

Structural Encroachment Risk Analysis

SUMMARY

This utility procedure describes the process how Pacific Gas and Electric Company (PG&E or Company) performs risk prioritization and analysis to determine threat levels of structural encroachments within the right-of-way (ROW).

Level of Use: Informational Use

TARGET AUDIENCE

Transmission integrity management (IM) personnel, and Gas pipeline operations and maintenance (GPO&M) personnel.

Land rights management personnel are included for procedure awareness.

SAFETY

Performing this procedure will not raise the risk of a specific hazard to personnel, public, or equipment.

BEFORE YOU START

All personnel performing the duties of this utility procedure must complete annual transmission integrity management program (TIMP) training.

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PROCEDURE STEPS

1 General

NOTE

In some instances, it may not be necessary to remove all structural encroachments from the ROW as described in [Utility Standard TD-4490S, "Gas Pipeline Encroachment Management."](#)

1.1 GPO&M personnel perform the following:

1. All structural encroachment management operations:
 - In a safe and effective manner.
 - In accordance with all federal and state laws, regulations and permit conditions.
 - With special attention to environmental concerns.
2. Minimize risk of pipeline damage by managing structural encroachments near gas transmission facilities.
3. Ensure appropriate pipeline maintenance can be performed.
4. Maintain unobstructed access to Company natural gas pipeline facilities for emergency response and pipeline operations and maintenance (O&M) activities.

2 Data Collection

2.1 IM personnel complete the following:

1. Collect the following minimum data required for structural encroachment risk analysis:
 - The encroachment classification as described in [Section 3.1](#).
 - The horizontal distance from the encroachment to the pipeline centerline.
 - Pipeline depth of cover (DOC)
2. Collect the following additional data as needed for analysis when determining recommendations per [Section 4](#):
 - IM assessment history.
 - Construction practices used to install the encroachment.
 - Depth of the encroachment (conservative assumptions may be used).

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3 Initial Screening

- 3.1 IM personnel classify each encroachment for screening, as indicated in Table 1, “Encroachment Classifications,” which represents the majority of encroachments PG&E personnel encounter.

Table 1. Encroachment Classifications

Classification	Description
P-1	Utility poles and guy wires.
P-2	Fence posts, bollards, sign posts, and shallowly embedded structures (less than 36 in.).
P-3	Uninhabited structures not breaking the ground (e.g. barns, sheds, patios, above ground pools, occupied areas).
P-4	Uninhabited structures with deeper foundations or depths of structure footing greater than 36 in. but less than 60 in; such as warehouses, below ground pools, or loading docks.
P-5	Inhabited structures.

1. IF an encroachment does not appear to fit any of the classifications above,
THEN the IM subject matter expert further assesses the encroachment’s risk, to determine where it fits within the screening process.

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- 3.2 Use the classification and the minimum data required as specified in [Section 2.1](#), to determine the initial risk level of each encroachment with impacted occupancy count (IOC) per Table 2, "Encroachment Screening Process."

Table 2. Encroachment Screening Process

LIKELIHOOD OF POTENTIAL COATING OR MECHANICAL DAMAGE	CONSEQUENCE									
	P-3, IOC = 0	P-3, IOC > 0	P-2, IOC = 0	P-4, IOC = 0	P-2, IOC > 0	P-1, IOC = 0	P-4, IOC > 0	P-5, IOC > 0	P-1, IOC > 0	
Distance is < 2 ft AND DOC is < 3 ft.	LOW	LOW-MEDIUM	MEDIUM		HIGH					
Distance is < 2 ft AND DOC is 3 ft to 5 ft.	LOW	LOW-MEDIUM		MEDIUM			HIGH			
Distance is < 2 ft AND DOC is > 5 ft	LOW	LOW-MEDIUM				MEDIUM		HIGH		
Distance is 2 to 5 ft AND DOC is < 3 ft.	LOW		LOW-MEDIUM				MEDIUM			
Distance is 2 to 5 ft and DOC is 3 ft to 5 ft.	LOW			LOW-MEDIUM			MEDIUM			
Distance is 2 to 5 ft AND DOC is > 5 ft.	LOW				LOW-MEDIUM					
All classifications with distance away from pipe > 5 ft AND at all DOC.	LOW									

NOTE: P-5, IOC equals 0: This scenario cannot exist since P-5 are habitable structures

- 3.3 IM personnel make associated decisions OR take additional action for each encroachment as described for the appropriate initial risk level.

1. Low risk

IF the IOC is equal to zero AND there is very low likelihood of mechanical damage,

THEN the encroachment may remain within the ROW.

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3.3 (continued)

2. Low to medium risk

IF normal operation and maintenance (O&M) measures are in place AND one of the following is true:

- The IOC is greater than zero AND there is no pipeline integrity threat.
- The IOC is equal to zero AND there is low likelihood of a pipeline integrity threat.

THEN the encroachment may remain within the ROW.

3. Medium risk

IF one of the following is true:

- The IOC is equal to zero AND there is a potential for mechanical damage.
- The IOC is greater than zero AND there is low likelihood of mechanical damage.

THEN additional data must be collected as described in [Section 4.1](#).

4. High risk

IF the IOC is greater than zero AND there is a likelihood of potential mechanical damage,

THEN the encroachment must be removed UNLESS the mechanical damage is validated to not exist.

4 Action Requirements or Recommendations

4.1 IF initial screening result is a “medium risk,”

THEN IM personnel complete additional data collection or analysis, including indirect inspection (closed interval survey, alternating current voltage gradient, and direct current voltage gradient), to determine whether the encroachment may cause any of the following mechanical damage to the pipeline:

- Coating damage
- Metallic contact with pipeline
- Damage to pipeline

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- 4.2 IF indirect inspection yields a result of mechanical damage not likely to exist,
THEN perform the following steps (the encroachment may remain):
1. O&M personnel continue to monitor the encroachment through appropriate processes for pipeline patrol and emergency response according to [Utility Procedure TD-4412P-07, "Patrolling Gas Pipelines."](#)
 2. IM personnel evaluate the encroachment for potential use of additional mitigation measures.
- 4.3 IF indirect inspection cannot be accomplished due to the interference from the encroachment,
OR appropriate processes for pipeline patrol and emergency response cannot be established at a specific encroachment site,
THEN IM elevates the site to eliminate the threat, pursues the removal of encroachment AND validates that mechanical damage to the pipe did not occur.
- 4.4 IF indirect inspection yields a result of mechanical damage likely to exist,
THEN perform the following steps:
1. O&M personnel, construction personnel, or both, must stabilize OR remove the encroachment before excavating.
 2. O&M personnel, construction personnel, or both, must excavate the pipeline to identify any coating or pipeline damage.
 3. IF the pipeline requires repair,
THEN O&M personnel, construction personnel, facilities IM program personnel (Pipeline services), or any combination, must follow the instructions of [Utility Procedure TD-4100P-05, "Selection of Steel Gas Pipeline Repair Methods,"](#) as appropriate.

END of Instructions

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DEFINITIONS

Alternating current voltage gradient (ACVG): Inspection technique including a series of above ground measurements of voltage gradients resulting from current pickup and discharge points at holidays. Capable of locating holidays on the pipeline.

Closed interval survey (CIS): Inspection technique including a series of above ground pipe-to-soil potential measurements taken at predetermined increments of several feet along the pipeline and used to provide information on the effectiveness of the cathodic protection system.

Depth of cover (DOC): The vertical distance measured from the ground surface to the top of the pipeline.

Direct current voltage gradient (DCVG): Inspection technique including a series of above ground measurements of voltage gradients resulting from current pickup and discharge points at holidays. Capable of locating holidays on the pipeline.

Encroachment: Anything located on or near the pipeline that would either pose integrity management risk, hinder maintenance activities, OR cause a lengthy delay in accessing pipeline facilities during an emergency.

Impacted Occupancy Count (IOC): Total occupancy value for all structures or outside occupied areas within the potential impact radius (PIR) circles of an individual pipeline section, as determined through processes within the Transmission Asset Knowledge and Integrity Management department.

Indirect inspection technology (IIT): Inspection techniques including a series of above ground survey techniques (ACVG, DCVG, CIS) taken at predetermined increments of several feet along the pipeline and used to provide information on the condition of the pipelines protective coating.

Right-of-way (ROW): The right to cross property to go to and from another parcel. The ROW may be a specific grant of land or an "easement," which is a right to pass across another's land.

IMPLEMENTATION RESPONSIBILITIES

This utility procedure will be communicated via a Gas Technical Document Management (TDM) Communications Monday morning email announcement.

Transmission IM will provide Web ex sessions to target audience to reinforce the current process and communicate the publication of new procedure.

GOVERNING DOCUMENT

[Utility Standard TD-4490S, "Gas Pipeline Encroachment Management"](#)

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COMPLIANCE REQUIREMENT / REGULATORY COMMITMENT

[Code of Federal Regulations \(CFR\), Title 49, Transportation, Part 192—Transportation of Natural and other Gas by Pipeline: Minimum Federal Safety Standards, Subpart O, “Gas Transmission Pipeline Integrity Management”](#)

REFERENCE DOCUMENTS

Developmental References:

NA

Supplemental References:

[Utility Procedure TD-4100P-05, “Selection of Steel Gas Pipeline Repair Methods”](#)

[Utility Procedure TD-4412P-07, “Patrolling Gas Pipelines”](#)

APPENDICES

NA

ATTACHMENTS

NA

DOCUMENT REVISION

NA

DOCUMENT APPROVER

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REVISION NOTES

Where?	What Changed?
All	This is a new utility procedure documenting this process for the first time; however this process is currently being used.