

Date of Issue: January 2013

Affected Publication: API Recommended Practice 1161, *Recommended Practice for Pipeline Operator Qualification (OQ)*, Second Edition, April 2012

ADDENDUM 1

Replace Annex A and Annex B with the attached.

Annex A (normative)

Covered Task List

The Covered Tasks listed below were identified by API and may be adopted by the Operator as described in 4.2.1 of this document.

The tasks in bold text are included in Annex B, the remaining tasks are in development.

COVERED TASK NUMBER	Covered Task Name
1.1	Measurement of Structure-to-Soil Potentials
1.2	Conduct Close Interval Survey
1.3	Test to Detect Interference
1.4	Inspect and Perform Electrical Test of Bonds
1.5	Inspect and Test Electrical Isolation
2.1	Verify Test Lead Continuity
2.2	Repair Damaged Test Lead
2.3	Install Test Leads by Non-Exothermic Welding Methods
2.4	Install Test Leads by Exothermic Welding Methods
3.0	Obtain a Voltage and Current Output Reading from a Rectifier to Verify Proper Performance
4.1	Troubleshoot Rectifier
4.2	Repair or Replace Defective Rectifier Components
4.3	Adjustment of Rectifier
4.1	Troubleshoot Rectifier
4.2	Repair or Replace Defective Rectifier Components
4.3	Adjustment of Rectifier
5.1	Examine for Mechanical Damage on Buried or Submerged Pipe
5.2	Examine for External Corrosion on Buried or Submerged Pipe
5.3	Inspect the Condition of External Coating on Buried or Submerged Pipe
7.1	Visual Inspection of Atmospheric Coatings
7.2	Prepare Surface for Coating Using Hand and Power Tools
7.3	Prepare Surface for Coating by Abrasive Water Blasting
7.4	Prepare Surface for Coating by Abrasive Blasting Methods Other Than Water
7.5	Apply Coating Using Hand Application Methods
7.6	Apply Coating Using Spray Applications
7.7	Perform Coating Inspection
8.1	Measure Pit Depth with Pit Gauge
8.2	Measure Wall Thickness with Ultrasonic Meter

8.3	Measure Corroded Area
9.1	Install Bonds
9.2	Install Galvanic Anodes
9.3	Install Rectifiers
9.4	Install Impressed Current Ground Beds
9.5	Repair Shorted Casings
9.6	Install Electrical Insulating Device
10.1	Insert and Remove Coupons
10.2	Monitor Probes (On-Line)
11.0	Monitoring and Controlling the Injection Rate of the Corrosion Inhibitor
12.0	Visual Inspection of the Internal Pipe Surface
14.1	Locate Line
14.2	Install, Inspect, and Maintain Permanent Marker
14.5	Install, Inspect, and Maintain Temporary Marker
15.1	Visually Inspect Surface Conditions of Right-of-Way
16.1	Inspect Navigable Waterway Crossing
19.1	Valve Body Winterization or Corrosion Inhibition
19.2	Valve Lubrication
19.3	Valve Seat Sealing
19.4	Valve Stem Packing Maintenance
19.5	Actuator/Operator Adjustment, Electric
19.6	Actuator/Operator Adjustment, Pneumatic
19.7	Actuator/Operator Adjustment, Hydraulic
20.0	Inspect Mainline Valves
21.1	Repair Valve Actuator/Operator, Pneumatic
21.2	Disassembly/Re-assembly of Valve
21.3	Internal Inspection of Valve
21.4	Repair Valve Actuator/Operator, Hydraulic
21.5	Repair Valve Actuator/Operator, Electric
22.1	Inspect Tank Pressure/Vacuum Breakers
22.2	Inspect, Test, and Calibrate HVL Tank Pressure Relief Valves
23.1	Maintain/Repair Relief Valves
23.2	Maintain/Repair Pressure Limiting Devices
24.1	Inspect, Test and Calibrate Pressure Limiting Devices
24.2	Inspect Test and Calibrate Relief Valves
25.1	Inspect, Test and Calibrate Pressure Switches
25.2	Inspect, Test and Calibrate Pressure Transmitters
27.1	Routine Inspection of Breakout Tanks (API 653 Monthly or DOT Annual)

27.2	API 653 Inspection of In-Service Breakout Tanks
27.3	API 510 Inspection of In-Service Breakout Tanks
30.0	Test Overfill Protective Devices
31.0	Inspect and Calibrate Overfill Protective Devices
32.0	Observation of Excavation Activities
38.1	Visually Inspect Pipe and Pipe Components Prior to Installation
38.3	Visually Inspect that Welds Meet DOT Requirements
38.4	NDT - Radiographic Testing
38.5	NDT - Liquid Penetrate Testing
38.6	NDT - Magnetic Particle Testing
38.7	NDT - Ultrasonic Testing
39.0	Backfilling a Trench Following Maintenance
40.1	Fit Full Encirclement Welded Split Sleeve (Oversleeve, Tight Fitting Sleeve, etc.)
40.3	Apply Composite Sleeve
40.4	Install Mechanical Bolt on Repair Device
40.5	Install Weldable Compression Couplings
40.6	Install and Remove Plugging Machine
40.7	Hot Tapping a Hole 2 in. or Under
40.8	Hot Tapping a Hole Larger than 2 in.
40.9	Installation and Removal of a Completion Plug
41.0	Conduct Pressure Test
42.7	Welding
43.1	Start-up of a Liquid Pipeline (Control Center)
43.2	Shutdown of a Liquid Pipeline (Control Center)
43.3	Monitor Pressures, Flows, Communications, and Line Integrity and Maintain Them Within Allowable Limits on a Liquid Pipeline System (Control Center)
43.4	Remotely Operate Valves on a Liquid Pipeline System
44.3	Inspect, Test, and Calibrate Computational Pipeline Monitoring (CPM) Leak Detection System
44.4	Inspection, Testing, Corrective and Preventative Maintenance of Tank Gauging for Leak Detection
44.5	Prove Flow Meters for Hazardous Liquid Leak Detection
44.6	Maintain Flow Meters for Hazardous Liquid Leak Detection
44.7	Inspect, Test and Maintain Gravimeters/Densitometers for Hazardous Liquid Leak Detection
44.8	Inspect, Test and Maintain Temperature Transmitters
63.1	Start-up of a Liquid Pipeline (Field)
63.2	Shutdown of a Liquid Pipeline (Field)
63.3	Monitor Pressures, Flows, Communications, and Line Integrity and Maintain Them Within Allowable Limits on a Liquid Pipeline System (Field)
63.4	Locally Operate Valves on a Liquid Pipeline System

Annex B (normative)

Covered Task Standards

Annex B is expected to include all of the updated Task Standards. As of the publication date of API 1161, 2nd Edition, this annex includes only those Task Standards approved by the governance group by ballot. This annex will continue to incorporate Task Standards as addenda as they are developed and approved by API. The Task Standards in this annex directly correlate to Annex A (Covered Task List), but will be published in no particular order.

The expected completion date for this annex is 18 months from publication of RP 1161 Rev. 2. At that time, this annex will be incorporated in full into the document.

As available, OQ Task Standards will be available at no cost on API's website and are accessible at:

<http://www.api.org/1161TaskLists>

Users of this document are directed to visit this website periodically to obtain the updated Task Standards as they are made available for publication.

OQ Task Name

Task 3.0 – Obtain a Voltage and Current Output Reading from a Rectifier to Verify Proper Performance

1.0 Task Description

This task includes the physical measurement and documentation of electrical output of a rectifier. The task begins with the identification of the rectifier and ends with the documentation of data after measurement.

Obtain a Voltage and Current Output Reading from a Rectifier to Verify Proper Performance is a separate covered task (Reference Task 3.0).

This task does not include data analysis.

2.0 Knowledge Component

An individual performing this task must have knowledge of cathodic protection systems and components comparable to NACE Certification Level CP 1 to include, but not limited to:

- Use of voltmeters
- Use of clamp-on ammeters
- Calculating current from shunt factor and voltage measurement. Current output may be calculated based on shunt factor (ratio) and voltage drop across the shunt.
- Validation of display meters with observed readings and with remote read devices, if applicable
- Understanding the importance of proper rectifier output polarity
- Accurate documentation of gathered data and appropriate communication, if necessary

Abnormal Operating Conditions (AOCs)

The following AOCs could be encountered while performing this task:

AOC Recognition	AOC Reaction
Reading outside of expected parameters, such as reverse polarity or inoperable rectifier	Take action, if qualified, or notify appropriate personnel of observed condition for further analysis and/or repair.

3.0 Skill Component

To demonstrate proficiency of this task, an individual must perform the following steps:

Step	Action	Explanation
1	Verify the identification of the rectifier.	
2	Determine voltage by connecting a voltmeter across the output terminals of the rectifier. <ul style="list-style-type: none"> ▪ Connect the positive lead to the rectifier positive terminal. ▪ Connect the negative lead to the rectifier negative terminal. 	Obtaining accurate voltage and polarity are essential to maintaining cathodic protection.

Step	Action	Explanation
3	Obtain the shunt factor by reading the value labeled on the shunt and dividing the amp value by the mV value.	Obtaining a shunt factor is essential to calculate current from millivolt reading obtained from shunt.
4	Determine current on a pre-installed shunt by reading the millivolt drop across the shunt and multiplying by the shunt factor.	Obtaining accurate current is essential to determining the effectiveness of a cathodic protection system.
5	Check voltage and current readings against display meters and/or remote monitoring devices, if applicable.	Validating remote devices and display meters is necessary to ensure accurate data is being received.
6	Record all required readings per company procedures.	Up to date records are essential to maintaining a Corrosion Control System. Notify company personnel if readings are non-existent or reversed in polarity.

OQ Task Name

Task 4.1 – Troubleshoot Rectifier

1.0 Task Description

This task begins when a rectifier is found inoperable and ends when the faulty rectifier component is identified for replacement and documentation is completed.

Repair or Replace Defective Rectifier Components is a separate covered task (Reference Task 4.2).

Adjustment of Rectifier is a separate covered task (Reference Task 4.3).

2.0 Knowledge Component

An individual performing this task must have knowledge of troubleshooting a rectifier and components comparable to NACE Certification Level CP 2 to include, but not limited to:

- Understanding of basic electricity, electrical circuits, and electrical schematics.
- Understanding the operation of rectifier and the principles of converting AC current to DC current.
- Understanding component operation such as AC supply, circuit breaker or fuse, transformer, rectifier elements (selenium stack or diode array), shunts, adjustment links, DC output terminals, remote monitoring units, and surge protection.

3.0 Skill Component

To demonstrate proficiency of this task, an individual must perform the following steps:

Step	Action	Explanation
1	Check for proper operation to determine faulty component. Consult manufacturer's manual for detailed information.	Proper operation of components is necessary for rectifier operation.
2a	Check AC voltage input. If none, check circuit breaker or fuse.	If circuit breaker or fuse is faulty, identify for replacement.
2b	Verify power to transformer and check voltage from output of transformer.	If there is no voltage from output, then transformer is identified for replacement.
2c	If transformer output is present, then check DC voltage at rectifier element (selenium stack or diode array) output.	If no DC voltage is present, then rectifier element (selenium stack or diode array) is identified as faulty.
2d	Check DC voltage output. If none, check circuit breaker or fuse.	If circuit breaker or fuse is faulty, identify for replacement.
2e	If no components are found at fault, check all wires and wiring connections including lightning arrestors or surge protection.	Identify any bad wires or connections as faulty.
3	Document faulty components.	Maintenance records.

OQ Task Name

Task 4.2 – Repair or Replace Defective Rectifier Components

1.0 Task Description

This task begins after the faulty component has been identified and ends when the rectifier is operational and documentation is complete.

Troubleshoot Rectifier is a separate covered task (Reference Task 4.1).

2.0 Knowledge Component

An individual performing this task must have knowledge of rectifier operation and rectifier components such as:

- Understanding component operation such as AC supply, circuit breaker, transformer, rectifier elements (stack), shunts, display meters, adjustment links, DC output terminals, remote monitoring units, and surge protection.
 - A transformer is a device used to change available voltage or current levels to desired power needs. Adjustment links (taps) are used as connectors on the secondary side of the transformer to allow different voltage settings to be selected for a desired output.
 - Rectifier elements or stacks are devices designed to allow current flow in one direction only. These stacks are used to convert alternating current to direct current in a rectifier.
 - Shunts are calibrated resistor links that allow current measurement in a rectifier.
 - A remote monitoring unit (RMU) is a device that transmits rectifier readings to a remote site via wireless media.
- Understanding the operation of rectifiers and the principles of converting AC current to DC current.

3.0 Skill Component

To demonstrate proficiency of this task, an individual must perform the following steps:

Step	Action	Explanation
1	Prior to performing any of the following steps, de-energize and verify the external AC supply to rectifier is off.	To avoid electrical shock and personnel injury.
2a	If AC Breaker is at fault, complete the following on primary AC breaker: <ul style="list-style-type: none"> ▪ Disconnect wires from supply to breaker. ▪ Disconnect wires from breaker to rectifier. ▪ Replace defective breaker with new breaker, if necessary. ▪ Connect wires from breaker to rectifier. ▪ Connect wires from AC supply to breaker. 	Proper operation of the rectifier's AC breaker is essential to protect the rectifier components during power surges, electrical shorts or component failures.

Step	Action	Explanation
2b	If AC fuses are faulty, complete the following on primary AC fuses: <ul style="list-style-type: none"> ▪ Remove fuse or fuses. ▪ Replace defective fuse or fuses with a correct size fuse. 	Proper operation of the rectifier's AC fuses is essential to protect rectifier components during power surges, electrical shorts or component failures.
2c	If transformer is faulty, complete the following on the transformer: <ul style="list-style-type: none"> ▪ Disconnect wires from the rectifier AC breaker to the transformer. ▪ Disconnect wires from the transformer to the coarse and fine tap panels. ▪ Replace the defective transformer with a new transformer. ▪ Connect wires from the transformer to the coarse and fine tap panel. ▪ Connect wires from the transformer to the AC rectifier breaker. 	Transformers are required to reduce primary AC voltage to a lower adjustable AC voltage.
2d	If the rectifier element is faulty, complete the following on the rectifier element (stack): <ul style="list-style-type: none"> ▪ Disconnect wires from the fine and coarse tap panel to the stack. ▪ Disconnect wires from the rectifier element to the positive and negative DC output terminals. ▪ If stack is selenium, remove the stack and replace it with a new stack. ▪ If the stack is silicon, remove the defective diodes and replace with new diodes. ▪ Connect wires from the stack to the positive and negative DC output terminals. ▪ Connect wires from the fine and coarse tap panel to the stack. 	Rectifier stacks are required to change AC current to DC current.
2e	If the DC fuses are faulty, complete the following on DC fuses: <ul style="list-style-type: none"> ▪ Remove fuse or fuses. ▪ Replace defective fuse or fuses with a correct size fuse. 	Proper operation of the rectifier's DC fuses is essential to protect rectifier components during power surges, electrical shorts or component failure.
3	Record all required information.	Up to date records are essential to maintaining a Corrosion Control System.

OQ Task Name

Task 4.3 – Adjustment of Rectifier

1.0 Task Description

This task begins with the defined need of rectifier adjustment based on cathodic protection system requirements and ends with proper adjustment of the rectifier and documentation.

Measurement of Structure-to-Soil Potentials is a separate covered task (Reference Task 1.1).

Obtain a Voltage and Current Output Reading from a Rectifier to Verify Proper Performance is a separate covered task (Reference Task 3.0).

2.0 Knowledge Component

An individual performing this task must have knowledge of cathodic protection systems and components comparable to NACE Certification Level CP 2 to include, but not limited to:

- Basic electricity and electrical circuits
- Understanding of rectifier operation and adjustment methods (typically a mechanical adjustment link on the transformer output)
- Use of voltmeter and electrical measurements
- Measuring the structure-to-soil potential (DC and AC) (covered task 1.1). These measurements are used to determine cathodic protection and necessary current adjustments to the rectifier.

Abnormal Operating Conditions (AOCs)

The following AOCs could be encountered while performing this task:

AOC Recognition	AOC Reaction
Inability to achieve target output.	Notify appropriate personnel for CP system analysis.

3.0 Skill Component

To demonstrate proficiency of this task, an individual must perform the following steps:

Step	Action	Explanation
1	Verify identification of rectifier needing adjustment.	
2	Determine the action to be taken. Either increase or decrease the output current with consideration of the entire system components, such as pipe-to-soil readings, bonds, etc.	Adjustments made to one rectifier may impact other system components.

Step	Action	Explanation
3	<p>Increase/decrease the fine tap setting in progressive steps until the desired settings have been achieved.</p> <p>NOTE: Power should be off before making these adjustments.</p> <p>Tap settings are current-carrying connections and should be tightened prior to re-energizing the rectifier.</p>	<p>When the required output current is obtained, the adjustment is complete.</p>
4	<p>If the fine tap setting reaches its limit, set the fine tap to the lowest setting and increase or decrease the coarse tap setting by 1 tap.</p> <p>NOTE: Power should be off before making these adjustments.</p> <p>Tap settings are current-carrying connections and should be tightened prior to re-energizing the rectifier.</p>	<p>Incremental adjustments will prevent the current from exceeding design limits.</p>
5	<p>Adjustments should be based on indicators such as pipe-to-soil readings, historical data, or design criteria.</p>	<p>Rectifiers are part of an overall CP system and must be adjusted based on system requirements.</p>
6	<p>Record all required information per company procedures.</p>	<p>Up to date records are essential to maintaining a Corrosion Control System.</p>

OQ Task Name

Task 5.1 – Examine for Mechanical Damage on Buried or Submerged Pipe

1.0 Task Description

Each time a pipeline is exposed, the operator must perform an inspection/examination of the pipe and the coating for evidence of damage and/or abnormalities. This task is to verify whether mechanical damage like dents, gouges, etc. exist on the pipeline and to ensure proper documentation and reporting have occurred. This task begins after the pipeline surface has been prepared for inspection and ends after inspection results are documented and reported.

Measure Pit Depth with Pit Gauge is a separate covered task (Reference Task 8.1).

Measure Wall Thickness with Ultrasonic Meter is a separate covered task (Reference Task 8.2).

Examine for External Corrosion on Buried or Submerged Pipe is a separate covered task (Reference Task 5.2).

Inspect the Condition of External Coating on Buried or Submerged Pipe is a separate covered task (Reference Task 5.3).

Measure Corroded Area is a separate covered task (Reference Task 8.3).

Coating tasks are separate covered tasks (Reference 7-Series Tasks).

2.0 Knowledge Component

An individual performing this task must have knowledge of:

Definitions applicable to this task:

Mechanical Damage

Visible physical damage to the metallic surface of the pipeline that, at a minimum, may include one or more of the defects listed below.

Dent

A depression in the surface that has been created by external forces on the pipeline with no visual evidence of metal loss.

Buckle

A bend, bulge, or kink that can cause flattening or changes in the curvature of the pipe.

Gouge

A groove in which metal has been removed or displaced from the surface.

Scratch

A thin, shallow cut or mark on the surface.

3.0 Skill Component

To demonstrate proficiency of this task, an individual must perform the following steps:

Step	Action	Explanation
1	Visually observe the exposed pipe for integrity issues such as evidence of a release or significant metal deformation.	Helps ensure that the pipeline is safe for operation and continued task performance.

Step	Action	Explanation
	If the observation identifies integrity issues that are not safe, discontinue the task and make immediate notifications.	
2	Confirm that the pipeline surface has been prepared for the mechanical damage inspection.	Proper surface preparation is critical to identifying and locating all types of mechanical damage present on the exposed pipe.
3	Inspect the exposed pipeline to determine if mechanical damage exists.	Inspection for mechanical damage is critical to identify potential risks that need further assessment to avoid future leaks or failures.
4	<p>Identify the type(s) and location(s) of mechanical damage.</p> <p>There are a variety of methods to describe the location of the damage. One of the more common methods is to locate the damage circumferentially with respect to a clock face. The location of the seam weld and the longitudinal distance to the nearest girth weld are also typically reported.</p>	The type(s) and location(s) of the damage are used to determine later actions such as whether repairs are needed, and if so, what kind of repair is needed.
5	Document the findings and make notifications.	Follow company policies/procedures for appropriate documentation, notification protocol, and actions required.

OQ Task Name

Task 5.2 – Examine for External Corrosion on Buried or Submerged Pipe

1.0 Task Description

Each time a pipeline is exposed, the operator must perform an inspection/examination of the pipe and the coating for evidence of corrosion. The inspection verifies whether external corrosion exists on the pipeline. This task begins after the pipeline surface has been prepared for inspection and ends after inspection results are documented and reported.

Measure Pit Depth with Pit Gauge is a separate covered task (Reference Task 8.1).

Measure Wall Thickness with Ultrasonic Meter is a separate covered task (Reference Task 8.2).

Measure Corroded Area is a separate covered task (Reference Task 8.3).

Examine for External Corrosion on Buried or Submerged Pipe is a separate covered task (Reference Task 5.2).

Inspect the Condition of External Coating on Buried or Submerged Pipe is a separate covered task (Reference Task 5.3).

Measure Corroded Area is a separate covered task (Reference Task 8.3).

Coating tasks are separate covered tasks (Reference 7-Series Tasks).

2.0 Knowledge Component

An individual performing this task must have knowledge of:

Definitions applicable to this task:

General Corrosion

An electrochemical reaction that takes place uniformly over the surface of steel, thereby causing general thinning of the component that could lead to eventual failure of the material.

Pitting

An electrochemical reaction that creates metal loss of the outer surface in small, crater-like depressions which have the potential to cause rapid wall loss.

3.0 Skill Component

To demonstrate proficiency of this task, an individual must perform the following steps:

Step	Action	Explanation
1	<p>Visually observe the exposed pipe for integrity issues such as evidence of a release or significant metal deformation.</p> <p>If the observation identifies integrity issues that are not safe, discontinue the task and make immediate notifications.</p>	Helps ensure that the pipeline is safe for operation and continued task performance.

Step	Action	Explanation
2	Confirm that the pipeline surface has been prepared for the external corrosion inspection.	Proper surface preparation is critical to identifying and locating all types of external corrosion present on the exposed pipe.
3	Examine the exposed pipe for any areas of external corrosion.	Inspection for external corrosion is critical to identify potential risks that need further assessment to avoid future leaks or failures.
4	<p>Identify the type(s) and location(s) of any corrosion on the pipeline.</p> <p>There are a variety of methods to describe the location of the corrosion. One of the more common methods is to locate the corrosion circumferentially with respect to an analog clock face. The location of the seam weld and the longitudinal distance to the nearest girth weld are also typically reported.</p>	The type(s) and location(s) of the corrosion are used to determine later actions such as whether repairs are needed, and if so, what kind of repair is needed.
5	Document the findings and make notifications.	Follow company policies/procedures for appropriate documentation, notification protocol, and actions required.

OQ Task Name

Task 5.3 – Inspect the Condition of External Coating on Buried or Submerged Pipe

1.0 Task Description

Each time the pipeline is exposed, the operator must perform an inspection/examination of the pipe and the coating. The inspection should verify whether the coating is intact (free from damage and/or degradation) and is adequately bonded to the pipe's surface. This task begins after the coated pipeline is exposed and ends after coating inspection results are documented and reported.

Examine for Mechanical Damage on Buried or Submerged Pipe is a separate covered task (Reference Task 5.1).

Examine for External Corrosion on Buried or Submerged Pipe is a separate covered task (Reference Task 5.2).

2.0 Knowledge Component

An individual performing this task must have knowledge of:

Definitions applicable to this task:

Pipeline Coating Types

Pipeline coating types, at a minimum, may include one or more the following:

Asphalt Coatings

A pipeline coating that consists of a naturally occurring material which is derived either by mining (e.g., Gilsonite), or it is a residue from the distillation of asphaltic petroleum. Asphalt coatings vary in their chemical and physical characteristics. Asphalt properly applied to steel or concrete surfaces has good adhesion properties, can be applied to thickness up to 100 to 200 mils, and is chemically stable with good resistance to water, most chemicals, and salts.¹

Coal Tar Coatings

A pipeline coating that is manufactured by dissolving processed coal tar pitch, or a blend of these pitches, in suitable solvents. The coating is cured by evaporating of the solvents. Coal tar coatings are made in different consistencies; those without any inert filler and those which contain inert materials in order to build film thickness. Coal tar coatings have good resistance to weak acids, alkalis, salts, seawater, and other aggressive atmospheres. This coating provides protection by the exclusion of moisture and air from the underlying surface.¹

Extruded Coatings

A dual layer pipeline coating that consists of an extruded polyethylene topcoat applied over a rubberized asphalt adhesive. Typically the polyethylene coating or jacket is "yellow" in color. The nature of the high density polyethylene outer jacket is formulated to protect the asphalt adhesive during handling and installation. While applied in thin layer, the asphalt adhesive provides the primary protection from corrosion consistent with the properties of an asphalt coating.²

Fusion Bonded Epoxy Coatings

A pipeline coating that consists of a powdered epoxy applied to a heated pipe by electrostatic methods (i.e., the powdered coating is attracted to the pipe by using the principles of static electricity). The powder gels and flows with the heat and then will cure and harden during cooling. The process creates a tight physical bond between the coating and the metal.³

Petrolatum Coating Products

Rust preventative products that contain petrolatum, which is a smooth, semisolid blend of mineral oil with waxes crystallized from residual-type petroleum lubricating oil. The wax molecules contain 30-70 carbon atoms and are straight chains with a few branches or naphthene rings.

Shrink Sleeve Products

A shrink sleeve is a polymer sleeve that is applied to the pipe, most usually over a girth weld, and heated according to a specific procedure in order to cause the sleeve to shrink into place on the pipe, causing the adhesive to bond to the pipe and to the adjacent coatings it overlaps.

Tape Coatings

The tape system consists of a primer applied directly to the pipe surface, an inner-wrap tape layer that provides a corrosion barrier and an outer-wrap tape layer that provides mechanical protection.

Coating Abnormalities

Coating Abnormalities — Change or failure of the coating attributed to one or several of the following: formulation related (e.g., checking, cracking, discoloration and similar phenomena), improper coating selection, incompatibility with the surface over which it is applied, improper or poor surface preparation, improper application (e.g., inadequate thickness, pinholes, overspray, improper drying, and improper curing), adhesion related, structural surface issues (e.g., sharp edges, crevices, skip welds, and back-to-back angles), and exterior forces (e.g., chemical exposure, abrasion, reverse impact, and severe weathering).¹

Bonding

The joining of the coating system and the pipeline in a manner where they are adhered or united by means of adhesive, heat, or pressure.

Coating Disbondment

Failure of the bond between the coating and the pipe's surface.

Cracking – as it relates to coatings

A physical separation to otherwise bonded coating that has an appearance of fissures.

Holiday

An undesirable discontinuity or break in the coating system. Electronic testing devices detect flaws in the protective coating.

Biological

Bacteria and fungi are the primary microorganisms that can act on coatings. There are two types of action. One is the activity of a microorganism due to dirt and contamination on the coating. In this case, the bacteria or fungi merely live on the surface of the coating and do not necessarily affect its protective nature. The second type is where the microorganisms actually use the coating for food and derive their energy from it. Under certain conditions, coatings can be rapidly disintegrated by this type of action.¹

Coating Methods**Spiral Wrap**

A method used to apply coating in a continuous fashion around the circumference of the pipeline.

Cigarette Wrap

A method used to apply coating one wrap at a time around the circumference of the pipeline.

Coating Overlap

The amount one wrap of coating overlaps the adjacent wrap of coating.

Manufacturer Applied Coating

This application of the pipe coating is done in a coating mill or similar location under controlled environmental conditions. On-site testing is performed to ensure that the surface of the pipe is properly prepared, that the temperature of the pipe is controlled, that the applied coating

thickness meets specifications, and that the pipe is free of coating voids or holidays. Additional on-site laboratory testing may include: cathodic disbondment testing, bend testing, adhesion testing, and abrasion/impact test. The pipe is shipped to the installation site in a pre-coated condition with the ends of the pipe prepared to facilitate welding and joining procedures.

Field Applied Coating

The application of the pipe coating is done in the field under variable environmental conditions. Typically this includes the field coating of welded joints and/or fittings during original construction; or when required, during routine maintenance activities as the pipeline is exposed and the coating has been removed or repaired. The field coating may or may not be the same material as the parent pipe coating – but the application process and physical properties need to be compatible. Field coatings typically have a wider tolerance of surface preparation condition. The coating is typically hand applied but can be machine applied. Coating thickness and adhesion to the pipe surface can vary based on the consistency of the application.

¹Munger, Charles G., *Corrosion Prevention by Protective Coatings*, National Association of Corrosion Engineers, 1984

²Open domain, Microsoft Explorer, (www.brederoshaw.com/solutions/yellow_jacket.htm)

³National Center for Construction Education and Research (NCCER), Pipeliner Training and Assessment Program (PTAP), Contren Learning Series, Module 61107-02, *Apply and repair external coatings on buried and submerged pipe*

3.0 Skill Component

To demonstrate proficiency of this task, an individual must perform the following steps:

Step	Action	Explanation
1	Visually observe the exposed pipe for integrity issues such as evidence of a release or significant metal deformation. If the observation identifies integrity issues that are not safe, discontinue the task and make immediate notifications.	Helps ensure that the pipeline is safe for operation and continued task performance.
2	Identify the type of existing coating.	It is necessary to be able to identify the type of coating that exists on the pipe so that a proper coating inspection can be conducted.
3	Examine the exposed coated pipe and determine if there are any flaws or abnormalities in the coating.	Inspection of the coating is critical to identify potential risks that need further assessment to avoid future leaks or failures.
4	Identify the type and location of coating damage, if any. There are a variety of methods to determine location of the damage. One of the more common methods is to locate the damage circumferentially with respect to an analog clock face. The location of the seam weld and the longitudinal distance to the nearest girth weld are also typically reported.	The type and location of the damage are used to determine later actions, such as whether repairs are needed, and if so, what kind of repair is needed.
5	Document the findings and make notifications.	Follow company policies/procedures for appropriate documentation, notification protocol, and actions required.

OQ Task Name

Task 8.1 – Measure Pit Depth with Pit Gauge

1.0 Task Description

This task is used to measure the wall loss that can occur from mechanical damage or corrosion utilizing a mechanical pit gauge, dial gauge or equivalent instrument. In the case where the pipeline has been opened, internal corrosion can be assessed in the same manner. This task begins when the steel surface of the pipe is exposed and prepared for inspection and ends when measurements are documented and proper notifications are made.

Measure Corroded Area is a separate covered task (Reference Task 8.3).

2.0 Knowledge Component

An individual performing this task must have knowledge of:

Definitions applicable to this task:

Wall Loss

Removal of metal caused by either mechanical damage (e.g. gouge or groove) or corrosion (e.g. general or pitting).

3.0 Skill Component

To demonstrate proficiency of this task, an individual must perform the following steps:

Step	Action	Explanation
1	Visually observe the exposed pipe for integrity issues such as evidence of a release or significant metal deformation. If the observation identifies integrity issues that are not safe, discontinue the task and make immediate notifications.	Helps ensure that the pipeline is safe for operation and continued task performance.
2	Clean and remove debris from the area to be measured.	The presence of debris will interfere with obtaining an accurate reading.
3	Calibrate the pit gauge or verify that the gauge is working properly.	Ensures accurate measurement by verifying that the pin on the depth indicating arm has not been damaged.
4	Position gauge flush and longitudinally across area to be measured, holding firmly against the surface ensuring that the pit gauge is supported on non-corroded surfaces. NOTE: If the surface is irregular due to surface conditions such as girth weld, a bridging bar may be used for a platform reference for the gauge.	Ensures that measurement is from the pipe surface.
5	Move the depth indicator until it contacts the deepest part of the wall loss.	Necessary to determine maximum wall loss.

Step	Action	Explanation
6	Read and record depth and longitudinal length measurements.	Measurements are used to evaluate the impact on operating pressure. Measurements are typically recorded in mils (thousandths of an inch).
7	Repeat several measurements to verify the deepest area of wall loss.	Verifies overall average of wall loss depth.
8	Document the findings and make notifications.	Follow company policies/procedures for appropriate documentation, notification protocol, and actions required.

OQ Task Name

Task 8.2 – Measure Wall Thickness with Ultrasonic Meter

1.0 Task Description

Performing this task involves the use of an Ultrasonic Thickness (UT) Meter to accurately collect and record a wall thickness reading on pipeline or related appurtenance. This task begins when the steel pipe surface is exposed and prepared for inspection and ends when measurements are documented and proper notifications are made.

2.0 Knowledge Component

An individual performing this task must have knowledge of:

Definitions applicable to this task:

Calibrate

The process of assuring an instrument's accuracy by comparing the instrument's reading to a known wall thickness. Some instruments may require adjusting the sound velocity to match the material being measured.

Couplant

A substance (typically a liquid or gel) used to transmit the sound waves between the transducer and pipeline during ultrasonic examination.

Transducer

A device or element that transmits a signal from the outer surface and receives that signal from the backwall (inner wall surface) to obtain a measurement of wall thickness.

Nominal Wall Thickness

The expected wall thickness determined by alignment sheets or other records.

3.0 Skill Component

To demonstrate proficiency of this task, an individual must perform the following steps:

Step	Action	Explanation
1	Visually observe the exposed pipe for integrity issues such as evidence of a release or significant metal deformation. If the observation identifies integrity issues that are not safe, discontinue the task and make immediate notifications.	Helps ensure that the pipeline is safe for operation and continued task performance.
2	Assemble, check, and calibrate UT meter for proper operation.	Proper assembly and calibration are required to obtain accurate readings.
3	Prepare, clean, and remove debris from surface to be measured.	Debris will interfere with accurate readings and need to be removed.
4	Apply a couplant to the area to be measured.	The use of a couplant is necessary to maintain consistent contact and allow sound waves to be transmitted with the surface for accurate readings.

Step	Action	Explanation
5	Measure wall thickness by placing the transducer firmly into the couplant and ensuring it is oriented to the pipe surface according to manufacturer's instructions.	Proper placement of the transducer is necessary to obtain accurate readings.
6	Observe meter display to obtain a measurement of wall thickness.	Ensure that the unit of measure is correct and that the display indicates a stable reading was obtained.
7	Repeat several measurements to confirm nominal wall thickness.	Verifies overall wall thickness and ensures measurements are not affected by internal corrosion or laminations.
8	Document the findings and make notifications.	Follow company policies/procedures for appropriate documentation, notification protocol, and actions required.

OQ Task Name

Task 8.3 – Measure Corroded Area

1.0 Task Description

While conducting this task, the individual creates a visual representation of the pipeline segment after corrosion has been identified, including all areas of localized corrosion. This task begins when the steel pipe surface has been exposed and prepared for inspection and ends when measurements are documented and proper notifications are made.

Measure Pit Depth with Pit Gauge is a separate covered task (Reference Task 8.1).

Measure Wall Thickness with Ultrasonic Meter is a separate covered task (Reference Task 8.1).

2.0 Knowledge Component

An individual performing this task must have knowledge of:

Definitions applicable to this task:

General Corrosion

An electrochemical reaction that takes place uniformly over the surface of the steel, thereby causing a general thinning of the component that can lead to eventual failure of the material.

Pitting

An electrochemical reaction that creates metal loss of the outer surface in small, crater-like depressions which have the potential to cause rapid wall loss.

Interaction

If two or more locations of localized corrosion are located in close proximity, the combination of effects may cause a loss of wall strength and must be recognized. The distance between areas and the dimensions of the localized corrosion determine the wall strength required based on pipe type, nominal wall thickness, and diameter.

Localized Corrosion

Individual areas of pitting or general corrosion areas at discrete sites that may also contain pitting. Areas of localized corrosion in the area of girth or longitudinal welds should be identified and documented.

Profile

Graphic (depth and length) representation of the affected area and/or individual pit measurements (“peaks and valleys”) that includes a level of detail necessary to provide a profile of the pipe surface (this is sometimes called a “river bottom profile”).

3.0 Skill Component

To demonstrate proficiency of this task, an individual must perform the following steps:

Step	Action	Explanation
1	<p>Visually observe the exposed pipe for integrity issues such as evidence of a release or significant metal deformation.</p> <p>If the observation identifies integrity issues that are not safe, discontinue the task and make immediate notifications.</p>	<p>Helps ensure that the pipeline is safe for operation and continued task performance.</p>

Step	Action	Explanation
2	Obtain proper tools for the work assignment, which may include a tape measure, pit gauge, ultrasonic gauge, metallic ruler, bridging bar, or other measuring devices to take accurate measurements.	Necessary equipment and tools required to complete task.
3	Prepare, clean, and remove debris from the surface to be measured.	Coatings, primer and surface deposits may interfere with accurate readings and need to be removed.
4	Create a representation of the pipe surface to be inspected so that corroded areas on the pipeline can be accurately represented. Identify the long seam and the nearest girth weld as reference points and identify corrosion in proximity.	Typically the pipeline is represented on paper as split at 12:00 or 6:00 (of an analog clock face) and flattened to represent the pipe as a rectangle. The format is determined based on company policy.
5	Overlay a grid on each area of localized corrosion.	Grids are used to represent areas of general corrosion to provide additional detail for assessment.
6	Measure longitudinal length of each area of localized corrosion.	This measurement is required for assessment of pipeline integrity.
7	Measure circumferential width of each area of localized corrosion.	Used to properly identify the localized corrosion on the overall representation.
8	Measure the distance between each area of localized corrosion.	Used to properly identify the localized corrosion on the overall representation. This is also used to determine the interaction between discrete areas of localized corrosion.
9	Obtain profile measurements of the corrosion region. The profile measurements can be represented as the remaining wall thickness or actual pit/general corrosion depth.	This must be performed by an individual qualified on Task 8.1 "Measure Pit Depth with Pit Gauge" and/or Task 8.2 "Measure Wall Thickness with Ultrasonic Meter."
10	Obtain and determine nominal wall thickness.	This must be performed by an individual qualified on Task 8.2 "Measure Wall Thickness with Ultrasonic Meter."
11	Identify areas of greatest wall loss within each area of localized corrosion and obtain pit depth measurements.	This must be performed by an individual qualified on Task 8.1 "Measure Pit Depth with Pit Gauge" and/or Task 8.2 "Measure Wall Thickness with Ultrasonic Meter."
12	Document the findings and make notifications. Denote all areas of localized corrosion, distances between those areas and pit depth readings on the representation.	Follow company policies/procedures for appropriate documentation, notification protocol, and actions required.

OQ Task Name

Task 14.1 – Locate Line

1.0 Task Description

This task consists of establishing the location of a pipeline. This task requires the use of maps, drawings, and locating equipment. A variety of line locating tools and methods can be used to locate a line; this task is not specific to any one tool or method.

This task begins when the need to locate line has been identified and ends when the correct line segment has been located.

Install, Inspect and Maintain Permanent Marker is a separate covered task (Reference Task 14.2).

Install, Inspect and Maintain Temporary Marker is a separate covered task (Reference Task 14.5).

NOTE: If this qualification is performed on a pipeline subject to regulation by 49 *CFR* Part 192 or 195 and potholing is used for verification, an individual qualified for Task 32 “Observe Excavation Activities” must observe or perform the potholing activity.

2.0 Knowledge Component

An individual performing this task must have knowledge of:

Definitions applicable to this task:

One-Call Notification System

A communication system in which an operational center receives notices from excavators of intended excavation activities and transmits the notices to operators of underground pipeline facilities and other underground facilities that participate in the system.

One-Call Ticket

Documentation of the One-Call request. It includes an assigned number for tracking the ticket and all associated documentation. One-Call laws vary from state to state.

Potholing

Digging a hole to uncover a pipeline to verify its location. Daylighting and bell-holing are alternate terms for potholing.

Probing

Contacting the pipeline with a bar or rod to verify its location. When probing, care must be taken to avoid damaging to the pipeline coating.

Locator readings may be impacted by pipeline depth, type of soil, and soil density.

When using handheld electronic line locators, interference (stray signals from surrounding pipelines, underground or overhead power lines, metal fencing, railroad, etc.) may be encountered. When locating a pipeline in a multiple pipeline corridor, it may be advantageous to directly connect the locating signal to the pipeline and/or use a multi-frequency pipeline locator, initially setting the frequency range to its lowest setting. Using the low setting prevents the signal from jumping to (identifying) other pipeline facilities. Drastic changes in voltage and/or depth readings may indicate that an adjacent pipeline has been located.

Abnormal Operating Conditions (AOCs)

The following AOCs could be encountered while performing this task:

AOC Recognition	AOC Reaction
<p>Unplanned or pre-existing release of hazardous liquid or gas which could lead to unintentional ignition or other adverse events. Evidence of a release may include and not be limited to:</p> <ul style="list-style-type: none"> • Odor of hazardous gas or liquids • Dead vegetation • Audible cues • Sheen on water • Bubbles 	<p>Stop task activities and move to a safe distance and notify appropriate pipeline personnel. Appropriate notifications may include:</p> <ul style="list-style-type: none"> • Contacting pipeline personnel • Activating the 911 Emergency System

3.0 Skill Component

To demonstrate proficiency of this task, an individual must perform the following steps:

Step	Action	Explanation
1	Receive a One-Call Ticket and describe the content and requirements of the ticket.	<p>The individual must be able to use the One-Call Ticket to determine at a minimum:</p> <ul style="list-style-type: none"> • The date the locate must be completed by • The area to be marked
2	Receive the most current drawings and/or maps and identify the pipeline to be located.	Drawings and/or pipeline maps are used to assist in locating the pipeline.
3	Check to ensure locating equipment is in proper working order in accordance with the manufacturer's recommendations.	Equipment needs to be operating properly for an accurate locate. Ensure the locating equipment is properly charged and calibrated.
4	Conduct a visual assessment to determine site conditions that could affect task performance.	Some rights-of-way are restricted or site conditions may impede access. Examples may include physical obstructions, traffic, soil conditions, hazards, standing water, trenches, etc.
5	Use line locating equipment to determine the approximate location of the line.	Line locating equipment will only identify the approximate location. Exact location will be verified in step 6.
6	Verify the location by potholing and/or probing.	<p>Verification must be performed by the evaluator or other qualified individual.</p> <p>NOTE: If this qualification is performed on a jurisdictional pipeline and potholing is used for verification, an individual qualified for Task 32 "Observe Excavation Activities" must observe or perform the potholing activity.</p>

OQ Task Name

Task 14.2 – Install, Inspect, and Maintain Permanent Marker

1.0 Task Description

The task begins with verification that the line has been located. This task consists of installing, inspecting, and maintaining permanent pipeline markers in required locations. Permanent markers visually communicate the location of the pipeline. Line markers must meet the specifications outlined in applicable regulations. The task ends when the line is accurately marked with permanent marker(s).

Locate Line is a separate covered task (Reference Task 14.1).

2.0 Knowledge Component

An individual performing this task must have knowledge of:

Signs should be located directly over the pipeline if possible, but offset orientation is permissible.

Markers should be installed:

- At public road crossings
- At railroad crossings
- At above ground locations in areas that are accessible to the public
- In sufficient number along the remainder of each buried line so that its location is accurately known

Markers are not required for buried pipelines located:

- Offshore or at crossings of or under waterways and other bodies of water
- In heavily developed urban areas such as downtown business centers where:
 - The placement of markers is impractical and would not serve the purpose for which the markers are intended
 - The local government maintains current substructure records

At a minimum, markers should contain the following information on a background of sharply contrasting color:

- The word “Warning,” “Caution,” or “Danger,” followed by the words “Petroleum (or the name of the hazardous liquid transported) Pipeline” or “Carbon Dioxide Pipeline,” all of which, except for markers in heavily developed urban areas, must be in letters at least 1” high with an approximate stroke of ¼”.
- The name of the operator and a telephone number at which the operator can be reached at all times.

If applicable, ensure that a One Call has been placed prior to installing a marker. A One-Call notification system means a communication system in which an operational center receives notices from excavators of intended excavation activities and transmits the notices to operators of underground pipeline facilities and other underground facilities that participate in the system.

One-Call laws vary from state to state.

Abnormal Operating Conditions (AOCs)

The following AOCs could be encountered while performing this task:

AOC Recognition	AOC Reaction
Unplanned or pre-existing release of hazardous liquid or gas, which could lead to unintentional ignition or other adverse events. Evidence of a release may include and not be limited to: <ul style="list-style-type: none"> • Odor of hazardous gas or liquids • Dead vegetation • Audible cues • Sheen on water • Bubbles 	Stop line-marking activities, move to a safe distance and notify appropriate pipeline personnel. Appropriate notifications may include: <ul style="list-style-type: none"> • Contacting pipeline personnel • Activating the 911 Emergency System

3.0 Skill Component

To demonstrate proficiency of this task, an individual must perform the following steps:

Step	Action	Explanation
1	Verify that the line has been located.	Ensures accurate placement of the marker.
2	Determine proper marker location(s).	Markers warn the public and prevent damage to the pipeline.
3	Verify the appropriate marker for the location and product.	Markers need to have the correct product identification and information required by the regulation.
4	Securely install the mounting apparatus and marker. Caution: When applicable, probe or pothole prior to installing a post to help ensure that the pipeline is not damaged.	Ensure markers have a good solid foundation.
5	Inspect the signs for correct information, visibility, and orientation. Replace the sign if a marker is missing, damaged, or the incorrect information is shown.	Ensures information on marker is in good condition, visible, legible, and in accordance with regulatory requirements.

OO Task Name

Task 14.5 – Install, Inspect, and Maintain Temporary Marker

1.0 Task Description

The task begins with a location request which may include a One Call. This task consists of installing, inspecting, and maintaining temporary pipeline markers. Temporary markers visually communicate the location of the pipeline on the surface of the right-of-way (ROW). Operators must provide for temporary marking of buried pipelines in the area of excavation activity before, as far as practical, the activity begins.

Installation is the placement of new markers or replacement of existing temporary markers. The task ends when the line is accurately marked.

NOTE:

- 1) State laws regarding marking requirements may vary.
- 2) Locate Line is a separate covered task (Reference Task 14.1).

2.0 Knowledge Component

An individual performing this task must have knowledge of:

Definitions applicable to this task:

One Call

A system through which anyone can notify owners/operators of lines or facilities of proposed excavation so that the Owners/Operators can mark the lines and undertake other damage prevention measures.

One-Call Ticket

Documentation of the One-Call request. It includes assigned number identification for tracking the ticket and all associated documentation. One-Call laws vary from state to state.

White Lining

Under certain state laws and/or best practices recommended by organizations such as the Common Ground Alliance, excavators designate the ground of an area to be excavated using white paint, white flags, white stakes, or any combination of these.

Some state laws require that the operator make a “positive response.” Positive response is communication with the excavator prior to excavation to ensure that all contacted owners/operators have located their underground facilities and have appropriately marked any potential conflicts within the areas of planned excavation. Positive response may be accomplished by fax, phone, pager, written correspondence, email, or other electronic means that allows an excavator to know, prior to the beginning of the excavation, that underground pipelines have been located and marked or that there are no underground pipelines in the vicinity of the excavation.

Temporary markers must be replaced if they are damaged or missing as long as the One-Call Ticket is active.

Types of markers include flags, painting, chalk, stake chasers (“whiskers”), stakes, etc. Marker selection may depend on existing and expected conditions such as weather, traffic, construction, and local requirements.

The ANSI uniform color code for marking underground hazardous liquid and gas pipeline facilities is yellow.

Markers should be placed as close as practicable over the pipeline. Markers should be installed in sufficient number along the buried line so that its location is accurately known.

Abnormal Operating Conditions (AOCs)

The following AOCs could be encountered while performing this task:

AOC Recognition	AOC Reaction
Unplanned or pre-existing release of hazardous liquid or gas, which could lead to unintentional ignition or other adverse events. Evidence of a release may include and not be limited to: <ul style="list-style-type: none"> • Odor of hazardous gas or liquids • Dead vegetation • Audible cues • Sheen on water • Bubbles 	Stop line-marking activities, move to a safe distance and notify appropriate pipeline personnel. Appropriate notifications may include: <ul style="list-style-type: none"> • Contacting pipeline personnel • Activating the 911 Emergency System

3.0 Skill Component

To demonstrate proficiency of this task, an individual must perform the following steps:

Step	Action	Explanation
1	Receive a One-Call Ticket and describe the content and requirements of the ticket.	The individual must be able to use the One-Call Ticket to determine at a minimum: <ul style="list-style-type: none"> • The date the locate must be completed by • The area to be marked
2	Verify that the line has been located within the proposed excavation area.	Ensures accurate placement of the marker. If there is difficulty determining the proposed excavation area, ensure the One-Call center or excavator is contacted for clarification of the proposed excavation area.
3	Adequately mark the pipeline so that its location is accurately known. Temporary marker(s) should be located directly over the pipeline.	When a temporary marker cannot be located directly over the pipeline, an offset marker shall be installed according to company and state requirements.

OQ Task Name

Task 15.1 – Visually Inspect Surface Conditions of Right-of-Way

1.0 Task Description

The task begins with accurately identifying the right-of-way to be inspected. This task consists of performing an inspection of surface conditions on, or adjacent to, the pipeline right-of-way. The purpose of the inspection is to identify and observe for indications of leaks, construction activity, and other factors affecting safety and operation. Methods of inspection may include walking, driving, flying, or other appropriate means of traversing the right-of-way. The task ends with completion of the required documentation.

2.0 Knowledge Component

An individual performing this task must have knowledge of:

The following conditions that could pose an immediate threat to persons, property, or the environment, resulting in a typical reaction that would include stopping right-of-way surveillance activities, moving to a safe distance, and notifying appropriate pipeline personnel.

- Indications of a release:
 - Vapor cloud or frost ball on or near a right-of-way
 - Sheen on or bubbles in the water on a right-of-way
 - Dead vegetation or wet spot
 - Odor of hazardous gas or liquids
 - Audible cues (hissing, roaring, etc.)
- Flooding, washouts, erosion, or exposure that could immediately damage or affect the stability of a pipeline
- Fire or explosion near the right-of-way

The conditions that could impact the safety or integrity of the pipeline, resulting in a typical reaction that would mandate prompt notification and reporting include:

- Construction or excavation equipment or other signs of construction activity on or near a right-of-way
- Soil movement such as a landslide, mudslide, or sinkhole
- Sagging aboveground pipe at a span
- Damaged, leaning, or failing pipe support system
- Unusual materials, equipment, and/or foreign objects on or near the right-of-way
- Damage to pipeline facilities or suspicious activity that might indicate vandalism or terrorist actions

The conditions that could impact the pipeline, resulting in a typical response that would include reporting:

- Vegetation overgrowth / excessive canopy that may obstruct view of right-of-way
- Damaged or missing line marker(s)
- Soil movement such as subsidence or settling
- Tripped anchors on aboveground pipe
- Damage to coatings or insulation on aboveground pipe or components

3.0 Skill Component

To demonstrate proficiency of this task, an individual must perform the following steps:

Step	Action	Explanation
1	Accurately identify the right-of-way to be inspected from alignment sheets and/or pipeline maps.	Ensures the correct line is being inspected and dictates the mode of inspection (aerial patrol, walking the right-of-way, vehicle patrol).
2	Perform the visual inspection/patrol of the right-of-way.	
3	Make proper notifications	Appropriate reaction to observations may help prevent damage and/or release.
4	Complete required documentation.	All regulatory-required inspections must be documented.

OQ Task Name

Task 16.1 – Inspect Navigable Waterway Crossing

1.0 Task Description

The purpose of navigable waterway crossing inspection is to detect areas of potential pipe exposure and/or damage and to collect and record information to document the location of the pipeline.

This task starts with notification of the line to be inspected and ends with the completed documentation.

Locate Line is a separate covered task (Reference Task 14.1).

2.0 Knowledge Component

An individual performing this task must have knowledge of:

Definitions applicable to this task:

Navigable Waterway

A waterway that is used or could be used for commerce.

Depth of Cover

The vertical distance from the top of the pipe to the soil/water interface.

Operation of specialized locating equipment to determine depth of cover.

Except for offshore pipelines, each operator shall, at intervals not exceeding 5 years, inspect each crossing under a navigable waterway to determine the condition of the crossing.

Abnormal Operating Conditions (AOCs)

The following AOCs could be encountered while performing this task:

AOC Recognition	AOC Response
Vessel anchored over the pipeline.	Make proper company notifications.
Visible sheen or other indications of product release.	Immediately make proper company notifications.
Waterway bank erosion.	Immediately make proper company notifications.
Debris lodge against pipeline.	Immediately make proper company notifications.
Pipe movement or suspension pipeline.	Immediately make proper company notifications.

3.0 Skill Component

To demonstrate proficiency of this task, an individual must perform the following steps:

Step	Action	Explanation
1	Locate pipeline adjacent to navigable water way crossing.	Establishes a reference point

Step	Action	Explanation
2	Determine the depth of the submerged pipeline by using a probe or specialized electronic equipment.	Determines the amount of cover and verifies the condition of the crossing
3	Document findings: <ul style="list-style-type: none"><li data-bbox="315 457 844 489">• Location of exposed or unsupported pipe<li data-bbox="315 495 537 527">• Depth of cover	Required by regulation 49 <i>CFR</i> 195.404

OQ Task Name

27.1 – Routine Inspection of Breakout Tanks (API 653 Monthly or DOT Annual)

1.0 Task Description

The scope of this task encompasses performing routine tank inspections in accordance with the latest DOT approved edition of API 653. The interval of the inspection shall not exceed 1 month.

API 653 Inspection of In-Service Breakout Tanks is a separate covered task (Reference Task 27.2).

2.0 Knowledge Component

An individual performing this task must have knowledge of:

The purpose of this task is to evaluate the condition of a breakout tank by visually determining the condition of the tank and its components.

There are three primary types of atmospheric steel aboveground breakout tanks:

1. **External/opentop floating roof tanks** – An open topped cylindrical aboveground steel shell equipped with a roof that floats on the surface of the stored liquid. The roof rises and falls with the liquid level in the tank. There is a rim seal system between the tank shell and roof to reduce rim evaporation.

The roof has support legs hanging down into the liquid. At low liquid levels the roof eventually lands and a vapor space forms between the liquid surface and the roof, similar to a fixed roof tank. The support legs are usually retractable to increase the working volume of the tank.

2. **Fixed/cone roof tank** – A closed top cylindrical aboveground steel shell with either a: supported cone roof supported principally either by rafters on girders and columns or by rafters on trusses with or without columns, a self-supporting cone roof that is supported only at its periphery, or a self-supporting dome roof formed to approximately a spherical surface that is supported only at its periphery.
3. **Internal floating roof tanks** – These tanks are cone roof tanks with a floating roof inside that travels up and down along with the liquid level.

Definitions applicable to this task:

Chime Ring

The outside edge of the tank bottom that extends past the weld of the tank shell. The chime ring should be visually inspected for signs of settlement, corrosion and evidence of leaks.

Secondary Containment

An impoundment, such as a dike, that could contain spilled product on site. The impoundment may be constructed of concrete, earth, steel, or solid masonry and is designed to be liquid tight. Dikes should not be compromised by erosion, excavations, or excessive vegetation.

Reinforcing Plate/Pad/Repad

Steel reinforcement plates installed around shell openings to provide the shell with added strength required for the installation of a shell appurtenance. Repads should be visually inspected for corrosion and coating condition.

Shell

The vertical, cylindrical walls of a tank. The shell shall be visually inspected for distortions, signs of settlement, corrosion and condition of coating and insulation systems, if applicable.

Shell Appurtenances

Manways, reinforcement plates, nozzles, sampling ports, temperature probes, mixers and auto-gauge systems. Shell appurtenances shall be visually inspected for corrosion, coating condition and evidence of leaks.

Tank Foundation/Ring Wall

Perimeter concrete ring providing support for the tank shell. Foundations shall be inspected for signs of settlement and foundation condition.

Roof

The top external surface of the tank. The roof shall be visually inspected for evidence of leaks and coating condition. External floating roof tanks should be inspected for excessive water or other material that may cause a condition that could affect the integrity of the tank.

Telltale/Weep Hole

A threaded penetration of the reinforcing plate that is used to determine if the shell has developed a leak in the area where the reinforcing plate covers the shell. Weep holes should be inspected for evidence of leaks.

3.0 Skill Component

To demonstrate proficiency of this task, an individual must perform the following steps:

Step	Action	Explanation
1	Visually inspect for evidence of leaks. <ul style="list-style-type: none"> • Mixer seals • Flanges • Manways/nozzles • Chime • Roof/pontoons • Welds/rivets • Telltales/weep holes on reinforcing pads • Sheen on water in containment area 	Leaks indicate an integrity issue and immediate response according to company policies is required. Response actions may include stopping operation and securing equipment, if safe to do so, immediately notifying the operator and executing applicable emergency procedures.
2	Visually inspect the shell for defects: <ul style="list-style-type: none"> • External visual inspection for paint and corrosion defects. • Inspect the chime area for corrosion. • Reinforcement plate/padding around manways and/or valves. • Inspect for shell distortions—look for deflection or deformation of the shell. • Insulation condition, if applicable 	Visual inspection of the shell is performed to identify coating condition, areas of pitting or corrosion and distortions.

Step	Action	Explanation
3	Visually inspect for settlement around the perimeter of the tank and the condition of the foundation: <ul style="list-style-type: none"> • Check that rainwater runoff from the shell drains away from tank. • Inspect for broken concrete and cracks. • Inspect for cavities under the foundation and vegetation against the bottom of the tank. 	Visual inspection of the foundation is performed to identify conditions such as settlement or lack of support under the tank shell/floor. Surface water should be kept away from the tank to prevent corrosion or erosion of the foundation.
4	Visually inspect the secondary containment system for impoundment integrity.	Tank dike wall must be maintained so that the containment area capacity remains as designed.
5	Visually inspect the tank roof for: <ul style="list-style-type: none"> • Coating condition, holes, pitting, and corrosion. • Standing or pooling water or product. • Floating roof out of level. 	Large standing water areas on a floating roof indicate inadequate drainage design or, if to one side, a non-level roof with possible leaking pontoons. Floating roofs can sink and possibly impact the integrity of the tank floor if excessive weight from water/product on top of the roof is not removed. Significant sagging of fixed-roof deck indicates potential rafter failure.
6	Document the findings of the inspection	Submit completed inspection form according to operator's procedures

OQ Task Name

Task 27.2 – API 653 Inspection of In-Service Breakout Tanks

1.0 Task Description

The scope of this task is performing an internal or external inspection of an in-service breakout tank in accordance with the latest DOT approved edition of API 653. This inspection shall be performed by an *authorized inspector* as defined by API 653.

An in-service breakout tank is one that has been commissioned.

Routine Inspection of Breakout Tanks is a separate covered task (Reference Task 27.1).

2.0 Knowledge Component

An individual performing this task must have knowledge of:

Provide documentation of the American Petroleum Institute (API) Authorized Inspector Certification for API 653. For atmospheric and low-pressure steel aboveground tanks the inspector shall have certification as an authorized inspector for those tanks under API 653.

3.0 Skill Component

The certificate demonstrates task performance proficiency. No other steps are required for OQ qualification.

Step	Action	Explanation
1	Inspect the physical integrity of aboveground steel breakout tanks in accordance with the latest DOT approved edition of API 653.	Authorized Inspector Certification required in accordance with the latest DOT approved edition of API 653. Conditions that are found to be unacceptable according to the latest DOT approved edition of API 653 shall be documented and provided to the operator.

OQ Task Name

Task 27.3 – API 510 Inspection of In-Service Breakout Tanks

1.0 Task Description

The scope of this task is performing an internal or external inspection of an in-service breakout tank in accordance with the latest DOT approved edition of API 510. This inspection shall be performed by an *authorized inspector* as defined by API 510.

An in-service breakout tank is one that has been commissioned.

Routine Inspection of Breakout Tanks is a separate covered task (Reference Task 27.1).

2.0 Knowledge Component

An individual performing this task must have knowledge of:

Provide documentation of the American Petroleum Institute (API) Authorized Inspector Certification for API 510. For steel aboveground breakout tanks built to API Standard 2510 the inspector shall have certification as an authorized pressure vessel inspector for API 510.

3.0 Skill Component

The certificate demonstrates task performance proficiency. No other steps are required for OQ qualification.

Step	Action	Explanation
1	Inspect the physical integrity of aboveground steel breakout tanks in accordance with the latest DOT approved edition of API 510.	Authorized Inspector Certification required in accordance with the latest DOT approved edition of API 510. Conditions that are found to be unacceptable according to the latest DOT approved edition of API 510 shall be documented and provided to the operator.

OQ Task Name

Task 32.0 – Observation of Excavation Activities

1.0 Task Description

This task consists of observing excavation activities in order to help prevent damage to buried pipelines. Excavation refers to the removal of earth by any means when that removal could expose or damage a buried or submerged pipeline. This task **does not** apply to horizontal/directional drilling, but **does** apply to vertical drilling (including drilling to collect soil samples) whenever pipelines are present.

This task begins after the pipeline(s) has been properly located and marked and when the removal of earth first begins. The task ends when all intended earth removal has been accomplished. This task is intended for individual(s) at the site responsible for the observation of the excavation.

Backfilling a Trench Following Maintenance is a separate covered task (Reference Task 39.0).

NOTE: This task is NOT intended to satisfy OSHA requirements for Competent Persons for Excavation Activities.

2.0 Knowledge Component

An individual performing this task must have knowledge of:

The pipeline operator's control center or local operations personnel must be notified so that operations personnel are aware of the excavation and can take appropriate actions.

A current One-Call Ticket must be on record, if required by operator's Damage Prevention program. One Call is a system to notify owners/operators of lines or facilities of proposed excavation so that the owners/operators can mark the lines and undertake other damage prevention measures. The excavation activities should not continue if there is not a current One-Call Ticket, when required.

The pipeline and all other buried structures must be located and marked by stakes, paint, or some other customary manner (line locating is a separate covered task). The excavation activities should not continue if any known structures are not marked. The positioning of equipment (profile) at the excavation site must not produce any undue stress on a buried structure.

The individual performing this task must be aware of the marked area to be excavated and digging criteria including tolerance zone and hand digging or other noninvasive excavation requirements. The tolerance zone is an area equal to half the nominal diameter of the underground pipeline plus a distance defined by the operator or state on either side of the outside edge of the underground pipeline facility on a horizontal plane (sometimes referred to as "clearance"). Tools must be appropriate for the excavation, including but not limited to:

- Backhoe (if required by operator's procedures, teeth on the backhoe bucket may need to be covered with a flat bar to prevent accidentally piercing the pipeline; the bucket must be of an appropriate size)
- Jackhammer
- Hydro-vac
- Vacuum excavator
- Shovels and hand tools

Abnormal Operating Conditions (AOCs)

The following AOCs could be encountered while performing this task:

AOC Recognition	AOC Reaction
Pipeline is unintentionally hit during the excavation with no release of product.	Stop excavation activities. Notify appropriate local operations personnel. If damage could result in an emergency situation, notify proper authorities and request a line shut down, if necessary.
Pipeline is unintentionally hit during the excavation, resulting in a release of product.	Stop excavation activities. Follow operator's emergency response procedures for notification. If damage could result in an emergency situation, notify proper authorities and request line shut down, if necessary.
Unplanned or pre-existing release of hazardous liquid or gas, which could lead to unintentional ignition or other adverse events.	Stop excavation activities and assess the extent of the release. Depending on the situation, take action according to the operator's emergency response plan.
Discovery of unexpected physical damage to the pipeline system, including: scraping, displacement, nicks, leaks, dents, gouges, grooves, destruction, or partial or complete breaks of an underground pipeline or of any protective coating, casing, conduits, cathodic protection, or any other protective or communications device of a pipeline.	Stop excavation activities. Report damage to appropriate operations personnel for further assessment, if necessary.
Discovery of an undocumented pipeline in the area of excavation.	Stop excavation activities. Ensure proper notifications are made to the appropriate One-Call Center, local operations personnel, and/or other appropriate agency. Notation or notification should be made so that the operator can update alignment sheets and/or pipeline maps.
Improper support for the pipeline during excavation could lead to pipeline damage.	Stop excavation activities if necessary, and ensure proper support.

If an area is left unattended, the area should be secured in accordance with an operator's procedures. Methods of securing an excavation may include temporary fences, metal plate, markers, or other appropriate methods.

3.0 Skill Component

To demonstrate proficiency of this task, an individual must perform the following steps:

Step	Action	Explanation
1	Ensure that notification has been made to the control center or local operations at the beginning of work.	Operations personnel should closely monitor pipeline pressure and flow during excavation activities.
2	Identify an appropriate location for excavated material (soil) to ensure that it is placed in a location that could not affect the integrity of the pipeline.	Provide adequate distance from the excavation to ensure the stability of the excavation, prevent excessive stress on the pipeline, and prevent pipeline damage due to cave-in.

Step	Action	Explanation
3	Identify the marked and potentially unmarked hazards surrounding the excavation site (including underground hazards).	Observe for irregularities. Ensure hazards are avoided and prevent damage to the line or any appurtenances.
4	Determine and communicate to excavator the required tolerance zone.	Adherence to tolerance zones provides assurance that the pipeline will not be hit.
5	Ensure that the tolerance zone is maintained during excavation. Require hand digging or other non-invasive excavation methods of the remaining soil within the tolerance zone.	Use of hand tools, vacuum excavation or other non-invasive methods minimizes damage when excavating near the pipe.
7	Notify control center or local operations at the completion of work.	Ensure the line is monitored during and after excavation activities.
8	Document the excavation per operator procedures.	<p>Documentation about the excavation may include but is not limited to:</p> <ul style="list-style-type: none"> • Date • Location (line segment, mile post, etc.) • Name of excavator • Purpose of excavation • Scope of excavation (size, extent, etc.) • One-Call information, if required • Depth of cover

OQ Task Name

Task 38.1 – Visually Inspect Pipe and Pipe Components Prior to Installation

1.0 Task Description

The scope of this task is the on site visual inspection of pipe and components that are to be installed in the pipeline system. The purpose of the inspection is to ensure that the pipe and components are not damaged in a manner that could impair their strength or reduce their serviceability and to ensure that the pipe and components are rated for intended service.

The task does not include an assessment of damage and any determination of the measures that should be taken to mitigate the damage found during an inspection.

2.0 Knowledge Component

An individual performing this task must have knowledge of:

Definitions applicable to this task:

Component

Any part of a pipeline which may be subjected to pump pressure including, but not limited to, pipe, valves, elbows, tees, flanges, and closures.

Maximum Operating Pressure (MOP)

The maximum pressure at which a pipeline or segment of a pipeline or a component may be normally operated. Inspection shall include assurance that the pipe and/or component is compatible with MOP for the system in which it is to be installed.

Corrosion

Surface rust or pitting are examples of conditions that may be identified during a visual inspection.

Mechanical Defects

Buckles, dents, cracks, gouges, out of round pipe, or other defects that might reduce the strength of the pipe or pipe component. A crack is a surface flaw or defect characterized by break without complete separation; fissure. A gouge is a surface flaw characterized by the removal of steel from the pipe or component.

Buckled or Wrinkled Bends

Bends must have a smooth contour. Buckles and wrinkles are physical defects that are characterized by bulging or warping of the pipe.

Coating defects that can be visually identified such as cuts, scratches, or other defects characterized by a visually determined loss of coating (holiday).

Each length of pipe with a nominal outside diameter of 4½ in. (114.3 mm) or more must be marked on the pipe or pipe coating with the specification to which it was made, the specified minimum yield strength or grade and the pipe size. The marking must be applied in a manner that does not damage the pipe or pipe coating and must remain visible until the pipe is installed.

Each valve must be marked on the body or the nameplate with at least the following:

1. Manufacturer's name or trademark
2. Class designation or the maximum working pressure to which the valve may be subjected

3. Body material designation (the end connection material, if more than one type is used)
4. Nominal valve size

Butt-welding type fittings must meet the marking and end preparation required by the operator's specification.

3.0 Skill Component

To demonstrate proficiency of this task, an individual must perform the following steps:

Step	Action	Explanation
1	Inspect pipe and components for: <ul style="list-style-type: none"> • Corrosion • Defects such as cracks, grooves, gouges, dents, or out of round pipe • Coating damage • For bends inspect for buckles and/or wrinkles 	The inspection of pipe and components prior to installation does not include an assessment of the damage and a determination of the measures necessary to mitigate the damage.
2	Ensure component is rated for intended service.	Inspector must know the design MOP for the system and ensure through visual verification of the markings on the pipe and components that the pipe or component is compatible.
3	Communicate the inspection results.	A satisfactory outcome of the inspection must be achieved. If not, the condition must be noted and resolved.

OQ Task Name

Task 38.3 – Visually Inspect that Welds Meet DOT Requirements

1.0 Task Description

The scope of this task is to visually inspect welds to ensure they are in accordance with the latest DOT approved edition of API 1104 and the applicable qualified welding procedure and to identify any defects that may affect the integrity of a pipeline tie-in or component replacement.

NDT – Magnetic Particle Testing is a separate covered task (Reference Task 38.6).

NDT – Radiographic Testing is a separate covered task (Reference Task 38.4).

2.0 Knowledge Component

An individual performing this task must have knowledge of:

This inspection of welds and identification of conditions as defined by the latest DOT edition of API 1104 and the operator's applicable written welding procedure are limited to conditions that can be identified visually and include:

- Arc Burn – The gouging effect imparted to the surface of the pipe whenever an electric arc is inadvertently struck, typically adjacent to a weld, when starting to weld.
- External Undercut (EU) – A groove melted in parent material adjacent to the cover pass and left unfilled by weld material.
- Pin Hole or Porosity (POR) – A condition when the surface of the weld is in a semi-molten stage and gas produced by the welding process rises to the surface of the molten puddle and escapes. This condition leaves the appearance of pin holes on the surface of the weld. Acceptable porosity limits are determined by radiography.
- Slag – Slag is the residue left on a weld bead from the flux. It shields the hot metal from atmospheric contaminants that may weaken the weld point. Slag can also be globules of molten metal that are expelled from the joint and then re-solidify on the metal surface.
- Weld (Cap) Height – The distance the completed weld extends beyond the height of the parent material. The weld dimensions, including the weld height, are determined by the written welding procedure.

The Qualified Welding Procedure is a tested and proven detailed method by which sound welds with suitable mechanical properties can be produced. The procedure shall be written and records shall include the results of qualifying tests. An individual performing this task must be knowledgeable of the operator's applicable written welding procedure.

3.0 Skill Component

To demonstrate proficiency of this task, an individual must perform the following steps:

	Action	Explanation
1	<p>Identify any conditions that do not meet the qualified welding procedure or the latest DOT approved edition of API Standard 1104. Conditions may include:</p> <ul style="list-style-type: none"> • Arc burn • External undercut (EU) • Pin hole/porosity • Slag • Weld (cap) height – inadequate or excessive 	<ul style="list-style-type: none"> • Arc burns are not acceptable and must be repaired • The depth of EU adjacent to the final bead on the outside of the pipe shall not be more than $\frac{1}{32}$ of an inch or 12.5% of the pipe wall thickness (whichever is smaller). There shall not be more than 2 inches of EU in any continuous 12 inch length of weld. • Surface pinholes are an indication of porosity • Slag and weld splatter can mask surface imperfections • Acceptable weld dimensions including the minimum and maximum weld height are determined by the applicable qualified welding procedure
2	Communicate the inspection results.	A satisfactory outcome must be achieved. If not, the condition must be noted and resolved.

OQ Task Name

Task 38.4 – NDT – Radiographic Testing

1.0 Task Description

The scope of this task is to verify that welds meet the specifications of the latest DOT approved edition of API Standard 1104 utilizing radiography and to identify any indications and imperfections that may affect the integrity of a pipeline tie-in, component installation/replacement, or pipeline repair.

Visually Inspect that Welds Meet DOT Requirements is a separate covered task (Reference Task 38.3).

2.0 Knowledge Component

An individual performing this task must have knowledge of:

Provide documentation of certification through the American Society for Nondestructive Testing, Recommended Practice No. SNT-TC-1A, ACCP certification for radiography (RT), or any other recognized national certification program that shall be acceptable to the company for the test method used.

3.0 Skill Component

The certificate demonstrates task performance proficiency. No other steps are required for OQ qualification.

Step	Action	Explanation
1	Evaluate completed welds utilizing radiography to ensure they meet the requirements of the latest DOT approved edition of API 1104.	Certification required to Level II or III in accordance with the recommendations of American Society for Nondestructive Testing (ASNT), Recommended Practice No. SNT-TC-1A, ACCP for radiography (RT), or any other recognized national certification program that shall be acceptable to the company for the test method used.

OQ Task Name

Task 38.5 NDT – Liquid Penetrant Testing

1.0 Task Description

The scope of this task is to verify that welds meet the specifications of the latest DOT approved edition of API Standard 1104 utilizing liquid penetrant testing and to identify indications and imperfections that may affect the integrity of a pipeline tie-in, component installation/replacement, or pipeline repair.

Visually Inspect that Welds Meet DOT Requirements is a separate covered task (Reference Task 38.3).

2.0 Knowledge Component

An individual performing this task must have knowledge of:

Provide documentation of certification through the American Society for Nondestructive Testing, Recommended Practice No. SNT-TC-1A, ACCP certification for Liquid Penetrant Testing (PT) or any other recognized national certification program that shall be acceptable to the company for the test method used.

3.0 Skill Component

The certificate demonstrates task performance proficiency. No other steps are required for OQ qualification.

Step	Action	Explanation
1	Evaluate completed welds utilizing liquid penetrant testing to ensure they meet the standards of the latest DOT approved edition of API 1104.	Certification required to Level II or III in accordance with the recommendations of American Society for Nondestructive Testing (ASNT), Recommended Practice No. SNT-TC-1A, ACCP for Liquid Penetrant Testing (PT), or any other recognized national certification program that shall be acceptable to the company for the test method used.

OQ Task Name

Task 38.6 – NDT – Magnetic Particle Testing

1.0 Task Description

The scope of this task is to verify that welds meet the specifications of the latest DOT approved edition of API Standard 1104 utilizing magnetic particle testing and to identify any indications or imperfections that may affect the integrity of a pipeline tie-in, component installation/replacement or pipeline repair.

Visually Inspect that Welds Meet DOT Requirements is a separate covered task (Reference Task 38.3).

2.0 Knowledge Component

An individual performing this task must have knowledge of:

Provide documentation of certification through the American Society for Nondestructive Testing, Recommended Practice No. SNT-TC-1A, ACCP certification for magnetic particle testing (MP) or any other recognized national certification program that shall be acceptable to the company for the test method used.

3.0 Skill Component

The certificate demonstrates task performance proficiency. No other steps are required for OQ qualification.

Step	Action	Explanation
1	Evaluate completed welds through magnetic particle testing to ensure they meet the requirements of the latest DOT approved edition of API 1104.	Certification required to Level II or III in accordance with the recommendations of American Society for Nondestructive Testing (ASNT), Recommended Practice No. SNT-TC-1A, ACCP for magnetic particle testing (MP) or any other recognized national certification program that shall be acceptable to the company for the test method used.

OQ Task Name

Task 38.7 – NDT – Ultrasonic Testing

1.0 Task Description

The scope of this task is to verify that welds meet the specifications of the latest DOT approved edition of API Standard 1104 utilizing ultrasonic testing and to identify any indications and imperfections that may affect the integrity of a pipeline tie-in, component installation/replacement, or pipeline repair.

Visually Inspect that Welds Meet DOT Requirements is a separate covered task (Reference Task 38.3).

2.0 Knowledge Component

An individual performing this task must have knowledge of:

Provide documentation of certification through the American Society for Nondestructive Testing, Recommended Practice No. SNT-TC-1A, ACCP certification for ultrasonic testing (UT) or any other recognized national certification program that shall be acceptable to the company for the test method used.

3.0 Skill Component

The certificate demonstrates task performance proficiency. No other steps are required for OQ qualification.

Step	Action	Explanation
1	Evaluate completed welds utilizing ultrasonic testing to ensure they meet the requirements of the latest DOT approved edition of API 1104.	Certification required to Level II or III in accordance with the recommendations of American Society for Nondestructive Testing (ASNT), Recommended Practice No. SNT-TC-1A, ACCP for ultrasonic testing (UT) or any other recognized national certification program that shall be acceptable to the company for the test method used.

OQ Task Name

Task 39.0 – Backfilling a Trench Following Maintenance

1.0 Task Description

This task begins with observation and monitoring of the backfilling or replacement of soil or other material into a trench/ditch and over a pipeline after maintenance or repairs. When a trench for a pipeline is backfilled, it must be done in a manner that provides firm support under the pipe and prevents damage to the pipe and its coating from equipment or the backfill material. This task ends when the pipe is covered such that further backfilling would not cause damage to the pipe.

2.0 Knowledge Component

An individual performing this task must have knowledge of:

Backfill material must be free of rocks, roots, and any other foreign material that could damage pipe coating or cause uneven loading of pipe.

- Visual inspection of backfill material to identify foreign objects that could cause damage to the pipeline system and make it unsuitable for backfilling around the pipeline. Material should be free of the following:
 - Items that could affect compaction such as roots, stones, cans, packing boxes, brush, broken skids, broken tools, refuse, etc.
 - Items that could affect cathodic protection systems such as cans, hand tools, welding rods, clamps, scrap metal left in the ditch, etc.
 - Items that could affect coating systems such as large rocks, sharp objects, soil contaminated by hydrocarbons, or large chunks of hard-packed clay or dirt.
 - Items that could contain organic or corrosive materials that could cause localized pipe wall corrosion such as battery acid, nitrate material, caustic matter, etc.

Pipe and pipe coating must be continuously monitored during backfilling to ensure that they are not damaged. Pipe must be properly supported after any temporary supports are removed.

- Allow extra compaction at road crossings or other locations where heavy loads may cross a pipeline.

Abnormal Operating Conditions (AOCs)

The following AOCs could be encountered while performing this task:

AOC Recognition	AOC Response
Pipeline System Damage: Coating damage from coarse materials.	Remove coarse materials from backfill and notify appropriate personnel for repair of coating, if necessary.
Pipeline System Damage: Pipeline damage from a bucket or other equipment inadvertently contacting a pipe (i.e., dent, gouge, scrape, etc).	Perform inspection of damaged area. Notify appropriate personnel for repair of a pipeline, if necessary.
Pipeline System Damage: Pipeline stress resulting from pipe movement (i.e., pipe sag).	Notify appropriate operator personnel.
	Level pipe and support properly. An engineering plan may be required.

3.0 Skill Component

To demonstrate proficiency of this task, an individual must perform the following steps:

Step	Action	Explanation
1	Inspect trench for presence of foreign objects or debris. Remove any objects that could cause damage to the pipe or coating.	Visual inspection will determine if objects of foreign material are in the trench.
2	Perform a visual inspection of backfill material. Identify foreign objects that could cause damage to the pipeline system. Remove any objects that could cause damage to the pipe or coating.	Visual inspection will determine if large objects of foreign material are in the backfill material and whether the backfill material has smaller but potentially damaging material.
3	Determine whether backfill material is suitable for backfill directly around pipeline. Non-coarse material must be used near the coating. If excavated material is not suitable to refill the trench, replace with suitable material or use a rock shield.	Unsuitable backfill material may damage the pipe coating and potentially the pipe.
4	As fill material is added to a trench, continue to observe material.	Some soil types compact better than others.
5	Ensure soil compaction for proper pipe support during backfilling operations. Tamping is required to compact soil.	If soil used for support is not compacted, a pipe will move, adding stress to the pipe.
6	Continue to backfill equally along both sides of the pipe until adequate cover is achieved.	
7	When applicable, compact soil using backhoe or roller equipment.	Settlement could mean increased risk to pipeline by third-party damage.
8	Crown the backfill according to procedures.	Crowning is usually performed to compensate for settlement of backfill.
9	Backfilling must be documented as required.	

OQ Task Name

Task 40.1 – Fit Full Encirclement Welded Split Sleeve (Oversleeve, Tight-Fitting Sleeve, etc.)

1.0 Task Description

The full encirclement welded split sleeve is a type of repair used for covering anomalies on a pipeline with two halves installed around the circumference of the pipeline in preparation for welding. Full encirclement split sleeves are designed to be installed on an in-service pipeline.

This task begins with the preparation of the carrier pipe and installation of the sleeves. The task ends with confirmation that the sleeves are correctly installed and the proper welding gap has been established.

This task does not include the welding of the split sleeves or sleeve type determination.

2.0 Knowledge Component

An individual performing this task must have knowledge of:

The full encirclement welded split sleeve is a permanent pressure-containing repair applied to a leaking or non-leaking defect.

This type of sleeve may also be applied to reinforce the wall of the carrier pipeline where a defect exists. The length of the sleeve varies according to the extent of the defect to be repaired.

Definitions applicable to this task:

Full Encirclement Sleeve

Rolled steel formed in two halves to encase the pipeline. The pressure rating of the sleeve must be equal to or greater than the carrier pipe.

Type A Sleeve

A steel split sleeve that only requires welding of the longitudinal seams of the sleeves. It is installed under compression.

Type B Sleeve

A steel split sleeve that requires welding the longitudinal seams of sleeves and welding the ends of the sleeves to the carrier pipe.

Abnormal Operating Conditions (AOCs)

The following AOCs could be encountered while performing this task:

AOC Recognition	AOC Reaction
Anomaly or other defect on carrier pipe outside the area of application.	Notify the operator or appropriate individual.
Unexpected release of hazardous liquid or gas.	Stop operation and secure equipment, if safe to do so. Immediately notify the operator and execute applicable emergency procedures.
Fire or explosion resulting from ignition of hazardous liquids or gas.	Stop operation and secure equipment, if safe to do so. Immediately notify the operator and execute applicable emergency procedures.

3.0 Skill Component

To demonstrate proficiency of this task, an individual must perform the following steps:

Step	Action	Explanation
1	Confirm surface has been properly prepared according to applicable covered task.	Coating removal and surface preparation is performed under Covered Tasks 13.1, 13.2, or 13.3.
2	Confirm pipe surface has been inspected for dents, gouges or other irregularity according to applicable covered task.	Inspection of the pipe surface is performed under Covered Tasks 5.1, 5.2, or 5.3.
3	Confirm proper type of sleeve to be installed.	Ensures proper type of sleeve will be installed. Type A sleeves are installed to reinforce the carrier pipe. Type B sleeves are installed for pressure-containing purposes.
4	Fill defects as needed with operator-approved material. Filler material shall be applied following manufacturer's recommendations.	Restricts flexion of carrier pipe to maintain integrity.
5	If the installation is to be a Type B sleeve, confirm acceptable wall thickness has been measured in the seal welding zones according to the applicable covered task.	Ensures integrity of carrier pipe at location of split sleeve ends to be welded for a Type B sleeve. AOC: potential loss of pressure or product resulting from breach of thin carrier pipe wall. Stop operation and secure equipment, if safe to do so. Inspect equipment and readjust or reset, as necessary. Wall thickness measurement is performed under Covered Task 8.2.
6	If the installation is to be a Type A sleeve, follow the welding procedure to ensure the proper fit.	The welding procedure determines the techniques to apply compression to the sleeve and may include pre-heating and mechanical compression.
7	Verify proper sleeve length and material grade per operator procedures.	Ensures sleeve meets operator standards, manufacturer's specifications, and industry codes.
8	Prepare and fit the sleeve to the pipeline.	Ensures proper coverage of defect and fit of the sleeve.
9	Use lifting device and chains or clamps to achieve a proper fit and an equal welding gap for the longitudinal seam, as necessary.	Ensures proper coverage of defect and fit of sleeve. Improper use of the lifting device could result in damage to the carrier pipe.

OQ Task Name

Task 40.3 – Apply Composite Sleeve

1.0 Task Description

The application of composite material, in the form of multiple layers of woven fiber wrap or rigid fiber sleeves are acceptable alternatives to steel split sleeves for permanently repairing corrosion and mechanical damage defects. Composite sleeves are designed to be applied to an in-service pipeline. The process also includes the application of filler material to eliminate voids and dents in the carrier pipe surface prior to applying the composite sleeve.

Composite sleeve manufacturers have structured curriculum, training and certification processes to ensure installers have the knowledge and skills necessary to install their product in accordance with their specifications.

This task begins with confirming the preparations of the pipe as required by the manufacturer prior to applying the composite material and ends with a completed application as defined in the manufacturer's procedures.

2.0 Knowledge Component

An individual performing this task must have knowledge of:

Composite material must be installed according to the manufacturer's procedures. The material consists of woven fiber cloth wrapped around the carrier pipe or rigid fiber sleeves shaped to fit the circumference of the carrier pipe. A chemical bonding system is used to adhere the material to the carrier pipe to establish the repair.

Definitions applicable to this task:

Composite Material

A high-strength glass or carbon fiber material or laminate that is wrapped around a pipe and adheres to the surface with an adhesive or resin bonding system.

Abnormal Operating Conditions (AOCs)

The following AOCs could be encountered while performing this task:

AOC Recognition	AOC Reaction
Anomaly or other defect on carrier pipe outside the area of application.	Notify the operator of suspected defect.
Unexpected release of hazardous liquid or gas.	Stop operation and secure equipment, if safe to do so. Immediately notify the operator and execute applicable emergency procedures.

3.0 Skill Component

To demonstrate proficiency of this task, an individual must perform the following steps:

Step	Action	Explanation
1	Ensure the carrier pipe surface is cleaned and prepared according to manufacturer's procedures.	Ensures proper adhesion/bonding of material to pipe surface.
2	Fill defects as needed according to composite material manufacturer's procedures.	Restricts flexion of carrier pipe to maintain integrity.
3	Apply composite material according to manufacturer's instructions.	Follow manufacturer's procedures for all steps such as applying adhesive, wrapping, and sealing the material.

OQ Task Name

Task 41.0 – Conduct Pressure Test

1.0 Task Description

This task consists of the activities required for pressure testing steel pipelines and components of a pipeline prior to it being placed in service. The pressure test provides verification that the pipeline does not leak after withstanding the required pressure for the specified time period. Pressure testing is conducted for purposes such as:

- Maximum Operating Pressure certification or integrity management
- Testing for certification
- Testing of replacement pipe for sections being relocated, replaced, or otherwise changed
- Conversion of service

This task begins with isolation of the pipeline segment to be tested and ends with the release of test pressure according to the operator's procedures.

2.0 Knowledge Component

An individual performing this task must have knowledge of:

Pressure testing is normally conducted with water as the test medium (hydrostatic testing). Except for offshore pipelines, liquid petroleum that does not vaporize rapidly may be used as the test medium under the following conditions: a) the pipeline test section is outside of cities and populated areas, b) buildings within 300 feet of test section are unoccupied when test pressure is greater than a pressure which produces a hoop stress of 50% specified minimum yield strength, and c) surveillance and continuous communication is maintained along the test section.

Test pressure must be maintained for four continuous hours at a pressure equal to at least 125% of the MOP. Pipelines that cannot be visually inspected for leakage must maintain an additional four continuous hours of test pressure equal to 110% of the MOP.

A pressure test plan must be prepared that identifies the name of the operator and the person conducting the test (including name of test company, if applicable). The following documentation must be included with the plan: a) date and time of the test, b) pressure recording charts, c) test instrumentation calibration data, d) minimum and maximum test pressures, e) minimum time duration of the test, f) description of the facility tested and the test apparatus, and g) temperature of the test medium or pipe during the test period. In the event elevation differences in the test segment exceed 100 feet, a profile of the pipeline identifying the elevations and test sites must also be included with the plan documentation.

The testing instrumentation calibration must be current and certified prior to the test. All pipe, components and test equipment must be capable of withstanding the required maximum test pressure as required by the test plan. Pressure discontinuities, including test failures that appear on the pressure recording charts must be explained in the pressure test plan.

Definitions applicable to this task:

Hydrostatic Testing

The application of pressure to a pipeline utilizing water as the test medium.

Maximum Operating Pressure (MOP)

The maximum pressure at which a pipeline or segment of the pipeline may be normally operated under 49 *CFR* Part 195.

Pressure Testing

The application of pressure to a pipeline segment or pipe utilizing water or non-HVL product as the test medium. Air or an inert gas may be used as the test medium on a low-stress pipeline.

Test Instruments

Calibrated equipment such as deadweight testers, temperature recorders, temperature probes, or pressure recorders that are used to conduct a pressure test.

Test Medium

The liquid or gas used to transmit a pre-determined force throughout an isolated pipeline segment for the purpose of determining the ability of the pipeline to withstand a specified pressure.

Test Normalization

To factor the thermal effects of a temperature increase or decrease on the test medium and the pipe.

Abnormal Operating Conditions (AOCs)

The following AOCs could be encountered while performing this task:

AOC Recognition	AOC Reaction
Valve failure, pipe failure, gasket failure, threaded fitting failure, weld failure.	Assess damage and notify appropriate operator personnel.
Pipe or component failure during a test or the presence of air in the test medium.	Determine the cause of deviation and take appropriate steps to correct. Make any necessary operator notification.

3.0 Skill Component

To demonstrate proficiency of this task, an individual must perform the following steps:

Step	Action	Explanation
1	Confirm the pipeline segment has been isolated for the test according to the specified procedures.	Ensures affected pipeline segment is prepared to accept test pressure.
2	Confirm calibration and certification of testing instrumentation is current.	Ensures proper measurement of test parameters.
3	Connect a pump or compressor to the pipeline segment.	Ensures connections are secured for tightness.
4	Install temperature probes and connect the temperature and pressure recording devices.	Allows for accurate measurement of test parameters.
5	Fill and vent the pipeline segment with the test medium and allow the temperature to stabilize.	Ensures removal of air from pipeline segment. Allows test normalization to minimize fluctuations.
6	Increase pipeline pressure according to specified procedures.	Perform at specified intervals.
7	Observe and record pressure and temperature according to specified procedures.	Document pressure discontinuities.
8	Document test results.	
9	After confirming the test was successful, release pressure according to specified procedures.	Ensure completed documentation.

OQ Task Name

Task 43.1 – Start-up of a Liquid Pipeline (Control Center)

1.0 Task Description

This task begins with identifying and verifying that the intended flow path is configured in accordance with applicable operating procedures and includes start up of pumping unit(s) and monitoring operational data. This task ends when the line segment reaches steady state and pressure and flow alarms have been set.

Shutdown of a Liquid Pipeline (Control Center) is a separate covered task (Reference Task 43.2).

Monitor Pressures, Flows, Communications and Line Integrity and Maintain Them Within Allowable Limits on a Liquid Pipeline System (Control Center) is a separate covered task (Reference Task 43.3).

Remotely Operate Valves on a Liquid Pipeline System is a separate covered task (Reference Task 43.4).

2.0 Knowledge Component

An individual performing this task must have knowledge of:

Definitions applicable to this task:

Alarm

SCADA generated visual and/or audible alert that indicates an operating parameter has been exceeded. An alarm receipt requires the controller to take action.

Leak Detection System – Computational Pipeline Monitoring (CPM) and Non-CPM

- CPM leak detection – An algorithmic approach to detect hydraulic anomalies in pipeline operating parameters. The CPM leak detection system generates an alarm when a leak event is probable and/or notifies a controller when a condition approaching a leak event is detected.
- Non-CPM leak detection – SCADA tools that utilize analog and other data to detect deviations from normal operations that may indicate a leak. Leak detection, as performed by a pipeline controller, may involve comparisons of pressures, expected flow rates, and over/short rate of change alarms.

Line Fill

A line fill is the actual volume of product in a pipeline segment that may vary depending on product density, pressure, and temperature.

Line Pack

Line pack is a condition where product vaporization and product mixing is reduced or eliminated. Line pack is a function of the elevation profile, volume of product, pressure and volatility of the product. Line pack is reached when minimum pressures are held throughout the line section.

MOP

Maximum Operating Pressure means the maximum pressure at which a pipeline or segment of a pipeline may be normally operated.

Pipeline Hydraulics

Characteristics of fluid flow in a pipeline. Pipeline hydraulics may be affected by:

- Elevation profile of the given pipeline
- The product characteristics, including drag reducing agents (DRA)
- Operational changes, including start-ups and shut-downs.

Steady State

The point when pressures and flows are relatively constant over time and comparable to historical operational data for that particular segment.

Supervisory Control and Data Acquisition (SCADA)

A computer-based system or systems used by a controller in a control room that collects and displays information about a pipeline facility and may have the ability to send commands back to the pipeline facility.

Abnormal Operating Conditions (AOCs)

The following AOCs could be encountered while performing this task. These conditions are typically indicated by an alarm.

AOC Recognition	AOC Reaction
<p>Activation of a Safety Device: Pressure relief, emergency/abnormal shut-down, high pressure shut-down, case pressure/temperature shutdown, etc.</p> <p>These devices are typically designed to operate and reduce or eliminate a hazardous situation.</p>	<p>If a safety device activates, the controller should investigate the cause of the safety device activation and take appropriate action to mitigate the situation.</p> <p>Make appropriate notifications.</p>
<p>Receipt of a safety-related alarm: Each operator defines safety-related alarms.</p>	<p>If a safety-related alarm is received, the controller should investigate the cause of the safety-related alarm and take appropriate action to mitigate the situation.</p> <p>Make appropriate notifications.</p>
<p>Communications, Control System or Power Interruption or Failure: Loss of SCADA or electrical services on all or part of the pipeline.</p>	<p>Ensure that back-up systems are activated. Follow trouble-shooting procedures and take appropriate action to mitigate the situation.</p> <p>Make appropriate notifications.</p>
<p>Flow Rate Deviation (Unexplained): High flow, low flow, or no flow.</p>	<p>Investigate the cause of the flow rate deviation and take appropriate action to mitigate the situation.</p> <p>Make appropriate notifications.</p>
<p>Pressure Deviation (Unexplained): Pressure increase, decrease or lack of a pressure reading.</p>	<p>Investigate the cause of the pressure deviation and take appropriate action to mitigate the situation.</p> <p>Make appropriate notifications.</p>
<p>Status Change (Unintended): Changes in unit status or valve position.</p>	<p>Investigate the cause of the status change and take appropriate action to mitigate the situation.</p> <p>Make appropriate notifications.</p>
<p>Tank Level Outside Safe Limits</p>	<p>Shutdown operation. Investigate the cause of the tank exceeding safe limits and take appropriate action to mitigate the situation.</p> <p>Make appropriate notifications.</p>

3.0 Skill Component

To demonstrate proficiency of this task an individual must perform the following steps:

Step	Action	Explanation
1	Notify all origin and delivery facilities of an impending startup and verify sufficient capacity at the receipt/delivery point.	Allows field personnel and shippers to perform necessary functions.
2	Verify that the intended flow path is configured in accordance with applicable operating procedures.	Verification may be by SCADA or by other communications.
3	Determine the operating pressures, flows, line packs, and linefill for the pipeline under similar conditions.	Refer to company procedures, documentation, and historical trends.
4	Determine which pumping units will be started to provide a scheduled flowrate.	Follow company procedures. Refer to pumping schedule, documentation, and historical trends.
5	Verify that pumps and other equipment are in a ready state.	
6	Start pump(s) according to written operating procedures.	
7	Monitor pressures and flow rates after startup and make adjustments to achieve steady state.	
8	After steady state has been achieved set pressure and flow alarms.	

OQ Task Name

Task 43.2 – Shutdown of a Liquid Pipeline (Control Center)

1.0 Task Description

This task involves shutting down any part of a pipeline system in a manner designed to assure safe operation. This task begins with identifying the part of the pipeline system to be shutdown. The task includes verifying all necessary valve alignments, making the required communications, and monitoring pressure and flow rates to ensure operation within safe design limits. This task ends when the identified part of a pipeline system reaches static or steady state.

Monitor Pressures, Flows, Communications and Line Integrity and Maintain Them Within Allowable Limits on a Liquid Pipeline System (Control Center) is a separate covered task (Reference Task 43.3).

Remotely Operate Valves on a Liquid Pipeline System is a separate covered task (Reference Task 43.4).

Locally Operate Valves on a Liquid Pipeline System is a separate covered task (Reference Task 63.4).

2.0 Knowledge Component

An individual performing this task must have knowledge of:

Definitions applicable to this task:

Alarm

SCADA generated visual and/or audible alert that indicates an operating parameter has been exceeded. An alarm receipt requires the controller to take action.

Leak Detection System – Computational Pipeline Monitoring (CPM) and Non-CPM

- CPM leak detection – An algorithmic approach to detect hydraulic anomalies in pipeline operating parameters. The CPM leak detection system alerts a controller when a leak event is probable and/or notifies a controller when a condition approaching a leak event is detected.
- Non-CPM leak detection – SCADA tools that utilize analog and other data to detect deviations from normal operations that may indicate a leak. Leak detection, as performed by a pipeline controller, may involve comparisons of pressures, expected flow rates, and over/short rate of change alarms.

Line Pack

Line pack is a condition where product vaporization and product mixing is reduced or eliminated. Line pack is a function of the elevation profile, volume of product, pressure and volatility of the product. Line pack is reached when minimum pressures are held throughout the line section.

MOP

Maximum Operating Pressure means the maximum pressure at which a pipeline or segment of a pipeline may be normally operated. Parts of a pipeline system should be shutdown in a manner not to exceed a pipeline segment's MOP.

Pipeline Hydraulics

Characteristics of fluid flow in a pipeline may impact shutdown operations. Pipeline hydraulics may be affected by:

- Elevation profile of the given pipeline.
- The product characteristics, including drag reducing agents (DRA)
- Operational changes

Pressure Surge

Pressure surge is a wave resulting when a fluid in motion is forced to stop or change direction suddenly. This commonly occurs in a pipeline when a valve is suddenly closed at the end of a pipeline system and a pressure wave propagates in the pipe.

Static State

Static state refers to an inactive or shutdown pipeline where product is not flowing.

Steady State

The point when pressures and flows are relatively constant over time and comparable to historical operational data for that particular segment. Steady state refers to a condition on an active or flowing pipeline.

Supervisory Control and Data Acquisition (SCADA)

A computer-based system or systems used by a controller in a control room that collects and displays information about a pipeline facility and may have the ability to send commands back to the pipeline facility.

Abnormal Operating Conditions (AOCs)

The following AOCs could be encountered while performing this task. These conditions are typically indicated by an alarm.

AOC Recognition	AOC Reaction
<p>Activation of a Safety Device: Pressure relief, emergency/abnormal shut-down, high pressure shut-down, case pressure/temperature shutdown, etc.</p> <p>These devices are typically designed to operate and reduce or eliminate a hazardous situation.</p>	<p>If a safety device activates, the controller should investigate the cause of the safety device activation and take appropriate action to mitigate the situation.</p> <p>Make appropriate notifications.</p>
<p>Receipt of a safety-related alarm: Each operator defines safety-related alarms.</p>	<p>If a safety-related alarm is received, the controller should investigate the cause of the safety-related alarm and take appropriate action to mitigate the situation.</p> <p>Make appropriate notifications.</p>
<p>Communications, Control System or Power Interruption or Failure: Loss of SCADA or electrical services on all or part of the pipeline, as indicated by SCADA displays or as a result of field communication.</p>	<p>Ensure that back-up systems are activated. Follow trouble-shooting procedures and take appropriate action to mitigate the situation.</p> <p>Make appropriate notifications.</p>
<p>Flow Rate Deviation (Unexplained): High flow, low flow, or no flow, as indicated by SCADA displays or as a result of field communication.</p>	<p>Investigate the cause of the flow rate deviation and take appropriate action to mitigate the situation.</p> <p>Make appropriate notifications.</p>
<p>Pressure Deviation (Unexplained): Pressure increase, decrease, or lack of a pressure reading, as indicated by SCADA displays or as a result of field communication.</p>	<p>Investigate the cause of the pressure deviation and take appropriate action to mitigate the situation.</p> <p>Make appropriate notifications.</p>
<p>Status Change (Unintended): Changes in unit status or valve position, as indicated by SCADA displays or as a result of field communication.</p>	<p>Investigate the cause of the status change and take appropriate action to mitigate the situation.</p> <p>Make appropriate notifications.</p>

3.0 Skill Component

To demonstrate proficiency of this task, an individual must perform the following steps:

Step	Action	Explanation
1	Notify all origin and delivery facilities of an impending shutdown, if applicable.	Allows field personnel to perform necessary local and/or non-automated functions.
2	Identify the pumping units that will be shutdown.	
3	Shutdown the identified part of the pipeline system according to written operating procedures.	Procedures may include steps to maintain appropriate pressure on shutdown to minimize contamination of products.
4	Monitor pressures and flow rates during shutdown and make adjustments to achieve desired static/steady state.	
5	When pump shutdown is completed, verify valve status and static/steady state has been achieved.	

OQ Task Name

Task 43.3 – Monitor Pressures, Flows, Communications, and Line Integrity and Maintain Them Within Allowable Limits on a Liquid Pipeline System (Control Center)

1.0 Task Description

This task includes the activities for monitoring and maintaining pipeline conditions (such as pressures, flow rates, tank levels) within allowable limits according to regulation and company procedure. The task begins when a pipeline reaches steady state and ends when the start up or shutdown of the pipeline begins.

Start-up of a Liquid Pipeline (Control Center) is a separate covered task (Reference Task 43.1).

Shutdown of a Liquid Pipeline (Control Center) is a separate covered task (Reference Task 43.2).

Remotely Operate Valves on a Liquid Pipeline System is a separate covered task (Reference Task 43.4).

2.0 Knowledge Component

An individual performing this task must have knowledge of:

Definitions applicable to this task:

Alarm

SCADA generated visual and/or audible alert that indicates an operating parameter has been exceeded. A controller must be able to interpret the alarm, determine the impact to safe pipeline operation, and respond accordingly.

Leak Detection System – Computational Pipeline Monitoring (CPM) and Non-CPM

- CPM leak detection – An algorithmic approach to detect hydraulic anomalies in pipeline operating parameters. The CPM leak detection system generates an alarm when a leak event is probable and/or notifies a controller when a condition approaching a leak event is detected.
- Non-CPM leak detection – SCADA tools that utilize analog and other data to detect deviations from normal operations that may indicate a leak. Leak detection, as performed by a pipeline controller, may involve comparisons of pressures, expected flow rates, and over/short rate of change alarms.

Line Fill

A line fill is the actual volume of product in a pipeline segment that may vary depending on product density, pressure, and temperature.

Line Pack

Line pack is a condition where product vaporization and product mixing is reduced or eliminated. Line pack is a function of the elevation profile, volume of product, pressure and volatility of the product. Line pack is reached when minimum pressures are held throughout the line section.

MOP

Maximum Operating Pressure means the maximum pressure at which a pipeline or segment of a pipeline may be normally operated.

Supervisory Control and Data Acquisition (SCADA)

A computer-based system or systems used by a controller in a control room that collects and displays information about a pipeline facility and may have the ability to send commands back to the pipeline facility.

Pipeline Hydraulics

Characteristics of fluid flow in a pipeline. Pipeline hydraulics may be affected by:

- Elevation profile of the given pipeline;
- The product characteristics, including drag reducing agents (DRA);
- Operational changes.

Steady State

The point when pressures and flows are relatively constant over time and comparable to historical operational data for that particular segment.

Abnormal Operating Conditions (AOCs)

The following AOCs could be encountered while performing this task. These conditions are typically indicated by an alarm.

AOC Recognition	AOC Reaction
<p>Activation of a Safety Device: Pressure relief, emergency/abnormal shut-down, high pressure shut-down, case pressure/temperature shutdown, etc.</p> <p>These devices are typically designed to operate and reduce or eliminate a hazardous situation.</p>	<p>If a safety device activates, the controller should investigate the cause of the safety device activation and do what is necessary to mitigate the situation.</p> <p>Make appropriate notifications.</p>
<p>Receipt of a safety-related alarm: Each operator defines safety-related alarms.</p>	<p>If a safety-related alarm is received, the controller should investigate the cause of the safety-related alarm and do what is necessary to mitigate the situation.</p> <p>Make appropriate notifications.</p>
<p>Communications, Control System or Power Interruption or Failure: Loss of SCADA or electrical services on all or part of the pipeline.</p>	<p>Ensure that back-up systems are activated. Follow trouble-shooting procedures, do what is necessary to mitigate the situation.</p> <p>Make appropriate notifications.</p>
<p>Flow Rate Deviation (Unexplained): High flow, low flow, or no flow.</p>	<p>Investigate the cause of the flow rate deviation and do what is necessary to mitigate the situation.</p> <p>Make appropriate notifications.</p>
<p>Pressure Deviation (Unexplained): Pressure increase, decrease or lack of a pressure reading.</p>	<p>Investigate the cause of the pressure deviation and do what is necessary to mitigate the situation.</p> <p>Make appropriate notifications.</p>
<p>Status Change (Unintended): Changes in unit status or valve position.</p>	<p>Investigate the cause of the status change and do what is necessary to mitigate the situation.</p> <p>Make appropriate notifications.</p>
<p>Tank Level Outside Safe Limits</p>	<p>Shutdown operation. Investigate the cause of the tank exceeding safe limits and do what is necessary to mitigate the situation.</p> <p>Make appropriate notifications.</p>

3.0 Skill Component

To demonstrate proficiency of this task an individual must perform the following steps. These actions are not performed in sequence and can happen simultaneously:

Step	Action	Explanation
1	Verify that the pressure and flow rates have stabilized (steady state).	Allow time for packing line.
2	Set appropriate operating limits such as pressure, flow rate.	Each pipeline has its own normal operating parameters. If operating limits are not set appropriately, safe operating parameters may be exceeded.
3	Continuously monitor SCADA information such as: Alarms, trending, pressure, flow rates, Rate of Change (ROC), linefill, tank levels, and communication status.	Each pipeline has its own normal operating parameters. By analyzing data a controller can take actions to avoid alarm conditions.
4	Adjust set-points on control points to achieve and maintain desired flow rates or pressures.	
5	Communicate as necessary with field personnel and shippers regarding pipeline operations.	Communication with field personnel and shippers may be necessary to effect changes or to notify of changes.
6	Utilize the leak detection system to continuously monitor for leak indications.	Leak detection indications require a controller to take some sort of remedial action which may include system shutdown and internal notifications.
7	Respond to alarm.	Each pipeline has its own alarm response protocols.
8	Document and/or report information as appropriate.	Documenting provides data for compliance, historical review and trending.

OQ Task Name

Task 43.4 – Remotely Operate Valves on a Liquid Pipeline System

1.0 Task Description

This task begins with identification of the valve to be operated and includes the remote operation of that valve. This task ends when the proper valve position has been indicated. Remote operation of the valve is defined as manipulation of the valve's position from a location that is not in direct proximity to the valve.

Locally Operate Valves on a Liquid Pipeline System is a separate covered task (Reference Task 63.4).

2.0 Knowledge Component

An individual performing this task must have knowledge of:

How valve indication is identified by some type of Supervisory Control and Data Acquisition (SCADA), Human Machine Interface (HMI) icon, or other indicator that changes appearance when the valve position changes.

Items to be considered prior to operation of valves include:

- Impacts to the pipeline operation such as: pressure, flow, and tank levels
- Operation of incorrect valves could cause an unsafe condition

How communication with either local operations or control center may be required prior to or after valve operation.

Abnormal Operating Conditions (AOCs)

The following AOCs could be encountered while performing this task:

AOC Recognition	AOC Reaction
<p>Pressure Deviation (Unexplained) – Pressure display(s), alarms, or other pressure indicators show the unexplained pressure deviation.</p>	<p>Make condition safe to the extent possible and according to company procedure. Assess the condition for safety, environmental or physical damage.</p> <p>Reactions could include:</p> <ul style="list-style-type: none"> • Shutting down the system (if qualified) • Returning the valve to its original position • Operating an appropriate valve • Isolating damaged equipment • Making appropriate notifications
<p>Flow Deviation (Unexplained) – Flow gauges, flow recorders, alarms, tank levels, or other flow indicators show the unexplained flow deviation.</p>	<p>Make condition safe to the extent possible and according to company procedure. Assess condition for safety, environmental or physical damage.</p> <p>Reactions could include:</p> <ul style="list-style-type: none"> • Shutting down the system (if qualified) • Returning the valve to its original position • Operating an appropriate valve • Isolating damaged equipment • Making appropriate notifications

AOC Recognition	AOC Reaction
Valve Position Indication (Unexpected) – SCADA, HMI, or other valve position/status indicators show unexpected valve position indication.	Troubleshoot communications and valve control functions as appropriate. Make appropriate notifications.

3.0 Skill Component

To demonstrate proficiency of this task an individual must perform the following steps:

Step	Action	Explanation
1	Identify the valve to be operated	Use appropriate references to help ensure correct identity of valve.
2	Communicate with field operations or the control center prior to valve operation (if required by operating procedure).	The control center has ultimate responsibility and authority for actions that affect the safe operation of a pipeline.
3	Remotely operate valve	
4	Ensure proper valve position and communicate (if required by operating procedure) with field operations or the control center after valve operation.	Valve position is indicated by some type of Supervisory Control and Data Acquisition (SCADA), Human Machine Interface (HMI) icon or other indicators that will change appearance when valve position changes.

OQ Task Name

Task 63.1 – Start-up of a Liquid Pipeline (Field)

1.0 Task Description

This task begins with identifying and verifying that the intended flow path is configured in accordance with applicable operating procedures and includes communicating with a control room to confirm a flow path is open for the intended operation. This task ends when the control room assumes control of the operation.

Remotely Operate Valves on a Liquid Pipeline System is a separate covered task (Reference Task 43.4).

Locally Operate Valves on a Liquid Pipeline System is a separate covered task (Reference Task 63.4).

2.0 Knowledge Component

An individual performing this task must have knowledge of:

Definitions applicable to this task:

Alarm

SCADA or HMI generated visual and/or audible alert that indicates an operating parameter has been exceeded. An alarm receipt may require a controller or operator to take action.

Human Machine Interface (HMI)

A software application that presents information to an operator about the state of a process, and to accept and implement an operator's control instructions. Typically information is displayed in a graphic format.

MOP

Maximum Operating Pressure means the maximum pressure at which a pipeline or segment of a pipeline may be normally operated.

Supervisory Control and Data Acquisition (SCADA)

A computer-based system or systems used by a controller in a control room that collects and displays information about a pipeline facility and may have the ability to send commands back to the pipeline facility.

Abnormal Operating Conditions (AOCs)

The following AOCs could be encountered while performing this task:

AOC Recognition	AOC Reaction
<p>Activation of a Safety Device: Pressure relief, emergency/abnormal shut-down, high pressure shut-down, case pressure/temperature shutdown, etc.</p> <p>The operator would receive or observe an audible or visual indication from the HMI or other systems.</p>	<p>If a safety device activates, the operator should investigate the cause of the safety device activation and take appropriate action to mitigate the situation.</p> <p>Make appropriate notifications.</p>
<p>Communications, Control System or Power Interruption or Failure: Loss of SCADA communication to control room or electrical services.</p>	<p>Ensure that back-up systems are activated. Follow trouble-shooting procedures and take appropriate action to mitigate the situation.</p> <p>Make appropriate notifications.</p>

AOC Recognition	AOC Reaction
<p>Flow Rate Deviation (Unexplained): High flow, low flow, or no flow.</p> <p>The operator should receive or observe an audible or visual indication from the HMI or other systems</p>	<p>Investigate the cause of the flow rate deviation and take appropriate action to mitigate the situation.</p> <p>Make appropriate notifications.</p>
<p>Pressure Deviation (Unexplained): Pressure increase, decrease or lack of pressure reading.</p> <p>The operator should receive or observe an audible or visual indication from the HMI or other systems</p>	<p>Investigate the cause of the pressure deviation and take appropriate action to mitigate the situation.</p> <p>Make appropriate notifications.</p>
<p>Status Change (Unintended): Changes in unit status or valve position.</p> <p>The operator should receive or observe an audible or visual indication from the HMI or other systems.</p>	<p>Investigate the cause of the status change and take appropriate action to mitigate the situation.</p> <p>Make appropriate notifications.</p>

3.0 Skill Component

To demonstrate proficiency of this task an individual must perform the following steps:

Step	Action	Explanation
1	Communicate with the control room the intended start-up configuration.	Allows control room and local operator to confirm start-up.
2	Verify with the control room that the intended flow path is configured in accordance with applicable operating procedures.	Verification may include local piping alignment and confirmation of remote flow path configuration from control room.
3	Verify that pumps and other equipment are in a ready state.	
4	Start pump(s) according to written operating procedures.	
5	Monitor pressures and flow rates after startup.	
6	Communicate with the control room to verify that it has assumed control of the operation.	

OQ Task Name

Task 63.2 – Shutdown of a Liquid Pipeline (Field)

1.0 Task Description

This task involves shutting down any part of a pipeline system in a manner designed to assure safe operation. This task begins with identifying the part of the pipeline system to be shutdown. The task includes communicating with a control room to confirm intended shutdown and may include verifying all necessary valve alignments, making required communications, and monitoring pressure and flow rates to ensure operation within safe design limits. This task ends when the control room assumes control of the operation or when the identified part of a pipeline system reaches static or steady state.

Monitor Pressures, Flows, Communications, and Line Integrity and Maintain Them Within Allowable Limits on a Liquid Pipeline System (Control Center) is a separate covered task (Reference Task 43.3).

Remotely Operate Valves on a Liquid Pipeline System is a separate covered task (Reference Task 43.4).

Monitor Pressures, Flows, Communications, and Line Integrity and Maintain Them Within Allowable Limits on a Liquid Pipeline System (Field) is a separate covered task (Reference Task 63.3).

Locally Operate Valves on a Liquid Pipeline System is a separate covered task (Reference Task 63.4).

2.0 Knowledge Component

An individual performing this task must have knowledge of:

Definitions applicable to this task:

Alarm

An alarm is a visual and/or audible alert that indicates a parameter has been exceeded. A qualified individual must be able to interpret an alarm, determine the impact to safe pipeline operation, and respond accordingly.

Human Machine Interface (HMI)

A software application that presents information to an operator about the state of a process, and to accept and implement an operator's control instructions. Typically information is displayed in a graphic format.

MOP

Maximum Operating Pressure means the maximum pressure at which a pipeline or segment of a pipeline may be normally operated. Parts of a pipeline system should be shutdown in a manner not to exceed a pipeline segment's MOP.

Pipeline Hydraulics

Characteristics of fluid flow in a pipeline may impact shutdown operations. Pipeline hydraulics may be affected by:

- Elevation profile of the given pipeline.
- The product characteristics, including drag reducing agents (DRA)
- Operational changes

Pressure Surge

Pressure surge is a wave resulting when a fluid in motion is forced to stop or change direction suddenly. This commonly occurs in a pipeline when a valve is suddenly closed at the end of a pipeline system and a pressure wave propagates in the pipe.

Static State

Static state refers to an inactive or shutdown pipeline where product is not flowing.

Steady State

The point when pressures and flows are relatively constant over time and comparable to historical operational data for that particular segment. Steady state refers to a condition on an active or flowing pipeline.

Abnormal Operating Conditions (AOCs)

The following AOCs could be encountered while performing this task. These conditions are typically indicated by an alarm.

AOC Recognition	AOC Reaction
<p>Activation of a Safety Device: Pressure relief, emergency/abnormal shut-down, high pressure shut-down, case pressure/temperature shutdown, etc.</p> <p>The operator should receive or observe an audible or visual indication from the HMI or other systems.</p>	<p>If a safety device activates, the operator should investigate the cause of the safety device activation and take appropriate action to mitigate the situation.</p> <p>Make appropriate notifications.</p>
<p>Communications, Control System or Power Interruption or Failure: Loss of HMI communication to control room or electrical services.</p>	<p>Ensure that back-up systems are activated. Follow trouble-shooting procedures and take appropriate action to mitigate the situation.</p> <p>Make appropriate notifications.</p>
<p>Flow Rate Deviation (Unexplained): High flow, low flow, or no flow.</p> <p>The operator should receive or observe an audible or visual indication from the HMI or other systems.</p>	<p>Investigate the cause of the flow rate deviation and take appropriate action to mitigate the situation.</p> <p>Make appropriate notifications.</p>
<p>Pressure Deviation (Unexplained): Pressure increase, decrease, or lack of pressure reading.</p> <p>The operator should receive or observe an audible or visual indication from the HMI or other systems.</p>	<p>Investigate the cause of the pressure deviation and take appropriate action to mitigate the situation.</p> <p>Make appropriate notifications.</p>
<p>Status Change (Unintended): Changes in unit status or valve position.</p> <p>The operator should receive or observe an audible or visual indication from the HMI or other systems.</p>	<p>Investigate the cause of the status change and take appropriate action to mitigate the situation.</p> <p>Make appropriate notifications.</p>

3.0 Skill Component

To demonstrate proficiency of this task an individual must perform the following steps:

Step	Action	Explanation
1	Communicate with the control room the intended shutdown configuration.	Allows the control room and local operator to confirm shutdown.
2	Identify which pumping units will be shutdown, if any.	

Step	Action	Explanation
3	Shutdown the identified part of the pipeline system according to written operating procedures.	Procedures may include steps to maintain appropriate pressure on shutdown to minimize contamination of products.
4	Monitor pressures and flow rates during shutdown and make adjustments to achieve desired static/steady state.	
5	When shutdown is complete, verify that valve status and static/steady state has been achieved.	

OQ Task Name

Task 63.3 – Monitor Pressures, Flows, Communications, and Line Integrity and Maintain Them Within Allowable Limits on a Liquid Pipeline System (Field)

1.0 Task Description

This task includes the activities for monitoring and maintaining pipeline conditions (such as pressures, flow rates, tank levels) within allowable limits according to regulation and company procedures. The task begins when a part of the pipeline system reaches steady state and ends when shutdown of part of the pipeline system begins.

Remotely Operate Valves on a Liquid Pipeline System is a separate covered task (Reference Task 43.4).

Locally Operate Valves on a Liquid Pipeline System is a separate covered task (Reference Task 63.4).

Start-Up of a Liquid Pipeline (Field) is a separate covered task (Reference Task 63.1).

Shutdown of a Liquid Pipeline (Field) is a separate covered task (Reference Task 63.2).

2.0 Knowledge Component

An individual performing this task must have knowledge of:

Definitions applicable to this task:

Alarm

An alarm is a visual and/or audible alert that indicates that a parameter has been exceeded. A qualified individual must be able to interpret an alarm, determine the impact to safe pipeline operation, and respond accordingly.

Line Pack

Line pack is a condition where product vaporization and product mixing is reduced or eliminated. Line pack is a function of the elevation profile, volume of product, pressure and volatility of the product. Line pack is reached when minimum pressures are held throughout the line section.

MOP

Maximum Operating Pressure means the maximum pressure at which a pipeline or segment of a pipeline may be normally operated.

Pipeline Hydraulics

Characteristics of fluid flow in a pipeline. Pipeline hydraulics may be affected by:

- Elevation profile of the given pipeline
- The product characteristics, including drag reducing agents (DRA)
- Operational changes

Steady State

The point when pressures and flows are relatively constant over time and comparable to historical operational data for that particular segment. Steady state refers to a condition on an active or flowing pipeline.

Abnormal Operating Conditions (AOCs)

The following AOCs could be encountered while performing this task. These conditions are typically indicated by an alarm.

AOC Recognition	AOC Reaction
<p>Activation of a Safety Device: Pressure relief, emergency/abnormal shut-down, high pressure shut-down, case pressure/temperature shutdown, etc.</p> <p>These devices are typically designed to operate and reduce or eliminate a hazardous situation.</p>	<p>If a safety device activates, the controller should investigate the cause of the safety device activation and do what is necessary to mitigate the situation.</p> <p>Make appropriate notifications.</p>
<p>Activation of an alarm</p>	<p>If an alarm is activated, the qualified individual should investigate the cause of the alarm and do what is necessary to mitigate the situation.</p> <p>Make appropriate notifications.</p>
<p>Loss of Communications or Control System or Power Interruption/Failure</p>	<p>Ensure that back-up systems are activated. Follow trouble-shooting procedures, do what is necessary to mitigate the situation.</p> <p>Make appropriate notifications.</p>
<p>Flow Rate Deviation (Unexplained): High flow, low flow, or no flow.</p>	<p>Investigate the cause of the flow rate deviation and do what is necessary to mitigate the situation.</p> <p>Make appropriate notifications.</p>
<p>Pressure Deviation (Unexplained): Pressure increase, decrease or lack of pressure reading.</p>	<p>Investigate the cause of the pressure deviation and do what is necessary to mitigate the situation.</p> <p>Make appropriate notifications.</p>
<p>Status Change (Unintended): Changes in unit status, valve position.</p>	<p>Investigate the cause of the status change and do what is necessary to mitigate the situation.</p> <p>Make appropriate notifications.</p>
<p>Tank Level Outside Safe Limits</p>	<p>Shutdown operation. Investigate the cause of the tank exceeding safe limits and do what is necessary to mitigate the situation.</p> <p>Make appropriate notifications.</p>

3.0 Skill Component

To demonstrate proficiency of this task an individual must perform the following steps. These actions are not performed in sequence and can happen simultaneously:

Step	Action	Explanation
1	Verify that the pressure and flow rates have stabilized (steady state).	Allow time for packing line.
2	Set appropriate operating limits such as pressure and flow rate while ensuring that MOP is not exceeded.	Each pipeline has its own normal operating parameters. If operating limits are not set appropriately, safe operating parameters may be exceeded.

Step	Action	Explanation
3	Monitor operating information such as: alarms, trending, pressure, flow rates, rate of change (ROC), linefill, tank levels and communication status.	Each pipeline has its own normal operating parameters. By analyzing data, a qualified individual can take actions to avoid or respond to alarm conditions.
4	Adjust set-points on control points to achieve and maintain desired flow rates or pressures while ensuring that MOP is not exceeded.	
5	Communicate as necessary with field and control room personnel and shippers regarding pipeline operations.	Communication may be necessary to effect changes or to notify of changes.
6	Document and/or report information as appropriate.	Documenting provides data for compliance, historical review, and trending.

OQ Task Name

Task 63.4 – Locally Operate Valves on a Liquid Pipeline System

1.0 Task Description

This task begins with identification of the valve to be operated and includes the local operation of the valve. The task ends when proper valve position has been indicated. Local operation of the valve is defined as manipulation of the valve's position from a location that is in close proximity to the valve. Direct observation shall be used to confirm the valve's position.

Remotely Operate Valves on a Liquid Pipeline System is a separate covered task (Reference Task 43.4).

2.0 Knowledge Component

An individual performing this task must have knowledge of:

Valve position indication – Each valve, other than a check valve, must have some method to indicate the valve's position. Examples include:

- Rising stem
- Arrow
- Handle position
- Open/close flag or display

Items to be considered prior to operation of valves include:

- Impacts to the pipeline operation such as: pressures, flows and tank levels. Pressure surges and hydraulic shock/hammer are examples of conditions that can result from valve operation.
- Operation of incorrect valves could cause an unsafe condition
- Creation of thermal traps by shutting in segments of pipeline systems where it could be over pressured due to increase of product temperature

How communication with either local operations or control center may be required prior to or after valve operation.

Abnormal Operating Conditions (AOCs)

The following AOCs could be encountered while performing this task:

AOC Recognition	AOC Reaction
<p>Pressure Deviation (Unexplained) – Pressure display(s), sound, vibration, alarms, or other pressure indicators show the unexplained pressure deviation.</p>	<p>Make the condition safe according to the extent possible and according to company procedure. Assess the condition for safety, environmental or physical damage.</p> <p>Reactions could include:</p> <ul style="list-style-type: none"> • Shutting down the system (if qualified) • Returning the valve to its original position • Operating an appropriate valve • Isolating damaged equipment • Making appropriate notifications

AOC Recognition	AOC Reaction
<p>Flow Rate Deviation (Unexplained) – Flow gauges, alarms, tank levels, or other flow indicators show the unexplained flow deviation.</p>	<p>Make the condition safe to the extent possible and according to company procedure. Assess the condition for safety, environmental or physical damage.</p> <p>Reactions could include:</p> <ul style="list-style-type: none"> • Shutting down the system (if qualified) • Returning the valve to its original position • Operating an appropriate valve • Isolating damaged equipment • Making appropriate notifications
<p>Valve Position Indication (Unexpected) – Valve position indicators show unexpected valve position indication.</p>	<p>Confirm valve position. Investigate and resolve source of discrepancy between valve position and indicator. Proper valve indication is required. Ensure appropriate notifications are made before resuming safe pipeline operation.</p>
<p>Valve Inoperable – Valve will not operate as intended or will not fully close/open.</p> <p>Examples:</p> <ul style="list-style-type: none"> • Valve indicator does not show the intended position. • Unexpected pressure and flow outcomes. • Inoperable operator/actuator or hand wheel • Excessive differential pressure across valve prohibits its operation 	<p>Make the condition safe to the extent possible and according to company procedure. Assess condition for safety, environmental, or physical damage.</p> <p>Reactions could include:</p> <ul style="list-style-type: none"> • Re-try operation • Relieve excessive differential pressure • Shut down system (if qualified) • Make appropriate notifications
<p>Unexpected Presence of Hazardous Liquid or Vapor – Incorrect valve operation could lead to an unintended release of product that could be observed by sight, smell, sound, or alarms.</p>	<p>Minimize the situation if it can be done safely.</p> <p>Make appropriate notifications.</p>

3.0 Skill Component

To demonstrate proficiency of this task an individual must perform the following steps:

Step	Action	Explanation
1	Identify the valve to be operated.	Use appropriate references to help ensure correct identity of valve.
2	Communicate with field operations or the control center prior to valve operation (if required by operating procedure).	The control center has ultimate responsibility and authorization for actions that affect the safe operation of a pipeline.
3	Locally operate valve.	Valves may be operated manually and/or by a motor operated actuator.
4	Ensure proper valve position and communicate (if required by operating procedure) with field operations or the control center after valve operation.	The control center has ultimate responsibility and authorization for actions that affect the safe operation of a pipeline.

