



Asset Type: **Gas and Electric Transmission
and Distribution**

Date Issued/Updated: **August 2009**

Function: **Operation and Maintenance**

Page: **1** of **10**

Title: Excavation Procedures for Damage Prevention

Overview This work procedure (WP) provides step-by-step excavation instructions for preventing damage to underground facilities.

Governing Document [Utility Standard S4412, "Preventing Damage to Underground Facilities"](#)

Safety This WP promotes safety by establishing procedures to reduce potential hazards from damages to underground facilities.
Perform all activities associated with this WP safely and in accordance with applicable safety rules, the [Code of Safe Practices](#), and [Utility Standard Practice \(USP\) 22, "Safety and Health Program."](#)

Before Starting this Procedure **Personal Protective Equipment (PPE)**
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)

Tools

- Communication device (i.e., radio, cell phone)
- Camera
- Shovel
- Fiberglass T-handled probe with ball tip

Materials

- Map for reference
- Electronic marker system (EMS) supply of all depths (3 feet [ft], 6 ft, etc.)
- Copy of current Underground Service Alert (USA) ticket
- White chalk, white flags, white stakes, white whiskers

Equipment

- Backhoes, vacuum excavation trucks, boring equipment, etc.

Qualifications

- Persons performing excavation must be trained and qualified to operate excavation equipment and able to read and understand Pacific Gas and Electric Company (Company) facility maps.
- The designated standby person must be qualified for [OO 05-02, "Standby Pipeline."](#)

Excavation Procedures

1. General Information

The excavation procedures in this WP are minimum requirements. In some situations, additional precautions may be necessary to ensure the safety of employees, the public, and facilities.

A. The excavation procedures in this WP apply to **any** excavator, including but not limited to the following persons or entities:

- Pacific Gas and Electric Company (the Company) – first party
- Contractors performing work for the Company – second party
- Third parties

Note: Always use caution to avoid damage to underground facilities and ensure a safe work environment.

- B. **Hand dig to find the outermost edge of an underground facility.**
- C. **Digging near third-party underground facilities:** Do not use power-operated equipment (including vacuum excavation) within 24 inches of the outermost edge of an underground facility unless the owner/operator of the facility agrees to allow power-operated equipment closer than 24 inches.
- D. **Digging near Company-owned underground facilities:** Follow the step-by-step instructions on [Attachment 1, "Prospecting Around PG&E-Owned Facilities," Section 2, "Physically Locate Facilities by Vacuum Excavation," Item B.](#)

2. Requirements Before Excavation

- A. Each excavator must delineate the excavation area with white chalk, flags, stakes, whiskers, or other suitable markings, including a Company identifier (name, abbreviations, or initials).
- B. Excavators must contact USA (811) to obtain a USA ticket number at least 2 working days, but not more than 14 calendar days, before starting excavation. The USA ticket is valid for 28 days.
- C. Each excavator must state their intent to use boring, vacuum excavation equipment, or explosives on the USA ticket and obtain permission to do so from each facility operator whose facilities are in conflict with the proposed work location before work begins.
- D. Each excavator on the job must have its own valid USA ticket before excavating.

Note: The Company and its contractors must obtain a hard copy of the USA ticket and have it available at the jobsite.

- E. Each excavator must receive a response from all known facility operators within the excavation area. The responses from the facility operators confirm that the owner/operator have located their underground facilities and the location of their underground facilities or advise the excavator that there is no conflict for the owner/operator. The response may be by phone, fax, email, or surface markings at the job site. Notify USA if the facility operator has not responded before the start date and time.

Note: The USA ticket includes a list of all notified facility operators. Facility operators' contact information is available from USA.

- F. If underground facilities belonging to non-USA members are known or suspected to be within the delineated area, the excavator must contact the facility operator and request the facility be marked and located.
 - USA may be able to provide assistance with non-USA members.
 - Document all contacts and conversations.
- G. Each excavator must notify the property owner or tenant if excavating on private property or in an easement.

3. Excavation

Do not excavate under the following circumstances:

- Without a current USA ticket. The excavator listed on the USA ticket must perform excavations.
- A response is not received from every underground facility owner listed on the USA ticket.

A. Emergency Excavations

- The excavator must contact USA during the one-call center’s regular business hours (6a.m. to 7p.m.).
- The excavator must attempt to contact any known underground facility owners in the excavation area before excavating.

B. Critical Facilities

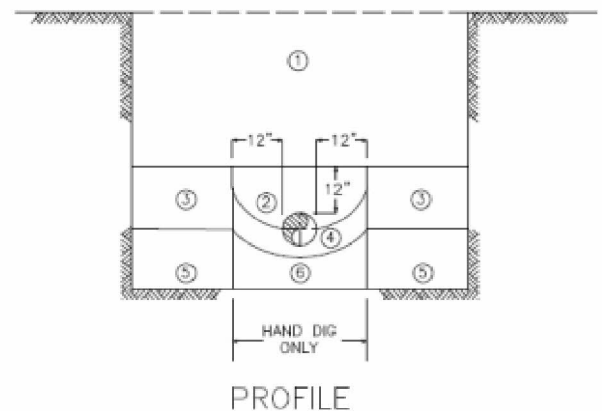
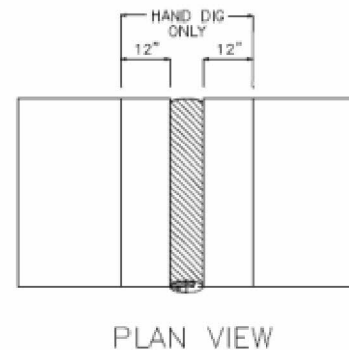
Do not excavate within 5 ft of either side of the exterior surface of a critical facility without a designated and qualified standby person present. Refer to [WP4412-04, “Field Meets and Standby – Damage Prevention.”](#)

C. High-Priority Facilities

Do not excavate within 10 ft of an identified high-priority facility before an on-site field meet between the excavator and facility operator is held.

See [WP4412-04](#) for field meet and standby requirements.

- 1) If the underground facility is suspected to be in unstable soil 5 ft deep or deeper, the excavator must slope, bench, or shore the excavation in compliance with [Utility Standard S4415, “Excavation Safety.”](#)
- 2) Power-operated equipment may be used to remove pavement, provided no facilities are contained within the pavement.
- 3) Review the map and identify all fittings and attachments to the pipe that could be within the delineated area (e.g., bottom taps, pressure control fittings, service tees, elbows, drips, stubs).



When fittings or attachments are suspected to be within the proposed excavation area, physically locate them using the following procedure ([Step 4](#)):

- 4) **If the proposed excavation is within 2 ft of the outer edge of the facility**, the facility must be exposed along the entire length of the excavation. Follow [Steps a-f](#) below to expose the facility:
 - a. Physically locate the facility and confirm that the surface marks are correct according to [Attachment 1, "Prospecting Around PG&E-Owned Facilities."](#)

Once the marks are confirmed, expand the excavation to the extent of the overall excavation. Continue following the prospecting procedure at enough locations within the overall excavation to ensure that possible horizontal or vertical offsets (i.e., sags, overbends, and/or changes in direction) are identified within the overall excavation.
 - b. Hand dig to expose the side of the facility along the entire length of the proposed excavation to identify possible fittings and/or attachments that may extend from the side of the facility.
 - c. If no other facilities are present, power-operated equipment may be used to remove soil along the side of the facility to a depth no greater than the depth reached in [Step b](#) above. Hand digging is only allowed within 12 inches of the facility.
 - d. Hand dig to expose the bottom of the facility along the entire length of the proposed excavation to identify possible fittings and/or attachments that may extend from the bottom of the facility.
 - e. If no other facilities are present, power-operated equipment may be used to remove soil along the side of the facility to the desired depth. Only hand digging is allowed within 12 inches of the facility.
 - f. Hand dig to remove the remaining soil below the facility.
- 5) If the proposed excavation is between 2 ft to 5 ft of the nearest side of a critical facility, physically locate the facility and confirm that the surface marks are correct according to [Attachment 1, "Prospecting Around PG&E-Owned Facilities,"](#) and are at enough locations to provide confidence in the surface markings. Do not exceed 100 ft between prospecting locations.

4. Special Circumstances

A. Boring

Expose exterior surfaces of all known underground facilities in the bore path. Refer to [Attachment 1, "Prospecting Around PG&E-Owned Facilities,"](#) for specific requirements.

B. Support the Exposed Pipeline

Protect, support, or remove exposed pipeline spans to safeguard employees and facilities. For steel gas pipelines, refer to [Attachment 2, "Maximum Unsupported Steel Pipe Span Length within an Excavation."](#) For pipeline materials other than steel or steel pipeline spans that exceed the allowable lengths in Attachment 2, contact the responsible gas engineer to determine allowable span lengths and to determine acceptable support methods.

C. Blasting

Consult the responsible engineer for specific requirements. Engineers must follow the Gas Piping Technology Committee's (*GPTC's*) *Guide for Gas Transmission and Distribution Systems*, Appendix G-192-16, to determine if blasting is allowed and what precautions or protections are necessary. To access the *GPTC Guide*, install WINDOT from: http://www/TechLib/default.asp?b_odv=all_go_regs.htm.

D. Accessing Covered Pipelines (slurry, concrete or other cementitious materials)

- 1) Only qualified workers are allowed to break out covered pipelines.
- 2) Check for gas leaks before beginning. If gas is detected, do not attempt to remove the covering material.
- 3) Remove covering material from around a pipeline using pneumatic tools or hand tools and monitor the immediate location for leaks.
- 4) Check for gas leaks after the covering material is removed.

5. Inspection of Exposed Underground Facilities

- A. Install an EMS on un-locatable underground facilities.
- B. If excavations have occurred without a USA ticket within 2 ft of the underground facility, uncover and inspect the underground facilities to check for mechanical damage. The excavator is responsible for uncovering the location. The Company verifies if there is any damage to Company facilities.
- C. Consider installing an electrolysis test station (ETS) per [Gas Numbered Document O-16, "Corrosion Control of Gas Facilities,"](#) on gas underground facilities with a maximum allowable operating pressure (MAOP) greater than 60 pounds per square inch gauge (psig). Contact gas engineering personnel for spacing requirements.
- D. On gas distribution pipelines that are difficult to locate, consider installing an ETS.
- E. Fill out the required inspection documents ([Form 62-4060, "Leak Survey, Repair, Inspection and Quarterly Incident Report \[Form A\]"](#)).

Definition of Terms

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

CGA: Common Ground Alliance. CGA is a member-driven association dedicated to ensuring public safety, environmental protection, and the integrity of services by promoting effective damage prevention practices.

Critical facilities: All gas transmission pressure (above 60 psig) facilities and all electric facilities operating at and above 60 kilovolt (kV) are considered “critical facilities” for the purposes of this WP. Critical facilities may also be determined by the local operating area. Those facilities which, if damaged, are likely to result in difficulty controlling the gas flow due to the size, material properties, operating pressure, and/or location of the facility. When determining the difficulty of controlling gas flow, consider employee and equipment availability. Critical facilities are also those electric distribution facilities which, if damaged, are likely to result in extensive (long duration) outages or outages to critical customers.

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

Emergency: A sudden, unexpected occurrence involving a clear and imminent danger, demanding immediate action to prevent or mitigate loss of life, health, property, or essential public services. An “unexpected occurrence” includes but is 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 [California Government Code §4216\[d\]](#).

EMS: Electronic marker system. 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.

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

ETS: Electrolysis test station. 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.

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 the following ways: 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. Field meets are intended to inform the excavator of the location of and danger posed by Company facilities. They may also be used to clarify any questions the excavator has for the Company regarding its facilities or timetable for the excavation.

GPTC: Gas Pipeline Technology Committee.

High-priority facilities: 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, or hazardous materials pipelines that are potentially hazardous to workers or the public, if damaged. See [California Government Code §4216\(e\)](#).

MAOP: Maximum allowable operating pressure.

Positive response (positive contact): Information about the location of an underground facility by locating and field marking the approximate location and, if known, the number of subsurface installations that may be affected by the excavation to the extent and degree of accuracy that the information is available, either in the records of the operator or as determined through the use of standard locating techniques other than excavating. Otherwise, advise the person who contacted the one-call center of the location of the operator's underground facilities, installations that may be affected by the excavation, or advise that person that the operator does not operate any underground facilities that would be affected by the proposed excavation.

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

Probing: A method of physically locating buried gas facilities before using power-operated equipment.

PSIG: Pounds per square inch gauge.

Third-party facilities: Owner/operator of facilities other than PG&E.

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 requesting underground facility locations before excavating.

Revision

This WP cancels and supersedes the following documents:

- UO Guideline G14413, "Procedure for Excavating Pipelines and Services," dated 11/00.
- Gas Distribution Information Bulletin 151 Rev 2, "Preventing Mechanical Damage to Gas Transmission Lines," dated 05/15/07.
- Gas Distribution Information Bulletin 155, "Preventing Mechanical Damage to Gas Distribution Lines," dated 08/02/02.

Reference Documents

[Code of Safe Practices](#)

[California Government Code §4216](#)

[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](#)

Company Forms:

- [Form 61-0548 "Gas Dig-In Incident Report \(Form A1\)"](#)
- [Form 62-4060, "Leak Survey, Repair, Inspection and Quarterly Incident Report \(Form A\)"](#)

[Excavation Safety Manual](#)

[Gas Numbered Document O-16, "Corrosion Control of Gas Facilities"](#)

GPTC's Guide for Gas Transmission and Distribution Systems,

Appendix G-192-16: http://www/TechLib/default.asp?body=all_go_regs.htm

[USA North's California Excavation Manual](#)

[Utility Standard Practice \(USP\) 22, "Safety and Health Program"](#)

Utility Standards:

- [S4412, "Preventing Damage to Underground Facilities"](#)
- [S4415, "Excavation Safety"](#)

Utility Work Procedures:

- [WP4412-01, "Operating Procedures for Locating Instruments"](#)
- [WP4412-02, "Locating Instruments Calibration Verification and Repair Procedures"](#)

Utility Work Procedure WP4412-05

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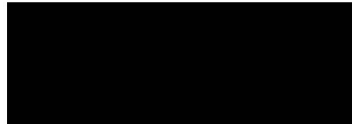
- [WP4412-03, "Marking and Locating PG&E Underground Facilities"](#)
- [WP4412-04, "Field Meets and Standby for Damage Prevention"](#)

Attachments

[Attachment 1, "Prospecting Around PG&E-Owned Facilities"](#)

[Attachment 2, "Maximum Unsupported Steel Pipe Span Length within an Excavation"](#)


Contact for More Information



Date Issued August 2009

Approved by Robert P. Fassett
Director

Revision History

| Chg No. | Date | Description | By (LAN ID) |
|---------|-------------|-------------------------------|---|
| 00 | August 2009 | Initiated new work procedure. |  |
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