



# **Public Works Corporation Yard Excavation/Penetration Procedure**

**Locate and Work in Subsurface Excavations**

REVISED APRIL 2018

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**Appendices**

- A Pre Excavation Meeting Documentation Form
- B Atmospheric Hazard Pre-Evaluation Checklist
- C Excavation Inspection Checklist



## **1.0 SCOPE AND APPLICATION**

The Burlingame Public Works is committed to the safety and health of all employees and recognizes the need to comply with regulations governing safety in excavation and trenching.

This procedure has been developed in accordance with California Code of Regulations, Title 8, Section 1541; Code of Federal Regulations Title 29 part 1926.650; and will be followed for all Burlingame Public Works locations.

Numerous activities within Burlingame Public Works require excavation and penetration, including repairing existing utilities, installation of new utilities, preparing the foundation for new construction, environmental remediation, and others. This document has been prepared to ensure that employees or contractors who may conduct trenching, boring, structural investigation and excavation work are able to:

- a. Recognize, evaluate and control trenching and excavation hazards;
- b. Save lives and protect employees from injuries and illnesses;
- c. Promote safe and effective work practices;
- d. Comply with pertinent laws and regulations.

This document provides guidelines for the implementation of a Trenching and Excavation Program. Standard terminology for trenching and excavation is used in this procedure. If the words are not understood, a Definition of Terms is included in Section 3.0.

## **2.0 REFERENCES AND RESOURCES**

- a. Title 29 Code of Federal Regulations Section 1926.650 – 652 Subpart P
- b. California Government Code Section 4216.2, Excavator Marking Specifications
- c. Title 8, California Code of Regulations, Sections 341, 1509 and 1539-1543.
- d. Common Ground Alliance Best Practices Manual
- e. National Utility Locating Contractors Association Standard 101
- f. Cal-OSHA Pocket Guide for the Construction Industry and other materials can be ordered from Cal-OSHA publications website at <http://www.dir.ca.gov>
- g. USA North's California Excavation Manual; 1-800-227-2600, 4090 Nelson Avenue, Suite A, Concord, CA. 94520-9506

## **3.0 DEFINITIONS**

***Accepted Engineering Practices*** - means those requirements which are compatible with standards of practice required by a registered professional engineer (PE) with expertise in the area of trenching and shoring.

***Aluminum Hydraulic Shoring*** - means a pre-engineered shoring system comprised of aluminum hydraulic cylinders (crossbraces) used in conjunction with vertical rails (uprights) or horizontal rails (wales). Such system is designed specifically to support the sidewalls of an excavation and prevent cave-ins.

**Bell-bottom pier hole**- a type of shaft or footing excavation, the bottom of which is made larger than the cross section above to form a belled shape.

**Benching (Benching System)** - means a method of protecting employees from cave-ins by excavating the sides of an excavation to form one or a series of horizontal levels or steps, usually with vertical or near-vertical surfaces between levels.

**Cave-In** - means the separation of a mass of soil or rock material from the side of an excavation, or the loss of soil from under a trench shield or support system, and its sudden movement into the excavation, either by falling or sliding, in sufficient quantity so that it could entrap, bury, or otherwise injure and immobilize a person.

**Competent Person** - is one who must demonstrate the following:

- a. knowledge of provisions pertaining to excavations, trenches, earthwork;
- b. knowledge of soil analysis as required in provisions pertaining to excavations, trenches, earthwork;
- c. knowledge and use of protective systems;
- d. authority to take prompt corrective actions on the job as conditions warrant;
- e. ability to recognize and test for hazardous atmospheres.

**Cross Braces** - mean the horizontal members of a shoring system installed perpendicular to the sides of the excavation, the ends of which bear against either uprights or wales.

**Emergency** – means a sudden, unexpected occurrence, involving a clear and imminent danger, demanding immediate action to prevent or mitigate loss of, or damage to, life, health, property, or essential public services. “Unexpected occurrence” includes, but is not limited to, fires, floods, earthquakes or other soil or geologic movements, riots, accidents, damage to a subsurface installing requiring immediate repair, or sabotage.

**Excavation** - means any man-made cut, cavity, trench, or depression in an earth surface, formed by earth removal. 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: grading, trenching, digging, ditching, drilling, auguring, tunneling, scraping, cable or pipe plowing and driving, or any other way.

**Excavator** – means any person, firm, contractor or subcontractor, owner, operator, utility, association, corporation, partnership, business trust, public agency, or other entity which with their, or his or her, own employees or equipment performs any excavation.

**Faces or Sides** - means the vertical or inclined earth surfaces formed as a result of excavation work.

**Failure** - means the breakage, displacement, or permanent deformation of a structural member or connection so as to reduce its structural integrity and its supportive capabilities.

**Hazardous Atmosphere** – An atmosphere which by reason of being explosive, flammable, poisonous, corrosive, oxidizing, irritating, oxygen deficient, toxic or otherwise harmful, may cause death, illness, or injury.

**High Priority Subsurface Installation** – are high pressure natural gas pipelines with normal operating pressures greater than 415kPA gauge (60 psi) or greater than six inches nominal pipe

diameter, 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 60,000 volts or more, or hazardous materials pipelines that are potentially hazardous to employees or the public if damaged.

***Inquiry Identification Number*** – means the number that is provided by a regional notification center to every person who contacts the center pursuant to Section 4216.2. The inquiry identification number shall remain valid for not more than 28 calendar days for the date of issuance, and after that date shall require regional notification center revalidation.

***Kickout*** - means the accidental release or failure of a cross brace.

***Operator*** – means any person, corporation, partnership, business trust, public agency, or other entity that owns, operates, or maintains a subsurface installation.

***Owner/Operator*** – the terms excavator and operator as used in Cal-OSHA 1541(b) shall be as defined in GC 4216(c) and (h) respectively. The term owner/operator means an operator as the term “operator” is defined in GC 4216(h).

***PPE*** - means personal protective equipment, such as coveralls, hard hats, safety glasses, goggles, steel-toed boots, respirators, reflective vests, and gloves. Not all projects require use of all types of PPE.

***Protective System*** - means a method of protecting employees from cave-ins, from material that could fall or roll from an excavation face or into an excavation, or from the collapse of adjacent structures. Protective systems include support systems, sloping and benching systems, shield systems, and other systems that provide the necessary protection.

***Qualified Person “Locator”*** – means a person who completes a training program in accordance with the requirements of Title 8, California Code of Regulations, Section 1509, Injury Prevention Program that meets the minimum training guidelines and practices of Common Ground Alliance (CGA) current Best Practices, or the standards of National Utility Locating Contractors Association (NULCA), Standard 101: Professional Competence Standards for Locating Technicians which are incorporated by reference, shall be deemed qualified.

***Ramp*** - means an inclined walking or working surface that is used to gain access to one point from another, and is constructed from earth or from structural materials such as steel or wood.

***Self-Contained Breathing Apparatus (SCBA)*** - means a full-face respirator connected via hose to a portable cylinder containing compressed breathing air.

***Sheeting*** - means the members of a shoring system that retain the earth in position and in turn are supported by other members of the shoring system.

***Shield (Shield System)*** - means a structure that is able to withstand the forces imposed on it by a cave-in and thereby protect employees within the structure. Shields can be permanent structures or can be designed to be portable and moved along as work progresses. Additionally, shields can be either pre-manufactured or job-built in accordance with 1926.652. Shields used in trenches are usually referred to as "trench boxes" or "trench shields."

***Shoring (Shoring System)*** - means a structure such as a metal hydraulic, mechanical or timber shoring system that supports the sides of an excavation and which is designed to prevent cave-ins.

*Sides.* See “Faces”

**Sloping (Sloping System)** - means a method of protecting employees from cave-ins by excavating to form sides of an excavation that are inclined away from the excavation so as to prevent cave-ins. The angle of incline required to prevent a cave-in varies with differences in such factors as the soil type, environmental conditions of exposure, and application of surcharge loads.

**Stable Rock** - means natural solid mineral material that can be excavated with vertical sides and will remain intact while exposed. Unstable rock is considered to be stable when the rock material on the side or sides of the excavation is secured against caving-in or movement by rock bolts or by another protective system that has been designed by a registered professional engineer (PE) competent in that type of engineering.

**Structural Ramp** - means a ramp built of steel or wood, usually used for vehicle access. Ramps made of soil or rocks are not considered structural ramps.

**Support System** - means a structure such as underpinning, bracing, or shoring, which provides support to an adjacent structure, underground installation, or the sides of an excavation.

**Tabulated Data** - means tables and charts approved by a registered professional engineer and used to design and construct a protective system.

**Trench (Trench Excavation)** - means a narrow excavation (in relation to its length) made below the surface of the ground. In general, the depth is greater than the width, but the width of a trench (measured at the bottom) is not greater than 15 feet or less (measured at the bottom of the excavation), the excavation is also considered to be a trench.

**Trench box.** See “Shield”

**Trench shield.** See “Shield”

**Uprights** - means the vertical members of a trench shoring system placed in contact with the earth and usually positioned so that individual members do not contact each other. Uprights placed so that individual members are closely spaced, in contact with or interconnected to each other, are often called "sheeting."

**USA** - means the Utility Service Alert. The agency that assists in the identification of the owners of utilities and/or underground facility installations. They're to be contacted at least 2 days prior to conducting any excavation. Their phone number is: 811.

**Wales** - means horizontal members of a shoring system placed parallel to the excavation face whose sides bear against the vertical members of the shoring system or earth.

## **4.0 RESPONSIBILITIES**

### **4.1 DEPUTY DIRECTOR OF PUBLIC WORKS OPERATIONS**

Safety Coordinator has the responsibility to:

- 4.1.1. Ensuring that appropriate supervisors/employees are all trained in the Burlingame Public Works excavation safety policy and procedures.



4.1.2. Audit and evaluate compliance with this policy on a regular basis. The effectiveness of the policy shall be evaluated at least annually and corrective action taken to eliminate defects found in the policy.

4.1.3. Provide Competent Person level training.

## **4.2 DIVISION HEADS**

Department Head have the responsibility to:

4.2.1. Providing all employees with information, training, and the equipment they need to protect themselves and others from excavation and trench hazards.

4.2.2. Ensuring that all necessary equipment is available in safe working condition to comply with this policy.

4.2.3. Ensuring that a Rescue Plan is developed in the project planning for all excavation trench projects and that the Emergency Rescue Service has been contacted and verified that they have the capability, equipment and training to respond and assist to any excavation trench project work emergency's.

4.2.4. Enforce compliance with this policy. All appropriate employees presently employed and all new employees must be trained and responsible for the purpose and the use of this excavation safety policy.

## **4.3 SUPERVISORS**

Supervisors have the responsibility to:

4.3.1. Identify and assess the hazards of each excavation area.

4.3.2. Ensure that all employees receive the appropriate training and equipment they need to protect them and others.

4.3.3. Ensuring that all necessary equipment is available in safe working condition to comply with this policy.

4.3.4. Ensure competent person is onsite and completes daily documented inspections.

4.3.5. Ensure Rescue Plan and procedures are understood and all employees and the necessary equipment is readily available for all identified potential excavation hazards as identified from the project hazard assessment for each excavation trench project.

4.3.6. Enforce compliance with this policy.

## **4.4 PROJECT COMPETENT PERSON**

Competent Person has the responsibility to:

4.4.1. Ensuring USA notification and location has been completed

4.4.2. Ensuring any/all onsite meetings of high priority installations has been documented and completed as required with subsurface facility owners.

4.4.3. Project planning with all affected employees.

4.4.4. Identifying required PPE and project equipment.

4.4.5. Verifying Central County Fire Department is available and at the ready if needed

4.4.6. Developing project RESCUE plan and procedure and ensure all affected employees know and understand in detail.

4.4.7. Completing required daily inspection(s) conducted at the start of work and as needed throughout shifts, after every rain storm or other hazard increasing occurrence.

Documented Daily Inspection of the following but not limited to:

- a. Excavations
- b. Adjacent areas
- c. Protective systems
- d. Complete daily required and documented visual and manual soil testing.
- e. All other equipment including PPE (ladders, ramps, gas detector, traffic control, etc.)

4.4.8. Ensuring everything not passing pre-use or daily inspection is immediately removed from service!

- a. Any other evidence of a situation that could result in possible cave-ins,
- b. Indications of failure of protective systems
- c. Hazardous atmospheres
- d. OR any other hazardous conditions

4.4.9. Conducting daily documented site safety briefings with all affected personnel.

4.4.10. Must be physically located and on site of excavation at all times.

## **4.5 EMPLOYEES**

Employees have the responsibility to:

4.5.1. Understand their assigned tasks relating to excavation safety and rescue.

4.5.2. Apply the proper training and equipment to safely work in excavations and trenches.

4.5.3. Assist with the assessment and the identification of excavation hazards.

4.5.4. Wear and use the proper PPE.

4.5.5. Comply with the directives of this policy.

## **5.0 PROCEDURES**

### **5.1 PRIOR PLANNING**

To ensure personnel safety, prior to commencing work on a trench or excavation, planning is necessary to ensure a safe workplace.

Items include:

5.1.1. Personal Protective Equipment (PPE)

- 5.1.2. Access & Egress
- 5.1.3. Safe & Unsafe soil Conditions
- 5.1.4. Protective Systems
- 5.1.5. Traffic & Vehicles & Pedestrians
- 5.1.6. Hazardous Environment
- 5.1.7. Buried Utilities
- 5.1.8. Rescue Plan and Procedure

## **5.2 SUBSURFACE INSTALLATIONS & LOCATION**

5.2.1 Approximate location of the subsurface installations, such as sewer, telephone, storm drain, electric, water lines, or any other subsurface installations that reasonably may be expected to be encountered during excavation work, shall be determined by the excavator prior to opening the excavation.

5.2.2 The excavation will not commence until:

5.2.2.1 The excavation area has been marked as specified in the Government Code (GC) 4216.2 by the excavator, and

5.2.2.2 The excavator has received a positive response from all known owner/operators of subsurface installations within the boundaries of the proposed project.

5.2.2.3 When the excavation is proposed within 10 feet of a high priority subsurface installation, the excavator shall be notified by the facility owner/operator of the existence of the high priority subsurface installation before the legal start date and time in accordance with GC 42.16.2(a), and an onsite meeting involving the excavator and the subsurface installation owner/operators representative shall be scheduled by the excavator and the subsurface owner/operator at a mutually agreed upon time to determine the action or activities required to verify the location of such installations.

5.2.2.4 Only qualified persons shall perform subsurface installation locating activities, and all such activities shall be performed in accordance with Cal-OSHA 1541 and GC 4216 – 4216.9. Note: Persons who completes a training program in accordance with the requirements of Title 8, California Code of Regulations, Section 1509, Injury Prevention Program that meets the minimum training guidelines and practices of Common Ground Alliance (CGA) current Best Practices, or the standards of National Utility Locating Contractors Association (NULCA), Standard 101: Professional Competence Standards for Locating Technicians which are incorporated by reference, shall be deemed qualified.

All members and non-members of the Regional Notification Center as defined GC 4216(j) shall be advised of the proposed work 2 working days prior to the start of any digging or excavation work.

EXCEPTION: Repair work to subsurface facilities done in response to an emergency as defined in GC 4216(d)

- 5.2.2.5 When excavation or boring operations approach the approximate location of subsurface installations, the exact location of the installations shall be determined by safe and acceptable means that will prevent damage to the subsurface installation, as provided by GC 4216.4.
- 5.2.2.6 While excavation is open all subsurface installations shall be protected, supported, or removed as necessary to safeguard employees.
- 5.2.2.7 If discovering or causing damage to the subsurface installation the excavator shall immediately notify the owner/operator or contact the Regional Notification Center to obtain subsurface installation operator contact information and immediately thereafter notify the facility operator. (All breaks, leaks, nicks, dents, gouges, grooves, or other damages to an installations lines, conduits, coatings or cathodic protection shall be reported).
- 5.2.2.8 If damage to a high priority subsurface installation results in escape of any flammable, toxic, or corrosive gas or liquid or endangers life, health or property, the excavator shall immediately notify 9-1-1 and the facility owner/operator.

The following Steps must be taken to avoid impacting a buried utility.

Therefore:

- 5.2.3 Primary contractor or Burlingame Public Works employees must call the regional notification center, USA North 811 at least 48 hours (2days) prior to the planned excavation start date but no sooner than 14 calendar days in advance.
- 5.2.4 Primary contractor or Burlingame Public Works employees must spray paint perimeter of planned excavation project boundary perimeter in white.
- 5.2.5 USA is tasked with contacting the utility companies in the project boundary area who need to locate their underground utilities in your project boundary.
- 5.2.6 All affected utility companies will then come out and mark their underground facility in their designated color with 2 days of the USA notification.
- 5.2.7 Contractor/employee must hand dig within 18 inches of the utility company painted lines.
- 5.2.8 If underground utility is not located, contractor/employees must call all affected utility companies.
- 5.2.9 Lines are painted according to the American Public Works Association (APWA) Uniform Color Code, the painted lines represent:

**White** – The perimeter/boundary of the planned excavation

**Red** – Electrical

**Orange** – Telephone/TV/Fiber Optic

**Yellow** – Natural Gas/Petroleum Pipeline/Steam/other vapor lines

**Blue** – Potable water

**Green** – Sanitary Sewer/Storm Drain

**Purple** – Reclaimed Water/Raw Water/Recycled Water

5.2.10 High Priority Subsurface Installations:

High pressure natural gas lines (>60 psig)

Large diameter natural gas lines (6 inch)

Petroleum pipelines

Pressurized sewage pipelines

High-voltage electric lines (>60kV)

Conductors or cables

Hazardous materials pipelines

5.2.11 High Priority Subsurface Requirements:

Utility must maintain “as built” drawings to indicate where their utilities are located

Utility company must notify the contractor if the proposed excavation is within 10 feet of a “High Priority Facility”

Contractor and utility must meet on site prior to the excavation start date/time

Meeting must include a discussion/determination of the best way to locate the utility and recommended that the owner verify the location of the installation at his meeting to ensure location has been positively located prior to the project start.

5.2.12 The contractor or Burlingame Public Works locating the underground utility must:

Use a “Qualified Person” to locate the underground utility as defined in section 3.0.

Use electromagnetic utility locating device in the active/conductive mode

Have access to ground penetrating radar for verification

5.2.13 If the Utility Company and/or Burlingame Public Works agree, employees may excavate using:

Power-operated boring equipment

Power-driven boring equipment

Vacuum excavation equipment

5.2.14 If the Client/Contractor discovers or causes damage to the utility, they must immediately notify USA North 811 and the Utility Company owner.

5.2.15 If the Client/Contractor discovers or causes damage to a “high priority” utility and cause a release, they must immediately call 9-1-1 and the Utility Company owner.

### **5.3 GENERAL EXCAVATION INFORMATION**

5.3.1. Prior to starting an excavation, examine the excavation site for physical evidence (manholes, valve covers, water meters, sewer cleanouts, vaults, utility maintenance

boxes, pole risers, etc.) that would indicate the existence of underground facilities. Always excavate, as cautiously and prudently as possible.

- 5.3.2. USA North 811 accepts calls for excavation work on public or private property, on Military Bases, on Indigenous Peoples Reservations and even on waterways within their coverage.
- 5.3.3. The USA members will provide information about the location, mark or stake the horizontal path, or provide clearance for facilities that they own. Excavators should be aware there could be other facilities of the same type at the excavation site owned by the property owner or another company who is not a member of USA North.
- 5.3.4. When excavating within 10 feet of the subsurface installation daylight the facility by hand every 25 feet to make sure the facility is where it is indicated. When excavation within 24 inches of a facility law requires you to hand expose and protect the facility prior to using power equipment.
- 5.3.5. Individuals with firsthand knowledge of the excavation site and that can be reached by telephone should call the location description into USA North 811. This allows USA North 811 and its members to discuss the location with a person who has knowledge of the excavation layout and specific location.
- 5.3.6. Limit your excavation location description to a site that can be completed within a 28 calendar day period in California or a 14 calendar day period in Nevada and that the members can reasonably locate within 2 working days in California and Nevada of your call to USA North 811.
- 5.3.7. USA North limits excavation work to areas no long in length than 1.5 miles in a metropolitan area and 3 miles in a rural area.
- 5.3.8. Dividing larger excavation areas into smaller manageable sites helps the members respond to your excavation site more promptly.
- 5.3.9. As work in one excavation site nears completion, call in your next excavation site to USA North 811 and continue this process until your entire excavation area is complete.
- 5.3.10. When working on private property the excavator should determine what facilities belong to the property owner; (water, well, sewer, septic tanks, gas, propane lines, electrical, etc.) and what easement(s) may exist on the property, if any. In general, ownership of underground facilities transfers to the property owner behind the curb, behind the sidewalk, clean out, at the meter or point of entry.
- 5.3.11. USA North notifies only its members of your excavation work, for your safety you should notify any non-member.

## **5.4 FIVE STEPS TO A SAFE EXCAVATION**

- 5.3.1. Survey and Mark – Survey your proposed excavation site. Make a list of affected operators of underground facilities (operators) at your job site, their needs and requirements. Mark the excavation site on paved surfaces with white spray chalk paint; use flags, stakes, whiskers, etc. on unpaved surfaces, use appropriately colored flags, stakes, whiskers or chalk lines. Select marker types that are most compatible to the

purpose and marking surface. Adhere to the paved marking suggestions to the extent practical.

- 5.3.2. Note: If any marking information is omitted due to site conditions, communicate omitted data by direct contact, signs, phone, fax, etc. “Offset” markings should clearly indicate the direction, the distance, and the path of facility or excavation.
- 5.3.3. Call Before You Dig – Call USA North 811 two working days before you dig in California and Nevada. Only operators who are members of the USA North program will be notified. Compare your list of affected operators determined in step 1, with the list of operators notified by USA North. For your safety contact any operator at your job site that is not a member of USA North. USA North 811 accepts design inquiry request through its internet application only, call 925-798-9504 ext. 6 for more information.
- 5.3.4. Wait the Required Time – The 2 working day notice in California and Nevada allows USA North members to examine their underground facility records and respond to you. The members, who are operators of underground facilities, will provide you information about the location of their facility, mark, or stake the horizontal path of their facility with the appropriate color code, or advise of clearance. Depending on the member’s workload, they may contact you to try and negotiate a new start time for your excavation. This will allow them the opportunity to provide you with greater service.
- 5.3.5. Respect the Marks – Preserve facility marks for the duration of the job. If any of the operator markings are not reasonably visible, you must call USA North 811 and request remarking by the affected operator(s). A re-mark request requires a 2 working day notice. When you request an operator(s) to re-mark their facilities, you will be asked if your excavation site is still outlined in white spray chalk, so the USA North member can respond to your request. NOTE: A USA North ticket is active for 28 calendar days in California and 14 calendar days in Nevada for the date of its issuance. You must have an active USA North ticket for the entire duration of your excavation.
- 5.3.6. Dig With Care – In California hand excavate within 24 inches of the outside diameter of the facility – in Nevada 30 inches. Facilities that are in conflict with your excavation are to be located by hand and protected before power equipment is used. Notify the affected utility of any contact, scrape, dent, nick or damage to their facility.

## **5.5 ACCESS AND EGRESS**

- 5.4.1. If an excavation or trench is more than four (4) feet deep, an adequate means of access (entrance) and egress (exit) must be provided. Access/egress can be a proper height/capacity ladder, stairway, ramp or other safe means.
- 5.4.2. The means of access/egress must be provided so that the worker need not travel more than 25 feet to get to an egress.
- 5.4.3. If a ladder is used it must extend three feet above grade and it must be tied off (secured).
- 5.4.4. All ladders must have a daily pre-use inspection as instructed and specific on a legible ladder rail label completed prior to each days start of work and if found defective immediately removed from service and either repaired by an approved manufacturer repair service or destroyed.

**NOTE:** if ladder labels are not legible immediately remove from service.

## **5.6 PERMIT REQUIREMENTS**

- 5.5.1. If a contractor project depth is five feet or deeper it is required that a permit from the Division of Occupational Safety & Health (DOSH) shall be obtained before the project work start date.
- 5.5.2. Construction of trenches or excavations 5 feet or deeper into which any person is required to descend. For purposes of permitting, "descend" means to enter any part of the trench or excavation once the excavation has attained a depth of 5 feet or more.
- 5.5.3. **Exceptions to Permit Requirements.** Permit requirements do not apply to the following:
  - 5.5.3.1. Government Bodies - United States of America, its officers or agencies, State of California, county, city and county, city, or district.
  - 5.5.3.2. Any public utility subject to the jurisdiction of the Public Utilities Commission.
  - 5.5.3.3. Construction of trenches or excavations for the purpose of performing emergency repair work to underground facilities.
  - 5.5.3.4. Construction or final use of excavations or trenches where the construction or final use does not require a person to descend into the excavation or trench.
  - 5.5.3.5. Excavation for the construction of graves as defined in Section 7014 of the Health and Safety Code.
  - 5.5.3.6. Excavation for the construction of swimming pools. Note: The construction of motion picture, television, or theater stages and sets does not require a permit unless the conditions specified in Section 6500(b) of the California Labor Code have occurred. For purposes of this requirement, stages and sets include, without limitation, scenery, props, backdrops, flats, green beds, and grids.
- 5.5.4. Full description of the permit requirements Title 8 California Code of Regulations, Chapter 3.2. Subchapter 2. Article 2. Permits--Excavations, Trenches, Construction and Demolition and the Underground Use of Diesel Engines in Work in Mines and Tunnels, Section 341. (Available at <http://www.dir.ca.gov/title8/341.html>.)

## **5.7 PRIOR TO BEGINNING EXCAVATION**

Documentation form located in Appendix A. Steps must be taken to avoid impacting a buried utility.

Therefore:

- 5.6.1. Post a copy of the excavation contractor's Cal/OSHA permit at the job site.
- 5.6.2. Evaluate and develop the project site specific rescue plan/procedures.
- 5.6.3. Identify and obtain a copy of a certificate for the excavation/trenching "competent person" for project.
- 5.6.4. Determine if there is standing water in the excavation to assign soil type.
- 5.6.5. Evaluate the weather. If rain is eminent, that establishes the soil type.
- 5.6.6. Determine the location of underground utilities by contacting USA.



- 5.6.7. Determine required PPE for the project.
- 5.6.8. Document that personnel conducting the work have proper training.
- 5.6.9. Conduct and document an onsite tail-gate safety meeting.
- 5.6.10. Evaluate structural impact to adjacent structures due to planned excavation.
- 5.6.11. Install barricades to keep undesired vehicular and pedestrian traffic out.
- 5.6.12. Evaluate and develop the traffic control/flagging plan if required.
- 5.6.13. Evaluate and install required number of access and egress points.
- 5.6.14. Evaluate the soil type by physical (manual) and visual methods.
- 5.6.15. Determine if there is previous soil contamination.
- 5.6.16. Determine the potential for hazardous atmosphere conditions and implement air monitoring plan and/or ventilation.
- 5.6.17. Determine proper protective system to be used and verify installation by soil class determination and protective system tabulated data.

## **6.0 SAFE AND UNSAFE SOIL CONDITIONS**

Section 6 describes differences in soil conditions that employees may encounter. There are four basic categories of soil: Stable Bedrock (Stable rock is natural solid mineral matter), Type A Soil, Type B Soil, and Type C Soil.

### **6.1 TYPE A SOIL**

- 6.1.1. Cohesive soil with an unconfined, compressive strength of 1.5 tons per square foot or greater.
- 6.1.2. Type A soils include clay, silty clay, sandy clay, clay loam, caliche, hardpan and, in some cases, silty loam and sandy clay loam.
- 6.1.3. No soil is Type A if:
  - 6.1.3.1. The soil is fissured.
  - 6.1.3.2. The soil is subject to vibration from heavy traffic, pile driving, or similar effects.
  - 6.1.3.3. The soil has been previously disturbed.
  - 6.1.3.4. The soil is part of a sloped, layered system where the layers dip into the excavation on a slope of four horizontal to one vertical or greater.
  - 6.1.3.5. There is standing water.
  - 6.1.3.6. The material is subject to other factors that would require it to be classified as a less stable material.

### **6.2 TYPE B SOIL**

- 6.2.1. Cohesive soil with an unconfined compressive strength greater than 0.5 tons per square foot, but less than 1.5 tons per square foot.

- 6.2.2. Type B soils include granular cohesion less soil including: angular gravel, silt, silt loam, sandy loam and, in some cases, silty clay loam and sandy clay loam.
- 6.2.3. Previously disturbed soil except that which would otherwise be classed as Type C soil.
- 6.2.4. Soil that meets the unconfined compressible strength or cementation requirements for Type A, but is fissured or subject to vibration.
- 6.2.5. There is standing water.
- 6.2.6. Dry rock that is not stable.
- 6.2.7. Material that is part of a sloped, layered system where the layers dip into the excavation on a slope less than four horizontal to one vertical, but only if the material would otherwise be classified as Type B.

### **6.3 TYPE C SOIL**

- 6.3.1. Cohesive soil with an unconfined compressive strength of 0.5 tons per square foot or less.
- 6.3.2. Granular soil including gravel sand and loamy sand.
- 6.3.3. Submerged soil or soil from which water is freely seeping.
- 6.3.4. Submerged rock that is not stable.
- 6.3.5. Material in a sloped, layered system where the layers dip into the excavation or a slope of four horizontal to one vertical or steeper.

### **6.4 UNSAFE SOIL CONDITIONS**

- 6.4.1. The following generally describes unsafe soil conditions.
- 6.4.2. Spoils pile - must be at least 2 feet away from the excavation.
- 6.4.3. Fissures- are an indication of pending collapse of an excavation wall.
- 6.4.4. Water - in excavation undermines soil tensile strength, and reduces the soil to Type C
- 6.4.5. Color striations - are indications of backfill, and reduces the soil to Type C.
- 6.4.6. Prior excavation - reduces soil tensile strength, and reduces the soil to Type C.
- 6.4.7. Building foundations - in close proximity to excavation.

Note: When trench and shore adjacent or next to any building or other structural foundations project and protective system must be calculated and determined by a Qualified Registered Professional Engineer (RPE).

- 6.4.8. Vibration - from vehicles/equipment/trains, etc. undermines excavation walls.

Note: Beware of disturbed ground. Trenches in disturbed soil may require additional sheeting and bracing, as well as hard compact ground, if there is filled ground nearby and is considered unstable.

## **7.0 PROTECTIVE SYSTEMS**

If an excavation or trench is more than five feet deep, an adequate means must be utilized to preclude cave-ins. Protective system's to prevent cave-ins include: shoring, trench boxes,

sloping, and benching. The following conditions influence what kind of protective system is needed:

- a. Depth of trench – if five feet or more must be shored or sloped. If possibility of any soil movement then even shallower trenches have to be shored. When in doubt shore/slope the trench!!
- b. Changing weather conditions –
  - i. Hardpacked soil can become saturated/unstable after rain.
  - ii. Safety sloped trenches shored in dry weather can become death traps when wet.
  - iii. Thawing soil becomes unstable quickly.
- c. Soil Classification – the less stable the soil, the more liquid the soil, the more need to protect against “cave ins”.
- d. Heavy load areas – no equipment parking in or next to the trench area and stress on shoring can also occur from nearby structures, curbs, trees and utility poles.
- e. Vibration – if digging near roadways or other operations, make certain shore/slope design reflects these conditions.

## **7.1 SHORING**

- 7.1.1. Pre-engineered system comprised of hydraulic cylinders (crossbraces) used in conjunction with vertical rails (uprights) or horizontal rails (wales).
- 7.1.2. Designed specifically to support the sidewalls of an excavation and prevent cave-ins.
- 7.1.3. Uses a structure such as a metal/aluminum hydraulic, mechanical or timber shoring system that supports the sides of an excavation and which is designed to prevent cave-ins.

## **7.2 TRENCH BOXES**

- 7.2.1. A structure that is able to withstand the forces imposed on it by a cave-in and thereby protects employees within the structure.
- 7.2.2. Shields can be permanent structures or can be designed to be portable and moved along as work progresses.
- 7.2.3. Shields can be either pre-manufactured or job-built in accordance with and CCR Title 8 Sections 1539-1543 and 29 CFR 1926.650.
- 7.2.4. Shields used in trenches are usually referred to as "trench boxes" or "trench shields."

## **7.3 SLOPING**

- 7.3.1. Soil sloped to forms the sides of an excavation at an incline away from the excavation.
- 7.3.2. The angle is a function of the soil type.
  - 7.3.2.1. For Stable Bedrock, the sides can be vertical.
  - 7.3.2.2. For Type A soil, for every one foot down, excavate in  $\frac{3}{4}$  foot.
  - 7.3.2.3. For Type B soil, for every one foot down, excavate in 1 foot.

7.3.2.4. For Type C soil, for every one foot down, excavate in 1½ foot.

## **7.4 BENCHING**

- 7.4.1. Benching is excavation the sides of a trench to form one or a series of horizontal levels or steps, usually with vertical or near-vertical surfaces between levels.
- 7.4.2. There are two basic types of benching, single bench and multiple benching which can be used in conjunction with sloping.
- 7.4.3. In Type - B soil, the vertical height of the benches must not exceed 4 feet. Benches must be below the maximum allowable slope for that soil type. In other words, a 10-foot deep trench in Type B soil must be benched back 10 feet in each direction, with the maximum of a 45-degree angle.
- 7.4.4. Benching is not allowed in Type C soil.

## **8.0 OTHER CONSIDERATIONS**

### **8.1 TRAFFIC AND VEHICLES**

- 8.1.1. Employees exposed to public vehicular traffic/equipment are required to wear orange Type 2 warning vests. This is considered to be required personal protective equipment.
- 8.1.2. When mobile equipment is operated adjacent to an excavation, or when such equipment is required to approach the edge of an excavation, and the operator does not have a clear and direct view of the edge of the excavation, a warning system will be utilized such as barricades, hand or mechanical signals, or stop logs.
- 8.1.3. Precautions must be taken to prevent vehicular/equipment traffic from causing fissures in the soil and creating a hazardous atmosphere due to carbon monoxide (CO).

### **8.2 HAZARDOUS ATMOSPHERE**

Testing and controls. In addition to the requirements set forth in the Construction Safety Orders and the General Industry Safety Orders to prevent exposure to harmful levels of atmospheric contaminants and to assure acceptable atmospheric conditions, the following requirements shall apply:

- 8.2.1. Where oxygen deficiency (atmospheres containing less than 19.5 percent oxygen) or a hazardous atmosphere exists or could reasonably be expected to exist, such as in excavations in landfill areas or excavations in areas where hazardous substances are stored nearby, the atmospheres in the excavation shall be tested before employees enter excavations greater than 4 feet in depth and be documented using the Atmospheric Hazard Pre-evaluation Checklist (Appendix B).
- 8.2.2. Direct simultaneous read monitor/detector instruments properly pre-use bump tested and calibrated shall only be used and employees/contractors must provide proof of proficiency in its use.
- 8.2.3. Adequate precautions shall be taken to prevent employee exposure to atmospheres containing less than 19.5 percent oxygen and other hazardous atmospheres. These precautions include providing proper respiratory protection or ventilation.

- 8.2.4. Adequate precaution shall be taken such as providing ventilation, to prevent employee exposure to an atmosphere containing a concentration of a flammable gas in excess of 20 percent of the lower flammable limit of the gas.
- 8.2.5. When controls are used that are intended to reduce the level of atmospheric contaminants to acceptable levels, testing shall be conducted as often as necessary to ensure that the atmosphere remains safe.
- 8.2.6. Any excavation that has a potential or known atmospheric hazard must be pre-evaluated and monitored using a simultaneous direct read gas monitor/detector which has had a documented gas bump test and current in its calibration inspection recertification in accordance with manufacturer's instruction and specifications. Pre-evaluation checklist located in (Appendix B).
- 8.2.7. A hazardous environment can be caused by the potential or known atmosphere or potential engulfment from solids or liquids. Examples include:
  - 8.2.7.1. Leaking fumes from utilities
  - 8.2.7.2. Fumes from vehicles
  - 8.2.7.3. Contaminants in soil
  - 8.2.7.4. Portable combustion engine equipment brought into the excavation
  - 8.2.7.5. Coating & sealant supplies brought into excavation
  - 8.2.7.6. Hot work or welding
  - 8.2.7.7. Spoil pile sliding into the excavation
  - 8.2.7.8. Water line rupturing in the excavation
  - 8.2.7.9. Any other oxygen displacing work process or procedure.
  - 8.2.7.10. Environmental events such as storms, earthquakes, flooding.

### **8.3 WATER ACCUMULATION**

- 8.3.1. Employees shall not work in excavations in which there is accumulated water, or in excavations in which water is accumulating, unless adequate precautions have been taken to protect employees against the hazards posed by water accumulation. The precautions necessary to protect employees adequately vary with each situation, but could include special support or shield systems to protect from cave-ins, water removal to control the level of accumulating water, or use of a safety harness and lifeline.
- 8.3.2. If water is controlled or prevented from accumulating by the use of water removal equipment, the water removal equipment and operations shall be monitored by a competent person to ensure proper operation.
- 8.3.3. If excavation work interrupts the natural drainage of surface water (such as streams), diversion ditches, dikes, or other suitable means shall be used to prevent surface water from entering the excavation and to provide adequate drainage of the area adjacent to the excavation. Excavations subject to runoff from heavy rains will require an inspection by a competent person and compliance with Sections 1541 (h)(1) and (h)(2).

## **8.4 STABILITY OF ADJACENT STRUCTURES**

- 8.4.1. Where the stability of adjoining buildings, walls, or other structures is endangered by excavation operations, support systems such as shoring, bracing, or underpinning shall be provided to ensure the stability of such structures for the protection of employees.
- 8.4.2. Excavation below the level of the base or footing of any foundation or retaining wall that could be reasonably expected to pose a hazard to employees shall not be permitted except when:
- 8.4.3. A support system, such as underpinning, is provided to ensure the safety of employees and the stability of the structure; or
- 8.4.4. The excavation is in stable rock; or
- 8.4.5. A registered professional engineer has approved the determination that such excavation work will not pose a hazard to employees.
- 8.4.6. Sidewalks, pavements and any structure shall not be undermined unless a support system or another method of protection is provided to protect employees from the possible collapse of such structures.

## **8.5 PROHIBITION OF ENTRY OF POTENTIAL HAZARDOUS ATMOSPHERES**

- 8.5.1. Testing and controls. In addition to the Construction and General Industry Safety Orders to prevent exposure to harmful levels of atmospheric contaminants and to assure acceptable atmospheric conditions, the following requirements shall apply:
- 8.5.2. Where oxygen deficiency (>19.5%) or hazardous atmosphere exists or could reasonably be expected to exist, such as excavations in landfill areas, where hazardous substances are stored nearby, the atmospheres shall be tested before employees enter excavations greater than 4 feet deep. (Precautions include respiratory protection or ventilation)
- 8.5.3. Adequate precautions shall be taken to prevent employee exposure to an atmosphere containing a concentration of flammable gas in excess of 20% of the lower flammability limit.
- 8.5.4. When controls are used to reduce the level of atmospheric contaminants to acceptable levels, testing shall be continuously and documented on the inspection check list every 15 minutes to ensure acceptable conditions are being maintained for all employees working in the excavation trench.

Note: When trench and shore adjacent or next to any building or other structural foundations project and protective system must be calculated and determined by a Qualified Registered Professional Engineer (RPE).

## **8.6 FALL PROTECTION**

- 8.6.1. Where employees or equipment are required or permitted to cross over excavations over 6 feet in depth and wider than 30 inches, walkways or bridges with standard rails shall be provided.
- 8.6.2. Adequate barrier physical protection shall be provided at all remotely located excavations.

8.6.3. All wells, pits, shafts, etc., shall be barricaded or covered. Upon completion of exploration and other similar operations, temporary wells, pits, shafts, etc. shall be backfilled.

## **8.7 RESCUE PLAN PROCESS/PROCEDURES**

Note: There shall be a project site specific Rescue Plan developed and verified project specific Rescue Plan for Excavation Trench/Shore projects with the local emergency responding service.

8.8.1 Emergency rescue equipment, such as a breathing apparatus, safety harness and line, or basket stretcher shall be readily available where hazardous atmospheric conditions exist or may reasonably be expected to develop during the excavation trench work. Equipment shall be attended when in use.

8.8.2 Employees entering bell-bottom pier holes, or similar deep and confined footing excavation, shall wear a harness with lifeline securely attached to it. Lifeline shall be separate from any line used to handle materials, and shall be individually attended at all times while employee wearing the lifeline is in the excavation trench.

## **9.0 PERSONNEL PROTECTIVE EQUIPMENT**

The Competent Person (as defined under Section 17 Duties) in charge of the project must select the correct type of personal protective equipment (PPE) for the job. If work is near vehicular traffic the ANSI-ISEA 107 (1999) Standard type two (2) apparel is appropriate. Also usage of hard hats, safety glasses, goggles, gloves, adequate foot wear, hearing protection, and respirators may be necessary. For hearing protection or respiratory protection, please see the Burlingame Public Works Hearing Conservation and Respiratory Protection Programs.

## **10.0 TRAINING**

All employees affected by trench and shoring operations receive training. Training is provided to ensure the purpose and function of the trenching and excavation program is understood by employees. Training will also provide employees with the knowledge and skills required for safe trenching and excavation operations.

### **10.1 INITIAL TRAINING**

Initial training shall include as a minimum, the following:

10.1.1. Training in the regulatory requirements associated with trenching and excavation operations.

10.1.2. Each affected employee will be instructed in the purpose and use of this standard practice instruction written program.

10.1.3. All other employees whose work operations are or may be in an area where trenching and excavation operation are conducted shall be instructed to an awareness level about the procedures, and prohibitions relating to work in such areas.

### **10.2 REFRESHER TRAINING**

Refresher training shall include as a minimum, the following:

- 10.2.1. Retraining shall be provided for all authorized and affected employees whenever there is a change in their job assignments, a change in equipment or processes that present a new hazard, or when there is a change in these procedures. Note: Retraining (to include a procedural review) will also be provided whenever there is a "close-call" or these procedures fail.
- 10.2.2. Additional retraining shall also be conducted whenever a periodic inspection reveals, or the department has reason to believe that there are deviations from or inadequacies in the employee's knowledge or use of these procedures.

## **11.0 RECORDKEEPING**

### **11.1 SITE INSPECTION OF EXCAVATION**

Excavation Inspection Checklist located in Appendix C.

- 11.1.1. The Contractor and Burlingame Public Works certified "competent person" in trenching and excavation must complete a documented inspection of the excavation daily prior to start up and after every hazard increasing occurrence as needed to ensure safe access by all workers while working in the trench.
- 11.1.2. The employer's supervisor is responsible to ensure their employees are properly certified as "competent persons".
- 11.1.3. The employer may provide an employer's representative to conduct these inspections in accordance with this requirement.
- 11.1.4. Periodically, Burlingame Public Works certified "competent person" in trenching and excavation will inspect the excavation to insure the above inspections are properly conducted and documented.
- 11.1.5. "Competent Person" is one who must demonstrate the following:
  - 11.1.4.1. knowledge of provisions pertaining to excavations, trenches, earthwork
  - 11.1.4.2. knowledge of soil analysis as required in provisions pertaining to excavations, trenches, earthwork
  - 11.1.4.3. knowledge and use of protective systems
  - 11.1.4.4. authority to take prompt corrective actions on the job as conditions warrant
  - 11.1.4.5. ability to recognize and test for hazardous atmospheres
- 11.1.5. Inspection items should include, but are not limited to:
  - 11.1.9.1. Ensure that at least one person carrying certification and acting as the competent person in trenching and excavation.
  - 11.1.9.2. Ensure all documentation of all inspections is located on site.
  - 11.1.9.3. Ensure the rescue plan and procedures is located on site and all employees are knowledgeable of its requirements.
  - 11.1.9.4. Ensure adequate barricades are installed as needed.
  - 11.1.9.5. Ensure adequate access and egress is in place and secured.



- 11.1.9.6. Ensure all ladders are OSHA approved and the proper height and capacity.
- 11.1.9.7. Ensure all ladders are pre-use inspected daily in accordance with manufacturer instruction and specifications as identified on a legible ladder rail label
- 11.1.9.8. Ensure all ladders are tied off or secured.
- 11.1.9.9. Ensure if ladders are in use that they extend at least 3 ft. above the excavation.
- 11.1.9.10. Ensure that the protective system tabulated data has been obtained for the equipment to be used and is available on site with equipment.
- 11.1.9.11. Ensure the shoring/trench box extends at least 18 inches above the surface leading edge.
- 11.1.9.12. Ensure the shoring/trench box extends to within 2 feet of the bottom of the excavation?
- 11.1.9.13. Ensure if plywood shoring is utilized thickness used must be selected as identified on the tabulated data for the soil type.
- 11.1.9.14. Ensure the hydraulic rams at the top of the excavation are within 18 inches of the top and as specified on the tabulated data for the soil type if used.
- 11.1.9.15. Ensure the hydraulic rams at the bottom of the excavation are within 4 feet of the bottom of the excavation and as specified on the tabulated data for the soil type if used.
- 11.1.9.16. Ensure all hydraulic rams are maintaining pressure and are not leaking.
- 11.1.9.17. Ensure spoils piles and equipment, materials, vehicles, are at least 2 feet from the excavation side wall.
- 11.1.9.18. Identify if there are there any fissures in the soil.
- 11.1.9.19. Identify if there is standing water in the excavation.
- 11.1.9.20. Check and ensure the shoring/sloping/benching is correct.
- 11.1.9.21. Ensure the Cal/OSHA permit is posted if required on site.
- 11.1.9.22. Ensure all copies of once shift/daily site inspections conducted by a competent person onsite.
- 11.1.9.23. Are copies of sign-in sheets for tail-gate safety meetings onsite?
- 11.1.9.24. Ensure there a copy of the IIPP onsite.
- 11.1.9.25. Ensure all required copies of SDS are onsite for all products requiring one.
- 11.1.9.26. Ensure copies of the tabulated data are onsite.
- 11.1.9.27. Ensure there is documentation to indicate that Atmospheric Initial Testing was conducted at the site and documented if required.
- 11.1.9.28. List all the required PPE and ensure all employees are wearing/using it.
- 11.1.9.29. Keep all people at least 6 feet from excavation leading edge unless transitioning onto or off of access ladder or entry location.

- 11.1.9.30. Ensure all PPE requiring pre-use inspections are completed and documented if required daily.
- 11.1.9.31. Ensure that all the equipment required to be inspected/recertified/calibrated are annually current.
- 11.1.9.32. Ensure all required equipment use instruction/specifications is on site for reference if needed.

## **APPENDICES**

**APPENDIX A:** PRE EXCAVATION MEETING DOCUMENTATION FORM

**APPENDIX B:** ATMOSPHERIC HAZARD, PRE-EVALUATION CHECK LIST

**APPENDIX C:** EXCAVATION INSPECTION CHECKLIST

## APPENDIX A

### PRE EXCAVATION MEETING DOCUMENTATION FORM

The assigned Competent Person will conduct a pre excavation meeting with appropriate employers/representatives (including utility owners and responsible employers) and complete the following meeting documentation.

	YES	NO	N/A
Identify the Competent Person for the project: _____			
Prime contractor/excavator is to call the regional notification center, USA Nor Cal at 800-227-2600 at least <b>4</b> days ahead of planned excavation, but no sooner than 14 calendar days in advance. Confirm receiving a “POSITIVE RESPONSE” from all know operators/owners of subsurface installations within the proposed projects boundaries.			
Utility company marks their underground in their designated color			
Contractor/excavator hand digs within 18 inches of utility company’s painted lines			
Review the American Public Works Association Uniform Color Code			
Identify any power-operated equipment that will be used			
Identify any vacuum excavation equipment to be used			
Post a copy of the excavation contractor’s Cal/OSHA permit at the job site			
Need a copy of a certificate for the excavation/trenching “competent person”			
Determine if there is standing water in the excavation to assign soil type			
Evaluate the weather. If rain is eminent, that establishes the soil type			
Determine soil type by approved analysis process			
Determine depth of trench project			
Determine protective system to be used			
Determine required PPE			
Document that personnel conducting the work have proper training			
Conduct and document an onsite tail-gate safety meeting			
Evaluate structural impact to adjacent structures due to planned excavation			
Install barricades to keep undesired vehicular and pedestrian traffic out			
Evaluate and install required number of access and egress points			
Evaluate the soil type by physical and visual methods			
Determine if there is previous soil contamination or potential for a hazardous atmosphere to develop.			

Meeting Attended by: (Name & Organization Representing)

\_\_\_\_\_

Location: \_\_\_\_\_

Meeting Coordinator Signature: \_\_\_\_\_ Date: \_\_\_\_\_

**APPENDIX B**  
**ATMOSPHERIC HAZARD**  
**PRE-EVALUATION CHECK LIST**

	YES	NO	N/A
1. Did your survey of the surrounding area show it to be free of hazards such as drifting vapors?			
2. Does your knowledge of industrial or other discharges indicate this area is likely to remain free of air contaminants while occupied?			
3. Are you knowledgeable in the operation of the gas detector to be used?			
4. Has the gas detector been pre-use gas bumped tested & logged? Make: _____ Model _____ Serial # _____			
5. Calibrated? Enter date of last calibration:			
6. Did you test the atmosphere if over 5 foot in depth or if any potential atmospheric hazards are identified prior to entry?			
7. Did the atmosphere check as acceptable? Document readings below: Oxygen = 20.7-20.9% _____ LFL/LEL = 0 % or 0 ppm _____ Toxics = 0 ppm _____			
7. Did you lock out/tag out any valves or electrical breakers?			
8. Are all other hazards controlled?			

***Notice: If any of the above questions are answered "NO":***  
**DO NOT ENTER – Must be considered a hazardous atmospheric environment that will require Respirator use unless ventilation can be introduced to maintain acceptable entry conditions.**

All entrants acknowledge potential hazards by initialing here: \_\_\_\_\_

Location: \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

## APPENDIX C

### EXCAVATION INSPECTION CHECKLIST

The assigned Competent Person will complete this inspection prior to the start each day of project work and after every hazard increasing occurrence or event or as needed.

	YES	NO	N/A
Does the contractor have at least one person carrying certification as competent person in trenching and excavation?			
Are adequate barricades installed?			
Is adequate access and egress installed?			
Are ladders tied off or secured?			
Do ladders extend at least 3 ft. above the excavation trench?			
Did all ladders pass the daily pre-use inspection ? Note : All ladders that do not pass the pre-use inspection or are damaged while in use must be immediately removed from service.			
Does the shoring/trench box extend to within 2 ft. of the bottom of the excavation?			
If plywood shoring is utilized, is it the thickness as identified by the tabulated date of the protective system in use? _____ inches			
Are hydraulic rams at the top of the excavation within 18 inches of the top?			
Are hydraulic rams at the bottom of the excavation within 4 ft. of the bottom?			
Are hydraulic rams maintaining pressure in the “green band” and not leaking?			
Are spoils, equipment, materials, vehicles and people at least 2 feet from the excavation?			
Are there any fissures in the soil?			
Is there standing water in the excavation?			
Is the shoring/sloping/benching correct?			
Are there copies of once a shift/daily site inspections conducted by a competent person onsite?			
Are there copies of sign-in sheets for tail-gate safety meetings onsite?			
Is there a copy of the IIPP onsite?			
Are copies of the MSDS onsite?			
Is all equipment user instructions and protective system tabulated data on site?			
Is there a copy of documentation to indicate that atmospheric testing was conducted if there is a potential for hazardous atmospheres?			
Are people wearing the proper PPE?			
List PPE:			

All entrants acknowledge potential hazards by initialing here: \_\_\_\_\_

Location: \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Comments or Issues that occurred during this Excavation Trench Project: