF) x Likelihood (FOF)

17.0 IDENTIFICATION AND IMPLEMENTATION OF MEASURES TO ADDRESS RISKS

The objective of this section of the IM Plan is to describe existing and proposed measures to address the risks that have been evaluated and prioritized for the jurisdictional liquefied propane gas systems for the 5 year review 2013- 2017 in section 16.

17.1 Leak Management Program

The Leak Management program is established in the Florida Public Utilities Procedure Manual in the section entitled “Leak Control”.

17.1.1 Description of Existing Program

Florida Public Utilities Leak Management Program contains all the essential elements for an effective program. Procedures are in place to 1) Locate the leak, 2) Evaluate its severity, 3) Act appropriately to mitigate the leak, 4) Keep records; and 5) Self assess to determine if additional actions are necessary.

Florida Public Utilities Operations and Maintenance Manual and Emergency Manual address necessary components of effective leak control including, prompt and effective response to gas odor calls, classification of gas leaks, performing leakage surveys at prescribed regulatory intervals and system patrols.

Leaks are repaired in compliance with the prescribed time frames of Chapter 25-12.040 of the Florida Administrative Code.

A summary of the key elements of the Leak Management Program are documented, or included by reference, in Appendix D Section 1 (Propane).

17.2 Other Additional or Accelerated Actions

At this time no additional or accelerated actions for leak management beyond the minimum code requirements specified outside of Part 192 subpart P are planned. In the event additional or accelerated actions are planned in the future, procedures to implement these will be identified.

17.2.1 Corrosion

Per 2013 to 2017 data, Corrosion is the highest ranked risk and leading cause of leaks in FPU's jurisdictional liquefied propane gas systems. It was mostly encountered on the steel services in the South Division, since this is the only division that has steel mains and services. This is reflected in the number of leaks and the risk rankings (Appendix C_Propane Section Ref table S-3). No leaks caused by corrosion were reported in any other division. It should also be noted that the risk ranking number has increased from the last revaluation from 0.057 to 4.1175.

Additional or Accelerated Actions that are currently scheduled or in place in order to reduce the risks associated with corrosion are documented, or included by reference, in Appendix D_Propane Section. Ref table S-5. Prior documentation shall be retained and stored in the Distribution Integrity Management Program files.

17.2.2 Natural Forces

Leaks in FPU's jurisdictional liquefied propane gas systems due to the threat of natural forces are zero to minimal and risk rankings are so low that they are negligible

Because the number of leaks from natural forces is zero, no Additional or Accelerated Actions are scheduled. Prior documentation shall be retained and stored in the Distribution Integrity Management Program files.

17.2.3 Excavation Damage

Per 2013 to 2017 data, Excavation Damage is the second leading cause of leaks in FPU's jurisdictional liquefied propane gas systems. This is reflected in the number of leaks and the risk rankings (Appendix C_Propane Section Ref table S-3). FPU's South Division accounted for most of the excavation damages, due to the fact that the south Division has significantly more buried pipe (47.3 miles) compared to the other two divisions (4.7 miles combined). For the 5 year period 2013 to 2017 there were only 24 leaks reported.

Additional or Accelerated Actions that are currently scheduled or in place in order to reduce the risks associated with corrosion are documented, or included by reference, in Appendix D_Propane Section. Ref table S-5. Prior documentation shall be retained and stored in the Distribution Integrity Management Program files.

17.2.4 Other Outside Force

Leaks in FPU's jurisdictional liquefied propane gas systems due to the threat of Other Outside force are zero to minimal and risk rankings are so low that they are negligible.

Because the number of leaks from Other Outside force is low, and risks rankings from this threat were minimal. No Additional or Accelerated Actions are scheduled. Prior documentation shall be retained and stored in the Distribution Integrity Management Program files.

17.2.5 Material, Weld or Joint Failure

Leaks in FPU's jurisdictional liquefied propane gas systems due to the threat of material, weld, or joint failure are zero to minimal and risk rankings are so low that they are negligible.

As noted in the previous reevaluation, Aldyl A pipe is still believed to exist in the South Division (Barefoot Bay). The same action item remains in place in order to gain better data on the amount of Aldyl A that exists in the system. These actions are documented, or included by reference, in Appendix D_Propane Section. Ref table S-5. Prior documentation shall be retained and stored in the Distribution Integrity Management Program files.

17.2.6 Equipment Failure

Leaks in FPU's jurisdictional liquefied propane gas systems due to the threat of Equipment failure are zero to minimal and risk rankings are so low that they are negligible.

No additional or Accelerated Action threats are planned for the equipment failure. Prior documentation shall be retained and stored in the Distribution Integrity Management Program files.

17.2.7 Incorrect Operation

Leaks in FPU's jurisdictional liquefied propane gas systems due to the threat of Incorrect Operation are zero to minimal and risk rankings are so low that they are negligible.

No additional or Accelerated Action threats are planned for the Incorrect Operation. Prior documentation shall be retained and stored in the Distribution Integrity Management Program files.

17.2.8 Other

Leaks in FPU's jurisdictional liquefied propane gas systems due to other causes are minimal and risk rankings are so low that they are negligible.

Because the number of leaks from other causes is low, and risks rankings from this threat were minimal, no Additional or Accelerated Actions are scheduled. Prior documentation shall be retained and stored in the Distribution Integrity Management Program files.

18.0 MEASUREMENT OF PERFORMANCE, MONITORING RESULTS, AND EVALUATING EFFECTIVENESS

The objective of this section of the plan is to establish performance measures that shall be monitored from an established baseline in order to evaluate the effectiveness of the IM program. The performance measures detailed below have been established in order to monitor performance and assist in the ongoing evaluation of threats.

18.1 Number of Hazardous Leaks either Eliminated or Repaired, per §192.703(c), Categorized by Cause

The baseline and ongoing performance of the number of hazardous leaks either eliminated or repaired, per §192.703(c), categorized by cause, shall be documented, or included by reference, in Appendix E_Propane Section.

18.2 Number of Excavation Damages

The baseline and ongoing performance of the number of excavation damages are included by reference in Appendix E_Propane Section.

18.3 Number of Excavation Tickets (received from the Sunshine State One Call of Florida notification center)

The baseline and ongoing performance of the number of excavation tickets received from the notification center(s) are included by reference in Appendix E_Propane Section.

18.4 Total Number of Leaks either Eliminated or Repaired, Categorized by Cause

The baseline and ongoing performance of the total number of leaks either eliminated or repaired, categorized by cause, are included by reference in Appendix E_Propane Section.

18.5 Number of Hazardous Leaks either Eliminated or Repaired, per §192.703(c), Categorized by Material

The baseline and ongoing performance of the number of hazardous leaks either eliminated or repaired, per §192.703(c), categorized by material, shall be documented, or included by reference, in Appendix E_Propane Section.

19.0 PERIODIC EVALUATION AND IMPROVEMENT

The objective of this section of the plan is to periodically re-evaluate threats and risks on all jurisdictional liquefied propane gas systems and periodically evaluate the effectiveness of its program.

19.1 Plan Updating, Review Frequency and Documentation

This written integrity management plan shall be reviewed annually and updated as required to reflect changes and improvements that have occurred in process, procedures and analysis for each element of the program. The updated integrity plan will be emailed to the operations managers. A complete program re-evaluation shall be completed every five years. All changes to the written plan, inclusive of material from the appendices, shall be recorded on the Revision Control Sheet on page ii. However, changes to material in the appendices that is included by reference need not be recorded on the Revision Control Sheet.

19.2 Effectiveness Review

An assessment of the performance measures described above shall be performed. In cases where the re-evaluation criteria specified is met or exceeded, a re-evaluation of the associated threats and risks shall be completed. **An emerging threat in one or more location shall be evaluated for relevance to other areas**. The re-evaluation of threats and risks shall be documented in Appendix F_Propane Section and the results of the re-evaluation shall be documented in Appendices B_Propane Section and C_Propane Section. The review shall also establish whether a complete program re-evaluation shall be completed in a shorter timeframe than five years; this decision shall also be documented. Past effectiveness reviews that are no longer current shall be retained and stored in the Distribution Integrity Management Program files.

20.0 REPORTING RESULTS

20.1 State & Federal Annual Reporting Requirements

The following four measures shall be reported, annually by March 15, to PHMSA as part of the annual report required by 49 CFR, § 191.11:

- Number of hazardous leaks either eliminated or repaired (or total number of leaks if all leaks are repaired when found), per § 192.703(c), categorized by cause
- Number of excavation damages
- Number of excavation tickets (receipt of information by the underground facility operator(Florida Public Utilities) from the Sunshine State One Call of Florida notification center)
- Total number of leaks either eliminated or repaired, categorized by cause
- Information related to failure of mechanical couplings, excluding those that result only in nonhazardous leaks, shall be reported to PHMSA as part of the annual report required by §191.11 beginning with the report submitted March 15, 2011. This information must include, as available, location of the failure in the pipeline, nominal pipe size, material type, nature of failure including any contribution of local pipeline environment, coupling manufacturer, lot number and date of manufacture, and other information that can be found in markings on the failed coupling. At this time, there are no mechanical fittings in the system. The exception for The South Division (Barefoot Bay), non-have been found, but because the system was purchased, it cannot be said for certain they do not exist.

The State of Florida also exercises jurisdiction over the pipeline; therefore, these five measures shall also be reported to the Florida Public Service Commission. A copy of the reports shall be maintained in the Distribution Integrity Management Program files.

21.0 DOCUMENT AND RECORD RETENTION

The following records shall be retained in the Distribution Integrity Management Program files.

- The most current as well as prior versions of this written IM Plan

- Documents supporting Knowledge of Facilities (material supporting Appendix A_Propane Section, of the IM Plan)
- Documents supporting threat identification (material supporting Appendix B_Propane Section, of the IM Plan)
- Documents supporting risk evaluation and ranking (material supporting Appendix C_Propane Section, of the IM Plan)
- Documents supporting the identification and implementation of measures to address risks (material supporting Appendix D_Propane Section, of the IM Plan)
- Documents supporting measurement of performance, monitoring results and evaluating effectiveness (material supporting Appendix E_Propane Section, of the IM Plan)
- Effectiveness Reviews (material supporting Appendix F_Propane Section, of the IM Plan)
- Annual Reports to PHMSA (as required by §191.11) and State pipeline safety authorities
- Mechanical Coupling Failure Reports

Documentation demonstrating compliance with the requirements of 49 CFR, Part 192, Subpart P shall be retained for at least 10 years.

APPENDIX A (PROPANE)
KNOWLEDGE OF FACILITIES

Appendix A. Section 1 (Propane). Table 5-1: IM Program Records Summary

Record	Record Type – Database, Electronic Record, Paper Record	Applicable Standard, Policy, or Guideline	Extent of Missing Records	Location of Records	Key Contact
Graphic Information System (GIS) database	Database		Largely Unpopulated	FPU Server	GIS Administrator
Wall Maps / Plats	Paper Record		Fairly Complete	Division Offices	Division Operations Supervisors
Gas Service Record Cards	Paper Record		Fairly Complete	Division Offices	Division Operations Supervisors
As-Built Construction Drawings / records	Electronic Record, Paper Record		Fairly Complete	Division Offices	Division Engineering Departments
Gas Leak Repair Records	Paper Record / Electronic		Fairly Complete	Division Offices / FPU servers.	Division Operations Supervisors / GIS Administrator
Gas Leak Repair Database	NA		NA	NA	NA
Gas Leak Survey Records	Paper Record		Fairly Complete	Division Offices	Division Operations Supervisors
DOT/PHMSA Incident Reports	Paper Records		Fairly Complete	Division Offices	Division Operations Manager
Other Incident Reports	Paper Records		Fairly Complete	Division Offices	Division Operations Manager

Appendix A. Section 1 (Propane). Table 5-1: IM Program Records Summary (continued)

Record	Record Type – Database, Electronic Record, Paper Record	Applicable Standard, Policy, or Guideline	Extent of Missing Records	Location of Records	Key Contact
CP Maintenance of Isolated Mains and Services subject to 10% annual inspection	Paper Record		Fairly Complete	Division Offices	Division Operations Supervisors
Cathodic Protection Maintenance Areas (Rectifier and Pipe-to-Soil inspection)	Paper Records		Fairly Complete	Division Offices	Division Operations Supervisors
Atmospheric Corrosion Inspection Records	Paper Record		Fairly Complete	Division Offices	Division Operations Supervisors
Patrol Records	Paper Record		Fairly Complete	Division Offices	Division Operations Supervisors
Valve Maintenance Records	Paper Record		Fairly Complete	Division Offices	Division Operations Supervisors
Regulator Station Maintenance Records	Paper Record		Fairly Complete	Division Offices	Division Operations Supervisors
Requests to Locate Gas Facilities	Electronic Record		Fairly Complete	Division Offices	Division Operations Supervisors
3rd Party Damage Claims	Paper Record		Fairly Complete	Division Offices	Division Operations Supervisors
Pipe Type Maps	Paper Record and Electronic Record		South Division (Barefoot Bay) only, marginal information	Division Offices	Division Operations Supervisors
Exposed Main & Services Reports	Paper Record		Fairly Complete	Division Offices	Division Operations Supervisors

Appendix A. Section 1 (Propane). Table 5-1: IM Program Records Summary (continued)

Record	Record Type – Database, Electronic Record, Paper Record	Applicable Standard, Policy, or Guideline	Extent of Missing Records	Location of Records	Key Contact
Environmental Factor: Areas subject to flood	NA		NA	NA	NA
Environmental Factor: Areas subject to landslide	NA		NA	NA	NA
Environmental Factor: Population Density Records	NA		NA	NA	NA
Environmental Factor: Areas of Wall-to-Wall Paving	NA		NA	NA	NA
SME Interview Records	Paper Record		Complete	DIMP Master File	Gas standards Engineer.

Appendix A. Section 2 (Propane). Table 5-2: Summary of System Design by Operating Pressure

Maximum Operating Pressure	Miles of Main
Intermediate Pressure – 2 psig to 60 psig	53.158

Appendix A. Section 2 (Propane). Table 5-3: Summary of Material Types and Years Installed (all divisions)

Material Type	Mains		Services	
	Current Miles of Main	Years Installed (of remaining)	Number of Services	Years Installed (of remaining)
Cast Iron	0	0	0	0
Wrought Iron	0	0	0	0
Bare Steel – with CP	0	0	0	0
Bare Steel – No CP	0	0	0	0
Coated Steel – with CP (SOUTH DIVISION)	9.9	Unknown	144	Unknown
Coated Steel – no CP	0	0	0	0
Ductile Iron	0	0	0	0
Copper	0	0	0	0
Plastic - PVC	0	0	0	0
Plastic - ABS	0	0	0	0
Plastic – Century MDPE 2306	0	0	0	0
Plastic – Aldyl-A	Unknown	Unknown	0	Unknown
Plastic – HDPE 3306	0	0	0	0
Plastic – All Others (SOUTH DIVISION)	28	Unknown	319	Unknown
Plastic – All Others (CENTRAL DIVISION)	0.432	Unknown	8	Unknown
Plastic – All Others (WEST DIVISION)	4.914	Unknown	415	Unknown

Appendix A. Section 2 (Propane). Table 5-4: Example Summary of Construction Practices

Material Type	Year first deployed	Year Ceased
Replacement via insertion of Copper	NA	NA
Replacement via Insertion of Plastic	NA	NA
Replacement via insertion and pipe bursting/splitting	NA	NA
Internal lining / slip-lining	NA	NA
Joint Trench with other utilities	Not Used (West) ~1965 (South) ~1985 (Central)	Practice Continues in Central and South Divisions
Unguided Bore – soil displacement/ram	~1985	Practice Continues
Guided Directional Bore / Drill	~1990	Practice Continues
Blasting	NA	NA
Plow-in	NA	NA

Appendix A. Section 3 (Propane). Table 5-5: Miles of Mains and Number of Services by Material Type

[Part B1 of PHMSA Form F 7100.1-1 incorporated by reference (all divisions)]

Appendix A. Section 3 (Propane). Table 5-6: Miles of Mains and Number of Service lines by material and nominal diameter

[Part B2 & B3 of PHMSA Form F 7100.1-1 incorporated by reference (all divisions)]

Appendix A. Section 3 (Propane). Table 5-7: Miles of Mains and Number of Services by material and decade

[Part B4 of PHMSA Form F 7100.1-1 incorporated by reference (all divisions)]

Appendix A. Section 3 (Propane). Table 5-8: Number of hazardous leaks either eliminated or repaired, per §192.703(c), categorized by cause (all divisions)

Cause of Leak	Number of Hazardous Leaks – 2021 *	
	MAINS	SERVICES
Corrosion	0	2
Natural Forces	0	0
Excavation	0	1
Other Outside Force	0	4
Material, Weld or Joint Failure	0	0
Equipment Failure	0	0
Incorrect Operation	0	0
Other	2	0

Appendix A. Section 3 (Propane). Table 5-9: Number of Excavation Damages (all divisions)

Year	Number of Excavation Damages	
2021	1	
2020	0	
2019	0	
2018	4	
2017	6	
2016	7	
2015	8	
2014	1	
2013	0	

Appendix A. Section 3 (Propane). Table 5-10: Number of Excavation Tickets (all divisions)

Year	Number of Excavation Tickets
2021	872
2020	820
2019	661
2018	783
2017	1124

2016	1226
2015	1297
2014	1121
2013	893

Appendix A. Section 3 (Propane). Table 5-11: Number of leaks either eliminated or repaired, categorized by cause (all divisions)

Cause of Leak	Number of leaks eliminated or repaired– 2021	
	MAINS	SERVICES
Corrosion	0	3
Natural Forces	0	0
Excavation	0	1
Other Outside Force	0	4
Material, Weld or Joint Failure	0	0
Equipment Failure	1	0
Incorrect Operation	0	0
Other	2	0

Appendix A. Section 4 (Propane). Table 5-36: Identification of Additional Information Needed for IM Program

Area of incomplete records or Knowledge	Can it be acquired over time through normal activities? Y / N	Does Action Plan Exist? Y / N
Vintage years of facilities	No	Yes
Exact location of pipe facilities including Aldyl A (Only Barefoot Bay – South Division only), Plexco Celcon Tap Service Tees (South Division only)	Yes	Yes
Information on pipe materials currently in the ground.	Yes	Yes

Greater detail on Subthreats of Causes	Yes	Yes

Appendix A. Section 4 (Propane). Table 5-37: Action Plans to Gain Additional Information Over Time

Action Plan Scope Gaining Additional Information	Schedule	Completion Date	Officer / Manager Responsible
Vintage years of facilities -information of new pipe facilities being installed is being captured on FPUC's GIS.		Ongoing project	Division Operations Managers, GIS technicians, & Gas Standards Engineer.
Exact location of pipe facilities including Aldyl A, Plexco Celcon Tap Service Tees -Gained through Exposed Piping Reports and Leak Reports -Leak reports are to be uploaded to GIS which will make it easier to analyze leak report data.		Ongoing Project	Division Operations Managers, GIS technicians, Manager of Engineering, & Gas Standards Engineer
Greater detail on Subthreats of Causes – Gained through modified Leak Reports and additional training on their completion.		Ongoing Project	Division Operations Managers & Gas Standards Engineer

APPENDIX B (PROPANE)
THREAT IDENTIFICATION

Appendix B. Section 1 (PROPANE)

Section 1. Threat Identification Process

[Southern Gas Association, Northeast Gas Association and Structural Integrity Associates, Inc. Subject Matter Expert(SME) Evaluation of Threats Applicable to the Gas Distribution System, incorporated by reference (all divisions)]

Appendix B. Section 2. (Propane)

Threats Identified as applicable to the propane systems

App. B. Section 2 (Propane) Supplemental Table S-1: SME Evaluation of Threats Applicable to the LP Distribution System

Service territory covered by this Assessment: All Divisions				
Primary Threat Category	**Sub-Threat**	**SME's to Consider the following**	**SME Evaluation/Answer**	**Threat Applicable? SME – Yes / No**
Corrosion	Cast Iron Pipe	Does Cast Iron pipe exist in the system?	NO	NO
		Is there a known history of body-of-pipe leaks, fractures, or graphitization?	NO	
		Are certain diameters or parts of the system known to be more prone to failure and leakage than others?	NO	
	Ductile Iron	Do ductile iron pipes exist in the system?	NO	NO
		Is there a known history of body-of-pipe leaks, fractures, or graphitization?	NO	
		Are certain diameters or parts of the system known to be more prone to failure and leakage than others?	NO	
	Bare Steel Pipe (no CP)	Do bare (uncoated) steel main or services exist in the system that are not under CP?	NO	NO
		Is there known evidence of active external corrosion on bare steel pipes not under CP?	NO	
		Is there a history of leakage on bare steel pipes not under CP?	NO	
	Bare Steel Pipe (with CP)	Do bare (uncoated) steel main or services exist in the system that are under CP?	NO	NO
		Is there known evidence of active external corrosion on bare steel pipes under CP?	NO	

		Is there a known history of leakage on bare steel pipes under CP?	NO	

App. B. Section 2 (Propane) Supplemental Table S-1: SME Evaluation of Threats Applicable to the LP Distribution System (continued)

Service territory covered by this Assessment: All Divisions				
Primary Threat Category	**Sub-Threat**	**SME's to Consider the following**	**SME Evaluation/Answer**	**Threat Applicable? SME – Yes / No**
Corrosion	Coated Steel with CP	Is there known evidence of active external corrosion on coated steel pipe with CP?	YES – South Division	YES – South Division
		Is there a known history of leakage on coated steel pipe with CP?	YES – South Division	
		Are some CP systems frequently down (not achieving the required level of protection); more than 10% of the time?	NO	
	Coated Steel w/o CP	Is there known evidence of active external corrosion on coated steel pipe without CP?	NO	NO
		Is there a known history of leakage on coated steel pipe without CP?	NO	
	LP Tank with CP	Is there known evidence of active external corrosion on LP Tanks with CP?	NO – All divisions	YES
		Is there a known history of leakage on LP Tanks with CP?	NO – All divisions	
	Copper Services	Are direct buried or inserted copper services known to exist in the system?	NO	NO
		Is there a known history of leakage on copper services?	NO	NO
	Stray Current	Do distribution facilities exist near DC transit systems, high voltage DC transmission systems or other known sources of DC current?	NO	NO
		Are any facilities known to be impacted by sources of stray DC current that has or may result in corrosion?	NO	
	Internal Corrosion	Are liquids known to exist within any portions of the distribution system?	NO	NO

		Is there known evidence of past or active internal corrosion on steel pipe?	NO	
		Is there a known history of leakage caused by internal corrosion of steel pipe?	NO	

App. B. Section 2 (Propane) Supplemental Table S-1: SME Evaluation of Threats Applicable to the LP Distribution System (continued)

Service territory covered by this Assessment: All Divisions				
Primary Threat Category	**Sub-Threat**	**SME's to Consider the following**	**SME Evaluation/Answer**	**Threat Applicable? SME – Yes / No**
Corrosion	Atmospheric Corrosion	Do above ground distribution facilities exist in areas exposed to marine atmosphere, high humidity, atmospheric pollutants or agricultural chemicals?	YES – All Divisions	YES – All Divisions
		Is there known evidence of past or active external atmospheric corrosion on exposed steel pipe, equipment or fittings?	YES – South Division	
		Is there a known history of leakage caused by atmospheric corrosion of steel pipe?	YES – South Division	
	Corrosion of carrier pipe in Cased Crossing	Do steel carrier pipes exist within cased crossings?	NO	NO
		Are there any existing known contacts between carrier pipes and casings?	N/A	
		Is there known evidence of past or active external corrosion on cased steel pipe?	N/A	
		Is there a known history of leakage caused by corrosion on cased steel pipe?	N/A	
Natural Forces	Seismic Activity	Are there any seismically active zones or fault lines that exist in the area?	N/A	N/A
		Is there a history of leakage associated with Seismic activity?	N/A	
	Earth Movement / Landslide	Are there any areas susceptible to earth movement or landslide in the area?	YES – West Division	YES – West Division
		Is there a known history of leakage associated with landslide or earth movement?	NO	

App. B. Section 2 (Propane) Supplemental Table S-1: SME Evaluation of Threats Applicable to the LP Distribution System (continued)

Service territory covered by this Assessment: All Divisions				
Primary Threat Category	**Sub-Threat**	**SME's to Consider the following**	**SME Evaluation/Answer**	**Threat Applicable? SME – Yes / No**
Natural Forces	Frost Heave	Is there a known history of leakage associated with frost heave?	N/A	N/A
	Flooding	Are there any areas within the gas system that are subject to flooding?	YES – South division	YES - South divisions
		Is there a known history of leakage or damage associated with flooding?	NO	
	Tree Roots	Is there a known history of leakage to pipe or fittings as a result of tree root damage?	NO	YES – South division
	Other	Is there a known history of leakage or damage due to other natural force causes; including but not limited to lightning, wild fire or high winds (tornados)?	NO	NO
Excavation Damage	Improper Excavation Practice	Has damage requiring repair or replacement occurred on properly marked facilities due to the failure of the excavator to follow proper excavation rules and procedures?	YES – South & West Divisions	YES – All Divisions
	Facility not located or marked	Has damage requiring repair or replacement occurred due to failure to locate a valid and timely locate request?	YES – South Division	
	One-call notification center error	Has damage requiring repair or replacement occurred due to an error made at the one-call notification center?	NO	
	Mis-Marked Facilities	Has damage requiring repair or replacement occurred due to the mis-marking of facilities?	NO	

App. B. Section 2 (Propane) Supplemental Table S-1: SME Evaluation of Threats Applicable to the LP Distribution System (continued)

Service territory covered by this Assessment: All Divisions				
Primary Threat Category	**Sub-Threat**	**SME's to Consider the following**	**SME Evaluation/Answer**	**Threat Applicable? SME – Yes / No**
Excavation Damage	Incorrect Facility Records	Has damage requiring repair or replacement occurred due incorrect facility records?	YES – South Division	Yes – All Divisions
	Other	Has damage requiring repair or replacement occurred due other causes including the inability to locate facility (e.g. no locating wire on plastic main), wrong or incorrect information provided to the one call center, deteriorated facilities and previous damage?	NO	
Other Outside Force Damage	Vehicle Damage to Riser/Meter	Are existing risers and/or meters exposed to damage from vehicular damage that do not have barriers or other protection conforming to current design requirements?	YES – South & West divisions	Yes- All Divisions
		Has known leakage occurred due to vehicle damage to risers/meters.	YES – West Division	
	Vehicle Damage to above-ground equip/station	Are HPRs and/or regulator stations exposed to damage from vehicular damage?	NO	YES
		Has known leakage occurred due to vehicle damage to HPRs and/or regulator stations?	NO	
	Vandalism	Are gas valves or station equipment susceptible to damage by vandalism that has the potential to pose a risk to employees or the public?	YES – South & Central divisions	Yes- All Divisions
		Has leakage or other unsafe condition been created by vandalism?	NO	

App. B. Section 2 (Propane) Supplemental Table S-1: SME Evaluation of Threats Applicable to the LP Distribution System (continued)

Service territory covered by this Assessment: All Divisions				
Primary Threat Category	**Sub-Threat**	**SME's to Consider the following**	**SME Evaluation/Answer**	**Threat Applicable? SME – Yes / No**
Other Outside Force Damage	Structure Fire	Is there a history of damage to gas meters or other equipment due to structure fires?	Yes – South Division	Yes – All Divisions
		Is there a history of lack of properly designed or maintained service shut-off valves resulting in a delay in inability to shut off gas service to structures that are on fire?	NO	
Material, Weld or Joint Failure	Century Products (MDPE 2306)	Is Century Products (MDPE 2306) pipe known to exist in the system?	NO	NO
		Is there a history of leakage of Century Products (MDPE 2306) pipe?	NO	
	Aldyl A	Is pre-1973 Aldyl A pipe known to exist in the system?	YES – South division	YES – South division (Barefoot Bay)
		Is there a history of leakage of pre-1973 Aldyl A pipe?	NO	

App. B. Section 2 (Propane) Supplemental Table S-1: SME Evaluation of Threats Applicable to the LP Distribution System (continued)

Service territory covered by this Assessment: All Divisions				
Primary Threat Category	**Sub-Threat**	**SME's to Consider the following**	**SME Evaluation/Answer**	**Threat Applicable? SME – Yes / No**
Material, Weld or Joint Failure	HDPE 3306	Is HDPE 3306 pipe known to exist in the system?	NO	NO
		Is there a history of leakage of HDPE 3306 pipe?	NO	
	PVC – Polyvinyl Chloride	Is PVC pipe known to exist in the system?	NO	NO
		Is there a history of leakage of PVC pipe?	NO	
	ABS – Acrylonitrile Butadiene Styrene	Is ABS pipe known to exist in the system?	NO	NO
		Is there a history of leakage of ABS pipe?	NO	
	CAB – Cellulose Acetate Butyrate	Is CAB A pipe known to exist in the system?	NO	NO
		Is there a history of leakage of CAB pipe?	NO	
	PB - Polybutylene	Is PB pipe known to exist in the system?	NO	NO
		Is there a history of leakage of PB pipe?	NO	
	Delrin Insert Tap Tees	Are Delrin Insert Tap Tees known to exist in the system?	NO	NO

		Is there a history of leakage of Delrin Insert Tap Tees?	NO	

App. B. Section 2 (Propane) Supplemental Table S-1: SME Evaluation of Threats Applicable to the LP Distribution System (continued)

Service territory covered by this Assessment: All Divisions				
Primary Threat Category	**Sub-Threat**	**SME's to Consider the following**	**SME Evaluation/Answer**	**Threat Applicable? SME – Yes / No**
Material, Weld, or Joint Failure	Plexco Service Tee Celcon Caps	Are Plexco Service Tee Celcon Caps known to exist in the system?	YES – South division	YES – South division
		Is there a history of leakage of Plexco Service Tee Celcon Caps?	NO	
	PE Fusion failure	Is there a history of PE Fusion Failures or leakage in the system?	NO	YES – ALL DIVISIONS
		Are any types of PE fusion (type, material, size, age, process, geographic area) more prone to leakage or failure?	NO	
	Pre-1940 Oxy-Acetylene Girth Weld	Do pre-1940 Oxy-Acetylene Girth Welds exist on pipe greater than 4 inch?	NO	NO
		Is there a history of pre-1940 Oxy-Acetylene Girth Weld failures or leakage in the system?	NO	
	Other	Do other material failures occur that present a possible current or future risk?	NO	NO
	Mechanical Couplings	Is there a history of Mechanical Coupling failures or leakage in the system due to pullout?	YES – South division	YES – South division
		Is there a history of Mechanical Coupling failures or leakage in the system due to seal leakage?	NO	NO
		Are any types of mechanical coupling (type, material, size, age, manufacturer, geographic area) more prone to leakage or failure due to seal leakage?	NO	NO

App. B. Section 2 (Propane) Supplemental Table S-1: SME Evaluation of Threats Applicable to the LP Distribution System (continued)

Service territory covered by this Assessment: All Divisions				
Primary Threat Category	**Sub-Threat**	**SME's to Consider the following**	**SME Evaluation/Answer**	**Threat Applicable? SME – Yes / No**
Equipment Failure	Valves	Are valves inoperable, inaccessible and or paved over without timely identification and repairs?	NO	NO
		Are certain types or makes of valves more likely to leak?	NO	NO
	Service Regulators	Is there a history of service regulator failures that present a threat to the public or employees?	NO	NO
		Are certain types or makes of service regulator more likely to create a risk?	NO	
	Control/Relief Station Equipment	Is there a history of control or relief station equipment failures that present a threat to the public or employees?	NO	NO
		Are certain types or makes of station equipment more likely to create a risk?	NO	
	Other	Is there a history of other equipment failures that present a threat to the public or employees?	NO	NO
		Are certain types or makes of other equipment more likely to create a risk?	NO	
Incorrect Operations	Operating Error	Have leaks or other safety incidents been caused by an inadequate procedure?	NO	Potential threat
		Have leaks or other safety incidents been caused by failure to follow an adequate procedure?	NO	

		Have bypass valves or MAOP separation valves been found to not have proper locks or other appropriate security replaced after completion of maintenance?	NO	

App. B. Section 2 (Propane) Supplemental Table S-1: SME Evaluation of Threats Applicable to the LP Distribution System (continued)

Service territory covered by this Assessment: All Divisions				
Primary Threat Category	**Sub-Threat**	**SME's to Consider the following**	**SME Evaluation/Answer**	**Threat Applicable? SME – Yes / No**
Incorrect Operations	Operating Error	Have employees been found to have falsified maintenance documents and thus not have completed operations and maintenance tasks in the manner or timeframe required?	NO	NO
		Has improper regulator station maintenance ever resulted in an overpressure incident?	NO	YES – ALL DIVISIONS
		Have butt-fusions been found to be leaking due to improper fusion due to failure to follow the correct procedure?	NO	YES – ALL DIVISIONS
		Have leak repairs or other mandated maintenance not been made in the time required by standard due to a process breakdown or ineffective process?	NO	YES – ALL DIVISIONS
		Has gas leak detection equipment used for a leak survey been found afterwards to be out of calibration?	NO	YES – ALL DIVISIONS
		Have unauthorized repair, maintenance or operations practices been used or are still in use?	NO	YES – ALL DIVISIONS
		Has the failure to accurately or timely record or map facilities resulted in failure to perform mandated maintenance or locates?	NO	YES – ALL DIVISIONS
	Gas lines bored through Sewers	Have pipes been installed via unguided or guided bore without proper procedures to ensure other facilities are not damaged?	NO	YES – ALL DIVISIONS
		Have pipes unknowingly bored through sewer lines been damaged by sewer line cleaning operations?	NO	

App. B. Section 2 (Propane) Supplemental Table S-1: SME Evaluation of Threats Applicable to the LP Distribution System (continued)

Service territory covered by this Assessment: All Divisions				
Primary Threat Category	**Sub-Threat**	**SME's to Consider the following**	**SME Evaluation/Answer**	**Threat Applicable? SME – Yes / No**
Other	Bell Joint Leakage	Does Cast Iron pipe exist in the system?	NO	NO
		Is there a history of bell joint leaks?	NO	NO
		Are certain diameters or parts of the system known to be more prone to bell joint failure or leakage than others?	NO	NO
	Inserted Copper Puncture	Do copper services inserted in steel exist in the system?	NO	NO
		Is there a history of leakage of copper services due to galvanic action between the copper and steel?	NO	NO
	Copper Sulfide	Do copper services exist in the system and is there a history of hydrogen sulfide greater than 0.3 grains per 100 standard cubic feet of gas?	NO	NO
		Have any safety incidents occurred as a result of copper sulfide in copper services or service regulators?	NO	NO
	Construction over gas mains & services	Have others constructed over gas facilities or taken other action that prevents effective leak survey and other maintenance?	YES – South division	YES – South division
		When identified, is construction that impacts required maintenance corrected in a timely manner?	YES – South division	YES – South division

APPENDIX C (PROPANE)
EVALUATION AND RANKING OF RISK

Appendix C. Section 1. (Propane section)

Section 1. Risk Assessment Process

[Southern Gas Association, Northeast Gas Association and Structural Integrity Associates, Inc.

Blended Risk (Subject Matter Expert and Data) Evaluation and Ranking Process*,*

incorporated by reference (all divisions)]

App. C. Section 2 (Propane) Supplemental Table S-2: Documentation of Risk Assessment Results LP Distribution System **(South Division)**

Region	Primary Threat	Sub-Threat	Facility Type	FOF Score	COF Score	Relative Risk
South	**Corrosion**	Coated Steel (with/CP)		0.675	0.61	0.41175
		Stray Current		0	0.61	0
		Internal Corrosion		0	0.61	0
		Atmospheric Corrosion		6.75	0.61	4.1175
		LP Tanks with CP		0	0.61	0
	Natural Forces	Tree Roots		0	0.61	0
		Flooding		0	0.61	0
	Excavation Damage	Improper Excavation Practice		0.025	0.61	0.01525
		No Call for Locate		0.1875	0.61	0.114375
		Late or No Locate		0.0275	0.61	0.016775
		Mis-marked Facilities		0.125	0.61	0.07625
		Incorrect Facility Records		0.025	0.61	0.01525
	Other Outside Force	Vehicle Damage to Riser		0.09	0.61	0.0549

Region	Primary Threat	Sub-Threat	Facility Type	FOF Score	COF Score	Relative Risk
South	**Other Outside Force**	Vehicle Damage to above ground equipment or station (not risers)		0	0.61	0
		Vandalism		0	0.61	0
		Structure Fire		0	0.61	0
	Material, Weld or Joint Failure	Plexco Service Tee Celcon Caps		0.045	0.61	0.02745
		PE Fusion Failure		0	0.61	0
	Equipment Failure	Valves		0	0.70	0
		Service Regulators		0	0.61	0
		Control or Relief Station Equipment		0	0.61	0
		Mechanical Couplings		0.081	0.61	0.04941
	Incorrect Operation	Operating Errors		0.0225	0.61	0.013725
		Service Lines Bored Thru Sewer		0	0.61	0

	OTHER	Construction over gas mains & services		0	0.61	0

App. C. Section 2 (Propane) Supplemental Table S-2: Documentation of Risk Assessment Results LP Distribution System **(WEST Division)**

Region	Primary Threat	Sub-Threat	Facility Type	FOF Score	COF Score	Relative Risk
WEST	**Corrosion**	Atmospheric Corrosion		0	0.35	0
		LP Tanks with CP		0	0.61	0
	Natural Forces	Earth Movement		0	0.61	0
	Excavation Damage	Improper Excavation Practice		0.0825	0.61	0.050325
		No Call for Locate		0.5625	0.61	0.343125
		Late or No Locate		0	0.61	0
		Mis-marked Facilities		0	0.61	0
		Incorrect Facility Records		0	0.61	0
	Other Outside Force	Vehicle Damage to Riser		0	0.61	0
		Vehicle Damage to above ground equipment or station (not risers)		0	0.61	0
		Vandalism		0	0.61	0

App. C. Section 2 (Propane) Supplemental Table S-2: Documentation of Risk Assessment Results LP Distribution System **(West Division)**

Region	Primary Threat	Sub-Threat	Facility Type	FOF Score	COF Score	Relative Risk
West	**Other Outside Force**	Fire		0	0.61	0
	Material, Weld or Joint Failure	PE Fusion Failure		0	0.61	0
	Equipment Failure	Valves		0	0.7	0
		Service Regulators		0.2025	0.61	0.123525
		Control or Relief Station Equipment		0	0.61	0
	Incorrect Operation	Operating Errors		0	0.61	0
		Service Lines Bored Thru Sewer		0	0.61	0
	OTHER	Construction over gas mains & services		0	0	0

App. C. Section 2 (Propane) Supplemental Table S-2: Documentation of Risk Assessment Results LP Distribution System **(Central Division)**

Region	Primary Threat	Sub-Threat	Facility Type	FOF Score	COF Score	Relative Risk
Central	**Corrosion**	Atmospheric Corrosion		0	0.35	0
		LP Tanks with CP		0	0.61	0
	Natural Forces	Tree Roots		N/A	N/A	N/A
		Flooding		N/A	N/A	N/A
	Excavation Damage	Improper Excavation Practice		0	0.61	0
		No Call for Locate		0	0.61	0
		Late or No Locate		0	0.61	0
		Mis-marked Facilities		0	0.61	0
		Incorrect Facility Records		0	0.61	0
	Other Outside Force	Vehicle Damage to Riser		0	0.61	0
		Vehicle Damage to above ground equipment or station (not risers)		0	0.61	0
		Vandalism		0	0.61	0

App. C. Section 2 (Propane) Supplemental Table S-2: Documentation of Risk Assessment Results LP Distribution System **(Central Division)**

Region	Primary Threat	Sub-Threat	Facility Type	FOF Score	COF Score	Relative Risk
Central	**Other Outside Force**	Structure fire		0	0.61	0
	Material, Weld or Joint Failure	PE Fusion Failure		0	0.61	0
	Equipment Failure	Valves		0	0.7	0
		Service Regulators		0.2025	0.61	0.123525
		Control or Relief Station Equipment		0	0.61	0
	Incorrect Operation	Operating Errors		0	0.61	0
		Service Lines Bored Thru Sewer		0	0.61	0
	OTHER	Construction over gas mains & services		0	0.35	0

App. C. Section 2 (Propane) Supplemental Table S-3: **Summary of LP Risk Evaluation and Ranking Results**

Threat	Max Risk Score in any Region	Min Risk Score in any Region	% of Regions in System with Risk Score Range			
			0.76 – & Higher	0.51 – 0.75	0.26 – 0.50	0.10 – 0.25
Corrosion						
Coated Steel Mains(with CP)	**0.41175**	0	0	0	33	0
Coated Steel Svcs (with CP)	0	0	0	0	0	0
Atmospheric corrosion on services	**4.1175**	0	33	0	0	0
LP Tanks with CP	0	0	0	0	0	0
Natural Forces						
Tree Roots Mains	0	0	0	0	0	0
Flood Mains	0	0	0	0	0	0

App. C. Section 2 (Propane) Supplemental Table S-3: **Summary of LP Risk Evaluation and Ranking Results (Continued)**

Threat	Max Risk Score in any Region	Min Risk Score in any Region	% of Regions in System with Risk Score Range			
			0.76 – 1.00	0.51 – 0.75	0.25 – 0.50	0.25 and lower
Excavation Damage						
Excavation Damage Mains	0	0	0	0	0	0
Excavation Damage Svcs	**0.343125**	**0.01525**	0	0	33	33
Other Outside Force						
Vehicle Damage services	**0.0549**	0	0	0	0	33
Vehicle Damage to above ground equipment or station (not risers)	0	0	0	0	0	0
Vandalism Mains	0	0	0	0	0	0
Fire / Explosion Mains	0	0	0	0	0	0

App. C. Section 2 (Propane) Supplemental Table S-3: **Summary of LP Risk Evaluation and Ranking Results (Continued)**

Threat	Max Risk Score in any Region	Min Risk Score in any Region	% of Regions in System with Risk Score Range			
			0.76 – 1.00	0.51 – 0.75	0.26 – 0.50	0.25 & lower
Material, Weld or Joint Failure						
Plastic Pipe Main	0	0	0	0	0	0
Plastic Pipe Services	0	0	0	0	0	0
	0	0	0	0	0	0
Plexco Service Tee Celcon Caps	**0.02745**	0	0	0	0	33
Equipment Failure						
Valves Mains	0	0	0	0	0	0
Valves Services	0	0	0	0	0	0
Service Regulators	**0.123525**	0	0	0	0	33
Mechanical Couplings	**0.04941**	0	0	0	0	33
Other	0	0	0	0	0	0

App. C. Section 2 (Propane) Supplemental Table S-3: **Summary of LP Risk Evaluation and Ranking Results (Continued)**

Threat	Max Risk Score in any Region	Min Risk Score in any Region	% of Regions in System with Risk Score Range			
			0.76 – 1.00	0.51 – 0.75	0.26 – 0.50	0.10 – 0.25
Incorrect Operation						
Operating Error	**0.013725**	0	0	0	0	33
Service Line bored thru Sewer	0	0	0	0	0	0
Other	0	0	0	0	0	0
Other						
Construction over gas mains & services	0	0	0	0	0	0

App. C. Section 2 (Propane) Supplemental Table S-3: **Summary of LP Risk Evaluation and Ranking Results (Continued)**

Ranking order	Threat	Risk Score	Region
1.	Atmospheric Corrosion on services (with CP)	4.1175	SOUTH FLORIDA
2.	Galvanic Corrosion on coated steel with CP	0.41175	SOUTH FLORIDA
3.	Excavation damage on services (No call for locates)	0.343125	WEST FLORIDA
4.	Equipment failure on service regulators	0.123525	CENTRAL & WEST DIVISIONS
5.	Other outside force (Vehicle damage to regulators)	0.0549	SOUTH FLORIDA
6.	Equipment failure on (Mechanical couplings)	0.04941	SOUTH FLORIDA
7.	Material Weld or Joint failure on Plexco Service Tee Celcon Caps	0.02745	SOUTH FLORIDA
8.	Incorrect Operation (Operating Error)	0.013725	SOUTH FLORIDA

2020

APPENDIX D (PROPANE)
IDENTIFICATION AND IMPLEMENTATION OF MEASURES TO ADDRESS RISKS

App. D. Section 1 (Propane) Supplemental Table S-4: Key Requirements of the Leak Management Program

Program Element	Reference to Requirement Established in the Standard or Procedure
Qualification/Training requirements for personnel conducting leak survey	FPU Operator Qualification Program
Auditing and Quality Assurance of Leak Survey Equipment	FPU Procedure LC-5
Criteria for leak severity classification	FPU Procedure LC-4
Established Frequency of Leak Survey in Business Districts, at intervals not exceeding 15 months, but at least once each calendar year.	FPU O&M Manual Section 1.2.1.1
Established Frequency of Leak Survey for Cathodically Unprotected Lines subject to §192.465(e) on which electrical surveys for corrosion are impractical, at least once every 3 calendar years at intervals not exceeding 39 months.	FPU O&M Manual Section 1.2.1.2
Established Frequency of Leak Survey of Remaining Lines at least once every 5 calendar years at intervals not exceeding 63 months.	FPU O&M Manual Section 1.2.1.2
Hazardous Leaks Requiring Immediate Repair – Ongoing action required	FPU Procedure LC-4, FPU O&M Manual Section 1.2.2.1
Non-hazardous Leaks Requiring Scheduled Repair – Time limit is established to Eliminate Leak	FPU Procedure LC-4, FPU O&M Manual Section 1.2.2.1
Non-Hazardous Leak NOT requiring scheduled repair– Monitoring Requirements established	FPU Procedure LC-4, FPU O&M Manual Section 1.2.2.1
Records and Data Management procedures defined	Florida Administrative Code Chapter 25-12, 12.060

App. D. Section 3 (Propane) Supplemental Table S-5: Corrosion Action Plans

Sub-Threat	Corrosion Action Plan Scope	Status	Officer / Manager Responsible
Atmospheric Corrosion on services with CP. (All Divisions)	Atmospheric corrosion surveys will be conducted quarterly by meter readers. In addition, operation technicians will be instructed to inspect for atmospheric corrosion in the course of normal duties. If identified, atmospheric corrosion should be corrected on site, or a work order generated and a crew to be scheduled to address/correct the deficiency.	In Progress	Propane District Managers
Galvanic Corrosion on mains with CP. Lauderhill system. South Division	FPUC has a program in place to remove steel gas mains in sections of the Lauderhill system that have few gas service connections. Individual tanks will be provided.	System Decommissioned in 2019 This project was completed the last quarter in 2019 and no longer in service.	Propane District Managers

App. D. Section 5 (Propane) Supplemental Table S-5: Excavation Action Plans

Sub-Threat	Excavation Damage Action Plan Scope	Status	Officer / Manager Responsible
Improper Excavation Practice	Track dig-ins and identify problem excavators. Provide targeted education, & field inspections. Meet with repeat offenders if deemed necessary.	In progress	Propane District Managers
	Provide One Call literature to Equipment Rental Companies, etc. to increase awareness	In progress	Propane District Managers
	Conduct pre-construction meeting or site-visits for excavation near critical or high risk facilities.	In Progress	Division Propane Operations Managers
	To augment our damage prevention program, as of 2021, Chesapeake has created positons for a damage prevention manager and damage prevention coordinators which will benefit FPUC damage prevention efforts.	In Progress	Division Operations Managers
Facility Not Located or Marked	Analyze root cause and implement corrective action when identified. Require written investigation of each damaged facility.	In progress	Propane District Managers
Mis-marked Facilities	Monitor and track for dig-ins resulting from mis-marked facilities. Analyze root cause and implement corrective action, including procedure reviews. Requires written investigation of each incident.	In Progress	Propane District Managers

App. D. Section 8 (Propane) Supplemental Table S-5: Equipment Failure Action Plans

Sub-Threat	Equipment Failure Action Plan Scope	Status	Officer / Manager Responsible
Service Regulators	No additional or accelerated actions planned.		
Mechanical couplings	No additional or accelerated actions planned.		

App. D. Section 10 (Propane) Supplemental Table S-5: Other Outside Force Action Plans

Sub-Threat	Material, Weld or Joint Failure Action Plan Scope	Status	Officer / Manager Responsible
Other outside force (Vehicle damage)	No additional or accelerated actions planned.		

App. D. Section 7 (Propane) Supplemental Table S-5: Example Material, Weld or Joint Failure Action Plans

Sub-Threat	Material, Weld or Joint Failure Action Plan Scope	Status	Officer / Manager Responsible
Aldyl A (South Florida Division_Barefoot Bay)	Provide training and process to identify Aldyl A whenever facilities are exposed and maintain records to identify where Aldyl A exists.	In Progress	Propane District Managers
	Determine whether leak history on Aldyl A warrants additional or accelerated actions.	In Progress	Propane District Managers
Plexco Service Tee Celcon Caps	No additional or accelerated actions planned.		

App. D. Section 10 (Propane) Supplemental Table S-5: Incorrect Operation Action Plans

Sub-Threat	Material, Weld or Joint Failure Action Plan Scope	Status	Officer / Manager Responsible
Operating Error	No additional or accelerated actions planned.		

APPENDIX E (PROPANE)

Measurement of performance, monitoring results, and evaluation effectiveness

App. E. Section 1 (Propane) Supplemental Table S-6 Number of **HAZARDOUS** leaks either eliminated or repaired, per 192.703 (C), categorized by cause

(South Division – LP)

Performance Measure	5-Year Average 2016-20	Year 2020	Established Baseline 2015 – 2019	Criteria for Re-evaluation of Threats and Risks	Re-Evaluation Required? Y / N
Number of Hazardous Leaks Eliminated or Repaired - Corrosion	0.03117	0	5-Yr Average Leaks/Mile/Yr 0.03857	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Natural Forces	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Excavation Damage	0.03425	0	5-Yr Average Leaks/Mile/Yr 0.064	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Other Outside Force Damage	0.00792	0	5-Yr Average Leaks/Mile/Yr 0.01533	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Material, Weld or Joint Failure	0	0	5-Yr Average Leaks/Mile/Yr 0.00741	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Equipment Failure	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Incorrect Operation	0	0.00000	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Other	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO

App. E. Section 1 (Propane) Supplemental Table S-6 Number of **HAZARDOUS** leaks either eliminated or repaired, per 192.703 (C), categorized by cause

(West Division – LP)

Performance Measure	5-Year Average 2016-20	Year 2020	Established Baseline 2015 – 2019	Criteria for Re-evaluation of Threats and Risks	Re-Evaluation Required? Y / N
Number of Hazardous Leaks Eliminated or Repaired - Corrosion	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Natural Forces	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Excavation Damage	0.17021	0	5-Yr Average Leaks/Mile/Yr 0.17021	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Other Outside Force Damage	0.07193	0	5-Yr Average Leaks/Mile/Yr 0.07193	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Material, Weld or Joint Failure	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Equipment Failure	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Incorrect Operation	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Other	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO

App. E. Section 1 (Propane) Supplemental Table S-6 Number of **HAZARDOUS** leaks either eliminated or repaired, per 192.703 (C), categorized by cause

(Central Division – LP)

Performance Measure	5-Year Average 2016-20	Year 2020	Established Baseline 2015 – 2019	Criteria for Re-evaluation of Threats and Risks	Re-Evaluation Required? Y / N
Number of Hazardous Leaks Eliminated or Repaired - Corrosion	0.46296	0	5-Yr Average Leaks/Mile/Yr 0.46296	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Natural Forces	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Excavation Damage	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Other Outside Force Damage	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Material, Weld or Joint Failure	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Equipment Failure	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Incorrect Operation	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Other	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO

App. E. Section 4 (Propane) Supplemental Table S-7 Number of leaks either eliminated or repaired, categorized by **CAUSE**

(South Division – LP)

Performance Measure	5-Year Average 2016-20	Year 2020	Established Baseline 2015 – 2019	Criteria for Re-evaluation of Threats and Risks	Re-Evaluation Required? Y / N
Total # of Leaks Eliminated or Repaired - Corrosion	0.07179	0	5-Yr Average Leaks/Mile/Yr 0.0866	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total # of Leaks Eliminated or Repaired – Natural Forces	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total # of Leaks Eliminated or Repaired – Excavation Damage	0.04268	0	5-Yr Average Leaks/Mile/Yr 0.0723	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total # of Leaks Eliminated or Repaired – Other Outside Force Damage	0.0226	0.53	5-Yr Average Leaks/Mile/Yr 0.01954	Moving 5-Yr Average is an increase of 5% or more from established baseline	An increase of over 5%, but no additional actions taken due to small # of leaks.
Total # of Leaks Eliminated or Repaired – Material, Weld or Joint Failure	0	0	5-Yr Average Leaks/Mile/Yr 0.01481	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total # of Leaks Eliminated or Repaired – Equipment Failure	0	0	5-Yr Average Leaks/Mile/Yr 0.0037	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total # of Leaks Eliminated or Repaired – Incorrect Operation	0.00422	0	5-Yr Average Leaks/Mile/Yr 0.00422	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total # of Leaks Eliminated or Repaired – Other	0.0037	0	5-Yr Average Leaks/Mile/Yr 0.00741	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO

App. E. Section 4 (Propane) Supplemental Table S-7 Number of leaks either eliminated or repaired, categorized by **CAUSE**

(West Division – LP)

Performance Measure	5-Year Average 2016-20	Year 2020	Established Baseline 2015 – 2019	Criteria for Re-evaluation of Threats and Risks	Re-Evaluation Required? Y / N
Total # of Leaks Eliminated or Repaired - Corrosion	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total # of Leaks Eliminated or Repaired – Natural Forces	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total # of Leaks Eliminated or Repaired – Excavation Damage	0.34043	0	5-Yr Average Leaks/Mile/Yr 0.34043	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total # of Leaks Eliminated or Repaired – Other Outside Force Damage	0.07193	0	5-Yr Average Leaks/Mile/Yr 0.07193	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total # of Leaks Eliminated or Repaired – Material, Weld or Joint Failure	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total # of Leaks Eliminated or Repaired – Equipment Failure	0.04255	0	5-Yr Average Leaks/Mile/Yr 0.08511	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total # of Leaks Eliminated or Repaired – Incorrect Operation	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total # of Leaks Eliminated or Repaired – Other	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO

App. E. Section 4 (Propane) Supplemental Table S-7 Number of leaks either eliminated or repaired, categorized by **CAUSE**

(Central Division – LP)

Performance Measure	5-Year Average 2016-20	Year 2020	Established Baseline 2015 – 2019	Criteria for Re-evaluation of Threats and Risks	Re-Evaluation Required? Y / N
Total # of Leaks Eliminated or Repaired - Corrosion	0.46296	0	5-Yr Average Leaks/Mile/Yr 0.46296	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total # of Leaks Eliminated or Repaired – Natural Forces	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total # of Leaks Eliminated or Repaired – Excavation Damage	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total # of Leaks Eliminated or Repaired – Other Outside Force Damage	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total # of Leaks Eliminated or Repaired – Material, Weld or Joint Failure	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total # of Leaks Eliminated or Repaired – Equipment Failure	1.46296	0	5-Yr Average Leaks/Mile/Yr 1.46296	Moving 5-Yr Average is an increase of 5% or more from established baseline	An increase of over 5%, but no additional actions taken due to small # of leaks.
Total # of Leaks Eliminated or Repaired – Incorrect Operation	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total # of Leaks Eliminated or Repaired – Other	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO

App. E. Section 2 (Propane) Supplemental Table S-8 Number of Exavation **Damages (All Divisions -LP)**

Performance Measure	5-Year Average 2016-20	Year 2020	Established Baseline	Criteria for Re-evaluation of Threats and Risks	Re-Evaluation Required? Y / N
Number of Excavation Damages	4.6	0	**2019** damages resulting in need to repair or replace 4	Increase of 5% or more from established baseline	**NO**

App. E. Section 3 (Propane) Supplement Table S-9 Number of Excavation **Tickets (All Divisions-LP)**

Performance Measure	5-Year Average 2016-20	Year 2020	Established Baseline	Criteria for Re-evaluation of Threats and Risks	Re-Evaluation Required? Y / N
Number of Excavation Tickets received from the notification center	999.4	750	**2019** number of excavation tickets 621	Increase of 5% or more from established baseline	**NO**

App. E. Section 5 (Propane) Supplemental Table S-10 Number of hazardous leaks either eliminated or repaired, per 192.703 (C), categorized by **MATERIAL**

(South Division – LP)

Performance Measure	5-Year Average 2016-20	Year 2020	Established Baseline 2015 – 2019	Criteria for Re-evaluation of Threats and Risks	Re-Evaluation Required? Y / N
Number of Hazardous Leaks Eliminated or Repaired - Coated steel w/ CP	0.03696	0.0525	5-Yr Average Leaks/Mile/Yr 0.0413	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Polyethylene	0.0343	0	5-Yr Average Leaks/Mile/Yr 0.0713	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired –	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	-

App. E. Section 5 (Propane) Supplemental Table S-10 Number of hazardous leaks either eliminated or repaired, per 192.703 (C), categorized by **MATERIAL**

(Central Division – LP)

Performance Measure	5-Year Average 2016-20	Year 2020	Established Baseline 2015 – 2019	Criteria for Re-evaluation of Threats and Risks	Re-Evaluation Required? Y / N
Number of Hazardous Leaks Eliminated or Repaired – Coated steel w/ CP	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Polyethylene	0.46296	0	5-Yr Average Leaks/Mile/Yr 0.46296	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired –	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO

App. E. Section 5 (Propane) Supplemental Table S-10 Number of hazardous leaks either eliminated or repaired, per 192.703 (C), categorized by **MATERIAL**

(West Division – LP)

Performance Measure	5-Year Average 2016-20	Year 2020	Established Baseline 2015 – 2019	Criteria for Re-evaluation of Threats and Risks	Re-Evaluation Required? Y / N
Number of Hazardous Leaks Eliminated or Repaired - Coated steel w/ CP	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Polyethylene	0.24214	0	5-Yr Average Leaks/Mile/Yr 0.24214	Moving 5-Yr Average is an increase of 5% or more from established baseline	**NO**
Number of Hazardous Leaks Eliminated or Repaired – Bare steel	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO

APPENDIX F (PROPANE)

PERIODIC EVALUATION AND IMPROVEMENT

Appendix F (Propane) Supplement Table S-11 Documentation of Re-evaluation of Threats and Risks

Performance Measures that Exceeded Baseline				
Region	**Performance Measure**	**Actual Performance for Year 2016 - 2020**	**Established Baseline**	**Re-evaluation criteria**
SOUTH DIVISION	# of Hazardous Leaks Eliminated or Repaired – Excavation damage	0.03425	0.06388	Moving 5-Yr Average is an increase of 5% or more from established baseline
ALL DIVISION	# of Excavation Damages	4.6	6.2	Moving 5-Yr Average is an increase of 5% or more from established baseline
NOTES:	Existing Date for Complete Program re-evaluation: 2023. Is a shorter timeframe for complete program re-evaluation warranted? : NO			

Required frequency	Program Re-evaluation Element	Date Completed
Required Annually	Update Baseline and on-going performance measures	12/05/2021
Required Annually	Confirmed updates with Propane Director Greg Blezina	12/06/2021
Required Annually	Confirmed updates with Ops Manager Preya John	12/06/2021
Required Annually	Confirmed updates with Ops Manager Steve Hetland	12/06/2021
Required Annually	Confirmed updates with Ops Manager Philip Zimmer	12/06/2021
As needed*		

APPENDIX G
CROSS REFERENCE OF 49 CFR PART 192, SUBPART P REQUIREMENTS TO THE IM PLAN

The table below provides a cross reference between 49 CFR Part 192, Subpart P (Gas Distribution Pipeline Integrity Management) and this Gas Distribution Integrity Management Plan.

49 CFR Part 192, Subpart P	IM Plan Reference
§192.1005 No later than August 2, 2011 a gas distribution operator must develop and implement an integrity management program that includes a written integrity management plan as specified in § 192.1007.	3.0 (For propane ref. 13.0)
§192.1007 A written integrity management plan must contain procedures for developing and implementing the following elements:	
§192.1007 (a) *Knowledge.* An operator must demonstrate an understanding of its gas distribution system developed from reasonably available information.	5.0, 5.1, 5.2, 5.3, 5.4, 5.5 (For propane ref. 14.0 - 14.5)
§192.1007 (a) (1) Identify the characteristics of the pipeline's design and operations and the environmental factors that are necessary to assess the applicable threats and risks to its gas distribution pipeline.	5.3 (For propane ref. 14.3)
§192.1007 (a) (2) Consider the information gained from past design, operations, and maintenance.	5.2 (For propane ref. 14.2)
§192.1007 (a) (3) Identify additional information needed and provide a plan for gaining that information over time through normal activities conducted on the pipeline (for example, design, construction, operations or maintenance activities).	5.4 (For propane ref. 14.4)
§192.1007 (a) (4) Develop and implement a process by which the IM program will be reviewed periodically and refined and improved as needed.	10.1, 10.2 (For propane ref. 19.1, 19.2)
§192.1007 (a) (5) Provide for the capture and retention of data on any new pipeline installed. The data must include, at a minimum, the location where the new pipeline is installed and the material of which it is constructed.	5.5 (For propane ref. 14.5)
§192.1007 (b) *Identify threats.* The operator must consider the following categories of threats to each gas distribution pipeline: corrosion, natural forces, excavation damage, other outside force damage, material, weld or joint failure, equipment failure, incorrect operation, and other concerns that could threaten the integrity of the pipeline.	6.0 (For propane ref. 15.0)
§192.1007 (b) An operator must consider reasonably available information to identify existing and potential threats. Sources of data may include, but are not limited to, incident and leak history, corrosion control records, continuing surveillance records, patrolling records, maintenance history, and excavation damage experience.	5.1, 6.0, (For propane ref. 14.1, 15.0)

§192.1007 (c) *Evaluate and rank risk.* An operator must evaluate the risks associated with its distribution pipeline. In this evaluation, the operator must determine the relative importance of each threat and estimate and rank the risks posed to its pipeline. This evaluation must consider each applicable current and potential threat, the likelihood of failure associated with each threat, and the potential consequences of such a failure.	7.1, 7.2 (For propane ref. 16.1,16.2)
§192.1007 (c) …. An operator may subdivide its pipeline into regions with similar characteristics (e.g., contiguous areas within a distribution pipeline consisting of mains, services and other appurtenances; areas with common materials or environmental factors), and for which similar actions likely would be effective in reducing risk.	Non-Mandatory

49 CFR Part 192, Subpart P	IM Plan Reference
§192.1007 (d) *Identify and implement measures to address risks.* Determine and implement measures designed to reduce the risks from failure of its gas distribution pipeline. These measures must include an effective leak management program (unless all leaks are repaired when found).	8.1, 8.2 (For propane ref. 17.1, 17.2)
§192.1007 (e) (1) *Measure performance, monitor results, and evaluate effectiveness.* Develop and monitor performance measures from an established baseline to evaluate the effectiveness of its IM program. …... These performance measures must include the following: (i) Number of hazardous leaks either eliminated or repaired, per § 192.703(c), categorized by cause; (ii) Number of excavation damages; (iii) Number of excavation tickets (receipt of information by the underground facility operator from the notification center); (iv) Total number of leaks either eliminated or repaired, categorized by cause; (v) Number of hazardous leaks either eliminated or repaired per § 192.703(c), categorized by material; and (vi) Any additional measures the operator determines are needed to evaluate the effectiveness of the operator's IM program in controlling each identified threat.	9.1 – 9.6 (For propane ref. 18.1-18.5)
§192.1007 (e) (1) *Measure performance, monitor results, and evaluate effectiveness.* …. An operator must consider the results of its performance monitoring in periodically re-evaluating the threats and risks.	10.2 (For propane ref. 19.2)
§192.1007 (f) *Periodic Evaluation and Improvement.* An operator must re-evaluate threats and risks on its entire pipeline and consider the relevance of threats in one location to other areas.	7.1, 10.1 (For propane ref. 16.1, 19.1)
§192.1007 (f) Each operator must determine the appropriate period for conducting complete program evaluations based on the complexity of its system and changes in factors affecting the risk of failure. The operator must conduct a complete program reevaluation at least every five years. The operator must consider the results of the performance monitoring in these evaluations.	10.2 (For propane ref. 19.2)
§192.1007 (g) *Report results.* Report, on an annual basis, the four measures listed in paragraphs (e)(1)(i) through (e)(1)(iv) of this section, as part of the annual report required by § 191.11. An operator also must report the four measures to the state pipeline safety authority if a state exercises jurisdiction over the operator's pipeline.	11.1 (For propane ref. 20.1)
§192.1009 Each operator must report, on an annual basis, information related to failure of compression couplings, excluding those that result only in nonhazardous leaks, as part of the annual report required by §191.11 beginning with the report submitted March 15, 2011. This information must include, at a minimum, location of the failure in the system, nominal pipe size, material type, nature of failure including any contribution of local pipeline environment, coupling manufacturer, lot number and date of manufacture, and other information that can be found in markings on the failed coupling. An operator also must report this information to the state pipeline safety authority if a state exercises jurisdiction over the operator's pipeline.	11.1 (For propane ref. 20.1)
§192.1011 An operator must maintain records demonstrating compliance with the requirements of this subpart for at least 10 years. The records must include copies of superseded integrity management plans developed under this subpart.	12.0 (For propane ref. 21.0)

49 CFR Part 192, Subpart P	IM Plan Reference
§192.1013 (a) An operator may propose to reduce the frequency of periodic inspections and tests required in this part on the basis of the engineering analysis and risk assessment required by this subpart. (b) An operator must submit its proposal to the PHMSA Associate Administrator for Pipeline Safety or, in the case of an intrastate pipeline facility regulated by the State, the appropriate State agency. The applicable oversight agency may accept the proposal on its own authority, with or without conditions and limitations, on a showing that the operator's proposal, which includes the adjusted interval, will provide an equal or greater overall level of safety. (c) An operator may implement an approved reduction in the frequency of a periodic inspection or test only where the operator has developed and implemented an integrity management program that provides an equal or improved overall level of safety despite the reduced frequency of periodic inspections.	Not covered by IM Plan

APPENDIX H
COPY OF 49 CFR PART 192, SUBPART P

Subpart P—Gas Distribution Pipeline Integrity Management (IM)

§ 192.1001 What definitions apply to this subpart?

The following definitions apply to this subpart:

Excavation Damage means any impact that results in the need to repair or replace an underground facility due to a weakening, or the partial or complete destruction, of the facility, including, but not limited to, the protective coating, lateral support, cathodic protection or the housing for the line device or facility.

Hazardous Leak means a leak that represents an existing or probable hazard to persons or property and requires immediate repair or continuous action until the conditions are no longer hazardous.

Integrity Management Plan or *IM Plan* means a written explanation of the mechanisms or procedures the operator will use to implement its integrity management program and to ensure compliance with this subpart.

Integrity Management Program or *IM Program* means an overall approach by an operator to ensure the integrity of its gas distribution system.

Small LPG Operator means an operator of a liquefied petroleum gas (LPG) distribution pipeline that serves fewer than 100 customers from a single source.

§ 192.1003 What do the regulations in this subpart cover?

General. This subpart prescribes minimum requirements for an IM program for any gas distribution pipeline covered under this part, including liquefied petroleum gas systems. A gas distribution operator, other than a master meter operator or a small LPG operator, must follow the requirements in §§ 192.1005–192.1013 of this subpart. A master meter operator or small LPG operator of a gas distribution pipeline must follow the requirements in § 192.1015 of this subpart.

§ 192.1005 What must a gas distribution operator (other than a master meter or small LPG operator) do to implement this subpart?

No later than August 2, 2011 a gas distribution operator must develop and implement an integrity management program that includes a written integrity management plan as specified in § 192.1007.

§ 192.1007 What are the required elements of an integrity management plan?

A written integrity management plan must contain procedures for developing and implementing the following elements:

(a) *Knowledge.* An operator must demonstrate an understanding of its gas distribution system developed from reasonably available information. (1) Identify the characteristics of the pipeline's design and operations and the environmental factors that are necessary to assess the applicable threats and risks to its gas distribution pipeline. (2) Consider the information gained from past design, operations, and maintenance. (3) Identify additional information needed and provide a plan for gaining that information over time through normal activities conducted on the pipeline (for example, design, construction, operations or maintenance activities). (4) Develop and implement a process by which the IM program will be reviewed periodically and refined and improved as needed. (5) Provide for the capture and retention of data on any new pipeline installed. The data must include, at a minimum, the location where the new pipeline is installed and the material of which it is constructed.

(b) *Identify threats.* The operator must consider the following categories of threats to each gas distribution pipeline: Corrosion, natural forces, excavation damage, other outside force damage, material, weld or joint failure (including compression coupling), equipment failure, incorrect operation, and other concerns that could threaten the integrity of its pipeline. An operator must consider reasonably available information to identify existing and potential threats. Sources of data may include, but are not limited to, incident and leak history, corrosion control records, continuing surveillance records, patrolling records, maintenance history, and excavation damage experience.

(c) *Evaluate and rank risk.* An operator must evaluate the risks associated with its distribution pipeline. In this evaluation, the operator must determine the relative importance of each threat and estimate and rank the risks posed to its pipeline. This evaluation must consider each applicable current and potential threat, the likelihood of failure associated with each threat, and the potential consequences of such a failure. An operator may subdivide its pipeline into regions with similar characteristics (e.g., contiguous areas within a distribution pipeline consisting of mains, services and other appurtenances; areas with common materials or environmental factors), and for which similar actions likely would be effective in reducing risk.

(d) *Identify and implement measures to address risks.* Determine and implement measures designed to reduce the risks from failure of its gas distribution pipeline. These measures must include an effective leak management program (unless all leaks are repaired when found).

(e) *Measure performance, monitor results, and evaluate effectiveness.* (1) Develop and monitor performance measures from an established baseline to evaluate the effectiveness of its IM program. An operator must consider the results of its performance monitoring in periodically re-evaluating the threats and risks. These performance measures must include the following: (i) Number of hazardous leaks either eliminated or repaired as required by § 192.703(c) of this subchapter (or total number of leaks if all leaks are repaired when found), categorized by cause; (ii) Number of excavation damages; (iii) Number of excavation tickets (receipt of information by the underground facility operator from the notification center); (iv) Total number of leaks either eliminated or repaired, categorized by cause; (v) Number of hazardous leaks either eliminated or repaired as required by § 192.703(c) (or total number of leaks if all leaks are repaired when found), categorized by material; and (vi) Any additional measures the operator determines are needed to evaluate the effectiveness of the operator's IM program in controlling
each identified threat.

(f) *Periodic Evaluation and Improvement.* An operator must reevaluate threats and risks on its entire pipeline and consider the relevance of threats in one location to other areas. Each operator must determine the appropriate period for conducting complete program evaluations based on the complexity of its system and changes in factors affecting the risk of failure. An operator must conduct a complete program re-evaluation at least every five years. The operator must consider the results of the performance monitoring in these evaluations.

(g) *Report results.* Report, on an annual basis, the four measures listed in paragraphs (e)(1)(i) through (e)(1)(iv) of this section, as part of the annual report required by § 191.11. An operator also must report the four measures to the state pipeline safety authority if a state exercises jurisdiction over the operator's pipeline.

§ 192.1009 What must an operator report when compression couplings fail?
Each operator must report, on an annual basis, information related to failure of compression couplings, excluding those that result only in nonhazardous leaks, as part of the annual report required by § 191.11 beginning with the report submitted March 15, 2011. This information must include, at a minimum, location of the failure in the system, nominal pipe size, material type, nature of failure including any contribution of local pipeline environment, coupling manufacturer, lot number and date of manufacture, and other information that can be found in markings on the failed coupling. An operator also must report this information to the state pipeline safety authority if a state exercises jurisdiction over the operator's pipeline.

§ 192.1011 What records must an operator keep?
An operator must maintain records demonstrating compliance with the requirements of this subpart for at least 10 years. The records must include copies of superseded integrity management plans developed under this subpart.

§ 192.1013 When may an operator deviate from required periodic inspections under this part?
(a) An operator may propose to reduce the frequency of periodic inspections and tests required in this part on the basis of the engineering analysis and risk assessment required by this subpart. (b) An operator must submit its proposal to the PHMSA Associate Administrator for Pipeline Safety or, in the case of an intrastate pipeline facility regulated by the State, the appropriate
State agency. The applicable oversight agency may accept the proposal on its own authority, with or without conditions and limitations, on a showing that the operator's proposal, which includes the adjusted interval, will provide an equal or greater overall level of safety. (c) An operator may implement an approved reduction in the frequency of a periodic inspection or test only where the operator has developed and implemented an integrity management program that provides an equal or improved overall level of safety despite the reduced frequency of periodic inspections.

§ 192.1015 What must a master meter or small liquefied petroleum gas (LPG) operator do to implement this subpart?
(a) *General.* No later than August 2, 2011 the operator of a master meter system or a small LPG operator must develop and implement an IM program that includes a written IM plan as specified in paragraph (b) of this section. The IM program for these
pipelines should reflect the relative simplicity of these types of pipelines. (b) *Elements.* A written integrity management plan must address, at a minimum, the following elements: (1) *Knowledge.* The operator must demonstrate knowledge of its pipeline,
which, to the extent known, should include the approximate location and material of its pipeline. The operator must identify additional information needed and provide a plan for gaining knowledge over time through normal activities conducted on the pipeline (for example, design, construction, operations or maintenance activities). (2) *Identify threats.* The operator must consider, at minimum, the following categories of threats (existing and potential): Corrosion, natural forces, excavation damage, other outside force damage, material or weld failure, equipment failure, and incorrect operation. (3) *Rank risks.* The operator must evaluate the risks to its pipeline and estimate the relative importance of each

identified threat. (4) *Identify and implement measures to mitigate risks.* The operator must determine and implement measures designed to reduce the risks from failure
of its pipeline. (5) *Measure performance, monitor results, and evaluate effectiveness.* The operator must monitor, as a performance measure, the number of leaks eliminated or repaired on its pipeline and their causes. (6) *Periodic evaluation and*
improvement. The operator must determine the appropriate period for conducting IM program evaluations based on the complexity of its pipeline and changes in factors affecting the risk of failure. An operator must re-evaluate its entire program at least every five years. The operator must consider the results of the performance monitoring in these evaluations. (c) *Records.* The operator must maintain, for a period of at least 10 years, the following records: (1) A written IM plan in accordance
with this section, including superseded IM plans; (2) Documents supporting threat identification; and (3) Documents showing the location and material of all piping and appurtenances that are installed after the effective date of the operator's IM program and, to the extent known, the location and material of all pipe and appurtenances that were existing on the effective date of the operator's program.

FLORIDA PUBLIC UTILITIES

Gas Distribution Integrity Management Program

2021

(5 YEAR DIMP REVIEW for 2016 to 2020 data)

REVISION CONTROL SHEET

Title: Distribution Integrity Management Plan

Section	Pages	Revision	Date	Comments
8.2.1	9	1	12/24/2012	Added a paragraph to clarify the highest risk to the distribution system.
App. E. SEC. 1	113-115	1	12/21/2012	Calculated new 5-year average 2007-2011.
App. E. SEC. 2	116	1	12/21/2012	Calculated new 5-year average 2007-2011.
App. E. SEC. 4 & 5	117-122	1	12/21/2012	Calculated new 5-year average 2007-2011.
App. F	125	1	12/21/2012	Completed table 10-1.

App. E. SEC. 1	113 - 115	1	12/30/2013	Calculated new 5-year average 2008-2012.
App. E. SEC. 2	116	1	12/30/2013	Calculated new 5-year average 2008-2012.
App. E. SEC. 4 & 5	117 – 122	1	12/30/2013	Calculated new 5-year average 2008-2012.
App. F	125	1	12/30/2013	Completed table 10-1.

Sec 7.1	6	3	11/20/14	Added a paragraph to clarify, Evaluation & Ranking of risk.
App. C Sec. 2	75-96	3	11/20/14	Reviewed & re-performed Risk calculations.
App. D Sec. 3	107	3	11/20/14	Added atmospheric corrosion to table 8-3
App. E Sec. 1	113	3	11/20/14	Calculated new 5-year average 2009-2013
App. E Sec. 2	121	3	11/20/14	Calculated new 5-year average 2009-2013
App. E Sec.4 & 5	122		11/20/14	Calculated new 5 year average 2009-2013
App. F	130	3	11/20/14	Updated table 10-1. Documentation of re-evaluation of threats & risks.
App. E Sec. 1-5	113-122	**4**	12/17/15	Calculated new 5-year averages 2010-2014
App. F	130	**4**	12/17/15	Updated table 10-1. Documentation of re-evaluation of threats & risks.
Sec 7.2	7	**4**	12/17/15	Revised to clarify the process used for risk assessment.
5 YEAR DIMP REVIEW		**5**	12/18/16	5 YEAR DIMP REVIEW

App. D		**6**	11/30/2017	Updated action plans.
App. E		**6**	11/30/2017	Updated measurement performance tables
App. F		**6**	11/30/2017	Updated evaluation performance tables
App. F	Page 139	**6**	11/30/2017	Updated Program Re-evaluation Element
App. E		**7**	11/30/2018	Updated measurement performance tables
App. F		**7**	11/30/2018	Updated evaluation performance tables
App. F	Page 139	**7**	11/30/2018	Updated Program Re-evaluation Element
App. E		**8**	11/22/2019	Updated measurement performance tables
App. F		**8**	11/22/2019	Updated evaluation performance tables
App. F	Page 139	**8**	11/22/2019	Updated Program Re-evaluation Element
App. D		**9**	11/05/2020	Updated action plan. Sec 3 Tbl 8-3.
App. E		**9**	10/22/2020	Updated measurement performance tables
App. F		**9**	10/22/2020	Updated evaluation performance tables

App. F	Page 139	**9**	10/22/2020	Updated Program Re-evaluation Element
5 YEAR DIMP REVIEW		**10**	**12/16/2021**	**5 YEAR DIMP REVIEW for 2016 to 2020 data.**

REVISION CONTROL SHEET

Title: Distribution Integrity Management Plan for PHMSA Jurisdictional Liquefied Propane Gas Systems.

Section	Pages	Revisions	Date	Comments
Supplemental Section "A"	128 - 180	1	01/05/2015	Updated Propane section.
Supplemental Section "A" Tbl S-6 to S-9	160 - 173	**2**	12/18/2015	Calculated new 5-year averages 2010-2014
Supplemental Section "A" Tbl S-10	175	**2**	12/18/2015	Updated table S-10 Documentation of re-evaluation of threats & risks.
Supplemental Section "A"		3	08/01/2016	Updated Propane section.
Supplemental Section "A" Tbl S-2		**2**	08/01/2016	Calculated new Risk assessments
Supplemental Section "A" Tbl S-3		**2**	08/01/2016	New Summary of LP Risk Evaluation & ranking results
Supplemental Section "A" Tbl S-5		**2**	08/01/2016	Action plans
Supplemental Section "A" Tbl S-6 to S-9		**3**	08/01/2016	Calculated new 5-year averages 2011-2015
Supplemental Section "A" Tbl S-10		**3**	08/01/2016	Updated table S-10 Documentation of re-evaluation of threats & risks.

Supplemental Section “C”		**4**	11/30/2017	Updated measurement performance tables
Supplemental Section “C”		**4**	11/30/2017	Added “leaks categorized by material” tables
		4	11/30/2017	Updated evaluation performance tables
Tbl S-1		**4**	12/14/2017	Updated SME evaluation of threats applicable to LP distribution system.
5 YEAR DIMP LP REVIEW 2013-2017		**5**	11/28/18	5 YEAR DIMP REVIEW
Supplemental Section-App E (Propane)		**6**	11/26/2019	Updated Measurement Performance Tables
Supplemental Section-App F (Propane)		**6**	11/26/2019	Updated Evaluation Performance Tables
Supplemental Section-App F (Propane)		**6**	11/26/2019	Updated Program Re-evaluation Element
Supplemental Section-App D (Propane)		**7**	11/05/2020	Updated Action plans. Sec 3 Tbl 8-3.
Supplemental Section-App E (Propane)		**7**	10/23/2020	Updated Measurement Performance Tables
Supplemental Section-App F (Propane)		**7**	10/23/2020	Updated Evaluation Performance Tables
Supplemental Section-App F (Propane)		**7**	10/23/2020	Updated Program Re-evaluation Element

Supplemental Section-App D (Propane)		**8**	12/05/2020	Updated Action plans. Sec 3 Tbl 8-3.
Supplemental Section-App E (Propane)		**8**	12/05/2020	Updated Measurement Performance Tables
Supplemental Section-App E (Propane)		**9**	12/16/2021	Updated Measurement Performance Tables

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Section Page

1.0 COMPANY OVERVIEW

Headquartered in Fernandina Beach, Florida, Florida Public Utilities (including Central Florida Gas Company) delivers natural gas and liquefied petroleum gas (propane) to more than ninety two thousand (92,000) residential, commercial and industrial customers.

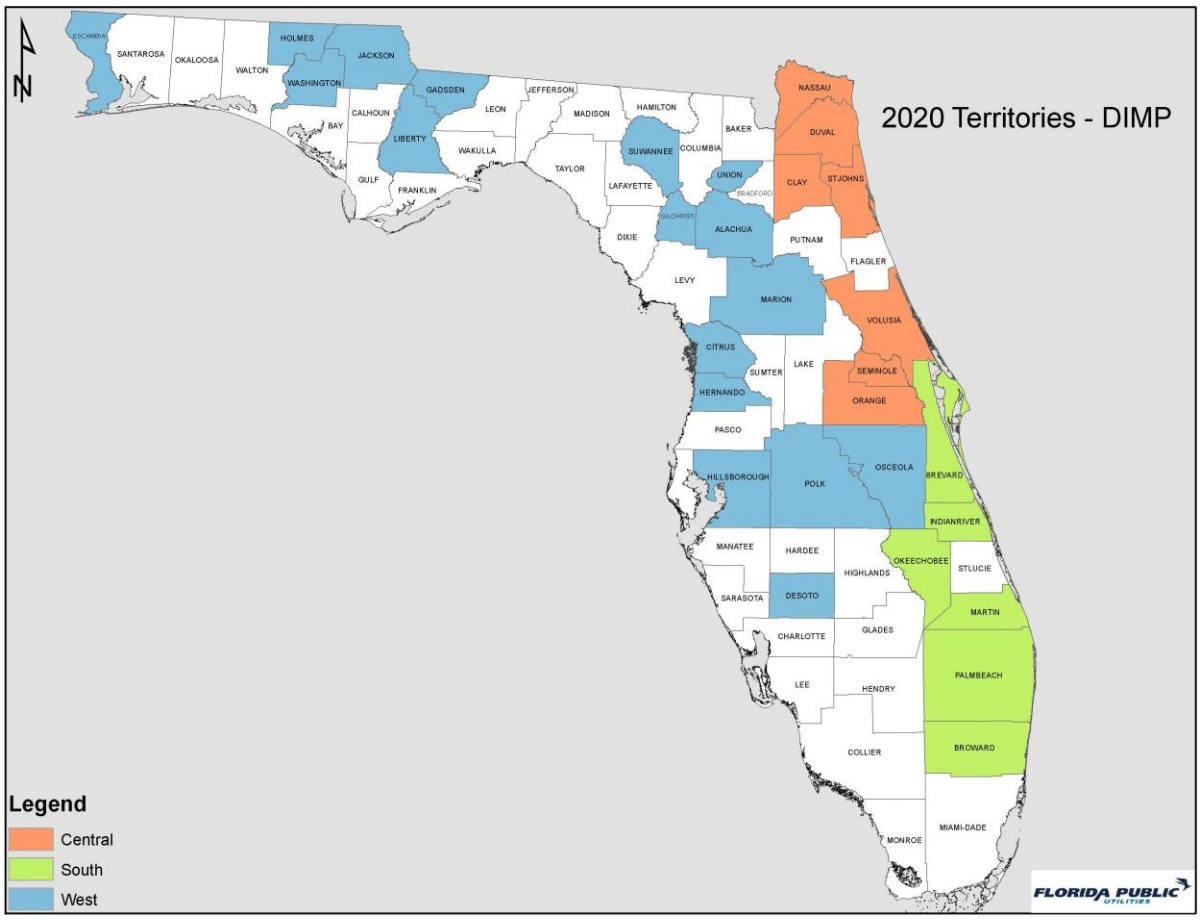
Florida Public Utilities Company is divided into three operational divisions. The systems that comprise each division are as follows:

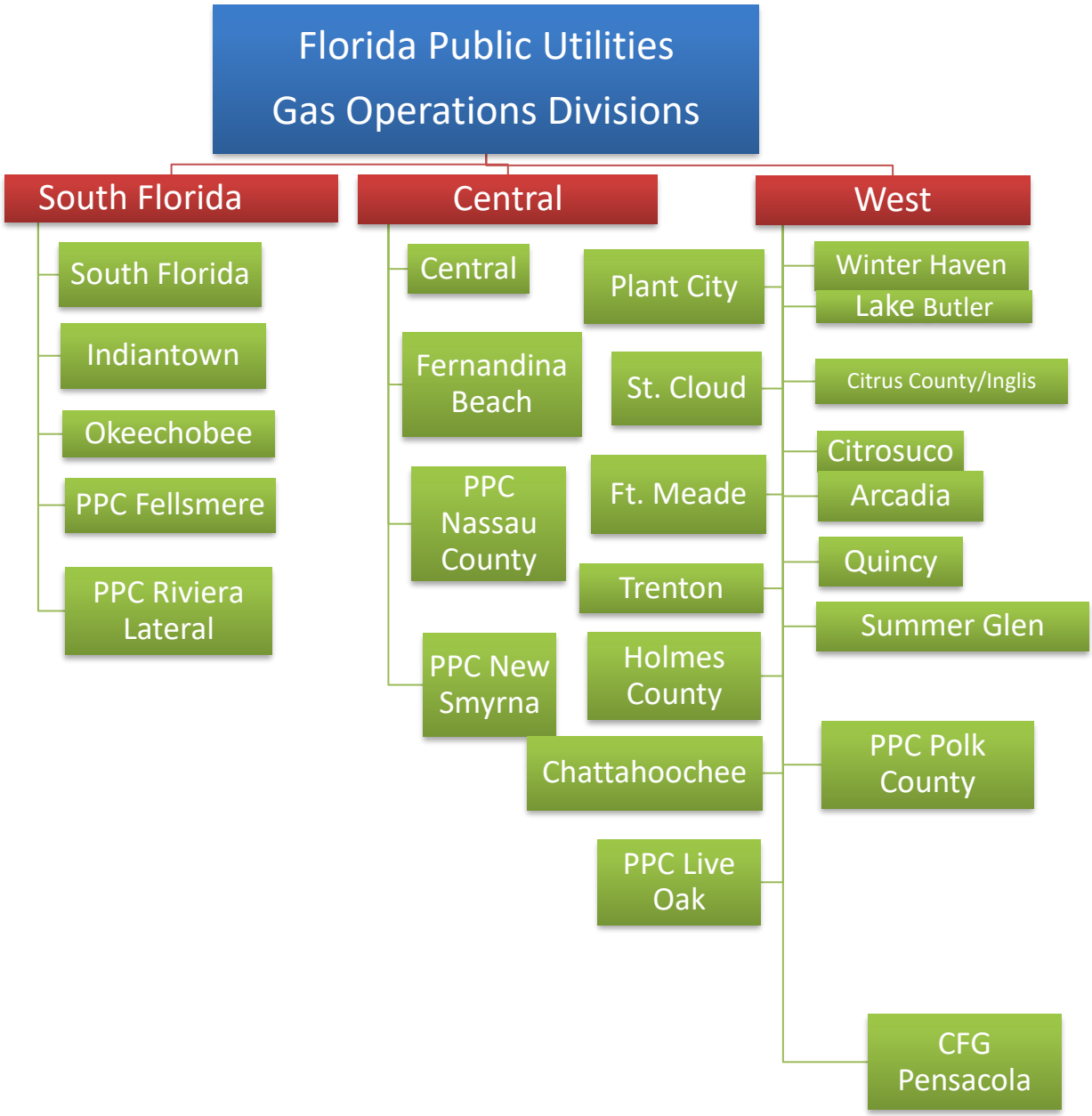
South Florida Division includes South Florida Division distribution systems, Indiantown, Okeechobee, Peninsula Pipeline Fellsmere, and Peninsula Pipeline Riviera Beach Lateral.

Central Division includes Central Division distribution systems, Fernandina Beach, and Peninsula Pipeline's Nassau County.

West Division includes West Division distribution systems, Lake Butler, Ft. Meade, Citrus County, Trenton, Holmes County, Arcadia, Chattahoochee, Quincy, Live Oak, Summer Glen and Polk County.

The service territory and organizational chart is depicted below




Florida Public Utilities
Gas Operations Divisions
South Florida
Central
West
South Florida
Indiantown
Okeechobee
PPC Fellsmere
PPC Riviera Lateral
Central
Fernandina Beach
PPC Nassau County
PPC New Smyrna
Plant City
St. Cloud
Ft. Meade
Trenton
Holmes County
Chattahoochee
PPC Live Oak
Winter Haven
Lake Butler
Citrus County/Inglis
Citrosuco
Arcadia
Quincy
Summer Glen
PPC Polk County
CFG Pensacola

2.0 SCOPE

The U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration (PHMSA) amended the Federal Pipeline Safety Regulations on December 4, 2009 to require operators of gas distribution pipelines to develop and implement an integrity management (IM) program that includes a written integrity management plan. This plan was to be implemented by August 2, 2011.

PHMSA also requires operators to re-evaluate their entire plan at least every five years, taking into account the results of performance monitoring. This plan update includes the program re-evaluation.

The IM approach was designed to promote continuous improvement in pipeline safety by requiring operators to identify and invest in risk control measures beyond previously established regulatory requirements.

This written IM Plan addresses the IM Rule which requires operators to develop and implement an IM program that addresses the following elements:

- Knowledge
- Identify Threats
- Evaluate and Rank Risks
- Identify and Implement Measures to Address Risks
- Measure Performance, Monitor Results, and Evaluate Effectiveness
- Periodic Evaluation and Improvement
- Report results

Because of the significant diversity among distribution pipeline operators and pipelines, the requirements in the IM Rule are high-level and performance-based. The IM Rule specifies the required program elements but does not prescribe specific methods of implementation.

3.0 PURPOSE AND OBJECTIVES

The purpose of the IM program is to enhance safety by identifying and reducing gas distribution integrity risks. Managing the integrity and reliability of the gas distribution pipeline has always been a primary goal for Florida Public Utilities; with design, construction, operations and maintenance activities performed in compliance with CFR Part 192 requirements. The objective of this IM Plan is to establish the requirements to comply with the Code of Federal Regulations (CFR 49) §§ 192.1005, 192.1007, 192.1009 and 192.1011, pertaining to integrity management for gas distribution pipelines. This IM Plan does not address how an operator may deviate from the required periodic inspections as provided for in §192.1013.

The IM Plan is comprised of seven elements depicted in Figure 3-1.

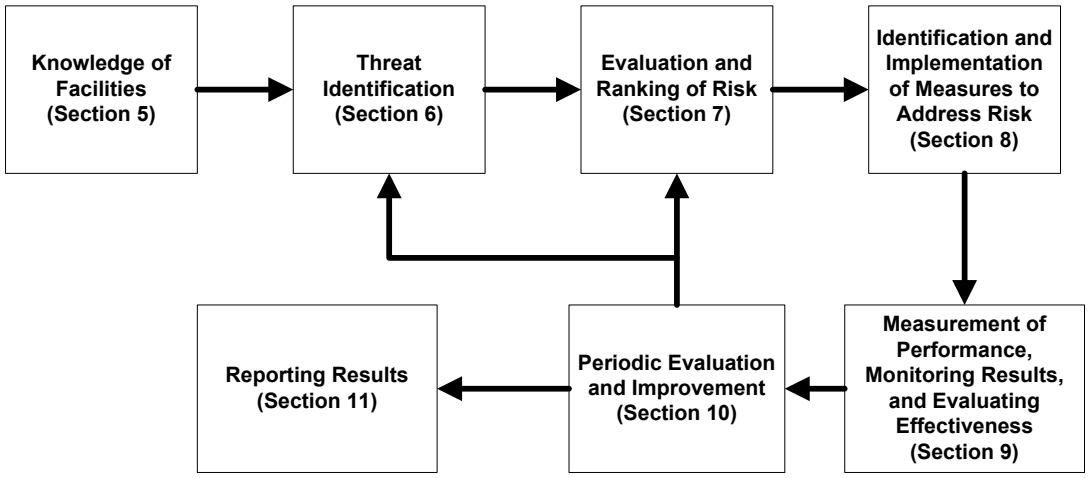


Figure 3-1 DIMP Elements

In addition to the key elements shown in Figure 3-1, the IM Plan also establishes requirements for reporting of mechanical coupling failures (Section 11.1) and maintaining records (Section 12).

All elements of this IM Plan where implemented by **August 2, 2011.**

4.0 DEFINITIONS

The definitions provided in 49 CFR, §192.3 and §192.1001 shall apply to this IM Plan. The following additional definitions and acronyms shall also apply to this IM Plan.

DIMP: Distribution Integrity Management Program

Distribution Integrity Management Program Files: operator records, databases, and/or files that contain either material incorporated by reference in the Appendices of the IM Plan or outdated material that was once contained in the IM Plan Appendices but is being retained in order to comply with record keeping requirements.

EFV: Excess Flow Valve. An Excess Flow Valve is a safety device that is designed to shut off flow of natural gas automatically if the service line breaks.

FOF: Frequency of failure.

COF: Consequence of failure.

IM Rule: 49 CFR Part 192, Subpart P

PHMSA: The U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration.

Risk: A relative measure of the likelihood of a failure associated with a threat and the potential consequences of such a failure.

Ticket: A notification from the one-call notification center to the operator providing information of pending excavation activity for which the operator is to locate and mark its facilities.

5.0 KNOWLEDGE OF FACILITIES

The objective of this section is to assemble as complete of an understanding of the company's infrastructure as possible using reasonably available information from past and ongoing design, operations and maintenance activities. In addition, this plan will identify what additional information is needed and provide a plan for gaining that information over time through normal activities.

5.1 Type and Location of Records

A summary of the existing records that are utilized by the IM Plan and where they are located is documented in Appendix A, Section 1. These records include, but are not limited to, incident and leak history, corrosion control records, continuing surveillance records, patrolling records, maintenance history and excavation damage experience.

5.2 Overview of Past Design, Operations and Maintenance

Record reviews, interviews with SMEs and other means were used to gain an understanding of past design, operations and maintenance history of the distribution system. This information includes operating pressures, materials used in construction and construction practices. This information is documented, or included by reference, in Appendix A, Section 2.

5.3 Characteristics of Design, Operations and Environmental Factors

Characteristics of the pipeline's design, operations and environmental factors that are necessary to assess the applicable threats and risks are documented, or included by reference, in Appendix A, Section 3.

5.4 Additional Information Needed

Additional information needed to support the IM plan (information that is not reasonably available today) is identified in Appendix A, Section 4. Plans for gaining additional information over time through normal activities conducted on the pipeline are documented, or included by reference, in Appendix A, Section 4.

5.5 Data Capture for New Construction and Ongoing O&M

Data is continuously collected for both construction of new facilities, reconstruction of existing facilities and ongoing operations and maintenance. In particular, the standard or procedure that require data capture for the location where the new pipeline is installed and the material of which it is constructed is contained in FPU Operations and Maintenance Manual Section 16.0.1.

5.6 Knowledge Capture – Subject Matter Experts

In addition to maps, records, and databases, valuable information for this IM plan was gathered and captured from SMEs. SMEs are individuals who have specialized knowledge based on their experience or training. SMEs were used to supplement existing, incomplete, or missing records and were the best source of information in subjects such as historical operations, maintenance, and construction practices. SME interviews were also utilized to ensure that all threats have been identified.

New SME interviews were conducted for this 5 year plan update and are documented and stored in the Distribution Integrity Management Program files.

A form documenting SME interviews is presented in Appendix A, Section 5.

6.0 THREAT IDENTIFICATION

The objective of this section of the plan is to identify existing and potential threats to the gas distribution pipeline.

For this plan update mains and services were separated in order to provide a more precise sense of where the highest risks are. Based on plan performance monitoring this separation can be particularly helpful in threat areas such as corrosion and excavation damages. In the previous DIMP plan mains & services were grouped together.

The following categories of threats shall be considered for each gas distribution pipeline:

- Corrosion
- Natural Forces
- Excavation Damage
- Other Outside Force
- Material, Weld or Joint Failure
- Equipment Failure
- Incorrect Operation
- Other concerns that could threaten the integrity of the pipeline.

A review of information gathered for Section 5 and interviews with Subject Matter Experts were used to identify existing and potential threats to the distribution system. **A description of the process used to identify threats is referenced in Appendix B, Section 1**. The threats identified as applicable to the gas distribution pipeline are documented in Appendix B, Section 2. Prior versions of the threat identification process and results that are no longer current shall be retained and stored in the Distribution Integrity Management Program files.

7.0 EVALUATION AND RANKING OF RISK

7.1 Objective

Risk analysis is an ongoing process of understanding what factors affect the risk posed by threats to the gas distribution pipeline and where they are relatively more important than others. The primary objectives of the evaluation and ranking of gas distribution pipeline risk are:

- Consider each applicable current and potential threat
- Consider the likelihood of failure associated with each threat
- Consider the potential consequences of such a failure
- Estimate and rank the risks (i.e. determine the relative importance) posed to the pipeline
- Consider the relevance of threats in one location to other areas

NOTE: There were several potential threats identified for the distribution system, but no previous incidents of these threats have occurred. Because there have been no previous incidents of these potential threats, their frequency is zero, thus resulting in a risk calculation of zero. However, some of these potential threats appear in the risk ranking tables with a risk ranking of zero as we are cognizant that they are a potential threat.

7.2 Risk Assessment Process

The current process used for Risk Assessment **(Blended Risk (Subject Matter Expert & data) Evaluation and Ranking Process)** shall be documented, or included by reference, in Appendix C, Section 1. Prior risk assessment processes shall be retained and stored in the Distribution Integrity Management Program files.

7.3 Risk Assessment

The current risk assessment **(likelihood, consequence, and resultant risk ranking)** shall be documented, or included by reference, in Appendix C, Section 2. Prior risk assessment results shall be retained and stored in the Distribution Integrity Management Program files.

RISK = Consequence (COF) x Likelihood (FOF)

8.0 IDENTIFICATION AND IMPLEMENTATION OF MEASURES TO ADDRESS RISKS

The objective of this section of the IM Plan is to describe existing and proposed measures to address the risks that have been evaluated and prioritized in Section 7.

8.1 Leak Management Program

The Leak Management program is established in the Florida Public Utilities Procedure Manual in the section entitled “Leak Control”.

8.1.1 Description of Existing Program

Florida Public Utilities Leak Management Program contains all the essential elements for an effective program. Procedures are in place to 1) Locate the leak, 2) Evaluate its severity, 3) Act appropriately to mitigate the leak, 4) Keep records; and 5) Self assess to determine if additional actions are necessary.

Florida Public Utilities Operations and Maintenance Manual and Emergency Manual address necessary components of effective leak control including, prompt and effective response to gas odor calls, classification of gas leaks, performing leakage surveys at prescribed regulatory intervals and system patrols.

Leaks are repaired in compliance with the prescribed time frames of Chapter 25-12.040 of the Florida Administrative Code.

A summary of the key elements of the Leak Management Program are documented, or included by reference, in Appendix D, Section 1.

8.2 Other Additional or Accelerated Actions

At this time no accelerated actions beyond the minimum code requirements specified outside of Part 192 subpart P are planned. However, one significant additional action is currently in place. Our initial risk ranking in the original DIMP plan identified corrosion on bare steel facilities as our highest system risk. This risk ranking contributed to the company seeking and subsequently being granted approval by the Florida Public Service Commission for a ten year bare steel

replacement program. This replacement program is referred to as our Gas Reliability Infrastructure Program (GRIP) and will be discussed further in this plan.

In the event accelerated actions more additional actions are planned in the future, procedures to implement these will be identified.

8.2.1 Corrosion

Corrosion on bare steel mains is no longer the highest ranking system risk, primarily due to FPUC's bare steel replacement plan. It is now the third highest ranking system risk. As of 2021, three hundred and thirty seven (337) miles of a total of three hundred fifty (350) miles of bare steel mains have been replaced. As this replacement program continues, this risk will continue to steadily decline and eventually go away as no bare steel facilities will remain in the system.

Atmospheric corrosion leaks on services is now the highest ranking system risk in FPU's gas distribution system (Ref. Appendix C. Section 2. Table 7-22: Summary of Risk Evaluation and Ranking Results). This is reflected in the number of leaks and the risk rankings. These atmospheric corrosion leaks on polyethylene services was due to the practice of cold wrapping anodeless risers for installation, and this practice was only used in the South Florida Division. This practice has been discontinued, and risers are being replaced as leaks are discovered. Additional or Accelerated Actions that are currently scheduled or in place in order to reduce the risks associated with corrosion are documented, or included by reference, in Appendix D, Section 3. Prior documentation shall be retained and stored in the Distribution Integrity Management Program files.

Corrosion on bare steel services is the second highest ranking system risk. As of 2021, there are two thousand three hundred and twenty eight (2,328) bare steel services remaining, these bare steel services are being replaced as part of FPUC's bare steel replacement plan. As this replacement program continues, this risk will continue to steadily decline and eventually go away as no bare steel services will remain in the system.

8.2.2 Natural Forces

Leaks in FPU's gas distribution system due to the threat of natural forces are minimal and risk rankings are so low that they are negligible (Ref. Appendix A. Section 3. Table 5-8). In the whole FPUC gas system, natural forces on mains & services accounted for less than 1% of hazardous leaks in 2020 and less than 1% of total leaks for the five year period of 2016 through 2020.

Because the number of leaks from natural forces is low, and risks rankings from this threat were minimal, no Additional or Accelerated Actions are scheduled. Prior documentation shall be retained and stored in the Distribution Integrity Management Program files.

8.2.3 Excavation Damage

Excavation Damage on services is the leading cause of leaks in FPU's gas distribution system (Ref. Appendix A. Section 3. Table 5-8). This is reflected in the number of leaks and the risk rankings. In FPU's South Division, excavation damages on services accounted for 37% of the total leaks in 2020 and 40% of the total service leaks for the five year period from 2016 through 2020. In FPU's Central Division excavation damages on services accounted for 44% of the total leaks in 2020 and 37% of the total service leaks for the five year period from 2016 through 2020. In FPU's West Division, excavation damages on services accounted for 22 % of the total leaks in 2020 and 17% of the total service leaks for the five year period from 2016 through 2020.

It is important to note that while excavation leaks on services represent the largest number of leaks in FPU's distribution system, it does not represent the highest risk to the distribution system based on the risk module formula.

Additional or Accelerated Actions that are currently scheduled or in place in order to reduce the risks associated with excavation damage are documented, or included by reference, in Appendix D, Section 5. Prior documentation shall be retained and stored in the Distribution Integrity Management Program files.

8.2.4 Other Outside Force

Leaks in FPU's gas distribution system due to the threat of other outside forces are minimal and risk rankings are so low that they are negligible. (Ref. Appendix A. Section 3. Table 5-8). In the

whole FPUC gas system, other outside forces on mains & services accounted for less than 2% of hazardous leaks in 2020 and less than 2% of total leaks for the five year period of 2016 through 2020.

Because the number of leaks from natural forces is low, and risks rankings from this threat were minimal, no Additional or Accelerated Actions are scheduled. Prior documentation shall be retained and stored in the Distribution Integrity Management Program files.

8.2.5 Material, Weld or Joint Failure

Leaks in FPU's gas distribution system due to the threat of material, weld or joint failure are minor and risk rankings are also low (Ref. Appendix A. Section 3. Table 5-8). As a whole, Material, Weld or Joint Failure accounts for 2% of the total leaks in 2020, & less than 2% of total leaks for the five year period of 2016 through 2020.

The number of leaks and risk rankings are low for the threat of material, weld, or joint failure; however, additional actions are scheduled in an effort to identify where certain materials are in the gas distribution system in order to gain a better understanding of the risks associated with material, weld or joint failure. These actions are documented, or included by reference, in Appendix D, Section 7. Prior documentation shall be retained and stored in the Distribution Integrity Management Program files.

8.2.6 Equipment Failure

Equipment failure leaks on services is the second leading cause of leaks in FPU's gas distribution system. In FPU's South Division, equipment failure on services accounted for 25% of leaks in 2020 and 20% of total leaks for the five year period of 2016 through 2020. In FPU's Central Division equipment failure accounted for 27% of the total leaks in 2020 and 25% of the total leaks for the five year period of 2016 through 2020. In FPU's West Division equipment failure accounted for 54% of the total leaks for 2020 and 30% of the total leaks for the five year period of 2016 through 2020.

Equipment failure is significantly higher in the South Division, service regulators continue to be a source, were venting due to sand or debris in the distribution system, and not from a defective service regulator. Virtually all of those were due to service regulators venting.

Additional or Accelerated Actions that are currently scheduled or in place in order to reduce the risks associated with equipment failure are documented, or included by reference, in Appendix D, Section 8. Prior documentation shall be retained and stored in the Distribution Integrity Management Program files.

8.2.7 Incorrect Operation

Leaks in FPU's gas distribution system due to the threat of incorrect operation tended to be higher among services than compared to mains. In FPU's South Division, incorrect operation on services accounted for 5% of leaks in 2020 and 2% of total leaks for the five year period of 2016 through 2020. In FPU's Central Division incorrect operation accounted for 0% of the total leaks in 2020 and 0.1% of the total leaks for the five year period of 2016 through 2020. In FPU's West Division incorrect operation accounted for 11% of the total leaks for 2020 and 4% of the total leaks for the five year period of 2016 through 2020.

Incorrect operation is significantly higher in the West and South Divisions.

Additional or Accelerated Actions that are currently scheduled or in place in order to reduce the risks associated with incorrect operation are documented, or included by reference, in Appendix D, Section 8. Prior documentation shall be retained and stored in the Distribution Integrity Management Program files.

8.2.8 Other

Leaks in FPU's gas distribution system due to Other causes, have significantly reduced compared to the last DIMP review. In the 2011 – 2015 DIMP plan, Other, accounted for 4% of total hazardous leaks, compared to the 2016-2015 DIMP plan were Other accounts for less then 1% of the total hazardous leaks.

The primary reason for this was training employees on the classification of leak causes on the leak investigations and classifying the leak in a more appropriate cause than *Other*.

Additional or Accelerated Actions that are currently scheduled or in place in order to reduce the risks associated with other causes are documented, or included by reference, in Appendix D,

Section 10. Prior documentation shall be retained and stored in the Distribution Integrity Management Program files.

9.0 MEASUREMENT OF PERFORMANCE, MONITORING RESULTS, AND EVALUATING EFFECTIVENESS

The objective of this section of the plan is to establish performance measures that shall be monitored from an established baseline in order to evaluate the effectiveness of the IM program. The performance measures detailed in Sections 9.1 through 9.5 have been established in order to monitor performance and assist in the ongoing evaluation of threats.

9.1 Number of Hazardous Leaks either Eliminated or Repaired, per §192.703(c), Categorized by Cause

The baseline and ongoing performance of the number of hazardous leaks either eliminated or repaired, per §192.703(c), categorized by cause, shall be documented, or included by reference, in Appendix E, Section 1.

9.2 Number of Excavation Damages

The baseline and ongoing performance of the number of excavation damages shall be documented, or included by reference, in Appendix E, Section 2.

9.3 Number of Excavation Tickets (received from the Sunshine State One Call of Florida notification center)

The baseline and ongoing performance of the number of excavation tickets received from the notification center(s) shall be documented, or included by reference, in Appendix E, Section 3.

9.4 Total Number of Leaks either Eliminated or Repaired, Categorized by Cause

The baseline and ongoing performance of the total number of leaks either eliminated or repaired, categorized by cause, shall be documented, or included by reference, in Appendix E, Section 4.

9.5 Number of Hazardous Leaks Either Eliminated or Repaired, per §192.703(c), Categorized by Material

The baseline and ongoing performance of the number of hazardous leaks either eliminated or repaired, per §192.703(c), categorized by material, shall be documented, or included by reference, in Appendix E, Section 5.

10.0 PERIODIC EVALUATION AND IMPROVEMENT

The objective of this section of the plan is to periodically re-evaluate threats and risks on the entire pipeline and periodically evaluate the effectiveness of its program.

10.1 Plan Updating, Review Frequency and Documentation

This written integrity management plan shall be reviewed annually and updated as required to reflect changes and improvements that have occurred in process, procedures and analysis for each element of the program. A complete program re-evaluation shall be completed every five years. All changes to the written plan, inclusive of material from the appendices, shall be recorded on the Revision Control Sheet on page ii. However, changes to material in the appendices that is included by reference need not be recorded on the Revision Control Sheet.

10.2 Effectiveness Review

An assessment of the performance measures described in Sections 9.1 through 9.6 shall be performed. In cases where the re-evaluation criteria specified is met or exceeded, a re-evaluation of the associated threats and risks shall be completed. An emerging threat in one or more location shall be evaluated for relevance to other areas. The re-evaluation of threats and risks shall be documented in Appendix F and the results of the re-evaluation shall be documented in Appendices B and C. The review shall also establish whether a complete program re-evaluation shall be completed in a shorter timeframe than five years; this decision shall also be documented. Past effectiveness reviews that are no longer current shall be retained and stored in the Distribution Integrity Management Program files.

11.0 REPORTING RESULTS

11.1 State & Federal Annual Reporting Requirements

The following four measures shall be reported, annually by March 15, to PHMSA as part of the annual report required by 49 CFR, § 191.11:

- Number of hazardous leaks either eliminated or repaired (or total number of leaks if all leaks are repaired when found), per § 192.703(c), categorized by cause
- Number of excavation damages

- Number of excavation tickets (receipt of information by the underground facility operator(Florida Public Utilities) from the Sunshine State One Call of Florida notification center)

- Total number of leaks either eliminated or repaired, categorized by cause

- Information related to failure of mechanical couplings, excluding those that result only in nonhazardous leaks, shall be reported to PHMSA as part of the annual report required by §191.11 beginning with the report submitted March 15, 2011. This information must include, as available, location of the failure in the pipeline, nominal pipe size, material type, nature of failure including any contribution of local pipeline environment, coupling manufacturer, lot number and date of manufacture, and other information that can be found in markings on the failed coupling.

The State of Florida also exercises jurisdiction over the pipeline; therefore, these five measures shall also be reported to the Florida Public Service Commission. A copy of the reports shall be maintained in the Distribution Integrity Management Program files.

12.0 DOCUMENT AND RECORD RETENTION

The following records shall be retained in the Distribution Integrity Management Program files.

- The most current as well as prior versions of this written IM Plan
- Documents supporting Knowledge of Facilities (material supporting Appendix A of the IM Plan)
- Documents supporting threat identification (material supporting Appendix B of the IM Plan)
- Documents supporting risk evaluation and ranking (material supporting Appendix C of the IM Plan)
- Documents supporting the identification and implementation of measures to address risks (material supporting Appendix D of the IM Plan)
- Documents supporting measurement of performance, monitoring results and evaluating effectiveness (material supporting Appendix E of the IM Plan)
- Effectiveness Reviews (material supporting Appendix F of the IM Plan)
- Annual Reports to PHMSA (as required by §191.11) and State pipeline safety authorities
- Mechanical Coupling Failure Reports

Documentation demonstrating compliance with the requirements of 49 CFR, Part 192, Subpart P shall be retained for at least 10 years.

APPENDIX A
KNOWLEDGE OF FACILITIES

Appendix A. Section 1. Table 5-1: IM Program Records Summary

Record	Record Type – Database, Electronic Record, Paper Record	Applicable Standard, Policy, or Guideline	Extent of Missing Records	Location of Records	Key Contact
Graphic Information System (GIS) database	Database		Largely Unpopulated	FPU Server	GIS Administrator
Wall Maps / Plats	Paper Record		Fairly Complete	Division Offices	Division Operations Supervisors
Gas Service Record Cards	Paper Record		Fairly Complete	Division Offices	Division Operations Supervisors
As-Built Construction Drawings / records	Electronic Record, Paper Record		Much data is missing	Division Offices	Division Engineering Departments
Gas Leak Repair Records	Paper Record / Electronic		Fairly Complete	Division Offices / FPU servers.	Division Operations Supervisors / GIS Administrator
Gas Leak Repair Database	NA		NA	NA	NA
Gas Leak Survey Records	Paper Record		Fairly Complete	Division Offices	Division Operations Supervisors
DOT/PHMSA Incident Reports	Paper Records		Fairly Complete	Division Offices	Division Operations Manager
Other Incident Reports	Paper Records		Fairly Complete	Division Offices	Division Operations Manager

Appendix A. Section 1. Table 5-1: IM Program Records Summary (continued)

Record	Record Type – Database, Electronic Record, Paper Record	Applicable Standard, Policy, or Guideline	Extent of Missing Records	Location of Records	Key Contact
CP Maintenance of Isolated Mains and Services subject to 10% annual inspection	Paper Record		Fairly Complete	Division Offices	Division Operations Supervisors
Cathodic Protection Maintenance Areas (Rectifier and Pipe-to-Soil inspection)	Paper Records		Fairly Complete	Division Offices	Division Operations Supervisors
Atmospheric Corrosion Inspection Records	Paper Record		Fairly Complete	Division Offices	Division Operations Supervisors
Patrol Records	Paper Record		Fairly Complete	Division Offices	Division Operations Supervisors
Valve Maintenance Records	Paper Record		Fairly Complete	Division Offices	Division Operations Supervisors
Regulator Station Maintenance Records	Paper Record		Fairly Complete	Division Offices	Division Operations Supervisors
Requests to Locate Gas Facilities	Electronic Record		Fairly Complete	Division Offices	Division Operations Supervisors
3rd Party Damage Claims	Paper Record		Fairly Complete	Division Offices	Division Operations Supervisors
Pipe Type Maps	Paper Record		South and Central Divisions only, marginal information	Division Offices	Division Operations Supervisors
Exposed Main & Services Reports	Paper Record		Much Data Missing	Division Offices	Division Operations Supervisors

Appendix A. Section 1. Table 5-1: IM Program Records Summary (continued)

Record	Record Type – Database, Electronic Record, Paper Record	Applicable Standard, Policy, or Guideline	Extent of Missing Records	Location of Records	Key Contact
Environmental Factor: Areas subject to flood	NA		NA	NA	NA
Environmental Factor: Areas subject to landslide	NA		NA	NA	NA
Environmental Factor: Population Density Records	NA		NA	NA	NA
Environmental Factor: Areas of Wall-to-Wall Paving	NA		NA	NA	NA
SME Interview Records	Paper Record		Complete	DIMP Master File	Gas standards Engineer.

Appendix A. Section 2. Table 5-2: Summary of System Design by Operating Pressure

Maximum Operating Pressure	Miles of Main
Intermediate Pressure – 2 psig to 60 psig	Unknown
High Pressure – greater than 60 psig	Unknown

Appendix A. Section 2. Table 5-3: Summary of Material Types and Years Installed (all divisions)

Material Type	Mains		Services	
	Current Miles of Main	Years Installed (of remaining)	Number of Services	Years Installed (of remaining)
Cast Iron	0	0	0	0
Wrought Iron	0	0	0	0
Bare Steel – with CP	0	0	0	0
Bare Steel – No CP	41	Unknown	2,434	Unknown
Coated Steel – with CP	1083	Unknown	11,545	Unknown
Coated Steel – no CP	0	0	0	0
Ductile Iron	0	0	0	0
Copper	0	0	0	0
Plastic - PVC	0	0	0	0
Plastic - ABS	0	0	0	0
Plastic – Century MDPE 2306	0	0	0	0
Plastic – Aldyl-A	Unknown	Unknown	Unknown	Unknown
Plastic – HDPE 3306	0	0	0	0
Plastic – All Others	1,948	~1980 Thru Present	87,266	~1980 Thru Present

Appendix A. Section 2. Table 5-4: Example Summary of Construction Practices

Material Type	Year first deployed	Year Ceased
Replacement via insertion of Copper	NA	NA
Replacement via Insertion of Plastic	~1976	Practice Continues
Replacement via insertion and pipe bursting/splitting	NA	NA
Internal lining / slip-lining	NA	NA
Joint Trench with other utilities	Not Used (West) ~1965 (South) ~1985 (Central)	Practice Continues in Central and South Divisions
Unguided Bore – soil displacement/ram	~1985	Practice Continues
Guided Directional Bore / Drill	~1990	Practice Continues
Blasting	NA	NA
Plow-in	NA	NA

Appendix A. Section 3. Table 5-5: Miles of Mains and Number of Services by Material Type

[Part B1 of PHMSA Form F 7100.1-1 incorporated by reference (all divisions)]

Appendix A. Section 3. Table 5-6: Miles of Mains and Number of Service lines by material and nominal diameter

[Part B2 & B3 of PHMSA Form F 7100.1-1 incorporated by reference (all divisions)]

Appendix A. Section 3. Table 5-7: Miles of Mains and Number of Services by material and decade

[Part B4 of PHMSA Form F 7100.1-1 incorporated by reference (all divisions)]

Appendix A. Section 3. Table 5-8: Number of hazardous leaks either eliminated or repaired, per §192.703(c), categorized by cause (all divisions)

Cause of Leak	Number of Hazardous Leaks – 2020*	
	MAINS	SERVICES
Corrosion	8	66
Natural Forces	3	3
Excavation	98	309
Other Outside Force	1	20
Material, Weld or Joint Failure	2	4
Equipment Failure	0	93
Incorrect Operation	2	9
Other	1	0

Appendix A. Section 3. Table 5-9: Number of Excavation Damages (all divisions)

Year	Number of Excavation Damages	
	MAINS	SERVICES
2020	101	315
2019	99	293
2018	87	280
2017	87	287
2016	60	275

Appendix A. Section 3. Table 5-10: Number of Excavation Tickets (all divisions)

Year	Number of Excavation Tickets
2020	147,503
2019	142,549
2018	144,684
2017	129,806
2016	119,256

Appendix A. Section 3. Table 5-11: Number of leaks either eliminated or repaired, categorized by cause (all divisions)

Cause of Leak	Number of leaks eliminated or repaired– 2020	
	MAINS	SERVICES
Corrosion	9	201
Natural Forces	4	3
Excavation	101	315
Other Outside Force	2	23
Material, Weld or Joint Failure	7	10
Equipment Failure	1	265
Incorrect Operation	2	47
Other	1	2

Appendix A. Section 3. Table 5-20: Corrosion Threat – Frequency and Trend (South Florida Division)

Threat / Sub-Threat	2020						
	Quantity		Leaks Repaired		Frequency of Failure		
	Miles Main	# Services	Mains	Services	Main Leaks/Mile	Service Leaks/100	Total Leaks / Facility Mile (mains & svcs)
Corrosion							
Cast Iron	0	0	0	0	0	0	0
Bare Steel	34	2,328	5	14	0.1471	0.6013	0.2984
Ductile Iron	0	0	0	0	0	0	0
Copper	0	0	0	0	0	0	0
Coated Steel (with CP)	498	5,774	2	32	0.0040	0.5542	0.0594
Coated Steel (No CP)	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0

Threat / Sub-Threat	Leak Ratio						Is Leak Frequency Increasing? Y/N
	2016	2017	2018	2019	2020	5-Year Average	
Corrosion (MAINS)							
Cast Iron	0	0	0	0	0	0	NA
Bare Steel			6	16	5		Y
Coated Steel (with CP)			5	4	2		N
Coated Steel (No CP)	0	0	0	0	0	0	NA
Other	0	0	0	0	0	0	NA
Corrosion (SERVICES)							
Bare Steel			7	17	14		N
Coated Steel (with CP)			38	22	32		N

Appendix A. Section 3. Table 5-21: Natural Forces Threat – Frequency and Trend (South Florida Division)

Threat / Sub-Threat	2020									
	Quantity			Leaks Repaired			Frequency of Failure			
	Miles Main	# Services	# of Units	Mains	Services	Units	Main Leaks/Mile	Service Leaks/100	Equip/ Fitting Leaks/ 100	Total Leaks / Facility Mile (mains & svcs)
Natural Forces										
Earth Movement / Landslide	1,384	49,609		1	0		0.000722	0		0.000496
Tree Roots	1,384	49,609		1	0		0.000722	0		0.000496
Frost Heave / Temperature	1,384	49,609		0	0		0	0		0
Flood	1,384	49,609		0	0		0	0		0
Ice/Snow Blockage of Control Equip			NA							
Other	1,384	49,609		0	1		0	0.00202		0.000496

Threat / Sub-Threat	Leak Ratio						Is Leak Frequency Increasing? Y/N
	2016	2017	2018	2019	2020	5-Year Average	
Natural Forces (MAINS)							
Seismic	NA	NA	NA	NA	NA	NA	NA
Earth Movement / Landslide	0	0	0	0	1	0.2	Y
Tree Roots	0	1	0	0	1	0.4	Y

Frost Heave / Temperature	NA	NA	NA	NA	NA	NA	NA
Flood	0	0	0	0	0	0	N
Ice/Snow Blockage of Control Equip	NA	NA	NA	NA	NA	NA	NA
Other	0	2	0	0	0	0.4	N
Natural Forces (SERVICES)							
Tree Roots	1	5	1	0	0	1.4	N
Other	0	3	1	3	1	1.6	N

Appendix A. Section 3. Table 5-22: Excavation Damage Threat – Frequency and Trend (South Florida Division)

Threat / Sub-Threat	2020							
	Quantity			Leaks Repaired			Frequency of Failure	
	System Miles Main	System Number of Services	System Number of Tickets	Number of Main Repairs	Number of Service Repairs	Total System Repairs	Leaks per 1000 Tickets	Leaks per System Mile
Excavation Damage - All	1,384	49,609	71,196	60	197	257	3.6098	0.12744

Threat / Sub-Threat	Leak Ratio						Is Leak Frequency Increasing? Y/N
	2016	2017	2018	2019	2020	5-Year Average	
Excavation Damage							
Tickets	58965	63643	65712	65020	71196	64907.2	y
Leaks (mains)	37	48	57	60	60	52.4	y
Leaks (services)	190	193	193	196	197	193.8	y
Leaks per 1000Tickets	3.8497	3.7867	3.8045	3.9373	3.6098	3.7976	n
Leaks per System Mile	0.1236	0.1281	0.1311	0.1313	0.1274	0.1283	n

Appendix A. Section 3. Table 5-23: Outside Force Threat – Frequency and Trend (South Florida Division)

Threat / Sub-Threat	2020									
	Quantity			Leaks Repaired			Frequency of Failure			
	Miles Main	# Services	# of Units	Mains	Services	Units	Main Leaks/Mile	Service Leaks/100	Equip/ Fitting Leaks/100	Total Leaks / Facility Mile (mains & svcs)
Outside Force										
Vehicle Damage	1,384	49,609	0	0	8		0	0.011613	NA	0.003967
Vandalism	1,384	49,609	0	0	2		0	0.004032	NA	0.000992
Fire / Explosion	1,384	49,609	0	0	0		0	0	NA	0
Previous Damage	1,384	49,609	0	0	0		0	0	NA	0
Other	1,384	49,609	0	1	7		0.000723	0.014110	NA	0.003471

Threat / Sub-Threat	Leak Ratio						Is Leak Frequency Increasing? Y/N
	2016	2017	2018	2019	2020	5-Year Average	
Outside Force (MAINS)							
Vehicle Damage	0	0	0	0	0	0	N
Vandalism	0	0	0	0	0	0	N
Fire / Explosion	0	2	0	0	0	0.4	N
Previous Damage	0	0	0	0	0	0	N

Other	1	2	0	0	1	0.8	Y
Outside Force (SERVICES)							
Vehicle Damage	3	6	1	6	8	4.8	Y
Vandalism	0	0	1	0	2	0.6	Y
Other	5	8	9	1	7	6.0	N

Appendix A. Section 3. Table 5-24: Material, Weld or Joint Failure Threat – Frequency and Trend (South Florida Division)

Threat / Sub-Threat	2020						
	Quantity		Leaks Repaired			Frequency of Failure	
	Miles Main	# Services	Mains	Services	Main Leaks/Mile	Service Leaks/100	Total Leaks / Facility Mile (mains & svcs)
Material, Weld or Joint Failure							
PVC	0	0	0	0	0	0	0
ABS	0	0	0	0	0	0	0
Aldyl A	Unk	Unk	Unk	Unk	Unknown	0	0
Century Products (incl PE 2306)	0	0	0	0	0	0	0
PE 3306	0	0	0	0	0	0	0
Other Plastic Pipe	0	0	0	0	0	0	0
Delrin Insert Tap Tees	Unk	Unk	Unk	Unk	Unk	Unk	Unk
Plexco Service Tee Celcon Caps	Unk	Unk	Unk	Unk	Unk	Unk	Unk
Pre 1940 OA girth welds	Unk	0	0	0	0	0	0
Other	1,384	49,609	4	6	0.002890	0.01209	0.004959

Appendix A. Section 3. Table 5-24: Material, Weld or Joint Failure Threat – Frequency and Trend (continued South Florida Division)

Threat / Sub-Threat	Leak Ratio						Is Leak Frequency Increasing? Y/N
	2016	2017	2018	2019	2020	5-Year Average	
Material, Weld or Joint Failure (MAINS)							
PVC	0	0	0	0	0	0	NA
ABS	0	0	0	0	0	0	NA
Aldyl A	Unk	Unk	Unk	Unk	Unk	Unk	Unk
Century Products (incl PE 2306)	0	0	0	0	0	0	NA
PE 3306	0	0	0	0	0	0	NA
Other Plastic Pipe	0	0	0	0	0	0	NA
Delrin Insert Tap Tees	Unk	Unk	Unk	Unk	Unk	Unk	Unk
Plexco Service Tee Celcon Caps	Unk	Unk	Unk	Unk	Unk	Unk	Unk
Pre 1940 OA girth welds	0	0	0	0	0	0	0
Other	5	1	1	2	4	2.6	Y
Material, Weld or Joint Failure (SERVICES)							
Aldyl A	0	0	0	4	0	0.8	N
Other	3	0	5	6	6	4.0	Y

Appendix A. Section 3. Table 5-25: Equipment Failure Threat – Frequency and Trend (South Florida Division)

Threat / Sub-Threat	2020									
	Quantity			Leaks Repaired			Frequency of Failure			
	Miles Main	# Services	# of Units	Mains	Services	Units	Main Leaks/Mile	Service Leaks/100	Equip/Fitting Leaks/100	Total Leaks / Facility Mile (mains & svcs)
Equipment Failure										
Valves	1,384	49,609	Unk	1	12	Unk	0.000723	0.00024	NA	0.006447
Service Regulators	1,384	49,609	Unk	0	110	Unk	0	0.22173	NA	0.054549
Control/Relief Station	1,384	49,609	0	0	0	0	0	0	NA	0
Mechanical Couplings	1,384	49,609	Unk	0	6	Unk	0	0.01209	NA	0.002975
Other	1,384	49,609	0	0	4	Unk	0	0	NA	0

Threat / Sub-Threat	Leak Ratio						Is Leak Frequency Increasing? Y/N
	2016	2017	2018	2019	2020	5-Year Average	
Equipment Failure (MAINS)							
Valves	1	1	2	2	1	1.4	N
Control/Relief Station	1	0	0	0	0	0.2	N
Mechanical Couplings	9	4	0	2	0	3.0	N
Other	0	0	0	0	0	0	N
Equipment Failure (SERVICES)							
Valves	11	3	0	7	12	6.6	Y
Service Regulators	86	87	59	73	110	83	Y
Mechanical Couplings	1	3	3	3	6	3.2	Y
Other	3	2	1	3	4	2.6	Y

Appendix A. Section 3. Table 5-26: Incorrect Operation Threat – Frequency and Trend (South Florida Division)

Threat / Sub-Threat	2020									
	Quantity			Incidents			Frequency of Failure			
	Miles Main	# Services	# of Units	Mains	Services	Units	Main Incidents/Mile	Service Incidents/100	Equip/Fitting Incidents/100	Total Incidents / Facility Mile (mains & svcs)
Incorrect Operation										
Operating Error	1,384	49,609		0	0		0	0	NA	0
Service Line bored thru Sewer	1,384	49,609		0	0		0	0	NA	0
Other	1,384	49,609		2	29		0.001445	0.058457	NA	0.015373

Threat / Sub-Threat	Leak Ratio						Is Leak Frequency Increasing? Y/N
	2016	2017	2018	2019	2020	5-Year Average	
Incorrect Operation (MAINS)							
Operating Error	0	0	0	0	0	0	N
Service Line bored thru Sewer	0	0	0	0	0	0	N
Other	1	5	2	2	2	2.4	N
Incorrect Operation (SERVICES)							
Other	7	4	6	11	12	11.4	Y

Appendix A. Section 3. Table 5-27: Other Threat – Frequency and Trend (South Florida Division)

Threat / Sub-Threat	2020								
	Quantity			Leaks Repaired		Frequency of Failure			
	Miles Main	Number Services	Number Copper Services	Mains	Services	Main Leaks/Mile	All Services Leaks / 100	Copper Services Only Leaks / 100	Total Leaks / Facility Mile (mains & svcs)
Other									
Bell Joint leaks	0	0	0	0	0	0	0	0	0
Copper Pipe Puncture	0	0	0	0	0	0	0	0	0
Other	1,384	49,609	0	1	1	0.000723	0.002016	0	0.0009918

Threat / Sub-Threat	Leak Ratio						Is Leak Frequency Increasing? Y/N
	2016	2017	2018	2019	2020	5-Year Average	
Other (MAINS)							
Bell Joint Leaks	Unk	Unk	Unk	Unk	Unk	Unk	Unk
Copper Pipe Puncture	NA	NA	NA	NA	NA	NA	NA
Other	4	0	0	0	1	1.0	N
Other (SERVICES)							
Other	12	6	1	2	1	4.4	N

Appendix A. Section 3. Table 5-28: Corrosion Threat – Frequency and Trend (West Division)

Threat / Sub-Threat	2020						
	Quantity		Leaks Repaired		Frequency of Failure		
	Miles Main	# Services	Mains	Services	Main Leaks/Mile	Service Leaks/100	Total Leaks / Facility Mile (mains & svcs)
Corrosion							
Cast Iron	0	0	0	0	0	0	0
Bare Steel	6.183	106	3	4	0.485	3.774	0.9054
Ductile Iron	0	0	0	0	0	0	0
Copper	0	0	0	0	0	0	0
Coated Steel (with CP)	302.271	3,454	5	1	0.0165	0.02895	0.01701
Coated Steel (No CP)	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0

Threat / Sub-Threat	Leak Ratio						Is Leak Frequency Increasing? Y/N
	2016	2017	2018	2019	2020	5-Year Average	
Corrosion (mains)							
Cast Iron	0	0	0	0	0	0	NA
Bare Steel	19	18	3	1	3	8.8	N
Ductile Iron	0	0	0	0	0	0	NA
Copper	0	0	0	0	0	0	NA
Coated Steel (with CP)	0	0	2	0	5	1.4	Y
Coated Steel (No CP)	0	0	0	0	0	0	NA
Other	0	0	0	0	0	0	NA
Corrosion (services)							
Bare Steel	4	6	3	0	4	3.4	N
Coated Steel (with CP)	2	11	10	2	1	5.2	N

Appendix A. Section 3. Table 5-29: Natural Forces Threat – Frequency and Trend (West Division)

Threat / Sub-Threat	2020									
	Quantity			Leaks Repaired			Frequency of Failure			
	Miles Main	# Services	# of Units	Mains	Services	Units	Main Leaks/Mile	Service Leaks/100	Equip/Fitting Leaks/100	Total Leaks / Facility Mile (mains & svcs)
Natural Forces										
Tree Roots	959.209	25,241		0			0			
Flood	NA	NA		0	0		0	0		0
Other	959.209	25,241		0			0			

Threat / Sub-Threat	Leak Ratio						Is Leak Frequency Increasing? Y/N
	2016	2017	2018	2019	2020	5-Year Average	
Natural Forces (MAINS)							
Tree Roots	0	2	0	0	0	0.4	N
Flood	0	0	0	0	0	0	N
Other	1	0	0	0	0	0.2	N
Natural Forces (SERVICES)							
Other	0	1	3	2	1	1.4	N

Appendix A. Section 3. Table 5-30: Excavation Damage Threat – Frequency and Trend (West Division)

Threat / Sub-Threat	2020							
	Quantity			Leaks Repaired			Frequency of Failure	
	System Miles Main	System Number of Services	System Number of Tickets	# of Main repairs	# of Services repairs	Total System repairs	Leaks per 1000 Tickets	Leaks per System Mile
Excavation Damage - All	959.209	25,241	39,094	21	35	56	1.4324	0.0429

Threat / Sub-Threat	Leak Ratio						Is Leak Frequency Increasing? Y/N
	2016	2017	2018	2019	2020	5-Year Average	
Excavation Damage							
Tickets	31,205	33,222	39,643	40,311	39,094	36,695	Y
Leaks (MAIN)	8	22	15	23	21	17.8	Y
Leaks (SERVICES)	23	61	27	29	35	35	N
Leaks per 1000 Tickets	0.9934	2.4983	1.0595	1.2900	1.4324	1.4547	N
Leaks per System Mile	0.0248	0.0674	0.0332	0.0402	0.0422	0.0416	Y

Appendix A. Section 3. Table 5-31: Outside Force Threat – Frequency and Trend (West Division)

Threat / Sub-Threat	2020									
	Quantity			Leaks Repaired			Frequency of Failure			
	Miles Main	# Services	# of Units	Mains	Services	Units	Main Leaks/Mile	Service Leaks/100	Equip/ Fitting Leaks/100	Total Leaks / Facility Mile (mains & svcs)
Outside Force										
Vehicle Damage	959.209	25,241		0	2		0	0.00792	0	0.00099
Vandalism	959.209	25,241		0	0		0	0	0	0
Fire / Explosion	959.209	25,241		0	0		0	0	0	0
Previous Damage	959.209	25,241		0	0		0	0	0	0
Other	959.209	25,241		0	3		0	0.01188	0	0.00148

Threat / Sub-Threat	Leak Ratio						Is Leak Frequency Increasing? Y/N
	2016	2017	2018	2019	2020	5-Year Average	
Outside Force (Main)							
Vehicle Damage	0	0	0	0	0	0	N
Vandalism	0	0	0	0	0	0	N
Fire / Explosion	0	0	0	0	0	0	N
Other	1	1	1	1	0	0.8	N
Outside Force (Service)							
Other	0	4	2	2	5	2.6	Y

Appendix A. Section 3. Table 5-32: Material, Weld or Joint Failure Threat – Frequency and Trend (West Division)

Threat / Sub-Threat	2020						
	Quantity		Leaks Repaired			Frequency of Failure	
	Miles Main	# Services	Mains	Services	Main Leaks/Mile	Service Leaks/100	Total Leaks / Facility Mile (mains & svcs)
Material, Weld or Joint Failure							
PVC	0	NA	NA	NA	NA	NA	NA
ABS	0	NA	NA	NA	NA	NA	NA
Aldyl A	0	NA	NA	NA	NA	NA	NA
Century Products (incl PE 2306)	0	NA	NA	NA	NA	NA	NA
PE 3306	0	NA	NA	NA	NA	NA	NA
Other Plastic Pipe	0	NA	NA	NA	NA	NA	NA
Delrin Insert Tap Tees	0	NA	UNK	UNK	UNK	UNK	UNK
Plexco Service Tee Celcon Caps	0	NA	UNK	UNK	UNK	UNK	UNK
Pre 1940 OA girth welds	0	NA	NA	NA	NA	NA	NA
Other	959.209	25,241	0	0	0.00	0.00	0.00

Appendix A. Section 3. Table 5-32: Material, Weld or Joint Failure Threat – Frequency and Trend (West Division continued)

Threat / Sub-Threat	Leak Ratio						Is Leak Frequency Increasing? Y/N
	2016	2017	2018	2019	2020	5-Year Average	
Material, Weld or Joint Failure (mains)							
PVC	NA	NA	NA	NA	NA	NA	NA
ABS	NA	NA	NA	NA	NA	NA	NA
Aldyl A	NA	NA	NA	NA	NA	NA	NA
Century Products (incl PE 2306)	NA	NA	NA	NA	NA	NA	NA
PE 3306	NA	NA	NA	NA	NA	NA	NA
Other Plastic Pipe	NA	NA	NA	NA	NA	NA	NA
Delrin Insert Tap Tees	Unk	Unk	Unk	Unk	Unk	Unk	Unk
Plexco Service Tee Celcon Caps	Unk	Unk	Unk	Unk	Unk	Unk	Unk
other	0	1	1	0	0	0.4	N
Material, Weld or Joint Failure (services)							
Other	0	0	89	4	0	18.6	N

Appendix A. Section 3. Table 5-33: Equipment Failure Threat – Frequency and Trend (West Division)

Threat / Sub-Threat	2020									
	Quantity			Leaks Repaired			Frequency of Failure			
	Miles Main	# Services	# of Units	Mains	Services	Units	Main Leaks/Mile	Service Leaks/100	Equip/Fitting Leaks/100	Total Leaks / Facility Mile (mains & svcs)
Equipment Failure										
Valves	959.209	25,241		0	7		0	0.0277	0	0.005271
Service Regulators	959.209	25,241		0	34		0	0.1347	0	0
Control/Relief Station	959.209	25,241		0	0		0	0	0	0
Mechanical Couplings	959.209	25,241		0	0		0	0	0	0
Other	959.209	25,241		0	46		0	0.1822	0	0 .03464

Threat / Sub-Threat	Leak Ratio						Is Leak Frequency Increasing? Y/N
	2016	2017	2018	2019	2020	5-Year Average	
Equipment Failure (main)							
Valves	1	0	0	1	0	0.4	N
Service Regulators	1	0	0	0	0	0.2	N
Control/Relief Station	0	1	0	0	0	0.2	N
Mechanical Couplings	1	1	0	1	0	0.6	N
Other	1	0	0	0	0	0.2	N

Equipment Failure (services)							
Other	39	31	24	76	87	51.4	Y

Appendix A. Section 3. Table 5-34: Incorrect Operation Threat – Frequency and Trend (West Division)

Threat / Sub-Threat	2020									
	Quantity			Incidents			Frequency of Failure			
	Miles Main	# Services	# of Units	Mains	Services	Units	Main Incidents/Mile	Service Incidents/100	Equip/Fitting Incidents/100	Total Incidents / Facility Mile (mains & svcs)
Incorrect Operation										
Operating Error	959.209	25,241		0	0		0	0	NA	0
Service Line bored thru Sewer	959.209	25,241		0	0		0	0	NA	0
Other	959.209	25,241		0	18		0	0.07131	NA	0.01355

Threat / Sub-Threat	Leak Ratio						Is Leak Frequency Increasing? Y/N
	2016	2017	2018	2019	2020	5-Year Average	
Incorrect Operation (MAINS)							
Operating Error	0	0	0	0	0	0	N
Service Line bored thru Sewer	0	0	0	0	0	0	N
Other	2	0	0	1	0	0.6	N
Incorrect Operation (SERVICES)							
Other	0	0	0	17	18	7.0	Y

Appendix A. Section 3. Table 5-35: Other Threat – Frequency and Trend (West Division)

Threat / Sub-Threat	2020								
	Quantity			Leaks Repaired		Frequency of Failure			
	Miles Main	Number Services	Number Copper Services	Mains	Services	Main Leaks/Mile	All Services Leaks / 100	Copper Services Only Leaks / 100	Total Leaks / Facility Mile (mains & svcs)
Other									
Bell Joint leaks	959.209	25,241	0	0	0	0	0	0	0
Copper Pipe Puncture	959.209	25,241	0	0	0	0	0	0	0
Copper Sulfide	0	0	0	0	0	0	0	0	0
Other	959.209	25,241	0	0	0	0	0	0	0

Threat / Sub-Threat	Leak Ratio						Is Leak Frequency Increasing? Y/N
	2016	2017	2018	2019	2020	5-Year Average	
Other (MAINS)							
Bell Joint Leaks	0	0	0	0	0	0	N
Copper Pipe Puncture	0	0	0	0	0	0	N
OTHER	2	3	12	0	0	3.4	N
Other (SERVICES)							

OTHER	29	13	150	30	0	44.4	N

Appendix A. Section 3. Table 5-36: Corrosion Threat – Frequency and Trend (Central Division)

Threat / Sub-Threat	2020						
	Quantity		Leaks Repaired		Frequency of Failure		
	Miles Main	# Services	Mains	Services	Main Leaks/Mile	Service Leaks/100	Total Leaks / Facility Mile (mains & svcs)
Corrosion							
Cast Iron	0	0	0	0	0	0	0
Bare Steel	0	0	0	0	0	0	0
Coated Steel (with CP)	282.498	2,317	1	20	0.00354	0.863	0.06676
Coated Steel (No CP)	0	0	0	0	0	0	0

Threat / Sub-Threat	Leak Ratio						Is Leak Frequency Increasing? Y/N
	2016	2017	2018	2019	2020	5-Year Average	
Corrosion (mains)							
Cast Iron	0	0	0	0	0	0	NA
Bare Steel	0	0	0	0	0	0	NA
Coated Steel (with CP)	0	0	0	1	1	0.4	Y
Coated Steel (No CP)	0	0	0	0	0	0	NA
Corrosion (services)							
Bare Steel	0	0	0	0	0	0	NA
Coated Steel (with CP)	42	31	39	53	44	41.8	Y
Others	0	0	0	0	0	0	NA

Appendix A. Section 3. Table 5-37: Natural Forces Threat – Frequency and Trend (Central Division)

Threat / Sub-Threat	2020									
	Quantity			Leaks Repaired			Frequency of Failure			
	Miles Main	# Services	# of Units	Mains	Services	Units	Main Leaks/Mile	Service Leaks/100	Equip/Fitting Leaks/100	Total Leaks / Facility Mile (mains & svcs)
Natural Forces										
Tree Roots	727.955	26,723		0	0		0	0		0
Flood	727.955	26,723		0	0		0	0		0
Other	727.955	26,723		1	1		0.00137	0.0037		0.0018

Threat / Sub-Threat	Leak Ratio						Is Leak Frequency Increasing? Y/N
	2016	2017	2018	2019	2020	5-Year Average	
Natural Forces (Mains)							
Tree Roots	0	0	0	0	0	0	N
Flood	0	0	0	0	0	0	N
Other	0	0	0	1	1	0.4	Y
Natural Forces (Services)							
Tree Roots	1	1	1	0	0	0.6	N
Flood	0	0	0	0	0	0	N
Other	0	6	2	0	1	1.8	N

Appendix A. Section 3. Table 5-38: Excavation Damage Threat – Frequency and Trend (Central Division)

Threat / Sub-Threat	2020							
	Quantity			Leaks Repaired			Frequency of Failure	
	System Miles Main	System Number of Services	System Number of Tickets	# of main repairs	# of Services repairs	Total System Miles	Leaks per 1000 Ticket	Leaks per System Mile
Excavation Damage - All	727.955	26,723	37213	20	83	103	2.76785	0.0938

Threat / Sub-Threat	Leak Ratio						Is Leak Frequency Increasing? Y/N
	2016	2017	2018	2019	2020	5-Year Average	
Excavation Damage							
Tickets	29,086	32,941	39,329	37,218	37,213	35,157	
Leaks (Mains)	15	17	15	16	20	16.6	Y
Leaks (Services)	62	33	60	68	83	61.2	Y
Leaks per 1000 Tickets	2.6473	1.5179	1.9070	2.2570	2.7678	2.2194	Y
Leaks per System Mile	0.0785	0.0499	0.0725	0.0789	0.0938	0.0747	Y

Appendix A. Section 3. Table 5-39: Outside Force Threat – Frequency and Trend (Central Division)

Threat / Sub-Threat	2020									
	Quantity			Leaks Repaired			Frequency of Failure			
	Miles Main	# Services	# of Units	Mains	Services	Units	Main Leaks/Mile	Service Leaks/100	Equip/ Fitting Leaks/100	Total Leaks / Facility Mile (mains & svcs)
Outside Force										
Vehicle Damage	727.955	26,723		0	1		0	0.0037	NA	0.0009
Vandalism	727.955	26,723		0	0		0	0	NA	0
Fire / Explosion	727.955	26,723		0	0		0	0	NA	0
Other	727.955	26,723		1	0		0.00137	0	NA	0.0009

Threat / Sub-Threat	Leak Ratio						Is Leak Frequency Increasing? Y/N
	2016	2017	2018	2019	2020	5-Year Average	
Outside Force (Main)							
Vehicle Damage	0	0	0	0	0	0	N
Vandalism	0	0	0	0	0	0	N
Other	0	1	0	0	1	0.4	Y
Outside Force (Services)							
Vehicle Damage	6	0	1	3	1	2.2	N
other	0	4	1	3	0	1.6	N

Appendix A. Section 3. Table 5-40: Material, Weld or Joint Failure Threat – Frequency and Trend (Central Division)

Threat / Sub-Threat	2020						
	Quantity		Leaks Repaired			Frequency of Failure	
	Miles Main	# Services	Mains	Services	Main Leaks/Mile	Service Leaks/100	Total Leaks / Facility Mile (mains & svcs)
Material, Weld or Joint Failure							
PVC	NA	NA	NA	NA	NA	NA	NA
ABS	NA	NA	NA	NA	NA	NA	NA
Aldyl A	Unk	Unk	Unk	Unk	Unk	Unk	Unk
Century Products (incl PE 2306)	NA	NA	NA	NA	NA	NA	NA
PE 3306	NA	NA	NA	NA	NA	NA	NA
Other Plastic Pipe	NA	NA	NA	NA	NA	NA	NA
Delrin Insert Tap Tees	Unk	Unk	Unk	Unk	Unk	Unk	Unk
Plexco Service Tee Celcon Caps	Unk	Unk	Unk	Unk	Unk	Unk	Unk
Pre 1940 OA girth welds	NA	NA	NA	NA	NA	NA	NA
Other	727.955	26,723	3	4	0.00412	0.01497	0.0064

Appendix A. Section 3. Table 5-41: Material, Weld or Joint Failure Threat – Frequency and Trend (Central Division continued)

Threat / Sub-Threat	Leak Ratio						Is Leak Frequency Increasing? Y/N
	2016	2017	2018	2019	2020	5-Year Average	
Material, Weld or Joint Failure (Mains)							
PVC	NA	NA	NA	NA	NA	NA	NA
ABS	NA	NA	NA	NA	NA	NA	NA
Aldyl A	Unk	Unk	Unk	Unk	Unk	Unk	Unk
Century Products (incl PE 2306)	NA	NA	NA	NA	NA	NA	NA
PE 3306	NA	NA	NA	NA	NA	NA	NA
Other Plastic Pipe	NA	NA	NA	NA	NA	NA	NA
Delrin Insert Tap Tees	Unk	Unk	Unk	Unk	Unk	Unk	Unk
Plexco Service Tee Celcon Caps	Unk	Unk	Unk	Unk	Unk	Unk	Unk
Other	4	2	2	1	3	2.4	Y
Material, Weld or Joint Failure (Services)							
Other	8	5	5	3	4	5.0	N

Appendix A. Section 3. Table 5-42: Equipment Failure Threat – Frequency and Trend (Central Division)

Threat / Sub-Threat	2020									
	Quantity			Leaks Repaired			Frequency of Failure			
	Miles Main	# Services	# of Units	Mains	Services	Units	Main Leaks/Mile	Service Leaks/100	Equip/Fitting Leaks/100	Total Leaks / Facility Mile (mains & svcs)
Equipment Failure										
Valves	727.955	26,723		0	0		0	0	0	0
Service Regulators	727.955	26,723		0	47		0	0.17588	0	0.04281
Control/Relief Station	727.955	26,723		0	0		0	0	0	0
Mechanical Couplings	727.955	26,723		0	0		0	0	0	0
Other	727.955	26,723		0	5		0	0.01871	0	0.00455

Threat / Sub-Threat	Leak Ratio						Is Leak Frequency Increasing? Y/N
	2016	2017	2018	2019	2020	5-Year Average	
Equipment Failure (Mains)							
Valves	0	1	0	0	0	0.2	N
Mechanical Couplings	0	0	0	0	0	0	N
Other	0	0	0	0	0	0	N
Equipment Failure (Services)							
Service Regulators	50	31	44	45	47	43.4	Y
Other	0	0	0	0	5	1	Y

Appendix A. Section 3. Table 5-43: Incorrect Operation Threat – Frequency and Trend (Central Division)

Threat / Sub-Threat	2020									
	Quantity			Incidents			Frequency of Failure			
	Miles Main	# Services	# of Units	Mains	Services	Units	Main Incidents/Mile	Service Incidents/100	Equip/Fitting Incidents/100	Total Incidents / Facility Mile (mains & svcs)
Incorrect Operation										
Operating Error	727.955	26,723		0	0		0	0	0	0
Service Line bored thru Sewer	727.955	26,723		0	0		0	0	0	0
Other	727.955	26,723		0	0		0	0	0	0

Threat / Sub-Threat	Leak Ratio						Is Leak Frequency Increasing? Y/N
	2016	2017	2018	2019	2020	5-Year Average	
Incorrect Operation (Mains)							
Operating Error	0	0	0	0	0	0	N
Service Line bored thru Sewer	0	0	0	0	0	0	N
Other	0	0	0	4	0	0.8	N
Incorrect Operation (Services)							

Other	0	0	0	1	0	0.2	N

Appendix A. Section 3. Table 5-44: Other Threat – Frequency and Trend (Central Division)

Threat / Sub-Threat	2020								
	Quantity			Leaks Repaired		Frequency of Failure			
	Miles Main	Number Services	Number Copper Services	Mains	Services	Main Leaks/Mile	All Services Leaks / 100	Copper Services Only Leaks / 100	Total Leaks / Facility Mile (mains & svcs)
Other									
Bell Joint leaks	727.955	26,723		0	0	0	0	0	0
Copper Pipe Puncture	727.955	26,723		0	0	0	0	0	0
Copper Sulfide	727.955	26,723		0	0	0	0	0	0
Other	727.955	26,723		0	1	0	0.00374	0	0.00091

Threat / Sub-Threat	Leak Ratio						Is Leak Frequency Increasing? Y/N
	2016	2017	2018	2019	2020	5-Year Average	
Other (Mains)							
Bell Joint Leaks	0	0	0	0	0	0	NA
Copper Pipe Puncture	0	0	0	0	0	0	NA
Other	7	1	3	1	0	2.4	N
Other (Services)							
Other	30	1	9	13	1	10.8	N

Appendix A. Section 4. Table 5-36: Identification of Additional Information Needed for IM Program

Area of incomplete records or Knowledge	Can it be acquired over time through normal activities? Y / N	Does Action Plan Exist? Y / N
Vintage years of facilities	No	Yes
Exact location of pipe facilities including Aldyl A, Mechanical Couplings, Delrin Insert Tap Tees, Plexco Celcon Tap Service Tees, Pre 1940 OA Girth Welds	Yes	Yes
Information on pipe materials currently in the ground.	Yes	Yes
Greater detail on Subthreats of Causes	Yes	Yes

Appendix A. Section 4. Table 5-37: Action Plans to Gain Additional Information Over Time

Action Plan Scope Gaining Additional Information	Schedule	Completion Date	Officer / Manager Responsible
Vintage years of facilities -Leak report card was revised in 2020 to capture more detail or leaks. -information of new pipe facilities being installed is being captured on FPUC's GIS.		Ongoing project	Division Operations Managers, GIS technicians, & Gas Standards Engineer.
Exact location of pipe facilities including Aldyl A, Mechanical Couplings, Delrin Insert Tap Tees, Plexco Celcon Tap Service Tees, Pre 1940 OA Girth Welds -Gained through Exposed Piping Reports and Leak Reports -Leak reports are to be uploaded to GIS which will make it easier to analyze leak report data.		Ongoing Project	Division Operations Managers, GIS technicians, Manager of Engineering, & Gas Standards Engineer
Greater detail on Subthreats of Causes – Gained through modified Leak Reports and additional training on their completion.		Ongoing Project	Division Operations Managers & Gas Standards Engineer

Appendix A. Section 5. Sample of Subject Matter Expert Information Interview Form

SME Name	Current Job Title Role	Yrs Experience	Comment(s) re: Qualification & Experience

Written record

Describe nature of information (First Hand witness or direct experience vs. Second Hand)

Date:	

Interviewer Name:	
Interviewer Title:	

Signature of Interviewer (Reqd):	
Signature of SMEs (Optional):	

APPENDIX B
THREAT IDENTIFICATION

Appendix B. Section 1.

Section 1. Threat Identification Process

[Southern Gas Association, Northeast Gas Association and Structural Integrity Associates, Inc. Subject Matter Expert(SME) Evaluation of Threats Applicable to the Gas Distribution System, incorporated by reference (all divisions)]

Appendix B. Section 2.

Threats Identified as applicable to the gas distribution system

Appendix B. Section 2. Table 6-3: Summary SME Evaluation of Threats Applicable to the Gas Distribution System

Service territory covered by this Assessment: All Divisions				
Primary Threat Category	**Sub-Threat**	**SME's to Consider the following**	**SME Evaluation/Answer**	**Threat Applicable? SME – Yes / No**
Corrosion	Cast Iron Pipe	Does Cast Iron pipe exist in the system?	NO	NO
		Is there a known history of body-of-pipe leaks, fractures, or graphitization?	N/A	
		Are certain diameters or parts of the system known to be more prone to failure and leakage than others?	N/A	
	Bare Steel Pipe (no CP)	Do bare (uncoated) steel main or services exist in the system that are not under CP?	Yes – South, Divisions	Yes – South, Division
		Is there known evidence of active external corrosion on bare steel pipes not under CP?	Yes	
		Is there a history of leakage on bare steel pipes not under CP?	Yes	
	Bare Steel Pipe (with CP)	Do bare (uncoated) steel main or services exist in the system that are under CP?	No	No
		Is there known evidence of active external corrosion on bare steel pipes under CP?	No	
		Is there a known history of leakage on bare steel pipes under CP?	No	

Appendix B. Section 2. Table 6-3: Summary SME Evaluation of Threats Applicable to the Gas Distribution System (continued)

Service territory covered by this Assessment: All Divisions				
Primary Threat Category	**Sub-Threat**	**SME's to Consider the following**	**SME Evaluation/Answer**	**Threat Applicable? SME – Yes / No**
Corrosion	Coated Steel with CP	Is there known evidence of active external corrosion on coated steel pipe with CP?	Yes – South, Central West Divisions	Yes – All Divisions
		Is there a known history of leakage on coated steel pipe with CP?	Yes – South, Central West Divisions	
		Are some CP systems frequently down (not achieving the required level of protection); more than 10% of the time?	No	
	Coated Steel w/o CP	Is there known evidence of active external corrosion on coated steel pipe without CP?	No	No
		Is there a known history of leakage on coated steel pipe without CP?	No	
	Copper Services	Are direct buried or inserted copper services known to exist in the system?	No	No
		Is there a known history of leakage on copper services?	No	
	Stray Current	Do distribution facilities exist near DC transit systems, high voltage DC transmission systems or other known sources of DC current?	Yes – All Divisions	Yes – All Divisions
		Are any facilities known to be impacted by sources of stray DC current that has or may result in corrosion?	YES – Central division	
	Internal Corrosion	Are liquids known to exist within any portions of the distribution system?	No	No
		Is there known evidence of past or active internal corrosion on steel pipe?	No	
		Is there a known history of leakage caused by internal corrosion of steel pipe?	No	

Appendix B. Section 2. Table 6-3: Summary SME Evaluation of Threats Applicable to the Gas Distribution System (continued)

Service territory covered by this Assessment: All Divisions				
Primary Threat Category	**Sub-Threat**	**SME's to Consider the following**	**SME Evaluation/Answer**	**Threat Applicable? SME – Yes / No**
Corrosion	Atmospheric Corrosion	Do above ground distribution facilities exist in areas exposed to marine atmosphere, high humidity, atmospheric pollutants or agricultural chemicals?	Yes – All Divisions	Yes – All Divisions
		Is there known evidence of past or active external atmospheric corrosion on exposed steel pipe, equipment or fittings?	Yes – All Divisions	
		Is there a known history of leakage caused by atmospheric corrosion of steel pipe?	Yes – All Divisions	
	Corrosion of carrier pipe in Cased Crossing	Do steel carrier pipes exist within cased crossings?	Yes – All Divisions	Yes – All Divisions
		Are there any existing known contacts between carrier pipes and casings?	Yes – South Division	
		Is there known evidence of past or active external corrosion on cased steel pipe?	No	
		Is there a known history of leakage caused by corrosion on cased steel pipe?	No	
Natural Forces	Seismic Activity	Are there any seismically active zones or fault lines that exist in the area?	No	No
		Is there a history of leakage associated with Seismic activity?	No	
	Earth Movement / Landslide	Are there any areas susceptible to earth movement or landslide in the area?	No	No
		Is there a known history of leakage associated with landslide or earth movement?	No	
	Frost Heave	Are there any areas susceptible to frost heave that exist in the area?	No	No

Appendix B. Section 2. Table 6-3: Summary SME Evaluation of Threats Applicable to the Gas Distribution System (continued)

Service territory covered by this Assessment: All Divisions				
Primary Threat Category	**Sub-Threat**	**SME's to Consider the following**	**SME Evaluation/Answer**	**Threat Applicable? SME – Yes / No**
Natural Forces	Frost Heave	Is there a known history of leakage associated with frost heave?	No	No
	Flooding	Are there any areas within the gas system that are subject to flooding?	Yes – All Divisions	Yes – All Divisions
		Is there a known history of leakage or damage associated with flooding?	No	
	Over-pressure due to snow/ice blockage	Are pressure control equipment vents subject to ice blockage during the winter?	No	No
		Is there a known history of over-pressure events as a result of snow/ice blockage?	No	
	Tree Roots	Is there a known history of leakage to pipe or fittings as a result of tree root damage?	Yes – All Divisions	Yes – All Divisions
	Other	Is there a known history of leakage or damage due to other natural force causes; including but not limited to lightning, wild fire or high winds (tornados)?	Yes – All Divisions	Yes – All Divisions
Excavation Damage	Improper Excavation Practice	Has damage requiring repair or replacement occurred on properly marked facilities due to the failure of the excavator to follow proper excavation rules and procedures?	Yes – All Divisions	Yes – All Divisions
	Facility not located or marked	Has damage requiring repair or replacement occurred due to failure to locate a valid and timely locate request?	Yes – All Divisions	
	One-call notification center error	Has damage requiring repair or replacement occurred due to an error made at the one-call notification center?	Yes – All Divisions	

Appendix B. Section 2. Table 6-3: Summary SME Evaluation of Threats Applicable to the Gas Distribution System (continued)

Service territory covered by this Assessment: All Divisions				
Primary Threat Category	**Sub-Threat**	**SME's to Consider the following**	**SME Evaluation/Answer**	**Threat Applicable? SME – Yes / No**
Excavation Damage	Mis-Marked Facilities	Has damage requiring repair or replacement occurred due to the mis-marking of facilities?	Yes – All Divisions	Yes – All Divisions
	Incorrect Facility Records	Has damage requiring repair or replacement occurred due incorrect facility records?	Yes – All Divisions	Yes – All Divisions
	Other	Has damage requiring repair or replacement occurred due other causes including the inability to locate facility (e.g. no locating wire on plastic main), wrong or incorrect information provided to the one call center, deteriorated facilities and previous damage?	Yes – All Divisions	
Other Outside Force Damage	Vehicle Damage to Riser/Meter	Are existing risers and/or meters exposed to damage from vehicular damage that do not have barriers or other protection conforming to current design requirements?	Yes – All Divisions	Yes – All Divisions
		Has known leakage occurred due to vehicle damage to risers/meters.	Yes – All Divisions	
	Vehicle Damage to above-ground equip/station	Are HPRs and/or regulator stations exposed to damage from vehicular damage that do not have barriers or other protection conforming to current design requirements?	No	Yes – All Divisions
		Has known leakage occurred due to vehicle damage to HPRs and/or regulator stations?	Yes – South Division	

Appendix B. Section 2. Table 6-3: Summary SME Evaluation of Threats Applicable to the Gas Distribution System (continued)

Service territory covered by this Assessment: All Divisions				
Primary Threat Category	**Sub-Threat**	**SME's to Consider the following**	**SME Evaluation/Answer**	**Threat Applicable? SME – Yes / No**
Other Outside Force Damage	Vandalism	Are gas valves or station equipment susceptible to damage by vandalism that has the potential to pose a risk to employees or the public?	No	No
		Has leakage or other unsafe condition been created by vandalism?	No	NO
Other Outside Force Damage	Structure Fire	Is there a history of damage to gas meters or other equipment due to structure fires?	Yes – All Divisions	Yes – All Divisions
		Is there a history of lack of properly designed or maintained service shut-off valves resulting in a delay in inability to shut off gas service to structures that are on fire?	No	
Material, Weld or Joint Failure	Century Products (MDPE 2306)	Is Century Products (MDPE 2306) pipe known to exist in the system?	No	No
		Is there a history of leakage of Century Products (MDPE 2306) pipe?	No	
	Aldyl A	Is Aldyl A pipe known to exist in the system?	Yes – South and Central Divisions	Yes – South and Central Divisions
		Is there a history of leakage of Aldyl A pipe?	Yes – South and Central Divisions	

Appendix B. Section 2. Table 6-3: Summary SME Evaluation of Threats Applicable to the Gas Distribution System (continued)

Service territory covered by this Assessment: All Divisions				
Primary Threat Category	**Sub-Threat**	**SME's to Consider the following**	**SME Evaluation/Answer**	**Threat Applicable? SME – Yes / No**
Material, Weld or Joint Failure	HDPE 3306	Is HDPE 3306 pipe known to exist in the system?	Yes – South and Central Divisions	Yes – South and Central Divisions
		Is there a history of leakage of HDPE 3306 pipe?	Yes – South and Central Divisions	
	PVC – Polyvinyl Chloride	Is PVC pipe known to exist in the system?	No	No
		Is there a history of leakage of PVC pipe?	No	
	ABS – Acrylonitrile Butadiene Styrene	Is ABS pipe known to exist in the system?	No	No
		Is there a history of leakage of ABS pipe?	No	
	CAB – Cellulose Acetate Butyrate	Is CAB A pipe known to exist in the system?	No	No
		Is there a history of leakage of CAB pipe?	No	
	PB - Polybutylene	Is PB pipe known to exist in the system?	No	No
		Is there a history of leakage of PB pipe?	No	
	Delrin Insert Tap Tees	Are Delrin Insert Tap Tees known to exist in the system?	Yes – All Divisions	Yes – All Divisions
		Is there a history of leakage of Delrin Insert Tap Tees?	Yes – All Divisions	

Appendix B. Section 2. Table 6-3: Summary SME Evaluation of Threats Applicable to the Gas Distribution System (continued)

Service territory covered by this Assessment: All Divisions				
Primary Threat Category	**Sub-Threat**	**SME's to Consider the following**	**SME Evaluation/Answer**	**Threat Applicable? SME – Yes / No**
Material, Weld, or Joint Failure	Plexco Service Tee Celcon Caps	Are Plexco Service Tee Celcon Caps known to exist in the system?	Yes – All Divisions	Yes – All Divisions
		Is there a history of leakage of Plexco Service Tee Celcon Caps?	Yes – All Divisions	
	PE Fusion failure	Is there a history of PE Fusion Failures or leakage in the system?	Yes – South and Central Divisions	Yes – All Divisions
		Are any types of PE fusion (type, material, size, age, process, geographic area) more prone to leakage or failure?	No	
	Pre-1940 Oxy-Acetylene Girth Weld	Do pre-1940 Oxy-Acetylene Girth Welds exist on pipe greater than 4 inch?	NO	NO
		Is there a history of pre-1940 Oxy-Acetylene Girth Weld failures or leakage in the system?	NO	
	Other	Do other material failures occur that present a possible current or future risk? (Kerotest Gate Valves	Yes – South and Central Divisions	Yes – South And Central
	Mechanical Couplings	Is there a history of Mechanical Coupling failures or leakage in the system due to pullout?	No	No
		Is there a history of Mechanical Coupling failures or leakage in the system due to seal leakage?	Yes – All Divisions	Yes – South, Central, West
		Are any types of mechanical coupling (type, material, size, age, manufacturer, geographic area) more prone to leakage or failure due to seal leakage?	No	No

Appendix B. Section 2. Table 6-3: Summary SME Evaluation of Threats Applicable to the Gas Distribution System (continued)

Service territory covered by this Assessment: All Divisions				
Primary Threat Category	**Sub-Threat**	**SME's to Consider the following**	**SME Evaluation/Answer**	**Threat Applicable? SME – Yes / No**
Equipment Failure	Valves	Are valves inoperable, inaccessible and or paved over without timely identification and repairs?	Yes – All Divisions	Yes – All Divisions
		Are certain types or makes of valves more likely to leak? Kerotest Gate Valves	Yes – All Divisions	Yes – All Divisions
	Service Regulators	Is there a history of service regulator failures that present a threat to the public or employees?	Yes – All Divisions	Yes – All Divisions
		Are certain types or makes of service regulator more likely to create a risk?	No	
	Control/Relief Station Equipment	Is there a history of control or relief station equipment failures that present a threat to the public or employees?	No	No
		Are certain types or makes of station equipment more likely to create a risk?	No	
	Other	Is there a history of other equipment failures that present a threat to the public or employees?	No	No
		Are certain types or makes of other equipment more likely to create a risk?	No	
Incorrect Operations	Operating Error	Have leaks or other safety incidents been caused by an inadequate procedure?	Yes – South Division	Yes – All Divisions
		Have leaks or other safety incidents been caused by failure to follow an adequate procedure?	Yes – South Division	
		Have bypass valves or MAOP separation valves been found to not have proper locks after maintenance?	No	

Appendix B. Section 2. Table 6-3: Summary SME Evaluation of Threats Applicable to the Gas Distribution System (continued)

Service territory covered by this Assessment: All Divisions				
Primary Threat Category	**Sub-Threat**	**SME's to Consider the following**	**SME Evaluation/Answer**	**Threat Applicable? SME – Yes / No**
Incorrect Operations	Operating Error	Have employees been found to have falsified maintenance documents and thus not have completed operations and maintenance tasks in the manner or timeframe required?	No	No
		Has improper regulator station maintenance ever resulted in an overpressure incident?	No	No
		Have butt-fusions been found to be leaking due to improper fusion due to failure to follow the correct procedure?	Yes – All Divisions	Yes – All Divisions
		Have leak repairs or other mandated maintenance not been made in the time required by standard due to a process breakdown or ineffective process?	No	No
		Has gas leak detection equipment used for a leak survey been found afterwards to be out of calibration?	No	No
		Has the failure to accurately or timely record or map facilities resulted in failure to perform mandated maintenance or locates?	No	No
	Gas lines bored through Sewers	Have pipes been installed via unguided or guided bore without proper procedures to ensure other facilities are not damaged?	Yes – All Divisions	Yes – All Divisions
		Have pipes unknowingly bored through sewer lines been damaged by sewer line cleaning operations?	Yes – All Divisions	

Appendix B. Section 2. Table 6-3: Summary SME Evaluation of Threats Applicable to the Gas Distribution System (continued)

Service territory covered by this Assessment: All Divisions				
Primary Threat Category	**Sub-Threat**	**SME's to Consider the following**	**SME Evaluation/Answer**	**Threat Applicable? SME – Yes / No**
Other	Bell Joint Leakage	Does Cast Iron pipe exist in the system?	NO	NO
		Is there a history of bell joint leaks?	NO	NO
		Are certain diameters or parts of the system known to be more prone to bell joint failure or leakage than others?	No	
	Inserted Copper Puncture	Do copper services inserted in steel exist in the system?	No	No
		Is there a history of leakage of copper services due to galvanic action between the copper and steel?	No	
	Copper Sulfide	Do copper services exist in the system and is there a history of hydrogen sulfide greater than 0.3 grains per 100 standard cubic feet of gas?	No	No
		Have any safety incidents occurred as a result of copper sulfide in copper services or service regulators?	No	
	Construction over gas mains & services	Have others constructed over gas facilities or taken other action that prevents effective leak survey and other maintenance?	Yes- South Division	Yes – All Divisions
		When identified, is construction that impacts required maintenance corrected in a timely manner?	Yes – South Division	

APPENDIX C
EVALUATION AND RANKING OF RISK

Appendix C. Section 1.

Section 1. Risk Assessment Process

[Southern Gas Association, Northeast Gas Association and Structural Integrity Associates, Inc.

Blended Risk (Subject Matter Expert & data) Evaluation and Ranking Process*,*

incorporated by reference (all divisions)]

Appendix C. Section 2. Table 7-1: Documentation of Risk Assessment Results (South Division)

Region	Primary Threat	Sub-Threat	Facility Type	FOF Score	COF Score	Relative Risk
South	Corrosion	Cast Iron		NA	NA	NA
		Bare Steel (No CP) - mains		0.675	0.61	0.41175
		Bare Steel (No CP) - services		1.125	0.61	0.68625
		Bare Steel (w/CP)		NA	NA	NA
		Coated Steel (No CP)		NA	NA	NA
		Coated Steel (w/CP) - mains		0.1125	0.48	0.054
		Coated Steel (w/CP) - services		0.5625	0.61	0.343125
		Copper Services		NA	NA	NA
		Stray Current		0	0.61	0
		Internal Corrosion		0	0.61	0
		Atmospheric Corrosion (Services)		4.95	0.35	1.7325

Appendix C. Section 2. Table 7-2: Documentation of Risk Assessment Results (South Division)

Region	Primary Threat	Sub-Threat	Facility Type	FOF Score	COF Score	Relative Risk
South	Natural Forces	Seismic Activity		NA	NA	NA
		Earth Movement/ Landslide		0	0.35	0
		Frost Heave		NA	NA	NA
		Flooding		0	0.65	0
		Overpressure due to Snow-Ice Blockage		NA	NA	NA
		Tree Roots (mains)		0.0625	0.61	0.038125
		Tree Roots (svs)		0.0625	0.65	0.040625

Appendix C. Section 2. Table 7-3: Documentation of Risk Assessment Results (South Division)

Region	Primary Threat	Sub-Threat	Facility Type	FOF Score	COF Score	Relative Risk
South	Excavation Damage (Mains & svs)	Improper Excavation Practice		0.25	0.61	0.1525
		No Call for Locate		0.25	0.61	0.1525
		Late or No Locate		0.055	0.61	0.03355
		Mis-marked Facilities		0.05	0.61	0.0305
		Incorrect Facility Records		0.05	0.61	0.0305

Appendix C. Section 2. Table 7-4: Documentation of Risk Assessment Results (South Division)

Region	Primary Threat	Sub-Threat	Facility Type	FOF Score	COF Score	Relative Risk
South	Other Outside Force (svs)	Vehicle Damage to Riser		0.05	0.61	0.0305
		Vehicle Damage to above ground equipment or station (not risers)		0	0.61	0
		Vandalism		0	0.61	0
		Structure Fire		0.0045	0.61	0.002745

Appendix C. Section 2. Table 7-5: Documentation of Risk Assessment Results (South Division)

Region	Primary Threat	Sub-Threat	Facility Type	FOF Score	COF Score	Relative Risk
South	Material, Weld or Joint Failure	MDPE 2306 - mains		NA	NA	NA
		MDPE 2306 - services		NA	NA	NA
		Aldyl A - mains		0.09	0.48	0.0432
		Aldyl A - services		3.6	0.48	0.0432
		HDPE 3306 (Mains)		NA	NA	NA
		HDPE 3306 (svs)		NA	NA	NA
		PVC		NA	NA	NA
		ABS		NA	NA	NA
		CAB		NA	NA	NA
		PB		NA	NA	NA
		Delrin Insert Tap Tees and/or Plexco Service Tee Celcon Caps (svs)		0.03375	0.61	0.0205875
		PE Fusion Failure-(mains)		0.0386	0.61	0.02353
		PE Fusion Failure-services		0.045	0.61	0.02745
		Pre 1940 Oxy-Acetylene Girth Welds		NA	NA	NA

Appendix C. Section 2. Table 7-6: Documentation of Risk Assessment Results (South Division)

Region	Primary Threat	Sub-Threat	Facility Type	FOF Score	COF Score	Relative Risk
South	Equipment Failure	Valves (mains)		0	0.7	0
		Valves (svs)		0.0225	0.7	0.01575
		Service Regulators (svs)		0.2475	0.61	0.151
		Control or Relief Station Equipment		0	0.61	0
		Mechanical Couplings (svs)		0.0045	0.61	0.002745

Appendix C. Section 2. Table 7-7: Documentation of Risk Assessment Results (South Division)

Region	Primary Threat	Sub-Threat	Facility Type	FOF Score	COF Score	Relative Risk
South	Incorrect Operation	Operating Errors (mains)		0.0225	0.61	0.013725
		Operating Errors (svs)		0.045	0.61	0.02745
		Service Lines Bored Thru Sewer (mains)		0	1.26	0
		Service Lines Bored Thru Sewer (svs)		0.0009	1.26	0.001134
	Other	Bell Joints		NA	NA	NA
		Copper Services Pipe Puncture		NA	NA	NA

Appendix C. Section 2. Table 7-8: Documentation of Risk Assessment Results (West Division)

Region	Primary Threat	Sub-Threat	Facility Type	FOF Score	COF Score	Relative Risk
West	Corrosion	Cast Iron		NA	NA	NA
		Ductile Iron		NA	NA	NA
		Bare Steel (No CP) - mains		1.125	0.45	0.50625
		Bare Steel (No CP) - services		0.09	0.45	0.0405
		Bare Steel (w/CP)		NA	NA	NA
		Coated Steel (No CP)		NA	NA	NA
		Coated Steel (w/CP) - mains		0.34375	0.35	0.1203125
		Coated Steel (w/CP) - services		0.405	0.55	0.22275
		Copper Services		NA	NA	NA
		Stray Current		0	0.55	0
		Internal Corrosion		0	0.55	0
		Atmospheric Corrosion (SVS)		0.9	0.55	0.495

Appendix C. Section 2. Table 7-9: Documentation of Risk Assessment Results (West Division)

Region	Primary Threat	Sub-Threat	Facility Type	FOF Score	COF Score	Relative Risk
West	Natural Forces	Seismic Activity		NA	NA	NA
		Earth Movement/ Landslide		NA	NA	NA
		Frost Heave		NA	NA	NA
		Flooding (mains & svs)		0	0.35	0
		Overpressure due to Snow-Ice Blockage		NA	NA	NA
		Tree Roots (mains)		0	0.35	0
		Tree Roots (svs)		0.225	0.61	0.13725

Appendix C. Section 2. Table 7-10: Documentation of Risk Assessment Results (West Divison)

Region	Primary Threat	Sub-Threat	Facility Type	FOF Score	COF Score	Relative Risk
West	Excavation Damage (mains & svs)	Improper Excavation Practice		0.1375	0.61	0.083875
		No Call for Locate		0.125	0.61	0.07625
		Late or No Locate		0.0225	0.61	0.013725
		Mis-marked Facilities		0.125	0.61	0.07625
		Incorrect Facility Records		0	0.61	0

Appendix C. Section 2. Table 7-11: Documentation of Risk Assessment Results (West Division)

Region	Primary Threat	Sub-Threat	Facility Type	FOF Score	COF Score	Relative Risk
West	Other Outside Force (svs)	Vehicle Damage to Riser or meter		0.081	0.61	0.04941
		Vehicle Damage to above ground equipment or station (not risers)		0	0.35	0
		Vandalism		0	0.61	0
		Structure Fire		0	0.61	0

Appendix C. Section 2. Table 7-12: Documentation of Risk Assessment Results (West Division)

Region	Primary Threat	Sub-Threat	Facility Type	FOF Score	COF Score	Relative Risk
West	Material, Weld or Joint Failure	MDPE 2306 - mains		NA	NA	NA
		MDPE 2306 - services		NA	NA	NA
		Aldyl A		NA	NA	NA
		HDPE 3306		NA	NA	NA
		PVC		NA	NA	NA
		ABS		NA	NA	NA
		CAB		NA	NA	NA
		PB		NA	NA	NA
		Delrin Insert Tap Tees and/or Plexco Service Tee Celcon Caps (SVS)		0	0.35	0
		PE Fusion Failure (mains & svs)		0	0.61	0
		Pre 1940 Oxy-Acetylene Girth Welds		NA	NA	NA

Appendix C. Section 2. Table 7-13: Documentation of Risk Assessment Results (West Division)

Region	Primary Threat	Sub-Threat	Facility Type	FOF Score	COF Score	Relative Risk
West	Equipment Failure	Valves (mains)		0	0.7	0
		Valves (svs)		0.01125	0.70	0.007875
		Service Regulators (svs)		0.2475	0.61	0.150975
		Control or Relief Station Equipment (mains)		0	0.48	0
		Mechanical Couplings		0	0.61	0

Appendix C. Section 2. Table 7-14: Documentation of Risk Assessment Results (West Division)

Region	Primary Threat	Sub-Threat	Facility Type	FOF Score	COF Score	Relative Risk
West	Incorrect Operation	Operating Errors (mains)		0	0.61	0
		Operating Errors (svs)		0.1375	0.61	0.083875
		Service Lines Bored Thru Sewer (mains & svs)		0	1.26	0
	Other	Bell Joints		NA	NA	NA
		Copper Services Pipe Puncture		NA	NA	NA

Appendix C. Section 2. Table 7-15: Documentation of Risk Assessment Results (Central Division)

Region	Primary Threat	Sub-Threat	Facility Type	FOF Score	COF Score	Relative Risk
Central	Corrosion	Cast Iron		NA	NA	NA
		Ductile Iron		NA	NA	NA
		Bare Steel (No CP)		0	0	0
		Bare Steel (w/CP)		NA	NA	NA
		Coated Steel (No CP)		NA	NA	NA
		Coated Steel (w/CP) - mains		0	0.55	0
		Coated Steel (w/CP) - services		0.405	0.55	0.12375
		Copper Services		NA	NA	NA
		Stray Current (mains & svs)		0	0.55	0
		Internal Corrosion (mains & svs)		0	0.55	0
		Atmospheric Corrosion (svs)		2.025	0.55	1.11375

Appendix C. Section 2. Table 7-16: Documentation of Risk Assessment Results (Central Division)

Region	Primary Threat	Sub-Threat	Facility Type	FOF Score	COF Score	Relative Risk
Central	Natural Forces	Seismic Activity		NA	NA	NA
		Earth Movement/ Landslide		NA	NA	NA
		Frost Heave		NA	NA	NA
		Flooding (mains & svs)		0	0.35	0
		Overpressure due to Snow-Ice Blockage		NA	NA	NA
		Tree Roots (mains & svs)		0	0.61	0

Appendix C. Section 2. Table 7-17: Documentation of Risk Assessment Results (Central Divison)

Region	Primary Threat	Sub-Threat	Facility Type	FOF Score	COF Score	Relative Risk
Central	Excavation Damage (mains & svs)	Improper Excavation Practice		0.25	0.55	0.1375
		No Call for Locate		0.25	0.55	0.1375
		Late or No Locate		0.055	0.55	0.03025
		Mis-marked Facilities		0.05	0.55	0.0275
		Incorrect Facility Records		0.05	0.55	0.0275

Appendix C. Section 2. Table 7-18: Documentation of Risk Assessment Results (Central Division)

Region	Primary Threat	Sub-Threat	Facility Type	FOF Score	COF Score	Relative Risk
Central	Other Outside Force (svs)	Vehicle Damage to Riser		0.081	0.61	0.04941
		Vehicle Damage to above ground equipment or station (not risers)		0	0.61	0
		Vandalism		0	0.61	0
		Structure Fire		0.081	0.61	0.04941

Appendix C. Section 2. Table 7-19: Documentation of Risk Assessment Results (Central Division)

Region	Primary Threat	Sub-Threat	Facility Type	FOF Score	COF Score	Relative Risk
Central	Material, Weld or Joint Failure	MDPE 2306 - mains		NA	NA	NA
		MDPE 2306 - services		NA	NA	NA
		Aldyl A		NA	NA	NA
		HDPE 3306		NA	NA	NA
		PVC		NA	NA	NA
		ABS		NA	NA	NA
		CAB		NA	NA	NA
		PB		NA	NA	NA
		Delrin Insert Tap Tees and/or Plexco Service Tee Celcon Caps (SVS)		0	0.61	0
		PE Fusion Failure (mains)		0.04	0.61	0.0244
		PE Fusion Failure (svs)		0.03	0.61	0.0183
		Pre 1940 Oxy-Acetylene Girth Welds		0	0	0

Appendix C. Section 2. Table 7-20: Documentation of Risk Assessment Results (Central Division)

Region	Primary Threat	Sub-Threat	Facility Type	FOF Score	COF Score	Relative Risk
Central	Equipment Failure	Valves (svs)		0.01125	0.7	0.007875
		Valves (mains)		0	0.7	0
		Service Regulators (svs)		0.1875	0.61	0.114375
		Control or Relief Station Equipment		0	0.48	0
		Mechanical Couplings		0	0.61	0

Appendix C. Section 2. Table 7-21: Documentation of Risk Assessment Results (Central Division)

Region	Primary Threat	Sub-Threat	Facility Type	FOF Score	COF Score	Relative Risk
Central	Incorrect Operation	Operating Errors (mains & svs)		0	0.61	0
		Service Lines Bored Thru Sewer (mains & svs)		0	1.26	0
	Other	Bell Joints		NA	0.61	NA
		Copper Services Pipe Puncture		NA	NA	NA

Appendix C. Section 2. Table 7-22: Summary of Risk Evaluation and Ranking Results

Threat	Max Risk Score in any Region	Min Risk Score in any Region	% of Regions in System with Risk Score Range			
			0.76 – 1.00	0.51 – 0.75	0.26 – 0.50	0.10 – 0.25
Corrosion						
Cast Iron Mains	0	0	0	0	0	0
Bare Steel with no CP - mains	0.50625	0.41175	0	33	33	0
Bare Steel with no CP - services	0.68625	0.0405	0	33	0	33
Bare Steel Mains with CP	NA	NA	NA	NA	NA	NA
Atmospheric Corrosion - services	1.7325	0.495	66	0	33	0
Copper Services	NA	NA	NA	NA	NA	NA
Coated Steel Mains(with CP)	0.1203	0	0	0	0	33
Coated Steel services (with CP)	0.343125	0.12375	33	0	66	0
Coated Steel Mains (No CP)	NA	NA	NA	NA	NA	NA
Coated Steel Svcs (No CP)	NA	NA	NA	NA	NA	NA
Other Mains	NA	NA	NA	NA	NA	NA
Stray current	0.04375	0	0	0	0	33
Natural Forces						
Seismic	NA	NA	NA	NA	NA	NA
Earth Movement / Landslide	NA	NA	NA	NA	NA	NA
Tree Roots - mains	0.038125	0	0	0	0	33
Tree Roots - svs	0.13725	0	0	0	0	33
Frost Heave / Temperature Mains	NA	NA	NA	NA	NA	NA
Flood Mains	0	0	0	0	0	0
	0	0	0	0	0	0

Appendix C. Section 2. Table 7-22: Summary of Risk Evaluation and Ranking Results (Continued)

Threat	Max Risk Score in any Region	Min Risk Score in any Region	% of Regions in System with Risk Score Range			
			0.76 – 1.00	0.51 – 0.75	0.26 – 0.50	0.10 – 0.25
Ice/Snow Blockage of Control Equip - Mains	NA	NA	NA	NA	NA	NA
Ice/Snow Blockage of Control Equip - Services	NA	NA	NA	NA	NA	NA
Excavation Damage						
Excavation Damage – Improper Excavation Practice	0.1525	0.083875	0	0	0	100
Excavation Damage – No Call for Locate	0.1525	0.07625	0	0	0	100
Excavation Damage – Late or No Locate	0.03355	0.013725	0	0	0	100
Excavation Damage – Mis-marked Facilities	0.07625	0.0305	0	0	0	100
Excavation Damage – Incorrect Facility Records	0.0305	0	0	0	0	100
Other Outside Force						
Vehicle Damage (svs)	0	0	0	0	0	0
Vehicle Damage (svs)	0.04941	0.0305	0	0	0	100
Vandalism (svs)	0	0	0	0	0	0
	0	0	0	0	0	0
Fire / Explosion (svs)	0.04941	0	0	0	0	66
Material, Weld or Joint Failure						
PVC Mains	NA	NA	NA	NA	NA	NA
ABS Mains	NA	NA	NA	NA	NA	NA

Appendix C. Section 2. Table 7-22: Summary of Risk Evaluation and Ranking Results (Continued)

Threat	Max Risk Score in any Region	Min Risk Score in any Region	% of Regions in System with Risk Score Range			
			0.76 – 1.00	0.51 – 0.75	0.26 – 0.50	0.10 – 0.25
Material, Weld or Joint Failure (continued)						
Aldyl A Mains	0.0432	0	0	0	0	33
Aldyl A Services	0.0432	0	33	0	0	0
MDPE 2306 Mains	NA	NA	NA	NA	NA	NA
MDPE 2306 Services	0	0	0	0	0	0
HDPE 3306 Mains	NA	NA	NA	NA	NA	NA
Other Plastic Pipe Mains	NA	NA	NA	NA	NA	NA
Delrin Insert Tap Tees Fittings	0	0	0	0	0	0
Plexco Service Tee Celcon Caps Fittings	0.0011	0	0	0	0	0
Pre 1940 OA girth welds	NA	NA	NA	NA	NA	NA
PE Fusion failure - mains	0.0244	0	0	0	0	33
PE Fusion failure - services	0.02745	0	0	0	0	33
Equipment Failure						
Valves Mains	0	0	0	0	0	0
Valves svs	0.007875	0.01575	0	0	0	100
Service Regulators svs	0.151	0.11435	0	0	0	100
Control/Relief Station	0	0	0	0	0	0
Mechanical Couplings	0.002745	0	0	0	0	33
Other	0	0	0	0	0	0

Appendix C. Section 2. Table 7-22: Summary of Risk Evaluation and Ranking Results

(Continued)

Threat	Max Risk Score in any Region	Min Risk Score in any Region	% of Regions in System with Risk Score Range			
			0.76 – 1.00	0.51 – 0.75	0.26 – 0.50	0.10 – 0.25
Incorrect Operation						
Operating Error (mains)	0.013725	0	0	0	0	33
Operating Error (svs)	0.083875	0	0	0	0	66
Service Line bored thru Sewer	0.001134	0	0	0	0	33
Other	0	0	0	0	0	0
Other						
Bell Joint Leakage	0	0	0	0	0	0
Copper Pipe Puncture - Svcs	NA	NA	NA	NA	NA	NA
Other	0	0	0	0	0	0

APPENDIX D
IDENTIFICATION AND IMPLEMENTATION OF MEASURES TO ADDRESS RISKS

Appendix D. Section 1. Table 8-1: Key Requirements of the Leak Management Program

Program Element	Reference to Requirement Established in the Standard or Procedure
Qualification/Training requirements for personnel conducting leak survey	FPU Operator Qualification Program
Auditing and Quality Assurance of Leak Survey Equipment	FPU Procedure LC-5
Criteria for leak severity classification	FPU Procedure LC-4
Established Frequency of Leak Survey in Business Districts, at intervals not exceeding 15 months, but at least once each calendar year.	FPU O&M Manual Section 1.2.1.1
Established Frequency of Leak Survey for Cathodically Unprotected Lines subject to §192.465(e) on which electrical surveys for corrosion are impractical, at least once every 3 calendar years at intervals not exceeding 39 months.	FPU O&M Manual Section 1.2.1.2
Established Frequency of Leak Survey of Remaining Lines at least once every 5 calendar years at intervals not exceeding 63 months.	FPU O&M Manual Section 1.2.1.2
Hazardous Leaks Requiring Immediate Repair – Ongoing action required	FPU Procedure LC-4, FPU O&M Manual Section 1.2.2.1
Non-hazardous Leaks Requiring Scheduled Repair – Time limit is established to Eliminate Leak	FPU Procedure LC-4, FPU O&M Manual Section 1.2.2.1
Non-Hazardous Leak NOT requiring scheduled repair– Monitoring Requirements established	FPU Procedure LC-4, FPU O&M Manual Section 1.2.2.1
Records and Data Management procedures defined	Florida Administrative Code Chapter 25-12, 12.060

Appendix D. Section 3. Table 8-3: Corrosion Action Plans

Sub-Threat	Corrosion Action Plan Scope	Status	Officer / Manager Responsible
Cast Iron Pipe	No Additional or Accelerated Actions Planned	As of 2019, no known cast iron in system.	South Division Operations Managers
Bare Steel (No CP)	FPUC has a ten year bare steel replacement program in place known as Gas Reliability Infrastructure Program (GRIP) which began in 2012. As of 2020, approximately 337 miles of a total of 351 miles of bare steel pipe has been replaced.	In progress	South Division Operations Manager

Appendix D. Section 3. Table 8-3: Corrosion Action Plans (continued)

Sub-Threat	Corrosion Action Plan Scope	Status	Officer / Manager Responsible
Coated Steel with CP	No Additional or Accelerated Actions Planned		

Appendix D. Section 3. Table 8-3: Corrosion Action Plans (continued)

Sub-Threat	Corrosion Action Plan Scope	Status	Officer / Manager Responsible
Atmospheric Corrosion (South and Central Division)	Atmospheric corrosion surveys will be conducted quarterly by meter readers. In addition, operation technicians will be instructed to inspect for atmospheric corrosion in the course of normal duties. If identified, atmospheric corrosion should be corrected on site, or a work order generated and a crew to be scheduled to address/correct the deficiency.	In Progress	Division Operations Manager.

Appendix D. Section 5. Table 8-5: Excavation Damage Action Plans

Sub-Threat	Excavation Damage Action Plan Scope	Status	Officer / Manager Responsible
Improper Excavation Practice (All Divisions)	Track dig-ins and identify problem excavators. Provide targeted education, & field inspections. Meet with repeat offenders if deemed necessary.	In progress	Division Operations Managers
	Provide One Call literature to Equipment Rental Companies, etc. to increase awareness	In progress	Division Operations Managers
	Conduct pre-construction meeting or site-visits for excavation near critical or high risk facilities.	In Progress	Division Operations Managers
	To augment our damage prevention program, as of 2021, Chesapeake has created positons for a damage prevention manager and damage prevention coordinators which will benefit FPUC damage prevention efforts.	In Progress	Division Operations Managers
Facility Not Located or Marked (All Divisions)	Analyze root cause and implement corrective action when identified. Require written investigation of each damaged facility.	In progress	Division Operations Managers

Appendix D. Section 5. Table 8-5: Excavation Damage Action Plans (continued)

Sub-Threat	Excavation Damage Action Plan Scope	Status	Officer / Manager Responsible
Lack of Tracer Wire (All Divisions)	Contact excavator regarding the pertinent facilities and pothole if necessary. Attempt to create records of said facilities for future excavation. Utilize alternative methods to locate facilities.	In Progress	Division Operations Managers.
Mis-marked Facilities (All Divisions)	Monitor and track for dig-ins resulting from mis-marked facilities. Analyze root cause and implement corrective action, including procedure reviews. Requires written investigation of each incident.	In Progress	Division Operations Managers.
Incorrect Facility Records			
	Monitor timeliness of as-built mapping for new and/or reconstructed facilities. Continue process for indicating existence of plans for new construction or reconstruction on facility maps/records.	In Progress	Division Operations Managers

Table 8-7: Example Material, Weld or Joint Failure Action Plans

Sub-Threat	Material, Weld or Joint Failure Action Plan Scope	Status	Officer / Manager Responsible
Aldyl A	Continue documenting Aldyl A locations with stress or brittle like cracking.	In Progress	Division Operations Managers
	Determine whether leak history on Aldyl A warrants additional or accelerated actions.	In Progress	Division Operations Managers
Delrin Insert Tap Tees	No additional or accelerated actions planned.		
Plexco Service Tee Celcon Caps	No additional or accelerated actions planned.		

Appendix D. Section 8. Table 8-8: Equipment Failure Action Plans

Sub-Threat	Equipment Failure Action Plan Scope	Status	Officer / Manager Responsible
Valves – Kerotest Gate Valves, South and Central Division	Monitor these valves during normal maintenance activities and records review.	In Progress	Division Operations Managers
		In Progress	Division Operations Managers
Service Regulators (All Divisions)	Due to an increased number of leaks on regulators, a data base has been created in a central location in order to capture data on regulator failures. Failed regulators will be stored at each operational center for further investigation/review. Establish replacement program if failure history warrants. All leak causes will be based on the PHMSA definitions and the Compliance Manager or Operations Supervisor responsible for the compliance Tracker will review each Leak Report for accuracy. Review will be conducted with operation technicians and support staff to insure the data and material is collected.	In Progress	Division Operations Managers

Appendix D. Section 10. Table 8-10: Other Action Plans

Sub-Threat	Other Action Plan Scope	Status	Officer / Manager Responsible
Incorrect operation (South and West Divisions)	Review Leak Cause definitions and explanations on pages 6 – 8 of the Instructions for Completing PHMSA Form F 7100.1-1 (rev. 5/2021) with all technicians and contractors completing FPU Leak Reporting form and each administrative person or supervisor entering data in the Leak Reports tab on the Compliance Tracker. All leak causes will be based on the PHMSA definitions and the Compliance Manager or Operations Supervisor responsible for the compliance Tracker will review each Leak Report for accuracy. In addition, technicians should be instructed to use thread sealant (pipe dope or tape) and to tighten fittings and nipples with force sufficient to mitigate leaks.	In Progress	Division Operations Managers

APPENDIX E
MEASUREMENT OF PERFORMANCE, MONITORING RESULTS, AND EVALUATION EFFECTIVENESS

Appendix E. Section 1. Table 9-1: Number of **hazardous leaks** either eliminated or repaired, per §192.703(c), categorized by cause

(South Division)

Performance Measure	5-Year Average 2016-20	Year 2020	Established Baseline	Criteria for Re-evaluation of Threats and Risks	Re-Evaluation Required? Y / N
Number of Hazardous Leaks Eliminated or Repaired – Corrosion - **MAINS**	0.00287	0.00217	5-Yr Average Leaks/Mile/Yr 0.00371	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Corrosion - SERVICES	0.10142	0.0887	5-Yr Average Leaks/Mile/Yr 0.11	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Natural Forces - **MAINS**	0.00044	0.00144	5-Yr Average Leaks/Mile/Yr 0.00031	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Natural Forces - SERVICES	0.0052	0.00202	5-Yr Average Leaks/Mile/Yr 0.006	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Excavation Damage - **MAINS**	0.03793	0.04190	5-Yr Average Leaks/Mile/Yr 0.03481	Moving 5-Yr Average is an increase of 5% or more from established baseline	**YES** – Continue with action plans. (Ref. Appendix D. Section 5. Table 8-5)
Number of Hazardous Leaks Eliminated or Repaired – Excavation Damage - SERVICES	0.40	0.39	5-Yr Average Leaks/Mile/Yr 0.4	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Other	0.00077	0.00072	5-Yr Average Leaks/Mile/Yr 0.00078	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO

Outside Force Damage – **MAINS**					
Number of Hazardous Leaks Eliminated or Repaired – Other Outside Force Damage – SERVICES	0.02121	0.02822	5-Yr Average Leaks/Mile/Yr 0.01824	Moving 5-Yr Average is an increase of 5% or more from established baseline	An increase of over 5%, but no additional actions taken due to small # of leaks.
Number of Hazardous Leaks Eliminated or Repaired – Material, Weld or Joint Failure - **MAINS**	0.00076	0.00144	5-Yr Average Leaks/Mile/Yr 0.00079	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Material, Weld or Joint Failure - SERVICES	0.00422	0.006	5-Yr Average Leaks/Mile/Yr 0.005	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Equipment Failure - **MAINS**	0.00094	0	5-Yr Average Leaks/Mile/Yr 0.00142	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Equipment Failure - SERVICES	0.08212	0.07861	5-Yr Average Leaks/Mile/Yr 0.06952	Moving 5-Yr Average is an increase of 5% or more from established baseline	**YES** –Reference additional actions in appendix D. Section 8 Table 8-8
Number of Hazardous Leaks Eliminated or Repaired – Incorrect Operation - **MAINS**	0.00059	0.00144	5-Yr Average Leaks/Mile/Yr 0.00046	Moving 5-Yr Average is an increase of 5% or more from established baseline	An increase of over 5%, but no additional actions taken due to small # of leaks.

Number of Hazardous Leaks Eliminated or Repaired – Incorrect Operation - SERVICES	0.006	0.006	5-Yr Average Leaks/Mile/Yr 0.009	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Other - **MAINS**	0.00014	0.00072	5-Yr Average Leaks/Mile/Yr 0.00016	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Other - SERVICES	0.004	0	5-Yr Average Leaks/Mile/Yr 0.0044	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO

Appendix E. Section 1. Table 9-1: Number of **hazardous leaks** either eliminated or repaired, per §192.703(c), categorized by cause

(Central Division)

Performance Measure	5-Year Average 2016-20	Year 2020	Established Baseline	Criteria for Re-evaluation of Threats and Risks	Re-Evaluation Required? Y / N
Number of Hazardous Leaks Eliminated or Repaired - Corrosion-**MAINS**	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired - Corrosion-Services	0.042	0.067	5-Yr Average Leaks/Mile/Yr 0.032	Moving 5-Yr Average is an increase of 5% or more from established baseline	**YES** –Reference additional actions in appendix D. Section 8 Table 8-8
Number of Hazardous Leaks Eliminated or Repaired – Natural Forces-**Mains**	0.00027	0.0137	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Natural Forces-Services	0.00812	0.00374	5-Yr Average Leaks/Mile/Yr 0.00823	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Excavation Damage-**Mains**	0.026	0.028	5-Yr Average Leaks/Mile/Yr 0.026	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Excavation Damage-Services	0.26	0.31	5-Yr Average Leaks/Mile/Yr 0.26	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO

Number of Hazardous Leaks Eliminated or Repaired – Other Outside Force Damage-**Mains**	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Other Outside Force Damage-Services	0.014	0.00374	5-Yr Average Leaks/Mile/Yr 0.0138	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Material, Weld or Joint Failure-**Mains**	0.00476	0.00374	5-Yr Average Leaks/Mile/Yr 0.00571	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Material, Weld or Joint Failure-Services	0.00485	0.00384	5-Yr Average Leaks/Mile/Yr 0.00494	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Equipment Failure-**Mains**	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Equipment Failure-Services	0.042	0.0711	5-Yr Average Leaks/Mile/Yr 0.0274	Moving 5-Yr Average is an increase of 5% or more from established baseline	**YES** –Reference additional actions in appendix D. Section 8 Table 8-8
Number of Hazardous Leaks Eliminated or Repaired – Incorrect Operation-**Mains**	0.00057	0	5-Yr Average Leaks/Mile/Yr 0.00057	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Incorrect Operation-Services	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO

Number of Hazardous Leaks Eliminated or Repaired – Other - **Mains**	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Other - Services	0.00659	0	5-Yr Average Leaks/Mile/Yr 0.019	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO

Appendix E. Section 1. Table 9-1: Number of **hazardous leaks** either eliminated or repaired, per §192.703(c), categorized by cause

(West Division)

Performance Measure	5-Year Average 2016-20	Year 2020	Established Baseline	Criteria for Re-evaluation of Threats and Risks	Re-Evaluation Required? Y / N
Number of Hazardous Leaks Eliminated or Repaired – Corrosion - **Mains**	0.00362	0.00521	5-Yr Average Leaks/Mile/Yr 0.00433	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired - Corrosion-Services	0.026	0.0159	5-Yr Average Leaks/Mile/Yr 0.0287	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Natural Forces-**Mains**	0.00043	0	5-Yr Average Leaks/Mile/Yr 0.00043	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Natural Forces-Services	0.00502	0.00396	5-Yr Average Leaks/Mile/Yr 0.00514	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Excavation Damage-**Mains**	0.018	0.021	5-Yr Average Leaks/Mile/Yr 0.017	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Excavation Damage-Services	0.121	0.13	5-Yr Average Leaks/Mile/Yr 0.13	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Other Outside Force Damage-**Mains**	0.00106	0	5-Yr Average Leaks/Mile/Yr 0.00106	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO

Number of Hazardous Leaks Eliminated or Repaired – Other Outside Force Damage-Services	0.00993	0.0198	5-Yr Average Leaks/Mile/Yr 0.0069	Moving 5-Yr Average is an increase of 5% or more from established baseline	An increase of over 5%, but no additional actions taken due to small # of leaks.
Number of Hazardous Leaks Eliminated or Repaired – Material, Weld or Joint Failure-**Mains**	0.00043	0	5-Yr Average Leaks/Mile/Yr 0.00043	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Material, Weld or Joint Failure-Services	0	0	5-Yr Average Leaks/Mile/Yr 0.00366	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Equipment Failure-**Mains**	0.00064	0	5-Yr Average Leaks/Mile/Yr 0.00086	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Equipment Failure-Services	0.09015	0.139	5-Yr Average Leaks/Mile/Yr 0.069	Moving 5-Yr Average is an increase of 5% or more from established baseline	**YES** –Reference additional actions in appendix D. Section 8 Table 8-8
Number of Hazardous Leaks Eliminated or Repaired – Incorrect Operation-**Mains**	0.00064	0	5-Yr Average Leaks/Mile/Yr 0.0009	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Incorrect Operation-Services	0.018	0.024	5-Yr Average Leaks/Mile/Yr 0.013	Moving 5-Yr Average is an increase of 5% or more from established baseline	**YES** –Reference additional actions in appendix D. Section 8 Table 8-8

Number of Hazardous Leaks Eliminated or Repaired – Other-**Mains**	0.0015	0	5-Yr Average Leaks/Mile/Yr 0.00171	Moving 5-Yr Average is an increase of 5% or more from established baseline	**NO**
Number of Hazardous Leaks Eliminated or Repaired – Other-Services	0.03134	0.00411	5-Yr Average Leaks/Mile/Yr 0.03240	Moving 5-Yr Average is an increase of 5% or more from established baseline	**NO**

Appendix E. Section 2. Table 9-2: Number of Excavation Damages **(All Divisions)**

Performance Measure	5-Year Average 2016-20	Year 2020	Established Baseline	Criteria for Re-evaluation of Threats and Risks	Re-Evaluation Required? Y / N
Number of Excavation Damages - **Mains**	86.8	101	**2019** damages resulting in need to repair or replace 99	Increase of 5% or more from established baseline	**YES** – Continue with action plans. (Ref. Appendix D. Section 5. Table 8-5)
Number of Excavation Damages - Services	290	315	**2019** damages resulting in need to repair or replace 293	Increase of 5% or more from established baseline	NO

Appendix E. Section 3. Table 9-3: Number of Excavation Tickets **(All Divisions)**

Performance Measure	5-Year Average 2016-20	Year 2020	Established Baseline	Criteria for Re-evaluation of Threats and Risks	Re-Evaluation Required? Y / N
Number of Excavation Tickets received from the notification center	136,759.6	147,503	**2019** number of excavation tickets 142,549	Increase of 5% or more from established baseline	NO

Appendix E. Section 4. Table 9-4: Number of **leaks** either eliminated or repaired, categorized by cause **(South Division)**

Performance Measure	5-Year Average 2016-20	Year 2020	Established Baseline	Criteria for Re-evaluation of Threats and Risks	Re-Evaluation Required? Y / N
Total Number of Leaks Eliminated or Repaired – Corrosion - **MAINS**	0.011	0.00506	5-Yr Average Leaks/Mile/Yr 0.0124	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total Number of Leaks Eliminated or Repaired – Corrosion – Services	0.325	0.288	5-Yr Average Leaks/Mile/Yr 0.332	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total Number of Leaks Eliminated or Repaired – Natural Forces- **MAINS**	0.00105	0.00217	5-Yr Average Leaks/Mile/Yr 0.00094	Moving 5-Yr Average is an increase of 5% or more from established baseline	An increase of over 5%, but no additional actions taken due to small # of leaks.
Total Number of Leaks Eliminated or Repaired – Natural Forces– Services	0.00602	0.00202	5-Yr Average Leaks/Mile/Yr 0.00695	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total Number of Leaks Eliminated or Repaired – Excavation Damage- **MAINS**	0.0396	0.0434	5-Yr Average Leaks/Mile/Yr 0.0362	Moving 5-Yr Average is an increase of 5% or more from established baseline	**YES** – Continue with action plans. (Ref. Appendix D. Section 5. Table 8-5)
Total Number of Leaks Eliminated or Repaired – Excavation Damage– Services	0.416	0.397	5-Yr Average Leaks/Mile/Yr 0.413	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total Number of Leaks Eliminated or Repaired – Other Outside Force Damage- **MAINS**	0.00092	0.00072	5-Yr Average Leaks/Mile/Yr 0.00093	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total Number of Leaks Eliminated or Repaired – Other Outside Force Damage– Services	0.024	0.0343	5-Yr Average Leaks/Mile/Yr 0.02	Moving 5-Yr Average is an increase of 5% or more from established baseline	An increase of over 5%, but no additional actions taken due to small # of leaks.

Total Number of Leaks Eliminated or Repaired – Material, Weld or Joint Failure- **MAINS**	0.00198	0.00289	5-Yr Average Leaks/Mile/Yr 0.00315	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total Number of Leaks Eliminated or Repaired – Material, Weld or Joint Failure– Services	0.0102	0.0121	5-Yr Average Leaks/Mile/Yr 0.0131	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total Number of Leaks Eliminated or Repaired – Equipment Failure- **MAINS**	0.00403	0.00072	5-Yr Average Leaks/Mile/Yr 0.00548	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total Number of Leaks Eliminated or Repaired – Equipment Failure– Services	0.203	0.266	5-Yr Average Leaks/Mile/Yr 0.156	Moving 5-Yr Average is an increase of 5% or more from established baseline	**YES** –Reference additional actions in appendix D. Section 8 Table 8-8
Total Number of Leaks Eliminated or Repaired – Incorrect Operation- **MAINS**	0.00182	0.00144	5-Yr Average Leaks/Mile/Yr 0.00185	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total Number of Leaks Eliminated or Repaired – Incorrect Operation– Services	0.0237	0.0585	5-Yr Average Leaks/Mile/Yr 0.0178	Moving 5-Yr Average is an increase of 5% or more from established baseline	**YES** –Reference additional actions in appendix D. Section 8 Table 8-8
Total Number of Leaks Eliminated or Repaired – Other- **MAINS**	0.00078	0.00072	5-Yr Average Leaks/Mile/Yr 0.00111	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total Number of Leaks Eliminated or Repaired – Other– Services	0.00962	0.00202	5-Yr Average Leaks/Mile/Yr 0.01055	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO

Appendix E. Section 5. Table 9-5: Number of hazardous leaks either eliminated or repaired, per §192.703(c), categorized by **material**

(South Division)

Performance Measure	5-Year Average 2016-20	Year 2020	Established Baseline	Criteria for Re-evaluation of Threats and Risks	Re-Evaluation Required? Y / N
Number of Hazardous Leaks Eliminated or Repaired – Cast Iron- **MAINS**	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO. As of 2019 FDOT 7100 report. No cast iron in system
Number of Hazardous Leaks Eliminated or Repaired – Bare Steel- **MAINS**	0.00499	0.00578	5-Yr Average Leaks/Mile/Yr 0.00575	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Bare Steel- SERVICES	0.05061	0.0383	5-Yr Average Leaks/Mile/Yr 0.05278	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Coated Steel with CP- **MAINS**	0.0038	0.00217	5-Yr Average Leaks/Mile/Yr 0.00448	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Coated Steel with CP- Services	0.03976	0.03628	5-Yr Average Leaks/Mile/Yr 0.04323	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Polyethylene All other - **MAINS**	0.0352	0.03973	5-Yr Average Leaks/Mile/Yr 0.03160	Moving 5-Yr Average is an increase of 5% or more from established baseline	**YES** – Continue action plans. See action plans. (Ref. Appendix D. Section 5. Table 8-5)
Number of Hazardous Leaks Eliminated or Repaired – Polyethylene All other - services	0.42793	0.4193	5-Yr Average Leaks/Mile/Yr 0.42361	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO

Number of Hazardous Leaks Eliminated or Repaired – Aldyl A - **MAINS**	0.00074	0.00144	5-Yr Average Leaks/Mile/Yr 0.00045	Moving 5-Yr Average is an increase of 5% or more from established baseline	**YES** – Continue action plans. See action plans. (Ref. Appendix D. Section 5. Table 8-7)
Number of Hazardous Leaks Eliminated or Repaired – Aldyl A - Services	0.00596	0.00605	5-Yr Average Leaks/Mile/Yr 0.00873	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO

Appendix E. Section 4. Table 9-4: Number of leaks either eliminated or repaired, categorized by cause **(Central Division)**

Performance Measure	5-Year Average 2016-20	Year 2020	Established Baseline	Criteria for Re-evaluation of Threats and Risks	Re-Evaluation Required? Y / N
Total Number of Leaks Eliminated or Repaired – Corrosion – **MAINS**	0.00056	0.00137	5-Yr Average Leaks/Mile/Yr 0.00029	Moving 5-Yr Average is an increase of 5% or more from established baseline	An increase of over 5%, but no additional actions taken due to small # of leaks.
Total Number of Leaks Eliminated or Repaired – Corrosion - Services	0.1656	0.165	5-Yr Average Leaks/Mile/Yr 0.154	Moving 5-Yr Average is an increase of 5% or more from established baseline	**YES** –Reference additional actions in appendix D. Section 8 Table 8-8
Total Number of Leaks Eliminated or Repaired – Natural Forces– **mains**	0.00056	0.0137	5-Yr Average Leaks/Mile/Yr 0.00029	Moving 5-Yr Average is an increase of 5% or more from established baseline	An increase of over 5%, but no additional actions taken due to small # of leaks.
Total Number of Leaks Eliminated or Repaired – Natural Forces– services	0.00973	0.00374	5-Yr Average Leaks/Mile/Yr 0.00985	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total Number of Leaks Eliminated or Repaired – Excavation Damage– **mains**	0.0259	0.0275	5-Yr Average Leaks/Mile/Yr 0.0268	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total Number of Leaks Eliminated or Repaired – Excavation Damage– services	0.2594	0.2844	5-Yr Average Leaks/Mile/Yr 0.263	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total Number of Leaks Eliminated or Repaired – Other Outside Force Damage– **mains**	0.00058	0.00137	5-Yr Average Leaks/Mile/Yr 0.00030	Moving 5-Yr Average is an increase of 5% or more from established baseline	An increase of over 5%, but no additional actions taken due to small # of leaks.
Total Number of Leaks Eliminated or Repaired – Other Outside Force Damage– services	0.01531	0.00374	5-Yr Average Leaks/Mile/Yr 0.0154	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO

Total Number of Leaks Eliminated or Repaired – Material, Weld or Joint Failure– **mains**	0.00355	0.00413	5-Yr Average Leaks/Mile/Yr 0.00305	Moving 5-Yr Average is an increase of 5% or more from established baseline	An increase of over 5%, but no additional actions taken due to small # of leaks.
Total Number of Leaks Eliminated or Repaired – Material, Weld or Joint Failure– services	0.0134	0.015	5-Yr Average Leaks/Mile/Yr 0.0197	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total Number of Leaks Eliminated or Repaired – Equipment Failure– **mains**	0.00030	0	5-Yr Average Leaks/Mile/Yr 0.0003	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total Number of Leaks Eliminated or Repaired – Equipment Failure– services	0.1717	0.1721	5-Yr Average Leaks/Mile/Yr 0.139	Moving 5-Yr Average is an increase of 5% or more from established baseline	**YES** –Reference additional actions in appendix D. Section 8 Table 8-8
Total Number of Leaks Eliminated or Repaired – Incorrect Operation– **mains**	0.00115	0	5-Yr Average Leaks/Mile/Yr 0.00115	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total Number of Leaks Eliminated or Repaired – Incorrect Operation– services	0.00777	0	5-Yr Average Leaks/Mile/Yr 0.00077	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total Number of Leaks Eliminated or Repaired – Other– **mains**	0.00365	0	5-Yr Average Leaks/Mile/Yr 0.00814	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total Number of Leaks Eliminated or Repaired – Other– services	0.044	0.00374	5-Yr Average Leaks/Mile/Yr 0.06	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO

Appendix E. Section 5. Table 9-5: Number of hazardous leaks either eliminated or repaired, per §192.703(c), categorized by material

(Central Division)

Performance Measure	5-Year Average 2016-20	Year 2020	Established Baseline	Criteria for Re-evaluation of Threats and Risks	Re-Evaluation Required? Y / N
Number of Hazardous Leaks Eliminated or Repaired – Bare Steel – **MAINS**	0.00000	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO. Bare steel removed from Central Division
Number of Hazardous Leaks Eliminated or Repaired – Bare Steel – services	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO. Bare steel removed from Central Division
Number of Hazardous Leaks Eliminated or Repaired – Coated Steel with CP – **MAINS**	0.00144	0.00275	5-Yr Average Leaks/Mile/Yr 0.00217	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Coated Steel with CP – services	0.04782	0.04865	5-Yr Average Leaks/Mile/Yr 0.03896	Moving 5-Yr Average is an increase of 5% or more from established baseline	**YES** –Reference additional actions in appendix D. Section 8 Table 8-8
Number of Hazardous Leaks Eliminated or Repaired – Polyethylene All other– **MAINS**	0.02591	0.0261	5-Yr Average Leaks/Mile/Yr 0.0249	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Polyethylene All other– services	0.26657	0.341	5-Yr Average Leaks/Mile/Yr 0.258	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO

Appendix E. Section 4. Table 9-4: Number of leaks either eliminated or repaired, categorized by cause **(West Division)**

Performance Measure	5-Year Average 2016-20	Year 2020	Established Baseline	Criteria for Re-evaluation of Threats and Risks	Re-Evaluation Required? Y / N
Total Number of Leaks Eliminated or Repaired – Corrosion – **mains**	0.0107	0.0073	5-Yr Average Leaks/Mile/Yr 0.0127	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total Number of Leaks Eliminated or Repaired - Corrosion-Services	0.0598	0.055	5-Yr Average Leaks/Mile/Yr 0.0579	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total Number of Leaks Eliminated or Repaired – Natural Forces– **mains**	0.00065	0	5-Yr Average Leaks/Mile/Yr 0.00065	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total Number of Leaks Eliminated or Repaired – Natural Forces-Services	0.00583	0.00396	5-Yr Average Leaks/Mile/Yr 0.006	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total Number of Leaks Eliminated or Repaired – Excavation Damage– **mains**	0.01779	0.02189	5-Yr Average Leaks/Mile/Yr 0.01692	Moving 5-Yr Average is an increase of 5% or more from established baseline	**YES** – Continue with action plans. (Ref. Appendix D. Section 5. Table 8-5)
Total Number of Leaks Eliminated or Repaired – Excavation Damage-Services	0.12	0.14	5-Yr Average Leaks/Mile/Yr 0.134	Moving 5-Yr Average is an increase of 5% or more from established baseline	**NO**
Total Number of Leaks Eliminated or Repaired – Other Outside Force Damage– **mains**	0.00128	0	5-Yr Average Leaks/Mile/Yr 0.00128	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total Number of Leaks Eliminated or Repaired – Other Outside Force Damage-Services	0.01078	0.01981	5-Yr Average Leaks/Mile/Yr 0.0073	Moving 5-Yr Average is an increase of 5% or more from established baseline	An increase of over 5%, but no additional actions taken due to small # of leaks.
Total Number of Leaks Eliminated or Repaired –	0.00043	0	5-Yr Average Leaks/Mile/Yr 0.00065	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO

Material, Weld or Joint Failure– **mains**					
Total Number of Leaks Eliminated or Repaired – Material, Weld or Joint Failure-Services	0.078	0	5-Yr Average Leaks/Mile/Yr 0.082	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total Number of Leaks Eliminated or Repaired – Equipment Failure– **mains**	0.00149	0	5-Yr Average Leaks/Mile/Yr 0.00237	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total Number of Leaks Eliminated or Repaired – Equipment Failure-Services	0.214	0.345	5-Yr Average Leaks/Mile/Yr 0.183	Moving 5-Yr Average is an increase of 5% or more from established baseline	**YES** –Reference additional actions in appendix D. Section 8 Table 8-8
Total Number of Leaks Eliminated or Repaired – Incorrect Operation– **mains**	0.00064	0	5-Yr Average Leaks/Mile/Yr 0.00086	Moving 5-Yr Average is an increase of 5% or more from established baseline	**NO**
Total Number of Leaks Eliminated or Repaired – Incorrect Operation-Services	0.028	0.071	5-Yr Average Leaks/Mile/Yr 0.014	Moving 5-Yr Average is an increase of 5% or more from established baseline	**YES** –Reference additional actions in appendix D. Section 8 Table 8-8
Total Number of Leaks Eliminated or Repaired – Other– **mains**	0.00362	0	5-Yr Average Leaks/Mile/Yr 0.00384	Moving 5-Yr Average is an increase of 5% or more from established baseline	**NO**
Total Number of Leaks Eliminated or Repaired – Other-Services	0.19	0	5-Yr Average Leaks/Mile/Yr 0.189	Moving 5-Yr Average is an increase of 5% or more from established baseline	**NO**

Appendix E. Section 5. Table 9-5: Number of **hazardous** leaks either eliminated or repaired, per §192.703(c), categorized by material

(West Division)

Performance Measure	5-Year Average 2016-20	Year 2020	Established Baseline	Criteria for Re-evaluation of Threats and Risks	Re-Evaluation Required? Y / N
Number of Hazardous Leaks Eliminated or Repaired – Bare Steel - **MAINS**	0.00448	0.00313	5-Yr Average Leaks/Mile/Yr 0.00676	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Bare Steel– Services	0.01296	0.00396	5-Yr Average Leaks/Mile/Yr 0.02040	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Coated Steel with CP- **MAINS**	0.0021	0.00626	5-Yr Average Leaks/Mile/Yr 0.00085	Moving 5-Yr Average is an increase of 5% or more from established baseline	An increase of over 5%, but no additional actions taken due to small # of leaks.
Number of Hazardous Leaks Eliminated or Repaired – Coated Steel with CP– Services	0.01375	0.00396	5-Yr Average Leaks/Mile/Yr 0.01296	Moving 5-Yr Average is an increase of 5% or more from established baseline	An increase of over 5%, but no additional actions taken due to small # of leaks.
Number of Hazardous Leaks Eliminated or Repaired – Polyethylene All other- **MAINS**	0.0189	0.01564	5-Yr Average Leaks/Mile/Yr 0.0187	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Polyethylene All other – Services	0.146	0.13866	5-Yr Average Leaks/Mile/Yr 0.15784	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO

APPENDIX F
PERIODIC EVALUATION AND IMPROVEMENT

Appendix F. Table 10-1: Documentation of Re-evaluation of Threats and Risks

Performance Measures that Exceeded Baseline				
Region	**Performance Measure**	**Actual Performance for Year 2016 - 2020**	**Established Baseline**	**Re-evaluation criteria**
SOUTH DIVISION	# of Hazardous Leaks Eliminated or Repaired – other outside force - **services**	0.02121	0.01824	Moving 5-Yr Average is an increase of 5% or more from established baseline
SOUTH DIVISION	# of Hazardous Leaks Eliminated or Repaired – Equipment failure - **services**	0.08212	0.06952	Moving 5-Yr Average is an increase of 5% or more from established baseline
SOUTH DIVISION	# of Hazardous Leaks Eliminated or Repaired – Excavation damage - **mains**	0.03793	0.03481	Moving 5-Yr Average is an increase of 5% or more from established baseline
SOUTH DIVISION	# of Hazardous Leaks Eliminated or Repaired – Incorrect operation - **mains**	0.00059	0.00046	Moving 5-Yr Average is an increase of 5% or more from established baseline
CENTRAL DIVISION	# of Hazardous Leaks Eliminated or Repaired – Corrosion – **services**	0.04243	0.03231	Moving 5-Yr Average is an increase of 5% or more from established baseline
CENTRAL DIVISION	# of Hazardous Leaks Eliminated or Repaired – Equipment failure – **services**	0.04162	0.02740	Moving 5-Yr Average is an increase of 5% or more from established baseline
WEST DIVISION	# of Hazardous Leaks Eliminated or Repaired –Incorrect operation- **services**	0.01790	0.01314	Moving 5-Yr Average is an increase of 5% or more from established baseline
West DIVISION	# of Hazardous Leaks Eliminated or Repaired – Other Outside Force damage – **services**	0.00993	0.00689	Moving 5-Yr Average is an increase of 5% or more from established baseline

West DIVISION	# of Hazardous Leaks Eliminated or Repaired – Equipment failure – **services**	0.09015	0.06883	Moving 5-Yr Average is an increase of 5% or more from established baseline
SOUTH DIVISION	Total # of Leaks Eliminated or Repaired – Excavation damage – **mains**	0.03621	0.03275	Moving 5-Yr Average is an increase of 5% or more from established baseline
SOUTH DIVISION	Total # of Leaks Eliminated or Repaired – NF– **mains**	0.0105	0.00094	Moving 5-Yr Average is an increase of 5% or more from established baseline
SOUTH DIVISION	Total # of Leaks Eliminated or Repaired – Equipment failure – **services**	0.2030	0.1560	Moving 5-Yr Average is an increase of 5% or more from established baseline
SOUTH DIVISION	Total # of Leaks Eliminated or Repaired – Incorrect operation – **services**	0.0237	0.0178	Moving 5-Yr Average is an increase of 5% or more from established baseline
SOUTH DIVISION	Total # of Leaks Eliminated or Repaired – Other Outside Force – **services**	0.02417	0.02	Moving 5-Yr Average is an increase of 5% or more from established baseline
CENTRAL DIVISION	Total # of Leaks Eliminated or Repaired – Corrosion - **Mains**	0.00056	0.00029	Moving 5-Yr Average is an increase of 5% or more from established baseline
CENTRAL DIVISION	Total # of Leaks Eliminated or Repaired – Other Outside Force damage - **Mains**	0.00058	0.00030	Moving 5-Yr Average is an increase of 5% or more from established baseline
CENTRAL DIVISION	Total # of Leaks Eliminated or Repaired – NF- **Mains**	0.00056	0.00029	Moving 5-Yr Average is an increase of 5% or more from established baseline
CENTRAL DIVISION	Total # of Leaks Eliminated or Repaired – Material weld or joint - **Mains**	0.00355	0.00305	Moving 5-Yr Average is an increase of 5% or more from established baseline
CENTRAL DIVISION	Total # of Leaks Eliminated or Repaired – Equipment Failure - **services**	0.1717	0.139	Moving 5-Yr Average is an increase of 5% or more from established baseline

CENTRAL DIVISION	Total # of Leaks Eliminated or Repaired – Corrosion – **services**	0.1656	0.1543	Moving 5-Yr Average is an increase of 5% or more from established baseline
WEST DIVISION	Total # of Leaks Eliminated or Repaired – Excavation - **MAINS**	0.01779	0.01692	Moving 5-Yr Average is an increase of 5% or more from established baseline
WEST DIVISION	Total # of Leaks Eliminated or Repaired – other outside force - **services**	0.01078	0.00773	Moving 5-Yr Average is an increase of 5% or more from established baseline
WEST DIVISION	Total # of Leaks Eliminated or Repaired – Equipment Failure - **services**	0.214	0.183	Moving 5-Yr Average is an increase of 5% or more from established baseline
SOUTH DIVISION	# of Hazardous Leaks Eliminated or Repaired categorized by matl. – Polyethylene - **mains**	0.03524	0.03160	Moving 5-Yr Average is an increase of 5% or more from established baseline
SOUTH DIVISION	# of Hazardous Leaks Eliminated or Repaired categorized by matl. – Aldyl A - **mains**	0.00074	0.00045	Moving 5-Yr Average is an increase of 5% or more from established baseline
CENTRAL DIVISION	# of Hazardous Leaks Eliminated or Repaired categorized by matl. – Coated steel - **services**	0.04782	0.03896	Moving 5-Yr Average is an increase of 5% or more from established baseline
WEST DIVISION	# of Hazardous Leaks Eliminated or Repaired categorized by matl. – steel - **mains**	0.00210	0.00085	Moving 5-Yr Average is an increase of 5% or more from established baseline
WEST DIVISION	# of Hazardous Leaks Eliminated or Repaired categorized by matl. – steel - **services**	0.01375	0.01296	Moving 5-Yr Average is an increase of 5% or more from established baseline
ALL DIVISION	# of Excavation Damages - MAINS	86.8	101	Moving 5-Yr Average is an increase of 5% or more from established baseline
NOTES:				
Existing Date for Complete Program re-evaluation: 2021. Is a shorter timeframe for complete program re-evaluation warranted? : NO				

Required frequency	Program Re-evaluation Element	Date Completed
Required Annually	5 year DIMP review update	12/06/2021
Required Annually	Annual meeting with Compliance Manager – Mike McCarty (West Division) to review DIMP (TEAMS Video call)	12/02/2021
Required Annually	Annual meeting with Operations Supervisor – Glenn Pendleton (Central Division) to review DIMP	10/22/2020
Required Annually	Annual meeting with Compliance Manager – Walter Rossetto, Doug Moreland & James Rolle (South Division) to review DIMP (TEAMS Video call)	12/02/2021
As needed*		
As needed*		
As needed*		
As needed*		
As needed*		

** as needed to address the risk category whose performance measure was exceeded*

SUPPLEMENTAL SECTION

PHMSA JURISDICTIONAL LIQUEFIED PROPANE GAS SYSTEMS

THREAT IDENTIFICATION

13.0 PURPOSE AND OBJECTIVES

The objective of this IM Plan is to establish the requirements to comply with the Code of Federal Regulations (CFR 49) §§ 192.1015 pertaining to integrity management for small LPG operators. This IM Plan does not address how an operator may deviate from the required periodic inspections as provided for in §192.1013.

This is the 5 year review of FPUC's jurisdictional liquefied propane gas systems for the years 2013 - 2017.

Florida Public Utilities Company is divided into three operational divisions. The systems that comprise each division are as follows:

South Florida Division includes Barefoot Bay.

Central Division consists of Veranda Park

And the West Division consists of Newberry and Newton.

(Villas at Lake Smart has been converted to natural gas as of 08/10/2021)

Individual DIMP plans have been created for FPUCs jurisdictional Community Gas Systems and are available upon request.

The IM Plan is comprised of seven elements

-Knowledge of Facilities (Section 14)

-Threat Identification (Section 15)

-Evaluation & Ranking of Risk (Section 16)

- Identification & Implementation of Measures to address risk (Section 17)

- Measurement of performance, monitoring results, & evaluating effectiveness (Section 18)

-Periodic evaluation & improvement (Section 19)

- Reporting results (Section 20)

In addition to the key elements, the IM Plan also establishes requirements for reporting of mechanical coupling failures (Section 20)

All elements of this IM Plan where implemented by **August 2, 2011.**

14.0 KNOWLEDGE OF FACILITIES

The objective of this section is to assemble as complete of an understanding of the company's infrastructure as possible using reasonably available information from past and ongoing design, operations and maintenance activities. In addition, this plan will identify what additional information is needed and provide a plan for gaining that information over time through normal activities.

14.1 Type and Location of Records

A summary of the existing records that are utilized by the IM Plan and where they are located is documented in Appendix A, Section 1 (Propane). These records include, but are not limited to, incident and leak history, corrosion control records, continuing surveillance records, patrolling records, maintenance history and excavation damage experience.

14.2 Overview of Past Design, Operations and Maintenance

Record reviews, interviews with SMEs and other means were used to gain an understanding of past design, operations and maintenance history of the distribution system. This information includes operating pressures, materials used in construction and construction practices. This information is documented, or included by reference, in Appendix A, Section 2 (Propane).

14.3 Characteristics of Design, Operations and Environmental Factors

Characteristics of the pipeline's design, operations and environmental factors that are necessary to assess the applicable threats and risks are documented, or included by reference, in Appendix A, Section 3 (Propane).

14.4 Additional Information Needed

Additional information needed to support the IM plan (information that is not reasonably available today) is identified in Appendix A, Section 4 (Propane). Plans for gaining additional information over time through normal activities conducted on the pipeline are documented, or included by reference, in Appendix A, Section 4 (Propane).

14.5 Data Capture for New Construction and Ongoing O&M

Data is continuously collected for both construction of new facilities, reconstruction of existing facilities and ongoing operations and maintenance. In particular, the standard or procedure that require data capture for the location where the new pipeline is installed and the material of which it is constructed is contained in FPU Operations and Maintenance Manual Section 16.0.1.

14.6 Knowledge Capture – Subject Matter Experts

In addition to maps, records, and databases, valuable information for this IM plan was gathered and captured from SMEs. SMEs are individuals who have specialized knowledge based on their experience or training. SMEs were used to supplement existing, incomplete, or missing records and were the best source of information in subjects such as historical operations, maintenance, and construction practices. SME interviews were also utilized to ensure that all threats have been identified.

New SME interviews were conducted for this 5 year plan update and are documented and stored in the Distribution Integrity Management Program files and are available upon request.

15.0 THREAT IDENTIFICATION

The objective of this section of the plan is to identify existing and potential threats to the gas distribution pipeline.

The following categories of threats shall be considered for each gas distribution pipeline:

- Corrosion
- Natural Forces
- Excavation Damage
- Other Outside Force
- Material, Weld or Joint Failure
- Equipment Failure
- Incorrect Operation
- Other concerns that could threaten the integrity of the pipeline.

A review of information gathered for Section 14 and interviews with Subject Matter Experts were used to identify existing and potential threats to the distribution system. **A description of the process used to identify threats is referenced in Appendix B, Section 1 (Propane)**. The threats identified as applicable to the gas distribution pipeline are documented in Appendix B, Section 2 (Propane). Prior versions of the threat identification process and results that are no longer current shall be retained and stored in the Distribution Integrity Management Program files.

16.0 EVALUATION AND RANKING OF RISK

16.1 Objective

Risk analysis is an ongoing process of understanding what factors affect the risk posed by threats to the gas distribution pipeline and where they are relatively more important than others. The primary objectives of the evaluation and ranking of gas distribution pipeline risk are:

- Consider each applicable current and potential threat
- Consider the likelihood of failure associated with each threat
- Consider the potential consequences of such a failure
- Estimate and rank the risks (i.e. determine the relative importance) posed to the pipeline
- Consider the relevance of threats in one location to other areas

NOTE: There were several potential threats identified for the distribution system, but no previous incidents of these threats have occurred. Because there have been no previous incidents of these potential threats, their frequency is zero, thus resulting in a risk calculation of zero. However, some of these potential threats appear in the risk ranking tables with a risk ranking of zero as we are cognizant that they are a potential threat.

16.2 Risk Assessment Process

The current process used for Risk Assessment **(Blended Risk (Subject Matter Expert & data) Evaluation and Ranking Process)** shall be documented, or included by reference, in Appendix C, Section 1 (Propane). Prior risk assessment processes shall be retained and stored in the Distribution Integrity Management Program files.

16.3 Risk Assessment

The current risk assessment **(likelihood, consequence, and resultant risk ranking)** shall be documented, or included by reference, in Appendix C, Section 2 (Propane). Prior risk assessment results shall be retained and stored in the Distribution Integrity Management Program files.

RISK = Consequence (COF) x Likelihood (FOF)

17.0 IDENTIFICATION AND IMPLEMENTATION OF MEASURES TO ADDRESS RISKS

The objective of this section of the IM Plan is to describe existing and proposed measures to address the risks that have been evaluated and prioritized for the jurisdictional liquefied propane gas systems for the 5 year review 2013- 2017 in section 16.

17.1 Leak Management Program

The Leak Management program is established in the Florida Public Utilities Procedure Manual in the section entitled “Leak Control”.

17.1.1 Description of Existing Program

Florida Public Utilities Leak Management Program contains all the essential elements for an effective program. Procedures are in place to 1) Locate the leak, 2) Evaluate its severity, 3) Act appropriately to mitigate the leak, 4) Keep records; and 5) Self assess to determine if additional actions are necessary.

Florida Public Utilities Operations and Maintenance Manual and Emergency Manual address necessary components of effective leak control including, prompt and effective response to gas odor calls, classification of gas leaks, performing leakage surveys at prescribed regulatory intervals and system patrols.

Leaks are repaired in compliance with the prescribed time frames of Chapter 25-12.040 of the Florida Administrative Code.

A summary of the key elements of the Leak Management Program are documented, or included by reference, in Appendix D Section 1 (Propane).

17.2 Other Additional or Accelerated Actions

At this time no additional or accelerated actions for leak management beyond the minimum code requirements specified outside of Part 192 subpart P are planned. In the event additional or accelerated actions are planned in the future, procedures to implement these will be identified.

17.2.1 Corrosion

Per 2013 to 2017 data, Corrosion is the highest ranked risk and leading cause of leaks in FPU's jurisdictional liquefied propane gas systems. It was mostly encountered on the steel services in the South Division, since this is the only division that has steel mains and services. This is reflected in the number of leaks and the risk rankings (Appendix C_Propane Section Ref table S-3). No leaks caused by corrosion were reported in any other division. It should also be noted that the risk ranking number has increased from the last revaluation from 0.057 to 4.1175.

Additional or Accelerated Actions that are currently scheduled or in place in order to reduce the risks associated with corrosion are documented, or included by reference, in Appendix D_Propane Section. Ref table S-5. Prior documentation shall be retained and stored in the Distribution Integrity Management Program files.

17.2.2 Natural Forces

Leaks in FPU's jurisdictional liquefied propane gas systems due to the threat of natural forces are zero to minimal and risk rankings are so low that they are negligible

Because the number of leaks from natural forces is zero, no Additional or Accelerated Actions are scheduled. Prior documentation shall be retained and stored in the Distribution Integrity Management Program files.

17.2.3 Excavation Damage

Per 2013 to 2017 data, Excavation Damage is the second leading cause of leaks in FPU's jurisdictional liquefied propane gas systems. This is reflected in the number of leaks and the risk rankings (Appendix C_Propane Section Ref table S-3). FPU's South Division accounted for most of the excavation damages, due to the fact that the south Division has significantly more buried pipe (47.3 miles) compared to the other two divisions (4.7 miles combined). For the 5 year period 2013 to 2017 there were only 24 leaks reported.

Additional or Accelerated Actions that are currently scheduled or in place in order to reduce the risks associated with corrosion are documented, or included by reference, in Appendix D_Propane Section. Ref table S-5. Prior documentation shall be retained and stored in the Distribution Integrity Management Program files.

17.2.4 Other Outside Force

Leaks in FPU's jurisdictional liquefied propane gas systems due to the threat of Other Outside force are zero to minimal and risk rankings are so low that they are negligible.

Because the number of leaks from Other Outside force is low, and risks rankings from this threat were minimal. No Additional or Accelerated Actions are scheduled. Prior documentation shall be retained and stored in the Distribution Integrity Management Program files.

17.2.5 Material, Weld or Joint Failure

Leaks in FPU's jurisdictional liquefied propane gas systems due to the threat of material, weld, or joint failure are zero to minimal and risk rankings are so low that they are negligible.

As noted in the previous reevaluation, Aldyl A pipe is still believed to exist in the South Division (Barefoot Bay). The same action item remains in place in order to gain better data on the amount of Aldyl A that exists in the system. These actions are documented, or included by reference, in Appendix D_Propane Section. Ref table S-5. Prior documentation shall be retained and stored in the Distribution Integrity Management Program files.

17.2.6 Equipment Failure

Leaks in FPU's jurisdictional liquefied propane gas systems due to the threat of Equipment failure are zero to minimal and risk rankings are so low that they are negligible.

No additional or Accelerated Action threats are planned for the equipment failure. Prior documentation shall be retained and stored in the Distribution Integrity Management Program files.

17.2.7 Incorrect Operation

Leaks in FPU's jurisdictional liquefied propane gas systems due to the threat of Incorrect Operation are zero to minimal and risk rankings are so low that they are negligible.

No additional or Accelerated Action threats are planned for the Incorrect Operation. Prior documentation shall be retained and stored in the Distribution Integrity Management Program files.

17.2.8 Other

Leaks in FPU's jurisdictional liquefied propane gas systems due to other causes are minimal and risk rankings are so low that they are negligible.

Because the number of leaks from other causes is low, and risks rankings from this threat were minimal, no Additional or Accelerated Actions are scheduled. Prior documentation shall be retained and stored in the Distribution Integrity Management Program files.

18.0 MEASUREMENT OF PERFORMANCE, MONITORING RESULTS, AND EVALUATING EFFECTIVENESS

The objective of this section of the plan is to establish performance measures that shall be monitored from an established baseline in order to evaluate the effectiveness of the IM program. The performance measures detailed below have been established in order to monitor performance and assist in the ongoing evaluation of threats.

18.1 Number of Hazardous Leaks either Eliminated or Repaired, per §192.703(c), Categorized by Cause

The baseline and ongoing performance of the number of hazardous leaks either eliminated or repaired, per §192.703(c), categorized by cause, shall be documented, or included by reference, in Appendix E_Propane Section.

18.2 Number of Excavation Damages

The baseline and ongoing performance of the number of excavation damages are included by reference in Appendix E_Propane Section.

18.3 Number of Excavation Tickets (received from the Sunshine State One Call of Florida notification center)

The baseline and ongoing performance of the number of excavation tickets received from the notification center(s) are included by reference in Appendix E_Propane Section.

18.4 Total Number of Leaks either Eliminated or Repaired, Categorized by Cause

The baseline and ongoing performance of the total number of leaks either eliminated or repaired, categorized by cause, are included by reference in Appendix E_Propane Section.

18.5 Number of Hazardous Leaks either Eliminated or Repaired, per §192.703(c), Categorized by Material

The baseline and ongoing performance of the number of hazardous leaks either eliminated or repaired, per §192.703(c), categorized by material, shall be documented, or included by reference, in Appendix E_Propane Section.

19.0 PERIODIC EVALUATION AND IMPROVEMENT

The objective of this section of the plan is to periodically re-evaluate threats and risks on all jurisdictional liquefied propane gas systems and periodically evaluate the effectiveness of its program.

19.1 Plan Updating, Review Frequency and Documentation

This written integrity management plan shall be reviewed annually and updated as required to reflect changes and improvements that have occurred in process, procedures and analysis for each element of the program. The updated integrity plan will be emailed to the operations managers. A complete program re-evaluation shall be completed every five years. All changes to the written plan, inclusive of material from the appendices, shall be recorded on the Revision Control Sheet on page ii. However, changes to material in the appendices that is included by reference need not be recorded on the Revision Control Sheet.

19.2 Effectiveness Review

An assessment of the performance measures described above shall be performed. In cases where the re-evaluation criteria specified is met or exceeded, a re-evaluation of the associated threats and risks shall be completed. **An emerging threat in one or more location shall be evaluated for relevance to other areas**. The re-evaluation of threats and risks shall be documented in Appendix F_Propane Section and the results of the re-evaluation shall be documented in Appendices B_Propane Section and C_Propane Section. The review shall also establish whether a complete program re-evaluation shall be completed in a shorter timeframe than five years; this decision shall also be documented. Past effectiveness reviews that are no longer current shall be retained and stored in the Distribution Integrity Management Program files.

20.0 REPORTING RESULTS

20.1 State & Federal Annual Reporting Requirements

The following four measures shall be reported, annually by March 15, to PHMSA as part of the annual report required by 49 CFR, § 191.11:

- Number of hazardous leaks either eliminated or repaired (or total number of leaks if all leaks are repaired when found), per § 192.703(c), categorized by cause
- Number of excavation damages
- Number of excavation tickets (receipt of information by the underground facility operator(Florida Public Utilities) from the Sunshine State One Call of Florida notification center)
- Total number of leaks either eliminated or repaired, categorized by cause
- Information related to failure of mechanical couplings, excluding those that result only in nonhazardous leaks, shall be reported to PHMSA as part of the annual report required by §191.11 beginning with the report submitted March 15, 2011. This information must include, as available, location of the failure in the pipeline, nominal pipe size, material type, nature of failure including any contribution of local pipeline environment, coupling manufacturer, lot number and date of manufacture, and other information that can be found in markings on the failed coupling. At this time, there are no mechanical fittings in the system. The exception for The South Division (Barefoot Bay), non-have been found, but because the system was purchased, it cannot be said for certain they do not exist.

The State of Florida also exercises jurisdiction over the pipeline; therefore, these five measures shall also be reported to the Florida Public Service Commission. A copy of the reports shall be maintained in the Distribution Integrity Management Program files.

21.0 DOCUMENT AND RECORD RETENTION

The following records shall be retained in the Distribution Integrity Management Program files.

- The most current as well as prior versions of this written IM Plan

- Documents supporting Knowledge of Facilities (material supporting Appendix A_Propane Section, of the IM Plan)
- Documents supporting threat identification (material supporting Appendix B_Propane Section, of the IM Plan)
- Documents supporting risk evaluation and ranking (material supporting Appendix C_Propane Section, of the IM Plan)
- Documents supporting the identification and implementation of measures to address risks (material supporting Appendix D_Propane Section, of the IM Plan)
- Documents supporting measurement of performance, monitoring results and evaluating effectiveness (material supporting Appendix E_Propane Section, of the IM Plan)
- Effectiveness Reviews (material supporting Appendix F_Propane Section, of the IM Plan)
- Annual Reports to PHMSA (as required by §191.11) and State pipeline safety authorities
- Mechanical Coupling Failure Reports

Documentation demonstrating compliance with the requirements of 49 CFR, Part 192, Subpart P shall be retained for at least 10 years.

APPENDIX A (PROPANE)
KNOWLEDGE OF FACILITIES

Appendix A. Section 1 (Propane). Table 5-1: IM Program Records Summary

Record	Record Type – Database, Electronic Record, Paper Record	Applicable Standard, Policy, or Guideline	Extent of Missing Records	Location of Records	Key Contact
Graphic Information System (GIS) database	Database		Largely Unpopulated	FPU Server	GIS Administrator
Wall Maps / Plats	Paper Record		Fairly Complete	Division Offices	Division Operations Supervisors
Gas Service Record Cards	Paper Record		Fairly Complete	Division Offices	Division Operations Supervisors
As-Built Construction Drawings / records	Electronic Record, Paper Record		Fairly Complete	Division Offices	Division Engineering Departments
Gas Leak Repair Records	Paper Record / Electronic		Fairly Complete	Division Offices / FPU servers.	Division Operations Supervisors / GIS Administrator
Gas Leak Repair Database	NA		NA	NA	NA
Gas Leak Survey Records	Paper Record		Fairly Complete	Division Offices	Division Operations Supervisors
DOT/PHMSA Incident Reports	Paper Records		Fairly Complete	Division Offices	Division Operations Manager
Other Incident Reports	Paper Records		Fairly Complete	Division Offices	Division Operations Manager

Appendix A. Section 1 (Propane). Table 5-1: IM Program Records Summary (continued)

Record	Record Type – Database, Electronic Record, Paper Record	Applicable Standard, Policy, or Guideline	Extent of Missing Records	Location of Records	Key Contact
CP Maintenance of Isolated Mains and Services subject to 10% annual inspection	Paper Record		Fairly Complete	Division Offices	Division Operations Supervisors
Cathodic Protection Maintenance Areas (Rectifier and Pipe-to-Soil inspection)	Paper Records		Fairly Complete	Division Offices	Division Operations Supervisors
Atmospheric Corrosion Inspection Records	Paper Record		Fairly Complete	Division Offices	Division Operations Supervisors
Patrol Records	Paper Record		Fairly Complete	Division Offices	Division Operations Supervisors
Valve Maintenance Records	Paper Record		Fairly Complete	Division Offices	Division Operations Supervisors
Regulator Station Maintenance Records	Paper Record		Fairly Complete	Division Offices	Division Operations Supervisors
Requests to Locate Gas Facilities	Electronic Record		Fairly Complete	Division Offices	Division Operations Supervisors
3rd Party Damage Claims	Paper Record		Fairly Complete	Division Offices	Division Operations Supervisors
Pipe Type Maps	Paper Record and Electronic Record		South Division (Barefoot Bay) only, marginal information	Division Offices	Division Operations Supervisors
Exposed Main & Services Reports	Paper Record		Fairly Complete	Division Offices	Division Operations Supervisors

Appendix A. Section 1 (Propane). Table 5-1: IM Program Records Summary (continued)

Record	Record Type – Database, Electronic Record, Paper Record	Applicable Standard, Policy, or Guideline	Extent of Missing Records	Location of Records	Key Contact
Environmental Factor: Areas subject to flood	NA		NA	NA	NA
Environmental Factor: Areas subject to landslide	NA		NA	NA	NA
Environmental Factor: Population Density Records	NA		NA	NA	NA
Environmental Factor: Areas of Wall-to-Wall Paving	NA		NA	NA	NA
SME Interview Records	Paper Record		Complete	DIMP Master File	Gas standards Engineer.

Appendix A. Section 2 (Propane). Table 5-2: Summary of System Design by Operating Pressure

Maximum Operating Pressure	Miles of Main
Intermediate Pressure – 2 psig to 60 psig	53.158

Appendix A. Section 2 (Propane). Table 5-3: Summary of Material Types and Years Installed (all divisions)

Material Type	Mains		Services	
	Current Miles of Main	Years Installed (of remaining)	Number of Services	Years Installed (of remaining)
Cast Iron	0	0	0	0
Wrought Iron	0	0	0	0
Bare Steel – with CP	0	0	0	0
Bare Steel – No CP	0	0	0	0
Coated Steel – with CP (SOUTH DIVISION)	19.3	Unknown	480	Unknown
Coated Steel – no CP	0	0	0	0
Ductile Iron	0	0	0	0
Copper	0	0	0	0
Plastic - PVC	0	0	0	0
Plastic - ABS	0	0	0	0
Plastic – Century MDPE 2306	0	0	0	0
Plastic – Aldyl-A	Unknown	Unknown	0	Unknown
Plastic – HDPE 3306	0	0	0	0
Plastic – All Others (SOUTH DIVISION)	28	Unknown	329	Unknown
Plastic – All Others (CENTRAL DIVISION)	0.432	Unknown	8	Unknown
Plastic – All Others (WEST DIVISION)	5.426	Unknown	434	Unknown

Appendix A. Section 2 (Propane). Table 5-4: Example Summary of Construction Practices

Material Type	Year first deployed	Year Ceased
Replacement via insertion of Copper	NA	NA
Replacement via Insertion of Plastic	NA	NA
Replacement via insertion and pipe bursting/splitting	NA	NA
Internal lining / slip-lining	NA	NA
Joint Trench with other utilities	Not Used (West) ~1965 (South) ~1985 (Central)	Practice Continues in Central and South Divisions
Unguided Bore – soil displacement/ram	~1985	Practice Continues
Guided Directional Bore / Drill	~1990	Practice Continues
Blasting	NA	NA
Plow-in	NA	NA

Appendix A. Section 3 (Propane). Table 5-5: Miles of Mains and Number of Services by Material Type

[Part B1 of PHMSA Form F 7100.1-1 incorporated by reference (all divisions)]

Appendix A. Section 3 (Propane). Table 5-6: Miles of Mains and Number of Service lines by material and nominal diameter

[Part B2 & B3 of PHMSA Form F 7100.1-1 incorporated by reference (all divisions)]

Appendix A. Section 3 (Propane). Table 5-7: Miles of Mains and Number of Services by material and decade

[Part B4 of PHMSA Form F 7100.1-1 incorporated by reference (all divisions)]

Appendix A. Section 3 (Propane). Table 5-8: Number of hazardous leaks either eliminated or repaired, per §192.703(c), categorized by cause (all divisions)

Cause of Leak	Number of Hazardous Leaks – 2017 *	
	MAINS	SERVICES
Corrosion	0	2
Natural Forces	0	0
Excavation	0	2
Other Outside Force	0	1
Material, Weld or Joint Failure	0	0
Equipment Failure	0	1
Incorrect Operation	0	0
Other	0	0

Appendix A. Section 3 (Propane). Table 5-9: Number of Excavation Damages (all divisions)

Year	Number of Excavation Damages	
2017	6	
2016	7	
2015	8	
2014	1	
2013	0	

Appendix A. Section 3 (Propane). Table 5-10: Number of Excavation Tickets (all divisions)

Year	Number of Excavation Tickets
2017	1124
2016	1226
2015	1297
2014	1121
2013	893

Appendix A. Section 3 (Propane). Table 5-11: Number of leaks either eliminated or repaired, categorized by cause (all divisions)

Cause of Leak	Number of leaks eliminated or repaired– 2017	
	MAINS	SERVICES
Corrosion	1	9
Natural Forces	0	0
Excavation	0	4
Other Outside Force	0	2
Material, Weld or Joint Failure	0	0
Equipment Failure	0	0
Incorrect Operation	0	1
Other	0	1

Appendix A. Section 4 (Propane). Table 5-36: Identification of Additional Information Needed for IM Program

Area of incomplete records or Knowledge	Can it be acquired over time through normal activities? Y / N	Does Action Plan Exist? Y / N
Vintage years of facilities	No	Yes
Exact location of pipe facilities including Aldyl A (Only Barefoot Bay – South Division only), Plexco Celcon Tap Service Tees (South Division only)	Yes	Yes
Information on pipe materials currently in the ground.	Yes	Yes
Greater detail on Subthreats of Causes	Yes	Yes

Appendix A. Section 4 (Propane). Table 5-37: Action Plans to Gain Additional Information Over Time

Action Plan Scope Gaining Additional Information	Schedule	Completion Date	Officer / Manager Responsible
Vintage years of facilities -information of new pipe facilities being installed is being captured on FPUC's GIS.		Ongoing project	Division Operations Managers, GIS technicians, & Gas Standards Engineer.
Exact location of pipe facilities including Aldyl A, Plexco Celcon Tap Service Tees -Gained through Exposed Piping Reports and Leak Reports -Leak reports are to be uploaded to GIS which will make it easier to analyze leak report data.		Ongoing Project	Division Operations Managers, GIS technicians, Manager of Engineering, & Gas Standards Engineer
Greater detail on Subthreats of Causes – Gained through modified Leak Reports and additional training on their completion.		Ongoing Project	Division Operations Managers & Gas Standards Engineer

APPENDIX B (PROPANE)
THREAT IDENTIFICATION

Appendix B. Section 1 (PROPANE)

Section 1. Threat Identification Process

[Southern Gas Association, Northeast Gas Association and Structural Integrity Associates, Inc. Subject Matter Expert(SME) Evaluation of Threats Applicable to the Gas Distribution System, incorporated by reference (all divisions)]

Appendix B. Section 2. (Propane)

Threats Identified as applicable to the propane systems

App. B. Section 2 (Propane) Supplemental Table S-1: SME Evaluation of Threats Applicable to the LP Distribution System

Service territory covered by this Assessment: All Divisions				
Primary Threat Category	**Sub-Threat**	**SME's to Consider the following**	**SME Evaluation/Answer**	**Threat Applicable? SME – Yes / No**
Corrosion	Cast Iron Pipe	Does Cast Iron pipe exist in the system?	NO	NO
		Is there a known history of body-of-pipe leaks, fractures, or graphitization?	NO	
		Are certain diameters or parts of the system known to be more prone to failure and leakage than others?	NO	
	Ductile Iron	Do ductile iron pipes exist in the system?	NO	NO
		Is there a known history of body-of-pipe leaks, fractures, or graphitization?	NO	
		Are certain diameters or parts of the system known to be more prone to failure and leakage than others?	NO	
	Bare Steel Pipe (no CP)	Do bare (uncoated) steel main or services exist in the system that are not under CP?	NO	NO
		Is there known evidence of active external corrosion on bare steel pipes not under CP?	NO	
		Is there a history of leakage on bare steel pipes not under CP?	NO	
	Bare Steel Pipe (with CP)	Do bare (uncoated) steel main or services exist in the system that are under CP?	NO	NO
		Is there known evidence of active external corrosion on bare steel pipes under CP?	NO	

		Is there a known history of leakage on bare steel pipes under CP?	NO	

App. B. Section 2 (Propane) Supplemental Table S-1: SME Evaluation of Threats Applicable to the LP Distribution System (continued)

Service territory covered by this Assessment: All Divisions				
Primary Threat Category	**Sub-Threat**	**SME's to Consider the following**	**SME Evaluation/Answer**	**Threat Applicable? SME – Yes / No**
Corrosion	Coated Steel with CP	Is there known evidence of active external corrosion on coated steel pipe with CP?	YES – South Division	YES – South Division
		Is there a known history of leakage on coated steel pipe with CP?	YES – South Division	
		Are some CP systems frequently down (not achieving the required level of protection); more than 10% of the time?	NO	
	Coated Steel w/o CP	Is there known evidence of active external corrosion on coated steel pipe without CP?	NO	NO
		Is there a known history of leakage on coated steel pipe without CP?	NO	
	LP Tank with CP	Is there known evidence of active external corrosion on LP Tanks with CP?	NO – All divisions	YES
		Is there a known history of leakage on LP Tanks with CP?	NO – All divisions	
	Copper Services	Are direct buried or inserted copper services known to exist in the system?	NO	NO
		Is there a known history of leakage on copper services?	NO	NO
	Stray Current	Do distribution facilities exist near DC transit systems, high voltage DC transmission systems or other known sources of DC current?	NO	NO
		Are any facilities known to be impacted by sources of stray DC current that has or may result in corrosion?	NO	
	Internal Corrosion	Are liquids known to exist within any portions of the distribution system?	NO	NO

		Is there known evidence of past or active internal corrosion on steel pipe?	NO	
		Is there a known history of leakage caused by internal corrosion of steel pipe?	NO	

App. B. Section 2 (Propane) Supplemental Table S-1: SME Evaluation of Threats Applicable to the LP Distribution System (continued)

Service territory covered by this Assessment: All Divisions				
Primary Threat Category	**Sub-Threat**	**SME's to Consider the following**	**SME Evaluation/Answer**	**Threat Applicable? SME – Yes / No**
Corrosion	Atmospheric Corrosion	Do above ground distribution facilities exist in areas exposed to marine atmosphere, high humidity, atmospheric pollutants or agricultural chemicals?	YES – All Divisions	YES – All Divisions
		Is there known evidence of past or active external atmospheric corrosion on exposed steel pipe, equipment or fittings?	YES – South Division	
		Is there a known history of leakage caused by atmospheric corrosion of steel pipe?	YES – South Division	
	Corrosion of carrier pipe in Cased Crossing	Do steel carrier pipes exist within cased crossings?	NO	NO
		Are there any existing known contacts between carrier pipes and casings?	N/A	
		Is there known evidence of past or active external corrosion on cased steel pipe?	N/A	
		Is there a known history of leakage caused by corrosion on cased steel pipe?	N/A	
Natural Forces	Seismic Activity	Are there any seismically active zones or fault lines that exist in the area?	N/A	N/A
		Is there a history of leakage associated with Seismic activity?	N/A	
	Earth Movement / Landslide	Are there any areas susceptible to earth movement or landslide in the area?	YES – West Division	YES – West Division
		Is there a known history of leakage associated with landslide or earth movement?	NO	

App. B. Section 2 (Propane) Supplemental Table S-1: SME Evaluation of Threats Applicable to the LP Distribution System (continued)

Service territory covered by this Assessment: All Divisions				
Primary Threat Category	**Sub-Threat**	**SME's to Consider the following**	**SME Evaluation/Answer**	**Threat Applicable? SME – Yes / No**
Natural Forces	Frost Heave	Is there a known history of leakage associated with frost heave?	N/A	N/A
	Flooding	Are there any areas within the gas system that are subject to flooding?	YES – South division	YES - South divisions
		Is there a known history of leakage or damage associated with flooding?	NO	
	Tree Roots	Is there a known history of leakage to pipe or fittings as a result of tree root damage?	NO	YES – South division
	Other	Is there a known history of leakage or damage due to other natural force causes; including but not limited to lightning, wild fire or high winds (tornados)?	NO	NO
Excavation Damage	Improper Excavation Practice	Has damage requiring repair or replacement occurred on properly marked facilities due to the failure of the excavator to follow proper excavation rules and procedures?	YES – South & West Divisions	YES – All Divisions
	Facility not located or marked	Has damage requiring repair or replacement occurred due to failure to locate a valid and timely locate request?	YES – South Division	
	One-call notification center error	Has damage requiring repair or replacement occurred due to an error made at the one-call notification center?	NO	
	Mis-Marked Facilities	Has damage requiring repair or replacement occurred due to the mis-marking of facilities?	NO	

App. B. Section 2 (Propane) Supplemental Table S-1: SME Evaluation of Threats Applicable to the LP Distribution System (continued)

Service territory covered by this Assessment: All Divisions				
Primary Threat Category	**Sub-Threat**	**SME's to Consider the following**	**SME Evaluation/Answer**	**Threat Applicable? SME – Yes / No**
Excavation Damage	Incorrect Facility Records	Has damage requiring repair or replacement occurred due incorrect facility records?	YES – South Division	Yes – All Divisions
	Other	Has damage requiring repair or replacement occurred due other causes including the inability to locate facility (e.g. no locating wire on plastic main), wrong or incorrect information provided to the one call center, deteriorated facilities and previous damage?	NO	
Other Outside Force Damage	Vehicle Damage to Riser/Meter	Are existing risers and/or meters exposed to damage from vehicular damage that do not have barriers or other protection conforming to current design requirements?	YES – South & West divisions	Yes- All Divisions
		Has known leakage occurred due to vehicle damage to risers/meters.	YES – West Division	
	Vehicle Damage to above-ground equip/station	Are HPRs and/or regulator stations exposed to damage from vehicular damage?	NO	YES
		Has known leakage occurred due to vehicle damage to HPRs and/or regulator stations?	NO	
	Vandalism	Are gas valves or station equipment susceptible to damage by vandalism that has the potential to pose a risk to employees or the public?	YES – South & Central divisions	Yes- All Divisions
		Has leakage or other unsafe condition been created by vandalism?	NO	

App. B. Section 2 (Propane) Supplemental Table S-1: SME Evaluation of Threats Applicable to the LP Distribution System (continued)

Service territory covered by this Assessment: All Divisions				
Primary Threat Category	**Sub-Threat**	**SME's to Consider the following**	**SME Evaluation/Answer**	**Threat Applicable? SME – Yes / No**
Other Outside Force Damage	Structure Fire	Is there a history of damage to gas meters or other equipment due to structure fires?	Yes – South Division	Yes – All Divisions
		Is there a history of lack of properly designed or maintained service shut-off valves resulting in a delay in inability to shut off gas service to structures that are on fire?	NO	
Material, Weld or Joint Failure	Century Products (MDPE 2306)	Is Century Products (MDPE 2306) pipe known to exist in the system?	NO	NO
		Is there a history of leakage of Century Products (MDPE 2306) pipe?	NO	
	Aldyl A	Is pre-1973 Aldyl A pipe known to exist in the system?	YES – South division	YES – South division (Barefoot Bay)
		Is there a history of leakage of pre-1973 Aldyl A pipe?	NO	

App. B. Section 2 (Propane) Supplemental Table S-1: SME Evaluation of Threats Applicable to the LP Distribution System (continued)

Service territory covered by this Assessment: All Divisions				
Primary Threat Category	**Sub-Threat**	**SME's to Consider the following**	**SME Evaluation/Answer**	**Threat Applicable? SME – Yes / No**
Material, Weld or Joint Failure	HDPE 3306	Is HDPE 3306 pipe known to exist in the system?	NO	NO
		Is there a history of leakage of HDPE 3306 pipe?	NO	
	PVC – Polyvinyl Chloride	Is PVC pipe known to exist in the system?	NO	NO
		Is there a history of leakage of PVC pipe?	NO	
	ABS – Acrylonitrile Butadiene Styrene	Is ABS pipe known to exist in the system?	NO	NO
		Is there a history of leakage of ABS pipe?	NO	
	CAB – Cellulose Acetate Butyrate	Is CAB A pipe known to exist in the system?	NO	NO
		Is there a history of leakage of CAB pipe?	NO	
	PB - Polybutylene	Is PB pipe known to exist in the system?	NO	NO
		Is there a history of leakage of PB pipe?	NO	
	Delrin Insert Tap Tees	Are Delrin Insert Tap Tees known to exist in the system?	NO	NO

		Is there a history of leakage of Delrin Insert Tap Tees?	NO	

App. B. Section 2 (Propane) Supplemental Table S-1: SME Evaluation of Threats Applicable to the LP Distribution System (continued)

Service territory covered by this Assessment: All Divisions				
Primary Threat Category	**Sub-Threat**	**SME's to Consider the following**	**SME Evaluation/Answer**	**Threat Applicable? SME – Yes / No**
Material, Weld, or Joint Failure	Plexco Service Tee Celcon Caps	Are Plexco Service Tee Celcon Caps known to exist in the system?	YES – South division	YES – South division
		Is there a history of leakage of Plexco Service Tee Celcon Caps?	NO	
	PE Fusion failure	Is there a history of PE Fusion Failures or leakage in the system?	NO	YES – ALL DIVISIONS
		Are any types of PE fusion (type, material, size, age, process, geographic area) more prone to leakage or failure?	NO	
	Pre-1940 Oxy-Acetylene Girth Weld	Do pre-1940 Oxy-Acetylene Girth Welds exist on pipe greater than 4 inch?	NO	NO
		Is there a history of pre-1940 Oxy-Acetylene Girth Weld failures or leakage in the system?	NO	
	Other	Do other material failures occur that present a possible current or future risk?	NO	NO
	Mechanical Couplings	Is there a history of Mechanical Coupling failures or leakage in the system due to pullout?	YES – South division	YES – South division
		Is there a history of Mechanical Coupling failures or leakage in the system due to seal leakage?	NO	NO
		Are any types of mechanical coupling (type, material, size, age, manufacturer, geographic area) more prone to leakage or failure due to seal leakage?	NO	NO

App. B. Section 2 (Propane) Supplemental Table S-1: SME Evaluation of Threats Applicable to the LP Distribution System (continued)

Service territory covered by this Assessment: All Divisions				
Primary Threat Category	**Sub-Threat**	**SME's to Consider the following**	**SME Evaluation/Answer**	**Threat Applicable? SME – Yes / No**
Equipment Failure	Valves	Are valves inoperable, inaccessible and or paved over without timely identification and repairs?	NO	NO
		Are certain types or makes of valves more likely to leak?	NO	NO
	Service Regulators	Is there a history of service regulator failures that present a threat to the public or employees?	NO	NO
		Are certain types or makes of service regulator more likely to create a risk?	NO	
	Control/Relief Station Equipment	Is there a history of control or relief station equipment failures that present a threat to the public or employees?	NO	NO
		Are certain types or makes of station equipment more likely to create a risk?	NO	
	Other	Is there a history of other equipment failures that present a threat to the public or employees?	NO	NO
		Are certain types or makes of other equipment more likely to create a risk?	NO	
Incorrect Operations	Operating Error	Have leaks or other safety incidents been caused by an inadequate procedure?	NO	Potential threat
		Have leaks or other safety incidents been caused by failure to follow an adequate procedure?	NO	

		Have bypass valves or MAOP separation valves been found to not have proper locks or other appropriate security replaced after completion of maintenance?	NO	

App. B. Section 2 (Propane) Supplemental Table S-1: SME Evaluation of Threats Applicable to the LP Distribution System (continued)

Service territory covered by this Assessment: All Divisions				
Primary Threat Category	**Sub-Threat**	**SME's to Consider the following**	**SME Evaluation/Answer**	**Threat Applicable? SME – Yes / No**
Incorrect Operations	Operating Error	Have employees been found to have falsified maintenance documents and thus not have completed operations and maintenance tasks in the manner or timeframe required?	NO	NO
		Has improper regulator station maintenance ever resulted in an overpressure incident?	NO	YES – ALL DIVISIONS
		Have butt-fusions been found to be leaking due to improper fusion due to failure to follow the correct procedure?	NO	YES – ALL DIVISIONS
		Have leak repairs or other mandated maintenance not been made in the time required by standard due to a process breakdown or ineffective process?	NO	YES – ALL DIVISIONS
		Has gas leak detection equipment used for a leak survey been found afterwards to be out of calibration?	NO	YES – ALL DIVISIONS
		Have unauthorized repair, maintenance or operations practices been used or are still in use?	NO	YES – ALL DIVISIONS
		Has the failure to accurately or timely record or map facilities resulted in failure to perform mandated maintenance or locates?	NO	YES – ALL DIVISIONS
	Gas lines bored through Sewers	Have pipes been installed via unguided or guided bore without proper procedures to ensure other facilities are not damaged?	NO	YES – ALL DIVISIONS
		Have pipes unknowingly bored through sewer lines been damaged by sewer line cleaning operations?	NO	

App. B. Section 2 (Propane) Supplemental Table S-1: SME Evaluation of Threats Applicable to the LP Distribution System (continued)

Service territory covered by this Assessment: All Divisions				
Primary Threat Category	**Sub-Threat**	**SME's to Consider the following**	**SME Evaluation/Answer**	**Threat Applicable? SME – Yes / No**
Other	Bell Joint Leakage	Does Cast Iron pipe exist in the system?	NO	NO
		Is there a history of bell joint leaks?	NO	NO
		Are certain diameters or parts of the system known to be more prone to bell joint failure or leakage than others?	NO	NO
	Inserted Copper Puncture	Do copper services inserted in steel exist in the system?	NO	NO
		Is there a history of leakage of copper services due to galvanic action between the copper and steel?	NO	NO
	Copper Sulfide	Do copper services exist in the system and is there a history of hydrogen sulfide greater than 0.3 grains per 100 standard cubic feet of gas?	NO	NO
		Have any safety incidents occurred as a result of copper sulfide in copper services or service regulators?	NO	NO
	Construction over gas mains & services	Have others constructed over gas facilities or taken other action that prevents effective leak survey and other maintenance?	YES – South division	YES – South division
		When identified, is construction that impacts required maintenance corrected in a timely manner?	YES – South division	YES – South division

APPENDIX C (PROPANE)
EVALUATION AND RANKING OF RISK

Appendix C. Section 1. (Propane section)

Section 1. Risk Assessment Process

[Southern Gas Association, Northeast Gas Association and Structural Integrity Associates, Inc.

Blended Risk (Subject Matter Expert and Data) Evaluation and Ranking Process*,*

incorporated by reference (all divisions)]

App. C. Section 2 (Propane) Supplemental Table S-2: Documentation of Risk Assessment Results LP Distribution System **(South Division)**

Region	Primary Threat	Sub-Threat	Facility Type	FOF Score	COF Score	Relative Risk
South	**Corrosion**	Coated Steel (with/CP)		0.675	0.61	0.41175
		Stray Current		0	0.61	0
		Internal Corrosion		0	0.61	0
		Atmospheric Corrosion		6.75	0.61	4.1175
		LP Tanks with CP		0	0.61	0
	Natural Forces	Tree Roots		0	0.61	0
		Flooding		0	0.61	0
	Excavation Damage	Improper Excavation Practice		0.025	0.61	0.01525
		No Call for Locate		0.1875	0.61	0.114375
		Late or No Locate		0.0275	0.61	0.016775
		Mis-marked Facilities		0.125	0.61	0.07625
		Incorrect Facility Records		0.025	0.61	0.01525
	Other Outside Force	Vehicle Damage to Riser		0.09	0.61	0.0549

Region	Primary Threat	Sub-Threat	Facility Type	FOF Score	COF Score	Relative Risk
South	**Other Outside Force**	Vehicle Damage to above ground equipment or station (not risers)		0	0.61	0
		Vandalism		0	0.61	0
		Structure Fire		0	0.61	0
	Material, Weld or Joint Failure	Plexco Service Tee Celcon Caps		0.045	0.61	0.02745
		PE Fusion Failure		0	0.61	0
	Equipment Failure	Valves		0	0.70	0
		Service Regulators		0	0.61	0
		Control or Relief Station Equipment		0	0.61	0
		Mechanical Couplings		0.081	0.61	0.04941
	Incorrect Operation	Operating Errors		0.0225	0.61	0.013725
		Service Lines Bored Thru Sewer		0	0.61	0

	OTHER	Construction over gas mains & services		0	0.61	0

App. C. Section 2 (Propane) Supplemental Table S-2: Documentation of Risk Assessment Results LP Distribution System **(WEST Division)**

Region	Primary Threat	Sub-Threat	Facility Type	FOF Score	COF Score	Relative Risk
WEST	**Corrosion**	Atmospheric Corrosion		0	0.35	0
		LP Tanks with CP		0	0.61	0
	Natural Forces	Earth Movement		0	0.61	0
	Excavation Damage	Improper Excavation Practice		0.0825	0.61	0.050325
		No Call for Locate		0.5625	0.61	0.343125
		Late or No Locate		0	0.61	0
		Mis-marked Facilities		0	0.61	0
		Incorrect Facility Records		0	0.61	0
	Other Outside Force	Vehicle Damage to Riser		0	0.61	0
		Vehicle Damage to above ground equipment or station (not risers)		0	0.61	0
		Vandalism		0	0.61	0

App. C. Section 2 (Propane) Supplemental Table S-2: Documentation of Risk Assessment Results LP Distribution System **(West Division)**

Region	Primary Threat	Sub-Threat	Facility Type	FOF Score	COF Score	Relative Risk
West	**Other Outside Force**	Fire		0	0.61	0
	Material, Weld or Joint Failure	PE Fusion Failure		0	0.61	0
	Equipment Failure	Valves		0	0.7	0
		Service Regulators		0.2025	0.61	0.123525
		Control or Relief Station Equipment		0	0.61	0
	Incorrect Operation	Operating Errors		0	0.61	0
		Service Lines Bored Thru Sewer		0	0.61	0
	OTHER	Construction over gas mains & services		0	0	0

App. C. Section 2 (Propane) Supplemental Table S-2: Documentation of Risk Assessment Results LP Distribution System **(Central Division)**

Region	Primary Threat	Sub-Threat	Facility Type	FOF Score	COF Score	Relative Risk
Central	**Corrosion**	Atmospheric Corrosion		0	0.35	0
		LP Tanks with CP		0	0.61	0
	Natural Forces	Tree Roots		N/A	N/A	N/A
		Flooding		N/A	N/A	N/A
	Excavation Damage	Improper Excavation Practice		0	0.61	0
		No Call for Locate		0	0.61	0
		Late or No Locate		0	0.61	0
		Mis-marked Facilities		0	0.61	0
		Incorrect Facility Records		0	0.61	0
	Other Outside Force	Vehicle Damage to Riser		0	0.61	0
		Vehicle Damage to above ground equipment or station (not risers)		0	0.61	0
		Vandalism		0	0.61	0

App. C. Section 2 (Propane) Supplemental Table S-2: Documentation of Risk Assessment Results LP Distribution System **(Central Division)**

Region	Primary Threat	Sub-Threat	Facility Type	FOF Score	COF Score	Relative Risk
Central	**Other Outside Force**	Structure fire		0	0.61	0
	Material, Weld or Joint Failure	PE Fusion Failure		0	0.61	0
	Equipment Failure	Valves		0	0.7	0
		Service Regulators		0.2025	0.61	0.123525
		Control or Relief Station Equipment		0	0.61	0
	Incorrect Operation	Operating Errors		0	0.61	0
		Service Lines Bored Thru Sewer		0	0.61	0
	OTHER	Construction over gas mains & services		0	0.35	0

App. C. Section 2 (Propane) Supplemental Table S-3: **Summary of LP Risk Evaluation and Ranking Results**

Threat	Max Risk Score in any Region	Min Risk Score in any Region	% of Regions in System with Risk Score Range			
			0.76 – & Higher	0.51 – 0.75	0.26 – 0.50	0.10 – 0.25
Corrosion						
Coated Steel Mains(with CP)	**0.41175**	0	0	0	33	0
Coated Steel Svcs (with CP)	0	0	0	0	0	0
Atmospheric corrosion on services	**4.1175**	0	33	0	0	0
LP Tanks with CP	0	0	0	0	0	0
Natural Forces						
Tree Roots Mains	0	0	0	0	0	0
Flood Mains	0	0	0	0	0	0

App. C. Section 2 (Propane) Supplemental Table S-3: **Summary of LP Risk Evaluation and Ranking Results (Continued)**

Threat	Max Risk Score in any Region	Min Risk Score in any Region	% of Regions in System with Risk Score Range			
			0.76 – 1.00	0.51 – 0.75	0.25 – 0.50	0.25 and lower
Excavation Damage						
Excavation Damage Mains	0	0	0	0	0	0
Excavation Damage Svcs	**0.343125**	**0.01525**	0	0	33	33
Other Outside Force						
Vehicle Damage services	**0.0549**	0	0	0	0	33
Vehicle Damage to above ground equipment or station (not risers)	0	0	0	0	0	0
Vandalism Mains	0	0	0	0	0	0
Fire / Explosion Mains	0	0	0	0	0	0

App. C. Section 2 (Propane) Supplemental Table S-3: **Summary of LP Risk Evaluation and Ranking Results (Continued)**

Threat	Max Risk Score in any Region	Min Risk Score in any Region	% of Regions in System with Risk Score Range			
			0.76 – 1.00	0.51 – 0.75	0.26 – 0.50	0.25 & lower
Material, Weld or Joint Failure						
Plastic Pipe Main	0	0	0	0	0	0
Plastic Pipe Services	0	0	0	0	0	0
	0	0	0	0	0	0
Plexco Service Tee Celcon Caps	**0.02745**	0	0	0	0	33
Equipment Failure						
Valves Mains	0	0	0	0	0	0
Valves Services	0	0	0	0	0	0
Service Regulators	**0.123525**	0	0	0	0	33
Mechanical Couplings	**0.04941**	0	0	0	0	33
Other	0	0	0	0	0	0

App. C. Section 2 (Propane) Supplemental Table S-3: **Summary of LP Risk Evaluation and Ranking Results (Continued)**

Threat	Max Risk Score in any Region	Min Risk Score in any Region	% of Regions in System with Risk Score Range			
			0.76 – 1.00	0.51 – 0.75	0.26 – 0.50	0.10 – 0.25
Incorrect Operation						
Operating Error	**0.013725**	0	0	0	0	33
Service Line bored thru Sewer	0	0	0	0	0	0
Other	0	0	0	0	0	0
Other						
Construction over gas mains & services	0	0	0	0	0	0

App. C. Section 2 (Propane) Supplemental Table S-3: **Summary of LP Risk Evaluation and Ranking Results (Continued)**

Ranking order	Threat	Risk Score	Region
1.	Atmospheric Corrosion on services (with CP)	4.1175	SOUTH FLORIDA
2.	Galvanic Corrosion on coated steel with CP	0.41175	SOUTH FLORIDA
3.	Excavation damage on services (No call for locates)	0.343125	WEST FLORIDA
4.	Equipment failure on service regulators	0.123525	CENTRAL & WEST DIVISIONS
5.	Other outside force (Vehicle damage to regulators)	0.0549	SOUTH FLORIDA
6.	Equipment failure on (Mechanical couplings)	0.04941	SOUTH FLORIDA
7.	Material Weld or Joint failure on Plexco Service Tee Celcon Caps	0.02745	SOUTH FLORIDA
8.	Incorrect Operation (Operating Error)	0.013725	SOUTH FLORIDA

2020

APPENDIX D (PROPANE)
IDENTIFICATION AND IMPLEMENTATION OF MEASURES TO ADDRESS RISKS

App. D. Section 1 (Propane) Supplemental Table S-4: Key Requirements of the Leak Management Program

Program Element	Reference to Requirement Established in the Standard or Procedure
Qualification/Training requirements for personnel conducting leak survey	FPU Operator Qualification Program
Auditing and Quality Assurance of Leak Survey Equipment	FPU Procedure LC-5
Criteria for leak severity classification	FPU Procedure LC-4
Established Frequency of Leak Survey in Business Districts, at intervals not exceeding 15 months, but at least once each calendar year.	FPU O&M Manual Section 1.2.1.1
Established Frequency of Leak Survey for Cathodically Unprotected Lines subject to §192.465(e) on which electrical surveys for corrosion are impractical, at least once every 3 calendar years at intervals not exceeding 39 months.	FPU O&M Manual Section 1.2.1.2
Established Frequency of Leak Survey of Remaining Lines at least once every 5 calendar years at intervals not exceeding 63 months.	FPU O&M Manual Section 1.2.1.2
Hazardous Leaks Requiring Immediate Repair – Ongoing action required	FPU Procedure LC-4, FPU O&M Manual Section 1.2.2.1
Non-hazardous Leaks Requiring Scheduled Repair – Time limit is established to Eliminate Leak	FPU Procedure LC-4, FPU O&M Manual Section 1.2.2.1
Non-Hazardous Leak NOT requiring scheduled repair– Monitoring Requirements established	FPU Procedure LC-4, FPU O&M Manual Section 1.2.2.1
Records and Data Management procedures defined	Florida Administrative Code Chapter 25-12, 12.060

App. D. Section 3 (Propane) Supplemental Table S-5: Corrosion Action Plans

Sub-Threat	Corrosion Action Plan Scope	Status	Officer / Manager Responsible
Atmospheric Corrosion on services with CP. (All Divisions)	Atmospheric corrosion surveys will be conducted quarterly by meter readers. In addition, operation technicians will be instructed to inspect for atmospheric corrosion in the course of normal duties. If identified, atmospheric corrosion should be corrected on site, or a work order generated and a crew to be scheduled to address/correct the deficiency.	In Progress	Propane District Managers
Galvanic Corrosion on mains with CP. Lauderhill system. South Division	FPUC has a program in place to remove steel gas mains in sections of the Lauderhill system that have few gas service connections. Individual tanks will be provided.	System Decommissioned in 2019 This project was completed the last quarter in 2019 and no longer in service.	Propane District Managers

App. D. Section 5 (Propane) Supplemental Table S-5: Excavation Action Plans

Sub-Threat	Excavation Damage Action Plan Scope	Status	Officer / Manager Responsible
Improper Excavation Practice	Track dig-ins and identify problem excavators. Provide targeted education, & field inspections. Meet with repeat offenders if deemed necessary.	In progress	Propane District Managers
	Provide One Call literature to Equipment Rental Companies, etc. to increase awareness	In progress	Propane District Managers
	Conduct pre-construction meeting or site-visits for excavation near critical or high risk facilities.	In Progress	Division Propane Operations Managers
	To augment our damage prevention program, as of 2021, Chesapeake has created positons for a damage prevention manager and damage prevention coordinators which will benefit FPUC damage prevention efforts.	In Progress	Division Operations Managers
Facility Not Located or Marked	Analyze root cause and implement corrective action when identified. Require written investigation of each damaged facility.	In progress	Propane District Managers
Mis-marked Facilities	Monitor and track for dig-ins resulting from mis-marked facilities. Analyze root cause and implement corrective action, including procedure reviews. Requires written investigation of each incident.	In Progress	Propane District Managers

App. D. Section 8 (Propane) Supplemental Table S-5: Equipment Failure Action Plans

Sub-Threat	Equipment Failure Action Plan Scope	Status	Officer / Manager Responsible
Service Regulators	No additional or accelerated actions planned.		
Mechanical couplings	No additional or accelerated actions planned.		

App. D. Section 10 (Propane) Supplemental Table S-5: Other Outside Force Action Plans

Sub-Threat	Material, Weld or Joint Failure Action Plan Scope	Status	Officer / Manager Responsible
Other outside force (Vehicle damage)	No additional or accelerated actions planned.		

App. D. Section 7 (Propane) Supplemental Table S-5: Example Material, Weld or Joint Failure Action Plans

Sub-Threat	Material, Weld or Joint Failure Action Plan Scope	Status	Officer / Manager Responsible
Aldyl A (South Florida Division_Barefoot Bay)	Provide training and process to identify Aldyl A whenever facilities are exposed and maintain records to identify where Aldyl A exists.	In Progress	Propane District Managers
	Determine whether leak history on Aldyl A warrants additional or accelerated actions.	In Progress	Propane District Managers
Plexco Service Tee Celcon Caps	No additional or accelerated actions planned.		

App. D. Section 10 (Propane) Supplemental Table S-5: Incorrect Operation Action Plans

Sub-Threat	Material, Weld or Joint Failure Action Plan Scope	Status	Officer / Manager Responsible
Operating Error	No additional or accelerated actions planned.		

APPENDIX E (PROPANE)

Measurement of performance, monitoring results, and evaluation effectiveness

App. E. Section 1 (Propane) Supplemental Table S-6 Number of **HAZARDOUS** leaks either eliminated or repaired, per 192.703 (C), categorized by cause

(South Division – LP)

Performance Measure	5-Year Average 2016-20	Year 2020	Established Baseline 2015 – 2019	Criteria for Re-evaluation of Threats and Risks	Re-Evaluation Required? Y / N
Number of Hazardous Leaks Eliminated or Repaired - Corrosion	0.03117	0	5-Yr Average Leaks/Mile/Yr 0.03857	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Natural Forces	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Excavation Damage	0.03425	0	5-Yr Average Leaks/Mile/Yr 0.064	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Other Outside Force Damage	0.00792	0	5-Yr Average Leaks/Mile/Yr 0.01533	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Material, Weld or Joint Failure	0	0	5-Yr Average Leaks/Mile/Yr 0.00741	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Equipment Failure	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Incorrect Operation	0	0.00000	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Other	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO

App. E. Section 1 (Propane) Supplemental Table S-6 Number of **HAZARDOUS** leaks either eliminated or repaired, per 192.703 (C), categorized by cause

(West Division – LP)

Performance Measure	5-Year Average 2016-20	Year 2020	Established Baseline 2015 – 2019	Criteria for Re-evaluation of Threats and Risks	Re-Evaluation Required? Y / N
Number of Hazardous Leaks Eliminated or Repaired - Corrosion	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Natural Forces	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Excavation Damage	0.17021	0	5-Yr Average Leaks/Mile/Yr 0.17021	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Other Outside Force Damage	0.07193	0	5-Yr Average Leaks/Mile/Yr 0.07193	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Material, Weld or Joint Failure	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Equipment Failure	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Incorrect Operation	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Other	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO

App. E. Section 1 (Propane) Supplemental Table S-6 Number of **HAZARDOUS** leaks either eliminated or repaired, per 192.703 (C), categorized by cause

(Central Division – LP)

Performance Measure	5-Year Average 2016-20	Year 2020	Established Baseline 2015 – 2019	Criteria for Re-evaluation of Threats and Risks	Re-Evaluation Required? Y / N
Number of Hazardous Leaks Eliminated or Repaired - Corrosion	0.46296	0	5-Yr Average Leaks/Mile/Yr 0.46296	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Natural Forces	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Excavation Damage	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Other Outside Force Damage	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Material, Weld or Joint Failure	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Equipment Failure	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Incorrect Operation	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Other	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO

App. E. Section 4 (Propane) Supplemental Table S-7 Number of leaks either eliminated or repaired, categorized by **CAUSE**

(South Division – LP)

Performance Measure	5-Year Average 2016-20	Year 2020	Established Baseline 2015 – 2019	Criteria for Re-evaluation of Threats and Risks	Re-Evaluation Required? Y / N
Total # of Leaks Eliminated or Repaired - Corrosion	0.07179	0	5-Yr Average Leaks/Mile/Yr 0.0866	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total # of Leaks Eliminated or Repaired – Natural Forces	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total # of Leaks Eliminated or Repaired – Excavation Damage	0.04268	0	5-Yr Average Leaks/Mile/Yr 0.0723	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total # of Leaks Eliminated or Repaired – Other Outside Force Damage	0.0226	0.53	5-Yr Average Leaks/Mile/Yr 0.01954	Moving 5-Yr Average is an increase of 5% or more from established baseline	An increase of over 5%, but no additional actions taken due to small # of leaks.
Total # of Leaks Eliminated or Repaired – Material, Weld or Joint Failure	0	0	5-Yr Average Leaks/Mile/Yr 0.01481	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total # of Leaks Eliminated or Repaired – Equipment Failure	0	0	5-Yr Average Leaks/Mile/Yr 0.0037	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total # of Leaks Eliminated or Repaired – Incorrect Operation	0.00422	0	5-Yr Average Leaks/Mile/Yr 0.00422	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total # of Leaks Eliminated or Repaired – Other	0.0037	0	5-Yr Average Leaks/Mile/Yr 0.00741	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO

App. E. Section 4 (Propane) Supplemental Table S-7 Number of leaks either eliminated or repaired, categorized by **CAUSE**

(West Division – LP)

Performance Measure	5-Year Average 2016-20	Year 2020	Established Baseline 2015 – 2019	Criteria for Re-evaluation of Threats and Risks	Re-Evaluation Required? Y / N
Total # of Leaks Eliminated or Repaired - Corrosion	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total # of Leaks Eliminated or Repaired – Natural Forces	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total # of Leaks Eliminated or Repaired – Excavation Damage	0.34043	0	5-Yr Average Leaks/Mile/Yr 0.34043	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total # of Leaks Eliminated or Repaired – Other Outside Force Damage	0.07193	0	5-Yr Average Leaks/Mile/Yr 0.07193	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total # of Leaks Eliminated or Repaired – Material, Weld or Joint Failure	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total # of Leaks Eliminated or Repaired – Equipment Failure	0.04255	0	5-Yr Average Leaks/Mile/Yr 0.08511	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total # of Leaks Eliminated or Repaired – Incorrect Operation	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total # of Leaks Eliminated or Repaired – Other	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO

App. E. Section 4 (Propane) Supplemental Table S-7 Number of leaks either eliminated or repaired, categorized by **CAUSE**

(Central Division – LP)

Performance Measure	5-Year Average 2016-20	Year 2020	Established Baseline 2015 – 2019	Criteria for Re-evaluation of Threats and Risks	Re-Evaluation Required? Y / N
Total # of Leaks Eliminated or Repaired - Corrosion	0.46296	0	5-Yr Average Leaks/Mile/Yr 0.46296	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total # of Leaks Eliminated or Repaired – Natural Forces	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total # of Leaks Eliminated or Repaired – Excavation Damage	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total # of Leaks Eliminated or Repaired – Other Outside Force Damage	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total # of Leaks Eliminated or Repaired – Material, Weld or Joint Failure	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total # of Leaks Eliminated or Repaired – Equipment Failure	1.46296	0	5-Yr Average Leaks/Mile/Yr 1.46296	Moving 5-Yr Average is an increase of 5% or more from established baseline	An increase of over 5%, but no additional actions taken due to small # of leaks.
Total # of Leaks Eliminated or Repaired – Incorrect Operation	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total # of Leaks Eliminated or Repaired – Other	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO

App. E. Section 2 (Propane) Supplemental Table S-8 Number of Exavation **Damages (All Divisions -LP)**

Performance Measure	5-Year Average 2016-20	Year 2020	Established Baseline	Criteria for Re-evaluation of Threats and Risks	Re-Evaluation Required? Y / N
Number of Excavation Damages	4.6	0	**2019** damages resulting in need to repair or replace 4	Increase of 5% or more from established baseline	**NO**

App. E. Section 3 (Propane) Supplement Table S-9 Number of Excavation **Tickets (All Divisions-LP)**

Performance Measure	5-Year Average 2016-20	Year 2020	Established Baseline	Criteria for Re-evaluation of Threats and Risks	Re-Evaluation Required? Y / N
Number of Excavation Tickets received from the notification center	999.4	750	**2019** number of excavation tickets 621	Increase of 5% or more from established baseline	**NO**

App. E. Section 5 (Propane) Supplemental Table S-10 Number of hazardous leaks either eliminated or repaired, per 192.703 (C), categorized by **MATERIAL**

(South Division – LP)

Performance Measure	5-Year Average 2016-20	Year 2020	Established Baseline 2015 – 2019	Criteria for Re-evaluation of Threats and Risks	Re-Evaluation Required? Y / N
Number of Hazardous Leaks Eliminated or Repaired - Coated steel w/ CP	0.03696	0.0525	5-Yr Average Leaks/Mile/Yr 0.0413	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Polyethylene	0.0343	0	5-Yr Average Leaks/Mile/Yr 0.0713	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired –	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	-

App. E. Section 5 (Propane) Supplemental Table S-10 Number of hazardous leaks either eliminated or repaired, per 192.703 (C), categorized by **MATERIAL**

(Central Division – LP)

Performance Measure	5-Year Average 2016-20	Year 2020	Established Baseline 2015 – 2019	Criteria for Re-evaluation of Threats and Risks	Re-Evaluation Required? Y / N
Number of Hazardous Leaks Eliminated or Repaired – Coated steel w/ CP	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Polyethylene	0.46296	0	5-Yr Average Leaks/Mile/Yr 0.46296	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired –	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO

App. E. Section 5 (Propane) Supplemental Table S-10 Number of hazardous leaks either eliminated or repaired, per 192.703 (C), categorized by **MATERIAL**

(West Division – LP)

Performance Measure	5-Year Average 2016-20	Year 2020	Established Baseline 2015 – 2019	Criteria for Re-evaluation of Threats and Risks	Re-Evaluation Required? Y / N
Number of Hazardous Leaks Eliminated or Repaired - Coated steel w/ CP	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Polyethylene	0.24214	0	5-Yr Average Leaks/Mile/Yr 0.24214	Moving 5-Yr Average is an increase of 5% or more from established baseline	**NO**
Number of Hazardous Leaks Eliminated or Repaired – Bare steel	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO

APPENDIX F (PROPANE)

PERIODIC EVALUATION AND IMPROVEMENT

Appendix F (Propane) Supplement Table S-11 Documentation of Re-evaluation of Threats and Risks

Performance Measures that Exceeded Baseline				
Region	**Performance Measure**	**Actual Performance for Year 2016 - 2020**	**Established Baseline**	**Re-evaluation criteria**
SOUTH DIVISION	# of Hazardous Leaks Eliminated or Repaired – Excavation damage	0.03425	0.06388	Moving 5-Yr Average is an increase of 5% or more from established baseline
ALL DIVISION	# of Excavation Damages	4.6	6.2	Moving 5-Yr Average is an increase of 5% or more from established baseline
NOTES:	Existing Date for Complete Program re-evaluation: 2023. Is a shorter timeframe for complete program re-evaluation warranted? : NO			

Required frequency	Program Re-evaluation Element	Date Completed
Required Annually	Update Baseline and on-going performance measures	12/05/2021
Required Annually	Confirmed updates with Propane Director Greg Blezina	12/06/2021
Required Annually	Confirmed updates with Ops Manager Preya John	12/06/2021
Required Annually	Confirmed updates with Ops Manager Steve Hetland	12/06/2021
Required Annually	Confirmed updates with Ops Manager Philip Zimmer	12/06/2021
As needed*		

APPENDIX G
CROSS REFERENCE OF 49 CFR PART 192, SUBPART P REQUIREMENTS TO THE IM PLAN

The table below provides a cross reference between 49 CFR Part 192, Subpart P (Gas Distribution Pipeline Integrity Management) and this Gas Distribution Integrity Management Plan.

49 CFR Part 192, Subpart P	IM Plan Reference
§192.1005 No later than August 2, 2011 a gas distribution operator must develop and implement an integrity management program that includes a written integrity management plan as specified in § 192.1007.	3.0 (For propane ref. 13.0)
§192.1007 A written integrity management plan must contain procedures for developing and implementing the following elements:	
§192.1007 (a) *Knowledge.* An operator must demonstrate an understanding of its gas distribution system developed from reasonably available information.	5.0, 5.1, 5.2, 5.3, 5.4, 5.5 (For propane ref. 14.0 - 14.5)
§192.1007 (a) (1) Identify the characteristics of the pipeline's design and operations and the environmental factors that are necessary to assess the applicable threats and risks to its gas distribution pipeline.	5.3 (For propane ref. 14.3)
§192.1007 (a) (2) Consider the information gained from past design, operations, and maintenance.	5.2 (For propane ref. 14.2)
§192.1007 (a) (3) Identify additional information needed and provide a plan for gaining that information over time through normal activities conducted on the pipeline (for example, design, construction, operations or maintenance activities).	5.4 (For propane ref. 14.4)
§192.1007 (a) (4) Develop and implement a process by which the IM program will be reviewed periodically and refined and improved as needed.	10.1, 10.2 (For propane ref. 19.1, 19.2)
§192.1007 (a) (5) Provide for the capture and retention of data on any new pipeline installed. The data must include, at a minimum, the location where the new pipeline is installed and the material of which it is constructed.	5.5 (For propane ref. 14.5)
§192.1007 (b) *Identify threats.* The operator must consider the following categories of threats to each gas distribution pipeline: corrosion, natural forces, excavation damage, other outside force damage, material, weld or joint failure, equipment failure, incorrect operation, and other concerns that could threaten the integrity of the pipeline.	6.0 (For propane ref. 15.0)
§192.1007 (b) An operator must consider reasonably available information to identify existing and potential threats. Sources of data may include, but are not limited to, incident and leak history, corrosion control records, continuing surveillance records, patrolling records, maintenance history, and excavation damage experience.	5.1, 6.0, (For propane ref. 14.1, 15.0)

§192.1007 (c) *Evaluate and rank risk.* An operator must evaluate the risks associated with its distribution pipeline. In this evaluation, the operator must determine the relative importance of each threat and estimate and rank the risks posed to its pipeline. This evaluation must consider each applicable current and potential threat, the likelihood of failure associated with each threat, and the potential consequences of such a failure.	7.1, 7.2 (For propane ref. 16.1,16.2)
§192.1007 (c) …. An operator may subdivide its pipeline into regions with similar characteristics (e.g., contiguous areas within a distribution pipeline consisting of mains, services and other appurtenances; areas with common materials or environmental factors), and for which similar actions likely would be effective in reducing risk.	Non-Mandatory

49 CFR Part 192, Subpart P	IM Plan Reference
§192.1007 (d) *Identify and implement measures to address risks.* Determine and implement measures designed to reduce the risks from failure of its gas distribution pipeline. These measures must include an effective leak management program (unless all leaks are repaired when found).	8.1, 8.2 (For propane ref. 17.1, 17.2)
§192.1007 (e) (1) *Measure performance, monitor results, and evaluate effectiveness.* Develop and monitor performance measures from an established baseline to evaluate the effectiveness of its IM program. …... These performance measures must include the following: (i) Number of hazardous leaks either eliminated or repaired, per § 192.703(c), categorized by cause; (ii) Number of excavation damages; (iii) Number of excavation tickets (receipt of information by the underground facility operator from the notification center); (iv) Total number of leaks either eliminated or repaired, categorized by cause; (v) Number of hazardous leaks either eliminated or repaired per § 192.703(c), categorized by material; and (vi) Any additional measures the operator determines are needed to evaluate the effectiveness of the operator's IM program in controlling each identified threat.	9.1 – 9.6 (For propane ref. 18.1-18.5)
§192.1007 (e) (1) *Measure performance, monitor results, and evaluate effectiveness.* …. An operator must consider the results of its performance monitoring in periodically re-evaluating the threats and risks.	10.2 (For propane ref. 19.2)
§192.1007 (f) *Periodic Evaluation and Improvement.* An operator must re-evaluate threats and risks on its entire pipeline and consider the relevance of threats in one location to other areas.	7.1, 10.1 (For propane ref. 16.1, 19.1)
§192.1007 (f) Each operator must determine the appropriate period for conducting complete program evaluations based on the complexity of its system and changes in factors affecting the risk of failure. The operator must conduct a complete program reevaluation at least every five years. The operator must consider the results of the performance monitoring in these evaluations.	10.2 (For propane ref. 19.2)
§192.1007 (g) *Report results.* Report, on an annual basis, the four measures listed in paragraphs (e)(1)(i) through (e)(1)(iv) of this section, as part of the annual report required by § 191.11. An operator also must report the four measures to the state pipeline safety authority if a state exercises jurisdiction over the operator's pipeline.	11.1 (For propane ref. 20.1)
§192.1009 Each operator must report, on an annual basis, information related to failure of compression couplings, excluding those that result only in nonhazardous leaks, as part of the annual report required by §191.11 beginning with the report submitted March 15, 2011. This information must include, at a minimum, location of the failure in the system, nominal pipe size, material type, nature of failure including any contribution of local pipeline environment, coupling manufacturer, lot number and date of manufacture, and other information that can be found in markings on the failed coupling. An operator also must report this information to the state pipeline safety authority if a state exercises jurisdiction over the operator's pipeline.	11.1 (For propane ref. 20.1)
§192.1011 An operator must maintain records demonstrating compliance with the requirements of this subpart for at least 10 years. The records must include copies of superseded integrity management plans developed under this subpart.	12.0 (For propane ref. 21.0)

49 CFR Part 192, Subpart P	IM Plan Reference
§192.1013 (a) An operator may propose to reduce the frequency of periodic inspections and tests required in this part on the basis of the engineering analysis and risk assessment required by this subpart. (b) An operator must submit its proposal to the PHMSA Associate Administrator for Pipeline Safety or, in the case of an intrastate pipeline facility regulated by the State, the appropriate State agency. The applicable oversight agency may accept the proposal on its own authority, with or without conditions and limitations, on a showing that the operator's proposal, which includes the adjusted interval, will provide an equal or greater overall level of safety. (c) An operator may implement an approved reduction in the frequency of a periodic inspection or test only where the operator has developed and implemented an integrity management program that provides an equal or improved overall level of safety despite the reduced frequency of periodic inspections.	Not covered by IM Plan

APPENDIX H
COPY OF 49 CFR PART 192, SUBPART P

Subpart P—Gas Distribution Pipeline Integrity Management (IM)

§ 192.1001 What definitions apply to this subpart?

The following definitions apply to this subpart:

Excavation Damage means any impact that results in the need to repair or replace an underground facility due to a weakening, or the partial or complete destruction, of the facility, including, but not limited to, the protective coating, lateral support, cathodic protection or the housing for the line device or facility.

Hazardous Leak means a leak that represents an existing or probable hazard to persons or property and requires immediate repair or continuous action until the conditions are no longer hazardous.

Integrity Management Plan or *IM Plan* means a written explanation of the mechanisms or procedures the operator will use to implement its integrity management program and to ensure compliance with this subpart.

Integrity Management Program or *IM Program* means an overall approach by an operator to ensure the integrity of its gas distribution system.

Small LPG Operator means an operator of a liquefied petroleum gas (LPG) distribution pipeline that serves fewer than 100 customers from a single source.

§ 192.1003 What do the regulations in this subpart cover?

General. This subpart prescribes minimum requirements for an IM program for any gas distribution pipeline covered under this part, including liquefied petroleum gas systems. A gas distribution operator, other than a master meter operator or a small LPG operator, must follow the requirements in §§ 192.1005–192.1013 of this subpart. A master meter operator or small LPG operator of a gas distribution pipeline must follow the requirements in § 192.1015 of this subpart.

§ 192.1005 What must a gas distribution operator (other than a master meter or small LPG operator) do to implement this subpart?

No later than August 2, 2011 a gas distribution operator must develop and implement an integrity management program that includes a written integrity management plan as specified in § 192.1007.

§ 192.1007 What are the required elements of an integrity management plan?

A written integrity management plan must contain procedures for developing and implementing the following elements:

(a) *Knowledge.* An operator must demonstrate an understanding of its gas distribution system developed from reasonably available information. (1) Identify the characteristics of the pipeline's design and operations and the environmental factors that are necessary to assess the applicable threats and risks to its gas distribution pipeline. (2) Consider the information gained from past design, operations, and maintenance. (3) Identify additional information needed and provide a plan for gaining that information over time through normal activities conducted on the pipeline (for example, design, construction, operations or maintenance activities). (4) Develop and implement a process by which the IM program will be reviewed periodically and refined and improved as needed. (5) Provide for the capture and retention of data on any new pipeline installed. The data must include, at a minimum, the location where the new pipeline is installed and the material of which it is constructed.

(b) *Identify threats.* The operator must consider the following categories of threats to each gas distribution pipeline: Corrosion, natural forces, excavation damage, other outside force damage, material, weld or joint failure (including compression coupling), equipment failure, incorrect operation, and other concerns that could threaten the integrity of its pipeline. An operator must consider reasonably available information to identify existing and potential threats. Sources of data may include, but are not limited to, incident and leak history, corrosion control records, continuing surveillance records, patrolling records, maintenance history, and excavation damage experience.

(c) *Evaluate and rank risk.* An operator must evaluate the risks associated with its distribution pipeline. In this evaluation, the operator must determine the relative importance of each threat and estimate and rank the risks posed to its pipeline. This evaluation must consider each applicable current and potential threat, the likelihood of failure associated with each threat, and the potential consequences of such a failure. An operator may subdivide its pipeline into regions with similar characteristics (e.g., contiguous areas within a distribution pipeline consisting of mains, services and other appurtenances; areas with common materials or environmental factors), and for which similar actions likely would be effective in reducing risk.

(d) *Identify and implement measures to address risks.* Determine and implement measures designed to reduce the risks from failure of its gas distribution pipeline. These measures must include an effective leak management program (unless all leaks are repaired when found).

(e) *Measure performance, monitor results, and evaluate effectiveness.* (1) Develop and monitor performance measures from an established baseline to evaluate the effectiveness of its IM program. An operator must consider the results of its performance monitoring in periodically re-evaluating the threats and risks. These performance measures must include the following: (i) Number of hazardous leaks either eliminated or repaired as required by § 192.703(c) of this subchapter (or total number of leaks if all leaks are repaired when found), categorized by cause; (ii) Number of excavation damages; (iii) Number of excavation tickets (receipt of information by the underground facility operator from the notification center); (iv) Total number of leaks either eliminated or repaired, categorized by cause; (v) Number of hazardous leaks either eliminated or repaired as required by § 192.703(c) (or total number of leaks if all leaks are repaired when found), categorized by material; and (vi) Any additional measures the operator determines are needed to evaluate the effectiveness of the operator's IM program in controlling
each identified threat.

(f) *Periodic Evaluation and Improvement.* An operator must reevaluate threats and risks on its entire pipeline and consider the relevance of threats in one location to other areas. Each operator must determine the appropriate period for conducting complete program evaluations based on the complexity of its system and changes in factors affecting the risk of failure. An operator must conduct a complete program re-evaluation at least every five years. The operator must consider the results of the performance monitoring in these evaluations.

(g) *Report results.* Report, on an annual basis, the four measures listed in paragraphs (e)(1)(i) through (e)(1)(iv) of this section, as part of the annual report required by § 191.11. An operator also must report the four measures to the state pipeline safety authority if a state exercises jurisdiction over the operator's pipeline.

§ 192.1009 What must an operator report when compression couplings fail?
Each operator must report, on an annual basis, information related to failure of compression couplings, excluding those that result only in nonhazardous leaks, as part of the annual report required by § 191.11 beginning with the report submitted March 15, 2011. This information must include, at a minimum, location of the failure in the system, nominal pipe size, material type, nature of failure including any contribution of local pipeline environment, coupling manufacturer, lot number and date of manufacture, and other information that can be found in markings on the failed coupling. An operator also must report this information to the state pipeline safety authority if a state exercises jurisdiction over the operator's pipeline.

§ 192.1011 What records must an operator keep?
An operator must maintain records demonstrating compliance with the requirements of this subpart for at least 10 years. The records must include copies of superseded integrity management plans developed under this subpart.

§ 192.1013 When may an operator deviate from required periodic inspections under this part?
(a) An operator may propose to reduce the frequency of periodic inspections and tests required in this part on the basis of the engineering analysis and risk assessment required by this subpart. (b) An operator must submit its proposal to the PHMSA Associate Administrator for Pipeline Safety or, in the case of an intrastate pipeline facility regulated by the State, the appropriate
State agency. The applicable oversight agency may accept the proposal on its own authority, with or without conditions and limitations, on a showing that the operator's proposal, which includes the adjusted interval, will provide an equal or greater overall level of safety. (c) An operator may implement an approved reduction in the frequency of a periodic inspection or test only where the operator has developed and implemented an integrity management program that provides an equal or improved overall level of safety despite the reduced frequency of periodic inspections.

§ 192.1015 What must a master meter or small liquefied petroleum gas (LPG) operator do to implement this subpart?
(a) *General.* No later than August 2, 2011 the operator of a master meter system or a small LPG operator must develop and implement an IM program that includes a written IM plan as specified in paragraph (b) of this section. The IM program for these
pipelines should reflect the relative simplicity of these types of pipelines. (b) *Elements.* A written integrity management plan must address, at a minimum, the following elements: (1) *Knowledge.* The operator must demonstrate knowledge of its pipeline,
which, to the extent known, should include the approximate location and material of its pipeline. The operator must identify additional information needed and provide a plan for gaining knowledge over time through normal activities conducted on the pipeline (for example, design, construction, operations or maintenance activities). (2) *Identify threats.* The operator must consider, at minimum, the following categories of threats (existing and potential): Corrosion, natural forces, excavation damage, other outside force damage, material or weld failure, equipment failure, and incorrect operation. (3) *Rank risks.* The operator must evaluate the risks to its pipeline and estimate the relative importance of each

identified threat. (4) *Identify and implement measures to mitigate risks.* The operator must determine and implement measures designed to reduce the risks from failure
of its pipeline. (5) *Measure performance, monitor results, and evaluate effectiveness.* The operator must monitor, as a performance measure, the number of leaks eliminated or repaired on its pipeline and their causes. (6) *Periodic evaluation and*
improvement. The operator must determine the appropriate period for conducting IM program evaluations based on the complexity of its pipeline and changes in factors affecting the risk of failure. An operator must re-evaluate its entire program at least every five years. The operator must consider the results of the performance monitoring in these evaluations. (c) *Records.* The operator must maintain, for a period of at least 10 years, the following records: (1) A written IM plan in accordance
with this section, including superseded IM plans; (2) Documents supporting threat identification; and (3) Documents showing the location and material of all piping and appurtenances that are installed after the effective date of the operator's IM program and, to the extent known, the location and material of all pipe and appurtenances that were existing on the effective date of the operator's program.

FLORIDA PUBLIC UTILITIES

Gas Distribution Integrity Management Program

2020

Revised 11/5/2020

REVISION CONTROL SHEET

Title: Distribution Integrity Management Plan

Section	Pages	Revision	Date	Comments
8.2.1	9	1	12/24/2012	Added a paragraph to clarify the highest risk to the distribution system.
App. E. SEC. 1	113-115	1	12/21/2012	Calculated new 5-year average 2007-2011.
App. E. SEC. 2	116	1	12/21/2012	Calculated new 5-year average 2007-2011.
App. E. SEC. 4 & 5	117-122	1	12/21/2012	Calculated new 5-year average 2007-2011.
App. F	125	1	12/21/2012	Completed table 10-1.

App. E. SEC. 1	113 - 115	1	12/30/2013	Calculated new 5-year average 2008-2012.
App. E. SEC. 2	116	1	12/30/2013	Calculated new 5-year average 2008-2012.
App. E. SEC. 4 & 5	117 – 122	1	12/30/2013	Calculated new 5-year average 2008-2012.
App. F	125	1	12/30/2013	Completed table 10-1.

Sec 7.1	6	3	11/20/14	Added a paragraph to clarify, Evaluation & Ranking of risk.
App. C Sec. 2	75-96	3	11/20/14	Reviewed & re-performed Risk calculations.
App. D Sec. 3	107	3	11/20/14	Added atmospheric corrosion to table 8-3
App. E Sec. 1	113	3	11/20/14	Calculated new 5-year average 2009-2013
App. E Sec. 2	121	3	11/20/14	Calculated new 5-year average 2009-2013
App. E Sec.4 & 5	122		11/20/14	Calculated new 5 year average 2009-2013
App. F	130	3	11/20/14	Updated table 10-1. Documentation of re-evaluation of threats & risks.
App. E Sec. 1-5	113-122	**4**	12/17/15	Calculated new 5-year averages 2010-2014
App. F	130	**4**	12/17/15	Updated table 10-1. Documentation of re-evaluation of threats & risks.
Sec 7.2	7	**4**	12/17/15	Revised to clarify the process used for risk assessment.
5 YEAR DIMP REVIEW		**5**	12/18/16	5 YEAR DIMP REVIEW

App. D		**6**	11/30/2017	Updated action plans.
App. E		**6**	11/30/2017	Updated measurement performance tables
App. F		**6**	11/30/2017	Updated evaluation performance tables
App. F	Page 139	**6**	11/30/2017	Updated Program Re-evaluation Element
App. E		**7**	11/30/2018	Updated measurement performance tables
App. F		**7**	11/30/2018	Updated evaluation performance tables
App. F	Page 139	**7**	11/30/2018	Updated Program Re-evaluation Element
App. E		**8**	11/22/2019	Updated measurement performance tables
App. F		**8**	11/22/2019	Updated evaluation performance tables
App. F	Page 139	**8**	11/22/2019	Updated Program Re-evaluation Element
App. D		**9**	11/05/2020	Updated action plan. Sec 3 Tbl 8-3.
App. E		**9**	10/22/2020	Updated measurement performance tables
App. F		**9**	10/22/2020	Updated evaluation performance tables

App. F	Page 139	**9**	10/22/2020	Updated Program Re-evaluation Element

REVISION CONTROL SHEET

Title: Distribution Integrity Management Plan for PHMSA Jurisdictional Liquefied Propane Gas Systems.

Section	Pages	Revisions	Date	Comments
Supplemental Section "A"	128 - 180	1	01/05/2015	Updated Propane section.
Supplemental Section "A" Tbl S-6 to S-9	160 - 173	**2**	12/18/2015	Calculated new 5-year averages 2010-2014
Supplemental Section "A" Tbl S-10	175	**2**	12/18/2015	Updated table S-10 Documentation of re-evaluation of threats & risks.
Supplemental Section "A"		3	08/01/2016	Updated Propane section.
Supplemental Section "A" Tbl S-2		**2**	08/01/2016	Calculated new Risk assessments
Supplemental Section "A" Tbl S-3		**2**	08/01/2016	New Summary of LP Risk Evaluation & ranking results
Supplemental Section "A" Tbl S-5		**2**	08/01/2016	Action plans
Supplemental Section "A" Tbl S-6 to S-9		**3**	08/01/2016	Calculated new 5-year averages 2011-2015
Supplemental Section "A" Tbl S-10		**3**	08/01/2016	Updated table S-10 Documentation of re-evaluation of threats & risks.

Supplemental Section “C”		**4**	11/30/2017	Updated measurement performance tables
Supplemental Section “C”		**4**	11/30/2017	Added “leaks categorized by material” tables
		4	11/30/2017	Updated evaluation performance tables
Tbl S-1		**4**	12/14/2017	Updated SME evaluation of threats applicable to LP distribution system.
5 YEAR DIMP LP REVIEW 2013-2017		**5**	11/28/18	5 YEAR DIMP REVIEW
Supplemental Section-App E (Propane)		**6**	11/26/2019	Updated Measurement Performance Tables
Supplemental Section-App F (Propane)		**6**	11/26/2019	Updated Evaluation Performance Tables
Supplemental Section-App F (Propane)		**6**	11/26/2019	Updated Program Re-evaluation Element
Supplemental Section-App D (Propane)		**7**	11/05/2020	Updated Action plans. Sec 3 Tbl 8-3.
Supplemental Section-App E (Propane)		**7**	10/23/2020	Updated Measurement Performance Tables
Supplemental Section-App F (Propane)		**7**	10/23/2020	Updated Evaluation Performance Tables
Supplemental Section-App F (Propane)		**7**	10/23/2020	Updated Program Re-evaluation Element

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1.0 COMPANY OVERVIEW

Headquartered in Fernandina Beach, Florida, Florida Public Utilities (including Central Florida Gas Company) delivers natural gas and liquefied petroleum gas (propane) to more than ninety two thousand (92,000) residential, commercial and industrial customers.

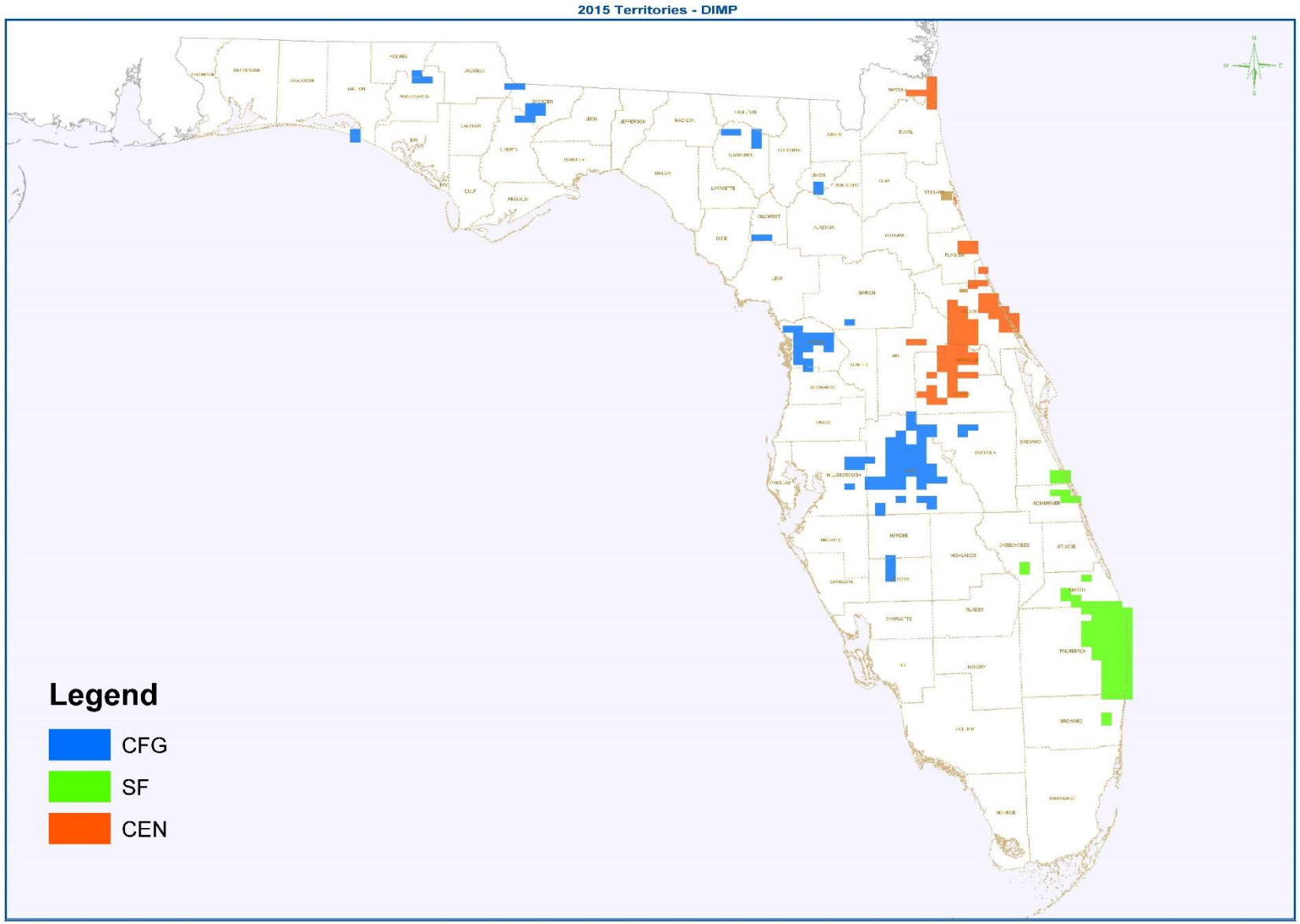
Florida Public Utilities Company is divided into three operational divisions. The systems that comprise each division are as follows:

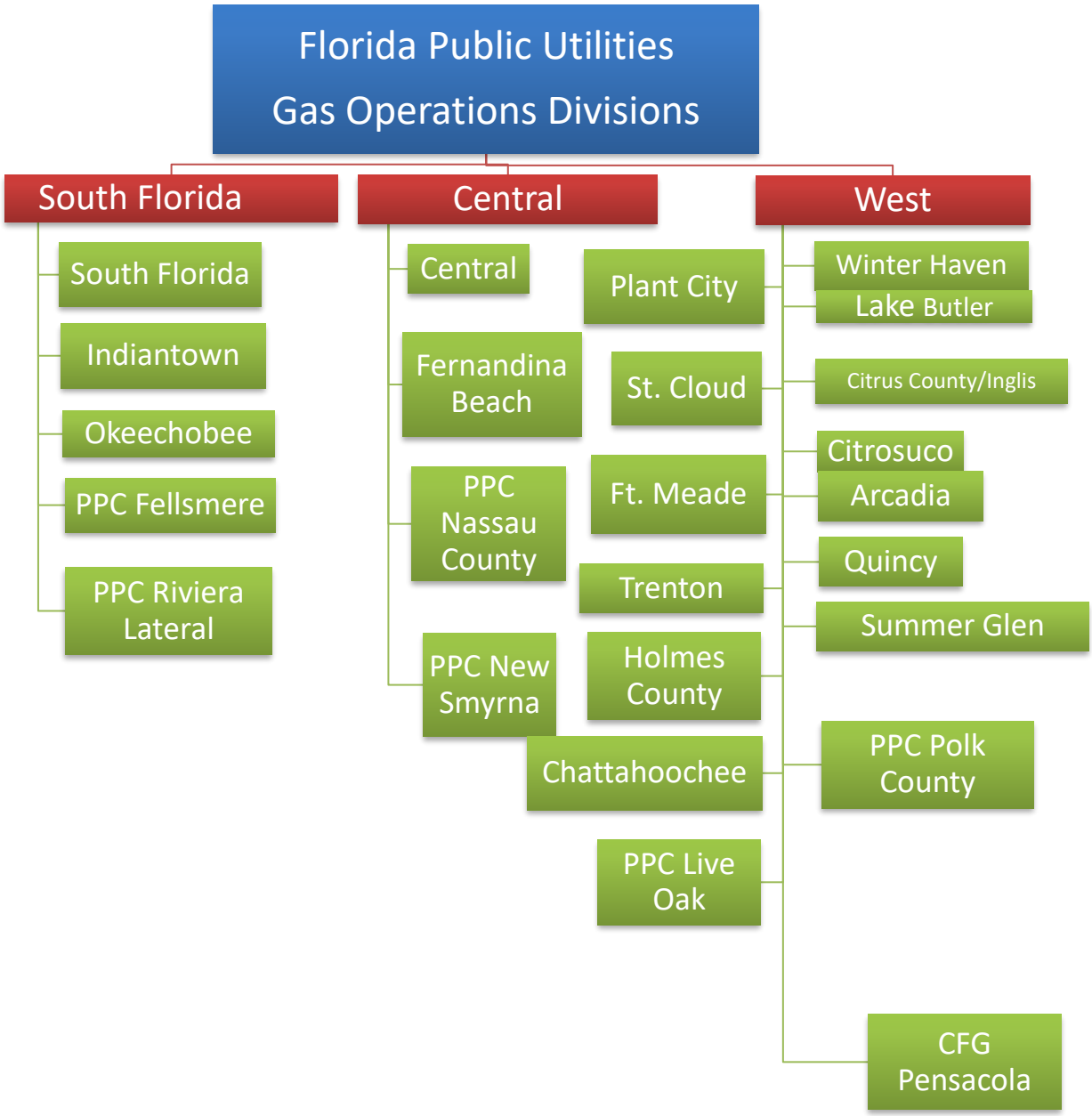
South Florida Division includes South Florida Division distribution systems, Indiantown, Okeechobee, Peninsula Pipeline Fellsmere, and Peninsula Pipeline Riviera Beach Lateral.

Central Division includes Central Division distribution systems, Fernandina Beach, and Peninsula Pipeline's Nassau County.

West Division includes West Division distribution systems, Lake Butler, Ft. Meade, Citrus County, Trenton, Holmes County, Arcadia, Chattahoochee, Quincy, Live Oak, Summer Glen and Polk County.

The service territory and organizational chart is depicted below


2015 Territories - DIMP
Legend
CFG
SF
CEN


Florida Public Utilities
Gas Operations Divisions
South Florida
Central
West
South Florida
Indiantown
Okeechobee
PPC Fellsmere
PPC Riviera Lateral
Central
Fernandina Beach
PPC Nassau County
PPC New Smyrna
Plant City
St. Cloud
Ft. Meade
Trenton
Holmes County
Chattahoochee
PPC Live Oak
Winter Haven
Lake Butler
Citrus County/Inglis
Citrosuco
Arcadia
Quincy
Summer Glen
PPC Polk County
CFG Pensacola

2.0 SCOPE

The U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration (PHMSA) amended the Federal Pipeline Safety Regulations on December 4, 2009 to require operators of gas distribution pipelines to develop and implement an integrity management (IM) program that includes a written integrity management plan. This plan was to be implemented by August 2, 2011.

PHMSA also requires operators to re-evaluate their entire plan at least every five years, taking into account the results of performance monitoring. This plan update includes the program re-evaluation.

The IM approach was designed to promote continuous improvement in pipeline safety by requiring operators to identify and invest in risk control measures beyond previously established regulatory requirements.

This written IM Plan addresses the IM Rule which requires operators to develop and implement an IM program that addresses the following elements:

- Knowledge
- Identify Threats
- Evaluate and Rank Risks
- Identify and Implement Measures to Address Risks
- Measure Performance, Monitor Results, and Evaluate Effectiveness
- Periodic Evaluation and Improvement
- Report results

Because of the significant diversity among distribution pipeline operators and pipelines, the requirements in the IM Rule are high-level and performance-based. The IM Rule specifies the required program elements but does not prescribe specific methods of implementation.

3.0 PURPOSE AND OBJECTIVES

The purpose of the IM program is to enhance safety by identifying and reducing gas distribution integrity risks. Managing the integrity and reliability of the gas distribution pipeline has always been a primary goal for Florida Public Utilities; with design, construction, operations and maintenance activities performed in compliance with CFR Part 192 requirements. The objective of this IM Plan is to establish the requirements to comply with the Code of Federal Regulations (CFR 49) §§ 192.1005, 192.1007, 192.1009 and 192.1011, pertaining to integrity management for gas distribution pipelines. This IM Plan does not address how an operator may deviate from the required periodic inspections as provided for in §192.1013.

The IM Plan is comprised of seven elements depicted in Figure 3-1.

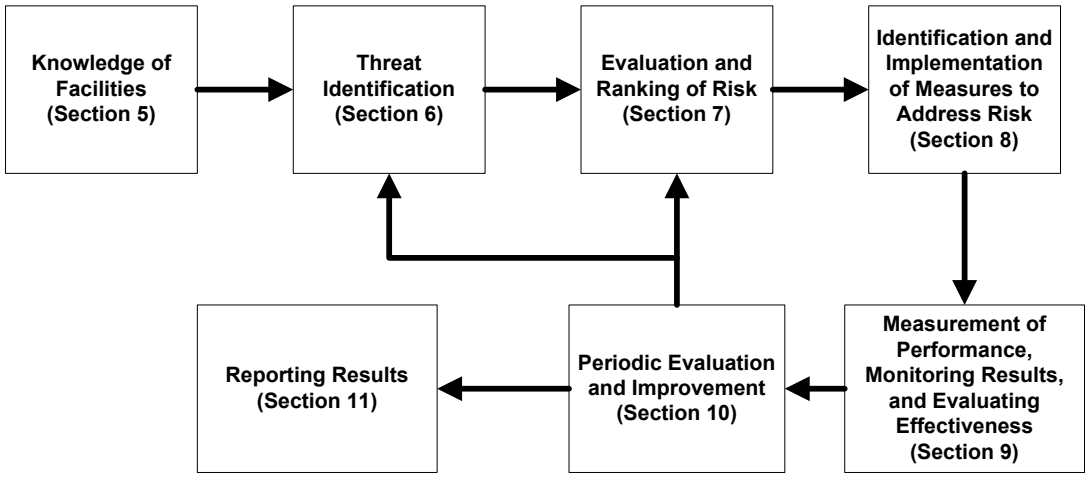


Figure 3-1 DIMP Elements

In addition to the key elements shown in Figure 3-1, the IM Plan also establishes requirements for reporting of mechanical coupling failures (Section 11.1) and maintaining records (Section 12).

All elements of this IM Plan where implemented by **August 2, 2011.**

4.0 DEFINITIONS

The definitions provided in 49 CFR, §192.3 and §192.1001 shall apply to this IM Plan. The following additional definitions and acronyms shall also apply to this IM Plan.

DIMP: Distribution Integrity Management Program

Distribution Integrity Management Program Files: operator records, databases, and/or files that contain either material incorporated by reference in the Appendices of the IM Plan or outdated material that was once contained in the IM Plan Appendices but is being retained in order to comply with record keeping requirements.

EFV: Excess Flow Valve. An Excess Flow Valve is a safety device that is designed to shut off flow of natural gas automatically if the service line breaks.

FOF: Frequency of failure.

COF: Consequence of failure.

IM Rule: 49 CFR Part 192, Subpart P

PHMSA: The U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration.

Risk: A relative measure of the likelihood of a failure associated with a threat and the potential consequences of such a failure.

Ticket: A notification from the one-call notification center to the operator providing information of pending excavation activity for which the operator is to locate and mark its facilities.

5.0 KNOWLEDGE OF FACILITIES

The objective of this section is to assemble as complete of an understanding of the company's infrastructure as possible using reasonably available information from past and ongoing design, operations and maintenance activities. In addition, this plan will identify what additional information is needed and provide a plan for gaining that information over time through normal activities.

5.1 Type and Location of Records

A summary of the existing records that are utilized by the IM Plan and where they are located is documented in Appendix A, Section 1. These records include, but are not limited to, incident and leak history, corrosion control records, continuing surveillance records, patrolling records, maintenance history and excavation damage experience.

5.2 Overview of Past Design, Operations and Maintenance

Record reviews, interviews with SMEs and other means were used to gain an understanding of past design, operations and maintenance history of the distribution system. This information includes operating pressures, materials used in construction and construction practices. This information is documented, or included by reference, in Appendix A, Section 2.

5.3 Characteristics of Design, Operations and Environmental Factors

Characteristics of the pipeline's design, operations and environmental factors that are necessary to assess the applicable threats and risks are documented, or included by reference, in Appendix A, Section 3.

5.4 Additional Information Needed

Additional information needed to support the IM plan (information that is not reasonably available today) is identified in Appendix A, Section 4. Plans for gaining additional information over time through normal activities conducted on the pipeline are documented, or included by reference, in Appendix A, Section 4.

5.5 Data Capture for New Construction and Ongoing O&M

Data is continuously collected for both construction of new facilities, reconstruction of existing facilities and ongoing operations and maintenance. In particular, the standard or procedure that require data capture for the location where the new pipeline is installed and the material of which it is constructed is contained in FPU Operations and Maintenance Manual Section 16.0.1.

5.6 Knowledge Capture – Subject Matter Experts

In addition to maps, records, and databases, valuable information for this IM plan was gathered and captured from SMEs. SMEs are individuals who have specialized knowledge based on their experience or training. SMEs were used to supplement existing, incomplete, or missing records and were the best source of information in subjects such as historical operations, maintenance, and construction practices. SME interviews were also utilized to ensure that all threats have been identified.

New SME interviews were conducted for this 5 year plan update and are documented and stored in the Distribution Integrity Management Program files.

A form documenting SME interviews is presented in Appendix A, Section 5.

6.0 THREAT IDENTIFICATION

The objective of this section of the plan is to identify existing and potential threats to the gas distribution pipeline.

For this plan update mains and services were separated in order to provide a more precise sense of where the highest risks are. Based on plan performance monitoring this separation can be particularly helpful in threat areas such as corrosion and excavation damages. In the previous DIMP plan mains & services were grouped together.

The following categories of threats shall be considered for each gas distribution pipeline:

- Corrosion
- Natural Forces
- Excavation Damage
- Other Outside Force
- Material, Weld or Joint Failure
- Equipment Failure
- Incorrect Operation
- Other concerns that could threaten the integrity of the pipeline.

A review of information gathered for Section 5 and interviews with Subject Matter Experts were used to identify existing and potential threats to the distribution system. **A description of the process used to identify threats is referenced in Appendix B, Section 1**. The threats identified as applicable to the gas distribution pipeline are documented in Appendix B, Section 2. Prior versions of the threat identification process and results that are no longer current shall be retained and stored in the Distribution Integrity Management Program files.

7.0 EVALUATION AND RANKING OF RISK

7.1 Objective

Risk analysis is an ongoing process of understanding what factors affect the risk posed by threats to the gas distribution pipeline and where they are relatively more important than others. The primary objectives of the evaluation and ranking of gas distribution pipeline risk are:

- Consider each applicable current and potential threat
- Consider the likelihood of failure associated with each threat
- Consider the potential consequences of such a failure
- Estimate and rank the risks (i.e. determine the relative importance) posed to the pipeline
- Consider the relevance of threats in one location to other areas

NOTE: There were several potential threats identified for the distribution system, but no previous incidents of these threats have occurred. Because there have been no previous incidents of these potential threats, their frequency is zero, thus resulting in a risk calculation of zero. However, some of these potential threats appear in the risk ranking tables with a risk ranking of zero as we are cognizant that they are a potential threat.

7.2 Risk Assessment Process

The current process used for Risk Assessment **(Blended Risk (Subject Matter Expert & data) Evaluation and Ranking Process)** shall be documented, or included by reference, in Appendix C, Section 1. Prior risk assessment processes shall be retained and stored in the Distribution Integrity Management Program files.

7.3 Risk Assessment

The current risk assessment **(likelihood, consequence, and resultant risk ranking)** shall be documented, or included by reference, in Appendix C, Section 2. Prior risk assessment results shall be retained and stored in the Distribution Integrity Management Program files.

RISK = Consequence (COF) x Likelihood (FOF)

8.0 IDENTIFICATION AND IMPLEMENTATION OF MEASURES TO ADDRESS RISKS

The objective of this section of the IM Plan is to describe existing and proposed measures to address the risks that have been evaluated and prioritized in Section 7.

8.1 Leak Management Program

The Leak Management program is established in the Florida Public Utilities Procedure Manual in the section entitled “Leak Control”.

8.1.1 Description of Existing Program

Florida Public Utilities Leak Management Program contains all the essential elements for an effective program. Procedures are in place to 1) Locate the leak, 2) Evaluate its severity, 3) Act appropriately to mitigate the leak, 4) Keep records; and 5) Self assess to determine if additional actions are necessary.

Florida Public Utilities Operations and Maintenance Manual and Emergency Manual address necessary components of effective leak control including, prompt and effective response to gas odor calls, classification of gas leaks, performing leakage surveys at prescribed regulatory intervals and system patrols.

Leaks are repaired in compliance with the prescribed time frames of Chapter 25-12.040 of the Florida Administrative Code.

A summary of the key elements of the Leak Management Program are documented, or included by reference, in Appendix D, Section 1.

8.2 Other Additional or Accelerated Actions

At this time no accelerated actions beyond the minimum code requirements specified outside of Part 192 subpart P are planned. However, one significant additional action is currently in place. Our initial risk ranking in the original DIMP plan identified corrosion on bare steel facilities as our highest system risk. This risk ranking contributed to the company seeking and subsequently being granted approval by the Florida Public Service Commission for a ten year bare steel

replacement program. This replacement program is referred to as our Gas Reliability Infrastructure Program (GRIP) and will be discussed further in this plan.

In the event accelerated actions more additional actions are planned in the future, procedures to implement these will be identified.

8.2.1 Corrosion

Corrosion on bare steel mains is still the highest ranking system risk. This is not surprising. The risk ranking formula is based on the number of corrosion leaks as a whole across all facilities, which there are very few leaks on coated steel mains, and the consequences of failure. The bare steel facilities tend to be located in more established and populated areas. However, as mentioned earlier in the plan, FPUC has an approved bare steel replacement plan in place to mitigate this risk. As of July 2016, one hundred ninety-one (191) miles of a total of three hundred fifty (350) miles of bare steel mains have been replaced. As this replacement program continues this risk will steadily decline and eventually go away as no bare steel facilities will remain in the system.

Corrosion leaks on services is the second leading cause of leaks in FPU's gas distribution system (Ref. Appendix A. Section 3. Table 5-8). This is reflected in the number of leaks and the risk rankings. In FPU's South Division, corrosion on services accounted for 40% of the total leaks in 2015 and 12% of the total leaks for the five year period from 2011 through 2015. In FPU's Central Division corrosion on services accounted for 20% of the total leaks in 2015 and 34% of the total leaks for the five year period from 2011 through 2015. In FPU's West Division corrosion on services accounted for 10% of the total leaks in 2015 and 13% of the total leaks for the five year period from 2011 through 2015.

This risk ranking, however, is somewhat peculiar in that the majority of these corrosion leaks are actually atmospheric corrosion leaks on anodeless risers on polyethylene services, not steel services. These atmospheric corrosion leaks on polyethylene services was due to the practice of cold wrapping anodeless risers for installation, and this practice was only used in the South Florida Division. This practice has been discontinued, and risers are being replaced as leaks are discovered. Additional or Accelerated Actions that are currently scheduled or in place in order

to reduce the risks associated with corrosion are documented, or included by reference, in Appendix D, Section 3. Prior documentation shall be retained and stored in the Distribution Integrity Management Program files.

8.2.2 Natural Forces

Leaks in FPU's gas distribution system due to the threat of natural forces are minimal and risk rankings are so low that they are negligible (Ref. Appendix A. Section 3. Table 5-8). In the whole FPUC gas system, natural forces on mains & services accounted for less than 1% of hazardous leaks in 2015 and less than 1% of total leaks for the five year period of 2011 through 2015.

Because the number of leaks from natural forces is low, and risks rankings from this threat were minimal, no Additional or Accelerated Actions are scheduled. Prior documentation shall be retained and stored in the Distribution Integrity Management Program files.

8.2.3 Excavation Damage

Excavation Damage on services is the leading cause of leaks in FPU's gas distribution system (Ref. Appendix A. Section 3. Table 5-8). This is reflected in the number of leaks and the risk rankings. In FPU's South Division, excavation damages on services accounted for 47% of the total leaks in 2015 and 41% of the total service leaks for the five year period from 2011 through 2015. In FPU's Central Division excavation damages on services accounted for 57% of the total leaks in 2015 and 47% of the total service leaks for the five year period from 2011 through 2015. In FPU's West Division, excavation damages on services accounted for 41% of the total leaks in 2015 and 37% of the total service leaks for the five year period from 2011 through 2015.

It is important to note that while excavation leaks on services represent the largest number of leaks in FPU's distribution system, it does not represent the highest risk to the distribution system based on the risk module formula.

Additional or Accelerated Actions that are currently scheduled or in place in order to reduce the risks associated with excavation damage are documented, or included by reference, in Appendix D, Section 5. Prior documentation shall be retained and stored in the Distribution Integrity Management Program files.

8.2.4 Other Outside Force

Leaks in FPU's gas distribution system due to the threat of other outside forces are minimal and risk rankings are so low that they are negligible. (Ref. Appendix A. Section 3. Table 5-8). In the whole FPUC gas system, other outside forces on mains & services accounted for less than 2% of hazardous leaks in 2015 and less than 2% of total leaks for the five year period of 2011 through 2015.

Because the number of leaks from natural forces is low, and risks rankings from this threat were minimal, no Additional or Accelerated Actions are scheduled. Prior documentation shall be retained and stored in the Distribution Integrity Management Program files.

8.2.5 Material, Weld or Joint Failure

Leaks in FPU's gas distribution system due to the threat of material, weld or joint failure are minor and risk rankings are also low (Ref. Appendix A. Section 3. Table 5-8). As a whole, Material, Weld or Joint Failure accounts for 2% of the total leaks in 2015, & less than 2% of total leaks for the five year period of 2011 through 2015.

The number of leaks and risk rankings are low for the threat of material, weld, or joint failure; however, additional actions are scheduled in an effort to identify where certain materials are in the gas distribution system in order to gain a better understanding of the risks associated with material, weld or joint failure. These actions are documented, or included by reference, in Appendix D, Section 7. Prior documentation shall be retained and stored in the Distribution Integrity Management Program files.

8.2.6 Equipment Failure

Leaks in FPU's gas distribution system due to the threat of equipment failure tended to be higher among services than compared to mains. In FPU's South Division equipment failure on services accounted for 4% of leaks in 2015 and 5% of total leaks for the five year period of 2011 through 2015. In FPU's Central Division equipment failure accounted for 2% of the total leaks in 2015 and 2% of the total leaks for the five year period of 2011 through 2015. In FPU's West Division equipment failure accounted for 42% of the total leaks for 2015 and 34% of the total leaks for the five year period of 2011 through 2015.

Equipment failure is significantly higher in the West Division, service regulators continue to be a source, were venting due to sand or debris in the distribution system, and not from a defective service regulator. Virtually all of those were due to service regulators venting.

Additional or Accelerated Actions that are currently scheduled or in place in order to reduce the risks associated with equipment failure are documented, or included by reference, in Appendix D, Section 8. Prior documentation shall be retained and stored in the Distribution Integrity Management Program files.

8.2.7 Incorrect Operation

Leaks in FPU's gas distribution system due to the threat of incorrect operation are minimal and risk rankings are so low that they are negligible. As a whole, Incorrect Operation, accounts for 2.5% of the total leaks in 2015, & less than 2% of total leaks for the five year period of 2011 through 2015.

Because the number of leaks from incorrect operation is low, and risks rankings from this threat were minimal, no Additional or Accelerated Actions are scheduled. Prior documentation shall be retained and stored in the Distribution Integrity Management Program files.

8.2.8 Other

Leaks in FPU's gas distribution system due to Other causes, have significantly reduced compared to the last DIMP review. In the 2006 – 2010 DIMP plan, Other accounted for 12% of total hazardous leaks, compared to the 2011-2015 DIMP plan were Other accounts for only 4% of the total hazardous leaks.

The primary reason for this was training employees on the classification of leak causes on the leak investigations and classifying the leak in a more appropriate cause than *Other*.

Additional or Accelerated Actions that are currently scheduled or in place in order to reduce the risks associated with other causes are documented, or included by reference, in Appendix D, Section 10. Prior documentation shall be retained and stored in the Distribution Integrity Management Program files.

9.0 MEASUREMENT OF PERFORMANCE, MONITORING RESULTS, AND EVALUATING EFFECTIVENESS

The objective of this section of the plan is to establish performance measures that shall be monitored from an established baseline in order to evaluate the effectiveness of the IM program. The performance measures detailed in Sections 9.1 through 9.6 have been established in order to monitor performance and assist in the ongoing evaluation of threats.

9.1 Number of Hazardous Leaks either Eliminated or Repaired, per §192.703(c), Categorized by Cause

The baseline and ongoing performance of the number of hazardous leaks either eliminated or repaired, per §192.703(c), categorized by cause, shall be documented, or included by reference, in Appendix E, Section 1.

9.2 Number of Excavation Damages

The baseline and ongoing performance of the number of excavation damages shall be documented, or included by reference, in Appendix E, Section 2.

9.3 Number of Excavation Tickets (received from the Sunshine State One Call of Florida notification center)

The baseline and ongoing performance of the number of excavation tickets received from the notification center(s) shall be documented, or included by reference, in Appendix E, Section 3.

9.4 Total Number of Leaks either Eliminated or Repaired, Categorized by Cause

The baseline and ongoing performance of the total number of leaks either eliminated or repaired, categorized by cause, shall be documented, or included by reference, in Appendix E, Section 4.

9.5 Number of Hazardous Leaks Either Eliminated or Repaired, per §192.703(c), Categorized by Material

The baseline and ongoing performance of the number of hazardous leaks either eliminated or repaired, per §192.703(c), categorized by material, shall be documented, or included by reference, in Appendix E, Section 5.

10.0 PERIODIC EVALUATION AND IMPROVEMENT

The objective of this section of the plan is to periodically re-evaluate threats and risks on the entire pipeline and periodically evaluate the effectiveness of its program.

10.1 Plan Updating, Review Frequency and Documentation

This written integrity management plan shall be reviewed annually and updated as required to reflect changes and improvements that have occurred in process, procedures and analysis for each element of the program. A complete program re-evaluation shall be completed every five years. All changes to the written plan, inclusive of material from the appendices, shall be recorded on the Revision Control Sheet on page ii. However, changes to material in the appendices that is included by reference need not be recorded on the Revision Control Sheet.

10.2 Effectiveness Review

An assessment of the performance measures described in Sections 9.1 through 9.6 shall be performed. In cases where the re-evaluation criteria specified is met or exceeded, a re-evaluation of the associated threats and risks shall be completed. An emerging threat in one or more location shall be evaluated for relevance to other areas. The re-evaluation of threats and risks shall be documented in Appendix F and the results of the re-evaluation shall be documented in Appendices B and C. The review shall also establish whether a complete program re-evaluation shall be completed in a shorter timeframe than five years; this decision shall also be documented. Past effectiveness reviews that are no longer current shall be retained and stored in the Distribution Integrity Management Program files.

11.0 REPORTING RESULTS

11.1 State & Federal Annual Reporting Requirements

The following four measures shall be reported, annually by March 15, to PHMSA as part of the annual report required by 49 CFR, § 191.11:

- Number of hazardous leaks either eliminated or repaired (or total number of leaks if all leaks are repaired when found), per § 192.703(c), categorized by cause
- Number of excavation damages

- Number of excavation tickets (receipt of information by the underground facility operator(Florida Public Utilities) from the Sunshine State One Call of Florida notification center)

- Total number of leaks either eliminated or repaired, categorized by cause

- Information related to failure of mechanical couplings, excluding those that result only in nonhazardous leaks, shall be reported to PHMSA as part of the annual report required by §191.11 beginning with the report submitted March 15, 2011. This information must include, as available, location of the failure in the pipeline, nominal pipe size, material type, nature of failure including any contribution of local pipeline environment, coupling manufacturer, lot number and date of manufacture, and other information that can be found in markings on the failed coupling.

The State of Florida also exercises jurisdiction over the pipeline; therefore, these five measures shall also be reported to the Florida Public Service Commission. A copy of the reports shall be maintained in the Distribution Integrity Management Program files.

12.0 DOCUMENT AND RECORD RETENTION

The following records shall be retained in the Distribution Integrity Management Program files.

- The most current as well as prior versions of this written IM Plan
- Documents supporting Knowledge of Facilities (material supporting Appendix A of the IM Plan)
- Documents supporting threat identification (material supporting Appendix B of the IM Plan)
- Documents supporting risk evaluation and ranking (material supporting Appendix C of the IM Plan)
- Documents supporting the identification and implementation of measures to address risks (material supporting Appendix D of the IM Plan)
- Documents supporting measurement of performance, monitoring results and evaluating effectiveness (material supporting Appendix E of the IM Plan)
- Effectiveness Reviews (material supporting Appendix F of the IM Plan)
- Annual Reports to PHMSA (as required by §191.11) and State pipeline safety authorities
- Mechanical Coupling Failure Reports

Documentation demonstrating compliance with the requirements of 49 CFR, Part 192, Subpart P shall be retained for at least 10 years.

APPENDIX A
KNOWLEDGE OF FACILITIES

Appendix A. Section 1. Table 5-1: IM Program Records Summary

Record	Record Type – Database, Electronic Record, Paper Record	Applicable Standard, Policy, or Guideline	Extent of Missing Records	Location of Records	Key Contact
Graphic Information System (GIS) database	Database		Largely Unpopulated	FPU Server	GIS Administrator
Wall Maps / Plats	Paper Record		Fairly Complete	Division Offices	Division Operations Supervisors
Gas Service Record Cards	Paper Record		Fairly Complete	Division Offices	Division Operations Supervisors
As-Built Construction Drawings / records	Electronic Record, Paper Record		Much data is missing	Division Offices	Division Engineering Departments
Gas Leak Repair Records	Paper Record / Electronic		Fairly Complete	Division Offices / FPU servers.	Division Operations Supervisors / GIS Administrator
Gas Leak Repair Database	NA		NA	NA	NA
Gas Leak Survey Records	Paper Record		Fairly Complete	Division Offices	Division Operations Supervisors
DOT/PHMSA Incident Reports	Paper Records		Fairly Complete	Division Offices	Division Operations Manager
Other Incident Reports	Paper Records		Fairly Complete	Division Offices	Division Operations Manager

Appendix A. Section 1. Table 5-1: IM Program Records Summary (continued)

Record	Record Type – Database, Electronic Record, Paper Record	Applicable Standard, Policy, or Guideline	Extent of Missing Records	Location of Records	Key Contact
CP Maintenance of Isolated Mains and Services subject to 10% annual inspection	Paper Record		Fairly Complete	Division Offices	Division Operations Supervisors
Cathodic Protection Maintenance Areas (Rectifier and Pipe-to-Soil inspection)	Paper Records		Fairly Complete	Division Offices	Division Operations Supervisors
Atmospheric Corrosion Inspection Records	Paper Record		Fairly Complete	Division Offices	Division Operations Supervisors
Patrol Records	Paper Record		Fairly Complete	Division Offices	Division Operations Supervisors
Valve Maintenance Records	Paper Record		Fairly Complete	Division Offices	Division Operations Supervisors
Regulator Station Maintenance Records	Paper Record		Fairly Complete	Division Offices	Division Operations Supervisors
Requests to Locate Gas Facilities	Electronic Record		Fairly Complete	Division Offices	Division Operations Supervisors
3rd Party Damage Claims	Paper Record		Fairly Complete	Division Offices	Division Operations Supervisors
Pipe Type Maps	Paper Record		South and Central Divisions only, marginal information	Division Offices	Division Operations Supervisors
Exposed Main & Services Reports	Paper Record		Much Data Missing	Division Offices	Division Operations Supervisors

Appendix A. Section 1. Table 5-1: IM Program Records Summary (continued)

Record	Record Type – Database, Electronic Record, Paper Record	Applicable Standard, Policy, or Guideline	Extent of Missing Records	Location of Records	Key Contact
Environmental Factor: Areas subject to flood	NA		NA	NA	NA
Environmental Factor: Areas subject to landslide	NA		NA	NA	NA
Environmental Factor: Population Density Records	NA		NA	NA	NA
Environmental Factor: Areas of Wall-to-Wall Paving	NA		NA	NA	NA
SME Interview Records	Paper Record		Complete	DIMP Master File	Gas standards Engineer.

Appendix A. Section 2. Table 5-2: Summary of System Design by Operating Pressure

Maximum Operating Pressure	Miles of Main
Intermediate Pressure – 2 psig to 60 psig	Unknown
High Pressure – greater than 60 psig	Unknown

Appendix A. Section 2. Table 5-3: Summary of Material Types and Years Installed (all divisions)

Material Type	Mains		Services	
	Current Miles of Main	Years Installed (of remaining)	Number of Services	Years Installed (of remaining)
Cast Iron	0.4	Unknown	0	0
Wrought Iron	0	0	0	0
Bare Steel – with CP	0	Unknown	0	Unknown
Bare Steel – No CP	190	Unknown	4,388	Unknown
Coated Steel – with CP	1067	Unknown	14,095	Unknown
Coated Steel – no CP	0	0	0	0
Ductile Iron	0	0	0	0
Copper	0	0	0	0
Plastic - PVC	0	0	0	0
Plastic - ABS	0	0	0	0
Plastic – Century MDPE 2306	0	0	0	0
Plastic – Aldyl-A	Unknown	Unknown	0	Unknown
Plastic – HDPE 3306	0	0	0	0
Plastic – All Others	1,532	~1980 Thru Present	68,503	~1980 Thru Present

Appendix A. Section 2. Table 5-4: Example Summary of Construction Practices

Material Type	Year first deployed	Year Ceased
Replacement via insertion of Copper	NA	NA
Replacement via Insertion of Plastic	~1976	Practice Continues
Replacement via insertion and pipe bursting/splitting	NA	NA
Internal lining / slip-lining	NA	NA
Joint Trench with other utilities	Not Used (West) ~1965 (South) ~1985 (Central)	Practice Continues in Central and South Divisions
Unguided Bore – soil displacement/ram	~1985	Practice Continues
Guided Directional Bore / Drill	~1990	Practice Continues
Blasting	NA	NA
Plow-in	NA	NA

Appendix A. Section 3. Table 5-5: Miles of Mains and Number of Services by Material Type

[Part B1 of PHMSA Form F 7100.1-1 incorporated by reference (all divisions)]

Appendix A. Section 3. Table 5-6: Miles of Mains and Number of Service lines by material and nominal diameter

[Part B2 & B3 of PHMSA Form F 7100.1-1 incorporated by reference (all divisions)]

Appendix A. Section 3. Table 5-7: Miles of Mains and Number of Services by material and decade

[Part B4 of PHMSA Form F 7100.1-1 incorporated by reference (all divisions)]

Appendix A. Section 3. Table 5-8: Number of hazardous leaks either eliminated or repaired, per §192.703(c), categorized by cause (all divisions)

Cause of Leak	Number of Hazardous Leaks – 2015 *	
	MAINS	SERVICES
Corrosion	16	65
Natural Forces	0	4
Excavation	68	273
Other Outside Force	1	8
Material, Weld or Joint Failure	2	8
Equipment Failure	4	14
Incorrect Operation	2	10
Other	2	17

Appendix A. Section 3. Table 5-9: Number of Excavation Damages (all divisions)

Year	Number of Excavation Damages	
	MAINS	SERVICES
2015	69	310
2014	57	220
2013	55	226
2012	54	214
2011	56	160

Appendix A. Section 3. Table 5-10: Number of Excavation Tickets (all divisions)

Year	Number of Excavation Tickets
2015	117,965
2014	108,692
2013	97,996
2012	83,656
2011	80,173

Appendix A. Section 3. Table 5-11: Number of leaks either eliminated or repaired, categorized by cause (all divisions)

Cause of Leak	Number of leaks eliminated or repaired– 2015	
	MAINS	SERVICES
Corrosion	32	181
Natural Forces	2	6
Excavation	69	310
Other Outside Force	1	8
Material, Weld or Joint Failure	13	12
Equipment Failure	14	76
Incorrect Operation	3	13
Other	18	24

Appendix A. Section 3. Table 5-20: Corrosion Threat – Frequency and Trend (South Florida Division)

Threat / Sub-Threat	2015						
	Quantity		Leaks Repaired		Frequency of Failure		
	Miles Main	# Services	Mains	Services	Main Leaks/Mile	Service Leaks/100	Total Leaks / Facility Mile (mains & svcs)
Corrosion							
Cast Iron	0.4	0	0	0	0	0	0
Bare Steel	97	3,938	15	25	0.1546	0.6364	0.2553
Ductile Iron	0	0	0	0	0	0	0
Copper	0	0	0	0	0	0	0
Coated Steel (with CP)	488	6,284	3	35	0.0061	0.5570	0.06283
Coated Steel (No CP)	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0

Threat / Sub-Threat	Leak Ratio						Is Leak Frequency Increasing? Y/N
	2011	2012	2013	2014	2015	5-Year Average	
Corrosion (MAINS)							
Cast Iron	0	0	0	0	0	0	N
Bare Steel	59	12	23	41	91	45.2	Y
Coated Steel (with CP)	8	4	10	5	2	5.8	N
Coated Steel (No CP)	0	0	0	0	0	0	NA
Other	0	0	0	0	0	0	NA
Corrosion (SERVICES)							

Bare Steel	63	41	29	37	25	39	N
Coated Steel (with CP)	38	29	30	36	35	33.6	N

Appendix A. Section 3. Table 5-21: Natural Forces Threat – Frequency and Trend (South Florida Division)

Threat / Sub-Threat	2015									
	Quantity			Leaks Repaired			Frequency of Failure			
	Miles Main	# Services	# of Units	Mains	Services	Units	Main Leaks/Mile	Service Leaks/100	Equip/Fitting Leaks/100	Total Leaks / Facility Mile (mains & svcs)
Natural Forces										
Earth Movement / Landslide	1,253	44,759		0	0		0	0		0
Tree Roots	1,253	44,759		1	1		0	0		0
Frost Heave / Temperature	1,253	44,759		0	0		0	0		0
Flood	1,253	44,759		0	0		0	0		0
Ice/Snow Blockage of Control Equip			NA							
Other	1,253	44,759		1	2		0.000798	0.00447		0.00144

Threat / Sub-Threat	Leak Ratio						Is Leak Frequency Increasing? Y/N
	2011	2012	2013	2014	2015	5-Year Average	
Natural Forces (MAINS)							
Seismic	NA	NA	NA	NA	NA	NA	NA
Earth Movement / Landslide	NA	NA	NA	NA	NA	NA	NA
Tree Roots	0	0	0	0	1	0.2	Y
Frost Heave / Temperature	NA	NA	NA	NA	NA	NA	NA
Flood	0	0	0	0	0	0	N
Ice/Snow Blockage of Control Equip	NA	NA	NA	NA	NA	NA	NA
Other	1	1	0	1	1	0.8	N
Natural Forces (SERVICES)							
Tree Roots	0	0	0	0	1	0.2	Y
Other	2	3	1	3	2	2.2	N

Appendix A. Section 3. Table 5-22: Excavation Damage Threat – Frequency and Trend (South Florida Division)

Threat / Sub-Threat	2015							
	Quantity			Leaks Repaired			Frequency of Failure	
	System Miles Main	System Number of Services	System Number of Tickets	Number of Main Repairs	Number of Service Repairs	Total System Repairs	Leaks per 1000 Tickets	Leaks per System Mile
Excavation Damage - All	1,253	44,759	54,588	33	172	205	3.755	0.0985

Threat / Sub-Threat	Leak Ratio						Is Leak Frequency Increasing? Y/N
	2011	2012	2013	2014	2015	5-Year Average	
Excavation Damage							
Tickets	43,433	44,611	49,307	52,708	54,588	48,929.4	y
Leaks (mains)	35	28	27	30	33	30.6	y
Leaks (services)	111	143	152	217	172	159	y
Leaks per 1000Tickets	3.36	3.83	3.63	4.69	3.76	3.85	Y
Leaks per System Mile	0.0895	0.103	0.105	0.120	0.098	0.103	y

Appendix A. Section 3. Table 5-23: Outside Force Threat – Frequency and Trend (South Florida Division)

Threat / Sub-Threat	2015									
	Quantity			Leaks Repaired			Frequency of Failure			
	Miles Main	# Services	# of Units	Mains	Services	Units	Main Leaks/Mile	Service Leaks/100	Equip/ Fitting Leaks/100	Total Leaks / Facility Mile (mains & svcs)
Outside Force										
Vehicle Damage	1,253	44,759	0	1	5		0	0.0111	NA	0.00288
Vandalism	1,253	44,759	0	0	1		0	0	NA	0
Fire / Explosion	1,253	44,759	0	0	0		0	0	NA	0
Previous Damage	1,253	44,759	0	0	0		0	0	NA	0
Other	1,253	44,759	0	0	4		0	0.00893	NA	0.00192

Threat / Sub-Threat	Leak Ratio						Is Leak Frequency Increasing? Y/N
	2011	2012	2013	2014	2015	5-Year Average	
Outside Force (MAINS)							
Vehicle Damage	0	2	1	0	1	0.8	N
Vandalism	0	0	0	0	0	0	N
Fire / Explosion	0	0	0	0	0	0	N
Previous Damage	0	0	0	0	0	0	N
Other	1	0	0	1	0	0.4	N
Outside Force (SERVICES)							

Vehicle Damage	4	9	4	1	5	4.6	Y
Vandalism	0	0	1	0	1	0.4	N
Other	4	6	3	5	4	4.4	N

Appendix A. Section 3. Table 5-24: Material, Weld or Joint Failure Threat – Frequency and Trend (South Florida Division)

Threat / Sub-Threat	2015						
	Quantity		Leaks Repaired			Frequency of Failure	
	Miles Main	# Services	Mains	Services	Main Leaks/Mile	Service Leaks/100	Total Leaks / Facility Mile (mains & svcs)
Material, Weld or Joint Failure							
PVC	0	0	0	0	0	0	0
ABS	0	0	0	0	0	0	0
Aldyl A	Unk	Unk	Unk	1	Unknown	0	0
Century Products (incl PE 2306)	0	0	0	0	0	0	0
PE 3306	0	0	0	0	0	0	0
Other Plastic Pipe	0	0	0	0	0	0	0
Delrin Insert Tap Tees	Unk	Unk	Unk	Unk	Unk	Unk	Unk
Plexco Service Tee Celcon Caps	Unk	Unk	Unk	Unk	Unk	Unk	Unk
Pre 1940 OA girth welds	Unk	0	0	0	0	0	0
Other	1,253	44,759	6	3	0.00479	0.0067	0.00432

Appendix A. Section 3. Table 5-24: Material, Weld or Joint Failure Threat – Frequency and Trend (continued South Florida Division)

Threat / Sub-Threat	Leak Ratio						Is Leak Frequency Increasing? Y/N
	2011	2012	2013	2014	2015	5-Year Average	
Material, Weld or Joint Failure (MAINS)							
PVC	0	0	0	0	0	0	NA
ABS	0	0	0	0	0	0	NA
Aldyl A	Unk	Unk	Unk	Unk	Unk	Unk	Unk
Century Products (incl PE 2306)	0	0	0	0	0	0	NA
PE 3306	0	0	0	0	0	0	NA
Other Plastic Pipe	0	0	0	0	0	0	NA
Delrin Insert Tap Tees	Unk	Unk	Unk	Unk	Unk	Unk	Unk
Plexco Service Tee Celcon Caps	Unk	Unk	Unk	Unk	Unk	Unk	Unk
Pre 1940 OA girth welds	0	0	0	0	0	0	0
Other	23	6	2	2	6	7.8	N

Material, Weld or Joint Failure (SERVICES)							
Aldyl A	0	0	1	0	0	0.2	N
Other	12	18	2	3	5	6	N

Appendix A. Section 3. Table 5-25: Equipment Failure Threat – Frequency and Trend (South Florida Division)

	2015									
	Quantity			Leaks Repaired			Frequency of Failure			
Threat / Sub-Threat	Miles Main	# Services	# of Units	Mains	Services	Units	Main Leaks/Mile	Service Leaks/100	Equip/Fitting Leaks/100	Total Leaks / Facility Mile (mains & svcs)
Equipment Failure										
Valves	1,253	44,759	Unk	1	9		0.000799	0.0201	NA	0.00480
Service Regulators	1,253	44,759	Unk	0	118		0	0.264	NA	0.00865
Control/Relief Station	1,253	44,759	0	0	0		0	0	NA	N
Mechanical Couplings	1,253	44,759	Unk	9	9		0.00718	0.0201	NA	0.00865
Other	1,253	44,759	0	0	0		0	0	NA	0

Threat / Sub-Threat	Leak Ratio						Is Leak Frequency Increasing? Y/N
	2011	2012	2013	2014	2015	5-Year Average	
Equipment Failure (MAINS)							
Valves	2	1	1	1	1	1.2	N
Control/Relief Station	0	0	0	0	0	0	N
Mechanical Couplings	0	6	7	6	9	5.6	0
Other	5	0	1	0	0	1.2	N
Equipment Failure (SERVICES)							
Valves	0	6	21	12	9	9.6	N
Service Regulators	76	61	86	84	115	84.4	Y
Mechanical Couplings	0	6	6	4	9	5	Y
Other	22	0	0	0	0	0	n

Appendix A. Section 3. Table 5-26: Incorrect Operation Threat – Frequency and Trend (South Florida Division)

Threat / Sub-Threat	2015									
	Quantity			Incidents			Frequency of Failure			
	Miles Main	# Services	# of Units	Mains	Services	Units	Main Incidents/Mile	Service Incidents/100	Equip/Fitting Incidents/100	Total Incidents / Facility Mile (mains & svcs)
Incorrect Operation										
Operating Error	1,253	44,759		0	0		0	0	NA	0
Service Line bored thru Sewer	1,253	44,759		0	0		0	0	NA	0
Other	1,253	44,759		2	12		0.00160	0.0268	NA	0.00673

Threat / Sub-Threat	Leak Ratio						Is Leak Frequency Increasing? Y/N
	2011	2012	2013	2014	2015	5-Year Average	
Incorrect Operation (MAINS)							
Operating Error	0	0	0	0	0	0	N
Service Line bored thru Sewer	0	0	0	0	0	0	N
Other	0	0	0	2	2	0.8	N
Incorrect Operation (SERVICES)							
Other	1	1	0	2	12	3.2	Y

Appendix A. Section 3. Table 5-27: Other Threat – Frequency and Trend (South Florida Division)

Threat / Sub-Threat	2015								
	Quantity			Leaks Repaired		Frequency of Failure			
	Miles Main	Number Services	Number Copper Services	Mains	Services	Main Leaks/Mile	All Services Leaks / 100	Copper Services Only Leaks / 100	Total Leaks / Facility Mile (mains & svcs)
Other									
Bell Joint leaks	0	0	0	0	0	0	0	0	0
Copper Pipe Puncture	0	0	0	0	0	0	0	0	0
Other	1,253	44,759	0	3	3	0.00239	0.00670	0	0.00288

Threat / Sub-Threat	Leak Ratio						Is Leak Frequency Increasing? Y/N
	2011	2012	2013	2014	2015	5-Year Average	
Other (MAINS)							
Bell Joint Leaks	Unk	Unk	Unk	Unk	Unk	Unk	Unk
Copper Pipe Puncture	NA	NA	NA	NA	NA	NA	NA
Other	11	4	5	4	3	5.4	N
Other (SERVICES)							
Other	29	15	5	7	3	11.8	N

Appendix A. Section 3. Table 5-28: Corrosion Threat – Frequency and Trend (West Division)

Threat / Sub-Threat	2015						
	Quantity		Leaks Repaired		Frequency of Failure		
	Miles Main	# Services	Mains	Services	Main Leaks/Mile	Service Leaks/100	Total Leaks / Facility Mile (mains & svcs)
Corrosion							
Cast Iron	0	0	0	0	0	0	0
Bare Steel	93.497	450	15	8	0.160	1.778	0.230
Ductile Iron	0	0	0	0	0	0	0
Copper	0	0	0	0	0	0	0
Coated Steel (with CP)	313.331	4223	0	0	0	0	0
Coated Steel (No CP)	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0

Threat / Sub-Threat	Leak Ratio						Is Leak Frequency Increasing? Y/N
	2011	2012	2013	2014	2015	5-Year Average	
Corrosion (mains)							
Cast Iron	0	0	0	0	0	0	NA
Bare Steel	5	20	15	67	15	24.4	Y
Ductile Iron	0	0	0	0	0	0	NA
Copper	0	0	0	0	0	0	NA
Coated Steel (with CP)	0	0	0	5	0	1	N
Coated Steel (No CP)	0	0	0	0	0	0	NA
Other	0	0	0	0	0	0	NA
Corrosion (services)							

Bare Steel	3	11	3	12	8	7.4	Y
Coated Steel (with CP)	0	0	0	5	0	1	N

Appendix A. Section 3. Table 5-29: Natural Forces Threat – Frequency and Trend (West Division)

Threat / Sub-Threat	2015									
	Quantity			Leaks Repaired			Frequency of Failure			
	Miles Main	# Services	# of Units	Mains	Services	Units	Main Leaks/Mile	Service Leaks/100	Equip/Fitting Leaks/100	Total Leaks / Facility Mile (mains & svcs)
Natural Forces										
Tree Roots	913.81	21,854		0	0		0	0		0
Flood	NA	NA		0	0		0	0		0
Other	913.81	21,854		0	0		0	0		0

Threat / Sub-Threat	Leak Ratio						Is Leak Frequency Increasing? Y/N
	2011	2012	2013	2014	2015	5-Year Average	
Natural Forces (MAINS)							
Tree Roots	0	0	0	0	0		N
Flood	0	0	0	0	0	0	N
Other	3	0	1	1	0	1	N
Natural Forces (SERVICES)							
Other	0	0	0	0	1	1	Y

Appendix A. Section 3. Table 5-30: Excavation Damage Threat – Frequency and Trend (West Division)

Threat / Sub-Threat	2015							
	Quantity			Leaks Repaired			Frequency of Failure	
	System Miles Main	System Number of Services	System Number of Tickets	# of Main repairs	# of Services repairs	Total System repairs	Leaks per 1000 Tickets	Leaks per System Mile
Excavation Damage - All	913.81	21,854	32,999	16	41	57	1.727	0.0308

Threat / Sub-Threat	Leak Ratio						Is Leak Frequency Increasing? Y/N
	2011	2012	2013	2014	2015	5-Year Average	
Excavation Damage							
Tickets	19,282	19,255	23,355	27,637	32,999	24,505.6	Y
Leaks (MAIN)	11	16	7	7	16	26.6	Y
Leaks (SERVICES)	12	31	27	22	41	26.6	Y
Leaks per 1000 Tickets	1.193	2.44	1.456	1.049	1.73	1.57	Y
Leaks per System Mile	0.0126	0.0248	0.0173	0.0160	0.0308	0.0203	Y

Appendix A. Section 3. Table 5-31: Outside Force Threat – Frequency and Trend (West Division)

Threat / Sub-Threat	2015									
	Quantity			Leaks Repaired			Frequency of Failure			
	Miles Main	# Services	# of Units	Mains	Services	Units	Main Leaks/Mile	Service Leaks/100	Equip/ Fitting Leaks/100	Total Leaks / Facility Mile (mains & svcs)
Outside Force										
Vehicle Damage	913.81	21,854		0	0		0	0	NA	0
Vandalism	913.81	21,854		0	0		0	0	NA	0
Fire / Explosion	913.81	21,854		0	0		0	0	NA	0
Previous Damage	913.81	21,854		0	0		0	0	NA	0
Other	913.81	21,854		0	1		0	0.00458	NA	0

Threat / Sub-Threat	Leak Ratio						Is Leak Frequency Increasing? Y/N
	2011	2012	2013	2014	2015	5-Year Average	
Outside Force (Main)							
Vehicle Damage	0	0	0	0	0	0	N
Vandalism	0	0	0	0	0	0	N
Fire / Explosion	0	0	0	0	0	0	N
Other	1	0	0	1	0	0.4	N
Outside Force (Service)							
Other	3	0	2	0	1	1.2	N

Appendix A. Section 3. Table 5-32: Material, Weld or Joint Failure Threat – Frequency and Trend (West Division)

Threat / Sub-Threat	2015						
	Quantity		Leaks Repaired			Frequency of Failure	
	Miles Main	# Services	Mains	Services	Main Leaks/Mile	Service Leaks/100	Total Leaks / Facility Mile (mains & svcs)
Material, Weld or Joint Failure							
PVC	0	NA	NA	NA	NA	NA	NA
ABS	0	NA	NA	NA	NA	NA	NA
Aldyl A	0	NA	NA	NA	NA	NA	NA
Century Products (incl PE 2306)	0	NA	NA	NA	NA	NA	NA
PE 3306	0	NA	NA	NA	NA	NA	NA
Other Plastic Pipe	0	NA	NA	NA	NA	NA	NA
Delrin Insert Tap Tees	0	NA	UNK	UNK	UNK	UNK	UNK
Plexco Service Tee Celcon Caps	0	NA	UNK	UNK	UNK	UNK	UNK
Pre 1940 OA girth welds	0	NA	NA	NA	NA	NA	NA
Other	913.81	21,854	1	4	0.00109	0.0183	0.0027

Appendix A. Section 3. Table 5-32: Material, Weld or Joint Failure Threat – Frequency and Trend (West Division continued)

Threat / Sub-Threat	Leak Ratio						Is Leak Frequency Increasing? Y/N
	2011	2012	2013	2014	2015	5-Year Average	
Material, Weld or Joint Failure (mains)							
PVC	NA	NA	NA	NA	NA	NA	NA
ABS	NA	NA	NA	NA	NA	NA	NA
Aldyl A	NA	NA	NA	NA	NA	NA	NA
Century Products (incl PE 2306)	NA	NA	NA	NA	NA	NA	NA
PE 3306	NA	NA	NA	NA	NA	NA	NA
Other Plastic Pipe	NA	NA	NA	NA	NA	NA	NA
Delrin Insert Tap Tees	Unk	Unk	Unk	Unk	Unk	Unk	Unk
Plexco Service Tee Celcon Caps	Unk	Unk	Unk	Unk	Unk	Unk	Unk
other	1	1	2	2	1		
Material, Weld or Joint Failure (services)							
Other	9	11	4	0	4		N

Appendix A. Section 3. Table 5-33: Equipment Failure Threat – Frequency and Trend (West Division)

Threat / Sub-Threat	2015									
	Quantity			Leaks Repaired			Frequency of Failure			
	Miles Main	# Services	# of Units	Mains	Services	Units	Main Leaks/Mile	Service Leaks/100	Equip/Fitting Leaks/100	Total Leaks / Facility Mile (mains & svcs)
Equipment Failure										
Valves	913.81	21,854		0	0		0	0	0	0
Service Regulators	913.81	21,854		0	0		0	0	0	0
Control/Relief Station	913.81	21,854		0	0		0	0	0	0
Mechanical Couplings	913.81	21,854		0	0		0	0	0	0
Other	913.81	21,854		4	42		0.00438	0.192	NA	0 .0248

Threat / Sub-Threat	Leak Ratio						Is Leak Frequency Increasing? Y/N
	2011	2012	2013	2014	2015	5-Year Average	
Equipment Failure (main)							
Valves	0	0	0	0	0	0	N
Service Regulators	0	0	0	0	0	0	N
Control/Relief Station	0	0	0	0	0	0	N
Mechanical Couplings	0	0	0	0	0	0	N
Other	1	0	1	1	4	1.75	Y
Equipment Failure (services)							

Other	2	13	7	29	42	18.6	Y

Appendix A. Section 3. Table 5-34: Incorrect Operation Threat – Frequency and Trend (West Division)

Threat / Sub-Threat	2015									
	Quantity			Incidents			Frequency of Failure			
	Miles Main	# Services	# of Units	Mains	Services	Units	Main Incidents/Mile	Service Incidents/100	Equip/Fitting Incidents/100	Total Incidents / Facility Mile (mains & svcs)
Incorrect Operation										
Operating Error	913.81	21,854		0	0		0	0	NA	0
Service Line bored thru Sewer	913.81	21,854		0	0		0	0	NA	0
Other	913.81	21,854		1	0		0.00109	0	NA	0

Threat / Sub-Threat	Leak Ratio						Is Leak Frequency Increasing? Y/N
	2011	2012	2013	2014	2015	5-Year Average	
Incorrect Operation (MAINS)							
Operating Error	0	0	0	0	0	0	N
Service Line bored thru Sewer	0	0	0	0	0	0	N
Other	0	0	0	1	1	0.4	N
Incorrect Operation (SERVICES)							
Other	0	0	0	0	0	0	N

Appendix A. Section 3. Table 5-35: Other Threat – Frequency and Trend (West Division)

Threat / Sub-Threat	2015								
	Quantity			Leaks Repaired		Frequency of Failure			
	Miles Main	Number Services	Number Copper Services	Mains	Services	Main Leaks/Mile	All Services Leaks / 100	Copper Services Only Leaks / 100	Total Leaks / Facility Mile (mains & svcs)
Other									
Bell Joint leaks	913.81	21,854	0	0	0		0	0	0
Copper Pipe Puncture	913.81	21,854	0	0	0		0	0	0
Copper Sulfide	0	0	0	0	0		0	0	0
Other	913.81	21,854	0	1	1	0.00109	0.00458	0	0.00108

Threat / Sub-Threat	Leak Ratio						Is Leak Frequency Increasing? Y/N
	2011	2012	2013	2014	2015	5-Year Average	
Other (MAINS)							
Bell Joint Leaks	0	0	0	0	0	0	N
Copper Pipe Puncture	0	0	0	0	0	0	N
OTHER	0	0	0	1	1	0.4	N
Other (SERVICES)							

OTHER	1	0	0	12	1	2.8	N

Appendix A. Section 3. Table 5-36: Corrosion Threat – Frequency and Trend (Central Division)

Threat / Sub-Threat	2015						
	Quantity		Leaks Repaired		Frequency of Failure		
	Miles Main	# Services	Mains	Services	Main Leaks/Mile	Service Leaks/100	Total Leaks / Facility Mile (mains & svcs)
Corrosion							
Cast Iron	0	0	0	0	0	0	0
Bare Steel	0	0	0	0	0	0	0
Coated Steel (with CP)	265.656	3588	0	25	0	0.697	0.0791
Coated Steel (No CP)	0	0	0	0	0	0	0

Threat / Sub-Threat	Leak Ratio						Is Leak Frequency Increasing? Y/N
	2011	2012	2013	2014	2015	5-Year Average	
Corrosion (mains)							
Cast Iron	0	0	0	0	0	0	NA
Bare Steel	5	8	1	0	0	2.8	NA
Coated Steel (with CP)	1	2	5	4	0	2.4	N
Coated Steel (No CP)	0	0	0	0	0	0	NA
Corrosion (services)							
Bare Steel	4	1	2	0	0	1.4	N
Coated Steel (with CP)	35	45	40	51	25	47.04	N
Others	0	0	0	0	0	0	

Appendix A. Section 3. Table 5-37: Natural Forces Threat – Frequency and Trend (Central Division)

Threat / Sub-Threat	2015									
	Quantity			Leaks Repaired			Frequency of Failure			
	Miles Main	# Services	# of Units	Mains	Services	Units	Main Leaks/Mile	Service Leaks/100	Equip/Fitting Leaks/100	Total Leaks / Facility Mile (mains & svcs)
Natural Forces										
Tree Roots	623.9	23,170		0	1		0	0 .004		0
Flood	623.9	23,170		0	0		0	0		0
Other	623.9	23,170		0	0		0	0		0

Threat / Sub-Threat	Leak Ratio						Is Leak Frequency Increasing? Y/N
	2011	2012	2013	2014	2015	5-Year Average	
Natural Forces (Mains)							
Tree Roots	0	0	0	0	0	0	N
Flood	0	0	0	0	0	0	N
Other	0	0	1	1	0	0.4	N
Natural Forces (Services)							
Tree Roots	0	0	1	0	0	0.2	N
Flood	0	0	0	0	0	0	N
Other	0	5	1	1	1	1.6	N

Appendix A. Section 3. Table 5-38: Excavation Damage Threat – Frequency and Trend (Central Division)

Threat / Sub-Threat	2015							
	Quantity			Leaks Repaired			Frequency of Failure	
	System Miles Main	System Number of Services	System Number of Tickets	# of main repairs	# of Services repairs	Total System Miles	Leaks per 1000 Ticket	Leaks per System Mile
Excavation Damage - All	623.9	23,170	19655	8	53	61	.061	.1057

Threat / Sub-Threat	Leak Ratio						Is Leak Frequency Increasing? Y/N
	2011	2012	2013	2014	2015	5-Year Average	
Excavation Damage							
Tickets	17,458	19,790	25,334	28,347	28,510	23,887.8	
Leaks (Mains)	10	10	21	20	20	16.2	N
Leaks (Services)	38	40	47	46	70	48.2	Y
Leaks per 1000 Tickets	2.75	2.53	2.68	2.33	3.16	2.69	Y
Leaks per System Mile	0.0565	0.0570	0.0762	0.0718	0.0887	0.0700	Y

Appendix A. Section 3. Table 5-39: Outside Force Threat – Frequency and Trend (Central Division)

Threat / Sub-Threat	2015									
	Quantity			Leaks Repaired			Frequency of Failure			
	Miles Main	# Services	# of Units	Mains	Services	Units	Main Leaks/Mile	Service Leaks/100	Equip/ Fitting Leaks/100	Total Leaks / Facility Mile (mains & svcs)
Outside Force										
Vehicle Damage	623.9	23,003		0	1	0	0	0.004	NA	0
Vandalism	623.9	23,003		0	0	0	0	0	NA	0
Fire / Explosion	623.9	23,003		0	0	0	0	0	NA	0
Other	623.9	23,003		0	0	0	0	0	NA	0

Threat / Sub-Threat	Leak Ratio						Is Leak Frequency Increasing? Y/N
	2011	2012	2013	2014	2015	5-Year Average	
Outside Force (Main)							
Vehicle Damage	0	0	0	0	0	0	N
Vandalism	0	0	0	0	0	0	N
Other							
Outside Force (Services)							
Vehicle Damage	2	4	0	1	1	1.6	N
other	0	0	1	0	0	0.2	N

Appendix A. Section 3. Table 5-40: Material, Weld or Joint Failure Threat – Frequency and Trend (Central Division)

Threat / Sub-Threat	2015						
	Quantity		Leaks Repaired			Frequency of Failure	
	Miles Main	# Services	Mains	Services	Main Leaks/Mile	Service Leaks/100	Total Leaks / Facility Mile (mains & svcs)
Material, Weld or Joint Failure							
PVC	NA	NA	NA	NA	NA	NA	NA
ABS	NA	NA	NA	NA	NA	NA	NA
Aldyl A	Unk	Unk	Unk	Unk	Unk	Unk	Unk
Century Products (incl PE 2306)	NA	NA	NA	NA	NA	NA	NA
PE 3306	NA	NA	NA	NA	NA	NA	NA
Other Plastic Pipe	NA	NA	NA	NA	NA	NA	NA
Delrin Insert Tap Tees	Unk	Unk	Unk	Unk	Unk	Unk	Unk
Plexco Service Tee Celcon Caps	Unk	Unk	Unk	Unk	Unk	Unk	Unk
Pre 1940 OA girth welds	NA	NA	NA	NA	NA	NA	NA
Other	623.899	23,170	1	3	0.0016	0.0129	0.003

Appendix A. Section 3. Table 5-41: Material, Weld or Joint Failure Threat – Frequency and Trend (Central Division continued)

Threat / Sub-Threat	Leak Ratio						Is Leak Frequency Increasing? Y/N
	2011	2012	2013	2014	2015	5-Year Average	
Material, Weld or Joint Failure (Mains)							
PVC	NA	NA	NA	NA	NA	NA	NA
ABS	NA	NA	NA	NA	NA	NA	NA
Aldyl A	Unk	Unk	Unk	Unk	Unk	Unk	Unk
Century Products (incl PE 2306)	NA	NA	NA	NA	NA	NA	NA
PE 3306	NA	NA	NA	NA	NA	NA	NA
Other Plastic Pipe	NA	NA	NA	NA	NA	NA	NA
Delrin Insert Tap Tees	Unk	Unk	Unk	Unk	Unk	Unk	Unk
Plexco Service Tee Celcon Caps	Unk	Unk	Unk	Unk	Unk	Unk	Unk
Other	1	1	4	9	3	3.6	Y
Material, Weld or Joint Failure (Services)							
Other	10	7	4	6	1	5.6	N

Appendix A. Section 3. Table 5-42: Equipment Failure Threat – Frequency and Trend (Central Division)

Threat / Sub-Threat	2015									
	Quantity			Leaks Repaired			Frequency of Failure			
	Miles Main	# Services	# of Units	Mains	Services	Units	Main Leaks/Mile	Service Leaks/100	Equip/Fitting Leaks/100	Total Leaks / Facility Mile (mains & svcs)
Equipment Failure										
Valves	623.9	23,170		0	0		0	0	0	0
Service Regulators	623.9	23,170		0	2		0	0.0086	0	0.00197
Control/Relief Station	623.9	23,170		0	0		0	0	0	0
Mechanical Couplings	623.9	23,170		0	0		0	0	0	0
Other	623.9	23,170		0	0		0	0	0	0

Threat / Sub-Threat	Leak Ratio						Is Leak Frequency Increasing? Y/N
	2011	2012	2013	2014	2015	5-Year Average	
Equipment Failure (Mains)							
Valves	0	0	0	0	0	0	N
Mechanical Couplings	0	0	0	0	0	0	N
Other	0	0	0	2	0	0.4	N
Equipment Failure (Services)							
Service Regulators	19	2	0	6	2	5.8	N
Other	0	0	0	0	0	0	N

Appendix A. Section 3. Table 5-43: Incorrect Operation Threat – Frequency and Trend (Central Division)

Threat / Sub-Threat	2015									
	Quantity			Incidents			Frequency of Failure			
	Miles Main	# Services	# of Units	Mains	Services	Units	Main Incidents/Mile	Service Incidents/100	Equip/Fitting Incidents/100	Total Incidents / Facility Mile (mains & svcs)
Incorrect Operation										
Operating Error	623.9	23,170		0	0		0	0	0	0
Service Line bored thru Sewer	623.9	23,170		0	0		0	0	0	0
Other	623.9	23,170		0	0		0	0	0	0

Threat / Sub-Threat	Leak Ratio						Is Leak Frequency Increasing? Y/N
	2011	2012	2013	2014	2015	5-Year Average	
Incorrect Operation (Mains)							
Operating Error	0	0	0	0	0	0	N
Service Line bored thru Sewer	0	0	0	0	0	0	N
Other	1	1	0	0	0	0.4	N
Incorrect Operation (Services)							

Other	0	1	0	0	0	0.2	N

Appendix A. Section 3. Table 5-44: Other Threat – Frequency and Trend (Central Division)

Threat / Sub-Threat	2015								
	Quantity			Leaks Repaired		Frequency of Failure			
	Miles Main	Number Services	Number Copper Services	Mains	Services	Main Leaks/Mile	All Services Leaks / 100	Copper Services Only Leaks / 100	Total Leaks / Facility Mile (mains & svcs)
Other									
Bell Joint leaks	623.9	23,170	0	0	0	0	0	0	0
Copper Pipe Puncture	623.9	23,170	0	0	0	0	0	0	0
Copper Sulfide	623.9	23,170	0	0	0	0	0	0	0
Other	623.9	23,170	0	14	20	0.022	0.086	0	0.034

Threat / Sub-Threat	Leak Ratio						Is Leak Frequency Increasing? Y/N
	2011	2012	2013	2014	2015	5-Year Average	
Other (Mains)							
Bell Joint Leaks	0	0	0	0	0	0	NA
Copper Pipe Puncture	0	0	0	0	0	0	NA
Other	8	3	2	6	14	6.6	Y
Other (Services)							
Other	25	2	7	8	20	12.4	Y

Appendix A. Section 4. Table 5-36: Identification of Additional Information Needed for IM Program

Area of incomplete records or Knowledge	Can it be acquired over time through normal activities? Y / N	Does Action Plan Exist? Y / N
Vintage years of facilities	No	Yes
Exact location of pipe facilities including Aldyl A, Mechanical Couplings, Delrin Insert Tap Tees, Plexco Celcon Tap Service Tees, Pre 1940 OA Girth Welds	Yes	Yes
Information on pipe materials currently in the ground.	Yes	Yes
Greater detail on Subthreats of Causes	Yes	Yes

Appendix A. Section 4. Table 5-37: Action Plans to Gain Additional Information Over Time

Action Plan Scope Gaining Additional Information	Schedule	Completion Date	Officer / Manager Responsible
Vintage years of facilities -information of new pipe facilities being installed is being captured on FPUC's GIS.		Ongoing project	Division Operations Managers, GIS technicians, & Gas Standards Engineer.
Exact location of pipe facilities including Aldyl A, Mechanical Couplings, Delrin Insert Tap Tees, Plexco Celcon Tap Service Tees, Pre 1940 OA Girth Welds -Gained through Exposed Piping Reports and Leak Reports -Leak reports are to be uploaded to GIS which will make it easier to analyze leak report data.		Ongoing Project	Division Operations Managers, GIS technicians, Manager of Engineering, & Gas Standards Engineer
Greater detail on Subthreats of Causes – Gained through modified Leak Reports and additional training on their completion.		Ongoing Project	Division Operations Managers & Gas Standards Engineer

Appendix A. Section 5. Sample of Subject Matter Expert Information Interview Form

SME Name	Current Job Title Role	Yrs Experience	Comment(s) re: Qualification & Experience

Written record

Describe nature of information (First Hand witness or direct experience vs. Second Hand)

Date:	

Interviewer Name:	
Interviewer Title:	

Signature of Interviewer (Reqd):	
Signature of SMEs (Optional):	

APPENDIX B
THREAT IDENTIFICATION

Appendix B. Section 1.

Section 1. Threat Identification Process

[Southern Gas Association, Northeast Gas Association and Structural Integrity Associates, Inc. Subject Matter Expert(SME) Evaluation of Threats Applicable to the Gas Distribution System, incorporated by reference (all divisions)]

Appendix B. Section 2.

Threats Identified as applicable to the gas distribution system

Appendix B. Section 2. Table 6-3: Summary SME Evaluation of Threats Applicable to the Gas Distribution System

Service territory covered by this Assessment: All Divisions				
Primary Threat Category	**Sub-Threat**	**SME's to Consider the following**	**SME Evaluation/Answer**	**Threat Applicable? SME – Yes / No**
Corrosion	Cast Iron Pipe	Does Cast Iron pipe exist in the system?	Yes- South Division	Yes – South Division
		Is there a known history of body-of-pipe leaks, fractures, or graphitization?	Yes	
		Are certain diameters or parts of the system known to be more prone to failure and leakage than others?	No	
	Bare Steel Pipe (no CP)	Do bare (uncoated) steel main or services exist in the system that are not under CP?	Yes – South, West Divisions	Yes – South, West Division
		Is there known evidence of active external corrosion on bare steel pipes not under CP?	Yes	
		Is there a history of leakage on bare steel pipes not under CP?	Yes	
	Bare Steel Pipe (with CP)	Do bare (uncoated) steel main or services exist in the system that are under CP?	No	No
		Is there known evidence of active external corrosion on bare steel pipes under CP?	No	
		Is there a known history of leakage on bare steel pipes under CP?	No	

Appendix B. Section 2. Table 6-3: Summary SME Evaluation of Threats Applicable to the Gas Distribution System (continued)

Service territory covered by this Assessment: All Divisions				
Primary Threat Category	**Sub-Threat**	**SME's to Consider the following**	**SME Evaluation/Answer**	**Threat Applicable? SME – Yes / No**
Corrosion	Coated Steel with CP	Is there known evidence of active external corrosion on coated steel pipe with CP?	Yes – South, Central West Divisions	Yes – All Divisions
		Is there a known history of leakage on coated steel pipe with CP?	Yes – South, Central West Divisions	
		Are some CP systems frequently down (not achieving the required level of protection); more than 10% of the time?	No	
	Coated Steel w/o CP	Is there known evidence of active external corrosion on coated steel pipe without CP?	No	No
		Is there a known history of leakage on coated steel pipe without CP?	No	
	Copper Services	Are direct buried or inserted copper services known to exist in the system?	No	No
		Is there a known history of leakage on copper services?	No	
	Stray Current	Do distribution facilities exist near DC transit systems, high voltage DC transmission systems or other known sources of DC current?	Yes – All Divisions	No
		Are any facilities known to be impacted by sources of stray DC current that has or may result in corrosion?	No	
	Internal Corrosion	Are liquids known to exist within any portions of the distribution system?	No	No
		Is there known evidence of past or active internal corrosion on steel pipe?	No	
		Is there a known history of leakage caused by internal corrosion of steel pipe?	No	

Appendix B. Section 2. Table 6-3: Summary SME Evaluation of Threats Applicable to the Gas Distribution System (continued)

Service territory covered by this Assessment: All Divisions				
Primary Threat Category	**Sub-Threat**	**SME's to Consider the following**	**SME Evaluation/Answer**	**Threat Applicable? SME – Yes / No**
Corrosion	Atmospheric Corrosion	Do above ground distribution facilities exist in areas exposed to marine atmosphere, high humidity, atmospheric pollutants or agricultural chemicals?	Yes – All Divisions	Yes – All Divisions
		Is there known evidence of past or active external atmospheric corrosion on exposed steel pipe, equipment or fittings?	Yes – South, Central, West Divisions	
		Is there a known history of leakage caused by atmospheric corrosion of steel pipe?	Yes – South, Central, West Divisions	
	Corrosion of carrier pipe in Cased Crossing	Do steel carrier pipes exist within cased crossings?	Yes – South, Central, West Divisions	Yes – South, Central, West Divisions
		Are there any existing known contacts between carrier pipes and casings?	Yes – South Division	
		Is there known evidence of past or active external corrosion on cased steel pipe?	No	
		Is there a known history of leakage caused by corrosion on cased steel pipe?	No	
Natural Forces	Seismic Activity	Are there any seismically active zones or fault lines that exist in the area?	No	No
		Is there a history of leakage associated with Seismic activity?	No	
	Earth Movement / Landslide	Are there any areas susceptible to earth movement or landslide in the area?	No	No
		Is there a known history of leakage associated with landslide or earth movement?	No	
	Frost Heave	Are there any areas susceptible to frost heave that exist in the area?	No	No

Appendix B. Section 2. Table 6-3: Summary SME Evaluation of Threats Applicable to the Gas Distribution System (continued)

Service territory covered by this Assessment: All Divisions				
Primary Threat Category	**Sub-Threat**	**SME's to Consider the following**	**SME Evaluation/Answer**	**Threat Applicable? SME – Yes / No**
Natural Forces	Frost Heave	Is there a known history of leakage associated with frost heave?	No	No
	Flooding	Are there any areas within the gas system that are subject to flooding?	Yes – All Divisions	Yes – All Divisions
		Is there a known history of leakage or damage associated with flooding?	No	
	Over-pressure due to snow/ice blockage	Are pressure control equipment vents subject to ice blockage during the winter?	No	No
		Is there a known history of over-pressure events as a result of snow/ice blockage?	No	
	Tree Roots	Is there a known history of leakage to pipe or fittings as a result of tree root damage?	Yes – South, Central, West Divisions	Yes – All Divisions
	Other	Is there a known history of leakage or damage due to other natural force causes; including but not limited to lightning, wild fire or high winds (tornados)?	Yes – South, Central, West Divisions	Yes – All Divisions
Excavation Damage	Improper Excavation Practice	Has damage requiring repair or replacement occurred on properly marked facilities due to the failure of the excavator to follow proper excavation rules and procedures?	Yes – South, Central, West Divisions	Yes – All Divisions
	Facility not located or marked	Has damage requiring repair or replacement occurred due to failure to locate a valid and timely locate request?	Yes – South, Central, West Divisions	
	One-call notification center error	Has damage requiring repair or replacement occurred due to an error made at the one-call notification center?	Yes – South, Central, West Divisions	

Appendix B. Section 2. Table 6-3: Summary SME Evaluation of Threats Applicable to the Gas Distribution System (continued)

Service territory covered by this Assessment: All Divisions				
Primary Threat Category	**Sub-Threat**	**SME's to Consider the following**	**SME Evaluation/Answer**	**Threat Applicable? SME – Yes / No**
Excavation Damage	Mis-Marked Facilities	Has damage requiring repair or replacement occurred due to the mis-marking of facilities?	Yes – South, Central, West Divisions	Yes – All Divisions
	Incorrect Facility Records	Has damage requiring repair or replacement occurred due incorrect facility records?	Yes – South, Central, West Divisions	Yes – All Divisions
	Other	Has damage requiring repair or replacement occurred due other causes including the inability to locate facility (e.g. no locating wire on plastic main), wrong or incorrect information provided to the one call center, deteriorated facilities and previous damage?	Yes – South, Central, West Divisions	
Other Outside Force Damage	Vehicle Damage to Riser/Meter	Are existing risers and/or meters exposed to damage from vehicular damage that do not have barriers or other protection conforming to current design requirements?	Yes – South, Central, West Divisions	Yes – All Divisions
		Has known leakage occurred due to vehicle damage to risers/meters.	Yes – South, Central, West Divisions	
	Vehicle Damage to above-ground equip/station	Are HPRs and/or regulator stations exposed to damage from vehicular damage that do not have barriers or other protection conforming to current design requirements?	No	Yes – All Divisions
		Has known leakage occurred due to vehicle damage to HPRs and/or regulator stations?	Yes – South Division	

Appendix B. Section 2. Table 6-3: Summary SME Evaluation of Threats Applicable to the Gas Distribution System (continued)

Service territory covered by this Assessment: All Divisions				
Primary Threat Category	**Sub-Threat**	**SME's to Consider the following**	**SME Evaluation/Answer**	**Threat Applicable? SME – Yes / No**
Other Outside Force Damage	Vandalism	Are gas valves or station equipment susceptible to damage by vandalism that has the potential to pose a risk to employees or the public?	No	No
		Has leakage or other unsafe condition been created by vandalism?	No	
Other Outside Force Damage	Structure Fire	Is there a history of damage to gas meters or other equipment due to structure fires?	Yes – South, Central, West Divisions	Yes – All Divisions
		Is there a history of lack of properly designed or maintained service shut-off valves resulting in a delay in inability to shut off gas service to structures that are on fire?	No	
Material, Weld or Joint Failure	Century Products (MDPE 2306)	Is Century Products (MDPE 2306) pipe known to exist in the system?	No	No
		Is there a history of leakage of Century Products (MDPE 2306) pipe?	No	
	Aldyl A	Is Aldyl A pipe known to exist in the system?	Yes – South and Central Divisions	Yes – South and Central Divisions
		Is there a history of leakage of Aldyl A pipe?	Yes – South and Central Divisions	

Appendix B. Section 2. Table 6-3: Summary SME Evaluation of Threats Applicable to the Gas Distribution System (continued)

Service territory covered by this Assessment: All Divisions				
Primary Threat Category	**Sub-Threat**	**SME's to Consider the following**	**SME Evaluation/Answer**	**Threat Applicable? SME – Yes / No**
Material, Weld or Joint Failure	HDPE 3306	Is HDPE 3306 pipe known to exist in the system?	No	No
		Is there a history of leakage of HDPE 3306 pipe?	No	
	PVC – Polyvinyl Chloride	Is PVC pipe known to exist in the system?	No	No
		Is there a history of leakage of PVC pipe?	No	
	ABS – Acrylonitrile Butadiene Styrene	Is ABS pipe known to exist in the system?	No	No
		Is there a history of leakage of ABS pipe?	No	
	CAB – Cellulose Acetate Butyrate	Is CAB A pipe known to exist in the system?	No	No
		Is there a history of leakage of CAB pipe?	No	
	PB - Polybutylene	Is PB pipe known to exist in the system?	No	No
		Is there a history of leakage of PB pipe?	No	
	Delrin Insert Tap Tees	Are Delrin Insert Tap Tees known to exist in the system?	Yes – South, Central, West Divisons	Yes – South, Central, West Divisions
		Is there a history of leakage of Delrin Insert Tap Tees?	Yes – South, Central, West Divisions	

Appendix B. Section 2. Table 6-3: Summary SME Evaluation of Threats Applicable to the Gas Distribution System (continued)

Service territory covered by this Assessment: All Divisions				
Primary Threat Category	**Sub-Threat**	**SME's to Consider the following**	**SME Evaluation/Answer**	**Threat Applicable? SME – Yes / No**
Material, Weld, or Joint Failure	Plexco Service Tee Celcon Caps	Are Plexco Service Tee Celcon Caps known to exist in the system?	Yes – South, Central, West Divisions	Yes – South, Central, West Divisions
		Is there a history of leakage of Plexco Service Tee Celcon Caps?	Yes – South, Central, West Divisions	
	PE Fusion failure	Is there a history of PE Fusion Failures or leakage in the system?	No	No
		Are any types of PE fusion (type, material, size, age, process, geographic area) more prone to leakage or failure?	No	
	Pre-1940 Oxy-Acetylene Girth Weld	Do pre-1940 Oxy-Acetylene Girth Welds exist on pipe greater than 4 inch?	Yes – South Divisions	Yes – South Division
		Is there a history of pre-1940 Oxy-Acetylene Girth Weld failures or leakage in the system?	No	
	Other	Do other material failures occur that present a possible current or future risk? (Kerotest Gate Valves	Yes – South and Central Divisions	Yes – South And Central
	Mechanical Couplings	Is there a history of Mechanical Coupling failures or leakage in the system due to pullout?	No	No
		Is there a history of Mechanical Coupling failures or leakage in the system due to seal leakage?	Yes – South, Central, West Divisions	Yes – South, Central, West
		Are any types of mechanical coupling (type, material, size, age, manufacturer, geographic area) more prone to leakage or failure due to seal leakage?	No	No

Appendix B. Section 2. Table 6-3: Summary SME Evaluation of Threats Applicable to the Gas Distribution System (continued)

Service territory covered by this Assessment: All Divisions				
Primary Threat Category	**Sub-Threat**	**SME's to Consider the following**	**SME Evaluation/Answer**	**Threat Applicable? SME – Yes / No**
Equipment Failure	Valves	Are valves inoperable, inaccessible and or paved over without timely identification and repairs?	Yes – South Division	Yes – South Division
		Are certain types or makes of valves more likely to leak? Kerotest Gate Valves	Yes	Yes – South and Central
	Service Regulators	Is there a history of service regulator failures that present a threat to the public or employees?	No	No
		Are certain types or makes of service regulator more likely to create a risk?	No	
	Control/Relief Station Equipment	Is there a history of control or relief station equipment failures that present a threat to the public or employees?	No	No
		Are certain types or makes of station equipment more likely to create a risk?	No	
	Other	Is there a history of other equipment failures that present a threat to the public or employees?	No	No
		Are certain types or makes of other equipment more likely to create a risk?	No	
Incorrect Operations	Operating Error	Have leaks or other safety incidents been caused by an inadequate procedure?	No	Yes – All Divisions
		Have leaks or other safety incidents been caused by failure to follow an adequate procedure?	Yes – South, Central, West Divisons	
		Have bypass valves or MAOP separation valves been found to not have proper locks after maintenance?	No	

Appendix B. Section 2. Table 6-3: Summary SME Evaluation of Threats Applicable to the Gas Distribution System (continued)

Service territory covered by this Assessment: All Divisions				
Primary Threat Category	**Sub-Threat**	**SME's to Consider the following**	**SME Evaluation/Answer**	**Threat Applicable? SME – Yes / No**
Incorrect Operations	Operating Error	Have employees been found to have falsified maintenance documents and thus not have completed operations and maintenance tasks in the manner or timeframe required?	No	No
		Has improper regulator station maintenance ever resulted in an overpressure incident?	No	No
		Have butt-fusions been found to be leaking due to improper fusion due to failure to follow the correct procedure?	Yes – South, Central, West Divisions	Yes – South, Central, WestDivisions
		Have leak repairs or other mandated maintenance not been made in the time required by standard due to a process breakdown or ineffective process?	No	No
		Has gas leak detection equipment used for a leak survey been found afterwards to be out of calibration?	No	No
		Has the failure to accurately or timely record or map facilities resulted in failure to perform mandated maintenance or locates?	No	No
	Gas lines bored through Sewers	Have pipes been installed via unguided or guided bore without proper procedures to ensure other facilities are not damaged?	Yes – South, Central, West Divisions	Yes – All Divisions
		Have pipes unknowingly bored through sewer lines been damaged by sewer line cleaning operations?	No	

Appendix B. Section 2. Table 6-3: Summary SME Evaluation of Threats Applicable to the Gas Distribution System (continued)

Service territory covered by this Assessment: All Divisions				
Primary Threat Category	**Sub-Threat**	**SME's to Consider the following**	**SME Evaluation/Answer**	**Threat Applicable? SME – Yes / No**
Other	Bell Joint Leakage	Does Cast Iron pipe exist in the system?	Yes- South Division	Yes – South Division
		Is there a history of bell joint leaks?	Yes – South Division	Yes – South Division
		Are certain diameters or parts of the system known to be more prone to bell joint failure or leakage than others?	No	
	Inserted Copper Puncture	Do copper services inserted in steel exist in the system?	No	No
		Is there a history of leakage of copper services due to galvanic action between the copper and steel?	No	
	Copper Sulfide	Do copper services exist in the system and is there a history of hydrogen sulfide greater than 0.3 grains per 100 standard cubic feet of gas?	No	No
		Have any safety incidents occurred as a result of copper sulfide in copper services or service regulators?	No	
	Construction over gas mains & services	Have others constructed over gas facilities or taken other action that prevents effective leak survey and other maintenance?	Yes- South Division	Yes – All Divisions
		When identified, is construction that impacts required maintenance corrected in a timely manner?	Yes – South Division	

APPENDIX C
EVALUATION AND RANKING OF RISK

Appendix C. Section 1.

Section 1. Risk Assessment Process

[Southern Gas Association, Northeast Gas Association and Structural Integrity Associates, Inc.

Blended Risk (Subject Matter Expert & data) Evaluation and Ranking Process*,*

incorporated by reference (all divisions)]

Appendix C. Section 2. Table 7-1: Documentation of Risk Assessment Results (South Division)

Region	Primary Threat	Sub-Threat	Facility Type	FOF Score	COF Score	Relative Risk
South	Corrosion	Cast Iron		0	0.35	0
		Bare Steel (No CP) - mains		1.688	0.35	0.591
		Bare Steel (No CP) - services		1.125	0.35	0.3938
		Bare Steel (w/CP)		NA	NA	NA
		Coated Steel (No CP)		NA	NA	NA
		Coated Steel (w/CP) - mains		0.1406	0.35	0.0492
		Coated Steel (w/CP) - services		1.125	0.35	0.3938
		Copper Services		NA	NA	NA
		Stray Current		0.125	0.35	0.04375
		Internal Corrosion		0	0.35	0
		Atmospheric Corrosion		4.5	0.35	1.575

Appendix C. Section 2. Table 7-2: Documentation of Risk Assessment Results (South Division)

Region	Primary Threat	Sub-Threat	Facility Type	FOF Score	COF Score	Relative Risk
South	Natural Forces	Seismic Activity		NA	NA	NA
		Earth Movement/ Landslide		0	0.35	0
		Frost Heave		NA	NA	NA
		Flooding		0	0.35	0
		Overpressure due to Snow-Ice Blockage		NA	NA	NA
		Tree Roots		0.25	0.35	0.0875

Appendix C. Section 2. Table 7-3: Documentation of Risk Assessment Results (South Division)

Region	Primary Threat	Sub-Threat	Facility Type	FOF Score	COF Score	Relative Risk
South	Excavation Damage	Improper Excavation Practice		0.125	0.61	0.07625
		No Call for Locate		0.25	0.61	0.1525
		Late or No Locate		0.1125	0.61	0.0686
		Mis-marked Facilities		0.045	0.61	0.0275
		Incorrect Facility Records		0.045	0.61	0.0275

Appendix C. Section 2. Table 7-4: Documentation of Risk Assessment Results (South Division)

Region	Primary Threat	Sub-Threat	Facility Type	FOF Score	COF Score	Relative Risk
South	Other Outside Force	Vehicle Damage to Riser		0.05	0.61	0.0305
		Vehicle Damage to above ground equipment or station (not risers)		0	0.61	0
		Vandalism		0.01	0.61	0.0061
		Structure Fire		0.005	0.61	0.00305

Appendix C. Section 2. Table 7-5: Documentation of Risk Assessment Results (South Division)

Region	Primary Threat	Sub-Threat	Facility Type	FOF Score	COF Score	Relative Risk
South	Material, Weld or Joint Failure	MDPE 2406 - mains		0.075	0.61	0.04575
		MDPE 2406 - services		0.075	0.61	0.04575
		Aldyl A - mains		0	0.61	0
		Aldyl A - services		0.9	0.35	0.315
		HDPE 3306		NA	NA	NA
		PVC		NA	NA	NA
		ABS		NA	NA	NA
		CAB		NA	NA	NA
		PB		NA	NA	NA
		Delrin Insert Tap Tees and/or Plexco Service Tee Celcon Caps		0	0.61	0
		PE Fusion Failure-mains		0.033	0.61	0.0203
		PE Fusion Failure-services		0.05	0.61	0.0305
		Pre 1940 Oxy-Acetylene Girth Welds		0	0.61	0

Appendix C. Section 2. Table 7-6: Documentation of Risk Assessment Results (South Division)

Region	Primary Threat	Sub-Threat	Facility Type	FOF Score	COF Score	Relative Risk
South	Equipment Failure	Valves		0.025	0.7	0.0175
		Service Regulators		0.2475	0.61	0.151
		Control or Relief Station Equipment		0	0.61	0
		Mechanical Couplings		0.0625	0.35	0.0219

Appendix C. Section 2. Table 7-7: Documentation of Risk Assessment Results (South Division)

Region	Primary Threat	Sub-Threat	Facility Type	FOF Score	COF Score	Relative Risk
South	Incorrect Operation	Operating Errors		0.025	0.61	0.0153
		Service Lines Bored Thru Sewer		0	0.61	0
	Other	Bell Joints		0	0.61	0
		Copper Services Pipe Puncture		NA	NA	NA

Appendix C. Section 2. Table 7-8: Documentation of Risk Assessment Results (West Division)

Region	Primary Threat	Sub-Threat	Facility Type	FOF Score	COF Score	Relative Risk
West	Corrosion	Cast Iron		NA	NA	NA
		Ductile Iron		NA	NA	NA
		Bare Steel (No CP) - mains		4.5	0.45	2.02
		Bare Steel (No CP) - services		1.25	0.45	0.563
		Bare Steel (w/CP)		NA	NA	NA
		Coated Steel (No CP)		NA	NA	NA
		Coated Steel (w/CP) - mains		0	0.35	0
		Coated Steel (w/CP) - services		0	0.35	0
		Copper Services		NA	NA	NA
		Stray Current		0	0.35	0
		Internal Corrosion		0	0.35	0
		Atmospheric Corrosion		0.563	0.35	0.197

Appendix C. Section 2. Table 7-9: Documentation of Risk Assessment Results (West Division)

Region	Primary Threat	Sub-Threat	Facility Type	FOF Score	COF Score	Relative Risk
West	Natural Forces	Seismic Activity		NA	NA	NA
		Earth Movement/ Landslide		0.1	0.35	0.035
		Frost Heave		NA	NA	NA
		Flooding		0	0.35	0
		Overpressure due to Snow-Ice Blockage		NA	NA	NA
		Tree Roots		0.1	0.35	0.035

Appendix C. Section 2. Table 7-10: Documentation of Risk Assessment Results (West Divison)

Region	Primary Threat	Sub-Threat	Facility Type	FOF Score	COF Score	Relative Risk
West	Excavation Damage	Improper Excavation Practice		0.125	0.35	0.04375
		No Call for Locate		0.125	0.35	0.04375
		Late or No Locate		0.05	0.35	0.0175
		Mis-marked Facilities		0.05	0.35	0.0175
		Incorrect Facility Records		0.05	0.35	0.0175

Appendix C. Section 2. Table 7-11: Documentation of Risk Assessment Results (West Division)

Region	Primary Threat	Sub-Threat	Facility Type	FOF Score	COF Score	Relative Risk
West	Other Outside Force	Vehicle Damage to Riser		0.01	0.35	0.0035
		Vehicle Damage to above ground equipment or station (not risers)		0.01	0.35	0.0035
		Vandalism		0	0.35	0
		Structure Fire		0.005	0.35	0.00175

Appendix C. Section 2. Table 7-12: Documentation of Risk Assessment Results (West Division)

Region	Primary Threat	Sub-Threat	Facility Type	FOF Score	COF Score	Relative Risk
West	Material, Weld or Joint Failure	MDPE 2406 - mains		0	.35	0
		MDPE 2406 - services		0	.35	0
		Aldyl A		NA	NA	NA
		HDPE 3306		NA	NA	NA
		PVC		NA	NA	NA
		ABS		NA	NA	NA
		CAB		NA	NA	NA
		PB		NA	NA	NA
		Delrin Insert Tap Tees and/or Plexco Service Tee Celcon Caps		0	0.35	0
		PE Fusion Failure		0	0.35	0
		Pre 1940 Oxy-Acetylene Girth Welds		NA	NA	NA

Appendix C. Section 2. Table 7-13: Documentation of Risk Assessment Results (West Division)

Region	Primary Threat	Sub-Threat	Facility Type	FOF Score	COF Score	Relative Risk
West	Equipment Failure	Valves		01875	0.70	0.1313
		Service Regulators		0.625	0.35	0.0219
		Control or Relief Station Equipment		0	0.35	0
		Mechanical Couplings		0	0.35	0

Appendix C. Section 2. Table 7-14: Documentation of Risk Assessment Results (West Division)

Region	Primary Threat	Sub-Threat	Facility Type	FOF Score	COF Score	Relative Risk
West	Incorrect Operation	Operating Errors		0.01	0.35	0.0035
		Service Lines Bored Thru Sewer		0	0.35	0
	Other	Bell Joints		NA	NA	NA
		Copper Services Pipe Puncture		NA	NA	NA

Appendix C. Section 2. Table 7-15: Documentation of Risk Assessment Results (Central Division)

Region	Primary Threat	Sub-Threat	Facility Type	FOF Score	COF Score	Relative Risk
Central	Corrosion	Cast Iron		NA	NA	NA
		Ductile Iron		NA	NA	NA
		Bare Steel (No CP)		0	0	0
		Bare Steel (w/CP)		NA	NA	NA
		Coated Steel (No CP)		NA	NA	NA
		Coated Steel (w/CP) - mains		0	0.55	0
		Coated Steel (w/CP) - services		0	0.55	0
		Copper Services		NA	NA	NA
		Stray Current		0	0.55	0
		Internal Corrosion		0	0.55	0
		Atmospheric Corrosion		2.25	0.55	1.238

Appendix C. Section 2. Table 7-16: Documentation of Risk Assessment Results (Central Division)

Region	Primary Threat	Sub-Threat	Facility Type	FOF Score	COF Score	Relative Risk
Central	Natural Forces	Seismic Activity		NA	NA	NA
		Earth Movement/ Landslide		NA	NA	NA
		Frost Heave		NA	NA	NA
		Flooding		0	0	0
		Overpressure due to Snow-Ice Blockage		NA	NA	NA
		Tree Roots		0.25	0.61	0.153

Appendix C. Section 2. Table 7-17: Documentation of Risk Assessment Results (Central Divison)

Region	Primary Threat	Sub-Threat	Facility Type	FOF Score	COF Score	Relative Risk
Central	Excavation Damage	Improper Excavation Practice		0.025	0.55	0.138
		No Call for Locate		0.025	0.55	0.138
		Late or No Locate		0.025	0.55	0.25
		Mis-marked Facilities		0.05	0.55	0.0275
		Incorrect Facility Records		0.05	0.55	0.0275

Appendix C. Section 2. Table 7-18: Documentation of Risk Assessment Results (Central Division)

Region	Primary Threat	Sub-Threat	Facility Type	FOF Score	COF Score	Relative Risk
Central	Other Outside Force	Vehicle Damage to Riser		0.075	0.35	0.0263
		Vehicle Damage to above ground equipment or station (not risers)		0	0.35	0
		Vandalism		0	0.35	0
		Structure Fire		0	0.35	0

Appendix C. Section 2. Table 7-19: Documentation of Risk Assessment Results (Central Division)

Region	Primary Threat	Sub-Threat	Facility Type	FOF Score	COF Score	Relative Risk
Central	Material, Weld or Joint Failure	MDPE 2406 - mains		0	0.55	0
		MDPE 2406 - services		1	0.55	1
		Aldyl A		na	na	na
		HDPE 3306		NA	NA	NA
		PVC		NA	NA	NA
		ABS		NA	NA	NA
		CAB		NA	NA	NA
		PB		NA	NA	NA
		Delrin Insert Tap Tees and/or Plexco Service Tee Celcon Caps		0	0.35	0
		PE Fusion Failure		0	0.35	0
		Pre 1940 Oxy-Acetylene Girth Welds		0	0	0

Appendix C. Section 2. Table 7-20: Documentation of Risk Assessment Results (Central Division)

Region	Primary Threat	Sub-Threat	Facility Type	FOF Score	COF Score	Relative Risk
Central	Equipment Failure	Valves		0.0125	0.2	0.0025
		Service Regulators		0.225	0.61	0.137
		Control or Relief Station Equipment		0	0.35	0
		Mechanical Couplings		0.0045	0.35	0.00158

Appendix C. Section 2. Table 7-21: Documentation of Risk Assessment Results (Central Division)

Region	Primary Threat	Sub-Threat	Facility Type	FOF Score	COF Score	Relative Risk
Central	Incorrect Operation	Operating Errors		0	0.35	0
		Service Lines Bored Thru Sewer		0	0.35	0
	Other	Bell Joints		NA	0.61	NA
		Copper Services Pipe Puncture		NA	NA	NA

Appendix C. Section 2. Table 7-22: Summary of Risk Evaluation and Ranking Results

Threat	Max Risk Score in any Region	Min Risk Score in any Region	% of Regions in System with Risk Score Range			
			0.76 – 1.00	0.51 – 0.75	0.26 – 0.50	0.10 – 0.25
Corrosion						
Cast Iron Mains	0	0	0	0	0	0
Bare Steel Mains with no CP - mains	2.02	0.591	33	33	0	0
Bare Steel Mains with no CP - services	0.563	0.3938	0	33	33	0
Bare Steel Mains with CP	NA	NA	NA	NA	NA	NA
Atmospheric Corrosion	1.575	0.197	66	0	0	33
Copper Services	NA	NA	NA	NA	NA	NA
Coated Steel Mains(with CP)	0.0492	0	0	0	0	33
Coated Steel Svcs (with CP)	0.3938	0	0	0	33	0
Coated Steel Mains (No CP)	NA	NA	NA	NA	NA	NA
Coated Steel Svcs (No CP)	NA	NA	NA	NA	NA	NA
Other Mains	NA	NA	NA	NA	NA	NA
Stray current	0.04375	0	0	0	0	33
Natural Forces						
Seismic	NA	NA	NA	NA	NA	NA
Earth Movement / Landslide	NA	NA	NA	NA	NA	NA
Tree Roots	0.153	0.035	0	0	0	100
Frost Heave / Temperature Mains	NA	NA	NA	NA	NA	NA
Flood Mains	0	0	0	0	0	0
	0	0	0	0	0	0

Appendix C. Section 2. Table 7-22: Summary of Risk Evaluation and Ranking Results

(Continued)

Threat	Max Risk Score in any Region	Min Risk Score in any Region	% of Regions in System with Risk Score Range			
			0.76 – 1.00	0.51 – 0.75	0.26 – 0.50	0.10 – 0.25
Ice/Snow Blockage of Control Equip - Mains	NA	NA	NA	NA	NA	NA
Ice/Snow Blockage of Control Equip - Services	NA	NA	NA	NA	NA	NA
Excavation Damage						
Excavation Damage – Improper Excavation Practice	0.138	0.04375	0	0	0	100
Excavation Damage – No Call for Locate	0.1525	0.04375	0	0	0	100
Excavation Damage – Late or No Locate	0.25	0.0175	0	0	33	66
Excavation Damage – Mis-marked Facilities	0.0275	0.0175	0	0	0	100
Excavation Damage – Incorrect Facility Records	0.0275	0.0175	0	0	0	100
Other Outside Force						
Vehicle Damage Mains	0	0	0	0	0	0
Vehicle Damage	0.0305	0.0035	0	0	0	100
Vandalism	0.0061	0	0	0	0	33
	0	0	0	0	0	0
Fire / Explosion	0.00305	0.00175	0	0	0	66
Material, Weld or Joint Failure						
PVC Mains	NA	NA	NA	NA	NA	NA
ABS Mains	NA	NA	NA	NA	NA	NA

Appendix C. Section 2. Table 7-22: Summary of Risk Evaluation and Ranking Results (Continued)

Threat	Max Risk Score in any Region	Min Risk Score in any Region	% of Regions in System with Risk Score Range			
			0.76 – 1.00	0.51 – 0.75	0.26 – 0.50	0.10 – 0.25
Material, Weld or Joint Failure (continued)						
Aldyl A Mains	0	0	0	0	0	0
Aldyl A Services	0.315	0	0	0	33	0
MDPE 2406 Mains	0.04575	0	0	0	0	33
MDPE 2406 Services	1.0	0.04575	33	0	0	33
HDPE 3306 Mains	NA	NA	NA	NA	NA	NA
Other Plastic Pipe Mains	NA	NA	NA	NA	NA	NA
Delrin Insert Tap Tees Fittings	0	0	0	0	0	0
Plexco Service Tee Celcon Caps Fittings	0.0011	0	0	0	0	0
Pre 1940 OA girth welds	NA	NA	NA	NA	NA	NA
PE Fusion failure - mains	0.0203	0	0	0	0	33
PE Fusion failure - services	0.0305	0	0	0	0	33
Equipment Failure						
Valves Mains	0.1313	0.0025	0	0	0	100
Service Regulators	0.151	0.0219	0	0	0	100
Control/Relief Station	0	0	0	0	0	0
Mechanical Couplings	0.0219	0.00158	0	0	0	66
Other	0	0	0	0	0	0

Appendix C. Section 2. Table 7-22: Summary of Risk Evaluation and Ranking Results

(Continued)

Threat	Max Risk Score in any Region	Min Risk Score in any Region	% of Regions in System with Risk Score Range			
			0.76 – 1.00	0.51 – 0.75	0.26 – 0.50	0.10 – 0.25
Incorrect Operation						
Operating Error	0.0153	0.0035	0	0	0	66
Service Line bored thru Sewer	0	0	0	0	0	0
Other	0	0	0	0	0	0
Other						
Bell Joint Leakage	0	0	0	0	0	0
Copper Pipe Puncture - Svcs	NA	NA	NA	NA	NA	NA
Other	0	0	0	0	0	0

APPENDIX D
IDENTIFICATION AND IMPLEMENTATION OF MEASURES TO ADDRESS RISKS

Appendix D. Section 1. Table 8-1: Key Requirements of the Leak Management Program

Program Element	Reference to Requirement Established in the Standard or Procedure
Qualification/Training requirements for personnel conducting leak survey	FPU Operator Qualification Program
Auditing and Quality Assurance of Leak Survey Equipment	FPU Procedure LC-5
Criteria for leak severity classification	FPU Procedure LC-4
Established Frequency of Leak Survey in Business Districts, at intervals not exceeding 15 months, but at least once each calendar year.	FPU O&M Manual Section 1.2.1.1
Established Frequency of Leak Survey for Cathodically Unprotected Lines subject to §192.465(e) on which electrical surveys for corrosion are impractical, at least once every 3 calendar years at intervals not exceeding 39 months.	FPU O&M Manual Section 1.2.1.2
Established Frequency of Leak Survey of Remaining Lines at least once every 5 calendar years at intervals not exceeding 63 months.	FPU O&M Manual Section 1.2.1.2
Hazardous Leaks Requiring Immediate Repair – Ongoing action required	FPU Procedure LC-4, FPU O&M Manual Section 1.2.2.1
Non-hazardous Leaks Requiring Scheduled Repair – Time limit is established to Eliminate Leak	FPU Procedure LC-4, FPU O&M Manual Section 1.2.2.1
Non-Hazardous Leak NOT requiring scheduled repair– Monitoring Requirements established	FPU Procedure LC-4, FPU O&M Manual Section 1.2.2.1
Records and Data Management procedures defined	Florida Administrative Code Chapter 25-12, 12.060

Appendix D. Section 3. Table 8-3: Corrosion Action Plans

Sub-Threat	Corrosion Action Plan Scope	Status	Officer / Manager Responsible
Cast Iron Pipe	Approximately 2000 feet of cast iron pipe is in service as of July 2016. This pipe will be replaced as part of our bare steel replacement program.	As of 2019, no known cast iron in system.	South Division Operations Managers
Bare Steel (No CP)	FPUC has a ten year bare steel replacement program in place known as Gas Reliability Infrastructure Program (GRIP) which began in 2012. As of July 2016 approximately 191 miles of a total of 351 miles of bare steel pipe has been replaced.	In progress	South & West Division Operations Managers

Appendix D. Section 3. Table 8-3: Corrosion Action Plans (continued)

Sub-Threat	Corrosion Action Plan Scope	Status	Officer / Manager Responsible
Coated Steel with CP	No Additional or Accelerated Actions Planned		

Appendix D. Section 3. Table 8-3: Corrosion Action Plans (continued)

Sub-Threat	Corrosion Action Plan Scope	Status	Officer / Manager Responsible
Atmospheric Corrosion (South Florida Division)	Meter readers conduct atmospheric corrosion surveys quarterly. If atmospheric corrosion is identified, a work order is generated and a crew is dispatched to address/correct the atmospheric corrosion.	In Progress	Division Operations Manager.
Wrapping of Anodeless Risers (South Division)	Discontinue practice of wrapping anodeless risers	In Progress	Division Operations Managers
	Replace corroded risers as they are encountered	In Progress	Division Operations Managers
Atmospheric Corrosion (West Division)	All the techs that perform meter inspections, inspect during any field visit to a customer premise. Patrolling surveys note signs of Atmospheric Corrosion. A program is in place to do these field inspections during Annual Reads Program.	In Progress	Division Operations Manager.

Appendix D. Section 5. Table 8-5: Excavation Damage Action Plans

Sub-Threat	Excavation Damage Action Plan Scope	Status	Officer / Manager Responsible
Improper Excavation Practice (All Divisions)	Track dig-ins and identify problem excavators. Provide targeted education, & field inspections. Meet with repeat offenders if deemed necessary.	In progress	Division Operations Managers
	Provide One Call literature to Equipment Rental Companies, etc. to increase awareness	In progress	Division Operations Managers
	Conduct pre-construction meeting or site-visits for excavation near critical or high risk facilities.	In Progress	Division Operations Managers
		In Progress	Division Operations Managers
Facility Not Located or Marked (All Divisions)	Analyze root cause and implement corrective action when identified. Require written investigation of each damaged facility.	In progress	Division Operations Managers

Appendix D. Section 5. Table 8-5: Excavation Damage Action Plans (continued)

Sub-Threat	Excavation Damage Action Plan Scope	Status	Officer / Manager Responsible
Lack of Tracer Wire (All Divisions)	Contact excavator regarding the pertinent facilities and pothole if necessary. Attempt to create records of said facilities for future excavation. Utilize alternative methods to locate facilities.	In Progress	Division Operations Managers.
Mis-marked Facilities (All Divisions)	Monitor and track for dig-ins resulting from mis-marked facilities. Analyze root cause and implement corrective action, including procedure reviews. Requires written investigation of each incident.	In Progress	Division Operations Managers.
Incorrect Facility Records			
	Monitor timeliness of as-built mapping for new and/or reconstructed facilities. Continue process for indicating existence of plans for new construction or reconstruction on facility maps/records.	In Progress	Division Operations Managers

Table 8-7: Example Material, Weld or Joint Failure Action Plans

Sub-Threat	Material, Weld or Joint Failure Action Plan Scope	Status	Officer / Manager Responsible
Aldyl A	Continue documenting Aldyl A locations with stress or brittle like cracking.	In Progress	Division Operations Managers
	Determine whether leak history on Aldyl A warrants additional or accelerated actions.	In Progress	Division Operations Managers
Delrin Insert Tap Tees	No additional or accelerated actions planned.		
Plexco Service Tee Celcon Caps	No additional or accelerated actions planned.		

Appendix D. Section 8. Table 8-8: Equipment Failure Action Plans

Sub-Threat	Equipment Failure Action Plan Scope	Status	Officer / Manager Responsible
Valves – Kerotest Gate Valves, South and Central Division	Monitor these valves during normal maintenance activities and records review.	In Progress	Division Operations Managers
		In Progress	Division Operations Managers
Service Regulators	Monitor data on the cause of service regulator failures and document the manufacturer of the service regulator.	In Progress	Division Operations Managers
	Establish replacement program if failure history warrants	In Progress	Division Operations Managers
	All Divisions currently tracking regulators (American 1813C-majority of regulators in South Division) that result in grade 1 leaks.	In progress	South Division Compliance Manager

Appendix D. Section 10. Table 8-10: Other Action Plans

Sub-Threat	Other Action Plan Scope	Status	Officer / Manager Responsible
Incorrect Records Completion (All Divisions)	No additional or accelerated actions planned.		

APPENDIX E
MEASUREMENT OF PERFORMANCE, MONITORING RESULTS, AND EVALUATION EFFECTIVENESS

Appendix E. Section 1. Table 9-1: Number of **hazardous leaks** either eliminated or repaired, per §192.703(c), categorized by cause

(South Division)

Performance Measure	5-Year Average 2015-19	Year 2019	Established Baseline	Criteria for Re-evaluation of Threats and Risks	Re-Evaluation Required? Y / N
Number of Hazardous Leaks Eliminated or Repaired – Corrosion - **MAINS**	0.00371	0.00448	5-Yr Average Leaks/Mile/Yr 0.00557	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Corrosion - SERVICES	0.10825	0.07523	5-Yr Average Leaks/Mile/Yr 0.12233	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Natural Forces - **MAINS**	0.00031	0	5-Yr Average Leaks/Mile/Yr 0.00048	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Natural Forces - SERVICES	0.00566	0.00418	5-Yr Average Leaks/Mile/Yr 0.00527	Moving 5-Yr Average is an increase of 5% or more from established baseline	An increase of over 5%, but no additional actions taken due to small # of leaks.
Number of Hazardous Leaks Eliminated or Repaired – Excavation Damage - **MAINS**	0.03481	0.04484	5-Yr Average Leaks/Mile/Yr 0.03022	Moving 5-Yr Average is an increase of 5% or more from established baseline	**YES** – Continue with action plans. (Ref. Appendix D. Section 5. Table 8-5)
Number of Hazardous Leaks Eliminated or Repaired – Excavation Damage - SERVICES	0.39612	0.40960	5-Yr Average Leaks/Mile/Yr 0.40740	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO

Number of Hazardous Leaks Eliminated or Repaired – Other Outside Force Damage – **MAINS**	0.00078	0	5-Yr Average Leaks/Mile/Yr 0.00094	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Other Outside Force Damage – SERVICES	0.01824	0.01463	5-Yr Average Leaks/Mile/Yr 0.01756	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Material, Weld or Joint Failure - **MAINS**	0.00079	0.00075	5-Yr Average Leaks/Mile/Yr 0.00080	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Material, Weld or Joint Failure - SERVICES	0.00346	0.00209	5-Yr Average Leaks/Mile/Yr 0.00437	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Equipment Failure - **MAINS**	0.00142	0	5-Yr Average Leaks/Mile/Yr 0.00174	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Equipment Failure - SERVICES	0.06952	0.06478	5-Yr Average Leaks/Mile/Yr 0.05970	Moving 5-Yr Average is an increase of 5% or more from established baseline	**YES** – due to sand getting inside regulators. Continue with action plans (Ref. Appendix D. Section 8 Table 8-8)
Number of Hazardous Leaks Eliminated or Repaired – Incorrect Operation - **MAINS**	0.00046	0.00075	5-Yr Average Leaks/Mile/Yr 0.00048	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO

Number of Hazardous Leaks Eliminated or Repaired – Incorrect Operation - SERVICES	0.00925	0.00627	5-Yr Average Leaks/Mile/Yr 0.00889	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Other - **MAINS**	0.00016	0	5-Yr Average Leaks/Mile/Yr 0.00016	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Other - SERVICES	0.00440	0.00209	5-Yr Average Leaks/Mile/Yr 0.00578	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO

Appendix E. Section 1. Table 9-1: Number of **hazardous leaks** either eliminated or repaired, per §192.703(c), categorized by cause

(Central Division)

Performance Measure	5-Year Average 2015-19	Year 2019	Established Baseline	Criteria for Re-evaluation of Threats and Risks	Re-Evaluation Required? Y / N
Number of Hazardous Leaks Eliminated or Repaired - Corrosion-**MAINS**	0	0	5-Yr Average Leaks/Mile/Yr 0.00032	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired - Corrosion-Services	0.03231	0.04994	5-Yr Average Leaks/Mile/Yr 0.03641	Moving 5-Yr Average is an increase of 5% or more from established baseline	**NO**
Number of Hazardous Leaks Eliminated or Repaired – Natural Forces-**Mains**	0	0	5-Yr Average Leaks/Mile/Yr 0.00032	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Natural Forces-Services	0.00823	0	5-Yr Average Leaks/Mile/Yr 0.00911	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Excavation Damage-**Mains**	0.02616	0.02295	5-Yr Average Leaks/Mile/Yr 0.02804	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Excavation Damage-Services	0.25950	0.26123	5-Yr Average Leaks/Mile/Yr 0.24775	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Other Outside Force Damage-**Mains**	0	0	5-Yr Average Leaks/Mile/Yr	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO.

			0		
Number of Hazardous Leaks Eliminated or Repaired – Other Outside Force Damage-Services	0.01384	0.01921	5-Yr Average Leaks/Mile/Yr 0.01088	Moving 5-Yr Average is an increase of 5% or more from established baseline	An increase of over 5%, but no additional actions taken due to small # of leaks.
Number of Hazardous Leaks Eliminated or Repaired – Material, Weld or Joint Failure-**Mains**	0.00153	0	5-Yr Average Leaks/Mile/Yr 0.00185	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Material, Weld or Joint Failure-Services	0.00485	0.00384	5-Yr Average Leaks/Mile/Yr 0.00494	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Equipment Failure-**Mains**	0	0	5-Yr Average Leaks/Mile/Yr 0.00065	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Equipment Failure-Services	0.02740	0.04226	5-Yr Average Leaks/Mile/Yr 0.01983	Moving 5-Yr Average is an increase of 5% or more from established baseline	**YES** – due to sand getting inside regulators. See action plans (Ref. Appendix D. Section 8 Table 8-8)
Number of Hazardous Leaks Eliminated or Repaired – Incorrect Operation-**Mains**	0.00057	0.00287	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Incorrect Operation-Services	0	0	5-Yr Average Leaks/Mile/Yr	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO

			0.0		
Number of Hazardous Leaks Eliminated or Repaired – Other - **Mains**	0	0	5-Yr Average Leaks/Mile/Yr 0.00032	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Other - Services	0.01867	0	5-Yr Average Leaks/Mile/Yr 0.02131	Moving 5-Yr Average is an increase of 5% or more from established baseline	**NO**

Appendix E. Section 1. Table 9-1: Number of **hazardous leaks** either eliminated or repaired, per §192.703(c), categorized by cause

(West Division)

Performance Measure	5-Year Average 2015-19	Year 2019	Established Baseline	Criteria for Re-evaluation of Threats and Risks	Re-Evaluation Required? Y / N
Number of Hazardous Leaks Eliminated or Repaired – Corrosion - **Mains**	0.00433	0	5-Yr Average Leaks/Mile/Yr 0.00679	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired - Corrosion-Services	0.02869	0.01643	5-Yr Average Leaks/Mile/Yr 0.02917	Moving 5-Yr Average is an increase of 5% or more from established baseline	**NO**
Number of Hazardous Leaks Eliminated or Repaired – Natural Forces-**Mains**	0.00043	0	5-Yr Average Leaks/Mile/Yr 0.00066	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Natural Forces-Services	0.00514	0.00821	5-Yr Average Leaks/Mile/Yr 0.00350	Moving 5-Yr Average is an increase of 5% or more from established baseline	An increase of over 5%, but no additional actions taken due to small # of leaks.
Number of Hazardous Leaks Eliminated or Repaired – Excavation Damage-**Mains**	0.01692	0.02419	5-Yr Average Leaks/Mile/Yr 0.01365	Moving 5-Yr Average is an increase of 5% or more from established baseline	**YES** – Continue with action plans. (Ref. Appendix D. Section 5. Table 8-5)
Number of Hazardous Leaks Eliminated or Repaired – Excavation Damage-Services	0.13175	0.11910	5-Yr Average Leaks/Mile/Yr 0.12772	Moving 5-Yr Average is an increase of 5% or more from established baseline	**NO**

Number of Hazardous Leaks Eliminated or Repaired – Other Outside Force Damage-**Mains**	0.00106	0.00105	5-Yr Average Leaks/Mile/Yr 0.00108	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Other Outside Force Damage-Services	0.00689	0.00821	5-Yr Average Leaks/Mile/Yr 0.00524	Moving 5-Yr Average is an increase of 5% or more from established baseline	An increase of over 5%, but no additional actions taken due to small # of leaks.
Number of Hazardous Leaks Eliminated or Repaired – Material, Weld or Joint Failure-**Mains**	0.00043	0	5-Yr Average Leaks/Mile/Yr 0.00088	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Material, Weld or Joint Failure-Services	0.00004	0	5-Yr Average Leaks/Mile/Yr 0.00366	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Equipment Failure-**Mains**	0.00086	0.00105	5-Yr Average Leaks/Mile/Yr 0.00065	Moving 5-Yr Average is an increase of 5% or more from established baseline	An increase of over 5%, but no additional actions taken due to small # of leaks.
Number of Hazardous Leaks Eliminated or Repaired – Equipment Failure-Services	0.06883	0.16838	5-Yr Average Leaks/Mile/Yr 0.03515	Moving 5-Yr Average is an increase of 5% or more from established baseline	**YES** – due to sand getting inside regulators. Continue with action plans (Ref. Appendix D. Section 8 Table 8-8)

Number of Hazardous Leaks Eliminated or Repaired – Incorrect Operation-**Mains**	0.00086	0.00105	5-Yr Average Leaks/Mile/Yr 0.00087	Moving 5-Yr Average is an increase of 5% or more from established baseline	**NO**
Number of Hazardous Leaks Eliminated or Repaired – Incorrect Operation-Services	0.01314	0.06571	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Other-**Mains**	0.00171	0	5-Yr Average Leaks/Mile/Yr 0.00171	Moving 5-Yr Average is an increase of 5% or more from established baseline	**NO**
Number of Hazardous Leaks Eliminated or Repaired – Other-Services	0.03134	0.00411	5-Yr Average Leaks/Mile/Yr 0.03240	Moving 5-Yr Average is an increase of 5% or more from established baseline	**NO**

Appendix E. Section 2. Table 9-2: Number of Excavation Damages **(All Divisions)**

Performance Measure	5-Year Average 2015-19	Year 2019	Established Baseline	Criteria for Re-evaluation of Threats and Risks	Re-Evaluation Required? Y / N
Number of Excavation Damages - **Mains**	80.4	99	**2018** damages resulting in need to repair or replace 87	Increase of 5% or more from established baseline	**YES** – Continue with action plans. (Ref. Appendix D. Section 5. Table 8-5)
Number of Excavation Damages - Services	283.6	293	**2018** damages resulting in need to repair or replace 280	Increase of 5% or more from established baseline	NO

Appendix E. Section 3. Table 9-3: Number of Excavation Tickets **(All Divisions)**

Performance Measure	5-Year Average 2015-19	Year 2019	Established Baseline	Criteria for Re-evaluation of Threats and Risks	Re-Evaluation Required? Y / N
Number of Excavation Tickets received from the notification center	130,478.4	142,549	**2018** number of excavation tickets 144,684	Increase of 5% or more from established baseline	**YES** – Continue with action plans. (Ref. Appendix D. Section 5. Table 8-5)

Appendix E. Section 4. Table 9-4: Number of **leaks** either eliminated or repaired, categorized by cause **(South Division)**

Performance Measure	5-Year Average 2015-19	Year 2019	Established Baseline	Criteria for Re-evaluation of Threats and Risks	Re-Evaluation Required? Y / N
Total Number of Leaks Eliminated or Repaired – Corrosion - **MAINS**	0.01242	0.01495	5-Yr Average Leaks/Mile/Yr 0.01705	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total Number of Leaks Eliminated or Repaired – Corrosion – Services	0.33172	0.29675	5-Yr Average Leaks/Mile/Yr 0.34541	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total Number of Leaks Eliminated or Repaired – Natural Forces- **MAINS**	0.00940	0	5-Yr Average Leaks/Mile/Yr 0.00110	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total Number of Leaks Eliminated or Repaired – Natural Forces– Services	0.00695	0.00627	5-Yr Average Leaks/Mile/Yr 0.00704	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total Number of Leaks Eliminated or Repaired – Excavation Damage- **MAINS**	0.03621	0.04484	5-Yr Average Leaks/Mile/Yr 0.03275	Moving 5-Yr Average is an increase of 5% or more from established baseline	**YES** – Continue with action plans. (Ref. Appendix D. Section 5. Table 8-5)
Total Number of Leaks Eliminated or Repaired – Excavation Damage– Services	0.41312	0.42422	5-Yr Average Leaks/Mile/Yr 0.42551	Moving 5-Yr Average is an increase of 5% or more from established baseline	**NO**
Total Number of Leaks Eliminated or Repaired – Other Outside Force Damage- **MAINS**	0.00093	0	5-Yr Average Leaks/Mile/Yr 0.00110	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total Number of Leaks Eliminated or Repaired – Other Outside Force Damage– Services	0.02000	0.01463	5-Yr Average Leaks/Mile/Yr 0.01976	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total Number of Leaks Eliminated or Repaired – Material, Weld or Joint Failure- **MAINS**	0.00315	0.00149	5-Yr Average Leaks/Mile/Yr 0.00350	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO

Total Number of Leaks Eliminated or Repaired – Material, Weld or Joint Failure– Services	0.01084	0.01254	5-Yr Average Leaks/Mile/Yr 0.01144	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total Number of Leaks Eliminated or Repaired – Equipment Failure- **MAINS**	0.00548	0.00299	5-Yr Average Leaks/Mile/Yr 0.00602	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total Number of Leaks Eliminated or Repaired – Equipment Failure– Services	0.15602	0.17972	5-Yr Average Leaks/Mile/Yr 0.12590	Moving 5-Yr Average is an increase of 5% or more from established baseline	**YES** – due to sand getting inside regulators. See action plans (Ref. Appendix D. Section 8 Table 8-8)
Total Number of Leaks Eliminated or Repaired – Incorrect Operation- **MAINS**	0.00185	0.00149	5-Yr Average Leaks/Mile/Yr 0.00188	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total Number of Leaks Eliminated or Repaired – Incorrect Operation– Services	0.01783	0.02299	5-Yr Average Leaks/Mile/Yr 0.01413	Moving 5-Yr Average is an increase of 5% or more from established baseline	An increase of over 5%, but no additional actions taken due to small # of leaks.
Total Number of Leaks Eliminated or Repaired – Other- **MAINS**	0.00111	0	5-Yr Average Leaks/Mile/Yr 0.00176	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total Number of Leaks Eliminated or Repaired – Other– Services	0.01055	0.00418	5-Yr Average Leaks/Mile/Yr 0.01285	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO

Appendix E. Section 5. Table 9-5: Number of hazardous leaks either eliminated or repaired, per §192.703(c), categorized by **material**

(South Division)

Performance Measure	5-Year Average 2015-19	Year 2019	Established Baseline	Criteria for Re-evaluation of Threats and Risks	Re-Evaluation Required? Y / N
Number of Hazardous Leaks Eliminated or Repaired – Cast Iron- **MAINS**	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO. As of 2019 FDOT 7100 report. No cast iron in system
Number of Hazardous Leaks Eliminated or Repaired – Bare Steel- **MAINS**	0.00575	0.00598	5-Yr Average Leaks/Mile/Yr 0.00731	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Bare Steel- SERVICES	0.05278	0.03344	5-Yr Average Leaks/Mile/Yr 0.06760	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Coated Steel with CP- **MAINS**	0.00448	0.00598	5-Yr Average Leaks/Mile/Yr 0.00458	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Coated Steel with CP- Services	0.04323	0.03762	5-Yr Average Leaks/Mile/Yr 0.04377	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Polyethylene All other - **MAINS**	0.03160	0.03662	5-Yr Average Leaks/Mile/Yr 0.02849	Moving 5-Yr Average is an increase of 5% or more from established baseline	**YES** – Continue action plans. See action plans. (Ref. Appendix D. Section 5. Table 8-5)
Number of Hazardous Leaks Eliminated or Repaired – Polyethylene All other - services	0.42631	0.42422	5-Yr Average Leaks/Mile/Yr 0.43018	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO

Number of Hazardous Leaks Eliminated or Repaired – Aldyl A - **MAINS**	0.00045	0.00149	5-Yr Average Leaks/Mile/Yr 0.00015	Moving 5-Yr Average is an increase of 5% or more from established baseline	**YES** – Continue action plans. See action plans. (Ref. Appendix D. Section 5. Table 8-7)
Number of Hazardous Leaks Eliminated or Repaired – Aldyl A - Services	0.00740	0.00627	5-Yr Average Leaks/Mile/Yr 0.00837	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO

Appendix E. Section 4. Table 9-4: Number of leaks either eliminated or repaired, categorized by cause **(Central Division)**

Performance Measure	5-Year Average 2015-19	Year 2019	Established Baseline	Criteria for Re-evaluation of Threats and Risks	Re-Evaluation Required? Y / N
Total Number of Leaks Eliminated or Repaired – Corrosion – **MAINS**	0.00029	0.00143	5-Yr Average Leaks/Mile/Yr 0.00129	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total Number of Leaks Eliminated or Repaired – Corrosion - Services	0.15427	0.2036	5-Yr Average Leaks/Mile/Yr 0.15844	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total Number of Leaks Eliminated or Repaired – Natural Forces– **mains**	0.00029	0.00143	5-Yr Average Leaks/Mile/Yr 0.00032	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total Number of Leaks Eliminated or Repaired – Natural Forces– services	0.00985	0	5-Yr Average Leaks/Mile/Yr 0.01073	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total Number of Leaks Eliminated or Repaired – Excavation Damage– **mains**	0.02678	0.02295	5-Yr Average Leaks/Mile/Yr 0.02867	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total Number of Leaks Eliminated or Repaired – Excavation Damage– services	0.2629	0.26123	5-Yr Average Leaks/Mile/Yr 0.25115	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total Number of Leaks Eliminated or Repaired – Other Outside Force Damage– **mains**	0.00030	0	5-Yr Average Leaks/Mile/Yr 0.00030	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total Number of Leaks Eliminated or Repaired – Other Outside Force Damage– services	0.01543	0.02305	5-Yr Average Leaks/Mile/Yr 0.01170	Moving 5-Yr Average is an increase of 5% or more from established baseline	An increase of over 5%, but no additional actions taken due to small # of leaks.
Total Number of Leaks Eliminated or Repaired – Material, Weld or Joint Failure– **mains**	0.00305	0.00143	5-Yr Average Leaks/Mile/Yr 0.00567	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO

Total Number of Leaks Eliminated or Repaired – Material, Weld or Joint Failure– services	0.01718	0.01152	5-Yr Average Leaks/Mile/Yr 0.02272	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total Number of Leaks Eliminated or Repaired – Equipment Failure– **mains**	0.00030	0	5-Yr Average Leaks/Mile/Yr 0.00095	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total Number of Leaks Eliminated or Repaired – Equipment Failure– services	0.13900	0.17287	5-Yr Average Leaks/Mile/Yr 0.10971	Moving 5-Yr Average is an increase of 5% or more from established baseline	**YES** – due to sand getting inside regulators. See action plans (Ref. Appendix D. Section 8 Table 8-8)
Total Number of Leaks Eliminated or Repaired – Incorrect Operation– **mains**	0.00115	0.00574	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total Number of Leaks Eliminated or Repaired – Incorrect Operation– services	0.00077	0.00384	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total Number of Leaks Eliminated or Repaired – Other– **mains**	0.00814	0.00143	5-Yr Average Leaks/Mile/Yr 0.00980	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total Number of Leaks Eliminated or Repaired – Other– services	0.06060	0.04994	5-Yr Average Leaks/Mile/Yr 0.05766	Moving 5-Yr Average is an increase of 5% or more from established baseline	**YES**

Appendix E. Section 5. Table 9-5: Number of hazardous leaks either eliminated or repaired, per §192.703(c), categorized by material

(Central Division)

Performance Measure	5-Year Average 2015-19	Year 2019	Established Baseline	Criteria for Re-evaluation of Threats and Risks	Re-Evaluation Required? Y / N
Number of Hazardous Leaks Eliminated or Repaired – Bare Steel – **MAINS**	0.00000	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO. Bare steel removed from Central Division
Number of Hazardous Leaks Eliminated or Repaired – Bare Steel – services	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO. Bare steel removed from Central Division
Number of Hazardous Leaks Eliminated or Repaired – Coated Steel with CP – **MAINS**	0.00217	0.00143	5-Yr Average Leaks/Mile/Yr 0.00285	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Coated Steel with CP – services	0.03896	0.04610	5-Yr Average Leaks/Mile/Yr 0.05087	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Polyethylene All other– **MAINS**	0.02486	0.02295	5-Yr Average Leaks/Mile/Yr 0.02642	Moving 5-Yr Average is an increase of 5% or more from established baseline	**NO**
Number of Hazardous Leaks Eliminated or Repaired – Polyethylene All other– services	0.25803	0.25354	5-Yr Average Leaks/Mile/Yr 0.23989	Moving 5-Yr Average is an increase of 5% or more from established baseline	**YES** – Continue action plans. See action plans. (Ref. Appendix D. Section 5. Table 8-5)

Appendix E. Section 4. Table 9-4: Number of leaks either eliminated or repaired, categorized by cause **(West Division)**

Performance Measure	5-Year Average 2015-19	Year 2019	Established Baseline	Criteria for Re-evaluation of Threats and Risks	Re-Evaluation Required? Y / N
Total Number of Leaks Eliminated or Repaired – Corrosion – **mains**	0.01273	0.00105	5-Yr Average Leaks/Mile/Yr 0.02684	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total Number of Leaks Eliminated or Repaired - Corrosion-Services	0.05788	0.04107	5-Yr Average Leaks/Mile/Yr 0.06568	Moving 5-Yr Average is an increase of 5% or more from established baseline	**NO**
Total Number of Leaks Eliminated or Repaired – Natural Forces– **mains**	0.00065	0	5-Yr Average Leaks/Mile/Yr 0.0000087	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total Number of Leaks Eliminated or Repaired – Natural Forces-Services	0.00595	0.00821	5-Yr Average Leaks/Mile/Yr 0.00431	Moving 5-Yr Average is an increase of 5% or more from established baseline	An increase of over 5%, but no additional actions taken due to small # of leaks.
Total Number of Leaks Eliminated or Repaired – Excavation Damage– **mains**	0.01692	0.02419	5-Yr Average Leaks/Mile/Yr 0.01365	Moving 5-Yr Average is an increase of 5% or more from established baseline	**YES** – Continue with action plans. (Ref. Appendix D. Section 5. Table 8-5)
Total Number of Leaks Eliminated or Repaired – Excavation Damage-Services	0.13429	0.1232	5-Yr Average Leaks/Mile/Yr 0.12849	Moving 5-Yr Average is an increase of 5% or more from established baseline	**NO**
Total Number of Leaks Eliminated or Repaired – Other Outside Force Damage– **mains**	0.00128	0.00105	5-Yr Average Leaks/Mile/Yr 0.00129	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total Number of Leaks Eliminated or Repaired – Other Outside Force Damage-Services	0.00773	0.00821	5-Yr Average Leaks/Mile/Yr 0.00609	Moving 5-Yr Average is an increase of 5% or more from established baseline	An increase of over 5%, but no additional actions taken due to small # of leaks.
Total Number of Leaks Eliminated or Repaired – Material, Weld or Joint Failure– **mains**	0.00065	0	5-Yr Average Leaks/Mile/Yr 0.00110	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO

Total Number of Leaks Eliminated or Repaired – Material, Weld or Joint Failure-Services	0.07823	0.01643	5-Yr Average Leaks/Mile/Yr 0.07857	Moving 5-Yr Average is an increase of 5% or more from established baseline	**NO**
Total Number of Leaks Eliminated or Repaired – Equipment Failure– **mains**	0.00237	0.00210	5-Yr Average Leaks/Mile/Yr 0.00195	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total Number of Leaks Eliminated or Repaired – Equipment Failure-Services	0.18307	0.31211	5-Yr Average Leaks/Mile/Yr 0.12442	Moving 5-Yr Average is an increase of 5% or more from established baseline	**YES** – due to sand getting inside regulators. See action plans (Ref. Appendix D. Section 8 Table 8-8)
Total Number of Leaks Eliminated or Repaired – Incorrect Operation– **mains**	0.00086	0.00105	5-Yr Average Leaks/Mile/Yr 0.00087	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total Number of Leaks Eliminated or Repaired – Incorrect Operation-Services	0.01396	0.06982	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total Number of Leaks Eliminated or Repaired – Other– **mains**	0.00384	0	5-Yr Average Leaks/Mile/Yr 0.00406	Moving 5-Yr Average is an increase of 5% or more from established baseline	**NO**
Total Number of Leaks Eliminated or Repaired – Other-Services	0.18915	0.12320	5-Yr Average Leaks/Mile/Yr 0.17016	Moving 5-Yr Average is an increase of 5% or more from established baseline	**YES** - instituted a documented review process of data utilized for compiling 7100 reports

Appendix E. Section 5. Table 9-5: Number of **hazardous** leaks either eliminated or repaired, per §192.703(c), categorized by material

(West Division)

Performance Measure	5-Year Average 2015-19	Year 2019	Established Baseline	Criteria for Re-evaluation of Threats and Risks	Re-Evaluation Required? Y / N
Number of Hazardous Leaks Eliminated or Repaired – Bare Steel - **MAINS**	0.00676	0.00105	5-Yr Average Leaks/Mile/Yr 0.00785	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Bare Steel– Services	0.02040	0.00411	5-Yr Average Leaks/Mile/Yr 0.02335	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Coated Steel with CP- **MAINS**	0.00085	0.00105	5-Yr Average Leaks/Mile/Yr 0.00096	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Coated Steel with CP– Services	0.01296	0.00411	5-Yr Average Leaks/Mile/Yr 0.01308	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Polyethylene All other- **MAINS**	0.01867	0.02419	5-Yr Average Leaks/Mile/Yr 0.01513	Moving 5-Yr Average is an increase of 5% or more from established baseline	**YES** – Continue with action plans. See action plans. (Ref. Appendix D. Section 5. Table 8-5)
Number of Hazardous Leaks Eliminated or Repaired – Polyethylene All other – Services	0.15784	0.16427	5-Yr Average Leaks/Mile/Yr 0.14383	Moving 5-Yr Average is an increase of 5% or more from established baseline	**YES** – Continue with action plans. See action plans. (Ref. Appendix D. Section 5. Table 8-5)

APPENDIX F
PERIODIC EVALUATION AND IMPROVEMENT

Appendix F. Table 10-1: Documentation of Re-evaluation of Threats and Risks

Performance Measures that Exceeded Baseline				
Region	**Performance Measure**	**Actual Performance for Year 2015 - 2019**	**Established Baseline**	**Re-evaluation criteria**
SOUTH DIVISION	# of Hazardous Leaks Eliminated or Repaired – Natural Forces - **services**	0.00566	0.00527	Moving 5-Yr Average is an increase of 5% or more from established baseline
SOUTH DIVISION	# of Hazardous Leaks Eliminated or Repaired – Equipment failure - **services**	0.06952	0.05970	Moving 5-Yr Average is an increase of 5% or more from established baseline
SOUTH DIVISION	# of Hazardous Leaks Eliminated or Repaired – Excavation damage - **mains**	0.03481	0.03022	Moving 5-Yr Average is an increase of 5% or more from established baseline
CENTRAL DIVISION	# of Hazardous Leaks Eliminated or Repaired – other outside force – **services**	0.01384	0.01088	Moving 5-Yr Average is an increase of 5% or more from established baseline
CENTRAL DIVISION	# of Hazardous Leaks Eliminated or Repaired – Equipment failure – **services**	0.02740	0.01983	Moving 5-Yr Average is an increase of 5% or more from established baseline
WEST DIVISION	# of Hazardous Leaks Eliminated or Repaired – Excavation - **main**	0.01692	0.01365	Moving 5-Yr Average is an increase of 5% or more from established baseline
WEST DIVISION	# of Hazardous Leaks Eliminated or Repaired – Equipment failure - **main**	0.00086	0.00065	Moving 5-Yr Average is an increase of 5% or more from established baseline
WEST DIVISION	# of Hazardous Leaks Eliminated or Repaired –NF - **services**	0.00514	0.00350	Moving 5-Yr Average is an increase of 5% or more from established baseline

West DIVISION	# of Hazardous Leaks Eliminated or Repaired – Other Outside Force damage – **services**	0.00689	0.00524	Moving 5-Yr Average is an increase of 5% or more from established baseline
West DIVISION	# of Hazardous Leaks Eliminated or Repaired – Equipment failure – **services**	0.06883	0.03515	Moving 5-Yr Average is an increase of 5% or more from established baseline
SOUTH DIVISION	Total # of Leaks Eliminated or Repaired – Excavation damage – **mains**	0.03621	0.03275	Moving 5-Yr Average is an increase of 5% or more from established baseline
SOUTH DIVISION	Total # of Leaks Eliminated or Repaired – Equipment failure – **services**	0.15602	0.12590	Moving 5-Yr Average is an increase of 5% or more from established baseline
SOUTH DIVISION	Total # of Leaks Eliminated or Repaired – Incorrect operation – **services**	0.01783	0.01413	Moving 5-Yr Average is an increase of 5% or more from established baseline
CENTRAL DIVISION	Total # of Leaks Eliminated or Repaired – Other Outside Force damage - **services**	0.01543	0.01170	Moving 5-Yr Average is an increase of 5% or more from established baseline
CENTRAL DIVISION	Total # of Leaks Eliminated or Repaired – Equipment Failure - **services**	0.1390	0.10971	Moving 5-Yr Average is an increase of 5% or more from established baseline
CENTRAL DIVISION	Total # of Leaks Eliminated or Repaired – Other– **services**	0.06060	0.05766	Moving 5-Yr Average is an increase of 5% or more from established baseline
WEST DIVISION	Total # of Leaks Eliminated or Repaired – Excavation - **MAINS**	0.01692	0.01365	Moving 5-Yr Average is an increase of 5% or more from established baseline
WEST DIVISION	Total # of Leaks Eliminated or Repaired – Natural Forces - **services**	0.00595	0.00431	Moving 5-Yr Average is an increase of 5% or more from established baseline
WEST DIVISION	Total # of Leaks Eliminated or Repaired – other outside force - **services**	0.00773	0.00609	Moving 5-Yr Average is an increase of 5% or more from established baseline

WEST DIVISION	Total # of Leaks Eliminated or Repaired – Equipment Failure - **services**	0.18307	0.12442	Moving 5-Yr Average is an increase of 5% or more from established baseline
WEST DIVISION	Total # of Leaks Eliminated or Repaired – Other - **services**	0.18915	0.17016	Moving 5-Yr Average is an increase of 5% or more from established baseline
SOUTH DIVISION	# of Hazardous Leaks Eliminated or Repaired categorized by matl. – Polyethylene - **mains**	0.03160	0.02849	Moving 5-Yr Average is an increase of 5% or more from established baseline
SOUTH DIVISION	# of Hazardous Leaks Eliminated or Repaired categorized by matl. – Aldyl A - **mains**	0.00045	0.00015	Moving 5-Yr Average is an increase of 5% or more from established baseline
CENTRAL DIVISION	# of Hazardous Leaks Eliminated or Repaired categorized by matl. – Polyethylene - **services**	0.25803	0.23989	Moving 5-Yr Average is an increase of 5% or more from established baseline
WEST DIVISION	# of Hazardous Leaks Eliminated or Repaired categorized by matl. – Polyethylene - **mains**	0.01867	0.01513	Moving 5-Yr Average is an increase of 5% or more from established baseline
WEST DIVISION	# of Hazardous Leaks Eliminated or Repaired categorized by matl. – Polyethylene - **services**	0.15784	0.14383	Moving 5-Yr Average is an increase of 5% or more from established baseline
ALL DIVISION	# of Excavation Damages - MAINS	80.4	72	Moving 5-Yr Average is an increase of 5% or more from established baseline
ALL DIVISION	# of Excavation Tickets received from the notification center – MAINS & SERVICES	130,478.4	123,707	Moving 5-Yr Average is an increase of 5% or more from established baseline
NOTES:				
Existing Date for Complete Program re-evaluation: 2021. Is a shorter timeframe for complete program re-evaluation warranted? : NO				

Required frequency	Program Re-evaluation Element	Date Completed
Required Annually	Update Baseline and on-going performance measures	10/22/2020
Required Annually	Annual meeting with Compliance Manager – Mike McCarty (West Division) to review DIMP	10/23/2020
Required Annually	Annual meeting with Operations Supervisor – Glenn Pendleton (Central Division) to review DIMP	10/22/2020
Required Annually	Annual meeting with Compliance Manager – Walter Rossetto (South Division) to review DIMP	10/26/2020
As needed*		
As needed*		
As needed*		
As needed*		
As needed*		

** as needed to address the risk category whose performance measure was exceeded*

SUPPLEMENTAL SECTION

PHMSA JURISDICTIONAL LIQUEFIED PROPANE GAS SYSTEMS

THREAT IDENTIFICATION

13.0 PURPOSE AND OBJECTIVES

The objective of this IM Plan is to establish the requirements to comply with the Code of Federal Regulations (CFR 49) §§ 192.1015 pertaining to integrity management for small LPG operators. This IM Plan does not address how an operator may deviate from the required periodic inspections as provided for in §192.1013.

This is the 5 year review of FPUC's jurisdictional liquefied propane gas systems for the years 2013 - 2017.

Florida Public Utilities Company is divided into three operational divisions. The systems that comprise each division are as follows:

South Florida Division includes Barefoot Bay and Lauderhill.

Central Division consists of Veranda Park

And the West Division consists of Villas at Lake Smart, Newberry and Newton.

Individual DIMP plans have been created for FPUCs jurisdictional Community Gas Systems and are available upon request.

The IM Plan is comprised of seven elements

-Knowledge of Facilities (Section 14)

-Threat Identification (Section 15)

-Evaluation & Ranking of Risk (Section 16)

- Identification & Implementation of Measures to address risk (Section 17)

- Measurement of performance, monitoring results, & evaluating effectiveness (Section 18)

-Periodic evaluation & improvement (Section 19)

- Reporting results (Section 20)

In addition to the key elements, the IM Plan also establishes requirements for reporting of mechanical coupling failures (Section 20)

All elements of this IM Plan where implemented by **August 2, 2011.**

14.0 KNOWLEDGE OF FACILITIES

The objective of this section is to assemble as complete of an understanding of the company's infrastructure as possible using reasonably available information from past and ongoing design, operations and maintenance activities. In addition, this plan will identify what additional information is needed and provide a plan for gaining that information over time through normal activities.

14.1 Type and Location of Records

A summary of the existing records that are utilized by the IM Plan and where they are located is documented in Appendix A, Section 1 (Propane). These records include, but are not limited to, incident and leak history, corrosion control records, continuing surveillance records, patrolling records, maintenance history and excavation damage experience.

14.2 Overview of Past Design, Operations and Maintenance

Record reviews, interviews with SMEs and other means were used to gain an understanding of past design, operations and maintenance history of the distribution system. This information includes operating pressures, materials used in construction and construction practices. This information is documented, or included by reference, in Appendix A, Section 2 (Propane).

14.3 Characteristics of Design, Operations and Environmental Factors

Characteristics of the pipeline's design, operations and environmental factors that are necessary to assess the applicable threats and risks are documented, or included by reference, in Appendix A, Section 3 (Propane).

14.4 Additional Information Needed

Additional information needed to support the IM plan (information that is not reasonably available today) is identified in Appendix A, Section 4 (Propane). Plans for gaining additional information over time through normal activities conducted on the pipeline are documented, or included by reference, in Appendix A, Section 4 (Propane).

14.5 Data Capture for New Construction and Ongoing O&M

Data is continuously collected for both construction of new facilities, reconstruction of existing facilities and ongoing operations and maintenance. In particular, the standard or procedure that require data capture for the location where the new pipeline is installed and the material of which it is constructed is contained in FPU Operations and Maintenance Manual Section 16.0.1.

14.6 Knowledge Capture – Subject Matter Experts

In addition to maps, records, and databases, valuable information for this IM plan was gathered and captured from SMEs. SMEs are individuals who have specialized knowledge based on their experience or training. SMEs were used to supplement existing, incomplete, or missing records and were the best source of information in subjects such as historical operations, maintenance, and construction practices. SME interviews were also utilized to ensure that all threats have been identified.

New SME interviews were conducted for this 5 year plan update and are documented and stored in the Distribution Integrity Management Program files and are available upon request.

15.0 THREAT IDENTIFICATION

The objective of this section of the plan is to identify existing and potential threats to the gas distribution pipeline.

The following categories of threats shall be considered for each gas distribution pipeline:

- Corrosion
- Natural Forces
- Excavation Damage
- Other Outside Force
- Material, Weld or Joint Failure
- Equipment Failure
- Incorrect Operation
- Other concerns that could threaten the integrity of the pipeline.

A review of information gathered for Section 14 and interviews with Subject Matter Experts were used to identify existing and potential threats to the distribution system. **A description of the process used to identify threats is referenced in Appendix B, Section 1 (Propane)**. The threats identified as applicable to the gas distribution pipeline are documented in Appendix B, Section 2 (Propane). Prior versions of the threat identification process and results that are no longer current shall be retained and stored in the Distribution Integrity Management Program files.

16.0 EVALUATION AND RANKING OF RISK

16.1 Objective

Risk analysis is an ongoing process of understanding what factors affect the risk posed by threats to the gas distribution pipeline and where they are relatively more important than others. The primary objectives of the evaluation and ranking of gas distribution pipeline risk are:

- Consider each applicable current and potential threat
- Consider the likelihood of failure associated with each threat
- Consider the potential consequences of such a failure
- Estimate and rank the risks (i.e. determine the relative importance) posed to the pipeline
- Consider the relevance of threats in one location to other areas

NOTE: There were several potential threats identified for the distribution system, but no previous incidents of these threats have occurred. Because there have been no previous incidents of these potential threats, their frequency is zero, thus resulting in a risk calculation of zero. However, some of these potential threats appear in the risk ranking tables with a risk ranking of zero as we are cognizant that they are a potential threat.

16.2 Risk Assessment Process

The current process used for Risk Assessment **(Blended Risk (Subject Matter Expert & data) Evaluation and Ranking Process)** shall be documented, or included by reference, in Appendix C, Section 1 (Propane). Prior risk assessment processes shall be retained and stored in the Distribution Integrity Management Program files.

16.3 Risk Assessment

The current risk assessment **(likelihood, consequence, and resultant risk ranking)** shall be documented, or included by reference, in Appendix C, Section 2 (Propane). Prior risk assessment results shall be retained and stored in the Distribution Integrity Management Program files.

RISK = Consequence (COF) x Likelihood (FOF)

17.0 IDENTIFICATION AND IMPLEMENTATION OF MEASURES TO ADDRESS RISKS

The objective of this section of the IM Plan is to describe existing and proposed measures to address the risks that have been evaluated and prioritized for the jurisdictional liquefied propane gas systems for the 5 year review 2013- 2017 in section 16.

17.1 Leak Management Program

The Leak Management program is established in the Florida Public Utilities Procedure Manual in the section entitled “Leak Control”.

17.1.1 Description of Existing Program

Florida Public Utilities Leak Management Program contains all the essential elements for an effective program. Procedures are in place to 1) Locate the leak, 2) Evaluate its severity, 3) Act appropriately to mitigate the leak, 4) Keep records; and 5) Self assess to determine if additional actions are necessary.

Florida Public Utilities Operations and Maintenance Manual and Emergency Manual address necessary components of effective leak control including, prompt and effective response to gas odor calls, classification of gas leaks, performing leakage surveys at prescribed regulatory intervals and system patrols.

Leaks are repaired in compliance with the prescribed time frames of Chapter 25-12.040 of the Florida Administrative Code.

A summary of the key elements of the Leak Management Program are documented, or included by reference, in Appendix D Section 1 (Propane).

17.2 Other Additional or Accelerated Actions

At this time no additional or accelerated actions for leak management beyond the minimum code requirements specified outside of Part 192 subpart P are planned. In the event additional or accelerated actions are planned in the future, procedures to implement these will be identified.

17.2.1 Corrosion

Per 2013 to 2017 data, Corrosion is the highest ranked risk and leading cause of leaks in FPU's jurisdictional liquefied propane gas systems. It was mostly encountered on the steel services in the South Division, since this is the only division that has steel mains and services. This is reflected in the number of leaks and the risk rankings (Appendix C_Propane Section Ref table S-3). No leaks caused by corrosion were reported in any other division. It should also be noted that the risk ranking number has increased from the last revaluation from 0.057 to 4.1175.

Additional or Accelerated Actions that are currently scheduled or in place in order to reduce the risks associated with corrosion are documented, or included by reference, in Appendix D_Propane Section. Ref table S-5. Prior documentation shall be retained and stored in the Distribution Integrity Management Program files.

17.2.2 Natural Forces

Leaks in FPU's jurisdictional liquefied propane gas systems due to the threat of natural forces are zero to minimal and risk rankings are so low that they are negligible

Because the number of leaks from natural forces is zero, no Additional or Accelerated Actions are scheduled. Prior documentation shall be retained and stored in the Distribution Integrity Management Program files.

17.2.3 Excavation Damage

Per 2013 to 2017 data, Excavation Damage is the second leading cause of leaks in FPU's jurisdictional liquefied propane gas systems. This is reflected in the number of leaks and the risk rankings (Appendix C_Propane Section Ref table S-3). FPU's South Division accounted for most of the excavation damages, due to the fact that the south Division has significantly more buried pipe (47.3 miles) compared to the other two divisions (4.7 miles combined). For the 5 year period 2013 to 2017 there were only 24 leaks reported.

Additional or Accelerated Actions that are currently scheduled or in place in order to reduce the risks associated with corrosion are documented, or included by reference, in Appendix D_Propane Section. Ref table S-5. Prior documentation shall be retained and stored in the Distribution Integrity Management Program files.

17.2.4 Other Outside Force

Leaks in FPU's jurisdictional liquefied propane gas systems due to the threat of Other Outside force are zero to minimal and risk rankings are so low that they are negligible.

Because the number of leaks from Other Outside force is low, and risks rankings from this threat were minimal. No Additional or Accelerated Actions are scheduled. Prior documentation shall be retained and stored in the Distribution Integrity Management Program files.

17.2.5 Material, Weld or Joint Failure

Leaks in FPU's jurisdictional liquefied propane gas systems due to the threat of material, weld, or joint failure are zero to minimal and risk rankings are so low that they are negligible.

As noted in the previous reevaluation, Aldyl A pipe is still believed to exist in the South Division (Barefoot Bay). The same action item remains in place in order to gain better data on the amount of Aldyl A that exists in the system. These actions are documented, or included by reference, in Appendix D_Propane Section. Ref table S-5. Prior documentation shall be retained and stored in the Distribution Integrity Management Program files.

17.2.6 Equipment Failure

Leaks in FPU's jurisdictional liquefied propane gas systems due to the threat of Equipment failure are zero to minimal and risk rankings are so low that they are negligible.

No additional or Accelerated Action threats are planned for the equipment failure. Prior documentation shall be retained and stored in the Distribution Integrity Management Program files.

17.2.7 Incorrect Operation

Leaks in FPU's jurisdictional liquefied propane gas systems due to the threat of Incorrect Operation are zero to minimal and risk rankings are so low that they are negligible.

No additional or Accelerated Action threats are planned for the Incorrect Operation. Prior documentation shall be retained and stored in the Distribution Integrity Management Program files.

17.2.8 Other

Leaks in FPU's jurisdictional liquefied propane gas systems due to other causes are minimal and risk rankings are so low that they are negligible.

Because the number of leaks from other causes is low, and risks rankings from this threat were minimal, no Additional or Accelerated Actions are scheduled. Prior documentation shall be retained and stored in the Distribution Integrity Management Program files.

18.0 MEASUREMENT OF PERFORMANCE, MONITORING RESULTS, AND EVALUATING EFFECTIVENESS

The objective of this section of the plan is to establish performance measures that shall be monitored from an established baseline in order to evaluate the effectiveness of the IM program. The performance measures detailed below have been established in order to monitor performance and assist in the ongoing evaluation of threats.

18.1 Number of Hazardous Leaks either Eliminated or Repaired, per §192.703(c), Categorized by Cause

The baseline and ongoing performance of the number of hazardous leaks either eliminated or repaired, per §192.703(c), categorized by cause, shall be documented, or included by reference, in Appendix E_Propane Section.

18.2 Number of Excavation Damages

The baseline and ongoing performance of the number of excavation damages are included by reference in Appendix E_Propane Section.

18.3 Number of Excavation Tickets (received from the Sunshine State One Call of Florida notification center)

The baseline and ongoing performance of the number of excavation tickets received from the notification center(s) are included by reference in Appendix E_Propane Section.

18.4 Total Number of Leaks either Eliminated or Repaired, Categorized by Cause

The baseline and ongoing performance of the total number of leaks either eliminated or repaired, categorized by cause, are included by reference in Appendix E_Propane Section.

18.5 Number of Hazardous Leaks either Eliminated or Repaired, per §192.703(c), Categorized by Material

The baseline and ongoing performance of the number of hazardous leaks either eliminated or repaired, per §192.703(c), categorized by material, shall be documented, or included by reference, in Appendix E_Propane Section.

19.0 PERIODIC EVALUATION AND IMPROVEMENT

The objective of this section of the plan is to periodically re-evaluate threats and risks on all jurisdictional liquefied propane gas systems and periodically evaluate the effectiveness of its program.

19.1 Plan Updating, Review Frequency and Documentation

This written integrity management plan shall be reviewed annually and updated as required to reflect changes and improvements that have occurred in process, procedures and analysis for each element of the program. The updated integrity plan will be emailed to the operations managers. A complete program re-evaluation shall be completed every five years. All changes to the written plan, inclusive of material from the appendices, shall be recorded on the Revision Control Sheet on page ii. However, changes to material in the appendices that is included by reference need not be recorded on the Revision Control Sheet.

19.2 Effectiveness Review

An assessment of the performance measures described above shall be performed. In cases where the re-evaluation criteria specified is met or exceeded, a re-evaluation of the associated threats and risks shall be completed. **An emerging threat in one or more location shall be evaluated for relevance to other areas**. The re-evaluation of threats and risks shall be documented in Appendix F_Propane Section and the results of the re-evaluation shall be documented in Appendices B_Propane Section and C_Propane Section. The review shall also establish whether a complete program re-evaluation shall be completed in a shorter timeframe than five years; this decision shall also be documented. Past effectiveness reviews that are no longer current shall be retained and stored in the Distribution Integrity Management Program files.

20.0 REPORTING RESULTS

20.1 State & Federal Annual Reporting Requirements

The following four measures shall be reported, annually by March 15, to PHMSA as part of the annual report required by 49 CFR, § 191.11:

- Number of hazardous leaks either eliminated or repaired (or total number of leaks if all leaks are repaired when found), per § 192.703(c), categorized by cause
- Number of excavation damages
- Number of excavation tickets (receipt of information by the underground facility operator(Florida Public Utilities) from the Sunshine State One Call of Florida notification center)
- Total number of leaks either eliminated or repaired, categorized by cause
- Information related to failure of mechanical couplings, excluding those that result only in nonhazardous leaks, shall be reported to PHMSA as part of the annual report required by §191.11 beginning with the report submitted March 15, 2011. This information must include, as available, location of the failure in the pipeline, nominal pipe size, material type, nature of failure including any contribution of local pipeline environment, coupling manufacturer, lot number and date of manufacture, and other information that can be found in markings on the failed coupling. At this time, there are no mechanical fittings in the system. The exception for The South Division (Barefoot Bay), non-have been found, but because the system was purchased, it cannot be said for certain they do not exist.

The State of Florida also exercises jurisdiction over the pipeline; therefore, these five measures shall also be reported to the Florida Public Service Commission. A copy of the reports shall be maintained in the Distribution Integrity Management Program files.

21.0 DOCUMENT AND RECORD RETENTION

The following records shall be retained in the Distribution Integrity Management Program files.

- The most current as well as prior versions of this written IM Plan

- Documents supporting Knowledge of Facilities (material supporting Appendix A_Propane Section, of the IM Plan)
- Documents supporting threat identification (material supporting Appendix B_Propane Section, of the IM Plan)
- Documents supporting risk evaluation and ranking (material supporting Appendix C_Propane Section, of the IM Plan)
- Documents supporting the identification and implementation of measures to address risks (material supporting Appendix D_Propane Section, of the IM Plan)
- Documents supporting measurement of performance, monitoring results and evaluating effectiveness (material supporting Appendix E_Propane Section, of the IM Plan)
- Effectiveness Reviews (material supporting Appendix F_Propane Section, of the IM Plan)
- Annual Reports to PHMSA (as required by §191.11) and State pipeline safety authorities
- Mechanical Coupling Failure Reports

Documentation demonstrating compliance with the requirements of 49 CFR, Part 192, Subpart P shall be retained for at least 10 years.

APPENDIX A (PROPANE)
KNOWLEDGE OF FACILITIES

Appendix A. Section 1 (Propane). Table 5-1: IM Program Records Summary

Record	Record Type – Database, Electronic Record, Paper Record	Applicable Standard, Policy, or Guideline	Extent of Missing Records	Location of Records	Key Contact
Graphic Information System (GIS) database	Database		Largely Unpopulated	FPU Server	GIS Administrator
Wall Maps / Plats	Paper Record		Fairly Complete	Division Offices	Division Operations Supervisors
Gas Service Record Cards	Paper Record		Fairly Complete	Division Offices	Division Operations Supervisors
As-Built Construction Drawings / records	Electronic Record, Paper Record		Fairly Complete	Division Offices	Division Engineering Departments
Gas Leak Repair Records	Paper Record / Electronic		Fairly Complete	Division Offices / FPU servers.	Division Operations Supervisors / GIS Administrator
Gas Leak Repair Database	NA		NA	NA	NA
Gas Leak Survey Records	Paper Record		Fairly Complete	Division Offices	Division Operations Supervisors
DOT/PHMSA Incident Reports	Paper Records		Fairly Complete	Division Offices	Division Operations Manager
Other Incident Reports	Paper Records		Fairly Complete	Division Offices	Division Operations Manager

Appendix A. Section 1 (Propane). Table 5-1: IM Program Records Summary (continued)

Record	Record Type – Database, Electronic Record, Paper Record	Applicable Standard, Policy, or Guideline	Extent of Missing Records	Location of Records	Key Contact
CP Maintenance of Isolated Mains and Services subject to 10% annual inspection	Paper Record		Fairly Complete	Division Offices	Division Operations Supervisors
Cathodic Protection Maintenance Areas (Rectifier and Pipe-to-Soil inspection)	Paper Records		Fairly Complete	Division Offices	Division Operations Supervisors
Atmospheric Corrosion Inspection Records	Paper Record		Fairly Complete	Division Offices	Division Operations Supervisors
Patrol Records	Paper Record		Fairly Complete	Division Offices	Division Operations Supervisors
Valve Maintenance Records	Paper Record		Fairly Complete	Division Offices	Division Operations Supervisors
Regulator Station Maintenance Records	Paper Record		Fairly Complete	Division Offices	Division Operations Supervisors
Requests to Locate Gas Facilities	Electronic Record		Fairly Complete	Division Offices	Division Operations Supervisors
3rd Party Damage Claims	Paper Record		Fairly Complete	Division Offices	Division Operations Supervisors
Pipe Type Maps	Paper Record and Electronic Record		South Division (Barefoot Bay) only, marginal information	Division Offices	Division Operations Supervisors
Exposed Main & Services Reports	Paper Record		Fairly Complete	Division Offices	Division Operations Supervisors

Appendix A. Section 1 (Propane). Table 5-1: IM Program Records Summary (continued)

Record	Record Type – Database, Electronic Record, Paper Record	Applicable Standard, Policy, or Guideline	Extent of Missing Records	Location of Records	Key Contact
Environmental Factor: Areas subject to flood	NA		NA	NA	NA
Environmental Factor: Areas subject to landslide	NA		NA	NA	NA
Environmental Factor: Population Density Records	NA		NA	NA	NA
Environmental Factor: Areas of Wall-to-Wall Paving	NA		NA	NA	NA
SME Interview Records	Paper Record		Complete	DIMP Master File	Gas standards Engineer.

Appendix A. Section 2 (Propane). Table 5-2: Summary of System Design by Operating Pressure

Maximum Operating Pressure	Miles of Main
Intermediate Pressure – 2 psig to 60 psig	53.158

Appendix A. Section 2 (Propane). Table 5-3: Summary of Material Types and Years Installed (all divisions)

Material Type	Mains		Services	
	Current Miles of Main	Years Installed (of remaining)	Number of Services	Years Installed (of remaining)
Cast Iron	0	0	0	0
Wrought Iron	0	0	0	0
Bare Steel – with CP	0	0	0	0
Bare Steel – No CP	0	0	0	0
Coated Steel – with CP (SOUTH DIVISION)	19.3	Unknown	480	Unknown
Coated Steel – no CP	0	0	0	0
Ductile Iron	0	0	0	0
Copper	0	0	0	0
Plastic - PVC	0	0	0	0
Plastic - ABS	0	0	0	0
Plastic – Century MDPE 2306	0	0	0	0
Plastic – Aldyl-A	Unknown	Unknown	0	Unknown
Plastic – HDPE 3306	0	0	0	0
Plastic – All Others (SOUTH DIVISION)	28	Unknown	329	Unknown
Plastic – All Others (CENTRAL DIVISION)	0.432	Unknown	8	Unknown
Plastic – All Others (WEST DIVISION)	5.426	Unknown	434	Unknown

Appendix A. Section 2 (Propane). Table 5-4: Example Summary of Construction Practices

Material Type	Year first deployed	Year Ceased
Replacement via insertion of Copper	NA	NA
Replacement via Insertion of Plastic	NA	NA
Replacement via insertion and pipe bursting/splitting	NA	NA
Internal lining / slip-lining	NA	NA
Joint Trench with other utilities	Not Used (West) ~1965 (South) ~1985 (Central)	Practice Continues in Central and South Divisions
Unguided Bore – soil displacement/ram	~1985	Practice Continues
Guided Directional Bore / Drill	~1990	Practice Continues
Blasting	NA	NA
Plow-in	NA	NA

Appendix A. Section 3 (Propane). Table 5-5: Miles of Mains and Number of Services by Material Type

[Part B1 of PHMSA Form F 7100.1-1 incorporated by reference (all divisions)]

Appendix A. Section 3 (Propane). Table 5-6: Miles of Mains and Number of Service lines by material and nominal diameter

[Part B2 & B3 of PHMSA Form F 7100.1-1 incorporated by reference (all divisions)]

Appendix A. Section 3 (Propane). Table 5-7: Miles of Mains and Number of Services by material and decade

[Part B4 of PHMSA Form F 7100.1-1 incorporated by reference (all divisions)]

Appendix A. Section 3 (Propane). Table 5-8: Number of hazardous leaks either eliminated or repaired, per §192.703(c), categorized by cause (all divisions)

Cause of Leak	Number of Hazardous Leaks – 2017 *	
	MAINS	SERVICES
Corrosion	0	2
Natural Forces	0	0
Excavation	0	2
Other Outside Force	0	1
Material, Weld or Joint Failure	0	0
Equipment Failure	0	1
Incorrect Operation	0	0
Other	0	0

Appendix A. Section 3 (Propane). Table 5-9: Number of Excavation Damages (all divisions)

Year	Number of Excavation Damages	
2017	6	
2016	7	
2015	8	
2014	1	
2013	0	

Appendix A. Section 3 (Propane). Table 5-10: Number of Excavation Tickets (all divisions)

Year	Number of Excavation Tickets
2017	1124
2016	1226
2015	1297
2014	1121
2013	893

Appendix A. Section 3 (Propane). Table 5-11: Number of leaks either eliminated or repaired, categorized by cause (all divisions)

Cause of Leak	Number of leaks eliminated or repaired– 2017	
	MAINS	SERVICES
Corrosion	1	9
Natural Forces	0	0
Excavation	0	4
Other Outside Force	0	2
Material, Weld or Joint Failure	0	0
Equipment Failure	0	0
Incorrect Operation	0	1
Other	0	1

Appendix A. Section 4 (Propane). Table 5-36: Identification of Additional Information Needed for IM Program

Area of incomplete records or Knowledge	Can it be acquired over time through normal activities? Y / N	Does Action Plan Exist? Y / N
Vintage years of facilities	No	Yes
Exact location of pipe facilities including Aldyl A (Only Barefoot Bay – South Division only), Plexco Celcon Tap Service Tees (South Division only)	Yes	Yes
Information on pipe materials currently in the ground.	Yes	Yes
Greater detail on Subthreats of Causes	Yes	Yes

Appendix A. Section 4 (Propane). Table 5-37: Action Plans to Gain Additional Information Over Time

Action Plan Scope Gaining Additional Information	Schedule	Completion Date	Officer / Manager Responsible
Vintage years of facilities -information of new pipe facilities being installed is being captured on FPUC's GIS.		Ongoing project	Division Operations Managers, GIS technicians, & Gas Standards Engineer.
Exact location of pipe facilities including Aldyl A, Plexco Celcon Tap Service Tees -Gained through Exposed Piping Reports and Leak Reports -Leak reports are to be uploaded to GIS which will make it easier to analyze leak report data.		Ongoing Project	Division Operations Managers, GIS technicians, Manager of Engineering, & Gas Standards Engineer
Greater detail on Subthreats of Causes – Gained through modified Leak Reports and additional training on their completion.		Ongoing Project	Division Operations Managers & Gas Standards Engineer

APPENDIX B (PROPANE)
THREAT IDENTIFICATION

Appendix B. Section 1 (PROPANE)

Section 1. Threat Identification Process

[Southern Gas Association, Northeast Gas Association and Structural Integrity Associates, Inc. Subject Matter Expert(SME) Evaluation of Threats Applicable to the Gas Distribution System, incorporated by reference (all divisions)]

Appendix B. Section 2. (Propane)

Threats Identified as applicable to the propane systems

App. B. Section 2 (Propane) Supplemental Table S-1: SME Evaluation of Threats Applicable to the LP Distribution System

Service territory covered by this Assessment: All Divisions				
Primary Threat Category	**Sub-Threat**	**SME's to Consider the following**	**SME Evaluation/Answer**	**Threat Applicable? SME – Yes / No**
Corrosion	Cast Iron Pipe	Does Cast Iron pipe exist in the system?	NO	NO
		Is there a known history of body-of-pipe leaks, fractures, or graphitization?	NO	
		Are certain diameters or parts of the system known to be more prone to failure and leakage than others?	NO	
	Ductile Iron	Do ductile iron pipes exist in the system?	NO	NO
		Is there a known history of body-of-pipe leaks, fractures, or graphitization?	NO	
		Are certain diameters or parts of the system known to be more prone to failure and leakage than others?	NO	
	Bare Steel Pipe (no CP)	Do bare (uncoated) steel main or services exist in the system that are not under CP?	NO	NO
		Is there known evidence of active external corrosion on bare steel pipes not under CP?	NO	
		Is there a history of leakage on bare steel pipes not under CP?	NO	
	Bare Steel Pipe (with CP)	Do bare (uncoated) steel main or services exist in the system that are under CP?	NO	NO
		Is there known evidence of active external corrosion on bare steel pipes under CP?	NO	

		Is there a known history of leakage on bare steel pipes under CP?	NO	

App. B. Section 2 (Propane) Supplemental Table S-1: SME Evaluation of Threats Applicable to the LP Distribution System (continued)

Service territory covered by this Assessment: All Divisions				
Primary Threat Category	**Sub-Threat**	**SME's to Consider the following**	**SME Evaluation/Answer**	**Threat Applicable? SME – Yes / No**
Corrosion	Coated Steel with CP	Is there known evidence of active external corrosion on coated steel pipe with CP?	YES – South Division	YES – South Division
		Is there a known history of leakage on coated steel pipe with CP?	YES – South Division	
		Are some CP systems frequently down (not achieving the required level of protection); more than 10% of the time?	NO	
	Coated Steel w/o CP	Is there known evidence of active external corrosion on coated steel pipe without CP?	NO	NO
		Is there a known history of leakage on coated steel pipe without CP?	NO	
	LP Tank with CP	Is there known evidence of active external corrosion on LP Tanks with CP?	NO – All divisions	YES
		Is there a known history of leakage on LP Tanks with CP?	NO – All divisions	
	Copper Services	Are direct buried or inserted copper services known to exist in the system?	NO	NO
		Is there a known history of leakage on copper services?	NO	NO

	Stray Current	Do distribution facilities exist near DC transit systems, high voltage DC transmission systems or other known sources of DC current?	NO	NO
		Are any facilities known to be impacted by sources of stray DC current that has or may result in corrosion?	NO	
	Internal Corrosion	Are liquids known to exist within any portions of the distribution system?	NO	NO
		Is there known evidence of past or active internal corrosion on steel pipe?	NO	
		Is there a known history of leakage caused by internal corrosion of steel pipe?	NO	

App. B. Section 2 (Propane) Supplemental Table S-1: SME Evaluation of Threats Applicable to the LP Distribution System

(continued)

Service territory covered by this Assessment: All Divisions				
Primary Threat Category	**Sub-Threat**	**SME's to Consider the following**	**SME Evaluation/Answer**	**Threat Applicable? SME – Yes / No**
Corrosion	Atmospheric Corrosion	Do above ground distribution facilities exist in areas exposed to marine atmosphere, high humidity, atmospheric pollutants or agricultural chemicals?	YES – All Divisions	YES – All Divisions
		Is there known evidence of past or active external atmospheric corrosion on exposed steel pipe, equipment or fittings?	YES – South Division	
		Is there a known history of leakage caused by atmospheric corrosion of steel pipe?	YES – South Division	
	Corrosion of carrier pipe in Cased Crossing	Do steel carrier pipes exist within cased crossings?	NO	NO
		Are there any existing known contacts between carrier pipes and casings?	N/A	
		Is there known evidence of past or active external corrosion on cased steel pipe?	N/A	

		Is there a known history of leakage caused by corrosion on cased steel pipe?	N/A	
Natural Forces	Seismic Activity	Are there any seismically active zones or fault lines that exist in the area?	N/A	N/A
		Is there a history of leakage associated with Seismic activity?	N/A	
	Earth Movement / Landslide	Are there any areas susceptible to earth movement or landslide in the area?	YES – West Division	YES – West Division
		Is there a known history of leakage associated with landslide or earth movement?	NO	

App. B. Section 2 (Propane) Supplemental Table S-1: SME Evaluation of Threats Applicable to the LP Distribution System (continued)

Service territory covered by this Assessment: All Divisions				
Primary Threat Category	**Sub-Threat**	**SME's to Consider the following**	**SME Evaluation/Answer**	**Threat Applicable? SME – Yes / No**
Natural Forces	Frost Heave	Is there a known history of leakage associated with frost heave?	N/A	N/A
	Flooding	Are there any areas within the gas system that are subject to flooding?	YES – South division	YES - South divisions
		Is there a known history of leakage or damage associated with flooding?	NO	
	Tree Roots	Is there a known history of leakage to pipe or fittings as a result of tree root damage?	NO	YES – South division
	Other	Is there a known history of leakage or damage due to other natural force causes; including but not limited to lightning, wild fire or high winds (tornados)?	NO	NO
Excavation Damage	Improper Excavation Practice	Has damage requiring repair or replacement occurred on properly marked facilities due to the failure of the	YES – South & West Divisions	YES – All Divisions

		excavator to follow proper excavation rules and procedures?		
	Facility not located or marked	Has damage requiring repair or replacement occurred due to failure to locate a valid and timely locate request?	YES – South Division	
	One-call notification center error	Has damage requiring repair or replacement occurred due to an error made at the one-call notification center?	NO	
	Mis-Marked Facilities	Has damage requiring repair or replacement occurred due to the mis-marking of facilities?	NO	

App. B. Section 2 (Propane) Supplemental Table S-1: SME Evaluation of Threats Applicable to the LP Distribution System (continued)

Service territory covered by this Assessment: All Divisions				
Primary Threat Category	**Sub-Threat**	**SME's to Consider the following**	**SME Evaluation/Answer**	**Threat Applicable? SME – Yes / No**
Excavation Damage	Incorrect Facility Records	Has damage requiring repair or replacement occurred due incorrect facility records?	YES – South Division	Yes – All Divisions
	Other	Has damage requiring repair or replacement occurred due other causes including the inability to locate facility (e.g. no locating wire on plastic main), wrong or incorrect information provided to the one call center, deteriorated facilities and previous damage?	NO	
Other Outside Force Damage	Vehicle Damage to Riser/Meter	Are existing risers and/or meters exposed to damage from vehicular damage that do not have barriers or other protection conforming to current design requirements?	YES – South & West divisions	Yes- All Divisions

		Has known leakage occurred due to vehicle damage to risers/meters.	YES – West Division	
	Vehicle Damage to above-ground equip/station	Are HPRs and/or regulator stations exposed to damage from vehicular damage?	NO	YES
		Has known leakage occurred due to vehicle damage to HPRs and/or regulator stations?	NO	
	Vandalism	Are gas valves or station equipment susceptible to damage by vandalism that has the potential to pose a risk to employees or the public?	YES – South & Central divisions	Yes- All Divisions
		Has leakage or other unsafe condition been created by vandalism?	NO	

App. B. Section 2 (Propane) Supplemental Table S-1: SME Evaluation of Threats Applicable to the LP Distribution System

(continued)

Service territory covered by this Assessment: All Divisions				
Primary Threat Category	**Sub-Threat**	**SME's to Consider the following**	**SME Evaluation/Answer**	**Threat Applicable? SME – Yes / No**
Other Outside Force Damage	Structure Fire	Is there a history of damage to gas meters or other equipment due to structure fires?	Yes – South Division	Yes – All Divisions
		Is there a history of lack of properly designed or maintained service shut-off valves resulting in a delay in inability to shut off gas service to structures that are on fire?	NO	
	Century Products (MDPE 2306)	Is Century Products (MDPE 2306) pipe known to exist in the system?	NO	NO

Material, Weld or Joint Failure		Is there a history of leakage of Century Products (MDPE 2306) pipe?	NO	
	Aldyl A	Is pre-1973 Aldyl A pipe known to exist in the system?	YES – South division	YES – South division (Barefoot Bay)
		Is there a history of leakage of pre-1973 Aldyl A pipe?	NO	

App. B. Section 2 (Propane) Supplemental Table S-1: SME Evaluation of Threats Applicable to the LP Distribution System (continued)

Service territory covered by this Assessment: All Divisions				
Primary Threat Category	**Sub-Threat**	**SME's to Consider the following**	**SME Evaluation/Answer**	**Threat Applicable? SME – Yes / No**
Material, Weld or Joint Failure	HDPE 3306	Is HDPE 3306 pipe known to exist in the system?	NO	NO
		Is there a history of leakage of HDPE 3306 pipe?	NO	
	PVC – Polyvinyl Chloride	Is PVC pipe known to exist in the system?	NO	NO
		Is there a history of leakage of PVC pipe?	NO	
	ABS – Acrylonitrile Butadiene Styrene	Is ABS pipe known to exist in the system?	NO	NO
		Is there a history of leakage of ABS pipe?	NO	
	CAB – Cellulose Acetate Butyrate	Is CAB A pipe known to exist in the system?	NO	NO
		Is there a history of leakage of CAB pipe?	NO	
	PB - Polybutylene	Is PB pipe known to exist in the system?	NO	NO
		Is there a history of leakage of PB pipe?	NO	
	Delrin Insert Tap Tees	Are Delrin Insert Tap Tees known to exist in the system?	NO	NO

		Is there a history of leakage of Delrin Insert Tap Tees?	NO	

App. B. Section 2 (Propane) Supplemental Table S-1: SME Evaluation of Threats Applicable to the LP Distribution System (continued)

Service territory covered by this Assessment: All Divisions				
Primary Threat Category	**Sub-Threat**	**SME's to Consider the following**	**SME Evaluation/Answer**	**Threat Applicable? SME – Yes / No**
Material, Weld, or Joint Failure	Plexco Service Tee Celcon Caps	Are Plexco Service Tee Celcon Caps known to exist in the system?	YES – South division	YES – South division
		Is there a history of leakage of Plexco Service Tee Celcon Caps?	NO	
	PE Fusion failure	Is there a history of PE Fusion Failures or leakage in the system?	NO	YES – ALL DIVISIONS
		Are any types of PE fusion (type, material, size, age, process, geographic area) more prone to leakage or failure?	NO	
	Pre-1940 Oxy-Acetylene Girth Weld	Do pre-1940 Oxy-Acetylene Girth Welds exist on pipe greater than 4 inch?	NO	NO
		Is there a history of pre-1940 Oxy-Acetylene Girth Weld failures or leakage in the system?	NO	
	Other	Do other material failures occur that present a possible current or future risk?	NO	NO
	Mechanical Couplings	Is there a history of Mechanical Coupling failures or leakage in the system due to pullout?	YES – South division	YES – South division
		Is there a history of Mechanical Coupling failures or leakage in the system due to seal leakage?	NO	NO
		Are any types of mechanical coupling (type, material, size, age, manufacturer, geographic area) more prone to leakage or failure due to seal leakage?	NO	NO

App. B. Section 2 (Propane) Supplemental Table S-1: SME Evaluation of Threats Applicable to the LP Distribution System (continued)

Service territory covered by this Assessment: All Divisions				
Primary Threat Category	**Sub-Threat**	**SME's to Consider the following**	**SME Evaluation/Answer**	**Threat Applicable? SME – Yes / No**
Equipment Failure	Valves	Are valves inoperable, inaccessible and or paved over without timely identification and repairs?	NO	NO
		Are certain types or makes of valves more likely to leak?	NO	NO
	Service Regulators	Is there a history of service regulator failures that present a threat to the public or employees?	NO	NO
		Are certain types or makes of service regulator more likely to create a risk?	NO	
	Control/Relief Station Equipment	Is there a history of control or relief station equipment failures that present a threat to the public or employees?	NO	NO
		Are certain types or makes of station equipment more likely to create a risk?	NO	
	Other	Is there a history of other equipment failures that present a threat to the public or employees?	NO	NO
		Are certain types or makes of other equipment more likely to create a risk?	NO	
Incorrect Operations	Operating Error	Have leaks or other safety incidents been caused by an inadequate procedure?	NO	Potential threat
		Have leaks or other safety incidents been caused by failure to follow an adequate procedure?	NO	

		Have bypass valves or MAOP separation valves been found to not have proper locks or other appropriate security replaced after completion of maintenance?	NO	

App. B. Section 2 (Propane) Supplemental Table S-1: SME Evaluation of Threats Applicable to the LP Distribution System (continued)

Service territory covered by this Assessment: All Divisions				
Primary Threat Category	**Sub-Threat**	**SME's to Consider the following**	**SME Evaluation/Answer**	**Threat Applicable? SME – Yes / No**
Incorrect Operations	Operating Error	Have employees been found to have falsified maintenance documents and thus not have completed operations and maintenance tasks in the manner or timeframe required?	NO	NO
		Has improper regulator station maintenance ever resulted in an overpressure incident?	NO	YES – ALL DIVISIONS
		Have butt-fusions been found to be leaking due to improper fusion due to failure to follow the correct procedure?	NO	YES – ALL DIVISIONS
		Have leak repairs or other mandated maintenance not been made in the time required by standard due to a process breakdown or ineffective process?	NO	YES – ALL DIVISIONS
		Has gas leak detection equipment used for a leak survey been found afterwards to be out of calibration?	NO	YES – ALL DIVISIONS
		Have unauthorized repair, maintenance or operations practices been used or are still in use?	NO	YES – ALL DIVISIONS
		Has the failure to accurately or timely record or map facilities resulted in failure to perform mandated maintenance or locates?	NO	YES – ALL DIVISIONS
	Gas lines bored through Sewers	Have pipes been installed via unguided or guided bore without proper procedures to ensure other facilities are not damaged?	NO	YES – ALL DIVISIONS
		Have pipes unknowingly bored through sewer lines been damaged by sewer line cleaning operations?	NO	

App. B. Section 2 (Propane) Supplemental Table S-1: SME Evaluation of Threats Applicable to the LP Distribution System (continued)

Service territory covered by this Assessment: All Divisions				
Primary Threat Category	**Sub-Threat**	**SME's to Consider the following**	**SME Evaluation/Answer**	**Threat Applicable? SME – Yes / No**
Other	Bell Joint Leakage	Does Cast Iron pipe exist in the system?	NO	NO
		Is there a history of bell joint leaks?	NO	NO
		Are certain diameters or parts of the system known to be more prone to bell joint failure or leakage than others?	NO	NO
	Inserted Copper Puncture	Do copper services inserted in steel exist in the system?	NO	NO
		Is there a history of leakage of copper services due to galvanic action between the copper and steel?	NO	NO
	Copper Sulfide	Do copper services exist in the system and is there a history of hydrogen sulfide greater than 0.3 grains per 100 standard cubic feet of gas?	NO	NO
		Have any safety incidents occurred as a result of copper sulfide in copper services or service regulators?	NO	NO
	Construction over gas mains & services	Have others constructed over gas facilities or taken other action that prevents effective leak survey and other maintenance?	YES – South division	YES – South division
		When identified, is construction that impacts required maintenance corrected in a timely manner?	YES – South division	YES – South division

APPENDIX C (PROPANE)
EVALUATION AND RANKING OF RISK

Appendix C. Section 1. (Propane section)

Section 1. Risk Assessment Process

[Southern Gas Association, Northeast Gas Association and Structural Integrity Associates, Inc. ***Blended Risk (Subject Matter Expert and Data) Evaluation and Ranking Process****, incorporated by reference (all divisions)]*

App. C. Section 2 (Propane) Supplemental Table S-2: Documentation of Risk Assessment Results LP Distribution System **(South Division)**

Region	Primary Threat	Sub-Threat	Facility Type	FOF Score	COF Score	Relative Risk
South	**Corrosion**	Coated Steel (with/CP)		0.675	0.61	0.41175
		Stray Current		0	0.61	0
		Internal Corrosion		0	0.61	0
		Atmospheric Corrosion		6.75	0.61	4.1175
		LP Tanks with CP		0	0.61	0
	Natural Forces	Tree Roots		0	0.61	0
		Flooding		0	0.61	0
	Excavation Damage	Improper Excavation Practice		0.025	0.61	0.01525

		No Call for Locate		0.1875	0.61	0.114375
		Late or No Locate		0.0275	0.61	0.016775
		Mis-marked Facilities		0.125	0.61	0.07625
		Incorrect Facility Records		0.025	0.61	0.01525
	Other Outside Force	Vehicle Damage to Riser		0.09	0.61	0.0549

Region	Primary Threat	Sub-Threat	Facility Type	FOF Score	COF Score	Relative Risk
South	**Other Outside Force**	Vehicle Damage to above ground equipment or station (not risers)		0	0.61	0
		Vandalism		0	0.61	0
		Structure Fire		0	0.61	0
	Material, Weld or Joint Failure	Plexco Service Tee Celcon Caps		0.045	0.61	0.02745
		PE Fusion Failure		0	0.61	0
	Equipment Failure	Valves		0	0.70	0

		Service Regulators		0	0.61	0
		Control or Relief Station Equipment		0	0.61	0
		Mechanical Couplings		0.081	0.61	0.04941
	Incorrect Operation	Operating Errors		0.0225	0.61	0.013725
		Service Lines Bored Thru Sewer		0	0.61	0
	OTHER	Construction over gas mains & services		0	0.61	0

App. C. Section 2 (Propane) Supplemental Table S-2: Documentation of Risk Assessment Results LP Distribution System **(WEST Division)**

Region	Primary Threat	Sub-Threat	Facility Type	FOF Score	COF Score	Relative Risk
WEST	**Corrosion**	Atmospheric Corrosion		0	0.35	0
		LP Tanks with CP		0	0.61	0
	Natural Forces	Earth Movement		0	0.61	0
	Excavation Damage	Improper Excavation Practice		0.0825	0.61	0.050325
		No Call for Locate		0.5625	0.61	0.343125
		Late or No Locate		0	0.61	0
		Mis-marked Facilities		0	0.61	0
		Incorrect Facility Records		0	0.61	0

	Other Outside Force	Vehicle Damage to Riser		0	0.61	0
		Vehicle Damage to above ground equipment or station (not risers)		0	0.61	0
		Vandalism		0	0.61	0

App. C. Section 2 (Propane) Supplemental Table S-2: Documentation of Risk Assessment Results LP Distribution System **(West Division)**

Region	Primary Threat	Sub-Threat	Facility Type	FOF Score	COF Score	Relative Risk
West	**Other Outside Force**	Fire		0	0.61	0
	Material, Weld or Joint Failure	PE Fusion Failure		0	0.61	0
	Equipment Failure	Valves		0	0.7	0
		Service Regulators		0.2025	0.61	0.123525
		Control or Relief Station Equipment		0	0.61	0
	Incorrect Operation	Operating Errors		0	0.61	0
		Service Lines Bored Thru Sewer		0	0.61	0
	OTHER	Construction over gas mains & services		0	0	0

App. C. Section 2 (Propane) Supplemental Table S-2: Documentation of Risk Assessment Results LP Distribution System **(Central Division)**

Region	Primary Threat	Sub-Threat	Facility Type	FOF Score	COF Score	Relative Risk
Central	**Corrosion**	Atmospheric Corrosion		0	0.35	0
		LP Tanks with CP		0	0.61	0
	Natural Forces	Tree Roots		N/A	N/A	N/A
		Flooding		N/A	N/A	N/A
	Excavation Damage	Improper Excavation Practice		0	0.61	0
		No Call for Locate		0	0.61	0
		Late or No Locate		0	0.61	0
		Mis-marked Facilities		0	0.61	0

		Incorrect Facility Records		0	0.61	0
	Other Outside Force	Vehicle Damage to Riser		0	0.61	0
		Vehicle Damage to above ground equipment or station (not risers)		0	0.61	0
		Vandalism		0	0.61	0

App. C. Section 2 (Propane) Supplemental Table S-2: Documentation of Risk Assessment Results LP Distribution System **(Central Division)**

Region	Primary Threat	Sub-Threat	Facility Type	FOF Score	COF Score	Relative Risk
Central	**Other Outside Force**	Structure fire		0	0.61	0
	Material, Weld or Joint Failure	PE Fusion Failure		0	0.61	0
	Equipment Failure	Valves		0	0.7	0
		Service Regulators		0.2025	0.61	0.123525
		Control or Relief Station Equipment		0	0.61	0
	Incorrect Operation	Operating Errors		0	0.61	0
		Service Lines Bored Thru Sewer		0	0.61	0
	OTHER	Construction over gas mains & services		0	0.35	0

App. C. Section 2 (Propane) Supplemental Table S-3: **Summary of LP Risk Evaluation and Ranking Results**

Threat	Max Risk Score in any Region	Min Risk Score in any Region	% of Regions in System with Risk Score Range			
			0.76 – & Higher	0.51 – 0.75	0.26 – 0.50	0.10 – 0.25
Corrosion						
Coated Steel Mains(with CP)	**0.41175**	0	0	0	33	0
Coated Steel Svcs (with CP)	0	0	0	0	0	0
Atmospheric corrosion on services	**4.1175**	0	33	0	0	0
LP Tanks with CP	0	0	0	0	0	0
Natural Forces						
Tree Roots Mains	0	0	0	0	0	0
Flood Mains	0	0	0	0	0	0

App. C. Section 2 (Propane) Supplemental Table S-3: **Summary of LP Risk Evaluation and Ranking Results (Continued)**

Threat	Max Risk Score in any Region	Min Risk Score in any Region	% of Regions in System with Risk Score Range			
			0.76 – 1.00	0.51 – 0.75	0.25 – 0.50	0.25 and lower
Excavation Damage						
Excavation Damage Mains	0	0	0	0	0	0
Excavation Damage Svcs	**0.343125**	**0.01525**	0	0	33	33
Other Outside Force						
Vehicle Damage services	**0.0549**	0	0	0	0	33
Vehicle Damage to above ground equipment or station (not risers)	0	0	0	0	0	0
Vandalism Mains	0	0	0	0	0	0
Fire / Explosion Mains	0	0	0	0	0	0

App. C. Section 2 (Propane) Supplemental Table S-3: **Summary of LP Risk Evaluation and Ranking Results (Continued)**

Threat	Max Risk Score in any Region	Min Risk Score in any Region	% of Regions in System with Risk Score Range			
			0.76 – 1.00	0.51 – 0.75	0.26 – 0.50	0.25 & lower
Material, Weld or Joint Failure						
Plastic Pipe Main	0	0	0	0	0	0
Plastic Pipe Services	0	0	0	0	0	0
	0	0	0	0	0	0
Plexco Service Tee Celcon Caps	**0.02745**	0	0	0	0	33
Equipment Failure						
Valves Mains	0	0	0	0	0	0
Valves Services	0	0	0	0	0	0
Service Regulators	**0.123525**	0	0	0	0	33
Mechanical Couplings	**0.04941**	0	0	0	0	33
Other	0	0	0	0	0	0

App. C. Section 2 (Propane) Supplemental Table S-3: **Summary of LP Risk Evaluation and Ranking Results (Continued)**

Threat	Max Risk Score in any Region	Min Risk Score in any Region	% of Regions in System with Risk Score Range			
			0.76 – 1.00	0.51 – 0.75	0.26 – 0.50	0.10 – 0.25
Incorrect Operation						
Operating Error	**0.013725**	0	0	0	0	33
Service Line bored thru Sewer	0	0	0	0	0	0
Other	0	0	0	0	0	0
Other						
Construction over gas mains & services	0	0	0	0	0	0

App. C. Section 2 (Propane) Supplemental Table S-3: **Summary of LP Risk Evaluation and Ranking Results (Continued)**

Ranking order	Threat	Risk Score	Region
1.	Atmospheric Corrosion on services (with CP)	4.1175	SOUTH FLORIDA
2.	Galvanic Corrosion on coated steel with CP	0.41175	SOUTH FLORIDA
3.	Excavation damage on services (No call for locates)	0.343125	WEST FLORIDA
4.	Equipment failure on service regulators	0.123525	CENTRAL & WEST DIVISIONS
5.	Other outside force (Vehicle damage to regulators)	0.0549	SOUTH FLORIDA
6.	Equipment failure on (Mechanical couplings)	0.04941	SOUTH FLORIDA
7.	Material Weld or Joint failure on	0.02745	SOUTH FLORIDA

	Plexco Service Tee Celcon Caps		
8.	Incorrect Operation (Operating Error)	0.013725	SOUTH FLORIDA

APPENDIX D (PROPANE)
IDENTIFICATION AND IMPLEMENTATION OF MEASURES TO ADDRESS RISKS

App. D. Section 1 (Propane) Supplemental Table S-4: Key Requirements of the Leak Management Program

Program Element	Reference to Requirement Established in the Standard or Procedure
Qualification/Training requirements for personnel conducting leak survey	FPU Operator Qualification Program
Auditing and Quality Assurance of Leak Survey Equipment	FPU Procedure LC-5
Criteria for leak severity classification	FPU Procedure LC-4
Established Frequency of Leak Survey in Business Districts, at intervals not exceeding 15 months, but at least once each calendar year.	FPU O&M Manual Section 1.2.1.1
Established Frequency of Leak Survey for Cathodically Unprotected Lines subject to §192.465(e) on which electrical surveys for corrosion are impractical, at least once every 3 calendar years at intervals not exceeding 39 months.	FPU O&M Manual Section 1.2.1.2
Established Frequency of Leak Survey of Remaining Lines at least once every 5 calendar years at intervals not exceeding 63 months.	FPU O&M Manual Section 1.2.1.2
Hazardous Leaks Requiring Immediate Repair – Ongoing action required	FPU Procedure LC-4, FPU O&M Manual Section 1.2.2.1
Non-hazardous Leaks Requiring Scheduled Repair – Time limit is established to Eliminate Leak	FPU Procedure LC-4, FPU O&M Manual Section 1.2.2.1
Non-Hazardous Leak NOT requiring scheduled repair– Monitoring Requirements established	FPU Procedure LC-4, FPU O&M Manual Section 1.2.2.1
Records and Data Management procedures defined	Florida Administrative Code Chapter 25-12, 12.060

App. D. Section 3 (Propane) Supplemental Table S-5: Corrosion Action Plans

Sub-Threat	Corrosion Action Plan Scope	Status	Officer / Manager Responsible
Atmospheric Corrosion on services with CP. (South Division)	Meter readers conduct atmospheric corrosion surveys quarterly. If atmospheric corrosion is identified, a work order is generated and a crew is dispatched to address/correct the atmospheric corrosion.	In Progress	Propane District Managers
Galvanic Corrosion on mains with CP. Lauderhill system. South Division	FPUC has a program in place to remove steel gas mains in sections of the Lauderhill system that have few gas service connections. Individual tanks will be provided.	System Decommissioned in 2019 This project was completed the last quarter in 2019 and no longer in service.	Propane District Managers

App. D. Section 5 (Propane) Supplemental Table S-5: Excavation Action Plans

Sub-Threat	Excavation Damage Action Plan Scope	Status	Officer / Manager Responsible
Improper Excavation Practice	Track dig-ins and identify problem excavators. Provide targeted education, & field inspections. Meet with repeat offenders if deemed necessary.	In progress	Propane District Managers
	Provide One Call literature to Equipment Rental Companies, etc. to increase awareness	In progress	Propane District Managers
	Conduct pre-construction meeting or site-visits for excavation near critical or high risk facilities.	In Progress	Division Propane Operations Managers
Facility Not Located or Marked	Analyze root cause and implement corrective action when identified. Require written investigation of each damaged facility.	In progress	Propane District Managers
Mis-marked Facilities	Monitor and track for dig-ins resulting from mis-marked facilities. Analyze root cause and implement corrective action, including procedure reviews. Requires written investigation of each incident.	In Progress	Propane District Managers

App. D. Section 8 (Propane) Supplemental Table S-5: Equipment Failure Action Plans

Sub-Threat	Equipment Failure Action Plan Scope	Status	Officer / Manager Responsible
Service Regulators	No additional or accelerated actions planned.		
Mechanical couplings	No additional or accelerated actions planned.		

App. D. Section 10 (Propane) Supplemental Table S-5: Other Outside Force Action Plans

Sub-Threat	Material, Weld or Joint Failure Action Plan Scope	Status	Officer / Manager Responsible
Other outside force (Vehicle damage)	No additional or accelerated actions planned.		

App. D. Section 7 (Propane) Supplemental Table S-5: Example Material, Weld or Joint Failure Action Plans

Sub-Threat	Material, Weld or Joint Failure Action Plan Scope	Status	Officer / Manager Responsible
Aldyl A (South Florida Division_Barefoot Bay)	Provide training and process to identify Aldyl A whenever facilities are exposed and maintain records to identify where Aldyl A exists.	In Progress	Propane District Managers
	Determine whether leak history on Aldyl A warrants additional or accelerated actions.	In Progress	Propane District Managers
Plexco Service Tee Celcon Caps	No additional or accelerated actions planned.		

App. D. Section 10 (Propane) Supplemental Table S-5: Incorrect Operation Action Plans

Sub-Threat	Material, Weld or Joint Failure Action Plan Scope	Status	Officer / Manager Responsible
Operating Error	No additional or accelerated actions planned.		

APPENDIX E (PROPANE)

Measurement of performance, monitoring results, and evaluation effectiveness

App. E. Section 1 (Propane) Supplemental Table S-6 Number of **HAZARDOUS** leaks either eliminated or repaired, per 192.703 (C), categorized by cause

(South Division – LP)

Performance Measure	5-Year Average 2015-19	Year 2019	Established Baseline 2014 – 2018	Criteria for Re-evaluation of Threats and Risks	Re-Evaluation Required? Y / N
Number of Hazardous Leaks Eliminated or Repaired - Corrosion	0.03857	0	5-Yr Average Leaks/Mile/Yr 0.03857	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Natural Forces	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Excavation Damage	0.06388	0.05253	5-Yr Average Leaks/Mile/Yr 0.05707	Moving 5-Yr Average is an increase of 5% or more from established baseline	**YES** – Ref. (App. D. Section 5 (Propane) Supplemental Table S-5) for action plans
Number of Hazardous Leaks Eliminated or Repaired – Other Outside Force Damage	0.01533	0	5-Yr Average Leaks/Mile/Yr 0.01533	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Material, Weld or Joint Failure	0.00741	0	5-Yr Average Leaks/Mile/Yr 0.00741	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Equipment Failure	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO

Number of Hazardous Leaks Eliminated or Repaired – Incorrect Operation	0	0.00000	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Other	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO

App. E. Section 1 (Propane) Supplemental Table S-6 Number of **HAZARDOUS** leaks either eliminated or repaired, per 192.703 (C), categorized by cause

(West Division – LP)

Performance Measure	5-Year Average 2015-19	Year 2019	Established Baseline 2014 - 2018	Criteria for Re-evaluation of Threats and Risks	Re-Evaluation Required? Y / N
Number of Hazardous Leaks Eliminated or Repaired - Corrosion	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Natural Forces	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Excavation Damage	0.17021	0	5-Yr Average Leaks/Mile/Yr 0.17021	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Other Outside Force Damage	0.07193	0	5-Yr Average Leaks/Mile/Yr 0.07193	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Material, Weld or Joint Failure	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Equipment Failure	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Incorrect Operation	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO

Number of Hazardous Leaks Eliminated or Repaired – Other	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO

App. E. Section 1 (Propane) Supplemental Table S-6 Number of **HAZARDOUS** leaks either eliminated or repaired, per 192.703 (C), categorized by cause

(Central Division – LP)

Performance Measure	5-Year Average 2015-19	Year 2019	Established Baseline 2014 - 2018	Criteria for Re-evaluation of Threats and Risks	Re-Evaluation Required? Y / N
Number of Hazardous Leaks Eliminated or Repaired - Corrosion	0.46296	0	5-Yr Average Leaks/Mile/Yr 0.46296	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Natural Forces	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Excavation Damage	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Other Outside Force Damage	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Material, Weld or Joint Failure	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Equipment Failure	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Incorrect Operation	0	0	5-Yr Average Leaks/Mile/Yr	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO

			0		
Number of Hazardous Leaks Eliminated or Repaired – Other	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO

App. E. Section 4 (Propane) Supplemental Table S-7 Number of leaks either eliminated or repaired, categorized by **CAUSE**

(South Division – LP)

Performance Measure	5-Year Average 2015-19	Year 2019	Established Baseline 2014 - 2018	Criteria for Re-evaluation of Threats and Risks	Re-Evaluation Required? Y / N
Total # of Leaks Eliminated or Repaired - Corrosion	0.08660	0	5-Yr Average Leaks/Mile/Yr 0.10142	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total # of Leaks Eliminated or Repaired – Natural Forces	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total # of Leaks Eliminated or Repaired – Excavation Damage	0.07231	0.05253	5-Yr Average Leaks/Mile/Yr 0.06551	Moving 5-Yr Average is an increase of 5% or more from established baseline	**YES** – Ref. (App. D. Section 5 (Propane) Supplemental Table S-5) for action plans
Total # of Leaks Eliminated or Repaired – Other Outside Force Damage	0.01954	0	5-Yr Average Leaks/Mile/Yr 0.01954	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total # of Leaks Eliminated or Repaired – Material, Weld or Joint Failure	0.01481	0	5-Yr Average Leaks/Mile/Yr 0.01481	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total # of Leaks Eliminated or Repaired – Equipment Failure	0.0037	0	5-Yr Average Leaks/Mile/Yr 0.0037	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total # of Leaks Eliminated or Repaired – Incorrect Operation	0.00422	0	5-Yr Average Leaks/Mile/Yr 0.00422	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO

Total # of Leaks Eliminated or Repaired – Other	0.00741	0	5-Yr Average Leaks/Mile/Yr 0.01111	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO

App. E. Section 4 (Propane) Supplemental Table S-7 Number of leaks either eliminated or repaired, categorized by **CAUSE**

(West Division – LP)

Performance Measure	5-Year Average 2015-19	Year 2019	Established Baseline 2014 - 2018	Criteria for Re-evaluation of Threats and Risks	Re-Evaluation Required? Y / N
Total # of Leaks Eliminated or Repaired - Corrosion	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total # of Leaks Eliminated or Repaired – Natural Forces	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total # of Leaks Eliminated or Repaired – Excavation Damage	0.34043	0	5-Yr Average Leaks/Mile/Yr 0.34043	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total # of Leaks Eliminated or Repaired – Other Outside Force Damage	0.07193	0	5-Yr Average Leaks/Mile/Yr 0.07193	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total # of Leaks Eliminated or Repaired – Material, Weld or Joint Failure	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total # of Leaks Eliminated or Repaired – Equipment Failure	0.08511	0	5-Yr Average Leaks/Mile/Yr 0.12766	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total # of Leaks Eliminated or Repaired – Incorrect Operation	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO

Total # of Leaks Eliminated or Repaired – Other	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO

App. E. Section 4 (Propane) Supplemental Table S-7 Number of leaks either eliminated or repaired, categorized by **CAUSE**

(Central Division – LP)

Performance Measure	5-Year Average 2015-19	Year 2019	Established Baseline 2014 - 2018	Criteria for Re-evaluation of Threats and Risks	Re-Evaluation Required? Y / N
Total # of Leaks Eliminated or Repaired - Corrosion	0.46296	0	5-Yr Average Leaks/Mile/Yr 0.46296	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total # of Leaks Eliminated or Repaired – Natural Forces	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total # of Leaks Eliminated or Repaired – Excavation Damage	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total # of Leaks Eliminated or Repaired – Other Outside Force Damage	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total # of Leaks Eliminated or Repaired – Material, Weld or Joint Failure	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Total # of Leaks Eliminated or Repaired – Equipment Failure	1.46296	2.31481	5-Yr Average Leaks/Mile/Yr 1	Moving 5-Yr Average is an increase of 5% or more from established baseline	An increase of over 5%, but no additional actions taken due to small # of leaks.
Total # of Leaks Eliminated or Repaired – Incorrect Operation	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO

Total # of Leaks Eliminated or Repaired – Other	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO

App. E. Section 2 (Propane) Supplemental Table S-8 Number of Exavation **Damages (All Divisions -LP)**

Performance Measure	5-Year Average 2015-19	Year 2019	Established Baseline	Criteria for Re-evaluation of Threats and Risks	Re-Evaluation Required? Y / N
Number of Excavation Damages	6.2	4	**2018** damages resulting in need to repair or replace 6	Increase of 5% or more from established baseline	**YES** – Ref. (App. D. Section 5 (Propane) Supplemental Table S-5) for action plans

App. E. Section 3 (Propane) Supplement Table S-9 Number of Excavation **Tickets (All Divisions-LP)**

Performance Measure	5-Year Average 2015-19	Year 2019	Established Baseline	Criteria for Re-evaluation of Threats and Risks	Re-Evaluation Required? Y / N
Number of Excavation Tickets received from the notification center	1108.8	621	**2018** number of excavation tickets 1276	Increase of 5% or more from established baseline	**NO**

App. E. Section 5 (Propane) Supplemental Table S-10 Number of hazardous leaks either eliminated or repaired, per 192.703 (C), categorized by **MATERIAL**

(South Division – LP)

Performance Measure	5-Year Average 2015-19	Year 2019	Established Baseline 2014 – 2018	Criteria for Re-evaluation of Threats and Risks	Re-Evaluation Required? Y / N
Number of Hazardous Leaks Eliminated or Repaired - Coated steel w/ CP	0.04127	0	5-Yr Average Leaks/Mile/Yr 0.04497	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Polyethylene	0.07130	0.05253	5-Yr Average Leaks/Mile/Yr 0.06449	Moving 5-Yr Average is an increase of 5% or more from established baseline	**YES** – Ref. (App. D. Section 5 (Propane) Supplemental Table S-5) for action plans
Number of Hazardous Leaks Eliminated or Repaired –	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	-

App. E. Section 5 (Propane) Supplemental Table S-10 Number of hazardous leaks either eliminated or repaired, per 192.703 (C), categorized by **MATERIAL**

(Central Division – LP)

Performance Measure	5-Year Average 2015-19	Year 2019	Established Baseline 2014 – 2018	Criteria for Re-evaluation of Threats and Risks	Re-Evaluation Required? Y / N
Number of Hazardous Leaks Eliminated or Repaired – Coated steel w/ CP	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Polyethylene	0.46296	0	5-Yr Average Leaks/Mile/Yr 0.46296	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired –	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO

App. E. Section 5 (Propane) Supplemental Table S-10 Number of hazardous leaks either eliminated or repaired, per 192.703 (C), categorized by **MATERIAL**

(West Division – LP)

Performance Measure	5-Year Average 2015-19	Year 2019	Established Baseline 2014 – 2018	Criteria for Re-evaluation of Threats and Risks	Re-Evaluation Required? Y / N
Number of Hazardous Leaks Eliminated or Repaired - Coated steel w/ CP	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO
Number of Hazardous Leaks Eliminated or Repaired – Polyethylene	0.24214	0	5-Yr Average Leaks/Mile/Yr 0.24214	Moving 5-Yr Average is an increase of 5% or more from established baseline	**NO**
Number of Hazardous Leaks Eliminated or Repaired – Bare steel	0	0	5-Yr Average Leaks/Mile/Yr 0	Moving 5-Yr Average is an increase of 5% or more from established baseline	NO

APPENDIX F (PROPANE)

PERIODIC EVALUATION AND IMPROVEMENT

Appendix F (Propane) Supplement Table S-11 Documentation of Re-evaluation of Threats and Risks

Performance Measures that Exceeded Baseline				
Region	**Performance Measure**	**Actual Performance for Year 2015 - 2019**	**Established Baseline**	**Re-evaluation criteria**
SOUTH DIVISION	# of Hazardous Leaks Eliminated or Repaired – Excavation damage	0.06388	0.05707	Moving 5-Yr Average is an increase of 5% or more from established baseline
SOUTH DIVISION	# of Leaks Eliminated or Repaired – Excavation Damage	0.07231	0.06551	Moving 5-Yr Average is an increase of 5% or more from established baseline
SOUTH DIVISION	# of Hazardous Leaks Eliminated or Repaired by material – PE	0.07130	0.06449	Moving 5-Yr Average is an increase of 5% or more from established baseline
CENTRAL DIVISION	# of Hazardous Leaks Eliminated or Repaired – Equipment Failure	1.46296	1	Moving 5-Yr Average is an increase of 5% or more from established baseline
ALL DIVISION	# of Excavation Damages	6.2	5.6	Moving 5-Yr Average is an increase of 5% or more from established baseline
NOTES:	Existing Date for Complete Program re-evaluation: 2023. Is a shorter timeframe for complete program re-evaluation warranted? : NO			

Required frequency	Program Re-evaluation Element	Date Completed
Required Annually	Update Baseline and on-going performance measures	10/23/2020
Required Annually	Confirmed updates with Propane Director Greg Blezina	10/23/2020
Required Annually	Confirmed updates with Ops Manager Preya John	10/23/2020
Required Annually	Confirmed updates with Ops Manager Steve Hetland	10/26/2020
Required Annually	Confirmed updates with Ops Manager Philip Zimmer	11/05/2020
As needed*		

APPENDIX G
CROSS REFERENCE OF 49 CFR PART 192, SUBPART P REQUIREMENTS TO THE IM PLAN

The table below provides a cross reference between 49 CFR Part 192, Subpart P (Gas Distribution Pipeline Integrity Management) and this Gas Distribution Integrity Management Plan.

49 CFR Part 192, Subpart P	IM Plan Reference
§192.1005 No later than August 2, 2011 a gas distribution operator must develop and implement an integrity management program that includes a written integrity management plan as specified in § 192.1007.	3.0 (For propane ref. 13.0)
§192.1007 A written integrity management plan must contain procedures for developing and implementing the following elements:	
§192.1007 (a) *Knowledge.* An operator must demonstrate an understanding of its gas distribution system developed from reasonably available information.	5.0, 5.1, 5.2, 5.3, 5.4, 5.5 (For propane ref. 14.0 - 14.5)
§192.1007 (a) (1) Identify the characteristics of the pipeline's design and operations and the environmental factors that are necessary to assess the applicable threats and risks to its gas distribution pipeline.	5.3 (For propane ref. 14.3)
§192.1007 (a) (2) Consider the information gained from past design, operations, and maintenance.	5.2 (For propane ref. 14.2)
§192.1007 (a) (3) Identify additional information needed and provide a plan for gaining that information over time through normal activities conducted on the pipeline (for example, design, construction, operations or maintenance activities).	5.4 (For propane ref. 14.4)
§192.1007 (a) (4) Develop and implement a process by which the IM program will be reviewed periodically and refined and improved as needed.	10.1, 10.2 (For propane ref. 19.1, 19.2)
§192.1007 (a) (5) Provide for the capture and retention of data on any new pipeline installed. The data must include, at a minimum, the location where the new pipeline is installed and the material of which it is constructed.	5.5 (For propane ref. 14.5)
§192.1007 (b) *Identify threats.* The operator must consider the following categories of threats to each gas distribution pipeline: corrosion, natural forces, excavation damage, other outside force damage, material, weld or joint failure, equipment failure, incorrect operation, and other concerns that could threaten the integrity of the pipeline.	6.0 (For propane ref. 15.0)
§192.1007 (b) An operator must consider reasonably available information to identify existing and potential threats. Sources of data may include, but are not limited to, incident and leak history, corrosion control records, continuing surveillance records, patrolling records, maintenance history, and excavation damage experience.	5.1, 6.0, (For propane ref. 14.1, 15.0)

§192.1007 (c) *Evaluate and rank risk.* An operator must evaluate the risks associated with its distribution pipeline. In this evaluation, the operator must determine the relative importance of each threat and estimate and rank the risks posed to its pipeline. This evaluation must consider each applicable current and potential threat, the likelihood of failure associated with each threat, and the potential consequences of such a failure.	7.1, 7.2 (For propane ref. 16.1,16.2)
§192.1007 (c) …. An operator may subdivide its pipeline into regions with similar characteristics (e.g., contiguous areas within a distribution pipeline consisting of mains, services and other appurtenances; areas with common materials or environmental factors), and for which similar actions likely would be effective in reducing risk.	Non-Mandatory

49 CFR Part 192, Subpart P	IM Plan Reference
§192.1007 (d) *Identify and implement measures to address risks.* Determine and implement measures designed to reduce the risks from failure of its gas distribution pipeline. These measures must include an effective leak management program (unless all leaks are repaired when found).	8.1, 8.2 (For propane ref. 17.1, 17.2)
§192.1007 (e) (1) *Measure performance, monitor results, and evaluate effectiveness.* Develop and monitor performance measures from an established baseline to evaluate the effectiveness of its IM program. …... These performance measures must include the following: (i) Number of hazardous leaks either eliminated or repaired, per § 192.703(c), categorized by cause; (ii) Number of excavation damages; (iii) Number of excavation tickets (receipt of information by the underground facility operator from the notification center); (iv) Total number of leaks either eliminated or repaired, categorized by cause; (v) Number of hazardous leaks either eliminated or repaired per § 192.703(c), categorized by material; and (vi) Any additional measures the operator determines are needed to evaluate the effectiveness of the operator's IM program in controlling each identified threat.	9.1 – 9.6 (For propane ref. 18.1-18.5)
§192.1007 (e) (1) *Measure performance, monitor results, and evaluate effectiveness.* …. An operator must consider the results of its performance monitoring in periodically re-evaluating the threats and risks.	10.2 (For propane ref. 19.2)
§192.1007 (f) *Periodic Evaluation and Improvement.* An operator must re-evaluate threats and risks on its entire pipeline and consider the relevance of threats in one location to other areas.	7.1, 10.1 (For propane ref. 16.1, 19.1)
§192.1007 (f) Each operator must determine the appropriate period for conducting complete program evaluations based on the complexity of its system and changes in factors affecting the risk of failure. The operator must conduct a complete program reevaluation at least every five years. The operator must consider the results of the performance monitoring in these evaluations.	10.2 (For propane ref. 19.2)
§192.1007 (g) *Report results.* Report, on an annual basis, the four measures listed in paragraphs (e)(1)(i) through (e)(1)(iv) of this section, as part of the annual report required by § 191.11. An operator also must report the four measures to the state pipeline safety authority if a state exercises jurisdiction over the operator's pipeline.	11.1 (For propane ref. 20.1)
§192.1009 Each operator must report, on an annual basis, information related to failure of compression couplings, excluding those that result only in nonhazardous leaks, as part of the annual report required by §191.11 beginning with the report submitted March 15, 2011. This information must include, at a minimum, location of the failure in the system, nominal pipe size, material type, nature of failure including any contribution of local pipeline environment, coupling manufacturer, lot number and date of manufacture, and other information that can be found in markings on the failed coupling. An operator also must report this information to the state pipeline safety authority if a state exercises jurisdiction over the operator's pipeline.	11.1 (For propane ref. 20.1)
§192.1011 An operator must maintain records demonstrating compliance with the requirements of this subpart for at least 10 years. The records must include copies of superseded integrity management plans developed under this subpart.	12.0 (For propane ref. 21.0)

49 CFR Part 192, Subpart P	IM Plan Reference
§192.1013 (a) An operator may propose to reduce the frequency of periodic inspections and tests required in this part on the basis of the engineering analysis and risk assessment required by this subpart. (b) An operator must submit its proposal to the PHMSA Associate Administrator for Pipeline Safety or, in the case of an intrastate pipeline facility regulated by the State, the appropriate State agency. The applicable oversight agency may accept the proposal on its own authority, with or without conditions and limitations, on a showing that the operator's proposal, which includes the adjusted interval, will provide an equal or greater overall level of safety. (c) An operator may implement an approved reduction in the frequency of a periodic inspection or test only where the operator has developed and implemented an integrity management program that provides an equal or improved overall level of safety despite the reduced frequency of periodic inspections.	Not covered by IM Plan

APPENDIX H
COPY OF 49 CFR PART 192, SUBPART P

Subpart P—Gas Distribution Pipeline Integrity Management (IM)

§ 192.1001 What definitions apply to this subpart?

The following definitions apply to this subpart:

Excavation Damage means any impact that results in the need to repair or replace an underground facility due to a weakening, or the partial or complete destruction, of the facility, including, but not limited to, the protective coating, lateral support, cathodic protection or the housing for the line device or facility.

Hazardous Leak means a leak that represents an existing or probable hazard to persons or property and requires immediate repair or continuous action until the conditions are no longer hazardous.

Integrity Management Plan or *IM Plan* means a written explanation of the mechanisms or procedures the operator will use to implement its integrity management program and to ensure compliance with this subpart.

Integrity Management Program or *IM Program* means an overall approach by an operator to ensure the integrity of its gas distribution system.

Small LPG Operator means an operator of a liquefied petroleum gas (LPG) distribution pipeline that serves fewer than 100 customers from a single source.

§ 192.1003 What do the regulations in this subpart cover?

General. This subpart prescribes minimum requirements for an IM program for any gas distribution pipeline covered under this part, including liquefied petroleum gas systems. A gas distribution operator, other than a master meter operator or a small LPG operator, must follow the requirements in §§ 192.1005–192.1013 of this subpart. A master meter operator or small LPG operator of a gas distribution pipeline must follow the requirements in § 192.1015 of this subpart.

§ 192.1005 What must a gas distribution operator (other than a master meter or small LPG operator) do to implement this subpart?

No later than August 2, 2011 a gas distribution operator must develop and implement an integrity management program that includes a written integrity management plan as specified in § 192.1007.

§ 192.1007 What are the required elements of an integrity management plan?

A written integrity management plan must contain procedures for developing and implementing the following elements:

(a) *Knowledge.* An operator must demonstrate an understanding of its gas distribution system developed from reasonably available information. (1) Identify the characteristics of the pipeline's design and operations and the environmental factors that are necessary to assess the applicable threats and risks to its gas distribution pipeline. (2) Consider the information gained from past design, operations, and maintenance. (3) Identify additional information needed and provide a plan for gaining that information over time through normal activities conducted on the pipeline (for example, design, construction, operations or maintenance activities). (4) Develop and implement a process by which the IM program will be reviewed periodically and refined and improved as needed. (5) Provide for the capture and retention of data on any new pipeline installed. The data must include, at a minimum, the location where the new pipeline is installed and the material of which it is constructed.

(b) *Identify threats.* The operator must consider the following categories of threats to each gas distribution pipeline: Corrosion, natural forces, excavation damage, other outside force damage, material, weld or joint failure (including compression coupling), equipment failure, incorrect operation, and other concerns that could threaten the integrity of its pipeline. An operator must consider reasonably available information to identify existing and potential threats. Sources of data may include, but are not limited to, incident and leak history, corrosion control records, continuing surveillance records, patrolling records, maintenance history, and excavation damage experience.

(c) *Evaluate and rank risk.* An operator must evaluate the risks associated with its distribution pipeline. In this evaluation, the operator must determine the relative importance of each threat and estimate and rank the risks posed to its pipeline. This evaluation must consider each applicable current and potential threat, the likelihood of failure associated with each threat, and the potential consequences of such a failure. An operator may subdivide its pipeline into regions with similar characteristics (e.g., contiguous areas within a distribution pipeline consisting of mains, services and other appurtenances; areas with common materials or environmental factors), and for which similar actions likely would be effective in reducing risk.

(d) *Identify and implement measures to address risks.* Determine and implement measures designed to reduce the risks from failure of its gas distribution pipeline. These measures must include an effective leak management program (unless all leaks are repaired when found).

(e) *Measure performance, monitor results, and evaluate effectiveness.* (1) Develop and monitor performance measures from an established baseline to evaluate the effectiveness of its IM program. An operator must consider the results of its performance monitoring in periodically re-evaluating the threats and risks. These performance measures must include the following: (i) Number of hazardous leaks either eliminated or repaired as required by § 192.703(c) of this subchapter (or total number of leaks

if all leaks are repaired when found), categorized by cause; (ii) Number of excavation damages; (iii) Number of excavation tickets (receipt of information by the underground facility operator from the notification center); (iv) Total number of leaks either eliminated or repaired, categorized by cause; (v) Number of hazardous leaks either eliminated or repaired as required by § 192.703(c) (or total number of leaks if all leaks are repaired when found), categorized by material; and (vi) Any additional measures the operator determines are needed to evaluate the effectiveness of the operator's IM program in controlling each identified threat.

(f) *Periodic Evaluation and Improvement.* An operator must reevaluate threats and risks on its entire pipeline and consider the relevance of threats in one location to other areas. Each operator must determine the appropriate period for conducting complete program evaluations based on the complexity of its system and changes in factors affecting the risk of failure. An operator must conduct a complete program re-evaluation at least every five years. The operator must consider the results of the performance monitoring in these evaluations.

(g) *Report results.* Report, on an annual basis, the four measures listed in paragraphs (e)(1)(i) through (e)(1)(iv) of this section, as part of the annual report required by § 191.11. An operator also must report the four measures to the state pipeline safety authority if a state exercises jurisdiction over the operator's pipeline.

§ 192.1009 What must an operator report when compression couplings fail?

Each operator must report, on an annual basis, information related to failure of compression couplings, excluding those that result only in nonhazardous leaks, as part of the annual report required by § 191.11 beginning with the report submitted March 15, 2011. This information must include, at a minimum, location of the failure in the system, nominal pipe size, material type, nature of failure including any contribution of local pipeline environment, coupling manufacturer, lot number and date of manufacture, and other information that can be found in markings on the failed coupling. An operator also must report this information to the state pipeline safety authority if a state exercises jurisdiction over the operator's pipeline.

§ 192.1011 What records must an operator keep?

An operator must maintain records demonstrating compliance with the requirements of this subpart for at least 10 years. The records must include copies of superseded integrity management plans developed under this subpart.

§ 192.1013 When may an operator deviate from required periodic inspections under this part?

(a) An operator may propose to reduce the frequency of periodic inspections and tests required in this part on the basis of the engineering analysis and risk assessment required by this subpart. (b) An operator must submit its proposal to the PHMSA Associate Administrator for Pipeline Safety or, in the case of an intrastate pipeline facility regulated by the State, the appropriate State agency. The applicable oversight agency may accept the proposal on its own authority, with or without conditions and limitations, on a showing that the operator's proposal, which includes the adjusted interval, will provide an equal or greater overall level of safety. (c) An operator may implement an approved reduction in the frequency of a periodic inspection or test only where the operator has developed and implemented an integrity management program that provides an equal or improved overall level of safety despite the reduced frequency of periodic inspections.

§ 192.1015 What must a master meter or small liquefied petroleum gas (LPG) operator do to implement this subpart?

(a) *General.* No later than August 2, 2011 the operator of a master meter system or a small LPG operator must develop and implement an IM program that includes a written IM plan as specified in paragraph (b) of this section. The IM program for these pipelines should reflect the relative simplicity of these types of pipelines. (b) *Elements.* A written integrity management plan must address, at a minimum, the following elements: (1) *Knowledge.* The operator must demonstrate knowledge of its pipeline, which, to the extent known, should include the approximate location and material of its pipeline. The operator must identify additional information needed and provide a plan for gaining knowledge over time through normal activities conducted on the pipeline (for example, design, construction, operations or maintenance activities). (2) *Identify threats.* The operator must consider, at minimum, the following categories of threats (existing and potential): Corrosion, natural forces, excavation damage, other outside force damage, material or weld failure, equipment failure, and incorrect operation. (3) *Rank risks.* The operator must evaluate the risks to its pipeline and estimate the relative importance of each identified threat. (4) *Identify and implement measures to mitigate risks.* The operator must determine and implement measures designed to reduce the risks from failure of its pipeline. (5) *Measure performance, monitor results, and evaluate effectiveness.* The operator must monitor, as a performance measure, the number of leaks eliminated or repaired on its pipeline and their causes. (6) *Periodic evaluation and improvement.* The operator must determine the appropriate period for conducting IM program evaluations based on the complexity of its pipeline and changes in factors affecting the risk of failure. An operator must re-evaluate its entire program at least every five years. The operator must consider the results of the performance monitoring in these evaluations. (c) *Records.* The operator must maintain, for a period of at least 10 years, the following records: (1) A written IM plan in accordance with this section, including superseded IM plans; (2) Documents supporting threat identification; and (3) Documents showing the location and material of all piping and appurtenances that are installed after the effective date of the operator's IM program and, to the extent known, the location and material of all pipe and appurtenances that were existing on the effective date of the operator's program.