



## Patrolling Pipelines and Mains

### Summary

This utility procedure establishes a uniform procedure for patrolling Pacific Gas and Electric Company (Company) gas facilities.

Patrolling Company gas facilities is the responsibility of the operating department supervisor and the district superintendent who direct the maintenance and operation of these facilities in their areas.

Performance responsibilities include the following tasks:

- Determining the specific scope of patrols and any special considerations.
- Scheduling and assigning patrol frequency.
- Reviewing and maintaining patrol records.
- Initiating and ensuring the completion of actions to correct conditions found during patrols.

Maintaining patrol records is the responsibility of division maintenance and construction (M&C) personnel and gas transmission district offices.

This procedure fully addresses the federal code requirements for 49 CFR §192.705, "Transmission Lines: Patrolling," 49 CFR § 192.721, "Distribution Systems: Patrolling," and 49 CFR §192.481, "Atmospheric Corrosion Control: Monitoring," for all transmission and distribution pipelines, with the following exceptions:

- WP4430-02, "Gas Station Facilities Inspection, Testing, and Maintenance Procedures," addresses piping in transmission stations containing controller-operated equipment.
- WP4430-04, "Gas Valve Maintenance Requirements and Procedures," addresses atmospheric corrosion on main line valves and associated equipment.
- TD-4540P-01 (proposed), currently WP4540-01, "District Regulator Station Maintenance," addresses piping at transmission stations containing pilot-operated equipment and district regulator stations.
- TD-4110P-06, "Abnormal Operation Conditions Inspections of Gas Facilities," (proposed) addresses customer riser pipes and customer meter and regulator sets. This includes curb meters in vaults and high-to-high sets to an individual customer, two small adjacent or adjoining customers, or multiple small customers served through a meter header or manifold (also known as non-district high pressure regulators [HPRs]).

**Target Audience** Gas transmission employees  
Gas maintenance and construction (M&C) employees  
Gas engineering employees

**Safety** Performing the patrols defined in this procedure promotes public safety by reducing potential hazards from surface conditions that could lead to gas facility failure or leakage.

Perform all gas patrolling work safely and in accordance with all applicable safety rules, the Code of Safe Practices, and Utility Standard Practice (USP) 22, "Safety and Health Program."

**Before Starting this Procedure** Field employees following this procedure must wear the following personal protective equipment (PPE) at a minimum, plus any other applicable PPE, as specified in the Code of Safe Practices:

- Hard hat (must be available)
- Traffic vest
- Proper work footwear, no sneakers allowed
- Long-sleeved shirt
- Long pants
- Gloves (must be available)
- Safety glasses (must be available)

**Procedural Steps** Patrol the following facilities:

**1. Facilities to Be Patrolled**

- 1) All gas transmission and gathering lines up to the first valve at compressor stations, district regulator sets, and valve lots.
- 2) Any gas distribution lines and distribution feeder mains (DFMs) operating at  $\leq 20\%$  specified minimum yield strength (SMYS) in places or on structures where anticipated physical movement or external loading could cause leakage or failure.
- 3) Exposed distribution mains, excluding customer riser pipes and customer meter and regulator sets not included in Item 2 above. This exclusion



includes curb meters in vaults and high-to-high sets to an individual customer, two small adjacent or adjoining customers, or multiple small customers served through a meter header or manifold (also known as non-district HPRs).

- 4) Any other gas pipeline facilities requiring special attention, as conditions warrant.

**2. Conditions to Observe and Report**

**Observe and report** on the following conditions using the documents in Section 8, "Documentation," on Page 7:

- Landslides or threatened slides.
- Erosion by streams, wave action, rain, or other natural causes.
- Land subsidence, earth slippage, or extensive tree root growth that could affect the pipeline.
- Possible third-party threats, including construction or maintenance work along the pipeline (within 220 yards [660 feet] on either side) or encroachment on the Company's right-of-way. Observe any excavation, grading, demolition, or other construction activity which could result in the following conditions:
  - Damage to the pipe.
  - Loss of support due to settlement or shifting of soil around the pipe.
  - Undermining or damage to pipe supports.
  - Loss of cover.
  - Excess fill.
- Presence of survey parties and/or other indications of possible future work within 220 yards (660 feet [ft]) on either side of the pipeline.
- Evidence of gas leakage as indicated by dead or dying vegetation, bubbles in surface water, odor, readings, etc.
- Signs of severe seismic displacement (fault zones).
- Damage to Company-owned facilities, including casing vents.
- Damage to the supports for exposed pipe for transmission and distribution pipe.
  - Supports (including highway structures and other facilities not owned by the Company) provide support to Company facilities.
  - Damage includes but is not limited to the following conditions:
    - Corrosion.
    - Missing supports.
    - Cracked supports.



➤ Loose supports.

- Access roads that may not be in a passable condition.
- Pipeline markers and signage, including those inside Company-owned stations.
- Any other factors affecting the operation or safety of the pipeline.

**3. Atmospheric Corrosion Conditions to Observe and Report**

When performing patrols, be sure to **report** on the following issues using the documents in Section 8, "Documentation," on Page 7.

**3.1 Pipe Conditions**

- 1) Coating OK? (Y/N)
  - No, if the coating is not in good condition. 6 inches beyond the soil surface is desired for air/soil transitions; but if the coating is in good condition, the answer should be Yes and the lack of coating length noted (if No, include notes of condition).
  - No, if coating is not present on the length of the span (surface rust is not an issue). If No, include notes of condition.
- 2) Pipe Integrity OK (Y/N)?  
No, if pitting is present (include depth in notes).
- 3) Paint OK? (Y/N)  
No, if there is chalking, peeling, or cracking (if No, include notes of condition).
- 4) Structure OK? (Y/N)  
No, if support, cables, or footings are not in good condition (if No, include notes of condition).

**3.2 Air/Soil Transition Considerations**

- 1) **Evaluate** any evidence of pitting corrosion on exposed pipe surfaces. Repair if possible.
- 2) The pipe condition always dictates whether or not remedial work is required and the priority for the remedial work.
  - i. The fact that the coating does not extend to a distance of at least 6 inches above the soil level is not sufficient reason to require repairs.
  - ii. The presence of cold-applied plastic tape or other coating systems that are not approved as replacement systems for transitions is not sufficient reason to require repairs.
- 3) Recoat the pipe to a minimum 6-inch height above the ground when making repairs.

**3.3 Evaluation Strategy and Criteria for Corrosion**

- 1) **Determine** the maximum corrosion depth and compare it to the nominal thickness in the uncorroded area. If the depth cannot be determined,



refer to corrosion engineering.

- 2) **Accept** any corrosion that does not exceed 20% of the measured nominal thickness.
- 3) **Contact** the responsible engineer if the depth is greater than 20% of the measured nominal thickness.
- 4) The responsible engineer **determines** if the corrosion is acceptable, based on the criteria and strategies provided in Table 1.

**Table 1. Corrosion Criteria and Evaluation Strategies**

Strategy	Maximum Corrosion Depth	Evaluation Criteria for Pipe	Comments
1	<= 20% of nominal wall thickness	None. Pipe is acceptable as is.	If Strategy 1 fails, proceed to Strategy 2.
2	> 20% and < 80%	Perform RSTRENG analysis. Per RSTRENG, any length of corrosion < 20% deep is acceptable. Use caution where secondary loads could be present.	If Strategy 2 fails, repair or replace pipe or lower the pressure. Contact the responsible engineer.
3	>= 80%	None. Automatic repair or replacement of pipe is required.	Repair or replace pipe.

**4. Patrolling Methods**

Conduct patrols to observe surface conditions on and adjacent to the facility right-of-way. Use the methods below in the following order:

**4.1 Aerial Observation (Preferred Method)**

- 1) **Coordinate** routine aerial patrols of gas transmission lines with the designated Company Aerial Pipeline Patrol Program manager.
- 2) **Coordinate** other special aerial patrols (e.g., helicopter patrols) with the gas transmission and distribution (T&D) Technical Special Program manager.
- 3) **Supplement** aerial patrols with ground patrols whenever any of the conditions listed in Section 2, "Conditions to Observe and Report," on Page 3 cannot be adequately observed by aerial patrol.

**4.2 Ground Observation (including motorized vehicle)**

- 1) **Patrol** by ground if it is not practical to patrol by air (e.g., heavy foliage over a pipeline, air space restrictions).
- 2) **Perform** ground patrols in conjunction with other work (e.g., leak survey) as long as the necessary functions of patrolling, including reporting, are accomplished.
- 3) **Supplement** aerial patrol with ground patrol if the conditions listed in Section 2, "Conditions to Observe and Report," on Page 3 cannot be adequately observed by aerial patrol.



**5. Annual Review of Facilities to be Patrolled**

Conduct annual reviews of facilities, as follows:

**5.1 Local Office Review**

Review and update the following:

- The list of pipelines to be patrolled.
- The patrolling methods for each pipeline.

**5.2 Aerial Patrol Review**

The Aerial Pipeline Patrol Program manager reviews and updates the Aerial Patrol Program.

**6. Patrol Frequency**

**6.1 Minimum Patrol Frequency Requirements**

**Table 2. Patrol Frequency Requirements**

Facilities	Quarterly	6 Mo.	3 Yr.	Acceptable Methods	Form
Gas transmission lines, gathering lines.	X			Aerial and/or ground	<a href="#">TD-4412P-07-F01</a>
Exposed portions of transmission lines, gathering lines (atmospheric corrosion).			X	Ground	<a href="#">TD-4412P-07-F02</a>
Distribution lines in places or on structures where anticipated physical movement or external loading could cause failure or leakage and consequent hazards to public safety. A. In business districts. B. Outside business districts.	X			Aerial and/or ground	<a href="#">TD-4412P-07-F03</a>
Exposed portions of distribution lines.		X	X	Ground	<a href="#">TD-4412P-07-F02</a>

**6.2 Allowable Limits to Patrol Frequencies**

- 1) Quarterly – At least four times each calendar year, not to exceed 4½ months to the date.
- 2) 6 months – At least twice each calendar year, not to exceed 7½ months to the date.
- 3) Annually – At least once each calendar year, not to exceed 15 months to the date.
- 4) 3 years – Once every 3 years, not to exceed 39 months to the date.



**6.3 Additional Patrols – as Local Conditions Warrant**

Conditions to **consider** when deciding whether to conduct additional patrols include but are not limited to the following:

- Earthquakes.
- Landslides.
- Fires.
- Heavy rainstorms or extended rainfall.
- Train derailments near a pipeline right-of-way.
- Other disasters.

**7. Corrective Actions**

- 1) **Be prepared to correct** minor conditions found during the patrol, if possible (e.g., missing stickers, ensure markers are upright).
- 2) **Contact** the responsible supervisor or superintendent as soon as possible concerning conditions that require immediate attention but cannot be corrected during the patrol itself.
- 3) **Enter** conditions which require follow-up attention and priority work scheduling (but which can be deferred) into a work management database as a Systems Applications and Products [SAP] Notification or Pipeline Maintenance [PLM] Work Request.

**8. Documentation**

**8.1 All Patrols**

- 1) **Complete** the Pipeline Patrol Report (Attachment 1, TD-4412P-07-F01) as follows:
  - i. Complete the form.
  - ii. Print the patroller’s LAN ID and the date of the patrol.
  - iii. Initial the form in the space provided.
  - iv. Submit the form to the responsible supervisor.
- 2) **Complete** a Corrective Notification or PLM Work Request as follows:
  - i. Report conditions that require immediate attention but cannot be corrected by the patrol.
  - ii. Submit the form to the responsible supervisor.

**8.2 Aerial Patrols**

- 1) The Aerial Pipeline Patrol Program manager (the person who administers the Aerial Patrol Program) **customizes** an Aerial Patrol Report for the pipeline segments patrolled in each area.
- 2) The pilot **completes** the customized Aerial Patrol Report for each aerial patrol.
- 3) **Send** the completed Aerial Patrol Report to the district or division office



for the pipeline segments and/or DFMs patrolled.

- 4) **File** the report in the Aerial Patrol Binder.
- 5) The Aerial Pipeline Patrol Program manager **retains** copies of the Aerial Patrol Reports.
- 6) The Aerial Pipeline Patrol Program manager **provides** copies of aerial patrol reports upon request.

**8.3 Ground Patrols**

**Complete Attachment 1, "Pipeline Patrol Report" (TD-4412P-07-F01), to document ground patrols.**

**8.4 Special Inspections**

- 1) Spans – **Complete Attachment 2, "Exposed Piping and Spans" (TD-4412P-07-F02), to document inspections of exposed piping and spans.**
- 2) Landslides
  - i. **Patrol** slide conditions quarterly, at a minimum.
  - ii. **Complete Attachment 3, "Landslide Area" (TD-4412P-07-F03), if slide conditions exist.**

**8.5 Form Retention**

- 1) **Retain** all patrol reports of Company responses at district or division M&C local offices.
- 2) **Retain** the records describing the Company's response and actions taken as a result of the patrol findings for the life of the patrolled facility.
- 3) **Retain** completed patrol reports for the following time frames:
  - i. The life of the facility for numbered transmission pipelines.
  - ii. 3 years for all other facilities.

**Implementation Responsibilities**

Gas management employees are responsible for providing the necessary resources to patrol gas facilities and to correct conditions found.

Gas transmission and M&C employees are responsible for performing patrols and reporting conditions found.

Gas engineering employees are responsible for performing analyses of atmospheric corrosion conditions found during patrols to determine the necessary actions.

The Aerial Pipeline Patrol Program manager is responsible for managing the Aerial Patrol and maintaining the necessary Aerial Patrol records.





**Governing Authority**

- This procedure is governed by Utility Standard S4412, "Preventing Damage to Underground Facilities."
- This procedure implements 49 CFR §192.705 and 49 CFR §192.721 of the Federal Gas Safety code, which requires gas utilities to patrol certain gas transmission and distribution facilities.

**Reference Documents**

Code of Federal Regulations, Title 49:

- 49 CFR §192.5, "Class Locations"
- 49 CFR §192.481, "Atmospheric Corrosion Control: Monitoring"
- 49 CFR §192.605(b), "Procedural Manual for Operations, Maintenance, and Emergencies"
- 49 CFR §192.705, "Transmission Lines: Patrolling"
- 49 CFR §192.721, "Distribution Systems: Patrolling"

Code of Safe Practices

Company Form F4127, "Report of New Construction along Pipeline – For Pipelines Operating at or over 20% SMYS"

Gas Numbered Document O-16, "Corrosion Control of Gas Facilities" (located in the Corrosion Control Volume of the Gas Transmission and Distribution Manual)

Utility Standard Practice (USP) 22, "Safety and Health Program"

Utility Standards:

- 4127, "Class Location Determination, Compliance and Maintenance"
- S4110, "Leak Survey and Repair of Gas Transmission and Distribution Facilities"
- S4122, "Gas Pipeline Markers"

Utility Work Procedures:

- WP4430-02, "Gas Station Facilities Inspection, Testing, and Maintenance Procedures"
- WP4430-04, "Gas Valve Maintenance Requirements and Procedures"
- WP4540-01, "District Regulator Station Maintenance"

**Attachments**

Attachment 1, Form TD-4412P-07-F01, "Pipeline Patrol Report"

Attachment 2, Form TD-4412P-07-F02, "Exposed Piping and Spans"

Attachment 3, Form TD-4412P-07-F03, "Landslide Area"



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**Document  
Revision**

This document supersedes Utility Work Procedure WP4412-07, "Patrolling Pipelines, Stations, and Mains," dated December 2008.

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**Definitions**

**Class location:** The density of buildings, as defined in 49 CFR §192.5 "Class Locations"

**CFR:** Code of Federal Regulations.

**CPUC:** California Public Utilities Commission.

**DFM:** Distribution feeder main. A line operating over 60 pounds per square inch gauge (PSIG) that is not a numbered transmission line.

**Distribution line:** A pipeline that serves as a common source of supply for more than two service lines.

**Exposed facility:** A facility that is normally exposed to the atmosphere. This includes mains and services on the roofs of buildings and equipment in underground vaults. Excluded facilities include those exposed in a temporary excavation, cased piping, and buried valve bodies within a frame and cover which may or may not be in contact with the soil.

**Gathering line:** A pipeline that transports gas from a current production facility to a transmission line or main. This term includes collection lines taking gas from wells.

**HPR:** High pressure regulator. A type of pressure regulation device.

**PSIG:** Pounds per square inch gauge.

**SMYS:** Specified minimum yield strength.

**Transmission lines:** All lines operating over 20% SMYS that are not gathering lines. This term includes gas underground storage field injection and withdrawal lines and lines that transport gas within a storage field.

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**Approved By**

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Director

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**Document Owner**

