

500 12th Street
Suite 100
Oakland, CA 94607-4014
(415) 893-3600

Woodward-Clyde Consultants

90 NOV -1 PM 12:00

October 31, 1990

Project: 90C0039B

Mr. Dennis Byrne
Senior Specialist
Alameda County Department
of Environmental Health
Hazardous Materials Division
80 Swan Way
Oakland, California 94621

Subject: 1155 Clay Project Soil Removal Activities *29407*

Dear Mr. Byrne:

This letter describes a soil removal and disposal program that will be undertaken at the 1155 Clay site bounded by 11th, 12th, Clay and Jefferson Streets in downtown Oakland. The purpose of this work is to remove fill containing elevated concentrations of lead from the site, so that planned construction may proceed on schedule.

BACKGROUND

In order to prepare for construction of a new office building on the 1155 Clay site, the Redevelopment Agency of the City of Oakland (Agency), owner of the property, is proceeding with a program to remove contaminated fill from the site. Woodward-Clyde Consultants (WCC) is assisting the Agency with this work. Covey Trucking Company of San Mateo is the general contractor for the soil removal work.

During the course of soil sampling and analysis performed for an environmental assessment of this site by WCC, elevated concentrations of lead and oil and grease were identified in fill soil that lies immediately beneath the surface of the existing, ground-level parking lot at the site. Generally, the fill occurs as a layer of silty sand containing fragments of brick and concrete ranging in thickness from approximately 2 feet to approximately 6 feet over the entire site. The volume of the fill is presently estimated to be approximately 12,500 cubic yards. Selected chemical analytical results are summarized in Table 1 attached. These results indicate that the concentration of lead ranges from below the detection limit of 3.0 parts-per-million (ppm) to 454 ppm with an average concentration of 105 ppm. Oil and grease was detected with a range of concentrations from below the detection limit of 2 ppm to 413 ppm with an average concentration of 62 ppm.



In the southeast corner of the site near the corner of Clay Street and 11th Street, the additional fill occurs to a depth of about 12 feet. The volume of this fill is estimated to be approximately 1800 cubic yards. Chemical analytical results of this fill indicate that lead is present in the samples at concentrations ranging from 7.8 ppm to 415 ppm with an average concentration of 68.6 ppm. Oil and grease were detected in the samples at concentrations ranging from below the detection limit of 2 ppm to 980 ppm with an average concentration of 225 ppm.

DISPOSAL PROGRAM

Excavation and initial stockpiling of the fill were begun this week. Fill containing elevated concentrations of oil and grease will be segregated from other soil. A second stockpile of fill containing elevated concentrations of lead will also be formed. WCC will perform additional chemical analyses on the stockpiled soil to characterize it for disposal. Hauling and disposal of the fill will begin in mid-November. The ultimate destination for disposal of the fill depends on the analytical results of samples to be collected after the fill is stockpiled, as well as acceptance by the landfills. We expect to dispose of most of the soil containing elevated concentrations of lead at the Zanker Road landfill in San Jose. Concentrations of oil and grease in the fill exceeding 100 ppm may require disposal of portions of the fill at locations other than Zanker.

WCC will perform closure sampling of the excavation during and after the soil removal operations in order to document that the contaminated fill has been removed. The closure sampling data will be submitted to you in a letter report upon completion of the project.

HEALTH AND SAFETY ISSUES

The soil removal, hauling and disposal will be performed in strict accordance with standard procedures developed for handling soil containing elevated concentrations of lead and oil and grease. These procedures are described in health and safety plans developed specifically for this project by WCC and Covey Trucking Company. The plans include requirements for protective equipment for personnel working on the job, measures to protect the general public from exposure, decontamination procedures for personnel and equipment, and procedures to be used in an emergency. If hazardous materials are encountered during the course of this work, a licensed hazardous waste subcontractor will be used. We have included a copy of WCC's current health and safety plan for the project for your reference.

Mr. Dennis Byrne
October 31, 1990
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Woodward-Clyde Consultants

We would be happy to discuss any questions you may have or give you a tour of the work area. Please feel free to call me at (415) 874-3203 if you have any questions.

Yours truly,

WOODWARD-CLYDE CONSULTANTS


George A. Ford
Associate

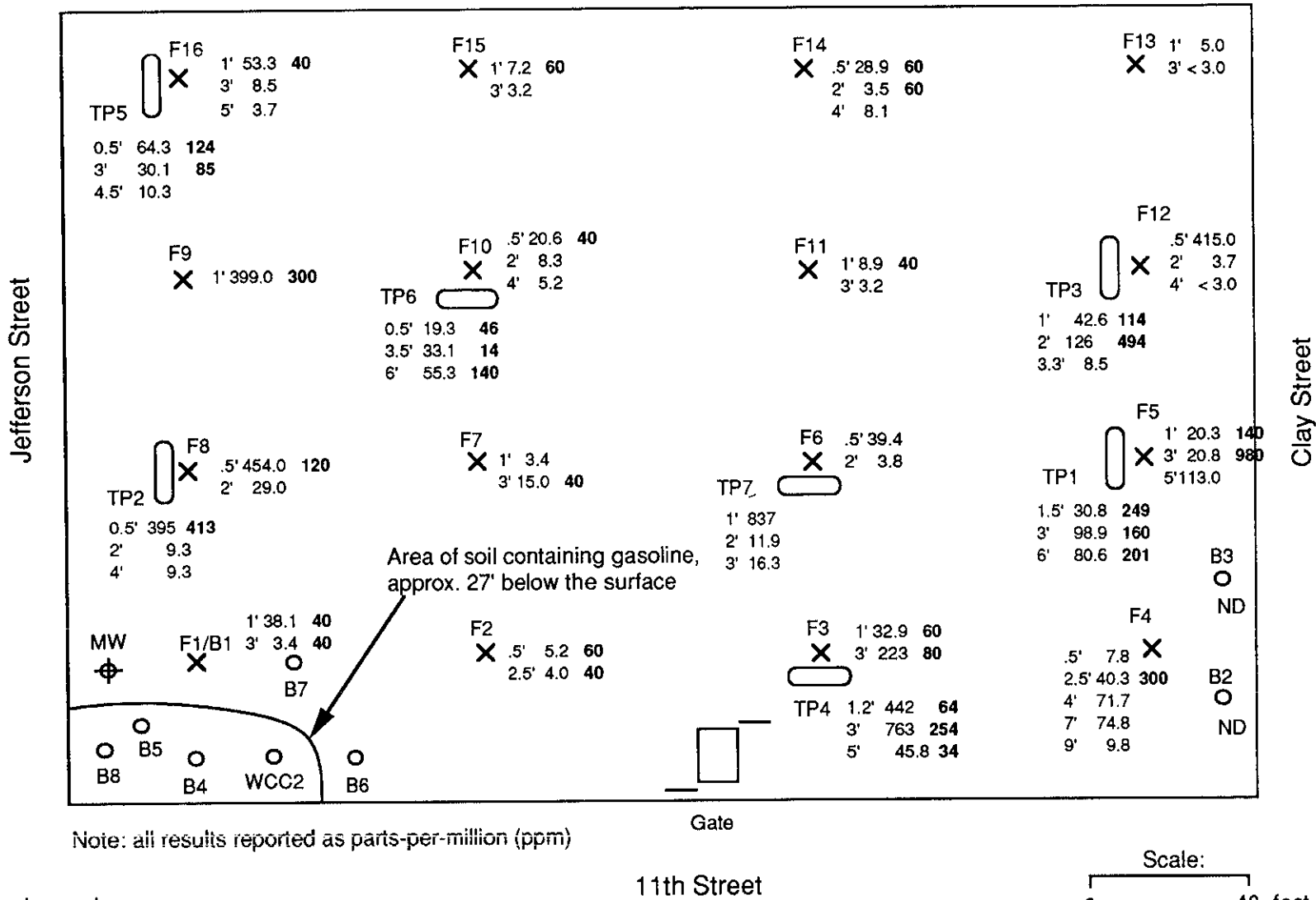
GAF/smp

Attachments: 1) Figure 1 - Site Plan
2) Table 1 - Summary of Selected Chemical Analyses
3) WCC Health and Safety Plan

cc: Mr. David Ralph, Redevelopment Agency of the City of Oakland
Mr. Spencer Covey, Covey Trucking Company

90C0039BL/COT

12th Street



Legend:

- X Fill Borings
- O Hydrocarbon Borings
- 1' 38.1 Depth, and total
- 4' 12.3 Lead in ppm

Project No. 90C0039A	City Center ESA	Parcel T9 Boring Locations	Figure 2
Woodward-Clyde Consultants			

Arim - Here is a "case"
that both Paul + Jen
had, but we never had
a "SLIC" dep/ref or did
any kind of active over-
sight - shall we forward
to City or what?

Thanks, Pam

1155 CLAY PROJECT - Average Lead and Oil and Grease Concentrations

W. Copeland 10/9/90

BORING/ TEST PIT	SAMPLE NO.	DEPTH (feet)	TOTAL LEAD CONCENTRATION (ppm)	OIL AND GREASE CONCENTRATION (ppm)
EXCAVATION AREA 1				
F1/B1	F1-1	1	38.1	40
	F1-2	4	3.4	40
F2	F2-1	1	5.2	60
	F2-2	3	4.0	40
	F2-3	5		
F3	F3-1	2	32.9	60
	F3-2	4	223.0	80
	F3-3	7		
F6	F6-1	1	394.0	20 (ND)
	F6-2	3	3.8	20 (ND)
	F6-3	5		
F7	F7-1	2	3.4	20 (ND)
	F7-2	4	15.0	40
F8	F8-1	1	454.0	120
	F8-2	3	29.0	20 (ND)
	F8-3	5		
F9	F9-1	2	399.0	300
	F9-2	4		
F10	F10-1	1	20.6	40
	F10-2	3	8.3	20 (ND)
	F10-3	5	5.2	
	F10-4	8		
F11	F11-1	2	8.9	40
	F11-2	4	3.2	20 (ND)
F13	F13-1	2	5.0	20 (ND)
	F13-2	4	1.5	
F14	F14-1	1	28.9	20 (ND)
	F14-2	3	3.5	60
	F14-3	5	8.1	
F15	F15-1	2	7.2	60
	F15-2	4	3.2	20 (ND)
F16	F16-1	1	53.3	40
	F16-2	3	8.5	20 (ND)
	F16-3	5	3.7	
TP2	TP2-1	0.5	395.0	413
	TP2-2	2	9.3	2 (ND)
	TP2-3	4	9.3	2 (ND)
TP4	TP4-1	1.2	442.0	64
	TP4-2	3	763.0	254
	TP4-3	5	45.8	34

1155 CLAY PROJECT - Average Lead and Oil and Grease Concentrations

BORING/ TEST PIT	SAMPLE NO.	DEPTH (feet)	TOTAL LEAD CONCENTRATION (ppm)	OIL AND GREASE CONCENTRATION (ppm)
TP5	TP5-1	0.5	64.3	124
	TP5-2	3	30.1	85
	TP5-3	4.5	10.3	2 (ND)
TP6	TP6-1	0.5	19.3	46
	TP6-2	3.5	33.1	14
	TP6-3	6	55.3	140
TP7	TP7-1	1	837.0	2 (ND)
	TP7-2	2	11.9	2 (ND)
	TP7-3	3	16.3	2 (ND)
AVERAGE =			105.0	62

EXCAVATION
AREA 2

F4	F4-1	1	7.8	20 (ND)
	F4-2	3	40.3	300
	F4-3	5	71.7	
	F4-4	8	74.8	
	F4-5	10	9.8	
F5	F5-1	2	20.3	140
	F5-2	4	20.8	980
	F5-3	6	113.0	
	F5-4	15		
F12	F12-1	1	415.0	20 (ND)
	F12-2	3	3.7	20 (ND)
	F12-3	5	1.5	
TP1	TP1-1	1.5	30.8	249
	TP1-2	3	98.9	160
	TP1-3	6	80.6	201
TP3	TP3-1	1	42.6	114
	TP3-2	2	126.0	494
	TP3-3	3.3	8.5	2 (ND)
AVERAGE =			68.6	225

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Woodward-Clyde Consultants

HEALTH AND SAFETY PLAN
1155 CLAY FILL REMOVAL PROJECT
1155 CLAY STREET
OAKLAND, CALIFORNIA

16 October 1990

APPROVALS

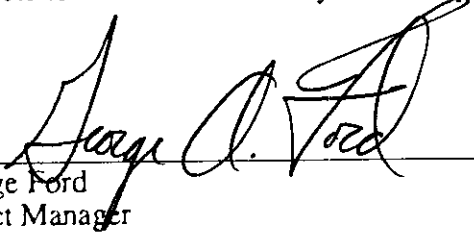
Eric Masamori
Health and Safety Officer, Oakland

Date

Anne Baptiste
Corporate Health and Safety

Date

As Project Manager for the above named project, I have read the attached Health and Safety Plan and agree to assume responsibility for implementing its provisions. To the best of my knowledge, the site descriptions and description of work are substantially accurate and complete to the extent necessary to assess project health and safety needs.



George Ford
Project Manager

10-22-90
Date

Consulting Engineers, Geologists,
and Environmental Scientists

Offices in Other Principal Cities



Job Number C00310P

SECTION I

HEALTH AND SAFETY GUIDELINES
EXCAVATION, TRANSPORTATION, AND DISPOSAL OF SOIL CONTAINING
PETROLEUM HYDROCARBONS AND LEAD
1155 CLAY STREET SITE
Oakland, California

1.0 INTRODUCTION

Woodward-Clyde Consultants (WCC) has prepared health and safety guidelines for soil cleanup work on the 1155 Clay Fill Removal Project on the site bounded by 11th and 12th Streets and Jefferson and Clay Streets in Oakland, California. These guidelines describe recommended procedures to be followed by the general contractor, excavation subcontractor, and any other subcontractors, vendors, or personnel working at or near the site during demolition, excavation, loading, shoring, and other grading and foundation construction activities. This document describes occupational safety and health precautions during the excavation and removal of soils containing petroleum hydrocarbons as waste oil and low levels of lead.

SPECIAL NOTE: WCC has prepared these guidelines to assist in performing the required work. The contractor is solely responsible for developing and implementing his own health and safety plan. When requested, WCC will assist in interpreting these guidelines, but WCC assumes no responsibility for implementing the guidelines or enforcing contractors' personnel or others to comply with the guidelines. Oakland Redevelopment Agency (Agency) shall require the contractor to assign to the job a safety specialist officer or manager with experience in gasoline, lead and waste oil cleanups to assist in supervising the excavation of contaminated soil.

2.0 BACKGROUND

2.1 Site Description

The 1155 Clay Fill Removal Project site is located on the block bounded by 11th, 12th, Clay and Jefferson Streets and occupies approximately 1.5 acres. In the past, various commercial buildings have been located on the site. A paved parking lot has existed on the site since 1970's.

2.2 Materials Present

Soil sampling and chemical analyses performed during 1990 indicate some areas of fill on the site contain elevated levels of petroleum hydrocarbons (gasoline, diesel and lubricating oil) and lead. This fill is located primarily on the Clay Street side of the site, within the basement areas of buildings formerly located on the site and in layer with an average thickness of approximately 5 feet covering the entire site. A maximum

concentration of 980 ppm oil and grease has been found in the fill. The average petroleum concentration in the contaminated portions of the fill is about 80 ppm. A maximum total lead concentration of 454 ppm has been detected in the fill. Average total lead concentration in the fill is about 60 ppm. Field evidence suggests that up to about 14,300 cubic yards of soil between elevations 30 and 35 feet City of Oakland Datum (C.O.O.D.) are affected by petroleum hydrocarbons and lead.

Analyses of groundwater taken from monitoring wells on the site indicate that the groundwater does not contain elevated levels of petroleum hydrocarbons, metals or volatile organics.

The underlying soil also contains gasoline at concentrations of up to approximately 100 parts per million (ppm) at a depth of 27 feet below the surface in a small area along the Jefferson Street at 11th Street corner of the site. It is not anticipated that this soil will be encountered during work for this project.

3.0 WORK DESCRIPTION

The cleanup of the 1155 Clay Fill Removal Project site will consist of removing approximately 14,300 cubic yards of soil containing petroleum hydrocarbons and lead from the site and hauling the soil directly to designated disposal sites.

Construction activities on the site will consist of the excavation, stockpiling, and off-hauling of soils containing oil and lead. The work will require close coordination between the contractor and Woodward-Clyde Consultants (Engineer).

4.0 HAZARD EVALUATION

The primary potential hazards anticipated for this project are: (1) physical injuries related to construction practices and heavy equipment; and (2) inhalation of dust containing concrete, oil and possibly lead. Table 1 gives the permissible exposure limits (PEL) and the Immediate Danger to Life and Health (IDLH) levels established for substances expected on the site.

TABLE 1
MAJOR SITE CONTAMINANTS

<u>Contaminant</u>	<u>PEL</u>	<u>IDLH</u>
Waste Oil	N/A	N/A
Lead and Inorganic Lead Compounds	0.05 mg/m ³	variable
Gasoline	300 ppm	500 ppm (short term - 15 minutes)

4.1 Endangerment Assessment

Oily petroleum hydrocarbons exhibit negligible inhalation and dermal toxicity. Because the oil occurs in a soil matrix, the fire hazard is judged to be relatively low.

Gasoline exhibits relatively low acute inhalation and dermal toxicity. Concentrations of 160 to 270 parts per million (ppm) gasoline vapor have been reported to cause eye, nose, and throat irritation in people after several hours of exposure. Levels of 500 to 900 ppm have been reported to cause irritation and dizziness in one hour and 2,000 ppm has been reported to cause mild anesthesia in 30 minutes. Gasoline will cause severe eye irritation on contact with the eye and low to moderate skin irritation on contact with the skin. In adults, ingestion of 20 to 50 grams may produce severe symptoms of poisoning. Secondary pneumonia may occur if gasoline or other fuels are aspirated (passed into the lungs) upon ingestion.

Petroleum distillate fuels, including gasoline, are flammable. Under certain conditions, this property presents a greater risk than toxicity. Generally, it is expected that the soil containing petroleum hydrocarbons encountered at the site will not support combustion, and the fire hazard will be negligible.

4.2 Pit Construction

Pits, trenches and other large holes in the ground can present a number of physical hazards. Among them is collapse of walls, which could cause severe injury or death to individuals working in or standing on the edge. Holes in the ground also present a tripping and falling hazard to unsuspecting visitors and passers-by. OSHA requires pits and other excavations to be shored or sloped if they are deeper than 5 feet and personnel must enter them. Also, OSHA requires the erection of barriers and signs around open pits and trenches.

5.0 SITE LAYOUT

Because of the relatively low chemical exposure hazards associated with the work to be performed, dividing the site into exclusion, contamination reduction, and support areas is unnecessary. The site may be entered only by authorized individuals, and such individuals must wear the specified protective equipment upon entering.

6.0 PERSONNEL PROTECTION

The personal protection for EPA Level D classified work will be enforced. Equipment specifications are based on the foregoing hazard assessment.

- o All personnel engaged in excavation operations must wear the protective equipment listed below:

- Hard hat and safety glasses/goggles or faceshields (when working within 10 feet of operating equipment)
 - Neoprene or nitrile gloves, 10-inch minimum length
 - Earplugs or muffs. Hearing protection should be worn when noise levels exceed 85 dBA. If verbal communication with a person 2 feet away requires one to raise his/her voice to be heard, the level of background noise will usually be greater than 85 dBA.
 - Neoprene boots with steel toes
 - Disposable uncoated-Tyvek coveralls may be worn to protect street clothes from soiling and the possibility of being splashed with water
- o All personnel engaged in soil sampling operations must wear the same protective equipment listed above.
 - o Half or full-face respirators with organic vapor-acid gas cartridges (color coded yellow) shall be available for immediate use. Respirators must be worn by individuals in the work area whenever organic vapor levels in the breathing zone of individuals working closest to the source reach and remain above the action levels specified in Section 7.2.
 - o A first aid kit shall be present at the work site.

An EPA Level C contingency will be observed for this project.

6.1 Health and Safety Training

Employees of WCC assigned to perform work at the site must meet 29 CFR 1910.120 requirements regarding 40-hour basic health and safety training, supervisor training and annual refresher training. Training is not required for WCC employees assigned to observe on-site activities from points outside of the site area. It is recommended that the contractor and subcontractors use personnel trained under 29 CFR 1910.120 requirements. If needed, WCC will assist the project team in providing health and safety training.

6.2 Medical Monitoring

All WCC employees assigned to the sampling operations must be active participants in WCC's Medical Surveillance Program. WCC's program requires employees assigned to hazardous waste site investigations to take preassignment, annual and exit medical examinations. The only acceptable proof of medical clearance is a letter or document, signed by a physician, certifying that the physician performed an examination within the past 12 months and found the person physically fit to wear a respirator and perform work at hazardous waste sites. It is strongly suggested that the

contractor and subcontractors use personnel who participate in a medical monitoring program.

6.3 Work-Rest Schedule

No special work-rest schedule is required. Air temperatures and humidity are expected to be in a relatively comfortable range during the project and, because the physical work will be light to moderate, no undue stress should be encountered even when wearing protective equipment. Therefore, no heat or cold stress monitoring is necessary.

6.4 Health and Safety Briefing

Before field work begins, all WCC field personnel (including employees of WCC subcontractors) must be briefed on their work assignments and on the provisions of this procedure. Each person briefed should be given a copy of the work guidelines and should acknowledge receipt and willingness to comply. Individuals refusing to abide by the guidelines should be prohibited from working on the site.

7.0 VAPOR MONITORING

The preferred vapor monitoring instrument is a combustible gas meter (CGM) with lower explosive limit (LEL) and 0-500ppm scales calibrated with hexane. If the CGM available does not have a ppm scale, a photoionization (PID) or flame-ionization meter should be used in combination with the CGM.

7.1 Explosion Hazard and Evacuation

If measurements with a combustible gas meter (CGM) indicate the presence of combustible gas levels equal to or exceeding the explosivity action level in the work area, the following action must be taken.

- o Extinguish all possible ignition sources in the work area (e.g., shut down electricity and fuel-powered motors).
- o Move personnel at least 100 feet away from work area.
- o Leave CGM in work area and return to work area only if CGM alarm stops and remains off at least 15 minutes.

7.2 Action Levels

The toxicity action levels below are based on the American Council of Government Industrial Hygienists (ACGIH) Threshold Limit Value (TLV) for gasoline of 300ppm, adjusted to comply with the new OSHA benzene standard. These action levels are meter readings equivalent to 10 percent of the TLV. Respirators must be worn when meter readings averaged over 15 minutes equal or exceed the action level near the source of contamination.

<u>Instrument</u>	<u>Calibration Gas</u>	<u>Action Level (ppm)</u>
Combustible gas meter	Hexane	30
Combustible gas meter	Methane	13
Photoionization meter with 10 to 10.2 eV lamp	Benzene	6
Photoionization meter with 10 to 10.2 eV lamp	Isobutylene	10
Flame-ionization meter (OVA-128)	Methane	30

The explosivity action level is 20 percent of LEL for hexane-calibrated CGM's and 47 percent of LEL for methane-calibrated CGM's. The CGM alarm must be set to sound at the action level.

7.3 Monitoring Guidelines

Vapor monitoring should be performed as often as necessary and wherever necessary to protect field personnel from hazardous vapors. Monitoring must be performed by individuals trained in the use and care of the required instruments. Because toxicity action levels are considerably lower than explosivity action levels, monitoring efforts should focus initially on detection of toxic vapors. Monitoring for explosive levels of gases and vapors should be performed only when gas/vapor concentrations exceed the ppm range of the CGM or PID and when explosive levels are expected (e.g., inside tanks and other enclosed spaces).

During excavation and loading operations, vapor emissions may be measured continuously or periodically. If vapors are measured continuously and the instrument must be unattended, the sample intake orifice or, in the case of instruments that operate by diffusion, the detector, must be positioned in a safe place down wind of the excavation and the instrument alarm set to sound at the action level.

If the alarm sounds while monitoring continuously for toxic concentrations, the sample intake orifice/detector should be moved so that vapor concentrations in the breathing zones of individuals closest to the work area are measured. Decisions regarding respirator use should be based on breathing zone vapor concentrations.

If the alarm sounds while continuously monitoring for explosive concentrations, shut-down and evacuation procedures must be initiated immediately.

If vapor emissions are measured periodically, they should be measured whenever a boring is open. Measurements may be limited to breathing zone air. Vapor emissions from the excavations should be measured while the

excavation is being dug. The monitoring instrument should be placed near the backhoe operator and the instrument alarm set at the action level.

7.4 Area Control

Access to potentially hazardous areas of the excavation must be controlled to reduce the likelihood of occurrence of physical injury and chemical exposure of people. A hazardous or potentially hazardous area includes any area where (1) field personnel are required to wear respirators, or (2) excavating operations are being performed with heavy equipment.

Entry to hazardous areas shall be limited to individuals who must work in those areas. Unofficial visitors must not be permitted to enter hazardous areas. Official visitors should be discouraged from entering hazardous areas, but may be allowed to enter if they agree to abide by the provisions of these guidelines and are informed of the potential dangers that could be encountered in the areas.

8.0 DECONTAMINATION

Field decontamination of personnel and equipment is not required except when contamination is obvious (visually or by odor). Recommended decontamination procedures follow.

Personnel

Petroleum and/or petroleum-bearing soil should be removed from skin using a mild detergent and water. Hot water is more effective than cold. Liquid dish washing detergent is more effective than hand soap.

Equipment

Gloves, respirators, hard hats, boots, and goggles should be cleaned as described under personnel; however, if boots do not come clean after washing with detergent and water, wash them with a strong solution of trisodium phosphate and hot water.

Excavating equipment, vehicle undercarriages, and tires should be cleaned of obvious contamination before being moved from the site. This may be done with steam or high-pressure water, preferably with soap. The steam cleaner is a convenient source of hot water for personnel and protective equipment cleaning.

9.0 EMERGENCY RESPONSE PROCEDURES

In the event of fire, explosion, chemical exposure, injury, and other accidents, contact an appropriate site emergency organization. The emergency organizations and their telephone numbers are listed below:

Phone Number

Fire Department

911

Ambulance	911
Police	911
Merritt/Peralta Hospital	420-6116
30th and Telegraph	
Oakland	

Directions to Hospital:

- Take 11th Street to Broadway
- Turn left onto Broadway
- Take Broadway to Telegraph
- Turn left on Telegraph
- Hospital is on the corner of Telegraph and 30th Street

10.0 PROHIBITED ACTIVITIES

- o Eating, drinking or smoking are prohibited on site except in areas to be designated by the Site Safety Officer.
- o If respirator use becomes necessary, individuals with facial hair that interferes with proper fit of respirators shall not be permitted to enter areas where respirator use may be required.

11.0 PROJECT SAFETY PERSONNEL

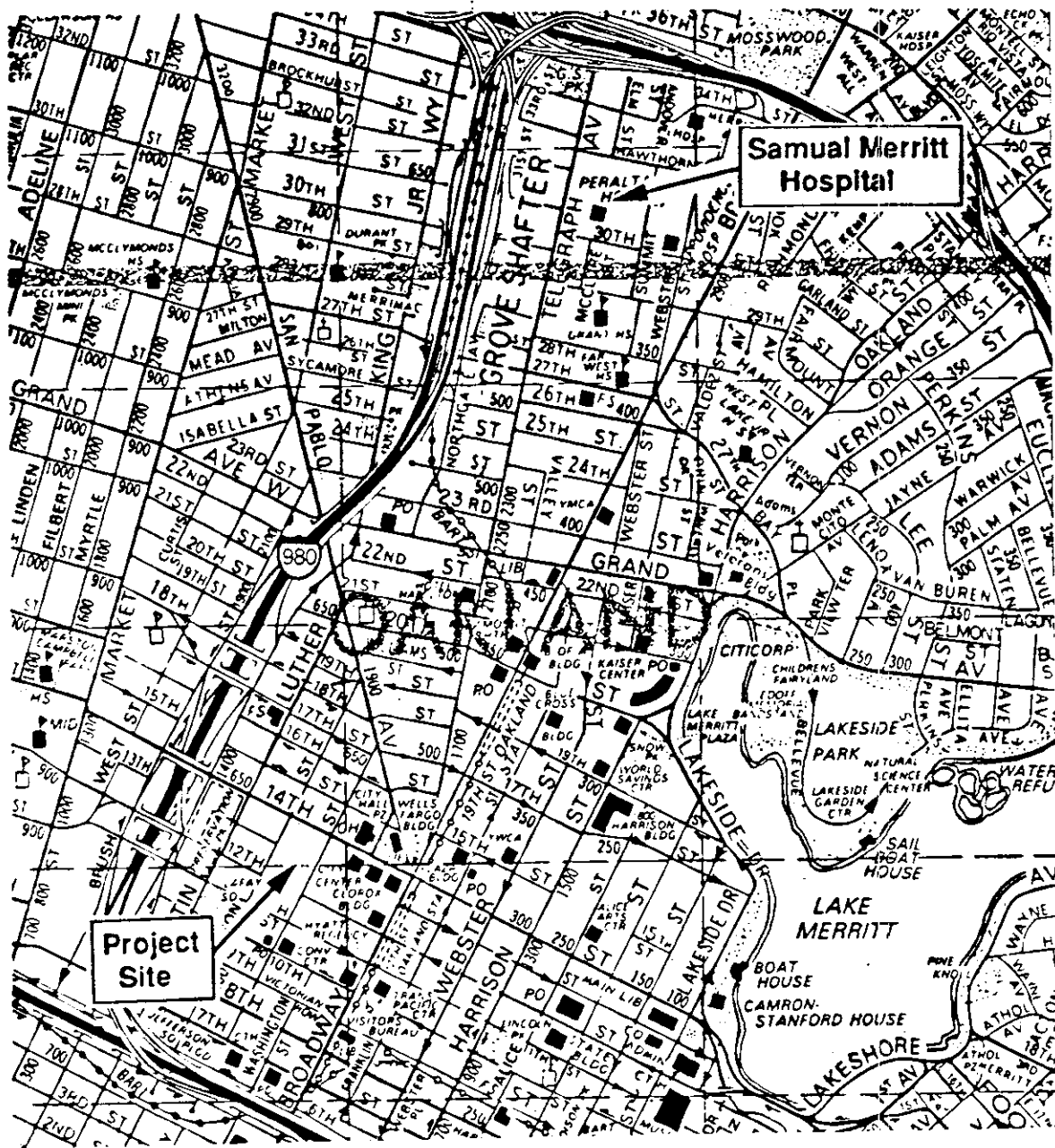
The Agency shall require the contractor to designate a full-time Health and Safety Specialist, Officer or Manager (HSM) who will remain on-site during excavation operations and monitor and enforce compliance with health and safety guidelines. This person should be familiar with conventional construction safety procedures as well as the requirements for dealing with soil containing oil, fuel hydrocarbons, and lead. The HSM should have the authority to control or direct the work in contaminated areas and to stop work when necessary.

WCC will have a Site Safety Officer (SSO) on site who will be responsible for directing WCC activities. The SSO will be available to assist the contractor's HSM in areas of worker health and safety; however, compliance with these guidelines is the sole responsibility of the contractor.

Telephone Numbers

	<u>Work</u>
<u>Redevelopment Agency of the City of Oakland</u>	
David W. Ralph	273-3694
Lois R. Parr	273-3694
<u>Woodward-Clyde Consultants</u>	
George Ford	874-3203
Peter Solberg	874-1752
Bill Copeland	874-3192

Note: WCC personnel may be paged during work hours by calling 893-3600.



Project No. 8910214A	Oakland Federal Building, Soil Excavation and Removal	Location of Nearest Hospital to Project Site, Oakland, California	Figure
Woodward-Clyde Consultants			

OPERATING PROCEDURE NO. HS-510

510.0 Safety Procedures for Trench Construction and Other Excavating Operations

510.1 Purpose

This procedure contains general safety requirements for excavating and trenching operations and work performed therein. The requirements are consistent with standards established by the Occupational Safety and Health Administration (OSHA) and described in 29 CFR 1926, Subpart P. The latter should be consulted for additional information.

510.2 Primary Responsibility

The WCC project manager is responsible for ensuring that employees of WCC and of firms contracted by WCC comply with the requirements.

510.3 Applicability

This procedure is applicable to all WCC projects in which trenching or other excavating operations, exclusive of borings, are performed by WCC personnel or personnel employed by firms under contract to WCC. It is also applicable to WCC projects requiring WCC personnel or personnel of firms under contract to WCC to enter trenches and other types of excavations.

510.4 Requirements

510.4.1 Preliminary Requirements

When planning any excavating operation, obtain a permit, if required, from the proper authority.

Before digging, determine if underground installations, such as sewer, water, fuel, or electrical lines are to be encountered, and if so, determine the exact locations of the lines. Information can be obtained by contacting Underground Service Alert (consult local telephone directory for toll-free number), local utility companies, and the owner of the property on which excavating operations are planned.

Trees, boulders, and other surface encumbrances, located so as to pose a potential hazard to employees must be removed or made safe before the operation begins.

510.4.2 Placement of Excavated Materials

Excavated materials must be placed at least two feet from the edge of the excavation and precautions must be taken to prevent the materials from falling into the excavation.

510.4.3 Working in Excavations

510.4.3.1 Shoring and Sloping

Excavations in which personnel are required to work must be shored or sloped to an angle of repose if the depth of the excavation is five (5) feet or more. When a shoring system is used, it shall consist of hydraulic shores or the equivalent, with sheathing or sheet piling as needed. The shoring system must be properly designed and installed to sustain all existing and expected loads. For details on shoring and sloping, consult 29 CFR, Subpart P, Sections 1926.650 to 1926.653.

510.4.3.2 Access

When work is to be performed in an excavation, safe access to the excavation must be provided by means of ladders, stairs, or ramps. Trenches four or more feet deep must have ladders spaced no less than 25 feet apart, and the ladders must extend at least three feet above grade.

510.4.3.3 Hazardous Atmospheres

At sites where oxygen deficiency or hazardous concentrations of flammable or toxic vapors or gases may be encountered in excavations, the atmosphere in the excavations must be tested by the project safety officer or other qualified person before work in an excavation begins and at appropriate intervals afterward.

510.4.4 Inspection of Excavations

Excavations must be inspected daily by the project or site safety officer. If no safety officer has been assigned to the project, inspections must be made by the project manager. If evidence for potential caveins or slides is apparent, all work in the excavation must be suspended until necessary steps have been taken to safeguard employees.

510.4.5 Operation of Vehicles Near Excavations

When vehicles or heavy equipment must operate near an excavation, the sides of the excavation must be shored or braced as necessary to withstand forces exerted by the superimposed load. Stop logs or other types of secure barriers must be installed at the edges of the excavations.

510.4.6 Bell-Bottom Pier Holes

Employees working in bell-bottom pier holes must be protected by a substantial casing that extends the full depth of the shaft. The employees must wear a shoulder harness secured to a full-time tended lifeline.

510.4.7 Bridges and Walkways

Walkways or bridges with standard guardrails must be provided where employees or equipment are required or permitted to cross over excavations. Pedestrian walkways shall be of sufficient strength to permit a vertical deflection of no more than 0.5 inch when a 250-pound weight is applied to the center of the walkway. All bridges intended for vehicular traffic must be constructed to withstand twice the load of the heaviest vehicle expected.

510.4.8 Barricades and Fences

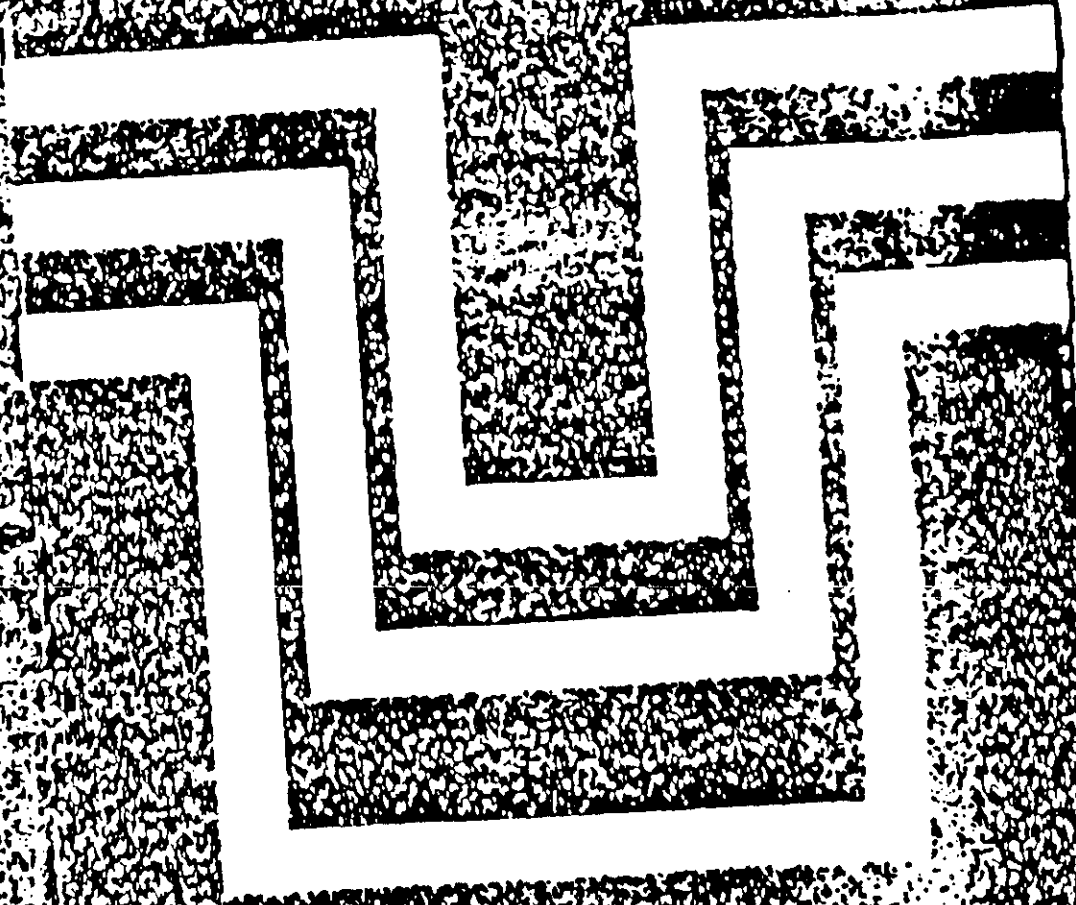
Excavated areas must be completely guarded on all sides with barricades or fences, as appropriate. If barricades are used, they must be spaced no more than 20 feet apart and shall not be less than 35 inches high when erected. A yellow or yellow and black tape, at least 0.75 inches wide, shall be stretched between the barricades.

510.4.9 Backfilling

Excavated areas must be backfilled as soon as practical after work is completed, and all associated equipment must be removed from the area.

Excavating and Trenching Operations

U.S. Department of Labor
Occupational Safety and Health Administration
1978 Edition





U.S. Department of Labor
William E. Brock, Secretary

Occupational Safety and Health Administration
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A Word About OSHA

The Occupational Safety and Health Act of 1970 was adopted by Congress "... to assure so far as possible every working man and woman in the Nation safe and healthful working conditions and to preserve our human resources." While strict compliance with the OSHA standards will help ensure a good level of safety and health on the job, those standards can prescribe only minimum requirements for all the workplaces they cover.

What finally makes workplace safety and health a reality is a diligent and committed management and workforce operating as a team, dedicated to sound health and safety education and training and good work habits.

The High Cost of Cave-Ins

Excavation and trenching cave-ins result in more than one hundred fatalities annually in the United States. With little or no warning, an unsupported, improperly-shored or sloped trench or excavation wall can collapse, trapping workers below in seconds. For each fatality there are an estimated fifty related serious injuries annually. In addition to human losses due to excavating and trenching accidents, the financial costs can be staggering—property damage, work stoppage, and workers' compensation among others.

Planning for Safety

Most on-the-job problems and accidents are a direct result of inadequate planning when preparing the bid. Correcting mistakes in shoring and/or sloping after work has begun slows down the operation, adds to the cost, and increases the possibility of an excavation failure. The contractor should build safety into the pre-bid planning in the same way all of the other pre-bid factors are considered.

It is a good idea for contractors to develop safety checklists, prior to working up a bid, to make certain that there is adequate information about the jobsite and that all needed items are on hand.

Before preparing a bid these specific conditions should be taken into account:

- Traffic,
- Nearness of structures and their conditions,
- Soil,
- Surface and ground water,
- The water table,
- Overhead and underground utilities, and
- Weather.

These and other conditions can be determined by jobsite studies, observations, test borings, and consultations with local officials and utility companies. Underground installations—sewer, telephone, water, fuel and electric lines—that may be encountered in the digging must be located. If underground installations are uncovered, OSHA regulations require that they be properly supported. The contractor must contact the utility companies involved and inform them of the proposed work before starting the trench or excavation.

Once all the necessary specific information about the jobsite is ascertained, the contractor is ready to determine the amount, kind and cost of the safety equipment needed. A careful inventory of the safety items on hand must be made before deciding what additional safety material must be acquired. No matter how many trenching, shoring and backfilling jobs have been done in the past, each job should be approached with the utmost care and preparation.

Before Beginning the Job

It is important, before beginning the job, for the contractor to establish a safety and health policy. It should be put in writing or made verbal and should reflect the contractor's own attitude toward jobsite safety.

To be sure safety policies are implemented effectively, there must be cooperation from supervisors; employee groups, including unions; and individual employees. Each supervisor must understand the degree of responsibility and authority he or she holds in a particular area. For effective labor support, affected unions should be notified of construction plans and asked to cooperate.

Before beginning work, employees should be taught to recognize hazards and safety precautions they must take. No employee should operate a piece of equipment without first being trained properly to handle it and fully alerted to its potential hazards.

Once the job gets underway, it will be important for the contractor to be kept informed of the safety aspects of the work as well as the work progress in general. Therefore, in the planning stages it will be necessary to incorporate procedures for fast notification and investigation of accidents.

On-the-Job Follow-up

Follow-up involves a series of inspections to detect hazards and correct jobsite situations before cave-ins or other accidents occur. Receiving daily reports, acting on these reports, and making personal visits to the jobsite will help to ensure that everyone is meeting job safety responsibilities.

Larger and more complex operations should have a full-time safety official who makes recommendations to improve the implementation of the safety plan. In a smaller operation, the safety official may be part-time and probably will be a supervisor.

Supervisors are the contractor's representatives on the job. Supervisors should conduct inspections, investigate accidents and anticipate hazards. They should be responsible for meeting on-the-job employee safety training and education needs. It should also be their responsibility to take precautions to guard against potential hazards, get the necessary worker cooperation in safety matters, and make frequent reports to the contractor.

Leadership by example is more necessary in safety than in almost any other field of jobsite activity. It is essential that every manager, regardless of status, wear safety shoes, safety glasses, a hard hat and any other prescribed gear when visiting the jobsite.

Employees must also take an active role in job safety. The contractor and supervisor should make certain that the workers have had proper training in the use of the prescribed protective gear and equipment, that they are indeed wearing and using the equipment correctly, and that they are using safe work practices.

On-site Safe Practices

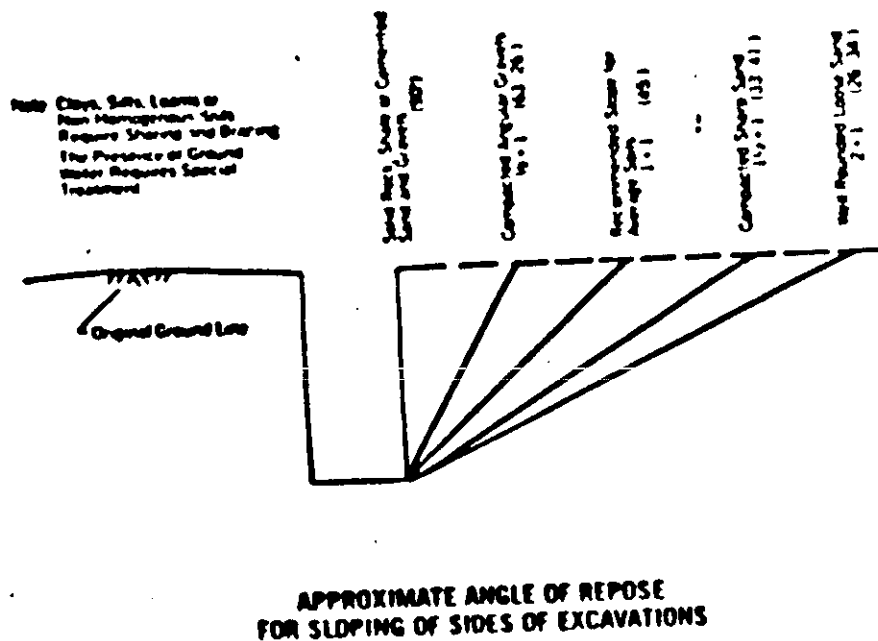
According to the OSHA construction safety and health standards, a trench is referred to as a narrow excavation in which the depth is greater than the width, although the width is not greater than 15 feet. An excavation is any mechanically-made cavity or depression in the earth's surface. This can include excavations for anything from cellars to highways.

OSHA requires that, in all excavations, employees exposed to danger from moving ground shall be protected by a shoring system, sloping of the ground, or some other equivalent means.

In addition, OSHA requires that all trenches over 5 feet deep in either hard and compact or soft and unstable soil be sloped, shored, sheeted, braced or otherwise supported and that trenches less than 5 feet in depth also be effectively protected when hazardous ground movement may be expected.

One method of ensuring the safety and health of workers in a trench or excavation is to slope the sides of the cut to the "angle of repose," the greatest angle above the horizontal plane at which a material will lie without sliding. The angle of repose varies with different kinds of soil, and must be determined on each individual project. When an excavation has water conditions, silty material or loose boulders, or when it is being dug in areas where erosion, deep frost, or slide planes are apparent, the angle of repose must be flattened. (See figure 1.)

Figure 1.



A second method of protection is shoring-sheeting which can be either tightly placed timber shores, bracing, trench jacks, piles, or other materials installed in a manner strong enough to resist the pressures surrounding the excavation. (See figure 2.)

Contractors also may use a trench shield, a prefabricated movable structure composed of steel plates welded to a heavy steel frame. Timber, aluminum or other suitable construction may also be used. OSHA standards permit the use of a trench shield (also known as a welder's hut) as long as the protection it provides is equal to or greater than the protection that would be provided by the appropriate shoring system. (See figure 3.)

Designing Adequate Protection

Designing a support system is a complex operation because of the number of factors involved. Some of the considerations the contractor must take into account are:

- Soil classification,
- Depth of cut,
- Water content of soil,
- Changes due to weather and climate,
- Superimposed loads,
- Vibrations, and
- Other operations in the vicinity.

Soil Classification

The type(s) of soil must be identified to determine proper protective measures. Excavations in wet soil, sandy soil, or areas that have been backfilled, are relatively unstable and must have strong support. Even hard rock sometimes can be hazardous; faults in the strata can make it unstable when cut.

Weather Conditions

Changing weather conditions and climate also greatly affect how strong a shoring system must be. Excess water from rain or melting snow loosens the soil, drastically increasing the pressure on the shoring system. A rainstorm can turn a stable trench side that required only light bracing into a mass of loose soil, posing an immediate threat to the employees working within. Shoring frozen ground presents another potential problem—a sudden thaw can undermine an entire section of shoring. Even excessively dry conditions can reduce the cohesiveness of the soil.

Figure 2.

ONE EXAMPLE OF SEVERAL TYPES OF SHEETING

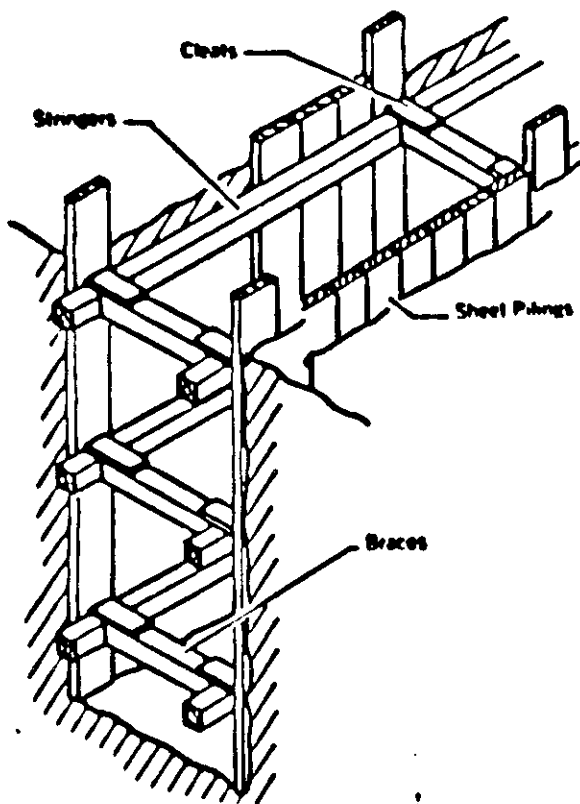
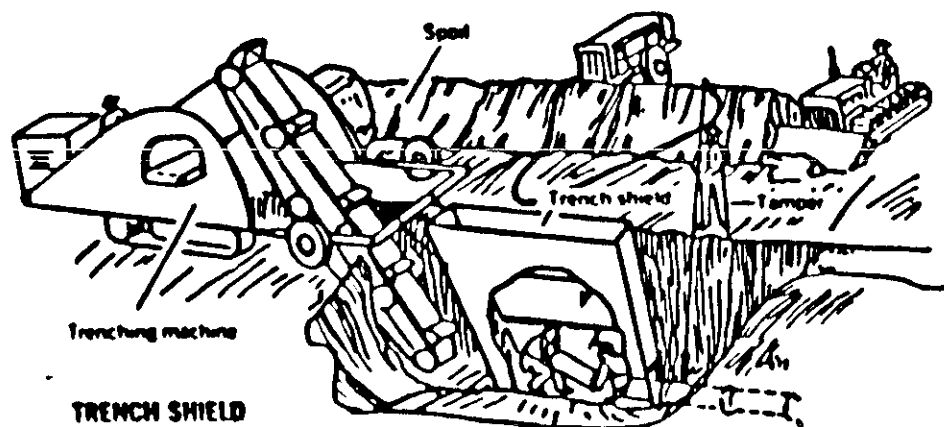


Figure 3.



Large excavations, in particular, are subject to changing weather conditions because they are generally open for longer periods of time than are trenches. Shoring for these excavations should provide long-range protection for a variety of weather conditions. In some cases, additional precautions are necessary to protect excavation sides or faces, such as covering them with plastic sheeting or spraying the soil bank with a moisture-limiting chemical.

Superimposed Loads

Superimposed loads in the vicinity of a trench or excavation increase the pressure on excavation faces. Heavy equipment and materials such as pipes or timbers should be kept as far back from the excavation as possible. When heavy loads must be located near an excavation, the walls must be braced, sheet-piled, or shored to safely support the extra weight. In some cases, it may be necessary to lessen the pressure of these loads. Pile drivers or cranes, for example, should be mounted on wooden mats or heavy planking to spread the weight more evenly.

Buildings, curbs, trees, utility poles, and other structures adjoining the excavation area also can place more stress on a trench side than it can safely accommodate. In these instances, OSHA requires that shoring, bracing, or underpinning be provided as necessary to protect workers. This will also prevent the dislocation of the soil beneath the structures in the vicinity.

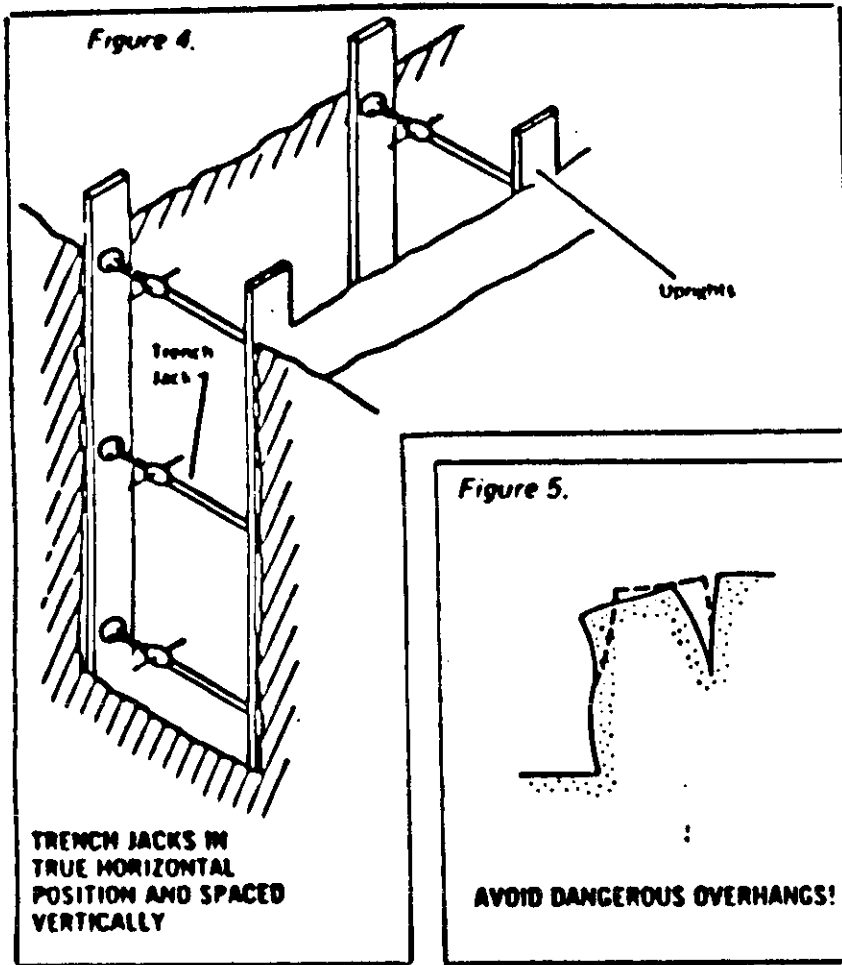
In addition, spoil, the excavated material, can exert great pressure on the excavation walls. Spoil must be stored 2 feet or more from the edge of the excavation, and be retained in an effective manner.

Vibrations

Vibrations or sudden shock from passing vehicles or railways, blasting, equipment such as trucks or pile drivers, and some tools can contribute to cave-ins by loosening the soil. Even machines operated in nearby buildings, such as punch presses, can create enough vibration to endanger a shoring system. If these conditions exist near an excavation site, stronger support is vital.

Installing the Protection

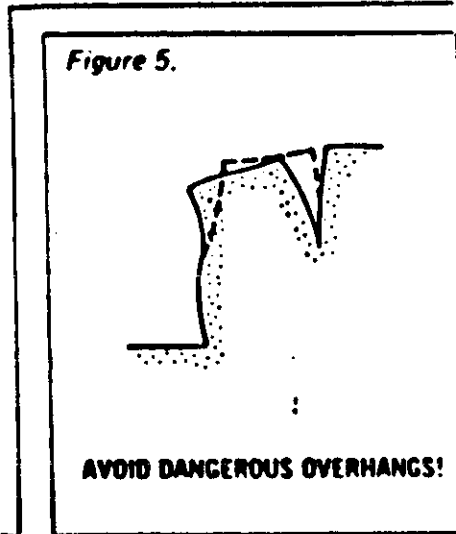
Whatever support system is used, workers should always apply shoring by starting from the top of the trench or excavation and working down. In installing the shoring, care must be taken to



place the cross beams or trench jacks in the true horizontal position and to space them vertically at appropriate intervals. The braces also must be secured to prevent sliding, falling or kickouts. (See figure 4.)

All materials used for shoring must be in good condition, free of defects, and of the right size. Timber with large or loose knots should not be used.

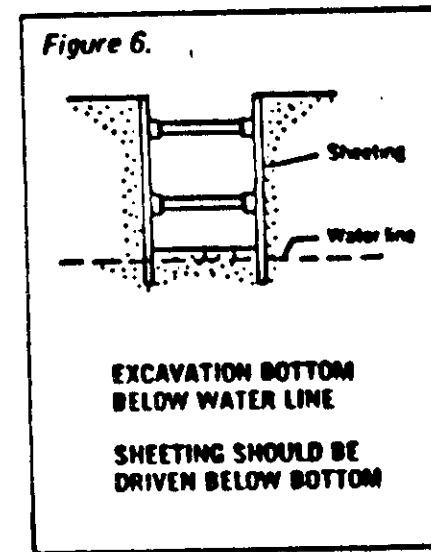
Installation of the shoring should closely follow the excavation work. The longer a trench is left unsupported, the greater the chance of a cave-in. (See figure 5.) Even if no work is being done in them, dirt walls will slough off, causing dangerous overhangs.



Special Precautions

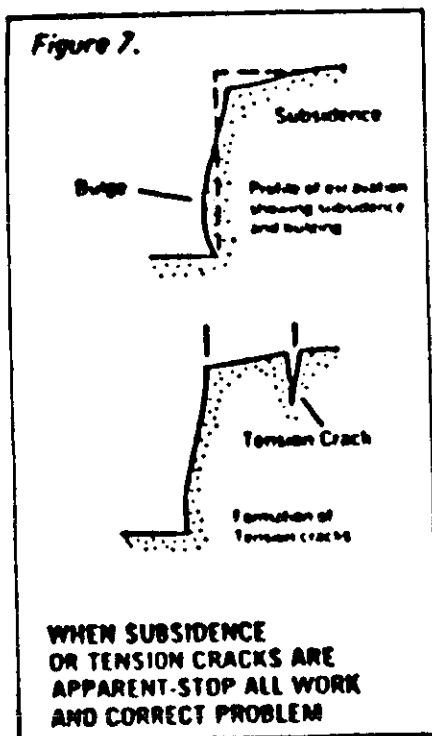
Sometimes the contractor will have to guard against an unstable excavation bottom, such as when working below the water line. Shoring may have to be driven below the bottom of such an excavation to add to the soil stability. (See figure 6.)

OSHA standards require that diversion dikes and ditches or other suitable means be used to prevent surface water from entering an excavation and to provide adequate drainage of the area adjacent to the excavation. Water causes soil erosion and softening and should not be allowed to accumulate in a trench or excavation.



Inspections

Shoring systems must be inspected daily by a competent person. Inspections also are required after rainstorms or any change in conditions that can increase the possibility of a cave-in or slide. If dangerous ground movements are apparent, such as subsidence or tension cracks, all work in the excavation must be stopped until the problem has been corrected. (See figure 7.)



Quick Exits

In case of an emergency, workers must be able to leave the trench quickly. According to OSHA regulations, when employees are required to be in trenches 4-feet deep or more, adequate means of exit, such as a ladder or steps, must be provided and located so as to require no more than 25 feet of lateral travel.

After the Work is Completed

As soon as work is completed, the trench should be backfilled as the shoring is dismantled. After the trench has been cleared, workers should remove the shoring from the bottom up, taking care to release jacks or braces slowly. In unstable soil, ropes should be used to pull out the jacks or braces from above.

Remember

OSHA regulations for trenching and excavation work leave no room for risk-taking; they require that safe working conditions be provided for all employees working in excavations.

A greater awareness of the safety problems to be overcome in excavations—on the part of the employer who designs the protection and the employee who installs it—will help end cave-in hazards in construction.

For More Information

Regulations for excavating, trenching, and shoring are contained in Subpart P, Part 1926 of the Code of Federal Regulations. (See Appendix.) Other OSHA construction standards may also apply.

Part 1926 covers the safety and health regulations for construction. Copies of the complete set of OSHA standards for construction may be purchased from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. Ask for *Construction Industry: Part 1926/1910* (OSHA 2207).

Additional information on trenching and excavation may be obtained from the OSHA office nearest you.

Subpart P—Excavations, Trenching, and Shoring

1926.850—General protection requirements.

(a) Walkways, runways, and sidewalks shall be kept clear of excavated material or other obstructions and no sidewalks shall be undermined unless shored to carry a minimum live load of one hundred and twenty-five (125) pounds per square foot.

(b) If planks are used for raised walkways, runways, or sidewalks, they shall be laid parallel to the length of the walk and fastened together against displacement.

(c) Planks shall be uniform in thickness and all exposed ends shall be provided with beveled cleats to prevent tripping.

(d) Raised walkways, runways, and sidewalks shall be provided with plank steps on strong stringers. Ramps, used in lieu of steps, shall be provided with cleats to insure a safe walking surface.

(e) All employees shall be protected with personal protective equipment for the protection of the head, eyes, respiratory organs, hands, feet, and other parts of the body as set forth in Subpart E of this part.

(f) Employees exposed to vehicular traffic shall be provided with and shall be instructed to wear warning vests marked with or made of reflectorized or high visibility material.

(g) Employees subjected to hazardous dusts, gases, fumes, mists, or atmospheres deficient in oxygen, shall be protected with approved respiratory protection as set forth in Subpart D of this part.

(h) No person shall be permitted under loads handled by power shovels, derricks, or hoists. To avoid any spillage employees shall be required to stand away from any vehicle being loaded.

(i) Daily inspections of excavations shall be made by a competent person. If evidence of possible cave-ins or slides is apparent, all work in the excavation shall cease until the necessary precautions have been taken to safeguard the employees.

1926.851—Specific excavation requirements.

(a) Prior to opening an excavation, effort shall be made to determine whether underground installations, i.e., sewer, telephone, water, fuel, electric lines, etc., will be encountered, and if so, where such underground installations are located. When the excavation approaches the estimated location of such an installation, the exact location shall be determined and when it is uncovered, proper supports shall be provided for the existing installation. Utility companies shall be contacted and advised of proposed work prior to the start of actual excavation.

(b) Trees, boulders, and other surface encumbrances, located so as to create a hazard to employees involved in excavation work or in the vicinity thereof at any time during operations, shall be removed or made safe before excavating is begun.

(c) The walls and faces of all excavations in which employees are exposed to danger from moving ground shall be guarded by a shoring system, sloping of the ground, or some other equivalent means.

(d) Excavations shall be inspected by a competent person after every rainstorm or other hazard-increasing occurrence, and the protection against slides and cave-ins shall be increased if necessary.

(e) The determination of the angle of repose and design of the supporting system shall be based on careful evaluation of pertinent factors such as: Depth of cut; possible variation in water content of the material while the excavation is open; anticipated changes in materials from exposure to air, sun, water, or freezing; loading imposed by structures, equipment, overlying material, or stored material; and vibration from equipment, blasting, traffic, or other sources.

(f) Supporting systems, i.e., piling, cribbing, shoring, etc., shall be designed by a qualified person and meet accepted engineering requirements. When tie rods are used to restrain the top of sheeting or other retaining systems, the rods shall be securely anchored well back of the angle of repose. When tight sheeting or sheet piling is used, full loading due to ground water table shall be assumed, unless prevented by weep holes or drains or other means. Additional stringers, ties, and bracing shall be provided to allow for any necessary temporary removal of individual supports.

(g) All slopes shall be excavated to at least the angle of repose except for areas where solid rock allows for line drilling or presplitting.

(h) The angle of repose shall be flattened when an excavation has water conditions, silty materials, loose boulders, and areas where erosion, deep frost action, and slide planes appear.

(i) (1) In excavations which employees may be required to enter, excavated or other material shall be effectively stored and retained at least 2 feet or more from the edge of the excavation.

(2) As an alternative to the clearance prescribed in subparagraph (1) of this paragraph, the employer may use effective barriers or other effective retaining devices in lieu thereof in order to prevent excavated or other materials from falling into the excavation.

(j) Sides, slopes, and faces of all excavations shall meet accepted engineering requirements by scaling, benching, barricading, rock bolting, wire meshing, or other equally effective means. Special at-

attention shall be given to slopes which may be adversely affected by weather or moisture content.

(k) Support systems shall be planned and designed by a qualified person when excavation is in excess of 20 feet in depth, adjacent to structures or improvements, or subject to vibration or ground water.

(l) Materials used for sheeting, sheet piling, cribbing, bracing, shoring, and underpinning shall be in good serviceable condition, and timbers shall be sound, free from large or loose knots, and of proper dimensions.

(m) Special precautions shall be taken in sloping or shoring the sides of excavations adjacent to a previously backfilled excavation or a fill, particularly when the separation is less than the depth of the excavation. Particular attention also shall be paid to joints and seams of material comprising a face and the slope of such seams and joints.

(n) Except in hard rock, excavations below the level of the base of footing of any foundation or retaining wall shall not be permitted, unless the wall is underpinned and all other precautions taken to insure the stability of the adjacent walls for the protection of employees involved in excavation work or in the vicinity thereof.

(o) If the stability of adjoining buildings or walls is endangered by excavations, shoring, bracing, or underpinning shall be provided as necessary to insure their safety. Such shoring, bracing, or underpinning shall be inspected daily or more often, as conditions warrant, by a competent person and the protection effectively maintained.

(p) Diversion ditches, dikes, or other suitable means shall be used to prevent surface water from entering an excavation and to provide adequate drainage of the area adjacent to the excavation. Water shall not be allowed to accumulate in an excavation.

(q) If it is necessary to place or operate power shovels, derricks, trucks, materials, or other heavy objects on a level above and near an excavation, the side of the excavation shall be sheet-piled, shored, and braced as necessary to resist the extra pressure due to such superimposed loads.

(r) Blasting and the use of explosives shall be performed in accordance with Subpart U of this part.

(s) When mobile equipment is utilized or allowed adjacent to excavations, substantial stop logs or barricades shall be installed. If possible, the grade should be away from the excavation.

(t) Adequate barrier physical protection shall be provided at all remotely located excavations. All wells, pits, shafts, etc., shall be barricaded or covered. Upon completion of exploration and similar operations, temporary wells, pits, shafts, etc., shall be back filled.

(u) If possible, dust conditions shall be kept to a minimum by the use of water, salt, calcium chloride, oil, or other means.

(v) In locations where oxygen deficiency or gaseous conditions are possible, air in the excavation shall be tested. Controls, as set forth in Subparts D and E of this part, shall be established to assure acceptable atmospheric conditions. When flammable gases are present, adequate ventilation shall be provided or sources of ignition shall be eliminated. Attended emergency rescue equipment, such as breathing apparatus, a safety harness and line, basket stretcher, etc., shall be readily available where adverse atmospheric conditions may exist or develop in an excavation.

(w) Where employees or equipment are required or permitted to cross over excavations, walkways or bridges with standard guard-rails shall be provided.

(x) Where ramps are used for employees or equipment, they shall be designed and constructed by qualified persons in accordance with accepted engineering requirements.

(y) All ladders used on excavation operations shall be in accordance with the requirements of Subpart L of this part.

1928.652—Specific trenching requirements.

(a) Banks more than 5 feet high shall be shored, laid back to a stable slope, or some other equivalent means of protection shall be provided where employees may be exposed to moving ground or cave-ins. Refer to Table P-1 as a guide in sloping of banks. Trenches less than 5 feet in depth shall also be effectively protected when examination of the ground indicates hazardous ground movement may be expected.

(b) Sides of trenches in unstable or soft material, 5 feet or more in depth, shall be shored, sheeted, braced, sloped, or otherwise supported by means of sufficient strength to protect the employees working within them. See Tables P-1, P-2 (following paragraph (1) of this section).

(c) Sides of trenches in hard or compact soil, including embankments, shall be shored or otherwise supported when the trench is more than 5 feet in depth and 8 feet or more in length. In lieu of shoring, the sides of the trench above the 5-foot level may be sloped to preclude collapse, but shall not be steeper than a 1-foot rise to each 1/2-foot horizontal. When the outside diameter of a pipe is greater than 6 feet, a bench of 4-foot minimum shall be provided at the toe of the sloped portion.

(d) Materials used for sheeting and sheet piling, bracing, shoring, and underpinning, shall be in good serviceable condition, and timbers used shall be sound and free from large or loose knots, and

shall be designed and installed so as to be effective to the bottom of the excavation.

(e) Additional precautions by way of shoring and bracing shall be taken to prevent slides or cave-ins when excavations or trenches are made in locations adjacent to backfilled excavations, or where excavations are subjected to vibrations from railroad or highway traffic, the operation of machinery, or any other source.

(f) Employees entering bell-bottom pier holes shall be protected by the installation of a removable-type casing of sufficient strength to resist shifting of the surrounding earth. Such temporary protection shall be provided for the full depth of that part of each pier hole which is above the bell. A lifeline, suitable for instant rescue and securely fastened to a shoulder harness, shall be worn by each employee entering the shafts. This lifeline shall be individually manned and separate from any line used to remove materials excavated from the bell footing.

(g) (1) Minimum requirements for trench timbering shall be in accordance with Table P-2.

(2) Braces and diagonal shores in a wood shoring system shall not be subjected to compressive stress in excess of values given by the following formula:

$$S = 1300 - \frac{20L}{D}$$

$$\text{Maximum ratio } \frac{L}{D} = 50$$

Where:

L = Length, unsupported, in inches.

D = Least side of the timber in inches.

S = Allowable stress in pounds per square inch of cross-section.

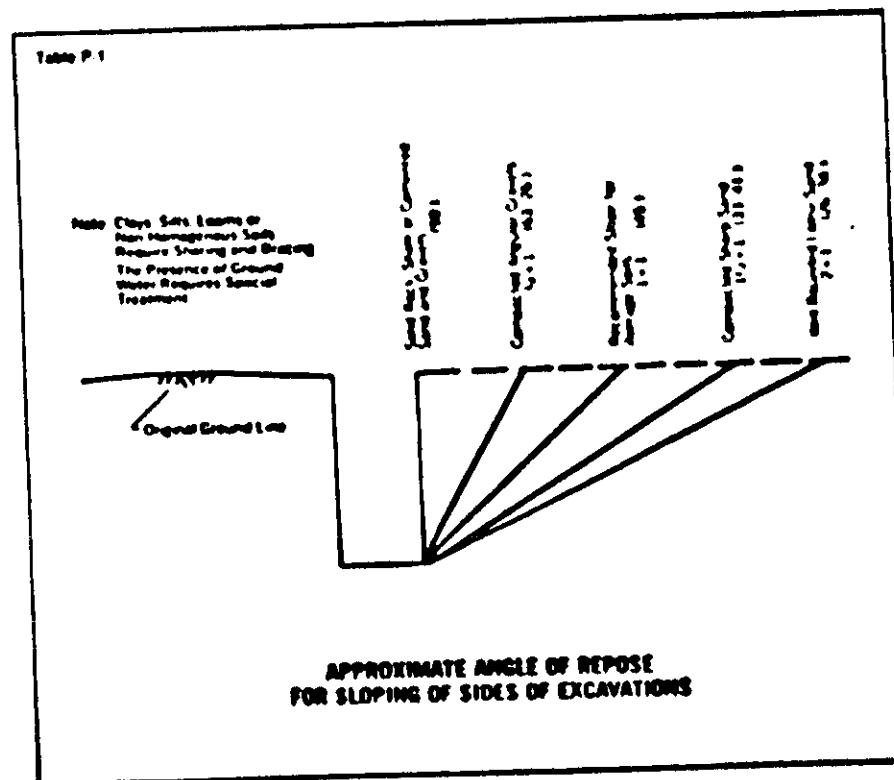
(h) When employees are required to be in trenches 4 feet deep or more, an adequate means of exit, such as a ladder or steps shall be provided and located so as to require no more than 25 feet of lateral travel.

(i) Bracing or shoring of trenches shall be carried along with the excavation.

(j) Cross braces or trench jacks shall be placed in true horizontal position, be spaced vertically, and be secured to prevent sliding, falling, or kickouts.

(k) Portable trench boxes or sliding trench shields may be used for the protection of personnel in lieu of a shoring system or sloping. Where such trench boxes or shields are used, they shall be designed, constructed, and maintained in a manner which will provide protection equal to or greater than the sheeting or shoring required for the trench.

(l) Backfilling and removal of trench supports shall progress together from the bottom of the trench. Jacks or braces shall be released slowly and, in unstable soil, ropes shall be used to pull out the jacks or braces from above after employees have cleared the trench.



1926.853—Definitions applicable to this subpart.

- (a) "Accepted engineering requirements (or practices)"—Those requirements or practices which are compatible with standards required by a registered architect, a registered professional engineer, or other duly licensed or recognized authority.
- (b) "Angle of repose"—The greatest angle above the horizontal plane at which a material will lie without sliding.
- (c) "Bank"—A mass of soil rising above a digging level.
- (d) "Belled excavation"—A part of a shaft or footing excavation, usually near the bottom and bell-shaped; i.e., an enlargement of the cross section above.
- (e) "Braces (trench)"—The horizontal members of the shoring system whose ends bear against the uprights or stringers.
- (f) "Excavation"—Any manmade cavity or depression in the earth's surface, including its sides, walls, or faces, formed by earth removal and producing unsupported earth conditions by reasons of the excavation. If installed forms or similar structures reduce the depth-to-width relationship, an excavation may become a trench.
- (g) "Faces"—See paragraph (k) of this section.
- (h) "Hard compact soil"—All earth materials not classified as running or unstable.
- (i) "Kickouts"—Accidental release or failure of a shore or brace.
- (j) "Sheet pile"—A pile, or sheeting, that may form one of a continuous interlocking line, or a row of timber, concrete, or steel piles, driven in close contact to provide a tight wall to resist the lateral pressure of water, adjacent earth, or other materials.
- (k) "Sides," "Walls," or "Faces"—The vertical or inclined earth surfaces formed as a result of excavation work.
- (l) "Slope"—The angle with the horizontal at which a particular earth material will stand indefinitely without movement.
- (m) "Stringers" (wales)—The horizontal members of a shoring system whose sides bear against the uprights or earth.
- (n) "Trench"—A narrow excavation made below the surface of the ground. In general, the depth is greater than the width, but the width of a trench is not greater than 15 feet.
- (o) "Trench jack"—Screw or hydraulic type jacks used as cross bracing in a trench shoring system.
- (p) "Trench shield"—A shoring system composed of steel plates and bracing, welded or bolted together, which support the walls of a trench from the ground level to the trench bottom and which can be moved along as work progresses.

TABLE P-2
TRENCH SHORING—MINIMUM REQUIREMENTS

Depth of trench	Kind or condition of earth	Uprights		Stringers		Cross bracing				Minimum spacing		
		Maximum Maximum dimension spacing	Minimum dimension	Maximum Maximum dimension spacing	Minimum dimension	Up to 3 feet depth	3 to 6 feet depth	6 to 9 feet depth	9 to 12 feet depth	12 to 15 feet depth	Vertical members	
Foot	Hard compact	3.0 or 2.0	4	3.0	4	2.0	2.0	2.0	2.0	2.0	4	4
	Loose to cobbles	3.0 or 2.0	3	2.0	4	2.0	2.0	2.0	2.0	2.0	4	4
5 to 10	Hard compact	3.0 or 2.0	4	2.0	4	2.0	2.0	2.0	2.0	2.0	4	4
	Loose to cobbles	3.0 or 2.0	3	2.0	4	2.0	2.0	2.0	2.0	2.0	4	4
15 to 20	Hard compact	3.0 or 2.0	4	2.0	4	2.0	2.0	2.0	2.0	2.0	4	4
	Loose to cobbles	3.0 or 2.0	3	2.0	4	2.0	2.0	2.0	2.0	2.0	4	4
20 to 25	Hard compact	3.0 or 2.0	4	2.0	4	2.0	2.0	2.0	2.0	2.0	4	4
	Loose to cobbles	3.0 or 2.0	3	2.0	4	2.0	2.0	2.0	2.0	2.0	4	4
25 to 30	Hard compact	3.0 or 2.0	4	2.0	4	2.0	2.0	2.0	2.0	2.0	4	4
	Loose to cobbles	3.0 or 2.0	3	2.0	4	2.0	2.0	2.0	2.0	2.0	4	4
30 to 35	Hard compact	3.0 or 2.0	4	2.0	4	2.0	2.0	2.0	2.0	2.0	4	4
	Loose to cobbles	3.0 or 2.0	3	2.0	4	2.0	2.0	2.0	2.0	2.0	4	4
35 to 40	Hard compact	3.0 or 2.0	4	2.0	4	2.0	2.0	2.0	2.0	2.0	4	4
	Loose to cobbles	3.0 or 2.0	3	2.0	4	2.0	2.0	2.0	2.0	2.0	4	4
40 to 45	Hard compact	3.0 or 2.0	4	2.0	4	2.0	2.0	2.0	2.0	2.0	4	4
	Loose to cobbles	3.0 or 2.0	3	2.0	4	2.0	2.0	2.0	2.0	2.0	4	4
45 to 50	Hard compact	3.0 or 2.0	4	2.0	4	2.0	2.0	2.0	2.0	2.0	4	4
	Loose to cobbles	3.0 or 2.0	3	2.0	4	2.0	2.0	2.0	2.0	2.0	4	4
50 to 55	Hard compact	3.0 or 2.0	4	2.0	4	2.0	2.0	2.0	2.0	2.0	4	4
	Loose to cobbles	3.0 or 2.0	3	2.0	4	2.0	2.0	2.0	2.0	2.0	4	4
55 to 60	Hard compact	3.0 or 2.0	4	2.0	4	2.0	2.0	2.0	2.0	2.0	4	4
	Loose to cobbles	3.0 or 2.0	3	2.0	4	2.0	2.0	2.0	2.0	2.0	4	4
60 to 65	Hard compact	3.0 or 2.0	4	2.0	4	2.0	2.0	2.0	2.0	2.0	4	4
	Loose to cobbles	3.0 or 2.0	3	2.0	4	2.0	2.0	2.0	2.0	2.0	4	4
65 to 70	Hard compact	3.0 or 2.0	4	2.0	4	2.0	2.0	2.0	2.0	2.0	4	4
	Loose to cobbles	3.0 or 2.0	3	2.0	4	2.0	2.0	2.0	2.0	2.0	4	4
70 to 75	Hard compact	3.0 or 2.0	4	2.0	4	2.0	2.0	2.0	2.0	2.0	4	4
	Loose to cobbles	3.0 or 2.0	3	2.0	4	2.0	2.0	2.0	2.0	2.0	4	4
75 to 80	Hard compact	3.0 or 2.0	4	2.0	4	2.0	2.0	2.0	2.0	2.0	4	4
	Loose to cobbles	3.0 or 2.0	3	2.0	4	2.0	2.0	2.0	2.0	2.0	4	4
80 to 85	Hard compact	3.0 or 2.0	4	2.0	4	2.0	2.0	2.0	2.0	2.0	4	4
	Loose to cobbles	3.0 or 2.0	3	2.0	4	2.0	2.0	2.0	2.0	2.0	4	4
85 to 90	Hard compact	3.0 or 2.0	4	2.0	4	2.0	2.0	2.0	2.0	2.0	4	4
	Loose to cobbles	3.0 or 2.0	3	2.0	4	2.0	2.0	2.0	2.0	2.0	4	4
90 to 95	Hard compact	3.0 or 2.0	4	2.0	4	2.0	2.0	2.0	2.0	2.0	4	4
	Loose to cobbles	3.0 or 2.0	3	2.0	4	2.0	2.0	2.0	2.0	2.0	4	4
95 to 100	Hard compact	3.0 or 2.0	4	2.0	4	2.0	2.0	2.0	2.0	2.0	4	4
	Loose to cobbles	3.0 or 2.0	3	2.0	4	2.0	2.0	2.0	2.0	2.0	4	4
100 to 105	Hard compact	3.0 or 2.0	4	2.0	4	2.0	2.0	2.0	2.0	2.0	4	4
	Loose to cobbles	3.0 or 2.0	3	2.0	4	2.0	2.0	2.0	2.0	2.0	4	4
105 to 110	Hard compact	3.0 or 2.0	4	2.0	4	2.0	2.0	2.0	2.0	2.0	4	4
	Loose to cobbles	3.0 or 2.0	3	2.0	4	2.0	2.0	2.0	2.0	2.0	4	4
110 to 115	Hard compact	3.0 or 2.0	4	2.0	4	2.0	2.0	2.0	2.0	2.0	4	4
	Loose to cobbles	3.0 or 2.0	3	2.0	4	2.0	2.0	2.0	2.0	2.0	4	4
115 to 120	Hard compact	3.0 or 2.0	4	2.0	4	2.0	2.0	2.0	2.0	2.0	4	4
	Loose to cobbles	3.0 or 2.0	3	2.0	4	2.0	2.0	2.0	2.0	2.0	4	4
120 to 125	Hard compact	3.0 or 2.0	4	2.0	4	2.0	2.0	2.0	2.0	2.0	4	4
	Loose to cobbles	3.0 or 2.0	3	2.0	4	2.0	2.0	2.0	2.0	2.0	4	4
125 to 130	Hard compact	3.0 or 2.0	4	2.0	4	2.0	2.0	2.0	2.0	2.0	4	4
	Loose to cobbles	3.0 or 2.0	3	2.0	4	2.0	2.0	2.0	2.0	2.0	4	4
130 to 135	Hard compact	3.0 or 2.0	4	2.0	4	2.0	2.0	2.0	2.0	2.0	4	4
	Loose to cobbles	3.0 or 2.0	3	2.0	4	2.0	2.0	2.0	2.0	2.0	4	4
135 to 140	Hard compact	3.0 or 2.0	4	2.0	4	2.0	2.0	2.0	2.0	2.0	4	4
	Loose to cobbles	3.0 or 2.0	3	2.0	4	2.0	2.0	2.0	2.0	2.0	4	4
140 to 145	Hard compact	3.0 or 2.0	4	2.0	4	2.0	2.0	2.0	2.0	2.0	4	4
	Loose to cobbles	3.0 or 2.0	3	2.0	4	2.0	2.0	2.0	2.0	2.0	4	4
145 to 150	Hard compact	3.0 or 2.0	4	2.0	4	2.0	2.0	2.0	2.0	2.0	4	4
	Loose to cobbles	3.0 or 2.0	3	2.0	4	2.0	2.0	2.0	2.0	2.0	4	4
150 to 155	Hard compact	3.0 or 2.0	4	2.0	4	2.0	2.0	2.0	2.0	2.0	4	4
	Loose to cobbles	3.0 or 2.0	3	2.0	4	2.0	2.0	2.0	2.0	2.0	4	4
155 to 160	Hard compact	3.0 or 2.0	4	2.0	4	2.0	2.0	2.0	2.0	2.0	4	4
	Loose to cobbles	3.0 or 2.0	3	2.0	4	2.0	2.0	2.0	2.0	2.0	4	4
160 to 165	Hard compact	3.0 or 2.0	4	2.0	4	2.0	2.0	2.0	2.0	2.0	4	4
	Loose to cobbles	3.0 or 2.0	3	2.0	4	2.0	2.0	2.0	2.0	2.0	4	4
165 to 170	Hard compact	3.0 or 2.0	4	2.0	4	2.0	2.0	2.0	2.0	2.0	4	4
	Loose to cobbles	3.0 or 2.0	3	2.0	4	2.0	2.0	2.0	2.0	2.0	4	4
170 to 175	Hard compact	3.0 or 2.0	4	2.0	4	2.0	2.0	2.0	2.0	2.0	4	4
	Loose to cobbles	3.0 or 2.0	3	2.0	4	2.0	2.0	2.0	2.0	2.0	4	4
175 to 180	Hard compact	3.0 or 2.0	4	2.0	4	2.0	2.0	2.0	2.0	2.0	4	4
	Loose to cobbles	3.0 or 2.0	3	2.0	4	2.0	2.0	2.0	2.0	2.0	4	4
180 to 185	Hard compact	3.0 or 2.0	4	2.0	4	2.0	2.0	2.0	2.0	2.0	4	4
	Loose to cobbles	3.0 or 2.0	3	2.0	4	2.0	2.0	2.0	2.0	2.0	4	4
185 to 190	Hard compact	3.0 or 2.0	4	2.0	4	2.0	2.0	2.0	2.0	2.0	4	4
	Loose to cobbles	3.0 or 2.0	3	2.0	4	2.0	2.0	2.0	2.0	2.0	4	4
190 to 195	Hard compact	3.0 or 2.0	4	2.0	4	2.0	2.0	2.0	2.0	2.0	4	4
	Loose to cobbles	3.0 or 2.0	3	2.0	4	2.0	2.0	2.0	2.0	2.0	4	4
195 to 200	Hard compact	3.0 or 2.0	4	2.0	4	2.0	2.0	2.0	2.0	2.0	4	4
	Loose to cobbles	3.0 or 2.0	3	2.0	4	2.0	2.0	2.0	2.0	2.0	4	4

*Trench jacks may be used in lieu of or in combination with cross bracing. Spacing is not required in sand, rock, hard loam or hard clay. Shoring shall be used where shoring and trenching of equal strength may be substituted for same.

(q) "Unstable soil"—Earth material, other than running, that because of its nature or the influence of related conditions, cannot be depended upon to remain in place without extra support, such as would be furnished by a system of shoring.

(r) "Uprights"—The vertical members of a shoring system.

(s) "Wales"—See paragraph (m) of this section.

(t) "Walls"—See paragraph (k) of this section.

OSHA RELATED PUBLICATIONS

The following related publications may be obtained from:

The United States Department of Labor - OSHA
OSHA Publications Distribution - Room S-4203
Washington, D.C. 20210

Consultation Services for the Employer (OSHA 3047)
All About OSHA (OSHA 2058)
Ground-Fault Protection on Construction Sites (OSHA 3007)
Construction Industry Digest (OSHA 2207)
OSHA: Safety and Health is our Middle Name (OSHA 3078)

U.S. Department of Labor Occupational Safety and Health Administration Regional Offices

Region I
(CT*, MA, ME, NH, RI VT*)
16 18 North Street
1 Dock Square Building
4th Floor
Boston, MA 02109
Telephone (617) 223-6710

Region II
(NJ, NY*, Puerto Rico*, Virgin
Islands*)
1 Astor Plaza Room 3445
1515 Broadway
New York NY 10036
Telephone: (212) 944-3432

Region III
(DC, DE, MD*, PA, VA*, WV)
Gateway Building, Suite 2100
3535 Market Street
Philadelphia PA 19104
Telephone (215) 596-1201

Region IV
(AL, FL, GA, KY*, MS, NC*, SC*,
TN*)
1375 Peachtree Street N E
Suite 587
Atlanta GA 30367
Telephone (404) 347-4495

Region V
(IL, IN*, MI*, MN*, OH, WI)
230 South Dearborn Street
32nd Floor, Room 3244
Chicago, IL 60604
Telephone (312) 353-2220

Region VI
(AR, LA, NM*, OK, TX)
525 Griffin Square Building, Room 602
Dallas, TX 75202
Telephone (214) 767-4731

Region VII
(IA*, KS, MO, NE)
911 Walnut Street Room 408
Kansas City MO 64106
Telephone (816) 374-5861

Region VIII
(CO, MT, ND, SD, UT*, WY*)
Federal Building Room 1554
1961 Stout Street
Denver CO 80294
Telephone (303) 844-3061

Region IX
(American Samoa, AZ*, CA*, Guam,
HI*, NV*, Pacific Trust Territories)
PO Box 36017
450 Golden Gate Avenue
San Francisco, CA 94102
Telephone (415) 556-7260

Region X
(AK*, ID, OR*, WA*)
Federal Office Building
Room 6003
509 First Avenue
Seattle, WA 98174
Telephone (206) 442-5930

* These states and territories operate their own OSHA-approved job safety and health programs (except Connecticut and New York whose plans cover public employees only).

Site or Project Name _____ Project No. _____ Date: _____

Person(s) Collecting Data _____

General Operation and Location at Site _____

Instrument Type, Make, Model _____

Instrument Serial or ID No. _____ Battery Check Results _____

Date of Last Calibration or Check _____ Date of Last Service _____

Contaminant(s) Suspected _____

	Specific Location	Specific Operation or Work Phase	Employee Name If Breathing Zone Monitored	Time	Reading	Comments (e.g., duration, causation of reading)
1.						
2.						
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						

General Comments: _____

Signature of Person Responsible for Data: _____ Date Signed _____

HEALTH AND SAFETY COMPLIANCE AGREEMENT

I, the undersigned, have received a copy of the health and safety plan for the project identified below. I have read the plan, understand it, and agree to comply with all of the health and safety requirements therein. I understand that I may be prohibited from continuing work on the project for failing to comply.

I have have not (check one) been briefed by a project safety authority on the health and safety requirements of the project.

Project No. _____

Project Title _____

Date of Plan _____

Print Name

Signature

Firm

Date

JOB SAFETY & HEALTH PROTECTION

The Occupational Safety and Health Act of 1970 provides job safety and health protection for workers by promoting safe and healthful working conditions throughout the Nation. Requirements of the Act include the following:

Employers

All employers must furnish to employees employment and a place of employment free from recognized hazards that are causing or are likely to cause death or serious harm to employees. Employers must comply with occupational safety and health standards issued under the Act.

Employees

Employees must comply with all occupational safety and health standards, rules, regulations, and orders issued under the Act that apply to their own actions and conduct on the job.

The Occupational Safety and Health Administration (OSHA) of the U.S. Department of Labor has the primary responsibility for administering the Act. OSHA issues occupational safety and health standards, and its Compliance Safety and Health Officers conduct jobsite inspections to help ensure compliance with the Act.

Inspection

The Act requires that a representative of the employer and a representative authorized by the employees be given an opportunity to accompany the OSHA inspector for the purpose of aiding the inspection.

Where there is no authorized employee representative, the OSHA Compliance Officer must consult with a reasonable number of employees concerning safety and health conditions in the workplace.

Complaint

Employees or their representatives have the right to file a complaint with the nearest OSHA office requesting an inspection if they believe unsafe or unhealthy conditions exist in their workplace. OSHA will withhold on request names of employees complaining.

The Act provides that employees may not be discharged or discriminated against in any way for filing safety and health complaints or for otherwise exercising their rights under the Act.

Employees who believe they have been discriminated against may file a complaint with their nearest OSHA office within 30 days of the alleged discrimination.

Citation

If upon inspection OSHA believes an employer has violated the Act, a citation alleging such violations will be issued to the employer. Each

citation will specify a time period within which the alleged violation must be corrected.

The OSHA citation must be prominently displayed at or near the place of alleged violation for three days or until it is corrected, whichever is later, to warn employees of dangers that may exist there.

Proposed Penalty

The Act provides for mandatory penalties against employers of up to \$1,000 for each serious violation and for optional penalties of up to \$1,000 for each nonserious violation. Penalties of up to \$1,000 per day may be proposed for failure to correct violations within the proposed time period. Also, any employer who willfully or repeatedly violates the Act may be assessed penalties of up to \$10,000 for each such violation.

Criminal penalties are also provided for in the Act. Any willful violation resulting in death of an employee upon conviction, is punishable by a fine of not more than \$10,000 or by imprisonment for not more than six months, or by both. Conviction of an employer after a first conviction doubles these maximum penalties.

Voluntary Activity

While providing penalties for violations, the Act also encourages efforts by labor and management, before an OSHA inspection, to reduce workplace hazards voluntarily and to develop and improve safety and health programs in all workplaces and industries. OSHA's Voluntary Protection Programs recognize outstanding efforts of this nature.

Such voluntary action should initially focus on the identification and elimination of hazards that could cause death, injury or illness to employees and supervisors. There are many public and private organizations that can provide information and assistance in this effort, if requested. Also, your local OSHA office can provide considerable help and advice on solving safety and health problems or can refer you to other sources for help, such as training.

Consultation

Free consultative assistance, without citation or penalty, is available to employers on request through OSHA supported programs in most State departments of labor or health.

More Information

Additional information and copies of the Act, specific OSHA safety and health standards, and other applicable regulations may be obtained from your employer or from the nearest OSHA Regional Office in the following locations:

Atlanta, Georgia
Boston, Massachusetts
Chicago, Illinois
Dallas, Texas
Denver, Colorado
Kansas City, Missouri
New York, New York
Philadelphia, Pennsylvania
San Francisco, California
Seattle, Washington

Telephone numbers for these offices and additional area office locations are listed in the telephone directory under the United States Department of Labor in the United States Government listing.

Washington, D.C.
1985
OSHA 2203



William E. Brock

William E. Brock, Secretary of Labor

U.S. Department of Labor
Occupational Safety and Health Administration

SAFETY AND HEALTH PROTECTION ON THE JOB



State of California
Department of Industrial Relations

The California Occupational Safety and Health Act of 1973 provides job safety and health protection for workers. The Department of Industrial Relations has primary responsibility for administering the Cal/OSHA program. Job safety and health standards are promulgated by the Occupational Safety and Health Standards Board. Employers and employees are required to comply with these standards. Enforcement is carried out by the Division of Occupational Safety and Health within the Department of Industrial Relations.

EMPLOYERS AND EMPLOYEES

California law requires every employer to provide employment and a place of employment which are safe and healthful for the employees therein. Employers and employees are required to comply with the occupational safety and health standards contained in Title 8 of the California Code of Regulations and all rules, regulations and orders pursuant to Division 5 of the California Labor Code which are applicable to their employment and actions on the job.

COMPLIANCE WITH JOB SAFETY AND HEALTH REQUIREMENTS

To ensure compliance with State job safety and health requirements, the Division of Occupational Safety and Health conducts periodic jobsite inspections. The inspections are made by trained safety engineers and industrial hygienists.

The law provides that an authorized representative of the employer and a representative of the employees be given an opportunity to accompany the safety engineer/industrial hygienist for the purpose of aiding the inspection. Where there is no authorized employee representative, the safety engineer/industrial hygienist talks with a reasonable number of employees about the safety and health conditions in the workplace.

Every employee has the right to bring unsafe or unhealthful conditions to the attention of the safety engineer/industrial hygienist making the inspection. In addition, any employee who believes unsafe or unhealthful conditions exist at the worksite has the right to notify the Division of Occupational Safety and Health. The Division upon request will withhold the names of employees who submit or make statements during an inspection or investigation.

If the Division of Occupational Safety and Health believes that an employer has violated a safety and health standard or order, it issues a citation to the employer. Each citation specifies a date by which the alleged violation must be corrected. The law provides for mandatory penalties against employers of up to \$2,000 for each serious violation and for optional penalties of up to \$1,000 for each general violation. Penalties of up to \$2,000 per day may be proposed for failure to correct serious violations and up to \$1,000 per day may be proposed for failure to correct general violations by the abatement date. Also, any employer who willfully or repeatedly violates any occupational safety and health standard or order may be assessed civil penalties of not more than \$21,000 for serious violations and \$10,000 for general violations.

A willful violation that causes death or permanent impairment of the body of any employee results, upon conviction, in a fine of not more than \$10,000 or imprisonment of not more than six months, or both. A second conviction after a first conviction doubles these maximum penalties.

While governmental entities may be cited on the same basis as other employers and abatement dates set, civil penalties will not be assessed.

An employer who receives a citation, Order to Take Special Action or Special Order must post prominently at or near the place of the violation for three working days, or until the unsafe condition is corrected, whichever is longer, to warn employees of danger that may exist there. Any employee may protest the time allowed for correction of the violation.

COMPLAINTS

Employees or their representatives who believe unsafe or unhealthful conditions exist in their workplace have the right to file a complaint with any office of the Division of Occupational Safety and Health and thereby to request an inspection. The Division keeps confidential the names of complainants unless they request otherwise.

An employee may not be fired or punished in any way for filing a complaint about unsafe or unhealthful working conditions or using any other right given to employees by the Cal/OSHA law. An employee of a private employer who believes that he/she has been fired or punished for exercising such rights may file a complaint about this discrimination with the nearest office of the Department of Industrial Relations - Division of Labor Standards Enforcement (State Labor Commissioner) or with the San Francisco office of the U.S. Department of Labor, Occupational Safety and Health Administration. Employees of state or local government agencies may file discrimination complaints only with the State Labor Commissioner. Consult your local telephone directory for the office nearest you.

OTHER EMPLOYEE RIGHTS

Any employee has the right to refuse to perform work which would violate the Cal/OSHA Act or any occupational safety or health standard or order where such violation would create a real and apparent hazard to the employee or other employees.

Employers who use any substance listed as a hazardous substance in Section 339 of Title 8 of the California Code of Regulations or subject to the Federal Hazard Communication Standard (29 CFR 1910.1200) must provide employees with information on the contents of material safety data sheets (MSDS) or equivalent information about the substance which trains employees to use the substance safely.

Employers shall make available on a timely and reasonable basis a material safety data sheet on each hazardous substance in the workplace upon request of an employee, collective bargaining representative, or an employee's physician.

Employees have the right to see and copy their medical records and accurate records of employee exposure to potentially toxic materials or harmful physical agents.

Any employee has the right to observe monitoring or measuring of employee exposure to hazards conducted pursuant to Cal/OSHA standards. Employers must let their employees when they are being or have been exposed to concentrations of harmful substances higher than the exposure limits allowed by Cal/OSHA standards and the corrective action being taken.

For information and assistance, contact the nearest office of the Division of Occupational Safety and Health. See addresses below.

The law requires each employer in California to post this poster conspicuously in each workplace.

CONSULTATION SERVICE

In order to encourage voluntary compliance, Cal/OSHA provides free, upon request, a full range of occupational safety and health consulting services. The Cal/OSHA Consultation Service is separate from Cal/OSHA enforcement activities.

OFFICES OF THE DIVISION OF OCCUPATIONAL SAFETY AND HEALTH

HEADQUARTERS: San Francisco 525 Golden Gate Ave. 94102 (415) 557-1946

Regional Offices

Los Angeles	6150 Van Nuys Blvd. Ste 310 Van Nuys 91401	(818) 901-5422
Sacramento	2422 Arden Way, Suite B 55 95825	(916) 920-6127
San Francisco	455 Golden Gate Ave. Room 1171 94102	(415) 557-8640
Santa Ana	28 Civic Center Plaza 92701	(714) 558-4476

Van Nuys	6150 Van Nuys Blvd. Suite 405 91401	(818) 901-5403
Ventura	5720 Ralston St. Rm 203 93003	(818) 654-4561
Vernon	8535 E. Florence Ave. Ste 200, Downey 90240	(213) 923-3006 (213) 862-3992

District Offices

Berkeley	4800 Stockdale Highway, Suite 212 94709	(805) 395-2718
Berkeley/Oakland	1111 Jackson Street, Room 1005, Oakland 94607	(415) 464-1177
Concord	1981 No. Broadway 9230 Walnut Creek 94596	(415) 876-5333
Covina	1317 W. Foothill Blvd. First Floor Upland 91786	(714) 985-2250
Fresno	2550 Mariposa St. Room 4000 93721	(209) 445-5302
Long Beach	245 West Broadway, Suite 245 90802	(213) 590-5069
Los Angeles	3550 West Sixth St., Room 431 90020	(213) 252-7829
Modesto	31 E. Channel St., Room 418 Stockton 95202	(209) 576-8260
Redding	2135 Alard Ave. Room 10 96001	(916) 225-2886
Sacramento	2422 Arden Way, Suite B 55 95825	(916) 920-6123
San Bernardino	303 West Third St. Room 640 92401	(714) 983-4321
San Diego	7807 Convey Court, Suite 150 92111	(619) 237-7325
San Francisco	455 Golden Gate Ave. Room 1193 94102	(415) 557-1677
San Jose	828 South Bascom Ave. Suite 120 95128	(408) 277-1260
San Mateo	455 Golden Gate Ave. Rm 300 San Fran 94102	(415) 557-1677
Santa Ana	28 Civic Center Plaza, Room 552 92701	(714) 558-4141
Santa Fe Spgs	8535 E. Florence Ave. Ste 200 Downey 90240	(213) 869-8855
Santa Rosa	50 "D" St. Suite 430 95404	(707) 576-2388

Field Offices

Chico	2135 Alard Ave., Room 10 Redding 96001	(916) 225-2886
Eureka	619 Second St. Room 109 95501	(707) 445-6611
Salinas	828 So. Bascom Ave. Ste 120, San Jose 95128	(408) 443-3050
Stockton	31 E. Channel St. Room 418 95202	(209) 948-7762
Ukiah	50 "D" Street, Ste 430, Santa Rosa 95404	(707) 576-2388

* Denotes temporary location.

CAL/OSHA CONSULTATION SERVICE

Headquarters: 525 Golden Gate Ave., 2nd Fl., San Francisco 94102 (415) 557-2870

Area Offices

Downey	8535 E. Florence Ave., Suite 200 90240	(213) 861-8993
Fresno	1801 N. Gateway, Suite 102 93727	(209) 445-5072
Sacramento	2422 Arden Way, Suite D-80 95825	(916) 920-6131
San Diego	7807 Convey Court, Suite 140 92111	(619) 279-3771
San Francisco	350 McAllister St., Room 2003 94102	(415) 557-1715

Persons wishing to register a complaint alleging inadequacy of the administrator of the California Occupational Safety and Health Plan may do so by contacting the San Francisco Regional Office of the Occupational Safety and Health Administration (OSHA), U.S. Department of Labor (Tel: 415/995-5672). OSHA monitors the operation of State plans to assure that continued approval is merited.

TO ALL EMPLOYERS OF CALIFORNIA EMPLOYEES: Section 6408(a) of the California Labor Code requires that information shall be posted regarding protections and obligations of employees under the occupational safety and health laws. This poster meets that requirement and must be prominently posted in all places of employment in the state of California. Section 6403 of the California Labor Code provides that any employer who violates any of the posting requirements of Section 6408 of the California Labor Code shall be assessed a civil penalty of up to one thousand dollars (\$1,000) for each violation.

HEALTH AND SAFETY EQUIPMENT CHECKLIST

Project Name: _____

Project Number: _____

The checked items shall be present on site:

- | | |
|--|--|
| <input type="checkbox"/> Eye Protection | <input type="checkbox"/> HNu |
| <input type="checkbox"/> Hard Hat | <input type="checkbox"/> OVA |
| <input type="checkbox"/> Safety Shoes/Boots | <input type="checkbox"/> Combustible Gas Meter |
| <input type="checkbox"/> Hearing Protection | <input type="checkbox"/> Sensidyne or Draeger Tubes and Pump |
| <input type="checkbox"/> First Aid Kit | <input type="checkbox"/> Specify: _____ |
| <input type="checkbox"/> Eye Wash | <input type="checkbox"/> Barricades/Pylons |
| <input type="checkbox"/> Fire Extinguisher | <input type="checkbox"/> Barricade Tape |
| <input type="checkbox"/> Splash Shield | <input type="checkbox"/> "Authorized Personnel Only" signs |
| <input type="checkbox"/> Splash Apron | <input type="checkbox"/> Latex Gloves |
| <input type="checkbox"/> Dust Mask | <input type="checkbox"/> Nitrile Gloves |
| <input type="checkbox"/> Respirator (Half-face APR) | <input type="checkbox"/> Neoprene Gloves |
| <input type="checkbox"/> Respirator (Full-face APR) | <input type="checkbox"/> Leather Gloves |
| <input type="checkbox"/> Airline System | <input type="checkbox"/> Uncoated Tyvek |
| <input type="checkbox"/> SCBA | <input type="checkbox"/> Poly laminated Tyvek |
| <input type="checkbox"/> Cartridges | <input type="checkbox"/> Saranex coated Tyvek |
| <input type="checkbox"/> Organic Vapor (color coded black) | <input type="checkbox"/> Boot Covers |
| <input type="checkbox"/> Acid Gases and Organic Vapor (color coded yellow) | <input type="checkbox"/> Duct Tape |
| <input type="checkbox"/> Dust and Mists (filter pad with cover) | |
| <input type="checkbox"/> HEPA (color coded purple) | |
| <input type="checkbox"/> Combination- Acid gas, organic vapor and HEPA (color coded yellow/purple) | |
| <input type="checkbox"/> Other Specify: _____ | |
| <input type="checkbox"/> Decontamination Equipment (See Operating Procedure HS-512) | |
| <input type="checkbox"/> Buckets | <input type="checkbox"/> Plastic Sheeting |
| <input type="checkbox"/> Scrub Brushes | <input type="checkbox"/> Paper Towels |
| <input type="checkbox"/> Detergent (Alconox) | <input type="checkbox"/> Hand Soap |

500 12th Street
Suite 100
Oakland, CA 94607-4014
(415) 893-3600

Woodward-Clyde Consultants

June 29, 1988

Project: 8810026A/3000

RECEIVED

JUN 30 1988


BRAMALEA PACIFIC

Bramalea Pacific
1221 Broadway, Suite 1800
Oakland, California 94612

Attention: Mr. Craig D. Scheidt

Subject: Reporting Requirements

Dear Craig:

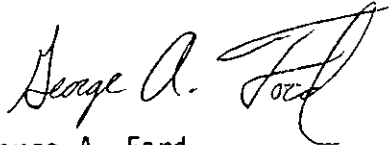
We have recently received chemical analytical data indicating that a groundwater sample taken from beneath the center portion of the Five City Center parcel contains about 400 parts per billion Total Petroleum Hydrocarbons as gasoline. 

Based on the "Guidelines for Addressing Fuel Leaks" (September 1985, California Regional Water Quality Control Board, San Francisco Bay Region), the owner or operator of a property where hydrocarbon contamination of groundwater is discovered should notify the Regional Board and the Alameda County Health Department by telephone as soon as possible, followed by written notification within five days.

Based on the limited data presently available, we have no reason to suspect an on-site source of hydrocarbon contamination. Woodward-Clyde Consultants will continue to assist you in defining the extent and amount of groundwater and/or soil contamination at the site. Please feel free to call me if you have any questions.

Sincerely,

WOODWARD-CLYDE CONSULTANTS



George A. Ford
Senior Project Geologist

GF/smp
8810026AL/COT

*This needs
a home*

Enclosure: Med-Tox Analytical Results



ENVIRONMENTAL & OCCUPATIONAL HEALTH SERVICES

3440 Vincent Road • Pleasant Hill, CA 94523 • (415) 930-9090

LABORATORY ANALYSIS REPORT

WOODWARD CLYDE CONSULTANTS
500 12TH STREET
SUITE 100
OAKLAND, CA 94607

ATTN: GEORGE FORD

CLIENT PROJECT NO: 8810021A

REPORT DATE: 06/21/88

DATE SAMPLED: 06/08/88

DATE RECEIVED: 06/09/88


DATE ANALYZED: 06/14/88

MED-TOX JOB NO: 8806051

ANALYSIS OF: TWO WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS,
CAM-17 METALS, AND GC/MS VOLATILE ORGANICS

METHOD: EPA 8015 (PURGE & TRAP)

Sample Identification		Total Petroleum Hydrocarbons As Gasoline (mg/L)
Client Id.	Lab No.	
8810021A-W1a	01A	ND
8810021A-W2	02A	0.4
Detection Limit		0.1


Michael J. Jaeger, Manager
Organic Laboratory

Results reported verbally to George Ford 06/17/88