Description

This procedure ensures cathodic protection is adequate.

Regulatory Applicability

Applies only to pipelines required to be cathodically protected under applicable regulations.

☒ Transmission Pipelines
☒ Regulated Gathering Pipelines (Type A)
☒ Regulated Gathering Pipelines (Type B)
☒ Distribution Pipelines

Frequency

Once per calendar year at intervals not to exceed 15 months.

However, if tests at these intervals are impractical for separately protected short sections of mains or transmission lines, not in excess of 100 feet, or separately protected service lines, these pipelines may be surveyed on a sampling basis. At least 10% of these protected structures, distributed over the entire system must be surveyed each calendar year, with a different 10% checked each subsequent year, so that the entire system is tested in each 10-year period.

Reference

49 CFR 192.455	*External Corrosion Control: Pipeline installed after July 31, 1971*
49 CFR 192.457	*External Corrosion Control: Pipeline installed before August 1, 1971*
49 CFR 192.463	*External Corrosion Control: Cathodic Protection*
49 CFR 192.465	*External Corrosion Control: Monitoring*
16 TAC Rule 8.203	*Supplemental Regulations*

Forms / Record Retention

WTG 1203	*Cathodic Protection / Life of Pipeline System*

Related Specifications

None

OQ Covered Task

0001	Measure Structure-to-Electrolyte Potential
0011	Conduct Close Interval Survey
0021	Measure Soil Resistivity
0031	Inspect and Monitor Galvanic Ground Beds/Anodes
0061	Inspect or Test Cathodic Protection Bonds
0071	Inspect or Test Cathodic Protection Electrical isolation Devices

(In order to perform the tasks listed above; personnel must be qualified in accordance with West Texas Gas's Operator Qualification program or directly supervised by a qualified individual.)

Procedure Steps

NOTE: Refer to procedure P-192.483 for needed remedial actions.

Use the following as appropriate to determine the level of the cathodic protection on the pipeline. All Cathodic Protection voltage surveys will be conducted using a copper/copper sulfate half-cell will be connected to a quality digital voltmeter with an internal resistance of at least 10 Megohms (NACE standard).

Persons performing cathodic protection surveys should be aware that:

- Test points must be selected that will give a representative pipe-to-soil reading.
- Test points only over or near anode locations are not considered representative.

NOTE: Refer to procedure P-192.455 to determine if the cathodic protection is adequate and procedure P-192.483 for needed remedial actions.

Measure Pipeline-to-Soil Potentials, DC

Test points (electrode locations) used when taking pipe-to-soil readings shall be selected to give representative pipe-to-soil readings. Test points over or near an anode or anodes are not, by themselves, considered to be representative readings.

1. Bring proper equipment: Hi-impedance voltmeter; Copper-copper sulfate reference electrode (half-cell) and Test leads
2. Properly locate the half-cell relative to the structure.
3. Measure pipeline-to-soil potential by connecting the voltmeter's positive lead to the pipeline and the negative (common) lead to the half-cell. Use the DC voltage scale. Use of digital multi-meter preferred.
4. Document readings in appropriate format. Use Form WTG-1203, or cathodic data gathering software.
5. Field-analyze readings to ensure that they meet one of the following criteria as allowed in 49 CFR 192 Appendix D:
   a) A negative voltage of at least 850 millivolts, with reference to a saturated copper-copper sulfate half cell. Determination of this voltage must be made with the protective current applied.
   b) A negative voltage shift of at least 300 millivolts. Determination of this voltage shift must be made with the protective current applied. This applies to structures not in contact with metals of different anodic potentials.

c) A minimum negative polarization voltage shift of 100 millivolts. This polarization voltage shift must be determined by interrupting the protective current and measuring polarization decay. When the current is initially interrupted, an immediate voltage shift occurs. The voltage reading after the immediate shift must be used as the base reading from which to measure polarization decay.

d) A voltage at least as negative as the originally established voltage at the beginning of the Tafel segment of the E-log-I curve.

e) A net productive current from the electrolyte into the structure surface as measured by an earth current technique applied at predetermined current discharge (anodic) points of the structure.

6. Promptly notify appropriate personnel if readings do not fall within desired range.
7. Forward all results to appropriate personnel for interpretation.

Measure Pipeline-to-Soil Potentials, AC

1. All steps are the same as for measuring pipeline-to-soil DC potentials, steps 1-4, except for step 3 where the scale setting of the voltmeter must be changed to AC voltage.
2. Notify appropriate personnel immediately if any reading is above 15 volts AC.

Measure Casing-to-Soil Potentials, DC

Repeat steps 1-4 from “Measure Pipeline-to-Soil Potentials, DC” for all casings, except connect voltmeter’s positive lead to the test station lead connected to the casings. Keep the voltmeter negative (common) connected to the half-cell. If test station lead to the casing does not exist or produces a questionable reading, crosscheck by connecting positive lead of voltmeter directly to a clean metallic spot on the casing vent pipe, and retake reading.

1. NOTE: missing or inactive test station lead wire in “Comment” section of Form WTG 1203, or cathodic data gathering software.

Measure Amperage at Test Stations Where Anode Lead-Wire(s) Come Above-ground:

1. Use voltmeter on DC millivolt scale to read voltage drop across shunt, if installed. Be sure to record direction of current flow, positive or negative, using the following convention for use of the voltmeter: attach pipeline side of the shunt to the positive lead of the voltmeter, and the anode side to the negative, or “common” lead.
2. Record the DC millivolt reading, and whether the voltage is positive or negative.
3. Forward all results to appropriate personnel for interpretation.

Close Interval Survey (as needed)

1. Determine type of close interval survey to be performed.
   a) Distance to cover

   b) Spacing between readings

2. Bring proper equipment:
   a) Hi-impedance voltmeter
   b) Copper-copper sulfate reference electrode (half-cell)
   c) Test leads
   d) Spool wire
   e) Data logging equipment if available
3. Take readings, and record properly in field notes.
4. Forward all results to appropriate personnel for interpretation.