

DISTRIBUTION INTEGRITY MANAGEMENT PLAN

For Kastanasburg Utilities

*125 East Northwest Street, South
Kastanasburg, Tennessee 34567*

*Effective Date: 2011-08-02
Replaces Plan Of: (No Prior Plan)*

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Chapter 1. SCOPE

This document is the distribution integrity management plan (Plan) for Kastanasburg Utilities. It is intended to meet the requirements of 49 CFR Part 192, Subpart P Distribution Integrity Management Programs (DIMP).

This Plan covers the Entire system of Kastanasburg Utilities.

This Plan is effective on 2011-08-02.

This Plan replaces the plan of (No Prior Plan).

Chapter 2. DEFINITIONS

Excavation damage

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.

Excavation ticket

All receipts of information by the operator from the ONE-CALL notification center requesting marking of the location of gas pipeline facilities.

Hazardous Leak

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. Examples include:

- Escaping gas that has ignited.
- Any indication of gas which has migrated into or under a building, or into a tunnel,
- Any reading at the outside wall of a building, or where gas would likely migrate to an outside wall of a building,
- Any reading of 80% LEL, or greater, in a confined space,
- Any reading of 80% LEL, or greater in small substructures (other than gas associated substructures) from which gas would likely migrate to the outside wall of a building,
- Any leak that can be seen, heard, or felt, and which is in a location that may endanger the general public or property, or
- Any leak which, in the judgment of operating personnel at the scene, is regarded as an immediate hazard.

Chapter 3. KNOWLEDGE OF THE DISTRIBUTION SYSTEM

This Plan was developed based on the design, construction, operation and maintenance records of Kastanasburg Utilities, including: incident and leak history, corrosion control records, continuing surveillance records, patrolling records, maintenance history, and excavation damage experience, as well as the judgment and knowledge of Kastanasburg Utilities' employees. The specific elements of knowledge of the infrastructure used to evaluate each threat and prioritize risks are listed in the Threat Evaluation and Risk Prioritization sections of this Plan. These sections also list additional information needed and the plan for gaining this currently unknown information over time through normal activities.

The processes used for Threat Evaluation and Risk Prioritization are the processes found in the Simple, Handy, Risk-based Integrity Management Plan™ (SHRIMP™) software package developed by the APGA Security and Integrity Foundation (SIF). SHRIMP™ uses an index model developed by the consultants and advisors of the SIF. Threat assessment is performed using questions developed by the Gas Piping Technology Committee (GPTC) as modified and added to by the SHRIMP™ advisors. A description of the process followed is included in [Section 11.3, "DESCRIPTION OF THE PROCESS FOLLOWED TO DEVELOP THIS PLAN"](#).

This Plan will be reviewed at least every 3 years to continually refine and improve this Plan. Reviews may be performed more frequently as described in [Chapter 8, PERIODIC EVALUATION AND IMPROVEMENT](#) of this Plan.

Records for all piping system installed after the effective date of this Plan will be captured and retained by Kastanasburg Utilities. This will include the location where new piping and appurtenances are installed and the material of which they are constructed.

Chapter 4. THREAT ASSESSMENT

4.1. Overview

The following threats were evaluated on the distribution piping covered under the scope of this Plan: corrosion, natural forces, excavation damage, other outside force damage, material, weld or joint failure (including compression coupling), equipment malfunction, incorrect operation, and any other concerns that could threaten the integrity of the pipeline. The results of these threat assessments are discussed in the following sections.

4.2. Kastanasburg Utilities Threat Assessment

4.2.1. Corrosion

Atmospheric Corrosion On The Entire System

Atmospheric corrosion on the entire system was determined to be a threat warranting further consideration for additional action beyond code compliance or current system practice because:

- Kastanasburg Utilities has facilities that require atmospheric corrosion inspections.
- Inspections have found metal loss due to atmospheric corrosion over the past 7 years.
- Leaks caused by atmospheric corrosion leaks have required repair on any part of your system over the past 7 years.
- Inspections have found problems with above ground pipe coatings that could not be fixed by routine maintenance

Atmospheric corrosion on the entire system was determined to be limited to certain portions of the system and, therefore, separate threat assessments were performed on the following sections of the system:

Section Rest of system:

Atmospheric corrosion on the entire system was determined not to be a threat warranting further consideration for additional action beyond code compliance or current system practice on the **Rest of system section (described as Remainder of system not having atmospheric corrosion problems)** because:

- Inspections have not found metal loss due to atmospheric corrosion over the past 7 years.
- Leaks caused by atmospheric corrosion leaks have not required repair on any part of your system over the past 7 years.
- Inspections have not found problems with above ground pipe coatings that could not be fixed by routine maintenance

Section Meter sets near the ocean:

Atmospheric corrosion on the entire system was determined not to be a threat warranting further consideration for additional action beyond code compliance or current system practice on the **Meter sets near the ocean section (described as Meter sets within 1 mile of the ocean)** because:

- Inspections have not found metal loss due to atmospheric corrosion over the past 7 years.
- Leaks caused by atmospheric corrosion leaks have not required repair on any part of your system over the past 7 years.
- Inspections have not found problems with above ground pipe coatings that could not be fixed by routine maintenance

Section 4th street bridge crossing:

Atmospheric corrosion on the entire system was determined to be a threat warranting further consideration for additional action beyond code compliance or current system practice on the **4th street bridge crossing section (described as 4" steel main suspended under the 4th St bridge)** because:

- 4th street bridge crossing has facilities that require atmospheric corrosion inspections.
- Inspections have found problems with above ground pipe coatings that could not be fixed by routine maintenance

The possible consequences of a failure of this portion due to the indicated threat would be higher than for the Kastanasburg Utilities-Test Version system in general because:

- The pipe is predominately located within business districts.

External Corrosion On Coated, Cathodically Protected, Steel Mains And Services

External corrosion on coated, cathodically protected, steel mains and services was determined to be a threat warranting further consideration for additional action beyond code compliance or current system practice because:

- Repaired leaks per service are increasing.
- Cathodic protection of the section is not adequate.

External corrosion on coated, cathodically protected, steel mains and services was determined to be limited to certain portions of the system and, therefore, separate threat assessments were performed on the following sections of the system:

Section Rest of coated, protected steel:

External corrosion on coated, cathodically protected, steel mains and services was determined not to be a threat warranting further consideration for additional action beyond code compliance or current system practice on the **Rest of coated, protected steel section (described as Farm taps with no corrosion issues)** because:

- Repaired leaks per mile of mains are not increasing.
- Exposed pipe inspections do not indicate a corrosion problem.
- Cathodic protection of the section is adequate.

Section Taps with low CP:

External corrosion on coated, cathodically protected, steel mains and services was determined to be a threat warranting further consideration for additional action beyond code compliance or current system practice on the **Taps with low CP section (described as Low cp)** because:

- Cathodic protection of the section is not adequate.
- Confirmed corrosion leaks have occurred on this section.
- Cathodic protection test point readings that meet or exceed acceptable cathodic protection criteria; at least 75% of readings exceed -.85 v.
- The condition of the pipeline coating is poor.

The possible consequences of a failure of this portion due to the indicated threat would be higher than for the Kastanasburg Utilities-Test Version system in general because:

- The pipe is predominately located within business districts.

Section Taps with evidence of metal loss:

External corrosion on coated, cathodically protected, steel mains and services was determined to be a threat warranting further consideration for additional action beyond code compliance or current system practice on the **Taps with evidence of metal loss section (described as metal loss)** because:

- Cathodic protection of the section is not adequate.
- Confirmed corrosion leaks have occurred on this section.
- Cathodic protection test point readings that meet or exceed acceptable cathodic protection criteria; at least 75% of readings exceed -.85 v.

The possible consequences of a failure of this portion due to the indicated threat would be higher than for the Kastanasburg Utilities-Test Version system in general because:

- The pressure/diameter of this section is substantially greater than the average of the system.
- A failure of this section could result in significant disruption of service.

External Corrosion On Bare, Cathodically Protected, Steel Mains And Services

External corrosion on bare, cathodically protected, steel mains and services was determined not to be a threat warranting further consideration for additional action beyond code compliance or current system practice because:

- bare, cathodically protected, steel mains and services are not present.

External Corrosion On Coated, Unprotected, Steel Mains And Services

External corrosion on coated, unprotected, steel mains and services was determined not to be a threat warranting further consideration for additional action beyond code compliance or current system practice because:

- coated, unprotected, steel mains and services are not present.

External Corrosion On Bare, Unprotected, Steel Mains And Services

External corrosion on bare, unprotected, steel mains and services was determined to be a threat warranting further consideration for additional action beyond code compliance or current system practice because:

- Exposed pipe inspections indicate a corrosion problem.

External corrosion on bare, unprotected, steel mains and services was determined to be limited to certain portions of the system and, therefore, separate threat assessments were performed on the following sections of the system:

Section Remainder of Bare, Non CP Steel:

External corrosion on bare, unprotected, steel mains and services was determined not to be a threat warranting further consideration for additional action beyond code compliance or current system practice on the **Remainder of Bare, Non CP Steel section (described as Rest of Uncoated, non-protected steel)** because:

- Repaired leaks per mile of mains are not increasing.
- Exposed pipe inspections do not indicate a corrosion problem.

Section West of 4th St in BD:

External corrosion on bare, unprotected, steel mains and services was determined to be a threat warranting further consideration for additional action beyond code compliance or current system practice on the **West of 4th St in BD section (described as Bare steel near the river in the business district)** because:

- Exposed pipe inspections indicate a corrosion problem.

- Confirmed corrosion leaks have occurred on this section.
- Section contain leaks found and being monitored that are suspected to be corrosion related and reflect a corrosion problem.
- Stray currents are creating problems.

The possible consequences of a failure of this portion due to the indicated threat would be higher than for the Kastanasburg Utilities-Test Version system in general because:

- The pressure/diameter of this section is substantially greater than the average of the system.
- The pipe is predominately located within business districts.
- A failure of this section could take more than two (2) hours to restore.
- A failure of this section could result in significant disruption of service.

Section West of 4th outside BD:

External corrosion on bare, unprotected, steel mains and services was determined to be a threat warranting further consideration for additional action beyond code compliance or current system practice on the **West of 4th outside BD section (described as Outside Business district)** because:

- Exposed pipe inspections indicate a corrosion problem.
- Confirmed corrosion leaks have occurred on this section.
- Section contain leaks found and being monitored that are suspected to be corrosion related and reflect a corrosion problem.

The possible consequences of a failure of this portion due to the indicated threat would be about the same as for the Kastanasburg Utilities-Test Version system in general.

External Corrosion On Cast, Wrought, Ductile Iron Mains And Services (8" Or Smaller)

External corrosion on cast, wrought, ductile iron mains and services (8" or smaller) was determined to be a threat warranting further consideration for additional action beyond code compliance or current system practice because:

- Exposed pipe inspections indicate a corrosion problem.
- Confirmed corrosion leaks have occurred on this section.
- Cast/ductile iron mains have steel laterals connected with no electrical isolation.
- Fractures have occurred on the cast/ductile iron pipes other than those related to excavation activities.
- Exposed pipe inspections indicate that graphitization is occurring.

The possible consequences of a failure of this portion due to the indicated threat would be higher than for the Kastanasburg Utilities-Test Version system in general because:

- The pipe is predominately located within business districts.

External Corrosion On Plastic Mains And Services With Metal Fittings

External corrosion on plastic mains and services with metal fittings was determined not to be a threat warranting further consideration for additional action beyond code compliance or current system practice because:

- plastic mains and services with metal fittings are not present.

External Corrosion On Other Metal

External corrosion on other metal was determined not to be a threat warranting further consideration for additional action beyond code compliance or current system practice because:

- other metal is not present.

External Corrosion On Cast, Wrought, Ductile Iron Mains And Services (larger Than 8")

External corrosion on cast, wrought, ductile iron mains and services (larger than 8") was determined not to be a threat warranting further consideration for additional action beyond code compliance or current system practice because:

- Repaired leaks per mile of mains are not increasing.
- Exposed pipe inspections do not indicate a corrosion problem.

Internal Corrosion On The Entire System

Internal corrosion on the entire system was determined to be a threat warranting further consideration for additional action beyond code compliance or current system practice because:

- Kastanasburg Utilities inspections of the inside of metal pipe or coupons removed from metal pipe show signs of internal corrosion.
- Leaks caused by internal corrosion have occurred in Kastanasburg Utilities.
- Gas received in Kastanasburg Utilities is not pipeline quality.
- Liquids have been found in Kastanasburg Utilities piping.

- Liquids found in your Kastanasburg Utilities piping are acidic or corrosive.

Internal corrosion on the entire system was determined to be limited to certain portions of the system and, therefore, separate threat assessments were performed on the following sections of the system:

Section Remainder of system:

Internal corrosion on the entire system was determined not to be a threat warranting further consideration for additional action beyond code compliance or current system practice on the **Remainder of system section (described as The rest of the system with no internal corrosion problems)** because:

- Remainder of system inspections of the inside of metal pipe or coupons removed from metal pipe do not show signs of internal corrosion.
- Leaks caused by internal corrosion have not occurred in Remainder of system.
- Gas received in Remainder of system is pipeline quality.
- Liquids have not been found in Remainder of system piping.

Section Sulfur Springs Area:

Internal corrosion on the entire system was determined to be a threat warranting further consideration for additional action beyond code compliance or current system practice on the **Sulfur Springs Area section (described as The area near sulfur springs where we get local gas production that contains H2S)** because:

- Sulfur Springs Area inspections of the inside of metal pipe or coupons removed from metal pipe show signs of internal corrosion.
- Leaks caused by internal corrosion have occurred in Sulfur Springs Area.
- Gas received in Sulfur Springs Area is not pipeline quality.
- Liquids have been found in Sulfur Springs Area piping.
- Liquids found in your Sulfur Springs Area piping are acidic or corrosive.

The possible consequences of a failure of this portion due to the indicated threat would be higher than for the Kastanasburg Utilities-Test Version system in general because:

- The pipe is predominately located within business districts.

4.2.2. Equipment Malfunctions

Equipment Malfunctions On The Entire System

Equipment malfunctions on the entire system was determined to be a threat warranting further consideration for additional action beyond code compliance or current system practice because:

- Leaks are occurring or inspections indicate potential equipment malfunctions.
- System contains equipment known/prone to malfunction (Industry wide).

Equipment Malfunctions Due To Failing Valves

Equipment malfunctions due to failing valves was determined to be a threat warranting further consideration for additional action beyond code compliance or current system practice because:

- Failing equipment has been specified.

Equipment malfunctions due to failing valves was determined to be limited to certain portions of the system and, therefore, separate threat assessments were performed on the following sections of the system:

Section Rockwell Fig 143:

Equipment malfunctions due to failing valves was determined to be a threat warranting further consideration for additional action beyond code compliance or current system practice on the **Rockwell Fig 143 section (described as Rockwell 2" plug valves (Rockwell, Fig 143, 2"))** because:

- Malfunctioning of these valve(s) is due to failing seals, gaskets, o-rings, packing, etc.
- The problem with these valves does result in gas leaking outside of the pipeline.

The possible consequences of a failure of this portion due to the indicated threat would be higher than for the Kastanasburg Utilities-Test Version system in general because:

- The equipment is primarily within business districts.

Equipment Malfunctions Due To Failing Regulators/relief Valves

Equipment malfunctions due to failing regulators/relief valves was determined to be a threat warranting further consideration for additional action beyond code compliance or current system practice because:

- Failing equipment has been specified.

Equipment malfunctions due to failing regulators/relief valves was determined to be limited to certain portions of the system and, therefore, separate threat assessments were performed on the following sections of the system:

Section Heath Reg ABC:

Equipment malfunctions due to failing regulators/relief valves was determined to be a threat warranting further consideration for additional action beyond code compliance or current system practice on the **Heath Reg ABC section (described as Backfeed Stn. Reg. (Heath, ABC, 2"))** because:

- The inspection/maintenance frequency for this type of equipment is annual.
- Failures are related to set point drift.
- Equipment failure would cause system pressure to exceed the MAOP.
- Equipment does fail more than one time per year.
- The likelihood of this piece of equipment failing is medium.

The possible consequences of a failure of this portion due to the indicated threat would be about the same as for the Kastanasburg Utilities-Test Version system in general.

Section Erickson Relief:

Equipment malfunctions due to failing regulators/relief valves was determined to be a threat warranting further consideration for additional action beyond code compliance or current system practice on the **Erickson Relief section (described as Gate Stn Relief (Erickson, XYZ, 4"))** because:

- The inspection/maintenance frequency for this type of equipment is annual.
- The equipment malfunctioning is due to failing seals, gaskets, o-rings, packing, boots, etc.
- Equipment failure would cause system pressure to exceed the MAOP.

The possible consequences of a failure of this portion due to the indicated threat would be about the same as for the Kastanasburg Utilities-Test Version system in general.

Equipment Malfunctions Due To Failing Other Equipment

Equipment malfunctions due to failing other equipment was determined not to be a threat warranting further consideration for additional action beyond code compliance or current system practice because:

- failing other equipment are not present.

Equipment Malfunctions Due To Valves Prone To Failure

Equipment malfunctions due to valves prone to failure was determined not to be a threat warranting further consideration for additional action beyond code compliance or current system practice because:

- valves prone to failure are not present.

Equipment Malfunctions Due To Regulators / Relief Valves Prone To Failure

Equipment malfunctions due to regulators / relief valves prone to failure was determined not to be a threat warranting further consideration for additional action beyond code compliance or current system practice because:

- regulators / relief valves prone to failure are not present.

Equipment Malfunctions Due To Other Equipment Prone To Failure

Equipment malfunctions due to other equipment prone to failure was determined to be a threat warranting further consideration for additional action beyond code compliance or current system practice because:

- Equipment prone to failure has been specified.

Equipment malfunctions due to other equipment prone to failure was determined to be limited to certain portions of the system and, therefore, separate threat assessments were performed on the following sections of the system:

Section Scott XYZ:

Equipment malfunctions due to other equipment prone to failure was determined to be a threat warranting further consideration for additional action beyond code compliance or current system practice on the **Scott XYZ section (described as Scott XYZ 100 (Scott, XYZ, 100 gal))** because:

- The equipment malfunctioning is due to failing seals, gaskets, o-rings, packing, etc.

The possible consequences of a failure of this portion due to the indicated threat would be about the same as for the Kastanasburg Utilities-Test Version system in general.

4.2.3. Excavation Damage

Excavation Damage Due To Concentrated Damages Or Tickets

Excavation damage due to concentrated damages or tickets was determined not to be a threat warranting further consideration for additional action beyond code compliance or current system practice because:

- There are no areas with concentrations of locate tickets.
- Operator has not sectioned the system based on a concentration of damages.

Excavation Damage Due To Your Crew Or Contractor Damages

Excavation damage due to your crew or contractor damages was determined to be a threat warranting further consideration for additional action beyond code compliance or current system practice because:

- Excavation damage has been caused by operator's crews or contractors.
- Excavation damages are being caused by operator's crews or contractors not following one call laws.
- Excavation damages caused by operator's crews or contractors due to mis-located lines have been caused by poorly performing locating equipment.
- Excavation damages are caused by failure to protect pipe during backfill operations.
- Excavation damages caused by operator's crews or contractors have occurred due to failure to follow company procedures/safety practices.

Excavation damage due to your crew or contractor damages was determined to be limited to certain portions of the system and, therefore, separate threat assessments were performed on the following sections of the system:

Section The Bull Diggers:

Excavation damage due to your crew or contractor damages was determined not to be a threat warranting further consideration for additional action beyond code compliance or current system practice on the **The Bull Diggers section (described as crew not hand digging (Lunar excavating))** because:

- Excavation damages are not being caused by operator's crews or contractors not following one call laws.
- Excavation damages caused by operator's crews or contractors due to mis-located lines have not been caused by poorly performing locating equipment.
- Excavation damages caused by operator's crews or contractors have not been due to unmarked or inaccurately marked facilities.
- Excavation damages are not caused by failure to protect pipe during backfill operations.
- Excavation damages caused by operator's crews or contractors have not occurred due to failure to follow company procedures/safety practices.

Section Company crew 1:

Excavation damage due to your crew or contractor damages was determined to be a threat warranting further consideration for additional action beyond code compliance or current system practice on the **Company crew 1 section (described as Backfill crew (Kastanasburg Utilities))** because:

- Excavation damages are caused by failure to protect pipe during backfill operations.
- Excavation damages caused by operator's crews or contractors have occurred due to failure to follow company procedures/safety practices.

The possible consequences of a failure of this portion due to the indicated threat would be about the same as for the Kastanasburg Utilities-Test Version system in general.

Section The Diggin' Ditchmen:

Excavation damage due to your crew or contractor damages was determined to be a threat warranting further consideration for additional action beyond code compliance or current system practice on the **The Diggin' Ditchmen section (described as Mislocates (Never miss excavating))** because:

- Excavation damages caused by operator's crews or contractors have been due to unmarked or inaccurately marked facilities.

The possible consequences of a failure of this portion due to the indicated threat would be higher than for the Kastanasburg Utilities-Test Version system in general because:

- Disruption of service and cost to return the system to service after the damages caused by the (crews/contractors/excavators) identified for this section are more serious when compared to all other excavation caused damages

Excavation Damage Due To Third Party Damages

Excavation damage due to third party damages was determined to be a threat warranting further consideration for additional action beyond code compliance or current system practice because:

- Excavation damages have occurred due to third parties during the past few years.
- Excavation damages are being caused by third-party excavators not following one call laws.
- Excavation damages caused by third-party excavators due to mis-located lines have been caused by poorly performing locating equipment.
- Excavation damages caused by third-party excavators have been due to unmarked or inaccurately marked facilities.
- Excavation damages are caused by failure to protect pipe during backfill operations.

Excavation damage due to third party damages was determined to be limited to certain portions of the system and, therefore, separate threat assessments were performed on the following sections of the system:

Section Wild Bill Excavating:

Excavation damage due to third party damages was determined to be a threat warranting further consideration for additional action beyond code compliance or current system practice on the **Wild Bill Excavating section (described as General contractor hired by the city)** because:

- Excavation damages are being caused by third-party excavators not following one call laws.
- Excavation damages are caused by failure to protect pipe during backfill operations.

The possible consequences of a failure of this portion due to the indicated threat would be higher than for the Kastanasburg Utilities-Test Version system in general because:

- The (crews/contractors/excavators) identified for this section have caused damage that resulted in a reportable incident.
- Disruption of service and cost to return the system to service after the damages caused by the (crews/contractors/excavators) identified for this section are more serious when compared to all other excavation caused damages

Section All other excavators:

Excavation damage due to third party damages was determined to be a threat warranting further consideration for additional action beyond code compliance or current system practice on the **All other excavators section (described as Everybody else that digs near our system)** because:

- Excavation damages are being caused by third-party excavators not following one call laws.

The possible consequences of a failure of this portion due to the indicated threat would be about the same as for the Kastanasburg Utilities-Test Version system in general.

Excavation Damage Due To Blasting Damage

Excavation damage due to blasting damage was determined to be a threat warranting further consideration for additional action beyond code compliance or current system practice because:

- portions of the system are located where excavation in the area of pipeline would require the use of explosives.
- damage has occurred due to blasting.

Excavation damage due to blasting damage was determined to be limited to certain portions of the system and, therefore, separate threat assessments were performed on the following sections of the system:

Section Rest of system:

Excavation damage due to blasting damage was determined not to be a threat warranting further consideration for additional action beyond code compliance or current system practice on the **Rest of system section (described as no blasting needed)** because:

- No portions of the system are located where excavation in the area of pipeline would require the use of explosives.
- No portions of the system are in known areas of blasting or demolition activity, such as rock quarries or coal mining,
- No damage has occurred due to blasting.

Section Rocky Mt. Hillside:

Excavation damage due to blasting damage was determined to be a threat warranting further consideration for additional action beyond code compliance or current system practice on the **Rocky Mt. Hillside section (described as blasting in rock ledge)** because:

- portions of the system are located where excavation in the area of pipeline would require the use of explosives.
- portions of the system are in known areas of blasting or demolition activity, such as rock quarries or coal mining,

The possible consequences of a failure of this portion due to the indicated threat would be higher than for the Kastanasburg Utilities-Test Version system in general because:

- The pressure/diameter of this section is substantially greater than the average of the system.

4.2.4. Incorrect Operations

Incorrect Operations Due To Inadequate Procedures

Incorrect operations due to inadequate procedures was determined to be a threat warranting further consideration for additional action beyond code compliance or current system practice because:

- Increasing failures have not been corrected.

Incorrect operations due to inadequate procedures was determined to be limited to certain portions of the system and, therefore, separate threat assessments were performed on the following sections of the system:

Section Butt Fusion procedures:

Incorrect operations due to inadequate procedures was determined to be a threat warranting further consideration for additional action beyond code compliance or current system practice on the **Butt Fusion procedures section (described as Procedures don't result in good fusions)** because:

- Failures due to inadequate procedures have been experienced during the past 7 years.
- Increasing failures have not been corrected.

The possible consequences of a failure of this portion due to the indicated threat would be higher than for the Kastanasburg Utilities-Test Version system in general because:

- The potential consequences (injuries and/or property loss) if a failure were to occur because of this problem: high likelihood of serious injury and/or property loss..

Incorrect Operations Due To Failure To Follow Procedures

Incorrect operations due to failure to follow procedures was determined to be a threat warranting further consideration for additional action beyond code compliance or current system practice because:

- Increasing failures have not been corrected.

Incorrect operations due to failure to follow procedures was determined to be limited to certain portions of the system and, therefore, separate threat assessments were performed on the following sections of the system:

Section Backfilling:

Incorrect operations due to failure to follow procedures was determined not to be a threat warranting further consideration for additional action beyond code compliance or current system practice on the **Backfilling section (described as Crews fail to support pipe properly)** because:

- Failures due to inadequate procedures are not increasing per year.

Section Line up clamps:

Incorrect operations due to failure to follow procedures was determined to be a threat warranting further consideration for additional action beyond code compliance or current system practice on the **Line up clamps section (described as Failure to use line up clamps)** because:

- Failures due to a failure to follow procedures have been experienced.
- Increasing failures have not been corrected.

The possible consequences of a failure of this portion due to the indicated threat would be about the same as for the Kastanasburg Utilities-Test Version system in general.

Incorrect Operations Due To Operator Qualification Revocation

Incorrect operations due to operator qualification revocation was determined to be a threat warranting further consideration for additional action beyond code compliance or current system practice because:

- Increasing failures have not been corrected.

Incorrect operations due to operator qualification revocation was determined to be limited to certain portions of the system and, therefore, separate threat assessments were performed on the following sections of the system:

Section Michael Thompson:

Incorrect operations due to operator qualification revocation was determined not to be a threat warranting further consideration for additional action beyond code compliance or current system practice on the **Michael Thompson section (described as The dipstick can't figure out how to work a CGI)** because:

- Increasing failures have been corrected.

We promoted him to Senior Vice President where he'll never see a CGI again.

Incorrect Operations Due To Drugs And Alcohol

Incorrect operations due to drugs and alcohol was determined not to be a threat warranting further consideration for additional action beyond code compliance or current system practice because:

- Increasing failures have been corrected.

The individuals testing positive for drugs and alcohol have been fired.

4.2.5. Materials, Welds and Joints

Material, Weld Or Joint On The Entire System

Material, weld or joint on the entire system was determined to be a threat warranting further consideration for additional action beyond code compliance or current system practice because:

- Manufacturing defects on pipe or non-pipe components have been experienced.
- Failures due to workmanship defects have been experienced.
- Materials with known problems are in use.

Material, Weld Or Joint Due To Manufacturing Defects

Material, weld or joint due to manufacturing defects was determined to be a threat warranting further consideration for additional action beyond code compliance or current system practice because:

- The pipes/components on this section have not been pressure tested in accordance to Part 192, subpart J.

The possible consequences of a failure of this portion due to the indicated threat would be higher than for the Kastanasburg Utilities-Test Version system in general because:

- The pressure/diameter of this section is substantially greater than the average of the system.
- A failure of this section could result in significant disruption of service.

Material, Weld Or Joint Due To Workmanship Defects

Material, weld or joint due to workmanship defects was determined to be a threat warranting further consideration for additional action beyond code compliance or current system practice because:

- Failures in this section occur more than once per year.
- Failures due to materials, welds or joints are increasing per year.
- Failures Occur more frequently than the scheduled leak survey intervals.
- Your current material specification requirements and construction/installation procedures have not been modified to address this issue.

The possible consequences of a failure of this portion due to the indicated threat would be about the same as for the Kastanasburg Utilities-Test Version system in general.

Material, Weld Or Joint Due To Known Problem Materials

Material, weld or joint due to known problem materials was determined not to be a threat warranting further consideration for additional action beyond code compliance or current system practice because:

- none of the known problem materials exist in the system.

4.2.6. Natural forces

Natural Forces On The Entire System

Natural forces on the entire system was determined to be a threat warranting further consideration for additional action beyond code compliance or current system practice because:

- Leaks, failures or damages are averaging one (1) or more per year.
- Portions of the system/section are in areas prone to land subsidence, earthquakes or washouts.
- System/section may or may not contain Cast Iron pipe 8" or less in diameter.
- Natural forces have caused leaks, failures or damages to steel or plastic pipeline in the system/section.

Natural forces on the entire system was determined to be limited to certain portions of the system and, therefore, separate threat assessments were performed on the following sections of the system:

Section Remainder of system:

Natural forces on the entire system was determined not to be a threat warranting further consideration for additional action beyond code compliance or current system practice on the **Remainder of system section (described as rest of system)** because:

- Leaks, failures or damages are not averaging one (1) or more per year.

Section North river crossing:

Natural forces on the entire system was determined to be a threat warranting further consideration for additional action beyond code compliance or current system practice on the **North river crossing section (described as North river crossing)** because:

- No threat recognized, operator did not accept conclusion.

We have experienced washouts after heavy rains at the North river crossing

The possible consequences of a failure of this portion due to the indicated threat would be higher than for the Kastanasburg Utilities-Test Version system in general because:

- No threat recognized, operator did not accept conclusion.

We have experienced washouts after heavy rains at the North river crossing

Section South river crossing:

Natural forces on the entire system was determined not to be a threat warranting further consideration for additional action beyond code compliance or current system practice on the **South river crossing section (described as South river crossing)** because:

- Leaks, failures or damages are not averaging one (1) or more per year.

4.2.7. Other outside forces

Other Outside Forces On The Entire System

Other outside forces on the entire system was determined to be a threat warranting further consideration for additional action beyond code compliance or current system practice because:

- Leaks, failures or damages are averaging one (1) or more per year.
- Above ground facilities are being hit by vehicles.
- Below ground facilities have been damaged due to heavy vehicles driving along or over the facility location.
- Damage has been caused by malicious actions (vandalism) of unauthorized individuals or unauthorized alteration of system.

Other outside forces on the entire system was determined to be limited to certain portions of the system and, therefore, separate threat assessments were performed on the following sections of the system:

Section Rest of system:

Other outside forces on the entire system was determined not to be a threat warranting further consideration for additional action beyond code compliance or current system practice on the **Rest of system section (described as rest of system)** because:

- Leaks, failures or damages are not averaging one (1) or more per year.

Section Downtown old system:

Other outside forces on the entire system was determined to be a threat warranting further consideration for additional action beyond code compliance or current system practice on the **Downtown old system section (described as Streets and alleys downtown)** because:

- Leaks, failures or damages are averaging one (1) or more per year.
- Above ground facilities are being hit by vehicles.
- Damage has been caused by malicious actions (vandalism) of unauthorized individuals or unauthorized alteration of system.

The possible consequences of a failure of this portion due to the indicated threat would be higher than for the Kastanasburg Utilities-Test Version system in general because:

- The pressure/diameter of this section is substantially greater than the average of the system.
- The pipe is predominately located within business districts.

4.2.8. Other threats

Other Threats On The Entire System

Other threats on the entire system was determined to be a threat warranting further consideration for additional action beyond code compliance or current system practice because:

- This system has experienced failures or other safety problems due to causes that were not addressed during the evaluation of the other seven threats.

Other threats on the entire system was determined to be limited to certain portions of the system and, therefore, separate threat assessments were performed on the following sections of the system:

Section Moles:

Other threats on the entire system was determined to be a threat warranting further consideration for additional action beyond code compliance or current system practice on the **Moles section (described as Moles eat our plastic pipe)** because:

- This section has experienced failures or other safety problems due to causes that were not addressed during the evaluation of the other seven threats.

The possible consequences of a failure of this portion due to the indicated threat are:

- The consequences of this threat are reflected in the ranking Kastanasburg Utilities applies to this threat.

Section Space aliens:

Other threats on the entire system was determined to be a threat warranting further consideration for additional action beyond code compliance or current system practice on the **Space aliens section (described as Space aliens parking UFOs on our gate station)** because:

- This section has experienced failures or other safety problems due to causes that were not addressed during the evaluation of the other seven threats.

The possible consequences of a failure of this portion due to the indicated threat are:

- The consequences of this threat are reflected in the ranking Kastanasburg Utilities applies to this threat.

Chapter 5. RISK EVALUATION AND PRIORITIZATION

5.1. Overview

Of the sections identified during the Threat Assessment as requiring further consideration for additional actions, Kastanasburg Utilities has determined that the relative risk of these threats to the integrity of these lines ranks in the following priority, beginning with the highest relative risk:

5.2. Kastanasburg Utilities Section Risk Ranking

a. Section: Butt Fusion procedures portion of Kastanasburg Utilities portion of Kastanasburg Utilities

Threat: Incorrect Operations -> Inadequate Procedures -> Certain Employees/Depts/Tasks

Description: Procedures don't result in good fusions

Rank	User Rank	SHRIMP Rank	Relative Risk Score	Probability Score	Consequence Score	Leak Cause Factor	Incident Probability Factor
1	0	2	18.75	10	1.5	1	1.25

Ranked here, in part, for the following reasons:

- The probability that this problem could lead to a failure on your distribution system (e.g. a leak, rupture or overpressure of the line) may be stated as highly likely to lead to a failure.
- Increasing failures have not been corrected.
- The potential consequences (injuries and/or property loss) if a failure were to occur because of this problem: high likelihood of serious injury and/or property loss..

b. Section: Wild Bill Excavating portion of Kastanasburg Utilities portion of Kastanasburg Utilities

Threat: Excavation Damage -> Third Party Damages -> Third Party Damages

Description: General contractor hired by the city

Rank	User Rank	SHRIMP Rank	Relative Risk Score	Probability Score	Consequence Score	Leak Cause Factor	Incident Probability Factor
2	0	3	18.28	5.35	1.5	1.822	1.25

Ranked here, in part, for the following reasons:

- Excavation damages are being caused by third-party excavators not following one call laws.
- Excavation damages are caused by failure to protect pipe during backfill operations.
- The (crews/contractors/excavators) identified for this section have caused damage that resulted in a reportable incident.
- Disruption of service and cost to return the system to service after the damages caused by the (crews/contractors/excavators) identified for this section are more serious when compared to all other excavation caused damages

c. Section: Space aliens portion of Kastanasburg Utilities

Threat: Other Threats -> Other

Description: Space aliens parking UFOs on our gate station

Rank	User Rank	SHRIMP Rank	Relative Risk Score	Probability Score	Consequence Score	Leak Cause Factor	Incident Probability Factor
3	3	23	0	0	1	1	1.00
	Explanation: Space alien landings have damaged our gate station and caused customer outages -- That's my story and I'm sticking to it.						

Ranked here, in part, for the following reasons:

- Operator overrode ranking with this explanation:
Space alien landings have damaged our gate station and caused customer outages -- That's my story and I'm sticking to it.

d. Section: Moles portion of Kastanasburg Utilities

Threat: Other Threats -> Other

Description: Moles eat our plastic pipe

Rank	User Rank	SHRIMP Rank	Relative Risk Score	Probability Score	Consequence Score	Leak Cause Factor	Incident Probability Factor
4	4	23	0	0	1	1	1.00
	Explanation: I hate these moles and want an excuse to kill them.						

Ranked here, in part, for the following reasons:

- Operator overrode ranking with this explanation:
I hate these moles and want an excuse to kill them.

e. Section: Line up clamps portion of Kastanasburg Utilities portion of Kastanasburg Utilities

Threat: Incorrect Operations -> Failure To Follow Procedures -> Certain Employees/Depts/Tasks

Description: Failure to use line up clamps

Rank	User Rank	SHRIMP Rank	Relative Risk Score	Probability Score	Consequence Score	Leak Cause Factor	Incident Probability Factor
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Rank	Rank	Rank	Score	Score	Score	Factor	Factor
5	0	4	15.63	10	1.25	1	1.25

Ranked here, in part, for the following reasons:

- The probability that this problem could lead to a failure on your distribution system (e.g. a leak, rupture or overpressure of the line) may be stated as highly likely to lead to a failure.
- Increasing failures have not been corrected.
- The potential consequences (injuries and/or property loss) if a failure were to occur because of this problem: moderate likelihood of injury and/or property loss..

f. Section: Heath Reg ABC portion of Failing Equipment portion of Kastanasburg Utilities

Threat: Equipment Malfunction -> Regulators Experiencing Failure -> Specific Regulators Experiencing Failure

Description: Backfeed Stn. Reg. (Heath, ABC, 2")

Rank	User Rank	SHRIMP Rank	Relative Risk Score	Probability Score	Consequence Score	Leak Cause Factor	Incident Probability Factor	
6	6	15	5.5	5.5	1	1	1.00	
	Explanation:	The risk of over pressure is greater than the risk posed by our low CP levels, in the opinion of our Gas Utility Supervisor						

Ranked here, in part, for the following reasons:

- Operator override ranking with this explanation:
The risk of over pressure is greater than the risk posed by our low CP levels, in the opinion of our Gas Utility Supervisor
- The likelihood of this piece of equipment failing is medium.
- Equipment failure would cause system pressure to exceed the MAOP.

g. Section: West of 4th St in BD portion of Unprotected, Bare Steel portion of Kastanasburg Utilities

Threat: Corrosion -> External Corrosion -> Unprotected, Bare Steel

Description: Bare steel near the river in the business district

Rank	User Rank	SHRIMP Rank	Relative Risk Score	Probability Score	Consequence Score	Leak Cause Factor	Incident Probability Factor
7	0	5	12.23	7.6	1.5	1.073	1.00

Ranked here, in part, for the following reasons:

- Stray currents are creating problems.
- Confirmed corrosion leaks have occurred on this section.
- Exposed pipe inspections indicate a corrosion problem.
- Section contain leaks found and being monitored that are suspected to be corrosion related and reflect a corrosion problem.

h. Section: Sulfur Springs Area portion of Kastanasburg Utilities portion of Kastanasburg Utilities

Threat: Corrosion -> Internal Corrosion -> Internal Corrosion

Description: The area near sulfur springs where we get local gas production that contains H2S

Rank	User Rank	SHRIMP Rank	Relative Risk Score	Probability Score	Consequence Score	Leak Cause Factor	Incident Probability Factor
8	0	6	10.43	8.45	1.15	1.073	1.00

Ranked here, in part, for the following reasons:

- Leaks caused by internal corrosion have occurred in Sulfur Springs Area.
- Sulfur Springs Area inspections of the inside of metal pipe or coupons removed from metal pipe show signs of internal corrosion.
- Liquids found in your Sulfur Springs Area piping are acidic or corrosive.
- Gas received in Sulfur Springs Area is not pipeline quality.

i. Section: Erickson Relief portion of Failing Equipment portion of Kastanasburg Utilities

Threat: Equipment Malfunction -> Regulators Experiencing Failure -> Specific Regulators Experiencing Failure

Description: Gate Stn Relief (Erickson, XYZ, 4")

Rank	User Rank	SHRIMP Rank	Relative Risk Score	Probability Score	Consequence Score	Leak Cause Factor	Incident Probability Factor	
9	9	16	3.66	3.25	1.125	1	1.00	
	Explanation:	A significant portion of our system would be overpressured if this relief were to fail. This area includes 2 schools, a hospital and a nursing home						

Ranked here, in part, for the following reasons:

- Operator override ranking with this explanation:
A significant portion of our system would be overpressured if this relief were to fail. This area includes 2 schools, a hospital and a nursing home
- Equipment failure would cause system pressure to exceed the MAOP.
- The likelihood of this piece of equipment failing is low.

- The size/capacity of the equipment is somewhat greater than other equipment in the system as a whole.

j. Section: North river crossing portion of Kastanasburg Utilities

Threat: Natural Forces -> Concentrated Area

Description: North river crossing

Rank	User Rank	SHRIMP Rank	Relative Risk Score	Probability Score	Consequence Score	Leak Cause Factor	Incident Probability Factor
10	10	14	5.65	3.37	1.3	1.031	1.25
	Explanation: Losing the river crossing would cause significant hardship to our customers						

Ranked here, in part, for the following reasons:

- Operator overrode assessment that this was not a threat:
We have experienced washouts after heavy rains at the North river crossing
- Operator overrode ranking with this explanation:
Losing the river crossing would cause significant hardship to our customers
- Portions of the system/section are in areas prone to land subsidence, earthquakes or washouts.
- The pressure/diameter of this section is substantially greater than the average of the system.

k. Section: Downtown old system portion of Kastanasburg Utilities

Threat: Other Outside Forces -> Other Outside Forces

Description: Streets and alleys downtown

Rank	User Rank	SHRIMP Rank	Relative Risk Score	Probability Score	Consequence Score	Leak Cause Factor	Incident Probability Factor
11	0	7	10.05	7	1.35	1.063	1.00

Ranked here, in part, for the following reasons:

- Above ground facilities are being hit by vehicles.
- Damage has been caused by malicious actions (vandalism) of unauthorized individuals or unauthorized alteration of system.
- The pressure/diameter of this section is substantially greater than the average of the system.
- The pipe is predominately located within business districts.

l. Section: 4th street bridge crossing portion of Kastanasburg Utilities portion of Kastanasburg Utilities

Threat: Corrosion -> Atmospheric Corrosion -> Atmospheric Corrosion

Description: 4" steel main suspended under the 4th St bridge

Rank	User Rank	SHRIMP Rank	Relative Risk Score	Probability Score	Consequence Score	Leak Cause Factor	Incident Probability Factor
12	12	18	3.29	2.5	1.225	1.073	1.00
	Explanation: There is a hospital at the east end of the bridge that would be difficult to evacuate and has many people present						

Ranked here, in part, for the following reasons:

- Operator overrode ranking with this explanation:
There is a hospital at the east end of the bridge that would be difficult to evacuate and has many people present
- Inspections have found problems with above ground pipe coatings that could not be fixed by routine maintenance
- The pipe is predominately located within business districts.
- A failure of this section could result in moderate disruption of service.

m. Section: Company crew 1 portion of Kastanasburg Utilities portion of Kastanasburg Utilities

Threat: Excavation Damage -> Crew or Contractor Damages -> Crew or Contractor Damages

Description: Backfill crew (Kastanasburg Utilities)

Rank	User Rank	SHRIMP Rank	Relative Risk Score	Probability Score	Consequence Score	Leak Cause Factor	Incident Probability Factor
13	13	13	7.11	3.12	1	1.822	1.25
	Explanation: We have already taken action on this threat and want to include it in our DIMP plan						

Ranked here, in part, for the following reasons:

- Operator overrode ranking with this explanation:
We have already taken action on this threat and want to include it in our DIMP plan
- Excavation damages are caused by failure to protect pipe during backfill operations.
- Excavation damages caused by operator's crews or contractors have occurred due to failure to follow company procedures/safety practices.

n. Section: The Diggin' Ditchmen portion of Kastanasburg Utilities portion of Kastanasburg Utilities

Threat: Excavation Damage -> Crew or Contractor Damages -> Crew or Contractor Damages

Description: Mislocates (Never miss excavating)

Rank	User Rank	SHRIMP Rank	Relative Risk Score	Probability Score	Consequence Score	Leak Cause Factor	Incident Probability Factor
14	0	8	9.98	3.65	1.2	1.822	1.25

Ranked here, in part, for the following reasons:

- Excavation damages caused by operator's crews or contractors have been due to unmarked or inaccurately marked facilities.
- Disruption of service and cost to return the system to service after the damages caused by the (crews/contractors/excavators) identified for this section are more serious when compared to all other excavation caused damages

o. Section: Cast, Ductile, Wrought Iron (8" or smaller) portion of Kastanasburg Utilities

Threat: Corrosion -> External Corrosion

Description: Entire system

Rank	User Rank	SHRIMP Rank	Relative Risk Score	Probability Score	Consequence Score	Leak Cause Factor	Incident Probability Factor
15	0	9	9.01	7	1.2	1.073	1.00

Ranked here, in part, for the following reasons:

- Fractures have occurred on the cast/ductile iron pipes other than those related to excavation activities.
- Cast/ductile iron mains have steel laterals connected with no electrical isolation.
- Exposed pipe inspections indicate that graphitization is occurring.
- Exposed pipe inspections indicate a corrosion problem.

p. Section: All other excavators portion of Kastanasburg Utilities portion of Kastanasburg Utilities

Threat: Excavation Damage -> Third Party Damages -> Third Party Damages

Description: Everybody else that digs near our system

Rank	User Rank	SHRIMP Rank	Relative Risk Score	Probability Score	Consequence Score	Leak Cause Factor	Incident Probability Factor
16	0	10	8.88	3.9	1	1.822	1.25

Ranked here, in part, for the following reasons:

- Excavation damages are being caused by third-party excavators not following one call laws.

q. Section: Vernon Heights subdivision portion of Kastanasburg Utilities

Threat: Material, Weld or Joint Failure -> Workmanship Defects

Description: 2" stl pipe, 2", .154, x42, ERW, Scotchcoat thin film, 1992, 1992, Mallu Contracting, Consolidated Pipe

Rank	User Rank	SHRIMP Rank	Relative Risk Score	Probability Score	Consequence Score	Leak Cause Factor	Incident Probability Factor
17	0	11	7.83	7.75	1	1.01	1.00

Ranked here, in part, for the following reasons:

- Failures in this section occur more than once per year.
- Failures due to materials, welds or joints are increasing per year.

r. Section: West of 4th outside BD portion of Unprotected, Bare Steel portion of Kastanasburg Utilities

Threat: Corrosion -> External Corrosion -> Unprotected, Bare Steel

Description: Outside Business district

Rank	User Rank	SHRIMP Rank	Relative Risk Score	Probability Score	Consequence Score	Leak Cause Factor	Incident Probability Factor
18	0	12	7.51	7	1	1.073	1.00

Ranked here, in part, for the following reasons:

- Section contain leaks found and being monitored that are suspected to be corrosion related and reflect a corrosion problem.
- Confirmed corrosion leaks have occurred on this section.
- Exposed pipe inspections indicate a corrosion problem.

s. Section: Taps with low CP portion of Cathodic Protected, Coated Steel portion of Kastanasburg Utilities

Threat: Corrosion -> External Corrosion -> Cathodic Protected, Coated Steel

Description: Low cp

Rank	User Rank	SHRIMP Rank	Relative Risk Score	Probability Score	Consequence Score	Leak Cause Factor	Incident Probability Factor
19	0	17	3.61	2.8	1.2	1.073	1.00

Ranked here, in part, for the following reasons:

- The condition of the pipeline coating is poor.
- Cathodic protection test point readings that meet or exceed acceptable cathodic protection criteria; at least 75% of readings exceed .85 v.
- Confirmed corrosion leaks have occurred on this section.
- The pipe is predominately located within business districts.

t. Section: Taps with evidence of metal loss portion of Cathodic Protected, Coated Steel portion of Kastanasburg Utilities

Threat: Corrosion -> External Corrosion -> Cathodic Protected, Coated Steel

Description: metal loss

Rank	User Rank	SHRIMP Rank	Relative Risk Score	Probability Score	Consequence Score	Leak Cause Factor	Incident Probability Factor
20	0	19	2.23	1.6	1.3	1.073	1.00

Ranked here, in part, for the following reasons:

- Cathodic protection test point readings that meet or exceed acceptable cathodic protection criteria; at least 75% of readings exceed .85 v.
- Confirmed corrosion leaks have occurred on this section.
- The pressure/diameter of this section is substantially greater than the average of the system.
- A failure of this section could result in significant disruption of service.

u. Section: HP Feeder Line portion of Kastanasburg Utilities

Threat: Material, Weld or Joint Failure -> Manufacturing Defects

Description: 6" C&W Steel, 6", .188, B, Low frequency ERW, Coal Tar TG3, 1962, 1962, Unknown, Unknown

Rank	User Rank	SHRIMP Rank	Relative Risk Score	Probability Score	Consequence Score	Leak Cause Factor	Incident Probability Factor
21	0	20	1.34	1	1.325	1.01	1.00

Ranked here, in part, for the following reasons:

- Failures in this section occur less than once per 5 years.
- The pressure/diameter of this section is substantially greater than the average of the system.
- A failure of this section could result in significant disruption of service.
- A failure of this section could take between one (1) and two (2) hours to restore.

v. Section: Rockwell Fig 143 portion of Failing Equipment portion of Kastanasburg Utilities

Threat: Equipment Malfunction -> Valves Experiencing Failure -> Specific Valves Experiencing Failure

Description: Rockwell 2" plug valves (Rockwell, Fig 143, 2")

Rank	User Rank	SHRIMP Rank	Relative Risk Score	Probability Score	Consequence Score	Leak Cause Factor	Incident Probability Factor
22	0	21	1.15	1	1.15	1	1.00

Ranked here, in part, for the following reasons:

- The likelihood of this valve failing is low.
- The equipment is primarily within business districts.

w. Section: Scott XYZ portion of Prone To Failure portion of Kastanasburg Utilities

Threat: Equipment Malfunction -> Other Equipment Prone to Failure -> Specific Other Equipment Prone to Failure

Description: Scott XYZ 100 (Scott, XYZ, 100 gal)

Rank	User Rank	SHRIMP Rank	Relative Risk Score	Probability Score	Consequence Score	Leak Cause Factor	Incident Probability Factor
23	0	22	1.02	1	1.025	1	1.00

Ranked here, in part, for the following reasons:

- The likelihood of this piece of equipment failing is low.
- A failure of this section could take between one (1) and two (2) hours to restore.

x. Section: Rocky Mt. Hillside portion of Kastanasburg Utilities portion of Kastanasburg Utilities

Threat: Excavation Damage -> Blasting Damage -> Blasting Damage

Description: blasting in rock ledge

Rank	User Rank	SHRIMP Rank	Relative Risk Score	Probability Score	Consequence Score	Leak Cause Factor	Incident Probability Factor	
24	25	1	24.05	8.8	1.2	1.822	1.25	
	Explanation:	Even though their are portions of our system in areas where blasting occurs, we have never had any issues related to blasting.						

Ranked here, in part, for the following reasons:

- Operator overrode ranking with this explanation:
Even though their are portions of our system in areas where blasting occurs, we have never had any issues related to blasting.
- portions of the system are in known areas of blasting or demolition activity, such as rock quarries or coal mining,
- portions of the system are located where excavation in the area of pipeline would require the use of explosives.
- The pressure/diameter of this section is substantially greater than the average of the system.

Chapter 6. ADDITIONAL/ACCELERATED MEASURES TO ADDRESS RISKS

6.1. MANDATORY ADDITIONAL ACTIONS

The following are mandatory additional actions required by DIMP regulations.

LEAK CLASSIFICATION AND ACTION CRITERIA

Kastanasburg Utilities has adopted leak classification and action criteria which can be found at O&M manual # 82.

6.2. RISK BASED ADDITIONAL ACTIONS

The following lists the additional/accelerated actions that will be taken and describes the part of Kastanasburg Utilities to which each applies to address the priority risks described in the previous section of this Plan.

a. Section: Butt Fusion procedures portion of Kastanasburg Utilities portion of Kastanasburg Utilities

Threat: Incorrect Operations -> Inadequate Procedures -> Certain Employees/Depts/Tasks

Description: Procedures don't result in good fusions

For **incorrect operations due to inadequate procedures** on the **Butt Fusion procedures** section, Kastanasburg Utilities will:

- review and improve procedures for these employees, departments and/or tasks.

b. Section: Wild Bill Excavating portion of Kastanasburg Utilities portion of Kastanasburg Utilities

Threat: Excavation Damage -> Third Party Damages -> Third Party Damages

Description: General contractor hired by the city

For **excavation damage due to third party damages** on the **Wild Bill Excavating** section, Kastanasburg Utilities will:

- conduct enhanced awareness education programs following the guidelines of the Supplemental Frequency and Activity in API RP 1162 Public Awareness Programs for Pipeline Operators incorporated by reference in 49 CFR Part 192.

c. Section: Space aliens portion of Kastanasburg Utilities

Threat: Other Threats -> Other

Description: Space aliens parking UFOs on our gate station

For **other threats on the entire system** on the **Space aliens** section, Kastanasburg Utilities will:

- Install "No space alien landing" signs at all gate stations

d. Section: Moles portion of Kastanasburg Utilities

Threat: Other Threats -> Other

Description: Moles eat our plastic pipe

For **other threats on the entire system** on the **Moles** section, Kastanasburg Utilities will:

- Electrify our tracer wire to 10,000 Volts to kill the moles

e. Section: Line up clamps portion of Kastanasburg Utilities portion of Kastanasburg Utilities

Threat: Incorrect Operations -> Failure To Follow Procedures -> Certain Employees/Depts/Tasks

Description: Failure to use line up clamps

For **incorrect operations due to failure to follow procedures** on the **Line up clamps** section, Kastanasburg Utilities will:

- review and improve training for these employees, departments and/or tasks.

f. Section: Heath Reg ABC portion of Failing Equipment portion of Kastanasburg Utilities

Threat: Equipment Malfunction -> Regulators Experiencing Failure -> Specific Regulators Experiencing Failure

Description: Backfeed Stn. Reg. (Heath, ABC, 2")

For **equipment malfunctions due to failing regulators/relief valves** on the **Heath Reg ABC** section, Kastanasburg Utilities will:

- perform inspections and maintenance on an accelerated frequency of Monthly on this portion of the distribution system.
- repair or replace problem materials.

g. Section: West of 4th St in BD portion of Unprotected, Bare Steel portion of Kastanasburg Utilities

Threat: Corrosion -> External Corrosion -> Unprotected, Bare Steel

Description: Bare steel near the river in the business district

For **external corrosion on bare, unprotected, steel mains and services** on the **West of 4th St in BD** section, Kastanasburg Utilities will:

- perform leakage surveys on an accelerated frequency of Semiannually on this portion of the distribution system.

h. Section: Sulfur Springs Area portion of Kastanasburg Utilities portion of Kastanasburg Utilities

Threat: Corrosion -> Internal Corrosion -> Internal Corrosion

Description: The area near sulfur springs where we get local gas production that contains H₂S

For **internal corrosion on the entire system** on the **Sulfur Springs Area** section, Kastanasburg Utilities will:

- perform leakage surveys on an accelerated frequency of Semiannually on this portion of the distribution system.

- i. Section: Erickson Relief** portion of Failing Equipment portion of Kastanasburg Utilities
Threat: Equipment Malfunction -> Regulators Experiencing Failure -> Specific Regulators Experiencing Failure
Description: Gate Stn Relief (Erickson, XYZ, 4")
For **equipment malfunctions due to failing regulators/relief valves** on the **Erickson Relief** section, Kastanasburg Utilities will:
- perform inspections and maintenance on an accelerated frequency of Quarterly on this portion of the distribution system.
 - repair problem equipment and/or change settings.
- j. Section: North river crossing** portion of Kastanasburg Utilities
Threat: Natural Forces -> Concentrated Area
Description: North river crossing
For **natural forces on the entire system** on the **North river crossing** section, Kastanasburg Utilities will:
- conduct additional leak surveys on North river crossing after significant natural force events. If leaks or damages are detected Kastanasburg Utilities will expose the pipeline to determine the extent of the damage, repair the leak or damage and consider if additional or accelerated action is required.
- k. Section: Downtown old system** portion of Kastanasburg Utilities
Threat: Other Outside Forces -> Other Outside Forces
Description: Streets and alleys downtown
For **other outside forces on the entire system** on the **Downtown old system** section, Kastanasburg Utilities will:
- relocate facilities
- l. Section: 4th street bridge crossing** portion of Kastanasburg Utilities portion of Kastanasburg Utilities
Threat: Corrosion -> Atmospheric Corrosion -> Atmospheric Corrosion
Description: 4" steel main suspended under the 4th St bridge
For **atmospheric corrosion on the entire system** on the **4th street bridge crossing** section, Kastanasburg Utilities will:
- rehabilitate the pipeline coating by removing/replacing the coating or making significant repairs or improvements to the coating. The Kastanasburg Utilities will rehabilitate miles) (and/or services) per year of this portion of the distribution system
- m. Section: Company crew 1** portion of Kastanasburg Utilities portion of Kastanasburg Utilities
Threat: Excavation Damage -> Crew or Contractor Damages -> Crew or Contractor Damages
Description: Backfill crew (Kastanasburg Utilities)
For **excavation damage due to your crew or contractor damages** on the **Company crew 1** section, Kastanasburg Utilities will:
- expand compliance with OQ plan.
- n. Section: The Diggin' Ditchmen** portion of Kastanasburg Utilities portion of Kastanasburg Utilities
Threat: Excavation Damage -> Crew or Contractor Damages -> Crew or Contractor Damages
Description: Mislocates (Never miss excavating)
For **excavation damage due to your crew or contractor damages** on the **The Diggin' Ditchmen** section, Kastanasburg Utilities will:
- expand equipment testing, calibration, upgrade.
 - re-evaluate contractor.
- o. Section: Cast, Ductile, Wrought Iron (8" or smaller)** portion of Kastanasburg Utilities
Threat: Corrosion -> External Corrosion
Description: Entire system
- p. Section: All other excavators** portion of Kastanasburg Utilities portion of Kastanasburg Utilities
Threat: Excavation Damage -> Third Party Damages -> Third Party Damages
Description: Everybody else that digs near our system
- q. Section: Vernon Heights subdivision** portion of Kastanasburg Utilities
Threat: Material, Weld or Joint Failure -> Workmanship Defects
Description: 2" stl pipe, 2", .154, x42, ERW, Scotchcoat thin film, 1992, 1992, Mallu Contracting, Consolidated Pipe
- r. Section: West of 4th outside BD** portion of Unprotected, Bare Steel portion of Kastanasburg Utilities
Threat: Corrosion -> External Corrosion -> Unprotected, Bare Steel
Description: Outside Business district
- s. Section: Taps with low CP** portion of Cathodic Protected, Coated Steel portion of Kastanasburg Utilities
Threat: Corrosion -> External Corrosion -> Cathodic Protected, Coated Steel
Description: Low cp
- t. Section: Taps with evidence of metal loss** portion of Cathodic Protected, Coated Steel portion of Kastanasburg Utilities
Threat: Corrosion -> External Corrosion -> Cathodic Protected, Coated Steel
Description: metal loss
- u. Section: HP Feeder Line** portion of Kastanasburg Utilities

Threat: Material, Weld or Joint Failure -> Manufacturing Defects

Description: 6" C&W Steel, 6", .188, B, Low frequency ERW, Coal Tar TG3, 1962, 1962, Unknown, Unknown

v. Section: Rockwell Fig 143 portion of Failing Equipment portion of Kastanasburg Utilities

Threat: Equipment Malfunction -> Valves Experiencing Failure -> Specific Valves Experiencing Failure

Description: Rockwell 2" plug valves (Rockwell, Fig 143, 2")

w. Section: Scott XYZ portion of Prone To Failure portion of Kastanasburg Utilities

Threat: Equipment Malfunction -> Other Equipment Prone to Failure -> Specific Other Equipment Prone to Failure

Description: Scott XYZ 100 (Scott, XYZ, 100 gal)

x. Section: Rocky Mt. Hillside portion of Kastanasburg Utilities portion of Kastanasburg Utilities

Threat: Excavation Damage -> Blasting Damage -> Blasting Damage

Description: blasting in rock ledge

Chapter 7. MEASURE PERFORMANCE, MONITOR RESULTS AND EVALUATE EFFECTIVENESS

7.1. MANDATORY PERFORMANCE MEASURES

Kastanasburg Utilities will keep records of the following performance measures:

1. The number of hazardous leaks either eliminated or repaired, categorized by cause;
2. The number of excavation damages;
3. The number of excavation tickets received;
4. The number of leaks either eliminated or repaired, categorized by cause; and
5. The number of hazardous leaks either eliminated or repaired, categorized by material.

7.2. RISK BASED PERFORMANCE MEASURES

The following lists the performance measures that will be tracked and describes the part of Kastanasburg Utilities to which each applies to evaluate the effectiveness of the additional measures taken to address risks as described in the previous section of this Plan.

- a. Section: Butt Fusion procedures** portion of Kastanasburg Utilities portion of Kastanasburg Utilities

Threat: Incorrect Operations -> Inadequate Procedures -> Certain Employees/Depts/Tasks

Description: Procedures don't result in good fusions

For **incorrect operations due to inadequate procedures** on the **Butt Fusion procedures** section, Kastanasburg Utilities will:

- track the frequency of failures due to incorrect operations.

- b. Section: Wild Bill Excavating** portion of Kastanasburg Utilities portion of Kastanasburg Utilities

Threat: Excavation Damage -> Third Party Damages -> Third Party Damages

Description: General contractor hired by the city

For **excavation damage due to third party damages** on the **Wild Bill Excavating** section, Kastanasburg Utilities will:

- track the frequency of these failures per 1000 tickets.

- c. Section: Space aliens** portion of Kastanasburg Utilities

Threat: Other Threats -> Other

Description: Space aliens parking UFOs on our gate station

For **other threats on the entire system** on the **Space aliens** section, Kastanasburg Utilities will:

- Track frequency of space alien landings

- d. Section: Moles** portion of Kastanasburg Utilities

Threat: Other Threats -> Other

Description: Moles eat our plastic pipe

For **other threats on the entire system** on the **Moles** section, Kastanasburg Utilities will:

- track the frequency of these failures.

- e. Section: Line up clamps** portion of Kastanasburg Utilities portion of Kastanasburg Utilities

Threat: Incorrect Operations -> Failure To Follow Procedures -> Certain Employees/Depts/Tasks

Description: Failure to use line up clamps

For **incorrect operations due to failure to follow procedures** on the **Line up clamps** section, Kastanasburg Utilities will:

- track OQ revocations for these employees, departments and/or tasks.

- f. Section: Heath Reg ABC** portion of Failing Equipment portion of Kastanasburg Utilities

Threat: Equipment Malfunction -> Regulators Experiencing Failure -> Specific Regulators Experiencing Failure

Description: Backfeed Stn. Reg. (Heath, ABC, 2")

For **equipment malfunctions due to failing regulators/relief valves** on the **Heath Reg ABC** section, Kastanasburg Utilities will:

- track the frequency of these failures.

- g. Section: West of 4th St in BD** portion of Unprotected, Bare Steel portion of Kastanasburg Utilities

Threat: Corrosion -> External Corrosion -> Unprotected, Bare Steel

Description: Bare steel near the river in the business district

For **external corrosion on bare, unprotected, steel mains and services** on the **West of 4th St in BD** section, Kastanasburg Utilities will:

- track the number of leaks caused by external corrosion per mile of main and per 1000 service lines on the West of 4th St in BD.

- h. Section: Sulfur Springs Area** portion of Kastanasburg Utilities portion of Kastanasburg Utilities

Threat: Corrosion -> Internal Corrosion -> Internal Corrosion

Description: The area near sulfur springs where we get local gas production that contains H2S

For **internal corrosion on the entire system** on the **Sulfur Springs Area** section, Kastanasburg Utilities will:

- track the frequency of leaks or failures due to internal corrosion repaired each year per mile of main (and/or per service) in the Sulfur Springs Area.

i. Section: Erickson Relief portion of Failing Equipment portion of Kastanasburg Utilities

Threat: Equipment Malfunction -> Regulators Experiencing Failure -> Specific Regulators Experiencing Failure

Description: Gate Stn Relief (Erickson, XYZ, 4")

For **equipment malfunctions due to failing regulators/relief valves** on the **Erickson Relief** section, Kastanasburg Utilities will:

- track the frequency of these failures.

j. Section: North river crossing portion of Kastanasburg Utilities

Threat: Natural Forces -> Concentrated Area

Description: North river crossing

For **natural forces on the entire system** on the **North river crossing** section, Kastanasburg Utilities will:

- track the number of leaks or failures due to natural forces repaired each year per mile of main (and/or per service) in the North river crossing.

k. Section: Downtown old system portion of Kastanasburg Utilities

Threat: Other Outside Forces -> Other Outside Forces

Description: Streets and alleys downtown

For **other outside forces on the entire system** on the **Downtown old system** section, Kastanasburg Utilities will:

- track the frequency of these failures.

l. Section: 4th street bridge crossing portion of Kastanasburg Utilities portion of Kastanasburg Utilities

Threat: Corrosion -> Atmospheric Corrosion -> Atmospheric Corrosion

Description: 4" steel main suspended under the 4th St bridge

For **atmospheric corrosion on the entire system** on the **4th street bridge crossing** section, Kastanasburg Utilities will:

- track the percentage of inspections that find or failures due to atmospheric corrosion per mile of main (and/or per service) in the 4th street bridge crossing.

m. Section: Company crew 1 portion of Kastanasburg Utilities portion of Kastanasburg Utilities

Threat: Excavation Damage -> Crew or Contractor Damages -> Crew or Contractor Damages

Description: Backfill crew (Kastanasburg Utilities)

For **excavation damage due to your crew or contractor damages** on the **Company crew 1** section, Kastanasburg Utilities will:

- track the frequency of these failures per 1000 tickets.

n. Section: The Diggin' Ditchmen portion of Kastanasburg Utilities portion of Kastanasburg Utilities

Threat: Excavation Damage -> Crew or Contractor Damages -> Crew or Contractor Damages

Description: Mislocates (Never miss excavating)

For **excavation damage due to your crew or contractor damages** on the **The Diggin' Ditchmen** section, Kastanasburg Utilities will:

- track the frequency of these failures per 1000 tickets.

o. Section: Cast, Ductile, Wrought Iron (8" or smaller) portion of Kastanasburg Utilities

Threat: Corrosion -> External Corrosion

Description: Entire system

p. Section: All other excavators portion of Kastanasburg Utilities portion of Kastanasburg Utilities

Threat: Excavation Damage -> Third Party Damages -> Third Party Damages

Description: Everybody else that digs near our system

q. Section: Vernon Heights subdivision portion of Kastanasburg Utilities

Threat: Material, Weld or Joint Failure -> Workmanship Defects

Description: 2" stl pipe, 2", .154, x42, ERW, Scotchcoat thin film, 1992, 1992, Mallu Contracting, Consolidated Pipe

r. Section: West of 4th outside BD portion of Unprotected, Bare Steel portion of Kastanasburg Utilities

Threat: Corrosion -> External Corrosion -> Unprotected, Bare Steel

Description: Outside Business district

s. Section: Taps with low CP portion of Cathodic Protected, Coated Steel portion of Kastanasburg Utilities

Threat: Corrosion -> External Corrosion -> Cathodic Protected, Coated Steel

Description: Low cp

t. Section: Taps with evidence of metal loss portion of Cathodic Protected, Coated Steel portion of Kastanasburg Utilities

Threat: Corrosion -> External Corrosion -> Cathodic Protected, Coated Steel

Description: metal loss

u. Section: HP Feeder Line portion of Kastanasburg Utilities

Threat: Material, Weld or Joint Failure -> Manufacturing Defects

Description: 6" C&W Steel, 6", .188, B, Low frequency ERW, Coal Tar TG3, 1962, 1962, Unknown, Unknown

v. Section: Rockwell Fig 143 portion of Failing Equipment portion of Kastanasburg Utilities

Threat: Equipment Malfunction -> Valves Experiencing Failure -> Specific Valves Experiencing Failure

Description: Rockwell 2" plug valves (Rockwell, Fig 143, 2")

w. Section: Scott XYZ portion of Prone To Failure portion of Kastanasburg Utilities

Threat: Equipment Malfunction -> Other Equipment Prone to Failure -> Specific Other Equipment Prone to Failure

Description: Scott XYZ 100 (Scott, XYZ, 100 gal)

x. Section: Rocky Mt. Hillside portion of Kastanasburg Utilities portion of Kastanasburg Utilities

Threat: Excavation Damage -> Blasting Damage -> Blasting Damage

Description: blasting in rock ledge

7.3. MONITOR RESULTS AND EVALUATE EFFECTIVENESS

Monitoring results and evaluating effectiveness is addressed in [Chapter 8, PERIODIC EVALUATION AND IMPROVEMENT](#) of this Plan.

Chapter 8. PERIODIC EVALUATION AND IMPROVEMENT

Kastanasburg Utilities will conduct a complete re-evaluation of this Plan no less than every 3 years. Trends in each of the performance measures listed in the previous section will be reviewed during the re-evaluation. If any performance measure indicates that any of the additional action taken is not effective in reducing the risk it is intended to address, Kastanasburg Utilities will consider implementing additional actions to address that risk.

Re-evaluation of the Plan will also occur when changes occur on the system that may significantly change the risk of failure, including but not limited to:

- Completion of any additional actions listed in [Chapter 6, ADDITIONAL/ACCELERATED MEASURES TO ADDRESS RISKS](#) of this Plan,
- A review of performance measures concludes that a change of approach is warranted.

[Section 11.4, "PLAN RE-EVALUATION LOG"](#) contains a detailed log of the re-evaluation including differences between this Plan and previous Plans, the date the re-evaluations were performed and the persons who were involved in the re-evaluation process.

Chapter 9. REPORTING

The following will be submitted annually to the Pipeline And Hazardous Materials Safety Administration (PHMSA) as part of the Distribution Annual Report (Form F7100.1-1).

PERFORMANCE MEASURES

Kastanasburg Utilities will track and report the following performance measures:

- Number of hazardous leaks either eliminated or repaired, categorized by cause;
- Number of excavation damages;
- Number of excavation tickets;;
- Total number of leaks either eliminated or repaired, categorized by cause;

EXCESS FLOW VALVES

Kastanasburg Utilities will track the number of excess flow valves installed on the system

These data will be sent to the PHMSA Information Resource Manager as part of the Distribution Annual Report (Form F7100.1-1).

MECHANICAL FITTING FAILURES

Kastanasburg Utilities will track and report information relating to each hazardous leak resulting from the failure of a mechanical fitting. This information will 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,
- fitting manufacturer,
- lot number,
- date of manufacture, and
- any other information that can be found in markings on the failed fitting

Mechanical fitting failures will be sent to the PHMSA Information Resource Manager on the mechanical fitting failure report (Form 7100.1-2) either periodically as these failures occur or aggregated into one or more submissions made no later than March 31 of the following calendar year after the fitting failure(s).

Form 7100.1-1 and Form 7100.1-2 will be sent to the PHMSA Information Resource Manager via the online electronic reporting system available at PHMSA's home page at <http://phmsa.dot.gov>.

Chapter 10. RECORD KEEPING

The following records must be maintained be maintained for ten years.

1. This Plan,
2. Copies of previous written DIMP Plans,
3. Records of data required to be collected to calculate performance measures listed in [Chapter 7, MEASURE PERFORMANCE, MONITOR RESULTS AND EVALUATE EFFECTIVENESS](#),
4. Records of mechanical fitting failures

Chapter 11. ATTACHMENTS

11.1. IMPLEMENTATION PLAN

This Attachment lists all the action items that are included in this written Distribution Integrity Management Plan.

Section A describes how Kastanasburg Utilities will modify procedures, policies and/or recordkeeping systems to implement:

1. mandatory data collection and recordkeeping requirements in the regulation as listed in [Section 7.1, "MANDATORY PERFORMANCE MEASURES"](#) of this Plan, and
2. performance measures specific to Additional/Accelerated Actions as listed in [Section 7.2, "RISK BASED PERFORMANCE MEASURES"](#) of this Plan.

Section B describes how Kastanasburg Utilities will implement Additional/Accelerated Actions, if any, listed in [Chapter 6, ADDITIONAL/ACCELERATED MEASURES TO ADDRESS RISKS](#) of this Plan.

Section C describes how Kastanasburg Utilities will implement procedures to collect additional information needed to fill gaps, if any, found during the development of this Plan.

- A.** Procedures, policies and/or recordkeeping systems will be modified as follows to collect and retain information required to be collected and retained under the DIMP plan, including:

1. The following Recordkeeping tasks:

- a. Records for all piping system installed after the effective date of this Plan, including, at minimum, the location where new piping and appurtenances are installed and the material of which they are constructed.

Kastanasburg Utilities will implement as follows:

These records are already maintained in our GIS system

- b. Mechanical fitting failure data, including:

- i. location of the failure in the system,
- ii. nominal pipe size,
- iii. material type,
- iv. nature of failure including any contribution of local pipeline environment,
- v. fitting manufacturer,
- vi. lot number and date of manufacture, and
- vii. other information that can be found in markings on the failed fitting

Kastanasburg Utilities will implement as follows:

The Gas Utility Supervisor will create a form for the field crews to use to record this data. This form will be created and crews instructed on how to fill it out by December 31, 2010. REcords will be kept for all failures after that date. Records will be kept in our GIS system.

2. The following mandatory Performance Measures:

- a. Number of hazardous leaks either eliminated or repaired as required by 49 CFR 192.703(c) (or total number of leaks if all leaks are repaired when found), categorized by cause.

Kastanasburg Utilities will implement as follows:

This information is already kept by our GIS system

- b. Number of excavation damages.

Kastanasburg Utilities will implement as follows:

This information is already kept in our GIS system

- c. Number of excavation tickets (receipt of information by the underground facility operator from the notification center).

Kastanasburg Utilities will implement as follows:

We will begin tracking this information in our GIS system. We will contract with our GIS vendor, GIS r Us, to make these changes. The changes will be completed by no later than December 1, 2011.

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

Kastanasburg Utilities will implement as follows:

This information is already kept in our GIS system

- e. Number of hazardous leaks either eliminated or repaired as required by Sec. 192.703(c) (or total number of leaks if all leaks are repaired when found), categorized by material;

Kastanasburg Utilities will implement as follows:

This information is already kept in our GIS system

3. The following threat specific Performance Measures (presented by section in risk rank order):

- a. For **incorrect operations due to inadequate procedures** on the **Butt Fusion procedures** section, Kastanasburg Utilities will:

- track the frequency of failures due to incorrect operations.

Kastanasburg Utilities will implement as follows:

The Gas Utility Supervisor will maintain records of this, beginning September 1, 2011

- b. For **excavation damage due to third party damages** on the **Wild Bill Excavating** section, Kastanasburg Utilities will:

- track the frequency of these failures per 1000 tickets.
Kastanasburg Utilities will implement as follows:
This information is already kept by the Gas Utility Supervisor
- c. For **other threats on the entire system** on the **Space aliens** section, Kastanasburg Utilities will:
 - Track frequency of space alien landings
Kastanasburg Utilities will implement as follows:
By October 1, 2011 we will enlist that crazy old guy who lives across the street from our gate station to report to us all space alien landings. By September 1, 2011 we will train our employees to identify and report indications of space alien landings. The Gas Utility Supervisor will maintain records of reported space alien landings.
- d. For **other threats on the entire system** on the **Moles** section, Kastanasburg Utilities will:
 - track the frequency of these failures.
Kastanasburg Utilities will implement as follows:
This information is already kept in our GIS system
- e. For **incorrect operations due to failure to follow procedures** on the **Line up clamps** section, Kastanasburg Utilities will:
 - track OQ revocations for these employees, departments and/or tasks.
Kastanasburg Utilities will implement as follows:
This information is already maintained by the Gas Utility Supervisor
- f. For **equipment malfunctions due to failing regulators/relief valves** on the **Heath Reg ABC** section, Kastanasburg Utilities will:
 - track the frequency of these failures.
Kastanasburg Utilities will implement as follows:
This information is already kept in our GIS system
- g. For **external corrosion on bare, unprotected, steel mains and services** on the **West of 4th St in BD** section, Kastanasburg Utilities will:
 - track the number of leaks caused by external corrosion per mile of main and per 1000 service lines on the West of 4th St in BD.
Kastanasburg Utilities will implement as follows:
Kastanasburg already tracks leaks by cause through the GIS system
- h. For **internal corrosion on the entire system** on the **Sulfur Springs Area** section, Kastanasburg Utilities will:
 - track the frequency of leaks or failures due to internal corrosion repaired each year per mile of main (and/or per service) in the Sulfur Springs Area.
Kastanasburg Utilities will implement as follows:
Kastanasburg already tracks leaks by cause through the GIS system
- i. For **equipment malfunctions due to failing regulators/relief valves** on the **Erickson Relief** section, Kastanasburg Utilities will:
 - track the frequency of these failures.
Kastanasburg Utilities will implement as follows:
This information is already kept in our GIS system
- j. For **natural forces on the entire system** on the **North river crossing** section, Kastanasburg Utilities will:
 - track the number of leaks or failures due to natural forces repaired each year per mile of main (and/or per service) in the North river crossing.
Kastanasburg Utilities will implement as follows:
This information is already kept in our GIS system
- k. For **other outside forces on the entire system** on the **Downtown old system** section, Kastanasburg Utilities will:
 - track the frequency of these failures.
Kastanasburg Utilities will implement as follows:
This information is already kept in our GIS system
- l. For **atmospheric corrosion on the entire system** on the **4th street bridge crossing** section, Kastanasburg Utilities will:
 - track the percentage of inspections that find or failures due to atmospheric corrosion per mile of main (and/or per service) in the 4th street bridge crossing.
Kastanasburg Utilities will implement as follows:
This information is already kept in our GIS system
- m. For **excavation damage due to your crew or contractor damages** on the **Company crew 1** section, Kastanasburg Utilities will:
 - track the frequency of these failures per 1000 tickets.
Kastanasburg Utilities will implement as follows:
We will begin tracking this information in our GIS system. We will contract with our GIS vendor, GIS r Us, to make these changes. The changes will be completed by no later than December 1, 2011.

n. For **excavation damage due to your crew or contractor damages** on the **The Diggin' Ditchmen** section, Kastanasburg Utilities will:

- track the frequency of these failures per 1000 tickets.

Kastanasburg Utilities will implement as follows:

We will begin tracking this information in our GIS system. We will contract with our GIS vendor, GIS r Us, to make these changes. The changes will be completed by no later than December 1, 2011.

B. Additional/Accelerated Actions included in this DIMP plan:

1. The following mandatory Accelerated/Additional Actions:

a. Leak classification and action criteria as chosen and described in [Section 6.1, "MANDATORY ADDITIONAL ACTIONS"](#) of this Plan.

Kastanasburg Utilities will implement as follows:

We already have a leak classification and action criteria policy. It is found at O&M #82

2. The following threat specific Additional/Accelerated Actions (presented by section in risk rank order):

a. For **incorrect operations due to inadequate procedures** on the **Butt Fusion procedures** section, Kastanasburg Utilities will:

- review and improve procedures for these employees, departments and/or tasks.

Kastanasburg Utilities will implement as follows:

The Gas Utility Supervisor will review and modify the procedures by December 31, 2011

b. For **excavation damage due to third party damages** on the **Wild Bill Excavating** section, Kastanasburg Utilities will:

- conduct enhanced awareness education programs following the guidelines of the Supplemental Frequency and Activity in API RP 1162 Public Awareness Programs for Pipeline Operators incorporated by reference in 49 CFR Part 192.

Kastanasburg Utilities will implement as follows:

The Gas Utility Supervisor will meet with Wild Bill monthly, beginning October, 2011, to explain proper excavating around our lines.

c. For **other threats on the entire system** on the **Space aliens** section, Kastanasburg Utilities will:

- Install "No space alien landing" signs at all gate stations

Kastanasburg Utilities will implement as follows:

The Gas Utility Supervisor is responsible to have these signs installed no later than October, 2012.

d. For **other threats on the entire system** on the **Moles** section, Kastanasburg Utilities will:

- Electrify our tracer wire to 10,000 Volts to kill the moles

Kastanasburg Utilities will implement as follows:

The city electrician will be responsible to electrify our tracer wires by no later than December 31, 2011

e. For **incorrect operations due to failure to follow procedures** on the **Line up clamps** section, Kastanasburg Utilities will:

- review and improve training for these employees, departments and/or tasks.

Kastanasburg Utilities will implement as follows:

The Gas Utility Supervisor is responsible to update our training for using line up clamps. The revised training material will be completed by December 31, 2011. All employees who perform this task will be re-trained by March 30, 2012.

f. For **equipment malfunctions due to failing regulators/relief valves** on the **Heath Reg ABC** section, Kastanasburg Utilities will:

- perform inspections and maintenance on an accelerated frequency of Monthly on this portion of the distribution system.

Kastanasburg Utilities will implement as follows:

The Gas Utility Supervisor will instruct field crews to perform more frequent inspections beginning September 1, 2011

- repair or replace problem materials.

Kastanasburg Utilities will implement as follows:

The Gas Utility Supervisor will instruct field crews to replace Heath ABC Regulators. The replacement program will be completed by August, 2013.

g. For **external corrosion on bare, unprotected, steel mains and services** on the **West of 4th St in BD** section, Kastanasburg Utilities will:

- perform leakage surveys on an accelerated frequency of Semiannually on this portion of the distribution system.

Kastanasburg Utilities will implement as follows:

The Gas Utility Supervisor will instruct our leak survey contractor, Leaks R Us, to perform surveys semiannually beginning September 1, 2011

h. For **internal corrosion on the entire system** on the **Sulfur Springs Area** section, Kastanasburg Utilities will:

- perform leakage surveys on an accelerated frequency of Semiannually on this portion of the distribution system.

Kastanasburg Utilities will implement as follows:

The Gas Utility Supervisor will instruct our leak survey contractor, Leaks R Us, to perform surveys semiannually beginning September 1, 2011

i. For **equipment malfunctions due to failing regulators/relief valves** on the **Erickson Relief** section, Kastanasburg Utilities will:

- perform inspections and maintenance on an accelerated frequency of Quarterly on this portion of the distribution system.

Kastanasburg Utilities will implement as follows:

The Gas Utility Supervisor is responsible to instruct field crews to perform more frequent inspections on these valves beginning September 1, 2011

- repair problem equipment and/or change settings.

Kastanasburg Utilities will implement as follows:

All Erickson relief valves will be replaced by March 30, 2013. The Gas Utility Supervisor is responsible to see that this is accomplished.

j. For natural forces on the entire system on the North river crossing section, Kastanasburg Utilities will:

- conduct additional leak surveys on North river crossing after significant natural force events. If leaks or damages are detected Kastanasburg Utilities will expose the pipeline to determine the extent of the damage, repair the leak or damage and consider if additional or accelerated action is required.

Kastanasburg Utilities will implement as follows:

The Gas Utility Supervisor is responsible to instruct field crews to perform more frequent inspections on these valves beginning September 1, 2011

k. For other outside forces on the entire system on the Downtown old system section, Kastanasburg Utilities will:

- relocate facilities

Kastanasburg Utilities will implement as follows:

This is already underway. See O&M procedure #99 for a description of the meter relocation/protection program

l. For atmospheric corrosion on the entire system on the 4th street bridge crossing section, Kastanasburg Utilities will:

- rehabilitate the pipeline coating by removing/replacing the coating or making significant repairs or improvements to the coating. The Kastanasburg Utilities will rehabilitate miles) (and/or services) per year of this portion of the distribution system

Kastanasburg Utilities will implement as follows:

We will hire Coatings r Us to repalce the coating on the bridge crossing. This will be completed by June 1, 2012.

m. For excavation damage due to your crew or contractor damages on the Company crew 1 section, Kastanasburg Utilities will:

- expand compliance with OQ plan.

Kastanasburg Utilities will implement as follows:

We will have Company crew 1 go through refresher training on proper excavation by December 31, 2011. The Gas Utility Supervisor is responsible to see that this is done.

n. For excavation damage due to your crew or contractor damages on the The Diggin' Ditchmen section, Kastanasburg Utilities will:

- expand equipment testing, calibration, upgrade.

Kastanasburg Utilities will implement as follows:

We will require the Diggin' Ditchment upgrade their program for testing and calibrating their line locating equipment. The Gas Utility Supervisor is responsible for ensuring that the Diggin' Ditchmen accomplish this by December 1, 2011. The City contracts manager will revise our contract with the Diggin' Ditchmen to require that all line locating instruments be tested and calibrated according to manufacturer's recommendations. The contract will be revised when it comes up for renewal in March, 2012.

- re-evaluate contractor.

Kastanasburg Utilities will implement as follows:

The Gas Utility Supervisor is responsible for periodically checking compliance of the Diggin' Ditchmen at utility worksites.

C. Unknown Boilerplate chosen.

a. Determine if you have H2S (hydrogen sulfide) in your gas.

Kastanasburg Utilities will implement as follows:

We will contact our gas supplier to determine if hydrogen sulfide is present in the gas we receive.

b. Determine if materials with known problems are in use and which materials they are.

Kastanasburg Utilities will implement as follows:

Employees will be instructed to inspect plastic piping whenever it is exposed and record the markings on the pipe and fittings. These markings will be compared to data on the SHRIMP website to determine if it is any of the materials identified in Advisory Bulletins from the Office of Pipeline Safety.

c. The following gaps identified by Kastanasburg Utilities.

Kastanasburg Utilities will implement as follows:

We will attempt to contact the space aliens to determine where they come from so we can revise our "No space alien landing" signs into their language.

11.2. LIST OF ANSWERS AND DATA SOURCES FROM SHRIMP™ INTERVIEWS

The following lists the interview responses and data sources entered during the threat assessments.

Corrosion Threat

- **Corrosion (CORR) (Kastanasburg Utilities - Entire system)**

- Interview Start (CORR)

Your Choice (weight: 0) --Continue

- How many leak repairs resulting from corrosion occurred by year for the last 7 years? (CORR-Leak)

Data Source:

GIS system

Your Choice (weight: 0) --

Table 11.1. Leak Repairs From PHMSA 7100.1-1

End of Year	Corrosion		Totals	
	Mains	Services	Mains	Services
In 2004	0	0	0	0
In 2005	0	2	0	2
In 2006	0	3	0	3
In 2007	0	2	0	2
In 2008	0	4	0	4
In 2009	0	5	0	5
In 2010	0	5	0	5

- Review the guidance. (ECMETALYES)

Your Choice (weight: 0) --Continue

- General System Description (EC101)

Data Source:

GIS system

Your Choice (weight: 0) --

Table 11.2. Material

	Mains	Services
Plastic	0.000	1705
Unprotected, Bare	0.000	1650
Cathodically Protected, Bare	0.000	0
Unprotected, Coated	0.000	0
Cathodically Protected, Coated	0.000	1500
Cast Iron, Wrought Iron	0.000	0
Ductile Iron	0.000	0
Copper	0.000	0
Other(1)	0.000	0
Other(2)	0.000	0

- Mains By Size (EC101sm)

Data Source:

GIS system

Your Choice (weight: 0) --

Table 11.3. Material

	Unknown	2" or less	Over 2" thru 4"	Over 4" thru 8"	Over 8" thru 12"	Over 12"	Total
PVC	0.000	0.000	0.000	25.000	0.000	0.000	25.000
PE	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ABS	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Steel	0.000	0.000	0.000	48.000	0.000	0.000	48.000
Cast Iron, Wrought Iron	0.000	0.000	0.000	9.500	0.500	0.000	10.000
Ductile Iron	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Copper	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Other(1)	0.000	0.000	1.000	0.000	0.000	0.000	1.000
Other(2)	0.000	0.000	0.000	0.000	0.000	0.000	0.000

- Services By Size (EC101ss)

Data Source:

GIS System

Your Choice (weight: 0) --

Table 11.4. Material

--	--	--	--	--	--	--	--

	Unknown	1" or less	Over 1" thru 2"	Over 2" thru 4"	Over 4" thru 8"	Over 8"	Total
PVC	0	0	0	1705	0	0	1705
PE	0	0	0	0	0	0	0
ABS	0	0	0	0	0	0	0
Steel	0	0	0	3150	0	0	3150
Cast Iron, Wrought Iron	0	0	0	0	0	0	0
Ductile Iron	0	0	0	0	0	0	0
Copper	0	0	0	0	0	0	0
Other(1)	0	0	0	0	0	0	0
Other(2)	0	0	0	0	0	0	0

- Does your plastic system contain isolated metallic fittings? (EC110)

Data Source:

GIS system, construction records maintained by the Gas Utility Supervisor and recollection of Old Bob, our 125 year old maintenance foreman who was around when the system was built.

Your Choice (weight: 0) --No

- Provide Additional Information (EC101b)

Your Choice (weight: 0) --

- **Atmospheric Corrosion (CORRAC) (Kastanasburg Utilities - Entire system)**

- Interview Start (CORRAC)

Your Choice (weight: 0) --Continue

- Does Kastanasburg Utilities have any facilities that require atmospheric corrosion inspections? (CORRAC101)

Your Choice (weight: 0) --Yes

- Over the past 7 years, have any atmospheric corrosion inspections found metal loss due to atmospheric corrosion? (CORRAC103)

Your Choice (weight: 5) --Yes

- Over the past 7 years, have leaks caused by atmospheric corrosion leaks required repair on any part of your system? (CORRAC104)

Your Choice (weight: 5) --Yes

- Are repaired atmospheric corrosion leaks increasing? (CORRAC104a)

Your Choice (weight: 0) --

Table 11.5. End of Year

	Leaks Repaired
In 2004	0
In 2005	1
In 2006	2
In 2007	3
In 2008	4
In 2009	0
In 2010	0

- SHRIMP has determined that leaks, failures or damages are not increasing. (see guidance).

Do you accept this determination? (CORRAC104d)

Your Choice (weight: 0) --Accept

- Your data and choices indicate that leaks are not increasing per year. (CORRAC104d)

Your Choice (weight: 0) --Continue

- Have inspections found problems with above ground pipe coatings that could not be fixed by routine maintenance? (CORRAC105)

Your Choice (weight: 5) --Yes

- Are atmospheric corrosion leaks system-wide/uniform or concentrated in local areas or facilities? (CORRAC110)

Your Choice (weight: 0) --Concentrated

- Do you want to section your system into areas of concentrated atmospheric corrosion and/or for certain facilities? (CORRAC111)

Your Choice (weight: 0) --Yes

- Enter sections or facilities of concentrated atmospheric corrosion (CORRAC112)

Your Choice (weight: 0) --

Table 11.6. Section

Facility

	Number of Facilities	Description
Rest of system	2789	Remainder of system not having atmospheric corrosion problems
Meter sets near the ocean	250	Meter sets within 1 mile of the ocean
4th street bridge crossing	1	4" steel main suspended under the 4th St bridge
ConcAtmo_03	0.000	0
ConcAtmo_04	0.000	0
ConcAtmo_05	0.000	0
ConcAtmo_06	0.000	0
ConcAtmo_07	0.000	0
ConcAtmo_08	0.000	0
ConcAtmo_09	0	

- Provide Additional Information (CORRAC112a)

Your Choice (weight: 0) --

- **Atmospheric Corrosion (CORRAC-1a) (Rest of system - Remainder of system not having atmospheric corrosion problems)**

- Interview Start (CORRAC-1a)

Your Choice (weight: 0) --Continue

- Does Kastanasburg Utilities have any facilities that require atmospheric corrosion inspections? (CORRAC101)

Data Source:

Common knowledge

Your Choice (weight: 0) --Yes

- Over the past 7 years, have any atmospheric corrosion inspections found metal loss due to atmospheric corrosion? (CORRAC103)

Data Source:

Inspection records maintained by the Gas Utility Supervisor

Your Choice (weight: 0) --No

- Over the past 7 years, have leaks caused by atmospheric corrosion leaks required repair on any part of your system? (CORRAC104)

Data Source:

GIS system

Your Choice (weight: 0) --No

- Have inspections found problems with above ground pipe coatings that could not be fixed by routine maintenance? (CORRAC105)

Data Source:

Inspection records maintained by the Gas Utility Supervisor

Your Choice (weight: 0) --No

- Confirm that no other atmospheric corrosion problems are known. (CORRAC204)

Your Choice (weight: 0) --Accept

- **Atmospheric Corrosion (CORRAC-1a) (Meter sets near the ocean - Meter sets within 1 mile of the ocean)**

- Interview Start (CORRAC-1a)
Your Choice (weight: 0) --Continue

- Does Kastanasburg Utilities have any facilities that require atmospheric corrosion inspections? (CORRAC101)
Data Source:
Common knowledge
Your Choice (weight: 0) --Yes

- Over the past 7 years, have any atmospheric corrosion inspections found metal loss due to atmospheric corrosion? (CORRAC103)
Data Source:
GIS system
Your Choice (weight: 0) --No

- Over the past 7 years, have leaks caused by atmospheric corrosion leaks required repair on any part of your system? (CORRAC104)
Data Source:
GIS system
Your Choice (weight: 0) --No

- Have inspections found problems with above ground pipe coatings that could not be fixed by routine maintenance? (CORRAC105)
Data Source:
Inspection records maintained by the Gas Utility Supervisor
Your Choice (weight: 0) --No

- Confirm that no other atmospheric corrosion problems are known. (CORRAC204)
Your Choice (weight: 0) --Accept

• **Atmospheric Corrosion (CORRAC-1a) (4th street bridge crossing - 4" steel main suspended under the 4th St bridge)**

- Interview Start (CORRAC-1a)
Your Choice (weight: 0) --Continue

- Does Kastanasburg Utilities have any facilities that require atmospheric corrosion inspections? (CORRAC101)
Data Source:
Common knowledge
Your Choice (weight: 0) --Yes

- Over the past 7 years, have any atmospheric corrosion inspections found metal loss due to atmospheric corrosion? (CORRAC103)
Data Source:
GIS system
Your Choice (weight: 0) --No

- Over the past 7 years, have leaks caused by atmospheric corrosion leaks required repair on any part of your system? (CORRAC104)
Data Source:
GIS system
Your Choice (weight: 0) --No

- Have inspections found problems with above ground pipe coatings that could not be fixed by routine maintenance? (CORRAC105)
Data Source:

Inspection records maintained by the Gas Utility Supervisor

Your Choice (weight: 5) --Yes

- Review the guidance. (CORRACCSQ0)

Your Choice (weight: 0) --Continue

- Are the pressure and/or diameter of this section greater than or about the same as the system as a whole? (CORRACCSQ1)

Data Source:

GIS system and supervisor knowledge

Your Choice (weight: 0) --About the same

- Is this section predominantly located in business districts or outside business districts (as those are defined for leak survey)? (CORRACCSQ2)

Data Source:

GIS system

Your Choice (weight: 0.15) --Within Business Districts

- How long would it typically take utility crews to reach this part of the system after receiving notice of a possible failure? (CORRACCSQ3)

Data Source:

Opinion of the Gas Utility Supervisor

Your Choice (weight: 0.025) --Between one (1) and two (2) hours

- What would be the impact on the utility and its customers if this section were to fail? (CORRACCSQ4)

Data Source:

Opinion of the Gas Utility Supervisor

Your Choice (weight: 0.05) --Moderate

- **External Corrosion (CORRECSTL-UB) (Unprotected, Bare Steel - Entire system)**

- Interview Start (CORRECSTL-UB)

Your Choice (weight: 0) --Continue

- Risk assigned for protected versus unprotected (AR-1u)

Your Choice (weight: 5) --Unprotected

- Risk assigned for coated versus bare (AR-2b)

Your Choice (weight: 3) --Bare

- Are repaired corrosion leaks per mile increasing? (EC102)

Data Source:

GIS System

Your Choice (weight: 0) --

Table 11.7. End of Year

	Miles of Mains	Corrosion Leaks Repaired	Repaired Leaks/mile
In 2004	22.000	0	0.000
In 2005	22.000	2	0.091
In 2006	22.000	4	0.182
In 2007	22.000	8	0.364
In 2008	22.000	8	0.364
In 2009	0.000	0	0.000
In 2010	0.000	0	0.000

- SHRIMP has determined that leaks, failures or damages are not increasing.(see guidance).

Do you accept this determination? (EC252ok)

Your Choice (weight: 0) --Accept

- Your data and choices indicate that repaired leaks per mile of mains are not increasing. (EC252)

Your Choice (weight: 0) --Continue

- Are repaired corrosion leaks per service increasing? (EC201)

Data Source:

GIS system

Your Choice (weight: 0) --

Table 11.8. End of Year

	Number of Services	Corrosion Leaks Repaired	Repaired Leaks/service
In 2004	1710	0	0.000
In 2005	1700	0	0.000
In 2006	1650	0	0.000
In 2007	1650	0	0.000
In 2008	1650	0	0.000
In 2009	0	0	0.000
In 2010	0	0	0.000

- SHRIMP has determined that leaks, failures or damages are not increasing. (see guidance).

Do you accept this determination? (EC254ok)

Your Choice (weight: 0) --Accept

- Your data and choices indicate that repaired leaks per service are not increasing. (EC254)

Your Choice (weight: 0) --Continue

- Do exposed pipe inspections indicate a corrosion problem? (EC202)

Data Source:

Inspection records maintained by the Gas Utility Supervisor

Your Choice (weight: 1) --Yes

- Are repaired corrosion leaks, areas of known corrosion or low CP levels system-wide/uniform or concentrated in local areas? (EC301)

Data Source:

Inspection records maintained by the Gas Utility Supervisor

Your Choice (weight: 0) --Concentrated

- Do you want to sub-section areas with concentrated corrosion from the remainder of the section? (EC401)

Your Choice (weight: 0) --Yes

- Enter sections of concentrated corrosion (EC402)

Your Choice (weight: 0) --

Table 11.9. Section

	Mains	Services	Description
Remainder of Bare, Non CP Steel	-6.000	1489	Rest of Uncoated, non-protected steel
West of 4th St in BD	2.000	38	Bare steel near the river in the business district
West of 4th outside BD	4.000	123	Outside Business district
ConcCorr_03	0.000	0	
ConcCorr_04	0.000	0	

- Provide Additional Information (EC402a)

Your Choice (weight: 0) --

- Unprotected, Bare Steel (CORRECSTL-UB1a) (Remainder of Bare, Non CP Steel - Rest of Uncoated, non-protected steel)**

- Interview Start (CORRECSTL-UB1a)

Your Choice (weight: 0) --Continue

- Risk assigned for protected versus unprotected (AR-1u)

Your Choice (weight: 5) --Unprotected

- Risk assigned for coated versus bare (AR-2b)

Your Choice (weight: 3) --Bare

- Are repaired corrosion leaks per mile increasing? (EC102)

Data Source:

GIS system

Your Choice (weight: 0) --

Table 11.10. End of Year

	Miles of Mains	Corrosion Leaks Repaired	Repaired Leaks/mile
In 2004	14.000	0	0.000
In 2005	14.000	1	0.071
In 2006	14.000	0	0.000
In 2007	14.000	0	0.000
In 2008	14.000	0	0.000
In 2009	0.000	0	0.000
In 2010	14.000	0	0.000

- SHRIMP has determined that leaks, failures or damages are not increasing.(**see guidance**).

Do you accept this determination? (EC252ok)

Your Choice (weight: 0) --Accept

- Your data and choices indicate that repaired leaks per mile of mains are not increasing. (EC252)

Your Choice (weight: 0) --Continue

- Are repaired corrosion leaks per service increasing? (EC201)

Data Source:

GIS system

Your Choice (weight: 0) --

Table 11.11. End of Year

	Number of Services	Corrosion Leaks Repaired	Repaired Leaks/service
In 2004	1239	0	0.000
In 2005	1239	0	0.000
In 2006	1239	0	0.000
In 2007	1239	0	0.000
In 2008	1239	0	0.000
In 2009	0	0	0.000
In 2010	0	0	0.000

- SHRIMP has determined that leaks, failures or damages are not increasing.(**see guidance**).

Do you accept this determination? (EC254ok)

Your Choice (weight: 0) --Accept

- Your data and choices indicate that repaired leaks per service are not increasing. (EC254)

Your Choice (weight: 0) --Continue

- Do exposed pipe inspections indicate a corrosion problem? (EC202)

Data Source:

Inspection records for 2006-2011 maintained by the Utility Supervisor

Your Choice (weight: 0) --No

- Confirm that no corrosion problems are known. (EC204)

Your Choice (weight: 0) --Accept

- **Unprotected, Bare Steel (CORRECSTL-UB1a) (West of 4th St in BD - Bare steel near the river in the business district)**

- Interview Start (CORRECSTL-UB1a)

Your Choice (weight: 0) --Continue

- Risk assigned for protected versus unprotected (AR-1u)

Your Choice (weight: 5) --Unprotected

- Risk assigned for coated versus bare (AR-2b)

Your Choice (weight: 3) --Bare

- Are repaired corrosion leaks per mile increasing? (EC102)

Data Source:

GIS system

Your Choice (weight: 0) --

Table 11.12. End of Year

	Miles of Mains	Corrosion Leaks Repaired	Repaired Leaks/mile
In 2004	2.000	1	0.500
In 2005	2.000	1	0.500
In 2006	2.000	2	1.000
In 2007	2.000	2	1.000
In 2008	2.000	3	1.500
In 2009	0.000	0	0.000
In 2010	0.000	0	0.000

- SHRIMP has determined that leaks, failures or damages are not increasing. **(see guidance)**.

Do you accept this determination? (EC252ok)

Your Choice (weight: 0) --Accept

- Your data and choices indicate that repaired leaks per mile of mains are not increasing. (EC252)

Your Choice (weight: 0) --Continue

- Are repaired corrosion leaks per service increasing? (EC201)

Data Source:

GIS system

Your Choice (weight: 0) --

Table 11.13. End of Year

	Number of Services	Corrosion Leaks Repaired	Repaired Leaks/service
In 2004	38	0	0.000
In 2005	38	0	0.000
In 2006	38	1	0.026
In 2007	38	1	0.026
In 2008	38	1	0.026
In 2009	0	0	0.000
In 2010	0	0	0.000

- SHRIMP has determined that leaks, failures or damages are not increasing. **(see guidance)**.

Do you accept this determination? (EC254ok)

Your Choice (weight: 0) --Accept

- Your data and choices indicate that repaired leaks per service are not increasing. (EC254)

Your Choice (weight: 0) --Continue

- Do exposed pipe inspections indicate a corrosion problem? (EC202)

Data Source:

Inspection records for 2006-2011 maintained by the Utility Supervisor

Your Choice (weight: 1) --Yes

- Have confirmed corrosion leaks occurred on this section? (EC701)

Data Source:
GIS system
Your Choice (weight: 1) --Yes

- Does section contain leaks found and being monitored that are suspected to be corrosion related and reflect a corrosion problem? (EC702)

Data Source:
GIS system, leak survey records for 2006-2011 maintained by the utility supervisor and recollection/opinion of the utility supervisor and our corrosion consultant, CP r Us
Your Choice (weight: 1) --Yes

- Are corrosion leaks system-wide or concentrated in local areas? (EC703)

Data Source:
GIS system
Your Choice (weight: 0) --System-wide

- Are there known sources of stray electrical current in the area? (EC705)

Data Source:
Measurements by our corrosion consultant, CP r Us. Records maintained by CP r Us.
Your Choice (weight: 0) --Yes

- Are stray currents creating problems? (EC706)

Data Source:
CP monitoring records for 2006-2011 maintained by the utility supervisor and the opinion of CP r Us
Your Choice (weight: 1) --Yes

- Review the guidance. (ECCSQ0)

Your Choice (weight: 0) --Continue

- Are the pressure and/or diameter of this section greater than or about the same as the system as a whole? (ECCSQ1)

Data Source:
GIS system
Your Choice (weight: 0.2) --Substantially greater

- Is this section predominantly located in business districts or outside business districts (as those are defined for leak survey)? (ECCSQ2)

Data Source:
GIS system
Your Choice (weight: 0.15) --Within Business Districts

- How long would it typically take utility crews to reach this part of the system after receiving notice of a possible failure? (ECCSQ3)

Data Source:
Opinion of the utility sipervisor
Your Choice (weight: 0.05) --More than two (2) hours

- What would be the impact on the utility and its customers if this section were to fail? (ECCSQ4)

Data Source:
Opinion of the utility supervisor
Your Choice (weight: 0.1) --High

- **Unprotected, Bare Steel (CORRECSTL-UB1a) (West of 4th outside BD - Outside Business district)**

- Interview Start (CORRECSTL-UB1a)
Your Choice (weight: 0) --Continue
- Risk assigned for protected versus unprotected (AR-1u)
Your Choice (weight: 5) --Unprotected
- Risk assigned for coated versus bare (AR-2b)
Your Choice (weight: 3) --Bare
- Are repaired corrosion leaks per mile increasing? (EC102)

Data Source:

GIS system

Your Choice (weight: 0) --

Table 11.14. End of Year

	Miles of Mains	Corrosion Leaks Repaired	Repaired Leaks/mile
In 2004	4.000	1	0.250
In 2005	4.000	1	0.250
In 2006	4.000	0	0.000
In 2007	4.000	2	0.500
In 2008	4.000	3	0.750
In 2009	0.000	0	0.000
In 2010	0.000	0	0.000

- SHRIMP has determined that leaks, failures or damages are not increasing. **(see guidance)**.
Do you accept this determination? (EC252ok)
Your Choice (weight: 0) --Accept
- Your data and choices indicate that repaired leaks per mile of mains are not increasing. (EC252)
Your Choice (weight: 0) --Continue
- Are repaired corrosion leaks per service increasing? (EC201)

Data Source:

GIS system

Your Choice (weight: 0) --

Table 11.15. End of Year

	Number of Services	Corrosion Leaks Repaired	Repaired Leaks/service
In 2004	123	1	0.008
In 2005	123	1	0.008
In 2006	123	3	0.024
In 2007	123	0	0.000
In 2008	123	4	0.033
In 2009	0	0	0.000
In 2010	0	0	0.000

- SHRIMP has determined that leaks, failures or damages are not increasing. **(see guidance)**.
Do you accept this determination? (EC254ok)
Your Choice (weight: 0) --Accept
- Your data and choices indicate that repaired leaks per service are not increasing. (EC254)
Your Choice (weight: 0) --Continue
- Do exposed pipe inspections indicate a corrosion problem? (EC202)

Data Source:

Inspection records maintained by the Utility Supervisor

Your Choice (weight: 1) --Yes

- Have confirmed corrosion leaks occurred on this section? (EC701)

Data Source:

GIS system

Your Choice (weight: 1) --Yes

- Does section contain leaks found and being monitored that are suspected to be corrosion related and reflect a corrosion problem? (EC702)

Data Source:

GIS system, leakage survey records from 2006 to 2011 and opinion of the Utility Supervisor and CP r Us.

Your Choice (weight: 1) --Yes

- Are corrosion leaks system-wide or concentrated in local areas? (EC703)

Data Source:

GIS system

Your Choice (weight: 0) --System-wide

- Are there known sources of stray electrical current in the area? (EC705)

Data Source:

CP r Us

Your Choice (weight: 0) --No

- Review the guidance. (ECCSQ0)

Your Choice (weight: 0) --Continue

- Are the pressure and/or diameter of this section greater than or about the same as the system as a whole? (ECCSQ1)

Data Source:

GIS system

Your Choice (weight: 0) --About the same

- Is this section predominantly located in business districts or outside business districts (as those are defined for leak survey)? (ECCSQ2)

Data Source:

GIS system

Your Choice (weight: 0) --Outside Business Districts

- How long would it typically take utility crews to reach this part of the system after receiving notice of a possible failure? (ECCSQ3)

Data Source:

Opinion of the Utility Supervisor

Your Choice (weight: 0) --Less than one (1) hour

- What would be the impact on the utility and its customers if this section were to fail? (ECCSQ4)

Data Source:

Opinion of the Utility Supervisor

Your Choice (weight: 0) --Low

- **External Corrosion (CORRECCDWI) (Cast, Ductile, Wrought Iron (8" or smaller) - Entire system)**

- Interview Start (CORRECCDWI)

Your Choice (weight: 0) --Continue

- Risk assigned for Cast Iron/Ductile Iron/Wrought Iron (AR-3)

Your Choice (weight: 5) --Cast Iron/Ductile Iron/Wrought Iron

- Are repaired corrosion leaks per mile increasing? (EC102)

Data Source:

GIS system

Your Choice (weight: 0) --

Table 11.16. End of Year

	Miles of Mains	Corrosion Leaks Repaired	Repaired Leaks/mile
In 2004	0.000	0	0.000
In 2005	1.000	0	0.000
In 2006	1.000	0	0.000
In 2007	1.000	3	3.000
In 2008	1.000	0	0.000
In 2009	0.000	0	0.000
In 2010	0.000	0	0.000

- SHRIMP has determined that leaks, failures or damages are not increasing. **(see guidance)**.

Do you accept this determination? (EC252ok)

Your Choice (weight: 0) --Accept

- Your data and choices indicate that repaired leaks per mile of mains are not increasing. (EC252)

Your Choice (weight: 0) --Continue

- Are repaired corrosion leaks per service increasing? (EC201)

Data Source:

GIS system

Your Choice (weight: 0) --

Table 11.17. End of Year

	Number of Services	Corrosion Leaks Repaired	Repaired Leaks/service
In 2004	0	0	0.000
In 2005	0	0	0.000
In 2006	0	0	0.000
In 2007	0	0	0.000
In 2008	0	0	0.000
In 2009	0	0	0.000
In 2010	0	0	0.000

- SHRIMP has determined that leaks, failures or damages are not increasing. **(see guidance)**.

Do you accept this determination? (EC254ok)

Your Choice (weight: 0) --Accept

- Your data and choices indicate that repaired leaks per service are not increasing. (EC254)

Your Choice (weight: 0) --Continue

- Do exposed pipe inspections indicate a corrosion problem? (EC202)

Data Source:

Inspection records for 2006-2011 maintained by the utility supervisor

Your Choice (weight: 1) --Yes

- Are repaired corrosion leaks or areas of known corrosion system-wide/uniform or concentrated in local areas? (EC301)

Data Source:

GIS system

Your Choice (weight: 0) --Uniform

- Have confirmed corrosion leaks occurred on this section? (EC701)

Data Source:

GIS system

Your Choice (weight: 1) --Yes

- Does section contain leaks found and being monitored that are suspected to be corrosion related and reflect a corrosion problem? (EC702)

Data Source:

Leakage survey records for 2006-2011 maintained by the utility supervisor and the opinion of CP r Us

Your Choice (weight: 0) --No

- Are corrosion leaks system-wide or concentrated in local areas? (EC703)

Data Source:

GIS system

Your Choice (weight: 0) --System-wide

- Do Cast/Ductile Iron mains have steel laterals connected with no electrical isolation? (CORRECCDW1)

Data Source:

Construction records maintained by the city engineer and the recollection of Old Bob, our 125 year-old Maintenance foreman

Your Choice (weight: 1) --Yes

- Have fractures occurred on the Cast/Ductile Iron pipes other than those related to excavation activities? (CORRECCDW2)

Data Source:

GIS system

Your Choice (weight: 2) --Yes

- Are the fractures limited to certain diameters? If so, indicate sizes experiencing problems. (CORRECCDW3)

Data Source:

Leak repair records for 2005-2011 maintained by Old Bob

Your Choice (weight: 0) --6" or larger

- Do exposed pipe inspections indicate that graphitization is occurring? (CORRECCDW4)

Data Source:

Inspection records for 2006-2011 maintained by the utility supervisor

Your Choice (weight: 1) --Yes

- Review the guidance. (ECCSQ0)

Your Choice (weight: 0) --Continue

- Are the pressure and/or diameter of this section greater than or about the same as the system as a whole? (ECCSQ1)

Data Source:

GIS system

Your Choice (weight: 0) --About the same

- Is this section predominantly located in business districts or outside business districts (as those are defined for leak survey)? (ECCSQ2)

Data Source:

GIS system

Your Choice (weight: 0.15) --Within Business Districts

- How long would it typically take utility crews to reach this part of the system after receiving notice of a possible failure? (ECCSQ3)

Data Source:

Opinion of the utility supervisor

Your Choice (weight: 0) --Less than one (1) hour

- What would be the impact on the utility and its customers if this section were to fail? (ECCSQ4)

Data Source:

Opinion of the utility supervisor

Your Choice (weight: 0.05) --Moderate

- **External Corrosion (CORRECSTL-PC) (Cathodic Protected, Coated Steel - Entire system)**

- Interview Start (CORRECSTL-PC)

Your Choice (weight: 0) --Continue

- Are repaired corrosion leaks per mile increasing? (EC102)

Data Source:

GIS system

Your Choice (weight: 0) --

Table 11.18. End of Year

	Miles of Mains	Corrosion Leaks Repaired	Repaired Leaks/mile
In 2004	0.000	0	0.000
In 2005	0.000	0	0.000
In 2006	0.000	0	0.000
In 2007	0.000	0	0.000
In 2008	0.000	0	0.000
In 2009	0.000	0	0.000
In 2010	0.000	0	0.000

- SHRIMP has determined that leaks, failures or damages are not increasing.(see guidance).

Do you accept this determination? (EC252ok)

Your Choice (weight: 0) --Accept

- Your data and choices indicate that repaired leaks per mile of mains are not increasing. (EC252)

Your Choice (weight: 0) --Continue

- Are repaired corrosion leaks per service increasing? (EC201)

Data Source:

GIS system

Your Choice (weight: '0) --

Table 11.19. End of Year

	Number of Services	Corrosion Leaks Repaired	Repaired Leaks/service
In 2004	1470	0	0.000
In 2005	1477	1	0.000
In 2006	1485	1	0.000
In 2007	1495	0	0.000
In 2008	1500	1	0.000
In 2009	1500	2	0.001
In 2010	1500	3	0.002

- SHRIMP has determined that leaks, failures or damages are increasing.(see guidance).

Do you accept this determination? (EC253ok)

Your Choice (weight: 0) --Accept

- Your data and choices indicate that repaired leaks per service are increasing. (EC253)

Your Choice (weight: 2) --Continue

- Do exposed pipe inspections indicate a corrosion problem? (EC202)

Data Source:

Inspection records for 2006-2011 maintained by the utility supervisor

Your Choice (weight: 0) --No

- Is cathodic protection of the section adequate? (EC203)

Data Source:

CP records for 2006-2011 maintained by the utility supervisor

Your Choice (weight: 0) --No

- Are repaired corrosion leaks, areas of known corrosion or low CP levels system-wide/uniform or concentrated in local areas? (EC301)

Data Source:

GIS system

Your Choice (weight: 0) --Concentrated

- Do you want to sub-section areas with concentrated corrosion from the remainder of the section? (EC401)

Your Choice (weight: 0) --Yes

- Enter sections of concentrated corrosion (EC402)

Your Choice (weight: 0) --

Table 11.20. Section

	Mains	Services	Description
Rest of coated, protected steel	0.000	1483	Farm taps with no corrosion issues
Taps with low CP	0.000	9	Low cp
Taps with evidence of metal loss	0.000	8	metal loss
ConcCorr_03	0.000	0	
ConcCorr_04	0.000	0	
ConcCorr_05	0.000	0	
ConcCorr_06	0.000	0	

- Provide Additional Information (EC402a)

Your Choice (weight: 0) --

- **Cathodic Protected, Coated Steel (CORRECSTL-PC1a) (Rest of coated, protected steel - Farm taps with no corrosion issues)**

- Interview Start (CORRECSTL-PC1a)

Your Choice (weight: 0) --Continue

- Are repaired corrosion leaks per mile increasing? (EC102)

Data Source:

GIS system

Your Choice (weight: 0) --

Table 11.21. End of Year

	Miles of Mains	Corrosion Leaks Repaired	Repaired Leaks/mile
In 2004	12.000	0	0.000
In 2005	12.000	1	0.083
In 2006	12.000	0	0.000
In 2007	12.000	0	0.000
In 2008	12.000	0	0.000
In 2009	0.000	0	0.000
In 2010	0.000	0	0.000

- SHRIMP has determined that leaks, failures or damages are not increasing. **(see guidance)**.

Do you accept this determination? (EC252ok)

Your Choice (weight: 0) --Accept

- Your data and choices indicate that repaired leaks per mile of mains are not increasing. (EC252)

Your Choice (weight: 0) --Continue

- Are repaired corrosion leaks per service increasing? (EC201)

Data Source:

GIS system

Your Choice (weight: 0) --

Table 11.22. End of Year

	Number of Services	Corrosion Leaks Repaired	Repaired Leaks/service
In 2004	1400	0	0.000
In 2005	1400	0	0.000
In 2006	1400	1	0.000
In 2007	1400	0	0.000
In 2008	1400	0	0.000
In 2009	0	0	0.000
In 2010	0	0	0.000

- SHRIMP has determined that leaks, failures or damages are not increasing. **(see guidance)**.

Do you accept this determination? (EC254ok)

Your Choice (weight: 0) --Accept

- Your data and choices indicate that repaired leaks per service are not increasing. (EC254)

Your Choice (weight: 0) --Continue

- Do exposed pipe inspections indicate a corrosion problem? (EC202)

Data Source:

Inspection records for 2006-2011 maintained by the utility supervisor

Your Choice (weight: 0) --No

- Is cathodic protection of the section adequate? (EC203)

Data Source:

CP Inspection records for 2006-2011 maintained by the utility supervisor

Your Choice (weight: 0) --Yes

- Confirm that no corrosion problems are known. (EC204a)

Your Choice (weight: 0) --Accept

- **Cathodic Protected, Coated Steel (CORRECSTL-PC1a) (Taps with low CP - Low cp)**

- Interview Start (CORRECSTL-PC1a)

Your Choice (weight: 0) --Continue

- Are repaired corrosion leaks per mile increasing? (EC102)

Data Source:

GIS system

Your Choice (weight: 0) --

Table 11.23. End of Year

	Miles of Mains	Corrosion Leaks Repaired	Repaired Leaks/mile
In 2004	10.000	3	0.300
In 2005	10.000	2	0.200
In 2006	10.000	6	0.600
In 2007	10.000	10	1.000
In 2008	10.000	12	1.200
In 2009	0.000	0	0.000
In 2010	0.000	0	0.000

- SHRIMP has determined that leaks, failures or damages are not increasing. **(see guidance)**.

Do you accept this determination? (EC252ok)

Your Choice (weight: 0) --Accept

- Your data and choices indicate that repaired leaks per mile of mains are not increasing. (EC252)

Your Choice (weight: 0) --Continue

- Are repaired corrosion leaks per service increasing? (EC201)

Data Source:

GIS system

Your Choice (weight: 0) --

Table 11.24. End of Year

	Number of Services	Corrosion Leaks Repaired	Repaired Leaks/service
In 2004	100	0	0.000
In 2005	100	1	0.010
In 2006	100	1	0.010
In 2007	100	0	0.000
In 2008	100	0	0.000
In 2009	0	0	0.000
In 2010	0	0	0.000

- SHRIMP has determined that leaks, failures or damages are not increasing.(see guidance).

Do you accept this determination? (EC254ok)

Your Choice (weight: 0) --Accept

- Your data and choices indicate that repaired leaks per service are not increasing. (EC254)

Your Choice (weight: 0) --Continue

- Do exposed pipe inspections indicate a corrosion problem? (EC202)

Data Source:

Inspection records for 2006-2011 maintained by the utility supervisor

Your Choice (weight: 0) --No

- Is cathodic protection of the section adequate? (EC203)

Data Source:

CP Inspection records for 2006-2011 maintained by the utility supervisor

Your Choice (weight: 0) --No

- Have confirmed corrosion leaks occurred on this section? (EC701)

Data Source:

GIS system

Your Choice (weight: 1) --Yes

- Does section contain leaks found and being monitored that are suspected to be corrosion related and reflect a corrosion problem? (EC702)

Data Source:

Leak survey records for 2006-2011 maintained by the utility supervisor

Your Choice (weight: 0) --No

- Are corrosion leaks system-wide or concentrated in local areas? (EC703)

Data Source:

GIS system

Your Choice (weight: 0) --Concentrated

- What percent of your cathodic protection test point readings meet or exceed acceptable cathodic protection criteria? (EC704)

Data Source:

CP Inspection records for 2006-2011 maintained by the utility supervisor

Your Choice (weight: 1) --At least 75% of readings exceed -.85 V

- Are there known sources of stray electrical current in the area? (EC705)

Data Source:

CP r US study in 2008, copy maintained by the cityengineer

Your Choice (weight: 0) --No

- What is the condition of the pipeline coating? (EC710)
Data Source:
 Inspection records for 2006-2011 maintained by the utility supervisor
 Your Choice (weight: 2) --Poor
- Do existing pipe inspections indicate coating deficiencies? (EC711)
Data Source:
 Inspection records for 2006-2011 maintained by the utility supervisor
 Your Choice (weight: 0) --Section wide
- Is the section cathodic protection provided by rectifier(s) only, anode(s) only, or a combination? (EC720)
Data Source:
 Construction records and knowledge of the utility supervisor
 Your Choice (weight: 0) --Anode(s) Only
- Review the guidance. (ECCSQ0)
 Your Choice (weight: 0) --Continue
- Are the pressure and/or diameter of this section greater than or about the same as the system as a whole? (ECCSQ1)
Data Source:
 GIS system
 Your Choice (weight: 0) --About the same
- Is this section predominantly located in business districts or outside business districts (as those are defined for leak survey)? (ECCSQ2)
Data Source:
 GISA system
 Your Choice (weight: 0.15) --Within Business Districts
- How long would it typically take utility crews to reach this part of the system after receiving notice of a possible failure? (ECCSQ3)
Data Source:
 Opinion of the utility supervisor
 Your Choice (weight: 0) --Less than one (1) hour
- What would be the impact on the utility and its customers if this section were to fail? (ECCSQ4)
Data Source:
 Opinion of the utility supervisor
 Your Choice (weight: 0.05) --Moderate
- **Cathodic Protected, Coated Steel (CORRECSTL-PC1a) (Taps with evidence of metal loss - metal loss)**
 - Interview Start (CORRECSTL-PC1a)
 Your Choice (weight: 0) --Continue
 - Are repaired corrosion leaks per mile increasing? (EC102)
Data Source:
 GIS system
 Your Choice (weight: 0) --

Table 11.25. End of Year

	Miles of Mains	Corrosion Leaks Repaired	Repaired Leaks/mile
In 2004	4.000	0	0.000

In 2005	4.000	3	0.750
In 2006	4.000	0	0.000
In 2007	4.000	0	0.000
In 2008	4.000	0	0.000
In 2009	0.000	0	0.000
In 2010	0.000	0	0.000

- SHRIMP has determined that leaks, failures or damages are not increasing. **(see guidance)**.

Do you accept this determination? (EC252ok)

Your Choice (weight: 0) --Accept

- Your data and choices indicate that repaired leaks per mile of mains are not increasing. (EC252)

Your Choice (weight: 0) --Continue

- Are repaired corrosion leaks per service increasing? (EC201)

Data Source:

GIS system

Your Choice (weight: 0) --

Table 11.26. End of Year

	Number of Services	Corrosion Leaks Repaired	Repaired Leaks/service
In 2004	0	0	0.000
In 2005	0	0	0.000
In 2006	0	0	0.000
In 2007	0	0	0.000
In 2008	0	0	0.000
In 2009	0	0	0.000
In 2010	0	0	0.000

- SHRIMP has determined that leaks, failures or damages are not increasing. **(see guidance)**.

Do you accept this determination? (EC254ok)

Your Choice (weight: 0) --Accept

- Your data and choices indicate that repaired leaks per service are not increasing. (EC254)

Your Choice (weight: 0) --Continue

- Do exposed pipe inspections indicate a corrosion problem? (EC202)

Data Source:

Inspection records for 2006-2011 maintained by the utility supervisor

Your Choice (weight: 0) --No

- Is cathodic protection of the section adequate? (EC203)

Data Source:

CP Inspection records for 2006-2011 maintained by the utility supervisor

Your Choice (weight: 0) --No

- Have confirmed corrosion leaks occurred on this section? (EC701)

Data Source:

GIS system

Your Choice (weight: 1) --Yes

- Does section contain leaks found and being monitored that are suspected to be corrosion related and reflect a corrosion problem? (EC702)

Data Source:

Leakage survey records and opinion of the utility supervisor and CP r US

Your Choice (weight: 0) --No

- Are corrosion leaks system-wide or concentrated in local areas? (EC703)

Data Source:

GIS system

Your Choice (weight: 0) --System-wide

- What percent of your cathodic protection test point readings meet or exceed acceptable cathodic protection criteria? (EC704)

Data Source:

CP Inspection records for 2006-2011 maintained by the utility supervisor

Your Choice (weight: 1) --At least 75% of readings exceed -.85 V

- Are there known sources of stray electrical current in the area? (EC705)

Data Source:

2008 study by CP r US maintained by the city engineer

Your Choice (weight: 0) --Yes

- Are stray currents creating problems? (EC706)

Data Source:

CP Inspection records for 2006-2011 maintained by the utility supervisor

Your Choice (weight: 0) --No

- What is the condition of the pipeline coating? (EC710)

Data Source:

Inspection records for 2006-2011 maintained by the utility supervisor

Your Choice (weight: 0) --Good

- Is the section cathodic protection provided by rectifier(s) only, anode(s) only, or a combination? (EC720)

Data Source:

Knowledge of the utility supervisor

Your Choice (weight: 0) --Rectifier(s) Only

- Review the guidance. (ECCSQ0)

Your Choice (weight: 0) --Continue

- Are the pressure and/or diameter of this section greater than or about the same as the system as a whole? (ECCSQ1)

Data Source:

GIS system

Your Choice (weight: 0.2) --Substantially greater

- Is this section predominantly located in business districts or outside business districts (as those are defined for leak survey)? (ECCSQ2)

Data Source:

GIS system

Your Choice (weight: 0) --Outside Business Districts

- How long would it typically take utility crews to reach this part of the system after receiving notice of a possible failure? (ECCSQ3)

Data Source:

Opinion of the utility supervisor

Your Choice (weight: 0) --Less than one (1) hour

- What would be the impact on the utility and its customers if this section were to fail? (ECCSQ4)

Data Source:

Opinion of the utility supervisor

• **External Corrosion (CORRECCDWIL) (Cast, Ductile, Wrought Iron (larger than 8") - Entire system)**

- Interview Start (CORRECCDW)

Your Choice (weight: 0) --Continue

- Risk assigned for Large Cast Iron/Ductile Iron/Wrought Iron (AR-3)

Your Choice (weight: 3) --Large Cast Iron/Ductile Iron/Wrought Iron

- Are repaired corrosion leaks per mile increasing? (EC102)

Data Source:

GIS system

Your Choice (weight: 0) --

Table 11.27. End of Year

	Miles of Mains	Corrosion Leaks Repaired	Repaired Leaks/mile
In 2004	0.000	0	0.000
In 2005	0.000	0	0.000
In 2006	0.000	0	0.000
In 2007	0.000	0	0.000
In 2008	0.000	0	0.000
In 2009	0.000	0	0.000
In 2010	0.000	0	0.000

- SHRIMP has determined that leaks, failures or damages are not increasing. **(see guidance)**.

Do you accept this determination? (EC252ok)

Your Choice (weight: 0) --Accept

- Your data and choices indicate that repaired leaks per mile of mains are not increasing. (EC252)

Your Choice (weight: 0) --Continue

- Are repaired corrosion leaks per service increasing? (EC201)

Data Source:

GIS system

Your Choice (weight: 0) --

Table 11.28. End of Year

	Number of Services	Corrosion Leaks Repaired	Repaired Leaks/service
In 2004	0	0	0.000
In 2005	0	0	0.000
In 2006	0	0	0.000
In 2007	0	0	0.000
In 2008	0	0	0.000
In 2009	0	0	0.000
In 2010	0	0	0.000

- SHRIMP has determined that leaks, failures or damages are not increasing. **(see guidance)**.

Do you accept this determination? (EC254ok)

Your Choice (weight: 0) --Accept

- Your data and choices indicate that repaired leaks per service are not increasing. (EC254)

Your Choice (weight: 0) --Continue

- Do exposed pipe inspections indicate a corrosion problem? (EC202)

Data Source:

Inspection records for 2006-2011 maintained by the Gas Utility Supervisor

Your Choice (weight: 0) --No

- Confirm that no corrosion problems are known. (EC204)

Your Choice (weight: 0) --Accept

- **Internal Corrosion (CORRIC) (Kastanasburg Utilities - Entire system)**

- Interview Start (CORRIC)

Your Choice (weight: 0) --Continue

- Do inspections of the inside of metal pipe or coupons removed from metal pipe show signs of internal corrosion? (CORRIC101)

Data Source:

Inspection records for 2006-2011 maintained by the utility supervisor

Your Choice (weight: 5) --Yes

- Have leaks caused by internal corrosion occurred? (CORRIC102)

Data Source:

GIS system

Your Choice (weight: 5) --Yes

- Are repaired internal corrosion leaks increasing? (CORRIC102a)

Data Source:

GIS system

Your Choice (weight: 0) --

Table 11.29. End of Year

	Leaks Repaired
In 2004	0
In 2005	1
In 2006	2
In 2007	4
In 2008	4
In 2009	0
In 2010	0

- SHRIMP has determined that leaks, failures or damages are not increasing. **(see guidance)**.

Do you accept this determination? (CORRIC102dok)

Your Choice (weight: 0) --Accept

- Your data and choices indicate that leaks are not increasing per year. (CORRIC102d)

Your Choice (weight: 0) --Continue

- Do you receive any gas that is not of transmission pipeline quality? (CORRIC103)

Data Source:

Knowledge of the utility supervisor

Your Choice (weight: 5) --Yes

- Do you have H2S (hydrogen sulfide) in your gas? (CORRIC103a)

Data Source:

Supplier gas composition records from 2006-2011 maintained by the utility supervisor

Your Choice (weight: 0) --less than 0.25 grains/100 CF

- Have liquids been found in your distribution piping? (CORRIC104)

Data Source:

Knowledge of Old Bob, our 125 year-old maintenance foreman

Your Choice (weight: 2) --Yes

- Are these liquids acidic or corrosive? (CORRIC104a)

Data Source:

tests by CP r US for 2006-2011, maintained by the utility suopervisor

Your Choice (weight: 5) --Yes

- Are internal corrosion leaks or corrosive liquid problems system-wide/uniform or concentrated in certain areas? (CORRIC110)

Data Source:

Knowledge of the utility supervisor

Your Choice (weight: 0) --Concentrated

- Do you want to section your system into areas of concentrated internal corrosion and/or corrosive liquid problems? (CORRIC111)

Your Choice (weight: 0) --Yes

- Enter sections of concentrated internal corrosion or corrosive liquid problems. (CORRIC112)

Your Choice (weight: 0) --

Table 11.30. Section

	Mains	Services	Description
Remainder of system	80.000	3125	The rest of the system with no internal corrosion problems
Sulfur Springs Area	2.000	25	The area near sulfur springs where we get local gas production that contains H2S
ConcInternal_02	0.000	0	
ConcInternal_03	0.000	0	
ConcInternal_04	0.000	0	
ConcInternal_05	0.000	0	
ConcInternal_06	0.000	0	
ConcInternal_07	0.000	0	
ConcInternal_08	0.000	0	
ConcInternal_09	0.000	0	

- Provide Additional Information (CORRIC112a)

Your Choice (weight: 0) --

- **Internal Corrosion (CORRIC-1a) (Remainder of system - The rest of the system with no internal corrosion problems)**

- Interview Start (CORRIC-1a)

Your Choice (weight: 0) --Continue

- Do inspections of the inside of metal pipe or coupons removed from metal pipe show signs of internal corrosion? (CORRIC101)

Data Source:

Inspection records for 2006-2011 maintained by the utility supervisor

Your Choice (weight: 0) --No

- Have leaks caused by internal corrosion occurred? (CORRIC102)

Data Source:

GIS system

Your Choice (weight: 0) --No

- Do you receive any gas that is not of transmission pipeline quality? (CORRIC103)

Data Source:

Knowledge of the utility supervisor

Your Choice (weight: 0) --No

- Have liquids been found in your distribution piping? (CORRIC104)

Data Source:

Knowledge of Old Bob, the 125 year-old maintenance foreman

Your Choice (weight: 0) --No

- Confirm that no other internal corrosion problems are known. (CORRIC204)

Your Choice (weight: 0) --Accept

- **Internal Corrosion (CORRIC-1a) (Sulfur Springs Area - The area near sulfur springs where we get local gas production that contains H2S)**

- Interview Start (CORRIC-1a)

Your Choice (weight: 0) --Continue

- Do inspections of the inside of metal pipe or coupons removed from metal pipe show signs of internal corrosion? (CORRIC101)

Data Source:

Inspection records for 2006-2011 maintained by the utility supervisor

Your Choice (weight: 5) --Yes

- Have leaks caused by internal corrosion occurred? (CORRIC102)

Data Source:

GIS system

Your Choice (weight: 5) --Yes

- Are repaired internal corrosion leaks increasing? (CORRIC102a)

Data Source:

GIS system

Your Choice (weight: 0) --

Table 11.31. End of Year

	Leaks Repaired
In 2004	0
In 2005	1
In 2006	3
In 2007	4
In 2008	6
In 2009	0
In 2010	0

- SHRIMP has determined that leaks, failures or damages are not increasing.(see guidance).

Do you accept this determination? (CORRIC102dok)

Your Choice (weight: 0) --Accept

- Your data and choices indicate that leaks are not increasing per year. (CORRIC102d)

Your Choice (weight: 0) --Continue

- Do you receive any gas that is not of transmission pipeline quality? (CORRIC103)

Data Source:

Knowledge of the utility supervisor and gas analysis records from 2006-2011 maintained by the utility supervisor

Your Choice (weight: 5) --Yes

- Do you have H2S (hydrogen sulfide) in your gas? (CORRIC103a)

Data Source:

Data analysis for 2006-2011 by the supplier, maintained by the utility supervisor

Your Choice (weight: 3) --more than 0.25 grains/100CF

- Have liquids been found in your distribution piping? (CORRIC104)

Data Source:

Knowledge of Old Bob, the 125 year old maintenance foreman

Your Choice (weight: 2) --Yes

- Are these liquids acidic or corrosive? (CORRIC104a)

Data Source:

Tests for 2006-2011 performed by CP r Us. records maintained by the utility supervisor

Your Choice (weight: 5) --Yes

- Are internal corrosion leaks or corrosive liquid problems system-wide/uniform or concentrated in certain areas? (CORRIC110)

Data Source:

GIS system

Your Choice (weight: 0) --Uniform

- Review the guidance. (CORRICCSQ0)

Your Choice (weight: 0) --Continue

- Are the pressure and/or diameter of this section greater than or about the same as the system as a whole? (CORRICCSQ1)

Data Source:

GIS system

Your Choice (weight: 0) --About the same

- Is this section predominantly located in business districts or outside business districts (as those are defined for leak survey)? (CORRICCSQ2)

Data Source:

GIS system

Your Choice (weight: 0.15) --Within Business Districts

- How long would it typically take utility crews to reach this part of the system after receiving notice of a possible failure? (CORRICCSQ3)

Data Source:

Opinion of the utility supervisor

Your Choice (weight: 0) --Less than one (1) hour

- What would be the impact on the utility and its customers if this section were to fail? (CORRICCSQ4)

Data Source:

Opinion of the utility supervisor

Your Choice (weight: 0) --Low

Equipment Malfunction Threat

- **Equipment Malfunction (EQIP) (Kastanasburg Utilities - Entire system)**

- Interview Start (EQIP)

Your Choice (weight: 0) --Continue

- How many leak repairs resulting from equipment problems occurred by year for the last 7 years? (EQIP-Leak)

Your Choice (weight: 0) --

Table 11.32. Leak Repairs From PHMSA 7100.1-1

End of Year	Equipment Malfunction		Totals	
	Mains	Services	Mains	Services
In 2004	0	0	0	0
In 2005	0	0	0	0

In 2006	0	0	0	0
In 2007	0	0	0	0
In 2008	0	0	0	0
In 2009	0	0	0	0
In 2010	0	0	0	0

- Are leaks occurring or do inspections indicate potential equipment malfunctions? (EQ101a)

Your Choice (weight: 2) --

Valves

Regulators/Relief Valves

- Does system contain equipment known/prone to malfunction (Industry wide)? (EQ102a)

Your Choice (weight: 1) --

Odorization

- Provide Additional Information (EQ105)

Your Choice (weight: 0) --

- **Other Equipment Prone to Failure (EQ-ProneO) (Prone To Failure - Odorization)**

- Interview Start (EQ-ProneO)

Your Choice (weight: 0) --Continue

- Would you like to identify specific makes/models/sizes of problem equipment? (EQ101a)

Your Choice (weight: 0) --Yes

- What equipment is suspected of being prone to malfunction? (EQ101b)

Your Choice (weight: 0) --

Table 11.33. Equipment

	Make	Model	Size(s)	Description
Scott XYZ	Scott	XYZ	100 gal	Scott XYZ 100
Specific_01				
Specific_02				

- Provide Additional Information (EQ101d)

Your Choice (weight: 0) --

- **Specific Other Equipment Prone to Failure (EQ-ProneO-1a) (Scott XYZ - Scott XYZ 100 (Scott, XYZ, 100 gal))**

- Interview Start (EQ-ProneO-1a)

Your Choice (weight: 0) --Continue

- What is the inspection/maintenance frequency for this type of equipment? (EQ301)

Your Choice (weight: 0) --Annual

- Is the equipment malfunctioning due to failing seals, gaskets, o-rings, packing, etc.? (EQ302)

Your Choice (weight: 0) --Yes

- Will equipment failure occur because of electric power failure or lightning damage? (EQ303)

Your Choice (weight: 0) --No

- Is the equipment sized appropriately for current operating conditions? (EQ304)

Your Choice (weight: 0) --Yes

- Is the equipment installed per the manufacturer's specifications and appropriate for current operating conditions? (EQ305)

Your Choice (weight: 0) --Yes

- Does the failing element of the equipment cause system pressure to exceed the MAOP? (EQ306)
Your Choice (weight: 0) --No
- What is the likelihood of this piece of equipment failing? (EQ307)
Your Choice (weight: 1) --Low
- Review the guidance. (EQCSQ0)
Your Choice (weight: 0) --Continue
- Is the size/capacity of the equipment substantially greater or lesser than other equipment in the system as a whole? (EQCSQ1)
Your Choice (weight: 0) --About the same
- Does the equipment primarily affect the system located in the business district? (EQCSQ2)
Your Choice (weight: 0) --Outside Business Districts
- How long would it typically take utility crews to reach this part of the system after receiving notice of a possible failure? (EQCSQ3)
Your Choice (weight: 0.025) --Between one (1) and two (2) hours
- What would be the impact on the utility and its customers if this equipment were to fail? (EQCSQ4)
Your Choice (weight: 0) --Low
- What is the likelihood that a failure of this equipment will result in a Grade 1 leak? (EQ308)
Your Choice (weight: 0) --Low

• **Regulators Experiencing Failure (EQ-FailR) (Failing Equipment - Regulators/Relief Valves)**

- Interview Start (EQ-FailR)
Your Choice (weight: 0) --Continue
- Would you like to identify specific makes/models/sizes of failing equipment? (EQ101a)
Your Choice (weight: 0) --Yes
- What equipment is malfunctioning? (EQ101b)
Your Choice (weight: 0) --

Table 11.34. Equipment

	Make	Model	Size(s)	Description
Heath Reg ABC	Heath	ABC	2"	Backfeed Stn. Reg.
Erickson Relief	Erickson	XYZ	4"	Gate Stn Relief
Specific_02				
Specific_03				
Specific_04				
Specific_05				

- Provide Additional Information (EQ101d)
Your Choice (weight: 0) --
 - **Specific Regulators Experiencing Failure (EQ-FailR-1a) (Heath Reg ABC - Backfeed Stn. Reg. (Heath, ABC, 2"))**
 - Interview Start (EQ-FailR-1a)
Your Choice (weight: 0) --Continue
 - What is the inspection/maintainance frequency for this type of equipment? (EQ301)
Your Choice (weight: 0) --Annual

- Are failures related to Set Point drift? (EQ302)
Your Choice (weight: 0) --Yes
- Is the equipment malfunctioning due to failing seals, gaskets, o-rings, packing, boots, etc.? (EQ303)
Your Choice (weight: 0) --No
- Is the regulating equipment sized appropriately for current operating conditions? (EQ304)
Your Choice (weight: 0) --Yes
- Is the regulating equipment installed per the manufacturer's specifications? (EQ305)
Your Choice (weight: 0) --Yes
- Would equipment failure cause system pressure to exceed the MAOP? (EQ306)
Your Choice (weight: 1) --Yes
- Does equipment fail more than one time per year? (EQ307)
Your Choice (weight: 0) --Yes
- What is the likelihood of this piece of equipment failing? (EQ308)
Your Choice (weight: 2) --Medium
- What is the likelihood that a failure of this equipment will result in a Grade 1 leak? (EQ309)
Your Choice (weight: 0) --Low
- Review the guidance. (EQCSQ0)
Your Choice (weight: 0) --Continue
- Is the size/capacity of the equipment substantially greater or lesser than other equipment in the system as a whole? (EQCSQ1)
Your Choice (weight: 0) --About the same
- Does the equipment primarily affect the system located in the business district? (EQCSQ2)
Your Choice (weight: 0) --Outside Business Districts
- How long would it typically take utility crews to reach this part of the system after receiving notice of a possible failure? (EQCSQ3)
Your Choice (weight: 0) --Less than one (1) hour
- What would be the impact on the utility and its customers if this equipment were to fail? (EQCSQ4)
Your Choice (weight: 0) --Low
- **Specific Regulators Experiencing Failure (EQ-FailR-1a) (Erickson Relief - Gate Stn Relief (Erickson, XYZ, 4"))**
 - Interview Start (EQ-FailR-1a)
Your Choice (weight: 0) --Continue
 - What is the inspection/maintainance frequency for this type of equipment? (EQ301)
Your Choice (weight: 0) --Annual
 - Are failures related to Set Point drift? (EQ302)
Your Choice (weight: 0) --No

- Is the equipment malfunctioning due to failing seals, gaskets, o-rings, packing, boots, etc.? (EQ303)
Your Choice (weight: 0) --Yes
- Is the regulating equipment sized appropriately for current operating conditions? (EQ304)
Your Choice (weight: 0) --Yes
- Is the regulating equipment installed per the manufacturer's specifications? (EQ305)
Your Choice (weight: 0) --Yes
- Would equipment failure cause system pressure to exceed the MAOP? (EQ306)
Your Choice (weight: 1) --Yes
- Does equipment fail more than one time per year? (EQ307)
Your Choice (weight: 0) --No
- What is the likelihood of this piece of equipment failing? (EQ308)
Your Choice (weight: 1) --Low
- What is the likelihood that a failure of this equipment will result in a Grade 1 leak? (EQ309)
Your Choice (weight: 0) --Low
- Review the guidance. (EQCSQ0)
Your Choice (weight: 0) --Continue
- Is the size/capacity of the equipment substantially greater or lesser than other equipment in the system as a whole? (EQCSQ1)
Your Choice (weight: 0.1) --Somewhat greater
- Does the equipment primarily affect the system located in the business district? (EQCSQ2)
Your Choice (weight: 0) --Outside Business Districts
- How long would it typically take utility crews to reach this part of the system after receiving notice of a possible failure? (EQCSQ3)
Your Choice (weight: 0.025) --Between one (1) and two (2) hours
- What would be the impact on the utility and its customers if this equipment were to fail? (EQCSQ4)
Your Choice (weight: 0) --Low

• **Valves Experiencing Failure (EQ-FailV) (Failing Equipment - Valves)**

- Interview Start (EQ-FailV)
Your Choice (weight: 0) --Continue
- Would you like to identify specific makes/models/sizes of failing equipment? (EQ101a)
Your Choice (weight: 0) --Yes
- What equipment is malfunctioning? (EQ101b)
Your Choice (weight: 0) --

Table 11.35. Equipment

	Make	Model	Size(s)	Description
Rockwell Fig 143	Rockwell	Fig 143	2"	Rockwell 2" plug valves
Specific_01				

Specific_02				
Specific_03				
Specific_04				
Specific_05				

- Provide Additional Information (EQ101d)

Your Choice (weight: 0) --

- **Specific Valves Experiencing Failure (EQ-FailV-1a) (Rockwell Fig 143 - Rockwell 2" plug valves (Rockwell, Fig 143, 2"))**

- Interview Start (EQ-FailV-1a)

Your Choice (weight: 0) --Continue

- Are the valve(s) addressed in this interview classified as critical valves? (EQ301)

Your Choice (weight: 0) --No

- What is the inspection/maintenance frequency for this type of equipment? (EQ302)

Your Choice (weight: 0) --Bi-Annual (Every other year) or Greater

- Do valves stick open or closed? (EQ303)

Your Choice (weight: 0) --No

- Are these valve(s) malfunctioning due to failing seals, gaskets, o-rings, packing, etc.? (EQ304)

Your Choice (weight: 0) --Yes

- Does the problem with these valves result in gas leaking outside of the pipeline? (EQ305)

Your Choice (weight: 0) --Yes

- Are leaking problem valve(s) obtaining adequate shut off? (EQ306)

Your Choice (weight: 0) --Yes

- Are the valve(s) installed per the manufacturer's specifications and appropriate for current operating conditions? (EQ307)

Your Choice (weight: 0) --Yes

- Does the failing element of the valve cause system pressure to exceed the MAOP? (EQ308)

Your Choice (weight: 0) --No

- What is the likelihood of this valve failing? (EQ309)

Your Choice (weight: 1) --Low

- What is the likelihood that a failure of this equipment will result in a Grade 1 leak? (EQ310)

Your Choice (weight: 0) --Low

- Review the guidance. (EQCSQ0)

Your Choice (weight: 0) --Continue

- Is the size/capacity of the equipment substantially greater or lesser than other equipment in the system as a whole? (EQCSQ1)

Your Choice (weight: 0) --About the same

- Does the equipment primarily affect the system located in the business district? (EQCSQ2)

Your Choice (weight: 0.15) --Within Business Districts

- How long would it typically take utility crews to reach this part of the system after receiving notice of a

possible failure? (EQCSQ3)

Your Choice (weight: 0) --Less than one (1) hour

- What would be the impact on the utility and its customers if this equipment were to fail? (EQCSQ4)

Your Choice (weight: 0) --Low

Incorrect Operations Threat

- **Incorrect Operations (IOP) (Kastanasburg Utilities - Entire system)**

- Interview Start (IOP)

Your Choice (weight: 0) --Continue

- How many leak repairs resulting from incorrect operations occurred by year for the last 7 years? (IOP-Leak)

Your Choice (weight: 0) --

Table 11.36. Leak Repairs From PHMSA 7100.1-1

End of Year	Incorrect Operations		Totals	
	Mains	Services	Mains	Services
In 2004	0	0	0	0
In 2005	0	0	0	0
In 2006	0	0	0	0
In 2007	0	0	0	0
In 2008	0	0	0	0
In 2009	0	0	0	0
In 2010	0	0	0	0

- Have failures due to inadequate procedures been experienced during the past 7 years? (IOP101)

Your Choice (weight: 1) --Yes

- Have failures due to a failure to follow procedures been experienced? (IOP104)

Your Choice (weight: 1) --Yes

- Have any employees or contractors had operator qualification credentials revoked due to poor performance of any covered task? (IOP105)

Your Choice (weight: 1) --Yes

- Have employees or contractors tested positive for drugs or alcohol (other than pre-hire tests)? (IOP106)

Your Choice (weight: 1) --Yes

- Provide Additional Information (IOPSet2)

Your Choice (weight: 0) --

- **Drugs and Alcohol (IOP-Drug) (Kastanasburg Utilities - Entire system)**

- Interview Start (IOP-Drug)

Your Choice (weight: 0) --Continue

- Is the number of positive drug or alcohol tests/employee increasing? (IOP-Proc101)

Your Choice (weight: 1) --

Table 11.37. End of Year

	Positive Drug or Alcohol Tests	Total Employees	Tests/Empl
In 2004	0	0	0.000
In 2005	0	15	0.000
In 2006	2	16	0.125
In 2007	2	16	0.125

In 2008	4	16	0.250
In 2009	4	16	0.250
In 2010	0	0	0.000

- SHRIMP has determined that leaks, failures or damages are increasing.(see guidance).
Do you accept this determination? (IOP-Proc102iok)
Your Choice (weight: 0) --Accept
- Have these increasing failures been corrected? (IOP-Proc102i)
Your Choice (weight: 0) --Yes
- Enter explanation (IOP-Proc102f)
Your Choice (weight: 0) --The individuals testing positive for drugs and alcohol have been fired.
- Confirm that no other incorrect operations problems are known. (IOP-Proc204)
Your Choice (weight: 0) --Accept

• **Failure To Follow Procedures (IOP-Follow) (Kastanasburg Utilities - Entire system)**

- Interview Start (IOP-Follow)
Your Choice (weight: 0) --Continue
- Is the number of failures due to a failure to follow procedures increasing? (IOP-Proc101)
Your Choice (weight: 1) --

Table 11.38. End of Year

	Failures
In 2004	0
In 2005	1
In 2006	1
In 2007	2
In 2008	2
In 2009	4
In 2010	0

- SHRIMP has determined that leaks, failures or damages are increasing.(see guidance).
Do you accept this determination? (IOP-Proc102iok)
Your Choice (weight: 0) --Accept
- Have these increasing failures been corrected? (IOP-Proc102i)
Your Choice (weight: 2) --No
- Are failures limited to certain employees and/or departments and/or tasks? (IOP-Proc103)
Your Choice (weight: 0) --Yes
- Do you want to section your failures by certain employees and/or departments and/or tasks? (IOP-Proc111)
Your Choice (weight: 0) --Yes
- Enter employees or departments or tasks of specific failures. (IOP-Proc112)
Your Choice (weight: 0) --

Table 11.39. Employee

Department

Task

	Failures to Follow Procedures	Description
Backfilling	4	Crews fail to support pipe properly
Line up clamps	2	Failure to use line up clamps
Specific_02	0	
Specific_03	0	

Specific_04	0	
Specific_05	0	
Specific_06	0	
Specific_07	0	
Specific_08	0	
Specific_09	0	

- Provide Additional Information (IOP-Proc112b)

Your Choice (weight: 0) --

- **Certain Employees/Depts/Tasks (IOP-Follow-1a) (Backfilling - Crews fail to support pipe properly)**

- Interview Start (IOP-Follow-1a)

Your Choice (weight: 0) --Continue

- Have failures due to a failure to follow procedures been experienced? (IOP-Proc100)

Your Choice (weight: 0) --Yes

- Is the number of failures due to a failure to follow procedures increasing? (IOP-Proc101)

Your Choice (weight: 0) --

Table 11.40. End of Year

	Failures
In 2004	0
In 2005	2
In 2006	0
In 2007	1
In 2008	1
In 2009	0
In 2010	0

- SHRIMP has determined that leaks, failures or damages are not increasing.(see guidance).

Do you accept this determination? (IOP-Proc102dok)

Your Choice (weight: 0) --Accept

- Your data and choices indicate that failures due to inadequate procedures are not increasing per year. (IOP-Proc102d)

Your Choice (weight: 0) --Continue

- Confirm that no other incorrect operations problems are known. (IOP-Proc204)

Your Choice (weight: 0) --Accept

- **Certain Employees/Depts/Tasks (IOP-Follow-1a) (Line up clamps - Failure to use line up clamps)**

- Interview Start (IOP-Follow-1a)

Your Choice (weight: 0) --Continue

- Have failures due to a failure to follow procedures been experienced? (IOP-Proc100)

Your Choice (weight: 0) --Yes

- Is the number of failures due to a failure to follow procedures increasing? (IOP-Proc101)

Your Choice (weight: 0) --

Table 11.41. End of Year

	Failures
In 2004	1
In 2005	2
In 2006	3
In 2007	4
In 2008	5
In 2009	6
In 2010	7

- SHRIMP has determined that leaks, failures or damages are increasing.(see guidance).

Do you accept this determination? (IOP-Proc102iok)

Your Choice (weight: 0) --Accept

- Have these increasing failures been corrected? (IOP-Proc102i)

Your Choice (weight: 2) --No

- What is the probability that this problem could lead to a failure on your distribution system (e.g. a leak, rupture or overpressure of the line)? (IOP-ProcFailProb)

Your Choice (weight: 3) --Highly likely to lead to a failure

- Review the guidance. (IOP-ProcCSQ0)

Your Choice (weight: 0) --Continue

- What would be the potential consequences (injuries and/or property loss) if a failure were to occur because of this problem? (IOP-ProcCSQ1)

Your Choice (weight: 0.25) --Moderate likelihood of injury and/or property loss.

• **Inadequate Procedures (IOP-Proc) (Kastanasburg Utilities - Entire system)**

- Interview Start (IOP-Proc)

Your Choice (weight: 0) --Continue

- Is the number of failures due to inadequate procedures increasing? (IOP-Proc101)

Your Choice (weight: 1) --

Table 11.42. End of Year

	Failures
In 2004	0
In 2005	0
In 2006	1
In 2007	1
In 2008	3
In 2009	2
In 2010	0

- SHRIMP has determined that leaks, failures or damages are increasing. **(see guidance)**.

Do you accept this determination? (IOP-Proc102iok)

Your Choice (weight: 0) --Accept

- Have these increasing failures been corrected? (IOP-Proc102i)

Your Choice (weight: 2) --No

- Are failures limited to certain employees and/or departments and/or tasks? (IOP-Proc103)

Your Choice (weight: 0) --Yes

- Do you want to section your failures by certain employees and/or departments and/or tasks? (IOP-Proc111)

Your Choice (weight: 0) --Yes

- Enter employees or departments or tasks of specific failures. (IOP-Proc112)

Your Choice (weight: 0) --

Table 11.43. Employee

Department

Task

	Failures from Inadequate Procedures	Description
Butt Fusion procedures	1	Procedures don't result in good fusions
Specific_01	0	
Specific_02	0	

Specific_03	0	
Specific_04	0	
Specific_05	0	
Specific_06	0	
Specific_07	0	
Specific_08	0	
Specific_09	0	

- Provide Additional Information (IOP-Proc112b)

Your Choice (weight: 0) --

- **Certain Employees/Depts/Tasks (IOP-Proc-1a) (Butt Fusion procedures - Procedures don't result in good fusions)**

- Interview Start (IOP-Proc-1a)

Your Choice (weight: 0) --Continue

- Have failures due to inadequate procedures been experienced during the past 7 years? (IOP-Proc100)

Your Choice (weight: 0) --Yes

- Is the number of failures due to inadequate procedures increasing? (IOP-Proc101)

Your Choice (weight: 0) --

Table 11.44. End of Year

	Failures
In 2004	0
In 2005	0
In 2006	0
In 2007	0
In 2008	2
In 2009	3
In 2010	10

- SHRIMP has determined that leaks, failures or damages are increasing.(see guidance).

Do you accept this determination? (IOP-Proc102iok)

Your Choice (weight: 0) --Accept

- Have these increasing failures been corrected? (IOP-Proc102i)

Your Choice (weight: 2) --No

- What is the probability that this problem could lead to a failure on your distribution system (e.g. a leak, rupture or overpressure of the line)? (IOP-ProcFailProb)

Your Choice (weight: 3) --Highly likely to lead to a failure

- Review the guidance. (IOP-ProcCSQ0)

Your Choice (weight: 0) --Continue

- What would be the potential consequences (injuries and/or property loss) if a failure were to occur because of this problem? (IOP-ProcCSQ1)

Your Choice (weight: 0.5) --High likelihood of serious injury and/or property loss.

- **Operator Qualification Revocation (IOP-Qual) (Kastanasburg Utilities - Entire system)**

- Interview Start (IOP-Qual)

Your Choice (weight: 0) --Continue

- Is the number of "for cause" OQ revocations per 100 employee increasing? (IOP-Proc101)

Your Choice (weight: 1) --

Table 11.45. End of Year

	For Cause OQ Revocations	Total Employees	OQ/100 Empl

In 2004	0	0	0.000
In 2005	0	15	0.000
In 2006	2	15	13.333
In 2007	0	16	0.000
In 2008	2	16	12.500
In 2009	3	16	18.750
In 2010	0	0	0.000

- SHRIMP has determined that leaks, failures or damages are increasing. **(see guidance)**.
Do you accept this determination? (IOP-Proc102iok)
Your Choice (weight: 0) --Accept
- Have these increasing failures been corrected? (IOP-Proc102i)
Your Choice (weight: 2) --No
- Are failures limited to certain employees and/or departments and/or tasks? (IOP-Proc103)
Your Choice (weight: 0) --Yes
- Do you want to section your failures by certain employees and/or departments and/or tasks? (IOP-Proc111)
Your Choice (weight: 0) --Yes
- Enter employees or departments or tasks of specific failures. (IOP-Proc112)
Your Choice (weight: 0) --

Table 11.46. Employee

Department

Task

	OQ Revocations	Description
Michael Thompson	1	The dipstick can't figure out how to work a CGI
Specific_01	0	
Specific_02	0	
Specific_03	0	
Specific_04	0	
Specific_05	0	
Specific_06	0	
Specific_07	0	
Specific_08	0	
Specific_09	0	

- Provide Additional Information (IOP-Proc112b)
Your Choice (weight: 0) --
 - **Certain Employees/Depts/Tasks (IOP-Qual-1a) (Michael Thompson - The dipstick can't figure out how to work a CGI)**
 - Interview Start (IOP-Qual-1a)
Your Choice (weight: 0) --Continue
 - Have any employees or contractors had operator qualification credentials revoked due to poor performance of any covered task? (IOP-Proc100)
Your Choice (weight: 0) --Yes
 - Is the number of "for cause" OQ revocations per 100 employee increasing? (IOP-Proc101)
Your Choice (weight: 0) --

Table 11.47. End of Year

	For Cause OQ Revocations	Total Employees	OQ/100 Empl
In 2004	0	0	0.000
In 2005	0	1	0.000
In 2006	1	1	100.000
In 2007	0	1	0.000
In 2008	0	1	0.000

In 2009	1	1	100.000
In 2010	0	0	0.000

- SHRIMP has determined that leaks, failures or damages are not increasing.(see guidance).

Do you accept this determination? (IOP-Proc102dok)

Your Choice (weight: 0) --Do Not Accept

- Enter explanation (IOP-Proc102dexp)

Your Choice (weight: 0) --We didn't let Michael use a CGI in years 3 and 4, but if we had we're sure he'd have screwed it up, therefore the fact that his OQ qualifications to use a CGI weren't revoked more often is simply because we wouldn't let him perform any tasks requiring use of a CGI.

- SHRIMP has determined that leaks, failures or damages are increasing.(see guidance).

Do you accept this determination? (IOP-Proc102iok)

Your Choice (weight: 0) --Accept

- Have these increasing failures been corrected? (IOP-Proc102i)

Your Choice (weight: 0) --Yes

- Enter explanation (IOP-Proc102f)

Your Choice (weight: 0) --We promoted him to Senior Vice President where he'll never see a CGI again.

- Confirm that no other incorrect operations problems are known. (IOP-Proc204)

Your Choice (weight: 0) --Accept

Material, Weld or Joint Failure Threat

- **Material, Weld or Joint Failure (MW) (Kastanasburg Utilities - Entire system)**

- Interview Start (MW)

Your Choice (weight: 0) --Continue

- How many leak repairs resulting from material, weld or joint problems occurred by year for the last 7 years? (MW-Leak)

Your Choice (weight: 0) --

Table 11.48. Leak Repairs From PHMSA 7100.1-1

End of Year	Material, Weld or Joint Failure		Totals	
	Mains	Services	Mains	Services
In 2004	0	0	0	0
In 2005	2	0	2	0
In 2006	1	0	1	0
In 2007	0	0	0	0
In 2008	0	0	0	0
In 2009	0	0	0	0
In 2010	0	0	0	0

- Have manufacturing defects on pipe or non-pipe components been experienced? (MW101)

Your Choice (weight: 1) --Yes

- What material is defective? (MW-SegMfg)

Your Choice (weight: 0) --

Table 11.49. Geographic Area or Project Name

	Pipe or Component Item	Size	Wall Thickness or SDR	Grade	Manufacturing Process	Coating	Date Manufactured	Date Installed	Contractor / Crews	Supplier
HP Feeder Line	6" C&W Steel	6"	.188	B	Low frequency ERW	Coal Tar TG3	1962	1962	Unknown	Unknown
Specific_01										

Specific_02										
Specific_03										
Specific_04										

- Have failures due to workmanship defects been experienced? (MW102)

Your Choice (weight: 1) --Yes

- What workmanship is defective? (MW-SegWrk)

Your Choice (weight: 0) --

Table 11.50. Geographic Area or Project Name

	Pipe or Component Item	Size	Wall Thickness or SDR	Grade	Manufacturing Process	Coating	Date Manufactured	Date Installed	Contractor / Crews	Supplier
Vernon Heights subdivision	2" stl pipe	2"	.154	x42	ERW	Scotchcoat thin film	1992	1992	Mallu Contracting	Consolidated Pipe
Specific_01										
Specific_02										
Specific_03										
Specific_04										

- Do any of the following materials exist on the system? (MW103)

Your Choice (weight: 0) --

I Don't Know

- Provide Additional Information (MWSet3)

Your Choice (weight: 0) --

- **Manufacturing Defects (MW-Mfg) (HP Feeder Line - 6" C&W Steel, 6", .188, B, Low frequency ERW, Coal Tar TG3, 1962, 1962, Unknown, Unknown)**

- Interview Start (MW-Mfg)

Your Choice (weight: 0) --Continue

- How often do failures occur in this section? (MW301)

Your Choice (weight: 1) --Less than once per 5 years

- Are failures in this section/component increasing or decreasing? (MW302)

Your Choice (weight: 0) --

Table 11.51. End of Year

	Failures
In 2004	0
In 2005	0
In 2006	0
In 2007	1
In 2008	0
In 2009	0
In 2010	0

- SHRIMP has determined that leaks, failures or damages are not increasing. **(see guidance)**.

Do you accept this determination? (MW302dok)

Your Choice (weight: 0) --Accept

- Your data and choices indicate that failures due to materials, welds or joints are not increasing per year. (MW302d)

Your Choice (weight: 0) --Continue

- Do failures occur more frequently than the scheduled leak survey intervals? (MW303)

Your Choice (weight: 0) --No

- Have your current material specification requirements and construction/installation procedures been modified to address this issue? (MW304)

Your Choice (weight: 0) --Yes

- Has the pipe/component on this section been pressure tested in accordance to Part 192, subpart J? (MW305)
Your Choice (weight: 0) --No
- What is the likelihood that a leak in this section will become a Grade 1 leak? (MW306)
Your Choice (weight: 0) --Low
- Review the guidance. (MWCSQ0)
Your Choice (weight: 0) --Continue
- Are the pressure and/or diameter of this section greater than or about the same as the system as a whole? (MWCSQ1)
Your Choice (weight: 0.2) --Substantially greater
- Is this section predominantly located in business districts or outside business districts (as those are defined for leak survey)? (MWCSQ2)
Your Choice (weight: 0) --Outside Business Districts
- How long would it typically take utility crews to reach this part of the system after receiving notice of a possible failure? (MWCSQ3)
Your Choice (weight: 0.025) --Between one (1) and two (2) hours
- What would be the impact on the utility and its customers if this section were to fail? (MWCSQ4)
Your Choice (weight: 0.1) --High
- **Workmanship Defects (MW-Work) (Vernon Heights subdivision - 2" stl pipe, 2", .154, x42, ERW, Scotchcoat thin film, 1992, 1992, Mallu Contracting, Consolidated Pipe)**
 - Interview Start (MW-Work)
Your Choice (weight: 0) --Continue
 - How often do failures occur in this section? (MW301)
Your Choice (weight: 3) --More than once per year
 - Are failures in this section/component increasing or decreasing? (MW302)
Your Choice (weight: '0) --

Table 11.52. End of Year

	Failures
In 2004	0
In 2005	1
In 2006	2
In 2007	2
In 2008	1
In 2009	2
In 2010	0

- SHRIMP has determined that leaks, failures or damages are increasing.(see guidance).
Do you accept this determination? (MW302iok)
Your Choice (weight: 0) --Accept
- Your data and choices indicate that failures due to materials, welds or joints are increasing per year. (MW302i)
Your Choice (weight: 1) --Continue
- Do failures occur more frequently than the scheduled leak survey intervals? (MW303)
Your Choice (weight: 0) --Yes
- Have your current material specification requirements and construction/installation procedures been modified to address this issue? (MW304)

Your Choice (weight: 0) --No

- Has the pipe/component on this section been pressure tested in accordance to Part 192, subpart J? (MW305)

Your Choice (weight: 0) --Yes

- What is the likelihood that a leak in this section will become a Grade 1 leak? (MW306)

Your Choice (weight: 0) --Low

- Review the guidance. (MWCSQ0)

Your Choice (weight: 0) --Continue

- Are the pressure and/or diameter of this section greater than or about the same as the system as a whole? (MWCSQ1)

Your Choice (weight: 0) --About the same

- Is this section predominantly located in business districts or outside business districts (as those are defined for leak survey)? (MWCSQ2)

Your Choice (weight: 0) --Outside Business Districts

- How long would it typically take utility crews to reach this part of the system after receiving notice of a possible failure? (MWCSQ3)

Your Choice (weight: 0) --Less than one (1) hour

- What would be the impact on the utility and its customers if this section were to fail? (MWCSQ4)

Your Choice (weight: 0) --Low

Excavation Damage Threat

- **Excavation Damage (OFEXC) (Kastanasburg Utilities - Entire system)**

- Interview Start (OFEXC)

Data Source:

One call tickets from Bugtussle One Call, company exc damage database

Your Choice (weight: 0) --Continue

- Does your system participate in a qualified one-call system (see 192.614)? (OFEXC101)

Data Source:

Bugtussle one call

Your Choice (weight: 0) --Yes

- Which system do you do you use? (OFEXC102)

Your Choice (weight: 0) --Tennessee-Tennessee 811

- Are you a Master Meter Operator? (OFEXC103)

Your Choice (weight: 0) --No

- Do you physically control access to your pipeline location? (OFEXC104)

Your Choice (weight: 0) --No

- How many excavation leak repairs occurred by year for the last 7 years? (OFEXC105)

Data Source:

DOT 7100

Your Choice (weight: 0) --

Table 11.53. Leak Repairs From PHMSA 7100.1-1

End of Year	Excavation Damage		Totals	
	Mains	Services	Mains	Services
In 2004	0	0	0	0
In 2005	18	12	18	12
In 2006	27	32	27	32
In 2007	21	18	21	18
In 2008	15	20	15	20
In 2009	17	19	17	19
In 2010	17	19	17	19

- How many excavation caused damages not resulting in leaks reported on the PHMSA 7100.1-1 form have occurred during the past 7 years? (OFEXC105a)

Data Source:

company database. From 2005 to 2007 there was a sewer project that exposed lines and damaged coatings.

Your Choice (weight: 0) --

Table 11.54. End of Year

	Mains	Services
In 2004	0	0
In 2005	32	40
In 2006	41	50
In 2007	55	60
In 2008	27	30
In 2009	26	20
In 2010	0	0

- How many excavation tickets (receipt of information by the underground facility operator from the one-call system) were received by year for the last 7 years? (OFEXC106)

Data Source:

Tennessee one call. (when this screen first displayed to enter data the damages previously entered did not display)

Your Choice (weight: 0) --

Table 11.55. End of Year

	Damages Previously Entered	Excavation Tickets	Damages Per 1000 Tickets
In 2004	0	0	0
In 2005	102	1200	85
In 2006	150	1300	115
In 2007	154	1400	110
In 2008	92	1000	92
In 2009	82	1050	78
In 2010	0	0	0

- SHRIMP has determined that leaks, failures or damages are not increasing. **(see guidance)**.

Do you accept this determination? (OFEXC106bok)

Your Choice (weight: 0) --Accept

- Your data and choices indicate that excavation damages per 1000 tickets are not increasing. (OFEXC106b)

Your Choice (weight: 0) --Continue

- Provide Additional Information (OFEXC106e)

Your Choice (weight: 0) --

- Blasting Damage (OFEXC-Blast) (Kastanasburg Utilities - Entire system)**

- Interview Start (OFEXC-Blast)

Your Choice (weight: 0) --Continue

- Has damage occurred due to blasting? (OFEXC137)

Your Choice (weight: 2) --Yes

- Are there portions of the system located where excavation in the area of pipeline would require the use of explosives? (OFEXC135)

Your Choice (weight: 6) --Yes

- Are there portions of the system in known areas of blasting or demolition activity, such as rock quarries or coal mining? (OFEXC136)

Your Choice (weight: 0) --No

- Do you want to section your system for this threat based on blasting areas, geographic areas where blasting may be required or other characteristics? (OFEXC140)

Your Choice (weight: 0) --Yes

- Enter sections for assessing the threat of excavation damages caused by blasting. (OFEXC140a)

Your Choice (weight: 0) --

Table 11.56. Section

	Mains	Services	Description
Rest of system	70.000	4005	no blasting needed
Rocky Mt. Hillside	4.000	850	blasting in rock ledge
BlastArea_02	0.000	0	
BlastArea_03	0.000	0	
BlastArea_04	0.000	0	

- Provide Additional Information (OFEXC140b)

Your Choice (weight: 0) --

- **Blasting Damage (OFEXC-Blast-1a) (Rest of system - no blasting needed)**

- Interview Start (OFEXC-Blast-1a)

Your Choice (weight: 0) --Continue

- Has damage occurred due to blasting? (OFEXC137)

Your Choice (weight: 0) --No

- Are there portions of the system located where excavation in the area of pipeline would require the use of explosives? (OFEXC135)

Your Choice (weight: 0) --No

- Are there portions of the system in known areas of blasting or demolition activity, such as rock quarries or coal mining? (OFEXC136)

Your Choice (weight: 0) --No

- Confirm that no other excavation problems are known. (OFEXC204)

Your Choice (weight: 0) --Accept

- **Blasting Damage (OFEXC-Blast-1a) (Rocky Mt. Hillside - blasting in rock ledge)**

- Interview Start (OFEXC-Blast-1a)

Your Choice (weight: 0) --Continue

- Has damage occurred due to blasting? (OFEXC137)

Your Choice (weight: 0) --No

- Are there portions of the system located where excavation in the area of pipeline would require the use of explosives? (OFEXC135)

Your Choice (weight: 6) --Yes

- Are there portions of the system in known areas of blasting or demolition activity, such as rock quarries or coal mining? (OFEXC136)

Your Choice (weight: 7) --Yes

- Review the guidance. (OFEXCCSQ0)

Your Choice (weight: 0) --Continue

- Are the pressure and/or diameter of this section greater than or about the same as the system as a whole? (OFEXCCSQ1)

Your Choice (weight: 0.2) --Substantially greater

- Is this section predominantly located in business districts or outside business districts (as those are defined for leak survey)? (OFEXCCSQ2)

Your Choice (weight: 0) --Outside Business Districts

- How long would it typically take utility crews to reach this part of the system after receiving notice of a possible failure? (OFEXCCSQ3)

Your Choice (weight: 0) --Less than one (1) hour

- What would be the impact on the utility and its customers if this section were to fail? (OFEXCCSQ4)

Your Choice (weight: 0) --Low

• **Concentrated Damages (OFEXC-Conc) (Kastanasburg Utilities - Entire system)**

- Interview Start (OFEXC-Conc)

Your Choice (weight: 0) --Continue

- You previously entered this information regarding excavation damages and tickets for the last 7 years.

Click Next to proceed. (OFEXC206)

Your Choice (weight: 0) --

Table 11.57. End of Year

	Damages Previously Entered	Excavation Tickets Previously Entered	Damages Per 1000 Tickets
In 2004	0	0	0
In 2005	102	1200	85
In 2006	150	1300	115
In 2007	154	1400	110
In 2008	92	1000	92
In 2009	82	1050	78
In 2010	0	0	0

- Are these excavation damages concentrated in certain locations or distributed across the entire system? (OFEXC207)

Your Choice (weight: 0) --Concentrated in certain locations

- Do you want to section your system for this threat based on a concentration of these damages? (OFEXC207a)

Your Choice (weight: 0) --No

- Are these locate tickets concentrated in certain locations or distributed across the entire system? (OFEXC208)

Your Choice (weight: 0) --Distributed across the entire system

- Confirm that no other excavation problems are known. (OFEXC204)

Your Choice (weight: 0) --Accept

• **Crew or Contractor Damages (OFEXC-Crew) (Kastanasburg Utilities - Entire system)**

- Interview Start (OFEXC-Crew)

Your Choice (weight: 0) --Continue

- Has excavation damage been caused by your crews or your contractors? (OFEXC115)

Your Choice (weight: 0) --Yes

- How many excavation damages were caused by the your crews and/or your contractors on the system over the last 7 years? (OFEXC116)

Data Source:

company damage database

Your Choice (weight: 0) --

Table 11.58. End of Year

	Damages Caused By Your Crews	Damages Caused By Your Contractors
In 2004	0	0
In 2005	3	4
In 2006	3	3
In 2007	1	4
In 2008	1	5
In 2009	1	2
In 2010	0	0

- Are excavation damages caused by your crews evenly distributed or concentrated in a few operator crews? (OFEXC118)

Your Choice (weight: 0) --Concentrated

- Are excavation damages being caused by your crews or your contractors not following one call laws? (OFEXC122)

Your Choice (weight: 10) --Yes

- Have any excavation damages caused by your crews or contractors due to mis-located lines been caused by poorly performing locating equipment? (OFEXC123)

Your Choice (weight: 2) --Yes

- Are excavation damages caused by your crews or contractors due to unmarked or inaccurately marked facilities? (Do not include excavation damages caused by poorly performing locating equipment.) (OFEXC124)

Your Choice (weight: 0) --No

- Are excavation damages caused by failure to protect pipe during backfill operations? (OFEXC125)

Your Choice (weight: 5) --

Cast Iron

- Have excavation damages caused by your crews or contractors occurred due to failure to follow company procedures/safety practices? (Do not include excavation damages caused by failure to follow one-call laws.) (OFEXC126)

Your Choice (weight: 3) --Yes

- Do you want to section your system for this threat based on damages by specific company and/or contractors crews? (OFEXC120)

Your Choice (weight: 0) --Yes

- Enter sections for assessing the threat of crew or contractor excavation damages. (OFEXC120a)

Your Choice (weight: 0) --

Table 11.59. Crew Name

	Company or Contractor	Description
The Bull Diggers	Lunar excavating	crew not hand digging
Company crew 1	Kastanasburg Utilities	Backfill crew
The Diggin' Ditchmen	Never miss excavating	Mislocates
Crew_03		
Crew_04		
Crew_05		

- Provide Additional Information (OFEXC120c)

Your Choice (weight: 0) --

- **Crew or Contractor Damages (OFEXC-Crew-1a) (The Bull Diggers - crew not hand digging (Lunar excavating))**

- Interview Start (OFEXC-Crew-1a)

Your Choice (weight: 0) --Continue

- Are excavation damages being caused by your crews or your contractors not following one call laws? (OFEXC122)

Your Choice (weight: 0) --No

- Have any excavation damages caused by your crews or contractors due to mis-located lines been caused by poorly performing locating equipment? (OFEXC123)

Your Choice (weight: 0) --No

- Are excavation damages caused by your crews or contractors due to unmarked or inaccurately marked facilities? (Do not include excavation damages caused by poorly performing locating equipment.) (OFEXC124)

Your Choice (weight: 0) --No

- Are excavation damages caused by failure to protect pipe during backfill operations? (OFEXC125)

Your Choice (weight: 0) --

No Damages

- Have excavation damages caused by your crews or contractors occurred due to failure to follow company procedures/safety practices? (Do not include excavation damages caused by failure to follow one-call laws.) (OFEXC126)

Your Choice (weight: 0) --No

- Review the guidance. (OFEXCCSQ0)

Your Choice (weight: 0) --Continue

- Have the (crews/contractors/excavators) identified for this section caused damage that resulted in a reportable incident? (OFEXCCSQ1)

Data Source:

consequence should not be asked for the crews

Your Choice (weight: 0.3) --Yes

- Considering disruption of service and cost to return the system to service, how serious are the damages caused by the (crews/contractors/excavators) identified for this section when compared to all other excavation caused damages? (OFEXCCSQ2)

Your Choice (weight: 0) --Less serious

- Confirm that no other excavation problems are known. (OFEXC204a)

Your Choice (weight: 0) --Accept

- **Crew or Contractor Damages (OFEXC-Crew-1a) (Company crew 1 - Backfill crew (Kastanasburg Utilities))**

- Interview Start (OFEXC-Crew-1a)

Your Choice (weight: 0) --Continue

- Are excavation damages being caused by your crews or your contractors not following one call laws? (OFEXC122)

Your Choice (weight: 0) --No

- Have any excavation damages caused by your crews or contractors due to mis-located lines been caused by poorly performing locating equipment? (OFEXC123)

Your Choice (weight: 0) --No

- Are excavation damages caused by your crews or contractors due to unmarked or inaccurately marked facilities? (Do not include excavation damages caused by poorly performing locating equipment.) (OFEXC124)

Your Choice (weight: 0) --No

- Are excavation damages caused by failure to protect pipe during backfill operations? (OFEXC125)

Your Choice (weight: 5) --

Cast Iron

- Have excavation damages caused by your crews or contractors occurred due to failure to follow company procedures/safety practices? (Do not include excavation damages caused by failure to follow one-call laws.) (OFEXC126)

Your Choice (weight: 3) --Yes

- Review the guidance. (OFEXCCSQ0)

Your Choice (weight: 0) --Continue

- Have the (crews/contractors/excavators) identified for this section caused damage that resulted in a reportable incident? (OFEXCCSQ1)

Your Choice (weight: 0) --No

- Considering disruption of service and cost to return the system to service, how serious are the damages caused by the (crews/contractors/excavators) identified for this section when compared to all other excavation caused damages? (OFEXCCSQ2)

Your Choice (weight: 0) --Less serious

- **Crew or Contractor Damages (OFEXC-Crew-1a) (The Diggin' Ditchmen - Mislocates (Never miss excavating))**

- Interview Start (OFEXC-Crew-1a)

Your Choice (weight: 0) --Continue

- Are excavation damages being caused by your crews or your contractors not following one call laws? (OFEXC122)

Your Choice (weight: 0) --No

- Have any excavation damages caused by your crews or contractors due to mis-located lines been caused by poorly performing locating equipment? (OFEXC123)

Your Choice (weight: 0) --No

- Are excavation damages caused by your crews or contractors due to unmarked or inaccurately marked facilities? (Do not include excavation damages caused by poorly performing locating equipment.) (OFEXC124)

Data Source:

Locator followed water lines instead of gas lines

Your Choice (weight: 10) --Yes

- Are excavation damages caused by failure to protect pipe during backfill operations? (OFEXC125)

Your Choice (weight: 0) --

No Damages

- Have excavation damages caused by your crews or contractors occurred due to failure to follow company procedures/safety practices? (Do not include excavation damages caused by failure to follow one-call laws.) (OFEXC126)

Your Choice (weight: 0) --No

- Review the guidance. (OFEXCCSQ0)

Your Choice (weight: 0) --Continue

- Have the (crews/contractors/excavators) identified for this section caused damage that resulted in a reportable incident? (OFEXCCSQ1)

Data Source:

these consequence questions not applicable to crews

Your Choice (weight: 0) --No

- Considering disruption of service and cost to return the system to service, how serious are the damages caused by the (crews/contractors/excavators) identified for this section when compared to all other excavation caused damages? (OFEXCCSQ2)

Your Choice (weight: 0.2) --More serious

- **Third Party Damages (OFEXC-Third) (Kastanasburg Utilities - Entire system)**

- Interview Start (OFEXC-Third)

Your Choice (weight: 0) --Continue

- During the past few years, have excavation damages occurred due to third parties? (OFEXC127)

Data Source:

discussion with Underground Maintenance Supervisors

Your Choice (weight: 0) --Yes

- How many excavation damages were caused by third parties over the last 7 years? (OFEXC128)

Your Choice (weight: 0) --

Table 11.60. End of Year

	Third Party Damages
In 2004	0
In 2005	100
In 2006	146
In 2007	152
In 2008	91
In 2009	81
In 2010	0

- SHRIMP has determined that leaks, failures or damages are not increasing.(see guidance).

Do you accept this determination? (OFEXC128bok)

Your Choice (weight: 0) --Accept

- Your data and choices indicate that excavation damages due to third parties are not increasing. (OFEXC128b)

Your Choice (weight: 0) --Continue

- Are excavation damages being caused by third-party excavators not following one call laws? (OFEXC131)

Your Choice (weight: 10) --Yes

- Have any excavation damages caused by third-party excavators due to mis-located lines been caused by poorly performing locating equipment? (OFEXC132)

Your Choice (weight: 2) --Yes

- Are excavation damages caused by third-party excavators due to unmarked or inaccurately marked facilities? (Do not include excavation damages caused by poorly performing locating equipment.) (OFEXC133)

Your Choice (weight: 10) --Yes

- Are excavation damages caused by failure to protect pipe during backfill operations? (OFEXC134)

Your Choice (weight: 5) --

Cast Iron

- Are there specific third parties that cause a greater number of damages compared to other third parties? (OFEXC129)

Your Choice (weight: 0) --Yes

- Do you want to section your system for this threat based on damages by specific third parties? (OFEXC130)

Your Choice (weight: 0) --Yes

- Enter sections for assessing the threat of third party excavation damages. (OFEXC130a)

Your Choice (weight: 0) --

Table 11.61. Third Party

Name	Description
Wild Bill Excavating	General contractor hired by the city
All other excavators	Everybody else that digs near our system
Third_Party_02	
Third_Party_03	
Third_Party_04	
Third_Party_05	

- Provide Additional Information (OFEXC130c)

Your Choice (weight: 0) --

- **Third Party Damages (OFEXC-Third-1a) (Wild Bill Excavating - General contractor hired by the city)**

- Interview Start (OFEXC-Third-1a)

Your Choice (weight: 0) --Continue

- Are excavation damages being caused by third-party excavators not following one call laws? (OFEXC131)

Data Source:

Underground Maintenance supervisor reports crews dig with backhoes within the "hand dig" zone and hit marked service lines when trenching for cable TV.

Your Choice (weight: 10) --Yes

- Have any excavation damages caused by third-party excavators due to mis-located lines been caused by poorly performing locating equipment? (OFEXC132)

Your Choice (weight: 0) --No

- Are excavation damages caused by third-party excavators due to unmarked or inaccurately marked facilities? (Do not include excavation damages caused by poorly performing locating equipment.) (OFEXC133)

Your Choice (weight: 0) --No

- Are excavation damages caused by failure to protect pipe during backfill operations? (OFEXC134)

Your Choice (weight: 5) --

Cast Iron

- Review the guidance. (OFEXCCSQ0)

Data Source:

the current consequence questions do not apply to crews.

Your Choice (weight: 0) --Continue

- Have the (crews/contractors/excavators) identified for this section caused damage that resulted in a reportable incident? (OFEXCCSQ1)

Your Choice (weight: 0.3) --Yes

- Considering disruption of service and cost to return the system to service, how serious are the damages caused by the (crews/contractors/excavators) identified for this section when compared to all other excavation caused damages? (OFEXCCSQ2)

Your Choice (weight: 0.2) --More serious

- **Third Party Damages (OFEXC-Third-1a) (All other excavators - Everybody else that digs near our system)**

- Interview Start (OFEXC-Third-1a)

Your Choice (weight: 0) --Continue

- Are excavation damages being caused by third-party excavators not following one call laws? (OFEXC131)
Data Source:
Information from Underground Maintenance supervisor and maintenance/repair/replace reports
Your Choice (weight: 10) --Yes
- Have any excavation damages caused by third-party excavators due to mis-located lines been caused by poorly performing locating equipment? (OFEXC132)
Your Choice (weight: 0) --No
- Are excavation damages caused by third-party excavators due to unmarked or inaccurately marked facilities? (Do not include excavation damages caused by poorly performing locating equipment.) (OFEXC133)
Your Choice (weight: 0) --No
- Are excavation damages caused by failure to protect pipe during backfill operations? (OFEXC134)
Your Choice (weight: 0) --
No Damages
- Review the guidance. (OFEXCCSQ0)
Your Choice (weight: 0) --Continue
- Have the (crews/contractors/excavators) identified for this section caused damage that resulted in a reportable incident? (OFEXCCSQ1)
Your Choice (weight: 0) --No
- Considering disruption of service and cost to return the system to service, how serious are the damages caused by the (crews/contractors/excavators) identified for this section when compared to all other excavation caused damages? (OFEXCCSQ2)
Your Choice (weight: 0) --Less serious

Natural Forces Threat

- **Natural Forces (OFNF) (Kastanasburg Utilities - Entire system)**

- Interview Start (OFNF)

Data Source:

We have seismic data on our pipelines from Bull Quake Co.

Your Choice (weight: 0) --Continue

- Do leaks repaired per year average one (1) or more? (OFNF101rp)

Your Choice (weight: 0) --

Table 11.62. Leak Repairs From PHMSA 7100.1-1

End of Year	Natural Forces		Totals	
	Mains	Services	Mains	Services
In 2004	0	0	0	0
In 2005	0	1	0	1
In 2006	1	0	1	0
In 2007	2	0	2	0
In 2008	1	0	1	0
In 2009	2	0	2	0
In 2010	2	0	2	0

- How many natural forces damages not resulting in leaks reported on the PHMSA 7100.1-1 form have occurred during the past 7 years? (OFNF101nr)

Your Choice (weight: 0) --

Table 11.63. End of Year

	Mains	Services
In 2004	1	0
In 2005	0	0
In 2006	0	0
In 2007	0	0
In 2008	1	0
In 2009	0	0
In 2010	0	0

- Here is a summary of your natural forces damages for the last 7 years.

Click Next to Continue. (OFNF101)

Data Source:

From Patrolling records and leak repair records maintained by the Gas Utility Supervisor at HQ

Your Choice (weight: 0) --

Table 11.64. End of Year

	Leak Repairs	Damages Not Reported	Total
In 2004	0	1	1
In 2005	1	0	1
In 2006	1	0	1
In 2007	2	0	2
In 2008	1	1	2
In 2009	2	0	2
In 2010	2	0	2

- SHRIMP has determined that leaks, failures or damages are averaging one (1) or more per year.(see guidance).

Do you accept this determination? (OFNF101aok)

Your Choice (weight: 0) --Accept

- Your data and choices indicate that leaks, failures or damages are averaging one (1) or more per year. (OFNF101a)

Your Choice (weight: 2) --Continue

- Are portions of the system/section in areas prone to land subsidence, earthquakes or washouts? (OFNF102)

Your Choice (weight: 5) --Yes

- Does the system/section contain Cast Iron pipe 8" or less in diameter? (OFNF301)

Your Choice (weight: 5) --I Don't Know

- Have damages occurred on cast iron due to ground movement, frost heave, earth subsidence? (OFNF302)

Your Choice (weight: 0) --No

- Have natural forces caused leaks, failures or damages to steel or plastic pipeline in the system/section? (OFNF303)

Data Source:

From leak repair records maintained by the Gas Utility Supervisor

Your Choice (weight: 3) --Yes

- Are the natural force leaks, failures or damages system-wide or concentrated in local areas? (OFNF103)

Your Choice (weight: 0) --Concentrated

- Do you want to sub-section areas by concentrated damage repairs from the remainder of the section? (OFNF104)

Your Choice (weight: 0) --Yes

- Enter sections of concentrated damage repairs. (OFNF105)

Your Choice (weight: 0) --

Table 11.65. Section

	Mains	Services	Description
Remainder of system	81.250	4855	rest of system

North river crossing	0.250	0	North river crossing
South river crossing	0.500	0	South river crossing
Conclnc_03	0.000	0	0
Conclnc_04	0.000	0	

- Provide Additional Information (OFNF105a)

Your Choice (weight: 0) --

- **Concentrated Area (OFNF-1a) (Remainder of system - rest of system)**

- Interview Start (OFNF-1a)

Your Choice (weight: 0) --Continue

- Do damages repaired per year average one (1) or more? (OFNF101)

Your Choice (weight: 0) --

Table 11.66. End of Year

	Damages Repaired
In 2004	0
In 2005	0
In 2006	0
In 2007	0
In 2008	0
In 2009	0
In 2010	0

- SHRIMP has determined that leaks, failures or damages are not averaging one (1) or more per year.(see guidance).

Do you accept this determination? (OFNF101bok)

Your Choice (weight: 0) --Accept

- Your data and choices indicate that leaks, failures or damages are not averaging one (1) or more per year. (OFNF101b)

Your Choice (weight: 0) --Continue

- Confirm that no natural force problems are known. (OFNF204)

Your Choice (weight: 0) --Accept

- **Concentrated Area (OFNF-1a) (North river crossing - North river crossing)**

- Interview Start (OFNF-1a)

Your Choice (weight: 0) --Continue

- Do damages repaired per year average one (1) or more? (OFNF101)

Your Choice (weight: 0) --

Table 11.67. End of Year

	Damages Repaired
In 2004	0
In 2005	0
In 2006	0
In 2007	1
In 2008	0
In 2009	2
In 2010	0

- SHRIMP has determined that leaks, failures or damages are not averaging one (1) or more per year.(see guidance).

Do you accept this determination? (OFNF101bok)

Your Choice (weight: 0) --Accept

- Your data and choices indicate that leaks, failures or damages are not averaging one (1) or more per year. (OFNF101b)

Your Choice (weight: 0) --Continue

- Confirm that no natural force problems are known. (OFNF204)

Your Choice (weight: 0) --Do Not Accept

- Enter explanation (OFNF205)
Data Source:
 Patrolling records maintained by the Gas Utility Supervisor
 Your Choice (weight: 0) --We have experienced washouts after heavy rains at the North river crossing
- Are portions of the system/section in areas prone to land subsidence, earthquakes or washouts? (OFNF102)
 Your Choice (weight: 5) --Yes
- Does the system/section contain Cast Iron pipe 8" or less in diameter? (OFNF301)
 Your Choice (weight: 0) --No
- Have damages occurred on cast iron due to ground movement, frost heave, earth subsidence? (OFNF302)
 Your Choice (weight: 0) --No
- Have natural forces caused leaks, failures or damages to steel or plastic pipeline in the system/section? (OFNF303)
 Your Choice (weight: 0) --No
- Review the guidance. (OFNFCSQ0)
 Your Choice (weight: 0) --Continue
- Are the pressure and/or diameter of this section greater than or about the same as the system as a whole? (OFNFCSQ1)
Data Source:
 This is one of our two high pressure feeder mains
 Your Choice (weight: 0.2) --Substantially greater
- Is this section predominantly located in business districts or outside business districts (as those are defined for leak survey)? (OFNFCSQ2)
 Your Choice (weight: 0) --Outside Business Districts
- How long would it typically take utility crews to reach this part of the system after receiving notice of a possible failure? (OFNFCSQ3)
 Your Choice (weight: 0) --Less than one (1) hour
- What would be the impact on the utility and its customers if this section were to fail? (OFNFCSQ4)
Data Source:
 We would lose ~ half our customers were this to fail during a peak demand period.
 Your Choice (weight: 0.1) --High
- **Concentrated Area (OFNF-1a) (South river crossing - South river crossing)**
 - Interview Start (OFNF-1a)
 Your Choice (weight: 0) --Continue
 - Do damages repaired per year average one (1) or more? (OFNF101)
 Your Choice (weight: 0) --

Table 11.68. End of Year

	Damages Repaired
In 2004	0
In 2005	0
In 2006	0
In 2007	0
In 2008	1
In 2009	0
In 2010	0

- SHRIMP has determined that leaks, failures or damages are not averaging one (1) or more per year.(see guidance).

Do you accept this determination? (OFNF101bok)

Your Choice (weight: 0) --Accept

- Your data and choices indicate that leaks, failures or damages are not averaging one (1) or more per year. (OFNF101b)

Your Choice (weight: 0) --Continue

- Confirm that no natural force problems are known. (OFNF204)

Data Source:

This river crossing was installed by boring and is too deep to be affected by washouts

Your Choice (weight: 0) --Accept

Other Outside Forces Threat

- **Other Outside Forces (OFOTHR) (Kastanasburg Utilities - Entire system)**

- Interview Start (OFOTHR)

Your Choice (weight: 0) --Continue

- Do leaks repaired per year average one (1) or more? (OFOTHR101rp)

Your Choice (weight: 0) --

Table 11.69. Leak Repairs From PHMSA 7100.1-1

End of Year	Other Outside Forces		Totals	
	Mains	Services	Mains	Services
In 2004	0	0	0	0
In 2005	0	5	0	5
In 2006	0	5	0	5
In 2007	0	5	0	5
In 2008	0	1	0	1
In 2009	0	1	0	1
In 2010	0	1	0	1

- How many other outside forces damages not resulting in leaks reported on the PHMSA 7100.1-1 form have occurred during the past 7 years? (OFOTHR101nr)

Your Choice (weight: 0) --

Table 11.70. End of Year

	Mains	Services
In 2004	0	0
In 2005	0	0
In 2006	0	0
In 2007	0	0
In 2008	0	0
In 2009	0	0
In 2010	0	0

- Here is a summary of your other outside forces damages for the last 7 years.

Click Next to Continue. (OFOTHR101)

Your Choice (weight: 0) --

Table 11.71. End of Year

	Leak Repairs	Damages Not Reported	Total
In 2004	0	0	0
In 2005	5	0	5
In 2006	5	0	5
In 2007	5	0	5
In 2008	1	0	1
In 2009	1	0	1
In 2010	0	0	0

- SHRIMP has determined that leaks, failures or damages are averaging one (1) or more per year.(see guidance).
Do you accept this determination? (OFOTHR101aok)
Your Choice (weight: 0) --Accept
- Your data and choices indicate that leaks, failures or damages are averaging one (1) or more per year. (OFOTHR101a)
Your Choice (weight: 0) --Continue
- Are above ground facilities being hit by vehicles? (OFOTHR301)
Your Choice (weight: 5) --Yes
- Have below ground facilities been damaged due to heavy vehicles driving along or over the facility location? (OFOTHR302)
Your Choice (weight: 4) --Yes
- Has damage been caused by malicious actions (vandalism) of unauthorized individuals or unauthorized alteration of system? (OFOTHR303)
Your Choice (weight: 3) --Yes
- Are the other outside force leaks, failures or damages system-wide or concentrated in local areas? (OFOTHR103)
Your Choice (weight: 0) --Concentrated
- Do you want to sub-section areas by concentrated damage repairs from the remainder of the section? (OFOTHR104)
Your Choice (weight: 0) --Yes
- Enter sections of concentrated damage repairs. (OFOTHR105)
Your Choice (weight: 0) --

Table 11.72. Section

	Mains	Services	Description
Rest of system	64.000	4530	rest of system
Downtown old system	10.000	325	Streets and alleys downtown
Conclnc_02	0.000	0	
Conclnc_03	0.000	0	
Conclnc_04	0.000	0	

- Provide Additional Information (OFOTHR105a)
Your Choice (weight: 0) --
 - **Other Outside Forces (OFOTHR-1a) (Rest of system - rest of system)**

- Interview Start (OFOTHR-1a)
Your Choice (weight: 0) --Continue
- Do damages repaired per year average one (1) or more? (OFOTHR101)
Your Choice (weight: 0) --

Table 11.73. End of Year

	Damages Repaired
In 2004	0
In 2005	0
In 2006	0
In 2007	0
In 2008	0
In 2009	0
In 2010	0

- SHRIMP has determined that leaks, failures or damages are not averaging one (1) or more per year.(see guidance).
Do you accept this determination? (OFOTHR101bok)
Your Choice (weight: 0) --Accept
- Your data and choices indicate that leaks, failures or damages are not averaging one (1) or more per year. (OFOTHR101b)

Your Choice (weight: 0) --Continue

- Confirm that no other outside force problems are known. (OFOTHR204)

Your Choice (weight: 0) --Accept

- **Other Outside Forces (OFOTHR-1a) (Downtown old system - Streets and alleys downtown)**

- Interview Start (OFOTHR-1a)

Your Choice (weight: 0) --Continue

- Do damages repaired per year average one (1) or more? (OFOTHR101)

Your Choice (weight: 0) --

Table 11.74. End of Year

	Damages Repaired
In 2004	0
In 2005	5
In 2006	5
In 2007	5
In 2008	5
In 2009	7
In 2010	0

- SHRIMP has determined that leaks, failures or damages are averaging one (1) or more per year.(see guidance).

Do you accept this determination? (OFOTHR101aok)

Your Choice (weight: 0) --Accept

- Your data and choices indicate that leaks, failures or damages are averaging one (1) or more per year. (OFOTHR101a)

Your Choice (weight: 0) --Continue

- Are above ground facilities being hit by vehicles? (OFOTHR301)

Your Choice (weight: 5) --Yes

- Have below ground facilities been damaged due to heavy vehicles driving along or over the facility location? (OFOTHR302)

Your Choice (weight: 0) --No

- Has damage been caused by malicious actions (vandalism) of unauthorized individuals or unauthorized alteration of system? (OFOTHR303)

Your Choice (weight: 3) --Yes

- Review the guidance. (OFOTHRCSQ0)

Your Choice (weight: 0) --Continue

- Are the pressure and/or diameter of this section greater than or about the same as the system as a whole? (OFOTHRCSQ1)

Your Choice (weight: 0.2) --Substantially greater

- Is this section predominantly located in business districts or outside business districts (as those are defined for leak survey)? (OFOTHRCSQ2)

Your Choice (weight: 0.15) --Within Business Districts

- How long would it typically take utility crews to reach this part of the system after receiving notice of a possible failure? (OFOTHRCSQ3)

Your Choice (weight: 0) --Less than one (1) hour

- What would be the impact on the utility and its customers if this section were to fail? (OFOTHRCSQ4)

Your Choice (weight: 0) --Low

Other Threats Threat

- **Other Threats (OTHR) (Kastanasburg Utilities - Entire system)**

- Interview Start (OTHR)

Your Choice (weight: 0) --Continue

- Has this system experienced failures or other safety problems due to causes that were not addressed during the evaluation of the other threats? (OTHR101)

Your Choice (weight: 0) --Yes

- Enter, on a separate line below, a name for each Other Threat that you are experiencing and a brief description of the problem. (OTHR102a)

Your Choice (weight: 0) --

Table 11.75. Section

	Description
Moles	Moles eat our plastic pipe
Space aliens	Space aliens parking UFOs on our gate station
Other_02	
Other_03	
Other_04	

- Provide Additional Information (OTHR102c)

Your Choice (weight: 0) --

- **Other (OTHR-1a) (Moles - Moles eat our plastic pipe)**

- Interview Start (OTHR-1a)

Your Choice (weight: 0) --Continue

- Please describe the failures or problems. (OTHR110)

Your Choice (weight: 0) --Moles chew through our plastic pipe -- they think it tastes good!

- Please describe any action you have taken (or plan to take) to address the failure previously entered. (OTHR111)

Your Choice (weight: 0) --We play "Whack-a-mole" with them.

- Review the guidance. (OTHRCSQ0)

Your Choice (weight: 0) --Continue

- **Other (OTHR-1a) (Space aliens - Space aliens parking UFOs on our gate station)**

- Interview Start (OTHR-1a)

Your Choice (weight: 0) --Continue

- Please describe the failures or problems. (OTHR110)

Your Choice (weight: 0) --Space aliens land at our gate stations and damage the piping with their landing gear.

- Please describe any action you have taken (or plan to take) to address the failure previously entered. (OTHR111)

Your Choice (weight: 0) --We put up "No UFOs allowed" signs at all our gate stations.

- Review the guidance. (OTHRCSQ0)

Your Choice (weight: 0) --Continue

11.3.1. Process Description

Procedures for developing and implementing DIMP elements using SHRIMP

Creating a written DIMP Plan using SHRIMP should follow the steps shown in the SHRIMP process diagram. Each step should be completed before moving on to the next step.

Figure 11.1. SHRIMP Process Diagram



1. Enter/confirm system information

If your system filed a Distribution Annual Report (Form 7100.1-1) you should find your system data already entered into SHRIMP. Note, this may not be the most current data – at the time SHRIMP was created only the annual reports for 2009 were available. This information is shown only to allow you to confirm that this is your system – it is not used for any other purpose in SHRIMP.

If your annual report data is not already entered in SHRIMP, e.g. you are a master meter or LP piping system operator that is not required to file annual reports, or your annual report is missing from PHMSA's database, you must enter the data manually.

2. Select settings

The next step is to enter settings for your plan. These include:

- The name of your system as you want it to appear in the plan,
- A description of what part of your system this plan covers (default is entire system),
- The effective date of the plan (for your first plan this should be no later than August 2, 2011 as required by the DIMP rule),
- The effective date of the DIMP Plan replaced by this Plan – SHRIMP automatically generates this,
- The History Period – this is how many years back you will enter inspection and maintenance data such as leak repairs, line locate tickets, etc. in the threat interviews. The default and minimum is 5 years and but you can change this to up to 10 years if you have the data. More years data = better DIMP plans.
- A LEAK management policy – Either select one of the two pre-written options in SHRIMP or if you already have a leak management plan that meets the rule's requirements enter a cross reference to that policy, and
- A program re-evaluation period, anywhere from 1 to 5 years.

You can go back and change these at any time by clicking on the Required Settings link in the menu bar on the left side of SHRIMP screens

3. Complete threat interviews

SHRIMP uses an interview process to assess each of the eight threats required by the DIMP rule. The 8 threats are:

1. Corrosion
2. Equipment Malfunction
3. Incorrect Operations
4. Material, Weld or Joint Failure
5. Excavation Damage
6. Natural forces

7. Other outside forces

8. Other Threats

Some of the threats are broken down into two or more subthreats. You must complete each threat and subthreat interview before going to Steps 4 and beyond. You can go back and change any of the information you provide in the threat interviews by clicking on the System Overview link on the menu then clicking on the blue "Review" link next to the threat interview in which you wish to make changes. Select the blue question number link by the question and the interview form will open. Make changes, but you may have to re-complete all of the interview questions after that question if your change affects answers to later questions. This is described in more detail later in this users guide.

Note

You can complete the first seven threat interviews in any order, however you MUST complete the first seven interviews before attempting to complete the "Other Threats" interview. The answers you provide in the Other Threats interview depend on the answers you provided in the other 7 threat interviews.

The threat interviews are intended to satisfy the following two requirements of the DIMP rule: Section 192.1007 (a) Knowledge and (b) Identify Threats. These requirements and the procedure followed by SHRIMP are further described in an attachment to this document.

4. Validate Risk Rankings

After all 8 threat interviews have been completed SHRIMP will rank each threat and section by relative risk, from highest to lowest, based on a numerical model that considers the likelihood and consequences were a segment of your system to fail due to the threat. A complete description of this risk ranking model is found in an appendix to this user's guide and an attachment to your written DIMP Plan created by SHRIMP.

Click on Risk Ranking in the left menu to open the risk ranking screen. If you entered any threats in the "Other Threats" interview those threats will be listed first with no assigned rank. These threats MUST be manually placed by the user where the user feels these threats belong in the list of threats. The process for that is described in further detail in the risk ranking section of the user's guide. You should not automatically accept SHRIMP's order of risk ranking. Review it, consider the summary description of why SHRIMP ranked each threat and, if you disagree with the order, rearrange the order of threats as you believe it should be, and be sure to enter a description of what factors you considered that led you to change the order. **This is a very important step!**

The risk ranking validation process is intended to satisfy the following requirement of the DIMP rule: Section 192.1007 (c) Evaluate and rank risk.

5. Select Additional Actions*

After you are satisfied that all threat-sections are ranked in the correct order, the next step is to select additional actions you will undertake to reduce those threats. Additional actions means actions above and beyond what is required by pipeline safety regulations. Other than implementing a leak management program, the DIMP rule does not presume that any further additional actions are necessary. You must decide whether any of the threats pose a level of risk that warrants additional action. SHRIMP cannot make that determination. There is additional guidance on selecting additional actions in the additional actions section of this user's guide.

SHRIMP offers at least one additional action for each threat. Click on the blue Choose AAs link in the Risk Ranking screen to display a list of possible additional actions for that threat. If you decide additional actions are warranted you can select one or more of SHRIMP's additional actions or you can create your own by clicking on the Manage AAs link in the left-side menu in SHRIMP.

This step is intended to satisfy the following requirement of the DIMP rule: Section 192.1007 (d) Identify and implement measures to address risks.

6. Select Performance Measures

The next step is to select performance measures for each of the additional actions you selected in Step 5. If you didn't feel any threats warranted additional actions you can skip this step.

The process of selecting performance measures is identical to selecting additional actions in the prior step. Click on the Choose PMs link then select one or more of the displayed, threat-specific performance measures. You can create your own performance measures by clicking on Manage PMs in the left-side menu.

This step is intended to satisfy the following requirement of the DIMP rule: Section 192.1007 (e) Measure performance, monitor results and evaluate effectiveness.

7. Create Implementation Plan

Now you are ready to review the actions required to implement your written DIMP plan. All of the actions required by the rule or selected by you in the additional actions and performance measures steps can be displayed by clicking on "Implementation Plan" in the left-side menu. The Implementation Plan should answer the questions of Who, What, When, Where and How each required action will be accomplished. Action items in your written DIMP Plan can be summarized in the following areas:

1. Describing how you will modify your procedures, policies and recordkeeping system(s) as necessary to collect and retain information required to be collected and retained under the DIMP plan, including mandatory performance measures and performance measures you selected in the previous step, and
2. Describing how you will implement any Additional/Accelerated Actions that you included in your written DIMP plan.

Each action item will be listed separately with a text box in which you must enter a description of how you will accomplish this action.

8. Download your written DIMP Plan

When you are satisfied that Steps 1-7 are complete you should download your written DIMP plan to your computer. Click on Written Plan in the left-side menu and a list of download options will be displayed.

Review the Required Settings one more time to ensure your system name appears as you want it to appear in your Plan and that the other information is correct.

Click on Web Page Format to display the written plan on your web browser. You can do this at any time during the process of creating your plan to see how selections you have made up to that point affect what is written into your plan. It is recommended that you look at the Plan in the Web Page Format frequently as you work on Steps 1-7 to see how data you enter appears in your Plan - it may affect how you write some text that will go into your Plan.

You may save your plan to your computer as a Web Page using the Save command on your web browser.

Click on Microsoft WORD Document to download your plan as a WORD file that you can edit using Microsoft WORD or other word processing software. (Note that the translator that creates this file may lose some formatting of the Table of Contents and other portions of the Plan. We apologize for any inconvenience this may cause you. We are evaluating other options for creating WORD files.)

Click on Adobe PDF Format to download you written Plan as an Adobe PDF file.

SHRIMP Procedures Compared To DIMP Rule Requirements

This section describes the procedures to be followed to develop and implement the 7 required elements of the Distribution Integrity Management Programs (DIMP) written Plan. For each required element the text of the DIMP rule is provided, followed by a description of the procedure to develop and implement that element.

a. Knowledge

The Rule: 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.

The Procedure: (Numbers in parenthesis refer to the requirements shown above)

(1 & 2) During the 8 threat assessments SHRIMP asks questions about the user's system design, operations and environmental factors necessary to assess the applicable threats and risks to distribution pipeline integrity. The user should refer to current and past design, construction, operation, inspection and maintenance records, as well as the knowledge of utility personnel to accurately answer questions posed by SHRIMP. SHRIMP includes a Data Source field with each question for the user to record the source of information used to answer each question. Information entered into this field will be included in an attachment to the written DIMP plan along with a complete list of questions answered during the SHRIMP process. Where past data is requested by SHRIMP, a minimum of the previous 5 years' data is requested, however if more than 5 years' data is readily available the user is encouraged to use that data as well.

In addition, during the Risk Ranking Validation step, the user should consider any additional factors that may affect the probability and/or consequences of a failure of a particular section of distribution piping but that were not asked about by SHRIMP. Examples could include pipe located near hospitals, schools, nursing homes or other difficult to evacuate facilities; environmental factors such as soil corrosivity; and more. During the Risk Ranking Validation step, any additional knowledge considered by the user to change the relative risk ranking of any section should be described in the text box provided by SHRIMP. This description will be written into the written DIMP Plan in the Risk Ranking section.

(3) If any of the design, construction or environmental factors requested by SHRIMP are not readily available the user should answer "I don't know." SHRIMP will then offer pre-written text describing how the user will gain that information over time through normal activities conducted on the pipeline. The user can accept SHRIMP's plan or enter their own description of how that knowledge will be gained. The SHRIMP text or the user's text will be included in the written DIMP plan.

(4) A process by which the IM program will be reviewed periodically and refined and improved as needed using SHRIMP is under development. This procedure will require the user to revisit each question answered in SHRIMP and either confirm the answer provided is still accurate or update the information. SHRIMP will generate a log of differences between the old plan to the new plan. SHRIMP will save a copy of the old plan for 10 years. The user is also encouraged to download the new and old plans for their records.

(5) SHRIMP includes an attachment that is the implementation plan. This attachment summarizes all the actions required to follow the DIMP plan, including capture and retention of data on any new pipeline installed. Since each user may have a unique recordkeeping system SHRIMP cannot advise the best way to track this data and instead provides a text box for the user to describe how these records will be captured and retained.

b. Identify threats

The Rule: 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.

The Procedure: SHRIMP uses an interview process to identify threats. The user must go through interviews for each of the eight threats listed above. In many cases there are two or more subthreat interviews within each threat interview. For example, the corrosion threat interview includes separate interviews for external, internal and atmospheric corrosion, and the external corrosion interview includes further separate interviews for different materials of construction (bare/coated, protected/unprotected steel, cast/wrought iron, etc.). These interviews ask for reasonably available information to identify existing and potential threats. All of the sources of data listed in the rule are directly asked for by SHRIMP except for continuing surveillance – continuing surveillance is the periodic review of other inspection and maintenance data to determine the continued serviceability of the pipe. If prior continuing surveillance reviews resulted in additional inspections or maintenance, the results of those actions should be entered into SHRIMP where SHRIMP asks for the results of such inspection and maintenance, therefore indirectly SHRIMP considers continuing surveillance records.

c. Evaluate and rank risk

The Rule: 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.

The Procedure: The SHRIMP Advisory Group developed a risk ranking model that assigns a numeric weighting to answers provided by the user. The risk ranking model is described in an attachment to this document.

Subdividing is not required by SHRIMP but encouraged where answers to SHRIMP threat assessment questions are different for different parts of the system. Many of the questions asked by SHRIMP during the threat assessment process are intended to assess the likelihood and consequences of a failure due to the threat being assessed. SHRIMP also asks questions to help determine if certain regions of the pipeline have similar characteristics and for which similar actions would be effective in reducing risk. If actual or potential threats identified during the threat assessment process are concentrated in certain areas, the user is encouraged to subdivide the system for that threat, separating the areas that have an actual or potential threat from those areas that don't. Subsections can be geographic, by material, by type of equipment (for equipment threat), by excavator crews or contractors (for excavation threat) or any other way of subdividing that makes sense for the user's situation.

If the user decides to subsection for any threat those subsections continue through the risk-ranking, implementing additional measures and performance measures steps. The system may be subdivided differently for each threat, since it is unlikely that an area at risk for one threat (e.g. external corrosion) would also be entirely at risk from another threat (e.g. natural forces).

d. Identify and implement measures to address risks

The Rule: 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).

The Procedure: SHRIMP offers the user at least one option to reduce the risk from failure for each threat except "Other." In the risk ranking screen, clicking on "A/A's" brings up a list of potential additional/accelerated actions ("A/A Actions") that the SHRIMP Advisors have determined could be effective in addressing the actual or potential threat. Some A/A Actions may be listed first because answers provided by the user during the threat assessment process suggests these A/A Actions are likely to be effective, whereas other A/A Actions that aren't expected to be effective are listed separately.

The user can select one or more of the A/A Actions included in SHRIMP, which will result in pre-written text being inserted into the "Implement Measures" section of written DIMP plan for the particular subsection of the system and threat. If the user has a better idea, or has already implemented action addressing this threat, the user should create a user-defined A/A Action and select that A/A Action for this threat and subsection. What the user writes when defining the A/A Action will be written into the written DIMP plan.

For some threats SHRIMP will recommend that the user initiate some A/A Action to reduce risk. For most threats the SHRIMP advisors could not agree on any relative risk score or combination of threat interview answers that should automatically require the user to specify an A/A Action. It is therefore up to the user to use his/her best judgment as to which threat-segments merit additional actions to reduce risk. The DIMP rule does not presume that every operator needs to implement additional measures.

If a user elects to include additional measures to reduce risk for any of the threats and/or subdivisions of the distribution system, SHRIMP will offer one or more options for performance measures specific to that threat and subdivision. The user may select pre-written text offered by SHRIMP or substitute a user-defined performance measure. The user is required to select at least one threat and subdivision-specific performance measure for every additional action selected in the previous step.

At the end of the SHRIMP process, SHRIMP displays a list of action items, including mandatory performance measures [(i) through (v) in the next section] and any threat-specific additional measures the operator determines are needed to evaluate the effectiveness of the operator's IM program in controlling each identified threat. The user is asked to describe in a text box how each action will be implemented and that information is included in the Implementation Plan included as an attachment to the written DIMP plan.

e. Measure performance, monitor results and evaluate effectiveness

The Rule: 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 Sec. 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 Sec. 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.

The Procedure: The written plan created using SHRIMP includes a section stating that the operator will keep records necessary to report performance measures.(i) through (v). These performance measures must be captured and recorded outside of SHRIMP – SHRIMP does not currently include a recordkeeping or performance measure tracking mechanism, although those enhancements are contemplated in future upgrades.

Where a performance measure requires data that has not previously been collected and retained by the operator, the baseline for such performance measures will be the first year such data is collected and retained. Where the operator does have past data for any performance measure, the user must establish a baseline based on that historical data. The baseline should be included in the implementation plan text for that performance measure.

At the end of the SHRIMP process, SHRIMP displays a list of action items, including mandatory performance measures (i) through (v) above and any threat-specific additional measures the operator determines are needed to evaluate the effectiveness of the operator's IM program in controlling each identified threat. The user is asked to describe in a text box how each action will be implemented and that information is included in the Implementation Plan included as an attachment to the written DIMP plan.

f. Periodic Evaluation and Improvement

The Rule: An operator must re-evaluate 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.

The Procedure: The SIF is currently working on a procedure to use SHRIMP to automate the re-evaluation process. SHRIMP includes in the written plan a requirement for periodic complete program re-evaluations at least once every 5 years and more often if certain conditions are met. The user should consider additional events that might trigger a complete program re-evaluation.

A re-evaluation using SHRIMP is essentially revisiting each SHRIMP interview screen to verify the answer is still valid or updating information as necessary. The risk ranking screen must be reviewed to ensure it is still accurate. The user must review each of the 5 mandatory performance measures described above and any threat-specific performance measures included in the written plan and compare results to the baseline [Note: Where a performance measure requires data that has not previously been collected and retained by the operator, the baseline for such performance measures will be the first year such data is collected and retained.] Particular attention should be given to the threat-specific performance measures that measure the effectiveness of specific A/A Actions. If one or more of these performance measures indicates that the A/A Action is not effective, the user should consider modifying the A/A Action and/or implementing additional A/A Actions.

g. Report results

The Rule: 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 Sec. 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.

The Procedure: The SHRIMP written DIMP Plan includes a Section on reporting results, listing procedures for reporting to both the federal and state pipeline safety agencies. Currently data to report these performance measures must be collected and retained outside of SHRIMP, however the APGA Security and Integrity Foundation (SIF) may modify SHRIMP to enable it to retain and submit these performance measures as well as mechanical fitting failure data and other data required by Distribution Annual Report Form 7100.1-1.

11.3.2. Relative Risk Model

The centerpiece of the Simple, Handy, Risk-based Integrity Management Plan (SHRIMP) is the risk ranking model. SHRIMP uses an index model in which numeric scores are assigned based on answers provided by the user to questions asked by SHRIMP. The index model was developed by the APGA Security and Integrity Foundation (SIF) with guidance by an advisory group comprised of industry and federal and state pipeline safety regulators.

Risk is the product of the probability of a failure times the consequences of a failure. The SHRIMP relative risk model considers both the probability and consequences of a failure for each of the eight threats. The equation is as follows:

$$\text{Relative Risk Score} = \frac{\text{Probability Score (Normalized to 1 - 10)}}{\text{10}} \times \frac{\text{Consequence Score (1.0 - 1.5)}}{\text{1.5}} \times \frac{\text{Leak History Factor (1 + \% of Lks)}}{\text{1}} \times \frac{\text{Incident Probability Factor (1.0 or 1.25)}}{\text{1.25}}$$

Each of the four components that go into the relative risk score are described in the following sections.

Probability Score is the sum of points assigned by answers to threat interview questions. Each segment receives a relative probability score for each threat based on the answers to a series of questions. The probability questions are based on the GPTC DIMP guidance, as modified and added to by the SIF SHRIMP Advisors. The weighting given to each possible answer are based on the knowledge and experience of the SHRIMP Development Team and the SHRIMP Advisors. The questions for each of the eight threats and the scores assigned to each possible answer are shown in Appendix A.

Table 11.77. Probability Scores

Threat	Subthreat category	Maximum Score	Minimum Score	Incident Probability Factor
Natural Forces	No subthreats	19	0	1
Other Outside Forces	No subthreats	12	0	1.0
Excavation Damage	Grouping by concentration of damages or tickets	39	0	1.25
	Grouping by operator crew or operator contractor damage	34	0	1.25
	Grouping by Third Party Damage	31	0	1.25
Corrosion	Blasting	15	0	1.25
	External Corrosion	16	1	1
	Internal Corrosion	30	1	1
Incorrect Operations	Atmospheric Corrosion	25	1	1
	Failure to Follow Procedures	5	1	1.25
	Inadequate Procedures	5	1	1.25
Equipment	Operator Qualification	5	1	1.25
	Drug & Alcohol	5	1	1.25
	No subthreats	5	1	1
Material, Welds or Joints	No subthreats	5	1	1
Other	No subthreats	None (User assigns rank)		1

Because there are different numbers of questions for each threat and subthreat, the maximum possible score for each threat and subthreat are different, therefore the probability score for each threat-segment is normalized to a scale of 1 - 10 using this equation:

$$\text{Normalized probability score} = 1 + (9 \times (\text{subthreat score} - \text{subthreat minimum score}) / (\text{subthreat maximum score} - \text{subthreat minimum score}))$$

For example, if a segment received a score of 9 for external corrosion the normalized probability score would be $1 + (9 \times (9-1) / (16-1)) = 1 + 9 \times 8/15 = 5.8$

Incident Probability Factor

The normalized probability factor described above is useful to rank various sections by the probability of a failure occurring within each of the eight threats, but SHRIMP also must rank sections across the eight threats. Failures due to some threats are more likely to cause death, injury or significant property loss than other threats. DOT Distribution Annual and Incident Report data shown below provide an indication of how likely it is that a failure (e.g. leak) due to one of the 8 threats will result in death, injury or significant property loss.

Table 11.78. Incident Probability Factor

Reported Cause of Incidents and Failures 2005-2007	# of Incidents	# of Failures	Incidents/1000 Failures	Normalized to Corrosion
Corrosion	6	293,933	0.02	1
Excavation Damage	73	338,666	0.22	11
Incorrect Operations	8	30,145	0.27	13
Material, Weld or Joint Failure	8	147,384	0.05	3
Equipment Failure	6	140,442	0.04	2
Natural Force Damage	22	77,229	0.28	14
Other Outside Force Damage	39	37,426	1.04	51
All Other Causes *	NA	NA	NA	
* Excluding Fire First Incidents				

The results of this analysis find that failures due to three threats (corrosion, material failure and equipment failure) are least likely to result in reportable incidents, that failures due to excavation damage, incorrect operations and natural force damage are moderately likely to result in reportable incidents and that other outside force damage failures are most likely to result in reportable incidents.

The advisors agreed to assign an Incident Probability Factor of 1.0 (no increase in relative risk score) for Corrosion, Materials/Welds, Equipment, and Other Outside Force Threats where it is relatively unlikely a failure will result in a reportable incident. For Excavation, Incorrect Operations, and Natural Force Threats where it is relatively more likely that a failure will result in a reportable incident the advisors agreed on an Incident Probability Factor of 1.25 (e.g. a 25% increase in relative risk score for these threats).

Further investigation of the "other outside force" category revealed that virtually all the incidents involved vehicles striking above ground facilities, usually meter sets. The SHRIMP advisors agreed with the PHMSA Phase 1 report conclusions that there was not enough information to conclude that vehicular damage could have been anticipated at the location of these incidents or whether meter protection existed,

therefore no additional weighting is provided for this threat. SHRIMP does, however, include assessment of vehicle damage in the threat assessment and offer additional/accelerated actions if vehicular damage is found to be a significant threat.

If the user sections the system by geographic area, the Consequence Score is determined by points assigned based answers to threat interview questions as follows:

Table 11.79. Consequence Score (Geographic Area Sections)

	Question	Possible Answers	Weighting
CSQ-1	Are the pressure and/or diameter of this section greater than or about the same as the system as a whole?	Yes	0.3
		No	0
CSQ-2	Is this section predominantly located in business districts or outside business districts (as those are defined for leak survey)?	Within Business Districts	0.15
		Outside Business Districts	0
CSQ-3	How long would it typically take utility crews to reach this part of the system after receiving notice of a possible failure?	Less than one (1) hour	0
		Between one (1) and two (2) hours	0.025
		More than two (2) hours	0.05
CSQ-4	What would be the impact on the utility and its customers if this equipment were to fail?	Low	0
		Moderate	0.05
		High	0.1

The base consequence factor is 1.0

1. Greater pressure and/or diameter can increase the consequence factor by up to 20% (1.0 to 1.2)
2. Sections predominantly within business districts get an additional 15% increase in the consequence factor
3. The time to respond to a failure results in an increase in consequence factor of up to 5% (1.0 to 1.05)
4. The significance of the facility can result in an increase in consequence factor of up to 10% (1.0 to 1.1)

These weightings are based on the knowledge of the subject matter experts on the SHRIMP Advisory Group. These increases are added together to calculate the consequence factor for the section. If all four questions were answered so that maximum scores were assigned, the consequences factor would be 1.50 (1.2 + 1.15 + 1.05 + 1.1). The overall relative risk score would be increased by 50%.

If all four questions are answered so the minimum scores are assigned, then the consequence factor will be 1.0 and the relative risk score would be unchanged by this factor.

If the user does not create subsections for a threat, then these consequence questions are not asked.

For the threats shown below where the geography based threat questions do not apply the following threat specific consequence questions are asked:

Table 11.80. Consequence Score (Non-Geographic Area Sections)

	Question	Possible Answers	Weighting
CSQ-EXC1	Have the (crews/contractors/excavators) identified for this section caused damage that resulted in a reportable incident?	Yes	0.3
		No	0
CSQ-EXC2	Considering disruption of service and cost to return the system to service, how serious are the damages caused by the (crews/contractors/excavators) identified for this section when compared to all other excavation caused damages?	More serious	0.3
		Less serious	0
		About the same	0.1
CSQ-GEN1	What would be the potential consequences (injuries and/or property loss) if a failure were to occur because of this problem?	High likelihood of serious injury and/or property loss	0.5
		Moderate likelihood of injury and/or property loss.	0.25
		Not likely to result in injury and/or property loss.	0
EQIPCSQ-1	Is the size/capacity of the equipment substantially greater or lesser than other equipment in the system as a whole?	Substantially greater	0.2
		Somewhat greater	0.1
		About the same	0
EQIPCSQ-2	Does the equipment primarily affect the system located in the business district?	Within Business Districts	0.15
		Outside Business Districts	0
EQIPCSQ-3	How long would it typically take utility crews to reach this part of the system after receiving notice of a possible failure?	Less than one (1) hour	0
		Between one (1) and two (2) hours	0.025
		More than two (2) hours	0.05
EQIPCSQ-4	What would be the impact on the utility and its customers if this equipment were to fail?	Low	0
		Moderate	0.05
		High	0.1

Leak Cause Factor

While most leaks are repaired without incident, the SHRIMP advisors felt that the users integrity management plan should consider the relative percentage of leaks by cause.

The Leak Cause Factor equals 1 + the percentage of leaks associated with threat to the total number of leaks for the system.

If the number of total leaks over a five year period are less than 50, the national average is used rather than the user's leak history data because with fewer than 50 leak repairs the relative percentages of leaks by cause may be skewed by a handful of leak repairs that are not representative of the system. The national average is shown below, taken from leak repair data reported to PHMSA by all distribution operators on Annual Report Form 7100.1-1..

Table 11.81. Reported Cause Of Failures (2005-2009)

Threat	Failures	Percent	Leak History Factor
Corrosion	399,378	26	1.26
Excavation Damage	161,079	11	1.11
Incorrect Operations	38,416	3	1.03
Material, Weld or Joint Failure	155,255	10	1.10
Equipment Malfunction	326,793	21	1.21
Natural Force Damage	82,565	5	1.05
Other Outside Force Damage	40,529	3	1.03
All Other Causes	329,401	21	NA *
Totals	1,533,416	100	

* Since the threat category "Other" is not assigned a relative risk score by SHRIMP the leak history factor is not used for that threat.

11.4. PLAN RE-EVALUATION LOG