

12-A Pipeline Patrolling

DESC O&M Manual - Version 2022.5 October 5, 2022

[1.0 SCOPE](#)

[2.0 REGULATORY REFERENCES](#)

[3.0 PROCEDURE](#)

[4.0 TRAINING/QUALIFICATIONS](#)

[5.0 DOCUMENTATION/FORMS](#)

[6.0 RELATED DOCUMENTS](#)

[7.0 APPENDICES](#)

1.0 SCOPE

This chapter identifies the procedures for *pipeline* patrolling.

2.0 REGULATORY REFERENCES

49 CFR Part 192 §§ [192.705](#), [192.721](#)

3.0 PROCEDURE

[3.1 Patrol Requirements](#)

[3.2 Patrol Follow-Up and Response](#)

[3.3 Patrol Frequency](#)

[3.4 Patrol Types and Procedures](#)

3.1 Patrol Requirements

(a) DENC and DESC pipelines *shall* be patrolled to identify the following:

- (1) Leaks;
- (2) Increased loading on pipelines that *may* occur at locations subject to movement such as where mains or pipelines are: attached to structures; contain expansion joints; located in areas subject to erosion or washout on land or in aquatic environments;

- (3) Evidence of corrosion or damage to pipe or coating where pipeline is exposed;
- (4) Construction activity near or adjacent to the pipeline;
- (5) Pipeline markers or station signs damaged or missing;
- (6) Encroachments (i.e. buildings, fences, utility crossings or heavy vehicle traffic) onto or across the pipeline or right-of-way;
- (7) Excessive tree or vegetative growth;
- (8) Potential changes in class locations or HCA status on transmission lines (of particular interest are buildings with four or more stories and buildings or outdoor areas where people congregate);
- (9) Facilities which need physical protection (meter sets, farmtaps, stations, etc.)
- (10) Any other conditions that may adversely affect the safe operation of the pipeline requiring maintenance or follow-up.

This list is not intended to be all-inclusive.

- (b) Only Company and/or contractor personnel that are properly trained and qualified under DENC and DESC's Operator Qualification Plan shall perform patrols.

3.2 Patrol Follow-Up and Response

- (a) All issues identified during a patrol shall be reported and follow-up scheduled as appropriate.
- (b) Housing or Buildings on the Right-of-Way: If housing or buildings are found on the pipeline right-of-way, the responsible Supervisor shall be notified as soon as practical. The responsible Supervisor or his designated personnel *should* notify the owner and/or occupant that they are on the pipeline right-of-way and give them information about the potential dangers of being in a pipeline right-of-way in accordance with DENC and DESC's right-of-way restrictions. The responsible Supervisor may increase the frequency of patrolling or *leak* surveying of the pipeline around the house.
- (c) If a potential change in class location or HCA status has occurred, Engineering should be notified and a study conducted.
- (d) Abnormal conditions found on attachments are to be reported and addressed in a timely manner.

Certain situations require immediate action such as:

- (1) For any pipeline condition that presents an immediate threat to life and/or property, prompt action shall be taken to repair the pipeline or otherwise mitigate the threat. Responses to leaking *gas* shall be conducted in accordance with DENC and DESC leak response procedures.
- (2) Construction activity on or near the pipeline: Where such activity is occurring, the patroller shall immediately address the situation. See [Chapter 11-C Damage Prevention](#).

3.3 Patrol Frequency

- (a) Transmission Pipeline Patrol [[192.705](#)]

- (1) The frequency of patrols may be determined by various factors; however, the interval between patrols shall not exceed the maximum prescribed

	Maximum interval between patrols	
Pipeline Class Location	At highway and railroad crossings	At all other locations
1, 2, 3	4-1/2 months; but at least four times each calendar year.	7-1/2 months; but at least two times each calendar year.
4	4-1/2 months; but at least four times each calendar year.	4-1/2 months; but at least four times each calendar year.

(2) DENC and DESC complies with these requirements through the following activities:

- Company may meet the patrol requirements through aerial patrols and/or supplemented with additional monthly flights during the second and third quarters; and
- Quarterly inspections, not to exceed 4-1/2 months between patrols, at locations designated by the manager as being subject to physical movement or loading such as attachments to bridges or other structures, surface and aquatic areas subject to washing or erosion, sections of exposed piping, etc.
- In addition to the above the following inspections are also performed to supplement annual patrol requirements:
 - Inspections over the pipeline and on the pipeline right-of-way conducted during the semi-annual leakage survey. These inspections target conditions including: structures in place or under construction; evidence of excavation activity; exposures, erosion, washouts, or areas of reduced cover; overgrown vegetation; dead vegetation; and missing pipeline markers. (See [Chapter 12-C Leakage Surveys](#).)
 - Inspections of the designated aquatic crossings after significant storm and flooding events (typically non-bored crossings of major navigable water bodies) to ensure pipelines remain properly supported.

(3) Patrolling at an interval less than that specified in (2) *must* be approved by the Director of Gas Operations.

(4) Any *transmission line* or part thereof may be patrolled on a more frequent basis. The choosing of a more frequent interval will be the responsibility of the management. Aspects to contemplate when considering an increased patrol frequency could include the location of the pipeline, the maintenance history of the pipeline, and the pipeline's operating pressure.

(b) Distribution Systems Patrols [[192.721](#)]

(1) The interval between patrols on distribution systems and pipelines shall not exceed the maximum prescribed intervals below:

	Maximum interval between patrols
Pipeline Location	At Mains In Locations Subject to Movement Or External Loading
Inside of Business Districts	4-1/2 months; but at least four times each calendar year.
Outside of Business Districts	7-1/2 months; but at least two times each calendar year.

(2) High Pressure Distribution Pipelines: DENC and DESC complies with these requirements through the following activities:

- Quarterly inspections, not to exceed 4-1/2 months between patrols, at locations designated by the manager as being subject to physical movement or loading such as attachments to bridges or other structures, surface and aquatic areas subject to washing or erosion, sections of exposed piping, etc.
- In addition to the above, patrols are supplemented by inspections along the pipelines conducted during the annual leakage survey. These inspections target conditions including: structures in place or under construction; evidence of excavation activity; exposures, erosion, washouts, or areas of reduced cover; overgrown vegetation; dead vegetation; and missing pipeline markers. (See [Chapter 12-C Leakage Surveys](#).)

- Mains in places or on structures where anticipated physical movement or external loading could cause failure or leakage shall be patrolled at intervals not exceeding 4-1/2 months, but at least four times each calendar year. Other distribution pipelines are patrolled during leakage surveys and other routine operations and maintenance.
 - Places to be patrolled must be determined by the Manager. Places to be patrolled may include creek crossings, mains in catch basins or drainage ditches, bridge crossings, aerial crossings, lines attached to buildings or other structures where movement or loading could occur. Each manager should maintain a list of pipeline locations to be patrolled.
 - In addition to the above, patrols are supplemented by inspections conducted during the sectional leakage survey. These inspections target conditions including: structures in place or under construction; evidence of excavation activity; exposures, erosion, washouts, or areas of reduced cover; overgrown vegetation; dead vegetation; and missing pipeline markers. (See [Chapter 12-C Leakage Surveys](#).)
- (4) In addition to quarterly inspections of any designated aquatic crossings subject to washing or erosion (typically non-bored crossings of major navigable rivers, installations on or *downstream* of dams, etc.), these locations are also to be patrolled following significant storm and flooding events.
- (5) Patrolling at an interval less than that specified in (2) or (3) above requires Director's approval.
- (6) Patrols on any system or part thereof may be supplemented with more frequent inspections or through alternative methods such as aerial inspection. Designating these locations and inspections will be the responsibility of the manager. Aspects to contemplate when considering an increased patrol frequency would include the location of the pipeline, the maintenance history of the pipeline, and the pipeline's operating pressure.

3.4 Patrol Types and Procedures

(a) Ground Patrol

Ground patrols are made to provide a detailed inspection of the pipeline and surrounding conditions. Ground patrols should be conducted while walking down the right-of-way but may be conducted from a slowly moving vehicle.

(b) Aerial Patrol

- (1) Aerial patrols are performed to supplement DENC and DESC's Damage Prevention Program activities. They are utilized to identify construction activity and other encroachments on or near rights-of-way as well as to identify potentially adverse conditions such as erosion.
- (2) Aerial Patrols are performed eight (8) times each calendar year; once during the first quarter, monthly during the second and third quarters, and once during the fourth quarter. Currently, aerial patrols are performed on segments that are primarily situated within private rights-of-way
- (3) If at any time the aerial patroller feels that people or property are in danger due to an adverse condition on the pipeline, he/she shall notify DENC and DESC immediately in accordance with the following:

Notify	Phone
Gas Control	803- 217-4924 or 800-296-0356

Gas Control shall immediately notify the responsible Supervisor of any reports. The responsible Supervisor shall initiate appropriate action(s) immediately to mitigate the danger and to protect the public.

(c) Inspections of Attachments

- At least one of the required quarterly inspections per year shall be performed on the full length of the attachment using a Remote Methane Leak Detector (RMLD), Combustible Gas Indicator (CGI), Flame Pack or other approved gas detector unless the section of line has been or is scheduled to be surveyed during the year's leakage survey.
- Retired bridge attachments shall be visually inspected once a year and do not require a leakage survey.
- Inspection of head walls where present shall include the removal of the silicone, jute, cement or other sealant from the front of the link seals. A visual inspection of the link seal and coating shall be completed around the entire carrier pipe. If after the inspection it is determined that there is damage to either the link seals or the coating, the feature shall be repaired or scheduled for repair as specified in the Preventative and Mitigative Measures of this section. Following the inspection or repair, the link seal shall be reinstalled and the bolts lightly coated with an approved mastic or corrosion inhibiting sealer.

(2) Hands-On Inspections

- Complete hands-on inspections require full access to all areas along and around the pipe. These inspections may require the use of ladders, bridge cranes, or other means to safely provide access.
- A hands-on inspection shall be performed using the Visual Inspection Items and inspection frequencies below.
- Retired bridge attachments are not subject to the hands-on inspections.
- All Bridge attachments shall be evaluated and categorized into one of the three groups based on the following criteria:
 1. 10 calendar year intervals
 - a. Wrapped pipe with both pipeline and wrap in good condition.
 - b. No corrosion promoters such as water (or brines) draining directly on pipe.
 - c. Hangers are insulated from pipe.
 2. 5 calendar year intervals
 - a. Pipe coating is paint.
 - b. Corrosion promoters exist.
 - c. Hangers are not insulated from pipe.
 - d. Other conditions exist that could decrease the serviceability of the attachment.
 3. 1 calendar year
 - a. Conditions limit access and limit optimal visual inspection without hands-on access.
 - b. Other conditions exist that warrant an accelerated inspection interval.

(3) "Hands-On" inspections should check for the following:

1. Head Wall Inspection should include the removal of all materials possible within the casing sleeve using air or water as needed to check the following:

- a. Isolation from the hole/steel casing sleeve.
- b. Presence of insulator.
- c. Damage or deformity of link seal, insulator or casing sleeve.
- d. Signs of water seepage through casing sleeve.
- e. Corrosion on the carrier pipe.
- f. Pipe movement resulting in damage to coating around the link seal or insulator.
- g. Cracking of coating and or any deterioration of coating.

2. Hanger Assembly Inspection should include:

- a. Broken, bent, and/or corroded hanger rods.
- b. Insulator shield on top of pipe (non-wrapped pipe only).
- c. Insulator shields fully encircles pipe (wrapped pipe only).
- d. Type of roller (i.e. cast iron or non-conductive).
- e. Presence of clevis insulator.
- f. Proper horizontal and vertical alignment with adjacent hangers.
- g. Proper sizing of hanger (typically one size larger for wrapped pipe).

3. Pipeline Coating Condition

- a. Pipeline coating cracking and/or deterioration. Pay special attention to pipe segments beneath bridge expansion joints and at hanger assemblies.
- b. Paint or coating disbondment from the pipe. Snap on pipe shields on pipelines shall be temporarily removed or slid out of place to allow for inspection of the coating or paint integrity beneath the shield and any remediation if necessary.
- c. Presence of holidays. Pay special attention to the pipe hanger assemblies for abrasion damage.
- d. Fading or discoloration of coating caused by Ultra Violet (UV) degradation.
- e. Slurry from expansion *joint* on pipe.
- f. Lead paint (non-wrapped pipe only).

4.0 TRAINING/QUALIFICATIONS

5.0 DOCUMENTATION/FORMS

System specific forms should be used where applicable.

State Specific: South Carolina

- [Right-of-Way Inspection Report](#) (PDF file)
- [Add/Modify Aboveground Pipeline Record](#) (PDF file)

Record Retention: [[192.709](#)][[192.935](#)][[192.947](#)]

As long as a line remains in service, the transmission records documenting patrols shall be maintained.

These are minimum requirements. Periodically, designated records as listed above or copies of such shall be forwarded to Engineering for permanent filing. Once placed in the permanent file, these on records shall be kept for the life of the pipeline. Permanent files may be kept in a variety of media including but not limited to paper, micrographic or electronic. Engineering is responsible for designating records to be placed into the permanent file and maintenance of such. No permanent records may be destroyed or disposed of without prior approval from the General Manager-Engineering & Construction.

6.0 RELATED DOCUMENTS

None at this time.

7.0 APPENDICES

Appendix 12-A - 1 Preventative and Mitigative Measures

[Click to open printable PDF copy of Appendix 12-A - 1.](#)

PREVENTATIVE AND MITIGATIVE MEASURES

1. Head walls

If after the inspection it is determined that there is damage to either the link seals or the coating, the following procedures need to be performed:

- a. Remove all materials within the casing sleeve using air or water as needed. This is to be done to the point where at least six inches of the existing coating can be seen on the carrier pipe and its condition evaluated.
- b. Remove all coating from the first six inches of the carrier pipe in front of the link seal location.
- c. Remove the coating on the carrier pipe going into the casing sleeve where the new link seals are to be installed. In addition, any damaged coating inside the sleeve is to be removed as well.
- d. Apply SPC 2888 epoxy coating following the manufacturer's installation guidelines. If possible apply the epoxy all the way beyond the existing coating within the headwall and allow for proper curing time.

- e. Install STOPAQ [stó-pac] 4200 sealant to fill the void area between the carrier pipe and casing sleeve within the headwall using the STOPAQ pneumatic caulking gun.
 - 1. Start from the back and bottom of the casing sleeve.
 - 2. Initiate the filling process moving the extension tube as needed from side to side and moving upward until the entire void is filled leaving enough space to insert the link seals at the front of the casing sleeve.
- f. Install appropriately sized link seals around the *main* between the carrier pipe and the head wall/casing sleeve and tighten until a watertight seal is achieved.
- g. The bolts shall be lightly coated with approved mastic or corrosion inhibiting sealer. The need to be able to observe the condition of the link seal and for pipe movement shall be maintained.

For locations where link seals are not able to be used, the following procedures need to be performed:

- h. Verify that the carrier pipe is not touching the casing sleeve at any location within the headwall. If the carrier pipe is touching the casing sleeve notify *engineering*.
- i. After the above steps D.1.a through D.1.e have been completed, ½" Styrofoam insulation board shall be cut to the ring shape of the void area between the carrier pipe and the casing sleeve and inserted in front of the STOPAQ 4200.
- j. The use of two (2) Styrofoam ring plugs need to be cut such that a "void free" fit is achieved into the void space. This may take several attempts to accomplish making the plugs.
- k. If the first Styrofoam ring plug is made in multiple pieces, the second plug will need to be made such that the cut locations will not overlap one another.
- l. Insert a small bead of silicone into any cut locations of the plug and around all seal locations at carrier pipe and sleeve.

For locations where little (i.e. 1" clearance or less) or no space between the casing sleeve and the carrier pipe is present, inspect the carrier pipe and casing sleeve to verify no deterioration of the existing seals and or coating has occurred. If damage is present, removal of the seals or sealants from between the carrier pipe and casing sleeve is required for further inspection. One of the following methods shall be used to perform an inspection of the coating and carrier pipe within the headwall:

- m. High Resolution Digital Inspection Camera
- n. Guided Wave Inspection

Composite casing sleeves shall be painted on all exposed surfaces with one (1) coat of approved paint ANSI 49 gray in color to protect against indirect and/or diffuse UV light.

2. Hanger Assemblies

a. Hanger Rod

- 1. Hanger rods that are broken, bent, corroded, or otherwise in disrepair should be replaced.

2. Holes for epoxy and or expansion anchors shall be made with a rotary drill or rotary-impact drill only. The size of the drill bit shall be in accordance with the epoxy or expansion anchor system specified. Holes shall be drilled, squared, and aligned, as no oversize drilling or re-drilling will be allowed, excepted when reinforcing steel is encountered. In such cases, the drilling shall be stopped and resumed at a location 3" from either side of the existing hole. Any holes that are abandoned, regardless of the reason, shall be thoroughly filled with a 1:3 Portland grout and then finished smooth and flush with the surrounding concrete. The diameter and depth of drilled holes shall be specified by Engineering.
3. New or relocated hanger rods shall be located no closer than 1' -6" to the curtain wall or bridge expansion joint, nor closer than 1'- 0 to a bridge deck drain.

b. Steel Clevis

1. The hanger assembly clevis should be oversized by one pipe size to provide the clearance necessary to accommodate tape coat and FRP roll on shields. The oversized clevis will require the use of a matching size roller axle along with axle spacers to fit the size to size insulated roller.
2. A clevis insulator should be installed on each hanger assembly clevis to ensure that the pipeline is electrically isolated from the bridge structure.

c. Rollers

1. Replace cast iron rollers with size-on-size non-conductive (insulating) pipe rollers.
2. Lubricate the roller sleeve to seal out moisture and reduce friction.

d. Protective Coating

1. All exposed metallic material (other than pipe) attached to the bridge structure that is not galvanized or aluminum shall be given one (1) coat of an approved primer, non-lead base, on all surfaces.
2. If the structure has reinforced concrete girders or structural steel beams/girders that are painted aluminum, then all exposed metallic material shall be painted on all surfaces with one (1) coat of approved paint ANSI 49 gray in color.
3. If the bridge is constructed primarily of structural steel that has been painted a color other than aluminum, then all exposed metallic material shall be painted on all exposed surfaces with one (1) coat of approved paint conforming to the color of the structural steel.

The recommended paint application includes a primer coat of Devoe Bar – Rust 231, 5-8 mils thick (dry) followed by a top coat of Devoe Devthane 379UVA 2-3 mils thick (dry). The primer coat must be allowed a minimum dry time prior to painting in accordance with the Devoe Bar-Rust 231 product specification.

3. Pipe

a. Coating

1. The entire exposed surface of the pipeline shall be inspected for signs of corrosion, abrasion damage, and coating disbondment/peeling.
2. For coating conditions that warrant repairs, the pipeline shall be coated and inspected in accordance with [8-C Protective Pipeline Coatings](#), and coating manufacturer's specifications.

b. Protection and Electrical Isolation at Hanger Assemblies

1. Wrapped Pipelines

- a. If a protective snap on shield is not already present, an oversized FRP Type #240 roll on pipe shield should be installed on the bottom. In addition, a FRP Type # 180 on top over lapping the bottom shield. To prevent shield movement, use FRP Type #4952 Double Sided Tape on the inside middle area of the shields.

2. Non-Wrapped Pipelines

- a. If a protective snap on shield is not already present, an oversized FRP Type #240 roll on pipe shield can be installed on the top.

c. Pipelines Under Bridge Expansion Joints

1. FRP Shields can be used to protect sections of mains located under bridge expansion joints. They can be supplied up to 5' lengths off the shelf and longer if needed. Two (2) FRP Type #240 shields are to be used installed centered to the bridge expansion joint.

d. Deck Drain Discharge

1. Bridge deck drains that are positioned such that they may discharge directly onto pipeline should be extended to a point just below the pipeline.

(UNCONTROLLED IF PRINTED)