

Excavation Procedures for Damage Prevention

SUMMARY

This utility procedure provides excavation instructions for preventing damage to Pacific Gas and Electric Company (Company or PG&E) underground facilities.

Level of Use: Informational Use

TARGET AUDIENCE

All personnel planning, performing, inspecting, and supervising excavations, including, but not limited to:

- Company gas and electric transmission and distribution (T&D) personnel (first party).
- Contractors performing work for the Company (second party).
- Third parties (including applicant install).

SAFETY

Specific hazards impacting this work include the following conditions:

- Electrical shock from contacting live electric facilities
- Construction activities
- Asphyxiation due to oxygen displacement
- Explosion or ignition of escaping gas
- Unrestrained animals at customer premises
- Tripping and slipping hazards
- Inadequate barriers from vehicular traffic
- Vegetation, including poison oak

This procedure includes the minimum excavation tasks required. In some situations, additional precautions may be necessary to ensure safety of personnel, public, and facilities. Always use caution to avoid damage to underground facilities and ensure a safe work environment.

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BEFORE YOU START

Training and Qualifications:

- Personnel performing excavation must be trained and qualified to operate excavation equipment AND must be able to read and understand Company facility maps.
- Personnel performing locating for underground service alert (USA) ticket purposes must be qualified for operator qualification (OQ) subtask 05-01, "Locate and Mark."
- Personnel performing locating for crew locating purposes must be qualified for OQ subtask 05-01, "Locate and Mark" OR OQ subtask 05-04, "Crew Locate."
- Personnel validating existing locate marks (e.g., conductively or inductively) must be trained on the instrument used.
- A designated standby person must be qualified for OQ subtask OQ 05-02, "Standby Pipeline."
- Personnel performing and documenting pipe inspections must be qualified for OQ subtask 03-05, "Pipe Inspections."

Personal Protective Equipment (PPE):

- Field personnel following this procedure must wear the PPE as specified in the [Code of Safe Practices](#) and the PPE Matrix for Gas Operations.

Tools, Materials, and Equipment:

The following Company approved tools are required, at a minimum, to perform the steps in this procedure:

- Communication device (e.g., radio, cell phone), if appropriate.
- Shovel.
- Fiberglass T-handled probe with ball tip or impact bar probe (See [Gas Design Standard \[GDS\] M-54.1, "Impact Bar Probe"](#)).
- Multi-gas monitor (See [GDS M-04, "Multi-Gas Monitors"](#)).

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Tools, Materials, and Equipment (continued)

Excavators must have the following materials:

- Mapping information and available job package of gas and electric facilities for reference.
- Electronic marker system (EMS) supply of appropriate depths (e.g., 3 feet (ft), 6 ft).
- Copy of valid USA ticket.
- White chalk, white flags, white stakes, and white whiskers, or other suitable markers, including a Company identifier.

The following are examples of power-operated equipment used to perform excavations:

- Backhoes
- Vacuum excavation
- Boring equipment
- Piercing equipment
- Pole augering equipment
- Trencher
- Rock-wheel

The following are examples of other equipment used to perform excavations:

- Shovel
- Post hole digger
- Digging bar
- Pick
- Pneumatic spade
- Pneumatic hammer
- Sharpshooter

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PROCEDURE STEPS

1 Preparing for an Excavation

1.1 Excavators perform the following steps before proceeding with an excavation:

1. Delineate the excavation area with white chalk, white flags, white stakes, white whisksers, or other suitable markings, including a Company identifier (e.g., name, abbreviations, or initials).
2. Contact USA personnel at **8-1-1** to obtain a USA ticket number at least 2 working days, but not more than 14 calendar days, before starting excavation.
3. Obtain contact information from USA personnel for all facility owners/operators notified by USA personnel and listed on USA ticket.
4. Request and obtain a response (by phone, fax, email, or surface markings at job site) from each known facility owner or operator within excavation area, providing the following information:
 - Confirmation that owner or operator has located their underground facilities.
 - Location of underground facilities or notification that those facilities pose no conflict with performing the proposed excavation.

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Step 1.1 (continued)

5. IF excavator intends to use boring, vacuum excavation equipment, or explosives for the excavation,

THEN excavator performs the following tasks:

- a. Notify USA personnel of that intention by phone or online so that it is stated on the USA ticket.
- b. Obtain permission to use intended excavation method from each facility owner or operator whose facilities are in conflict with proposed work location. Each facility owner or operator must evaluate proposed work and provide permission to excavator if approved.
- c. IF blasting is to be used,

THEN consult responsible engineer, who must follow the gas piping technology committee (GPTC) *Guide for Gas Transmission and Distribution Systems*, Appendix G-192-16, to determine whether blasting is allowed and what precautions or protections are necessary. (To access the *GPTC Guide*, install WINDOT from the internet location:

<http://pgeatwork/EO/GTD/GE/RSA/Pages/WinDOT.aspx>

NOTE

Each excavator at a job site must have a separate, valid USA ticket.

6. Obtain a hardcopy of the valid USA ticket AND keep the hardcopy available at job site.
7. Check excavator information and other details on USA ticket for accuracy.
8. Ensure that any contractor performing an excavation has a hardcopy of a valid USA ticket at job site.
9. IF facility owner or operator does not respond before the excavation start date and time,

THEN perform the following:

- a. Do NOT begin excavation.
- b. Notify USA personnel. See [USA North California Excavation Manual](#) for more information related to California Government Code (CGC) rules and regulations.

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Step 1.1 (continued)

- c. IF no response is received after additional notification,
THEN contact the responsible supervisor for additional guidance.

- 10. IF underground facilities belonging to non-USA members are known or suspected to be within the delineated area,
THEN perform the following tasks:
 - a. Contact facility owner or operator. USA personnel may be able to provide assistance with obtaining contact information for non-USA members.
 - b. Request that the owner or operator locate and mark the facility.
 - c. Document all contacts and conversations.
 - d. IF the non-USA member owner of a facility is a municipal sewer/storm drain operator OR other agency,
THEN contact the local work and resource coordinator (maintenance and construction) OR field engineer (general construction) to have the sewer located by an approved sewer video inspection contractor.

- 11. IF excavating on private property or in an easement,
THEN notify property owner or tenant.

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2 Preventing Damage by Company Excavators

NOTE

USA tickets are valid for 28 days from the date issued.



WARNING

Personal injury, facility damage, or both may occur from excavations performed without a current USA ticket.

Personal injury may occur if job site safety requirements identified in job site tailboards are not adhered to for excavations.

- 2.1 Company crews, contractors performing work for Company (second parties), and third parties perform the following:
1. Ensure that the proposed excavation adheres to the requirements identified in [Utility Manual TD-4621M, "Excavation Safety Manual"](#) AND that the manual is present at the job site.
 2. Ensure that a hardcopy of the current USA ticket listing excavator performing the excavation is at the job site.
 - a. IF there is more than one excavator,
THEN each must have a separate, valid USA ticket.
 3. Qualified personnel perform locates and place markings to identify Company facility locations for USA purposes.
 4. Ensure that a response is received from every underground facility owner listed on the USA ticket.
 - a. IF markings are not present, illegible, or incomplete,
THEN contact USA at **8-1-1** to have the facility owner provide locate marks OR confirm a "no conflict" response.
 5. Perform a job site safety analysis (JSSA) before the job begins to clearly identify any potential safety hazards AND identify the methods of excavation that will be performed.

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Step 2.1 (continued)

NOTE

Job packages may not be available for some excavations (e.g., non-engineered jobs).

6. Review existing mapping and available job package information for facility size, type, material, and location. Examples of mapping information include:
 - Gas and electric geographic information system(GIS) and/or mapping and estimating tool (MET) maps
 - As-built information
 - Gas service records
 - a. Review the map and identify all fittings and attachments to the pipe that could be within the delineated area including the following:
 - Bottom taps
 - Pressure control fittings
 - Service tees
 - Elbows
 - Drips
 - Stubs
 - b. IF locate marks placed by locate and mark personnel do not match Company mapping information,

THEN consider contacting Company locate and mark personnel to confirm the accuracy of the marks.
 - c. Review mapping information for work in progress (WIP) clouds or pre-post polygon symbols.
 - (1) IF these symbols are present,

THEN contact the responsible supervisor before excavating.

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Step 2.1 (continued)

- d. Review map information and compare to existing facilities that are visible as follows:
 - (1) Compare available job package information to existing risers.
 - (2) Look for signs of plastic inserted into other facilities.
 - (3) Look for existing casings.
 - IF job package information (including as-built data) does not match existing facilities,
 - THEN contact the responsible supervisor **before** excavating.

NOTE

Do NOT mark depth measurements. Depth measurements are only communicated to Company personnel.

7. Perform a depth measurement of existing facilities with an approved locating instrument as follows:
 - a. Compare depth measurement to as-built information to verify the measurement is accurate. Unexpected or extreme measurements may indicate an inaccurate locate (e.g. a gas service line depth reading of 8 ft. may indicate an inaccurate locate).
 - b. Do NOT use depth measurement to get as close as possible to a facility while using power-operated or power-driven equipment.
 - c. Use depth measurement as a guide ONLY. Depth measurements typically indicate the depth to the center of the facility.
8. Confirm existing marks by performing an inductive search and sweep of the area with an approved locating instrument as follows:
 - a. Confirm calibration verification of the locating instrument is current. (See [Utility Procedure TD-5811P-205, "Verifying Instrument Calibration."](#))
 - b. Refer to [Utility Procedure TD-5811P-203, "Inductive Locate"](#) for locating an unknown facility using one and two-person methods.
 - c. Temporarily mark unidentified facilities with pink chalk or flags.

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Step 2.1 (continued)

NOTE

Not all locate instrument indications represent a buried facility. Other conductors, (e.g., rebar, discarded material) or interferences (e.g., overhead power lines) can carry conductive and inductive signals that can be mistaken for buried facilities.

- d. IF unidentified facilities are found,
- THEN perform the following steps:
- (1) Follow the signal to identify the facility path. Signals may lead to a visually identifiable facility (e.g., water meter or valve).
 - (2) Consider requesting a field meet AND identify remarks from all owner/operators in the USA ticket for all facilities in conflict.
- OTHERWISE, proceed with potholing. ([See Section 4.](#))



WARNING

Personal injury, facility damage, or both may result from removal of covering material over a pipeline when gas is present.

9. Check for gas leaks during excavation using a combustible gas indicator (CGI) OR multi-gas monitor.
- a. IF the excavation activity is performed to repair a known, existing gas leak AND gas is detected,

THEN refer to [Utility Procedure TD-4414P-04, "Assessing and Working with Hazardous/Gaseous Atmosphere."](#)
 - b. IF the excavation activity is performed for other purposes AND gas is detected,

THEN stop the excavation. This represents an abnormal operating condition (AOC).
 - c. Perform the following before resuming excavation:
 - (1) Immediately notify the supervisor that a hazardous or potentially hazardous condition exists.
 - (2) Document AOCs on a corrective work form.

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Step 2.1 (continued)

- (3) Operator Qualified personnel document the leak on [Form TD-4110P-03-F01, "Leak Survey, Repair, Inspection and Quarterly Incident Report \(A Form\)"](#).

OTHERWISE, continue with the excavation process.

- d. Continue to monitor for hazardous atmosphere as long as an individual stays in the excavation area.
10. Using [Form TD-4412P-05-F02, "Pre-Dig Verification Checklist,"](#) document the actions taken to prevent damage to underground facilities.
 - a. Refer to [Job Aid TD-4412P-05-JA01, "Excavation Procedures for Damage Prevention – Form TD-4412P-05-F02 Instructions"](#) for directions to complete [TD-4412P-05-F02](#).
 - b. Checklists are **only** required for the following work:
 - All gas transmission projects.
 - Gas distribution projects with greater than **500 feet** of pipeline main.
 - Gas distribution projects with total service lengths greater than **500 feet**.
 - c. Retain the checklist (if used) with the job package.
 - d. Retain all records per the Document Retention Schedule.
 11. Ensure that slope, bench, or shore methods are used in accordance with [Utility Standard S4415, "Excavation Safety"](#) when underground facilities are suspected to be in unstable soil or deeper than 5 ft.

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3 Communicating between Equipment Operator and Spotter

- 3.1 Ensure personnel performing spotter tasks and personnel performing standby tasks are separate individuals. Equipment operator and the spotter must remain in view of each other at all times when excavation activities are performed.
- 3.2 Use a spotter when power-operated or power-driven equipment is used and the subsurface facility cannot be seen by an equipment operator, where the lack of sight poses a risk to the operator or facility (e.g., a back hoe operator cannot see the bucket within a trench, and a spotter is used to protect the facility from damage).
- 3.3 Equipment operator and the spotter determine method for communicating during excavation activity including verbal and visual methods before excavation begins.
- 3.4 IF radios are used,

THEN ensure the following before excavation:
 1. Radios are operable.
 2. Frequency and volume settings are appropriate to allow for clear communication.
- 3.5 The spotter immediately signals to equipment operators to stop work OR place bucket in down position when damage may occur OR the spotter cannot see the excavation activity.



WARNING

Personal injury and facility damage may occur in excavations where the operator cannot see facilities in order to avoid them.

1. IF a spotter believes power-operated equipment is too close to a suspected facility location,

THEN the spotter communicates with the equipment operator to discontinue use of power-equipment until the spotter can investigate by hand digging.
 - a. IF no facility is found,

THEN continue excavating with power-operated equipment.

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Step 3.5 (continued)

2. Spotters and equipment operators look for signs of facilities that are nearby. These include the following visible cues:
 - Gas warning tape
 - Pipe wrap
 - Locating wire
 - Anode
 - Casing
 - Compaction of backfill material changes
 - Backfill material changes from one material to another
 - Backfill material is sand
 - Backfill material is clay-like (if facility was installed with boring method)
 - Hardened soil due to existing gas leak (dry, odorous, discolored, hardened material)

4 Performing Excavations for Company

- 4.1 Company crews, contractors performing work for Company (second parties), and third parties perform tasks listed below that are appropriate for the excavation in progress:
 1. IF digging near third-party underground facilities,

THEN do not use power-operated equipment (including vacuum excavation) within 24 inches (in.) radially, of the outermost edge of an underground facility, unless the owner or operator of the facility agrees to allow power-operated equipment closer than 24 in.
 2. IF boring will be performed,

THEN expose exterior surfaces of all known underground facilities in the bore path first. (See [TD-4632P-01, "Cross Bore Prevention and Mitigation"](#) for additional requirements.)

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- 4.2 Use power-operated equipment to remove pavement or concrete as needed and appropriate, provided no facilities are contained within the pavement.
1. IF a pipeline is exposed during an excavation,

THEN protect, support, or remove exposed unsupported pipeline spans to safeguard personnel and facilities according to the appropriate instructions listed below:
 - a. For steel gas pipelines, refer to [Attachment 1, "Determining Maximum Unsupported Steel Pipe Span Length and Pipe with Increased Axial Stresses and Anomalies during Excavation Only"](#) for information.
 - b. For pipeline materials other than steel, or steel pipeline spans that exceed the allowable lengths specified in [Attachment 1](#), contact the responsible gas engineer to determine allowable span lengths AND to determine acceptable support methods.



Personal injury and damage to the facility and equipment may occur if pneumatic or power-operated equipment is used in a careless or reckless manner (e.g., not paying attention to changes in backfill material or presence of buried facilities).

- 4.3 IF it is necessary to access covered (e.g., slurry, concrete, or other similar materials) pipelines, THEN perform the following tasks:
1. Remove the covering material from around the pipeline while monitoring the immediate location for gas leaks
 2. Use pneumatic tools to break up and loosen protective fill material (e.g. slurry, flow-able fill, etc.).
 3. Continue to verify location of facilities with locating equipment as excavation moves closer to the facility.
 4. Inspect facilities to ensure that no physical damage has occurred.

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NOTE

CGC requires excavators to determine the exact locations of facilities in conflict with the excavation when the facilities are within 2 ft of the proposed excavation, using hand tools, and prior to using power-operated or power-driven excavating or boring equipment. See [CGC Section 4216.4 \(a\)](#).

- 4.4 Ensure the excavation size is wide enough for the type of excavation equipment to be used. For example, a trench must be wide enough to prevent a cut made by the corner teeth on a backhoe bucket into the wall of a trench.
- 4.5 Ensure daylighting is performed before power operated or power driven equipment is used within 24 in. of a facility. Daylighting a facility throughout the overall excavation area (from bench to bench) ensures that all horizontal or vertical offsets (e.g., sags, over-bends, possible fittings or attachments that may extend from bottom of facility, or changes in direction) are visible.
- 4.6 Use soft-dig method to daylight facilities. This is the preferred method to prevent damage to facilities. (See [Figure 1, "Daylighting a Facility."](#))
- 4.7 Ensure facility is daylighted from bench to bench (i.e. trench wall to trench wall) with an excavation before power operated or power driven equipment is used within 24 in. of the facility.



Figure 1. Daylighting a Facility

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4.8 Potholing and Prospecting

NOTE

Soft-dig excavation is the preferred method to perform potholing and prospecting.

1. Excavators perform potholing to create small excavations for the purpose of visually confirming a facility location. (See Figure 2, "Potholing.")



Figure 2. Potholing

2. Excavators perform prospecting to remove small amounts of cover from a buried facility in order to carefully expose facilities in an excavation.
 - a. IF potholing or prospecting reveals incomplete or inaccurate marks (i.e., locate marks are greater than 24 in. from the actual location of the facility),

THEN stop excavation AND call USA at **8-1-1** to request a re-mark.
 - b. IF potholing or prospecting at the suspected facility location does not reveal a facility,

THEN perform the following steps:
 - (1) Ensure the excavation is deep enough.
 - (2) Expand the excavation perpendicular to the suspected facility location.

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WARNING

Personal injury and facility damage may occur if a probe is driven into a facility OR power-operated equipment is used before the soil has been probed.

- 4.9 Ensure probing is not used within 24 in. of the suspected or confirmed location of high-priority electric facilities, fiber optic facilities, or data lines at gas distribution regulator stations.
- 4.10 IF hand digging (i.e., a shovel or hand-tools, NOT a jackhammer) is not practical due to the depth of the facility (greater than 5 ft.) OR the existing soil conditions (e.g. hard pan, flowing sand),

THEN perform the following:

1. Using an approved probe (e.g., Fiberglass T-handled probe or impact bar probe ["punch bar", "slide bar", "plunger bar"]), place barholes over suspected facility path 24 in. at a time. See [Figure 3, "Placing Barholes."](#)

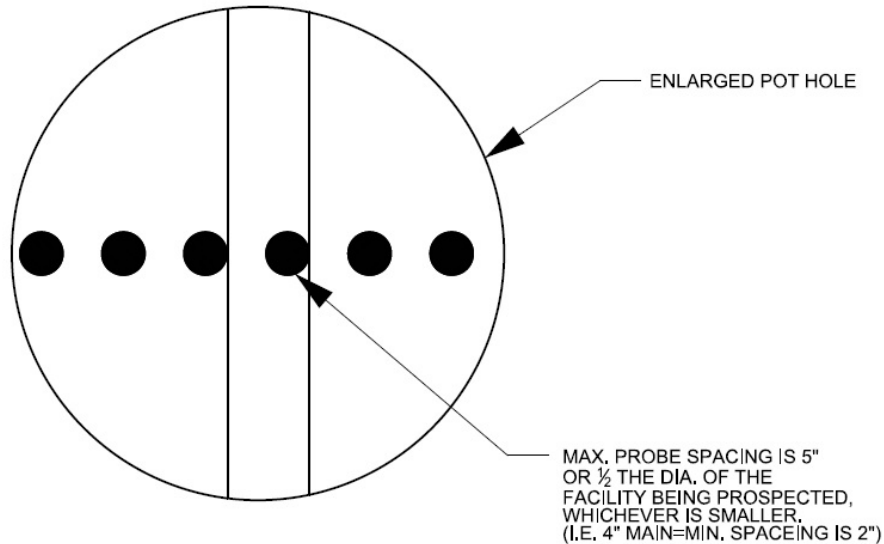


Figure 3. Placing Barholes

- Use additional caution when placing barholes over plastic or critical facilities.
 - Compare instrument indicated depth measurement to probe depth to avoid damaging facilities.
2. Place barholes at intervals of no greater than 5 in. or half the diameter of the facility, whichever is smaller. See Figure 3.

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Step 4.10 (continued)

3. IF the facility is within the probe depth, OR the instrument indicated depth measurement indicates the facility is within 24 in.,

THEN use hand-dig methods to excavate until the facility is daylighted.

OTHERWISE, remove a layer of soil, not more than 12 in., using the soft dig method or power equipment until the facility is within probe depth or the instrument indicated depth measurement indicates the facility is within 24 in.

4. Use probe-and-scrape technique. See Figure 4, "Probe and Scrape Technique."

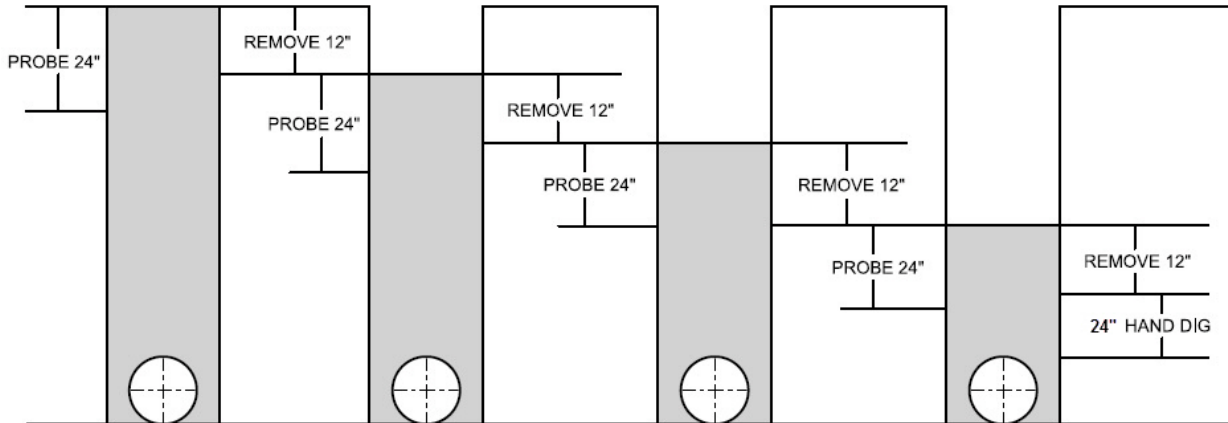


Figure 4. Probe and Scrape Technique

5. Use Vacuum excavation as follows:
 - a. Obtain permission from the facility owner/operator to use vacuum excavation and the specific conditions in which it will be used at the excavation (e.g., within 24 in. of a facility).
 - b. Break up and cut the soil with a high-pressure water or air stream while using a high-flow vacuum system to lift the soil up and out of the excavation area.
 - c. The use of pressure control equipment is required to prevent air or water jet pressures from exceeding the values in [Table 1, "Air/Water Pressure Specifications for Vacuum Excavation,"](#) For water jet equipment, use a nozzle greater than or equal to the minimum nozzle angle identified in [Table 1.](#)

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Step 4.10 (continued)

Table 1. Air/Water Pressure Specifications for Vacuum Excavation

Type of Pipe	High Pressure Air Maximum Pressure	High Pressure Water Maximum Pressure/Minimum Nozzle Angle
Plastic pipe	120 pounds per square inch (psi)	1,500 psi/15 degrees
Steel pipe-bare	120 psi	1,500 psi/15 degrees
Steel pipe with polyken tape	120 psi	1,000 psi/40 degrees
Steel pipe without polyken tape	120 psi	1,500 psi/40 degrees
Cast iron pipe	120 psi	1,000 psi/40 degrees
Wrought iron pipe	Not permitted	Not permitted
Copper pipe		
Fiber conduit		
Electric tile duct		
Electric polyvinyl chloride (PVC) conduit		
Electric steel conduit		
Electric direct bury		

6. Prevent rocks or other debris to contact the facility being excavated.
7. Compare the facility marks on the ground to the facility location to confirm that the marks are accurate.
8. Once the marks are confirmed as accurate, proceed with the excavation.
9. Keep nozzle a minimum of 8 in. from facilities.
10. Keep the nozzle moving: do NOT dwell in one location.

4.11 Use power-operated equipment adjacent to a facility as follows:

1. After the facility is daylighted, where power-equipment is to be used.
2. Maintain 12 in. of separation between equipment and the facility.

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5 Performing Emergency Excavations

5.1 The excavator must perform the following steps before performing an emergency excavation:

5.2 IF the emergency occurs between 6:00 a.m. and 7:00 p.m. Pacific Time,
THEN contact USA personnel immediately.

1. IF the emergency occurs outside the hours above,
THEN use the following link to submit a USA request electronically after normal operating hours: [USA North 811](#).
2. Attempt to contact known facility owner or operators that have facilities within the excavation area.
 - a. Request that the owner or operator locate and mark the facility.
 - b. Document all contacts and conversations.
 - c. IF any facility owners cannot be reached,
THEN document the attempt and continue with the excavation.

6 Excavating near Critical and High-Priority Facilities

NOTE

Standby requirements apply to PG&E facilities only. Other facility operators communicate their requirements to PG&E on the USA ticket response.



WARNING

Death or injury may result from excavating near critical or high priority facilities without a standby person present.

6.1 The excavator must adhere to the following steps when excavating near critical or high-priority facilities:

1. Refer to [Utility Procedure TD-5811P-301, "Performing a Standby"](#) for instructions on standby requirements.
2. Do NOT excavate within 5 ft. radial distance to an exterior surface of a critical or high-priority facility without a designated and operated qualified standby person present.

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Step 6.1 (continued)

3. Refer to [Job Aid TD-5811P-105-JA04, "Identifying the Need for Site Visit, Field Meet, and Standby"](#) for instructions on field meet and standby requirements.
4. Do NOT excavate within 10 ft. of an identified critical or high-priority facility before holding an on-site field meet with the facility owner or operator.

7 Boring Activities

7.1 When boring activities are used as an installation method, perform the following:

1. Parallel – boring
 - a. Ensure the nearby gas facility is daylighted at intervals not to exceed 50 ft. when parallel boring is performed within 5 ft of the outermost edge of a facility.
 - b. Observe the progression of the bore (forward and back) to ensure a minimum of 2 ft. is kept between the bore path and the gas facility.
 - c. Confirm the progression of the bore (forward and back) through the prepared excavations used to monitor bore path.
2. Perpendicular (Crossing) – boring
 - a. Ensure the gas facilities in conflict are day-lighted.
 - b. Observe the bore progression to ensure the bore head or other components do not contact OR operate within 2 ft. of the gas facility.
 - c. Observe the removal of the bore to ensure the bore head or other components do not contact the gas facility.

7.2 Daylighting (Using Potholing Method)

1. Expose **all** locations where known facilities conflict with the trenchless path.
2. IF a facility crosses the trenchless path at a different elevation,

THEN the area must be exposed to at least 2 ft. deeper than the trenchless tool or facility, whichever is higher.

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8 Other Excavation Information

- 8.1 Refer to [Utility Procedure TD-4632P-01, Cross Bore Prevention and Mitigation](#) for actions to take to prevent cross bores during boring activities.
- 8.2 Refer to [Utility Procedure TD-4632P-02 “Cross Bore Immediate Response”](#) for actions to take for cross bores that result in a leak.

9 Inspecting Exposed Underground Facilities

- 9.1 A crew may take the following actions as required:
 - 1. Install an EMS on underground facilities that cannot be located by means other than exposing them.
 - 2. Install an electrolysis test station (ETS) in accordance with the following, as appropriate:
 - [GDS A-90.2, “Locating Wire Installation for Direct Burial Plastic Mains and Services”](#)
 - [GDS A-90.3, “Locating Wire Installation for Inserted Plastic Mains and Services”](#)
 - [GDS O-10, “Electrolysis Test Station Connection to Main”](#)
 - 3. Consider installing an ETS on gas distribution pipelines that are difficult to locate.
 - 4. Generate a mapping correction form when EMS or ETS are installed.

NOTE

Performing and documenting work on the A-form may require multiple operator qualifications (e.g. 05-01, “Locate and Mark;” 09-02, “Leak Investigation;” 03-06, “Pipe to Soil;” 04-03, “Soap Test at Operating Pressure”).

- 9.2 Persons performing pipe inspections complete inspection form, [Gas Utility Form TD-4110P-03-F01, “Leak Survey, Repair Inspection and Quarterly Incident Report \(A-Form\).”](#)

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10 Notification after Damage Occurs

- 10.1 Excavators immediately notify the owner of a subsurface facility upon discovering or causing damage to that facility, including all breaks, leaks, nicks, dents, gouges, grooves, or other damage to subsurface installation lines, conduits, coatings, or cathodic protection.
1. IF Company is the owner of the facility,
THEN make notifications as follows:
 - a. For Gas Facilities
 - (1) Crews contact the responsible supervisor to provide updates and request additional resources and gas control (**North: 1-800-811-4111** or **South: 1-800-547-5955**). Responsible supervisors may include construction managers, project managers, safety managers, and local M&C supervisors.
 - (2) Supervisors notify the dig-in reduction team (DIRT) when gas is released.
 - (3) IF the gas facility is a gas transmission (GT) facility,
THEN supervisors contact the GT safety department.
 - b. For Electric Facilities
 - (1) Crews notify the PG&E Electric Incident Hotline at **415-973-2782** and the responsible supervisor. Responsible supervisors may include construction managers, project managers, safety managers, and local M&C supervisors.
 - (2) Supervisors notify the DIRT.
 2. IF Company is not the owner of the facility,
THEN make notifications as follows:
 - a. Crews contact the responsible Company supervisor. Responsible supervisors may include construction managers, project managers, safety managers, and local M&C supervisors.
 - b. Supervisors notify the facility owner in accordance with CGC 4126 guidelines.

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Step 10.1 (continued)

3. Supervisors submit corrective action program (CAP) notification for all instances of facility damage, including the following information:
 - Location
 - Date and time
 - Parties/participants involved
 - Facility type, size, and material

11 Records

- 11.1 Retain records per the Record Retention Schedule.

END of Instructions

DEFINITIONS

Abnormal operating condition (AOC): As defined in [Utility Standard TD-4008S, "Operator Qualification Program Requirements"](#).

Boring: Horizontal directional drilling, augering, tunneling, or other trench-less technologies.

Covered pipeline: A natural gas pipeline or service that is located within or encapsulated by slurry, concrete, or any other cementitious material.

Critical facilities: For the purposes of this procedure, all gas transmission pressure (above 60 psig) facilities and all electric facilities operating at or above 60 kilovolt (kV). The following facilities may also be critical facilities:

- Facilities identified as critical by the local operating area.
- Facilities which, if damaged, are likely to result in difficulty controlling the gas flow due to their size, material properties, operating pressure, or location, as well as the personnel and equipment available.
- Electric distribution facilities which, if damaged, are likely to result in outages of long duration or outages to critical customers.

Cross bore: An intersection of an existing underground facility or structure by a second facility installed using trenchless technology resulting in a direct contact between the facilities, compromising the integrity of the facility or underground structure.

Damage: Includes breaks, leaks, nicks, dents, gouges, grooves, or other damage to underground lines, conduits, coatings, or cathodic protection. (See [CGC §4216.4\[c\]](#).)

Excavation Procedures for Damage Prevention

Definitions (continued)

Daylight: To expose a facility around its entire circumference, where location, depth and orientation are visible.

Dig-In: When buried gas facilities are damaged by excavators

Electronic marker system (EMS): Devices encased in polyethylene housings that use passive antennas until they are activated by a locating instrument operating at a frequency compatible with that of the markers' antennas. These devices are installed on or adjacent to underground infrastructure to facilitate locating.

Electrolysis test station (ETS): A structure to house test wires that are bonded to buried metallic piping or structures. These wires are run up to the ETS in a location normally at or above ground to test the adequacy of the cathodic protection system.

Emergency: A sudden, unexpected occurrence involving a clear and imminent danger and demanding immediate action to prevent or mitigate loss of life, health, property, or essential public services. Unexpected occurrences include but are not limited to fires, floods, earthquakes or other soil or geologic movements, riots, accidents, damage to a subsurface installation requiring immediate repair, or sabotage (See [CGC §4216\[d\]](#)).

Equipment operator: For the purposes of this procedure, the equipment operator is a person that uses power-operated or power driven equipment while excavating.

Excavation: Any operation in which earth, rock, or other material in the ground is moved, removed, or otherwise displaced by means of tools, equipment, or explosives in any of the following ways: blasting, boring, backfilling, removal of aboveground structures by either mechanical or explosive means, grading, trenching, digging, ditching, drilling, augering, tunneling, scraping, cable or pipe plowing and driving, or any other way.

Field meets: Prearranged meetings between the locator and excavator to inform the excavator of the location of and danger posed by Company facilities and to clarify any questions the excavator has for the Company regarding its facilities or the timetable for the excavation.

Gas pipeline technology committee (GPTC): A national committee of industry and governmental representatives that provides technical guidance on natural gas issues.

Excavation Procedures for Damage Prevention

Definitions (continued)

High-priority facilities: Any of the following facilities (see [CGC §4216\[e\]](#)):

- High-pressure natural gas pipelines with normal operating pressures greater than 415 kilopascal (kPA) gauge (60 psig).
- Petroleum pipelines.
- Pressurized sewage pipelines.
- High-voltage electric supply lines, conductors, or cables that have a potential to ground of greater than or equal to 60 kV.
- Hazardous materials pipelines that are potentially hazardous to workers or the public if damaged.

Inductive Locating: The method of locate in which instruments induce a signal onto the facility being located.

Maximum allowable operating pressure (MAOP): The maximum pressure at which a pipeline, pipeline segment, or component is qualified to operate in accordance with the requirements of [49 CFR Part 192](#).

Operator: Any person, corporation, partnership, business, trust, public agency, or entity that owns, operates, or maintains a subsurface installation and belongs to a regional one-call notification center.

Operator qualified: Personnel trained, evaluated, and qualified in accordance with the requirements contained in [TD-4008S, "Operator Qualification Program Requirements"](#) as referenced in [49 CFR 192, Subpart N](#).

Positive response (positive contact): Response from a facility owner or operator providing requested information, including the following:

- The location of an underground facility, identified by locating and field marking the approximate location.
- If known, the number of subsurface installations that may be affected by the excavation.

Responses are as extensive and accurate as the available information, which is either found in the records of the owner or operator or determined through the use of standard locating techniques other than excavating.

Excavation Procedures for Damage Prevention

Definitions (continued)

Otherwise, the facility owner or operator advises the person who contacted the One-Call Center of the location of the owner or operator's underground facilities, installations that may be affected by the excavation, or that the owner or operator does not operate any underground facilities that would be affected by the proposed excavation.

Potholing: Creating small excavations for the purpose of visually confirming a facility location.

Power-operated equipment: Any power-operated or power-driven tool or device.

Probing: A method of creating barholes, to confirm the absence of facilities, prior to the use of power-operated equipment

Prospecting: Using hand-dig methods to remove cover from a buried facility in order to carefully expose facilities in an excavation.

Soft-dig methods: Use of hands tools, vacuum excavation, pneumatic tools with a clay spade (operating at 120 psi or less), and probe-and-scrape technique.

Third-party facilities: Facilities owned and operated by parties other than the Company.

Underground service alert (USA): Regional One-Call notification centers for the Company service territory. There are two centers serving the Company: [Underground Service Alert of Central/Northern California and Nevada \(USA North\)](#) and [Underground Service Alert of Southern California \(USA South\)](#).

USA ticket: A document created when an excavator calls USA personnel to request underground facility locations before excavating.

Vacuum excavation A means of soil extraction through vacuum using pressured water or air for breaking ground.

IMPLEMENTATION RESPONSIBILITIES

M&C supervisors must ensure that personnel are familiar with and follow this procedure.

GC supervisors must ensure that personnel are familiar with and follow this procedure.

PG&E Academy must include the information in this procedure in the training curriculum.

OQs must include the information in this procedure for appropriate testing.

Gold Shovel program personnel shares this procedures and requirements with excavation contractor.

Excavation Procedures for Damage Prevention

GOVERNING DOCUMENT

- [Utility Standard TD-4412S, "Preventing Damage to Underground Facilities"](#)

COMPLIANCE REQUIREMENT / REGULATORY COMMITMENT

- [49 CFR 192.703 \(b\) and \(c\) General](#)
- [California Government Code §4216](#)

REFERENCE DOCUMENTS

Developmental References:

- [49 CFR 192](#)
- [49 CFR 192, Subpart N, "Qualification of Pipeline Personnel"](#)
- [Code of Safe Practices](#)
- [GDS 90.3, Locating Wire Installation for Inserted Plastic Mains and Services"](#)
- [GDS A-90.2, "Locating Wire Installation for Direct Burial Plastic Mains and Services"](#)
- [GDS M-04, "Multi-Gas Monitors"](#)
- [GDS M-54.1, "Impact Bar Probe."](#)
- [GDS O-10, "Electrolysis Test Station Connection to Main"](#)
- [UO Standard S4415, "Excavation Safety"](#)
- [USA North California Excavation Manual](#)
- [Utility Form TD-4110P-03-F01, "Leak Survey, Repair Inspection and Quarterly Incident Report \(A-Form\)"](#)
- [Utility Procedure TD-4414P-04, "Assessing and Working with Hazardous/Gaseous Atmosphere"](#)
- [Utility Procedure TD-4441P-04, "Emergency Clearances for Gas Distribution Facilities"](#)
- [Utility Procedure TD-4632P-01, Cross Bore Prevention and Mitigation"](#)
- [Utility Procedure TD-4632P-02 "Cross Bore Immediate Response"](#)

Excavation Procedures for Damage Prevention

Developmental References (continued)

- [Utility Procedure TD-5811P-105-JA04, "Identifying the Need for Site Visit, Field Meet, and Standby"](#)
- [Utility Procedure TD-5811P-203, "Inductive Locate"](#)
- [Utility Procedure TD-5811P-205, "Verifying Instrument Calibration"](#)
- [Utility Procedure TD-5811P-301, "Performing a Standby"](#)
- [Utility Standard TD-4008S, "Operator Qualification Program Requirements"](#)

Supplemental References:

- [California Code of Regulations, Title 8, Subchapter 4, "Construction Safety Orders," Article 6, "Excavations"](#)
- [Code of Federal Regulations, 29 CFR 1926.651\(b\)\(4\): "Safety and Health Regulations for Construction," Subpart P, "Excavations: Specific Excavation Requirements"](#)
- [Common Ground Alliance Best Practices](#)
- [Excavation Safety Manual](#)
- GPTC Guide for Gas Transmission and Distribution Systems, Appendix G-192-16
- [SAFE-1001S, "Safety and Health Program Standard"](#)
- [USA North's California Excavation Manual](#)
- [Utility Form 61-0548 "Gas Dig-In Incident Report \(Form A1\)"](#)
- [Utility Form TD-4110P-03-F01, "Leak Survey, Repair, Inspection and Quarterly Incident Report \(A Form\)"](#)
- [Utility Manual TD-5811M, *Damage Prevention Handbook*](#)
- [Utility Standard D-4412S "Preventing Damage to Underground Facilities"](#)

APPENDICES

NA

Excavation Procedures for Damage Prevention

ATTACHMENTS

[Attachment 1, "Determining Maximum Unsupported Steel Pipe Span Length and Pipe with Increased Axial Stresses and Anomalies during Excavation Only"](#)

DOCUMENT REVISION

This procedure supersedes Utility Procedure TD-4412P-05, "Excavation Procedures for Damage Prevention," Rev. 1, issued 08/2013.

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Excavation Procedures for Damage Prevention

REVISION NOTES

Where?	What Changed?
Revision 2a	
Section 11	Created Records section and added record retention statement.
Revision 2	
Safety	Safety hazards, including electrical shock, asphyxiation, explosion or ignition of gas, and construction activities were included.
Before You Start	The PPE list from the code of safe practices was removed, and the PPE matrix for gas operations was referenced. Additional Operator Qualifications were added (OQ-05-04, 03-05). Impact bar probes were added, with reference document. Additional examples of power-operated and other types of equipment were provided.
Section 1.1.1	Delineate replaced "outline."
Section 1.1.9	Added facilities owned by non-USA members
Section 2	Section title changed
Section 2.1	Clarified USA ticket requirements for each excavator. Added tailboard information before excavation begins. Added mapping information and available job package review before excavation. Added references to locate and mark procedures for using instruments to perform conductive and inductive locating tasks.
Section 2.1.5	Includes guidance from previous Section 5 for fittings and attachments that may be present in excavation area.
Section 2.1.8	Added additional information and references when four gas monitors are used to monitor gas readings at an excavation site. Added Abnormal Operating Conditions (AOC) identification and reactions.
Section 3	New Section Communication between equipment operator and spotter has been included.
Section 3.3	Requirement for spotter to continuously observe during excavation was added. Included signs that a gas or electric facility may be encountered.

Excavation Procedures for Damage Prevention

Section 4	New Section
Section 4.4	Introduced new format and definitions of “daylighting,” “potholing,” and “prospecting” terminology, with figures for clarification. Added “hand-dig” methods.
Section 4.5	Added “hand-dig” methods.
Section 4.7	Clarified power-operated equipment. Revised probing requirements, allowing for probing around plastic facilities. Added clarification for vacuum excavation techniques.
Section 5	Moved previous Section 3 to this section. Provided new USA contact information, including a link.
Section 6	Moved previous Sections 4 and 5 to this section.
Section 6.1	Provided new references for Stand-by and Field Meet requirements, which include pipe bursting information. Removed pipe bursting from this procedure.
Section 7	New Section. Included reference for boring activities.
Section 8	Moved previous section 7 to this section. Updated references for performing pipe inspections. Removed previous Section 8.
Section 9	New Section.
Section 9.1	Provided guidance for notifying facility owners after damage to a PG&E facility.
Section 9.2	Provided guidance for notifying facility owner after damage to a non-PG&E facility.
Definitions	Added new definitions for critical facilities, daylight, EMS, potholing and probing.
Attachments	Remove attachments 1 and 3. Minor format changes to attachment 2, and renumber to be attachment 1.