



**SOIL MANAGEMENT PLAN  
333 TURNBULL CANYON ROAD  
CITY OF INDUSTRY, CALIFORNIA**

**PREPARED FOR:**

City of Industry  
15625 Eats Stafford Street, Suite 100  
City of Industry, California 91744

**PREPARED BY:**

Ardent Environmental Group, Inc.  
1141 Pomona Road, Suite E  
Corona, California 92882

December 5, 2011  
Project No. 100252002



December 5, 2011  
Project No. 100252002

Mr. Kevin Radecki  
City of Industry  
15625 East Stafford Street, Suite 100  
City of Industry, California 91744

Subject: Soil Management Plan  
333 Turnbull Canyon Road  
City of Industry, California

Dear Mr. Radecki:

Ardent Environmental Group, Inc. (Ardent) has prepared the enclosed Soil Management Plan for demolition activities at the property located at 333 East Turnbull Canyon Road in the City of Industry, California. We appreciate the opportunity to provide service on this project. Should you have any questions or comments, please contact me at your convenience.

Sincerely,  
**Ardent Environmental Group, Inc.**

A handwritten signature in cursive script that reads "Paul Roberts".

Paul A. Roberts, PG, REA I/II  
Principal Geologist

A handwritten signature in cursive script that reads "Craig A. Metheny".

Craig A. Metheny, REA, CAC  
Principal Geologist

PAR/CM/paw

Distribution: (1) Addressee

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## 1 INTRODUCTION

This Soil Management Plan (SMP) has been prepared to provide procedures and criteria to guide limited soil disturbances during demolition operations at the property located at 333 Turnbull Canyon Road in the City of Industry, California (site; Figure 1).

During acquisition of the site by the Industry Urban-Development Agency (Agency), Ardent Environmental Group, Inc. (Ardent) completed a Phase I Environmental Site Assessment (ESA) for the site (Ardent, 2010). The site is located within the San Gabriel Valley Groundwater Basin, portions of which have been included on the National Priority List (NPL), or Superfund Site. The site is located within the Puente Valley Operable Unit (PVOU) of the San Gabriel Valley Groundwater Basin. Portions of the PVOU are contaminated with volatile organic compounds (VOCs), namely the chlorinated solvents trichloroethene (TCE) and tetrachloroethylene (PCE), which were historically used by the commercial and industrial facilities located in this area. Calmar, Inc. (Calmar), a former occupant at the site, formerly used PCE in its operations. Based on the results of earlier investigations, PCE impacted soil and groundwater were discovered at the site. The area of impacted soil was assessed to be limited in the southwest corner of the site, within the former Waste Storage Area (Figure 2, referred to herein as the "Waste Storage Area"). Based on these findings, Calmar was named as one of many Potentially Responsible Parties (PRPs) for the regional groundwater issue by the Regional Water Quality Control Board, Los Angeles Region (RWQCB) and the EPA. After many investigations and remediation efforts, a no further action (NFA) letter for soil closure was issued by the RWQCB, although, groundwater closure is not expected in the near future. As part of the soil closure activities, a deed restriction was recorded on the site limiting land use to commercial purposes.

The City of Industry (City) is planning to raze the on-site building and ready the site for redevelopment. Because no grading activities are planned at this time, soil disturbances will be limited to the removal of building footings. With the exception of the known contaminants in the Waste Storage Area, there is a low likelihood, in our opinion, that areas of unknown contaminants might be encountered. This opinion is based on the extensive investigations previously completed at the site. However, based on the procedures presented in the deed restriction, a SMP

must be prepared and implemented if any soil disturbances are anticipated. This SMP was prepared for limited soil disturbances during demolition activities. A more extensive plan should be prepared prior to site grading.

## **2 BACKGROUND**

From at least 1928 through the early 1960s, the site was used for agricultural and residential purposes. In 1962/1963, the original commercial building was constructed in the southwest portion of the site with additions occurring over the years. Calmar operated a plastic bottle manufacturing facility from 1962/1963 through 2003. From 2007 through early-2009, ARC International, Inc. (ARC) used the site for disassembling computers and electronics for recycling purposes. The building has been vacant since ARC vacated the site in 2009.

From the late-1980s through the late-1990s, groundwater investigations completed at the site included the installation and monitoring of ten groundwater monitoring wells and piezometers. During this time, groundwater fluctuated from approximately 24 to 44 feet below the ground surface (bgs), with deeper groundwater occurring during the late-1980s through the early-1990s and shallower groundwater reported in the mid- to late-1990s. Groundwater flow has been reported in a north to northwesterly direction. All on-site groundwater monitoring wells have been abandoned.

During Calmar's operations in the late-1980s, audits of the property by both regulatory agencies and environmental consultants identified areas of possible concern. These areas were subsequently investigated by collecting and analyzing soil, soil gas, and groundwater samples. Based on these results, VOC-impacted soils were noted in the former Waste Storage Area located in the southwestern portion of the site. The extent of impacted soil was assessed to extend beneath the existing building and into the parking lot area, with a lateral extent of approximately 75 feet in diameter and a vertical extent to groundwater (which ranged from approximately 24 to 44 feet bgs). Vapor extraction pilot tests completed in the late-1990s indicated that vapor extraction would not be a feasible technique to mitigate these soils. Excavation was neither cost effective nor practical due to the impacted soil being located beneath the existing building. Based on this

information, natural attenuation was chosen as the remedial action. Laboratory results of soil and soil gas samples collected in the vicinity of the impacted area in 2005 indicated concentrations of PCE, TCE, and other chlorinated solvents remaining in soil and soil gas. Laboratory results of groundwater samples have shown elevated concentrations of PCE and to a lesser extent TCE, suggesting that the site has contributed to the regional groundwater issue. However, elevated concentrations of TCE have also been detected in upgradient wells, suggesting that an off-site source may also be present.

There are no cleanup standards for VOCs in soil or soil gas. Based on the RWQCB Interim Site Assessment & Cleanup Guidebook dated May 1996 (referred to herein as the “RWQCB guidelines”), the concentrations of remaining VOCs in soil matrix would be considered elevated, specifically in the area of the former Waste Storage Area. The remaining concentrations in soils to 25 feet (i.e., groundwater) in this area also exceed proposed cleanup goals presented in the approved “Site Assessment Report and Remedial Action Plan” completed by Levine-Fricke in 1997 (referred to herein as the “approved RAP cleanup goals”). It appears, based on a comparison of historical and more recent data that natural attenuation is occurring. Although the concentrations of PCE exceed the RWQCB guidelines and approved RAP cleanup goals, the approved RAP also states that if these concentrations could not be obtained, as long as certain criteria are met (e.g. a reduction or asymptotic condition of concentrations), the site would be eligible for closure. On December 2, 2010, a deed restriction was recorded with the County of Los Angeles restricting the land use to commercial purposes. On December 3, 2010, the RWQCB issued a NFA letter for soil closure at the site.

With the exception of soils in the Waste Storage Area, there is a low likelihood of encountering impacted soils throughout the remaining portions of the site. The purpose of this SMP is to present procedures to address possible “unknown environmental features” that might be encountered during demolition operations and to present monitoring activities that will be conducted by Ardent during periodic site visits and during soil disturbances in the Waste Storage Area. As discussed herein, “unknown environmental features” are defined as regulated features

(i.e., underground storage tanks [USTs], septic pit, clarifier, etc.) or unregulated features (i.e., stained or odorous soil).

### **3 OBJECTIVE**

The objective of the SMP is to periodically monitor the demolition activities in order to identify and properly manage unknown environmental features that might be encountered during site activities. This SMP provides procedures for the effective and prompt communication of the discovery of unknown environmental features to the RWQCB. The SMP and individuals' Health and Safety Plan will control the exposure of site workers and the general public to dust, vapors, or odors associated with the demolition operations. This SMP also presents the continuous monitoring activities that will be completed by Ardent during soil disturbances in the Waste Storage Area.

### **4 PROGRAM PARTICIPANTS**

The following presents the SMP program participants.

#### **4.1 Ardent Representatives**

Ardent will act as the environmental consultant and provide field oversight and management services for the SMP. Ardent personnel will include a SMP Field Coordinator and a SMP Program Manager.

The SMP Field Coordinator for this project is:

- Connie Lizarraga, Ardent office (951) 736-5334, cell (323) 381-9329

The SMP Program Manager for this project is:

- Paul Roberts, Ardent office (951) 736-5334, cell (951) 751-3198

The Alternative SMP Program Manager for this project is:

- Craig Metheny, Ardent office (951) 736-5334, cell (951) 751-2996

#### **4.2 Owner's Participants**

The Owner's Participants are as follows:

The Owner's Project Director is:

- Kevin Radecki, City of Industry (626) 333-1480

The Owner's Engineering Manager for this project is:

- Dale Masl, CNC Engineering (626) 333-0336

#### **4.3 General Contractor's Participants**

The General Contractor's Project Manager is:

- To be determined

The General Contractor's Project Site Superintendent is:

- To be determined

#### **4.4 Agency Participants**

The regulatory agencies that might be participating in oversight associated with unknown environmental concerns discovered during demolition will be the RWQCB.

### **5 INDIVIDUAL/AGENCY RESPONSIBILITIES**

The following presents the individual/agency responsibilities of the SMP program participants.

#### **5.1 SMP Field Coordinator**

The SMP Field Coordinator shall be responsible for the following tasks:

- Periodically monitor field activities to assess potential unknown environmental features;
- As directed and after having been permitted (if required), supervise activities related to unknown environmental features and other environmental conditions;
- If and when needed, collect samples and arrange for laboratory analyses;

- Continuously monitor soil disturbances in the Waste Storage Area; and
- Maintain record of soil sample locations and document field conditions.

## **5.2 SMP Program Manager**

The SMP Program Manager shall be responsible for the following tasks:

- Monitor the work of the SMP Field Coordinator;
- Communicate field activities to the Owner's Project Director, Owner's Environmental Manager, and RWQCB;
- Notify the RWQCB or the appropriate Certified Unified Program Agency (CUPA) of unknown environmental features encountered during redevelopment activities;
- Communicate with the SMP Field Coordinator to investigate unknown environmental features and other environmental conditions, if encountered;
- Evaluate results of soil sampling in accordance with the protocols and criteria set forth in Section 6.3 below;
- Consultation with the SMP Field Coordinator to characterize, delineate, and supervise the proper management of unknown environmental features and other unknown environmental conditions; and
- Prepare reports of field activities.

## **5.3 General Contractor Project Manager or Project Site Superintendent**

The General Contractor Project Manager or Project Site Superintendent shall be responsible for the following tasks:

- The General Contractor will monitor demolition operations for fugitive dust in accordance with South Coast Air Quality Management District (SCAQMD) guidelines and will take such measures, as necessary, to properly manage dust and soil from leaving the site;
- Report suspected unknown environmental features to the SMP Field Coordinator who will notify the SMP Program Manager, the Owner's Environmental Manager, and/or the Owner's Project Director. The SMP Program Manager or Owner's Environmental Manager will initiate and approve all non-emergency contacts with the RWQCB and CUPA; and

- If an unknown environmental feature is encountered, the SMP Field Coordinator will direct the General Contractor to stop demolition activities in the area of the feature and delineate the area with “Caution” tape, delineators, or fencing;

#### **5.4 Agency Responsibilities**

If unknown environmental concerns are discovered during redevelopment activities, the RWQCB or CUPA will be asked to oversee and approve permits, work plans, and reports on an expedited schedule so as not to delay grading or redevelopment activities. Ardent will request local CUPA participation (i.e., the Los Angeles County Department of Public Works [LACDPW] and/or the RWQCB) for regulated features such as USTs or clarifiers, and the RWQCB for non-regulated features such as stained and/or odorous soils. The RWQCB will be notified if regulated features are discovered.

#### **5.5 General Responsibilities**

All Ardent personnel working at the site will have current HAZWOPER health and safety training. As presented in Section 6.1.1, Ardent will implement a Health and Safety Plan (HSP) that covers Ardent’s employees and subcontractors. A copy of the HSP is presented in Appendix C. Ardent’s scope of work for this project does not include health and safety monitoring for the General or Demolition Contractor’s personnel and subcontractors as part of their daily work activities or during any soil excavation activities. The General Contractor and subcontractors will provide their own HSP.

If impacted soil or subsurface features that are suspected to contain chemicals are encountered, a contractor licensed to handle hazardous or potentially hazardous waste might be retained for investigative/remediation work.

## **6 ENVIRONMENTAL ACTIVITIES FOR SITE GRADING AND EXCAVATION**

The following presents the activities that will be performed prior to, during, and following the on-site demolition and excavation activities.

## **6.1 Pre-Demolition Activities**

The pre-demolition activities will be conducted to minimize down time and interruptions of demolition activities if unknown environmental features are encountered. Pre-demolition activities are intended for health and safety issues and preparing and coordinating site individuals with their respective responsibilities.

### **6.1.1 Health and Safety Plan (HSP)**

Ardent has prepared a HSP to protect Ardent's workers and subcontractors from chemicals that might be encountered. A copy of the HSP is provided in Appendix A.

### **6.1.2 Sampling Imported Soil**

It is our understanding that no soil will be imported to the site during demolition activities. If, in the future, import soils are to be brought to the site to raise the final elevation, these soils must be sampled prior to deposition on the subject property.

If, during demolition activities, an area of unknown environmental concern is encountered and excavation of these materials is warranted, soils might need to be imported for backfill purposes. Prior to and/or during demolition activities, import soil areas (or borrow areas) will be located by the General Contractor. To assure that the soils imported to the site are "clean," Ardent will sample the materials prior to transport to the site.

Currently, the DTSC has not established standards that address environmental requirements for acceptance of clean imported fill materials. However, DTSC has issued an advisory entitled "*Information Advisory Clean Imported Fill Material*" dated October 2001 which will be used as a general guideline. A copy of this document is provided in Appendix B. Ardent may use additional information such as knowledge of the site or known land use history to determine sampling criteria.

### 6.1.2.1 Sampling Criteria

To minimize the potential of introducing contaminated fill material onto the site, it is necessary to verify through documentation that the fill source is adequate and/or have the fill materials analyzed for potential contaminants based on the location and history of the source area. Fill documentation might include a Phase I ESA and/or the results of testing. If such documentation is not available or is inadequate, Ardent will conduct a review of the property locations current and historical operations to be used to decide what analytical parameters are relevant. The analyses of the fill material will be based on the source of the fill and/or knowledge of the prior land use. If knowledge of the prior land use is unknown, then an appropriate suite of analyses must be performed prior to the fill being used at the site. Sampling procedures are presented in Appendix C.

The following tables present the recommended number of samples to be collected from an area of fill obtained from in-place materials and the number of samples to be collected from a volume of fill from stockpiled materials.

**Table 1: Recommended Fill Material Sampling Schedule**

<b>Area of Individual Borrow Area</b>	<b>Sampling Requirements</b>
2 acres or less	Minimum of 4 samples
2 to 4 acres	Minimum of 1 sample every ½ acre
4 to 10 acres	Minimum of 8 samples
Greater than 10 acres	Minimum of 8 locations with 4 sub-samples pre location (32 total samples)

<b>Volume of Borrow Area Stockpile</b>	<b>Sample per Volume</b>
Up to 1,000 cubic yards	1 sample per 250 cubic yards
1,000 to 5,000 cubic yards	4 samples for first 1,000 cubic yards +1 samples per each additional 500 cubic yards
Greater than 5,000 cubic yards	12 samples for first 5,000 cubic yards +1 samples per each additional 1,000 cubic yards

Table 2 presents the recommended chemical analyses to be performed based on the fill source. To assess the chemical analyses, a Phase I ESA or equivalent document shall be reviewed to assess historical and current uses of the property and to determine whether the borrow area may have been impacted by previous activities on the property. If a Phase I ESA is not available, Ardent will conduct a preliminary screen of the site. All sampling and analyses will be completed prior to delivery of the materials to the site. Composite sampling will not be allowed. The acceptable levels are based on current regulatory guidelines and/or site specific cleanup criteria's as presented below.

**Table 2: Recommended Chemical Analyses for Fill Source Area**

<b>Fill Source</b>	<b>Target Compounds</b>
Land near to existing freeway	Lead (EPA Methods 6010B or 7471A), PAHs (EPA Method 8310)
Land near mining area or rock quarry	Heavy Metals (EPA Methods 6010B and 7471), pH
Agricultural Land	Organochlorine Pesticides (EPA Method 8081A or 8080A); Organophosphate Pesticides (EPA Method 8141A); Chlorinated Herbicides (EPA Method 8151A), Heavy Metals (EPA Methods 6010B)

Fill Source	Target Compounds
	and 7471)
Residential/Acceptable Commercial Land	VOCs (EPA Method 8021 or 8260B, as appropriate and combined with collection by EPA Method 5035), semi-VOCs (EPA Method 8270C), TPH (EPA Method 8015 modified), PCBs (EPA Method 8082 or 8080A), Heavy Metals including Lead (EPA Methods 6010B and 7471)

**6.1.2.2 Acceptable Levels**

Following receipt of laboratory reports, Ardent will evaluate these data to assess whether the materials meet the criteria of “clean” soils. To do so, Ardent will compare the results to a number of current regulatory guidelines. When more than one cleanup standards are used, the more conservative value will be used in case of conflict. When applicable, commercial standards will be used. In general, if concentrations exceed the standards set forth in these documents, the materials will not be accepted as fill materials. However, if chosen, a risk analysis may be completed using site specific data to further evaluate whether the materials may be used on site. The following documents will be used to evaluate import soils. Copies of these documents and/or appropriate tables from these documents are provided in Appendix B.

- Regional Water Quality Control Board, Los Angeles Region (RWQCB) Interim Site Assessment and Cleanup Guidebook dated May 1996 (referred to herein as the RWQCB guidelines);
- Hazardous waste criteria outlined in the California Code of Regulations (CCR) Title 22 (referred to herein as Title 22); and
- California Human Health Screening Levels (CHHSLs), dated January 2005, most notably Table 1 – Soil-Screening Numbers (mg/kg soil) for

Nonvolatile Chemicals Based on Total Exposure to Contaminated Soil:  
Inhalation, Ingestion and Dermal Absorption, dated September 23, 2010.

The following presents the constituents to be analyzed and the cleanup criteria that will be used to assess whether the materials can be used for import soils.

- Petroleum hydrocarbons – RWQCB guidelines.
- VOC – RWQCB guidelines
- SVOCs and PAHs – RWQCB guidelines.
- Metals – CHHSLs.
- Pesticides and PCBs – CHHSLs.
- pH – Title 22.

### **6.1.3 Pre-Demolition Meeting**

A pre-demolition meeting will be attended by the SMP Field Coordinator, the SMP Program Manager, the General Contractor Project Manager, the General Contractor Project Site Superintendent, the Owner's Engineering Manager. The agenda of the meeting will include an oversight of the historical land use, environmental investigations, chemicals of concern (COC), worker safety requirements, and dust control measures. The meeting will also be held to discuss possible unknown environmental features that might be encountered. The SMP Program Manager will present and review the information provided in this SMP, including individual's responsibilities and emergency phone numbers.

## **6.2 During Demolition and Excavation Activities**

Once demolition and/or excavation have begun, the following activities will be performed.

### **6.2.1 Dust and Odor Control**

The General or Demolition Contractor's health and safety field monitor will monitor grading operations for fugitive dust in accordance with SCAQMD Rule 403 Fugitive Dust (Appendix D) and direct the General or Demolition Contractor to take such measures, as necessary, such as the application of water or a change in operations or equipment in order to properly manage dust from leaving the site. With the exception of the Waste Storage Area, there is no known impacted soil in the remaining portion of the site, therefore, continuous air monitoring for potential toxic materials on dust partials will not be warranted.

Ardent will complete periodic site visits during demolition of the on-site building. If impacted soil is discovered, Ardent will complete general monitoring for odors as per SCAQMD Rule 402 (Appendix D) and will direct the General or Demolition Contractor to take such measures, as necessary, such as the application of water or a change in operations or equipment in order to properly manage noticeable or nuisance odors from leaving the site. If VOC impacted soil is discovered and during excavation of the building footings in the Waste Storage Area, air monitoring will be conducted in accordance with SCAQMD Rule 1166 guidelines (Appendix D). All excavated impacted soils that are stockpiled at the site will be covered with visqueen plastic. VOC-impacted soil excavated as part of the building footing removal in the Waste Storage Area will be placed back into the excavation and compacted. Wheel shakers will be installed at all exists from the site to ensure that soil will be removed from the tires of vehicles.

### **6.2.2 Notification and Identification of Unknown Environmental Features**

Due to the number of environmental studies that have been completed at the site, there is a low likelihood that unknown environmental features will be encountered. However, due to the historical land uses, Ardent will also monitor redevelopment activities for possible unknown environmental features as part of this SMP.

As previously stated, “unknown environmental features” are defined as regulated features (i.e., USTs, septic pit, clarifier, etc.) or unregulated features (i.e., stained or odorous soil). As discussed herein, the SMP Field Coordinator will complete periodic on-site monitoring during demolition activities. If field observations (i.e., odors, staining, and/or photoionization detector [PID] readings) indicate the possible presences of impacted soils, additional characterization/sampling will be completed. If a regulated feature is discovered, the appropriate regulatory agencies will be notified and the appropriate permits will be obtained prior to the removal of the feature. In all cases, the RWQCB will be updated and notified of all discoveries and sampling plans. The monitoring activities discussed herein will be completed for all invasive soil disturbances. All unknown environmental features will be plotted on a scaled site plan.

If encountered, the RWQCB will be notified of unknown environmental features that are discovered that require additional investigations or remediation. The SMP Field Coordinator will direct a limited excavation to identify the feature. If the unknown environmental feature is assessed to be stained and/or odorous soil or other feature that is not regulated, the scope of work to investigate and remediate this feature is discussed below. The specific scope of work will be verbally discussed with the RWQCB or provide a brief work plan prior to beginning the work. Documentation of the work conducted to assess and remediate these features will be provided in a final report.

If the unknown environmental feature is assessed to be a regulated feature, such as USTs, septic pit, or clarifier, the appropriate regulatory agencies will be notified, permits will be obtained, and work plans will be provided. The results of the investigations and remediation will be documented in an individual report that will be submitted to the appropriate CUPA. The RWQCB will be copied on all reports.

### **6.2.3 Cleanup Standards**

If impacted soil or unknown environmental features are encountered during demolition, the soil and/or features will be managed in accordance with this SMP. The regulatory guidelines set-forth in Section 6.1.3 will be used to assess acceptable limits of chemical constituents. If impacted soil exceeding these cleanup standards is to be left in-place, the material will be evaluated on an environmental and health risk basis (i.e., the preparation of a risk-based analysis based on a commercial use scenario) or by using engineering controls. If necessary, air monitoring will be conducted during the excavation of VOC-impacted soil in accordance with Ardent's SCAQMD various locations permit.

### **6.3 Site-Specific Soil Management Protocols**

The SMP Field Coordinator will periodically monitor disturbed soils during grading activities for visual fugitive dust, staining, and/or odors. These monitoring activities will be conducted using visual, olfactory, and PID meter calibrated daily to hexane. The monitoring activities will be documented on daily field sheets. If impacted soil or unknown environmental features are encountered during redevelopment, the soil and/or features will be managed in accordance with this SMP.

As presented below, the Site-Specific Soil Management Protocols are grouped by the type of environmental feature and have been developed with acknowledgement of past site use history and previous subsurface investigations completed at the site. Any soil samples collected as part of the SMP will be analyzed by a State-certified environmental laboratory.

#### **6.3.1 Stained and/or Odorous Soil, or Other Unregulated Feature**

Stained and/or odorous soil or other unregulated feature that are discovered at the site will initially be assessed or mitigated using on-site equipment. To assess the COCs, one sample will be collected from each homogeneous material and will be analyzed for total petroleum hydrocarbons as gasoline (TPHg), total petroleum hydrocarbons carbon chain C<sub>10</sub>-C<sub>32</sub> (TPHcc), VOCs, semi-volatile organic compounds

(SVOCs), polychlorinated biphenyls (PCBs), and Title 22 metals in general accordance with EPA Method Nos. 8015 (modified), 8270, 8082, and 6010/7000 series. If the soil materials are assessed to contain VOCs, air monitoring will be conducted in accordance with the SCAQMD guidelines. Liquids will be profiled and disposed at a State-licensed facility.

Impacted soil samples will be collected using either a backhoe or drill rig. If limited in area, the materials will be excavated and confirmation samples will be collected from the floor and walls of the excavation. Confirmation samples will be analyzed for the COC detected during the initial sampling. The results of the investigations and remediation will be documented in a documentation report. If impacted soils are discovered to be more extensive, site characterization will be completed using a drill rig or backhoe to define the extent and possible mitigation measures.

### **6.3.2 Regulated Features**

If a regulated feature such as a UST, septic tank, or clarifier is encountered, Ardent will obtain the appropriate permits to remove the feature and will follow the regulatory guidelines set forth by the appropriate regulatory agency.

### **6.3.3 Stockpile Sampling for Reuse or Export**

The DTSC has no standards for sampling stockpiled soils that will be reused on a property. Ardent based the proposed sampling criteria on the document entitled “*Stockpile Soil Testing Requirements Fact Sheet*” from the City of Santa Fe Springs Fire Department’s Soil Assessment and Remediation Guidelines for Commercial/Industrial Sites. A copy of this document is provided in Appendix B.

Excavated impacted soil will be placed on and covered with visqueen plastic, except when being added to or taken away from. Profile sampling for off-site use/disposal of the soil will include the following, or profiling criteria set forth by a disposal/recycling facility:

- Minimum of one sample for 100 cubic yards or less;
- Minimum of three samples for greater than 100 to 500 cubic yards;
- Minimum of five samples with one sample every 500 cubic yards up to 2,500 cubic yards; and
- Minimum of one sample for every 500 cubic yards greater than 2,500 cubic yards.

The location of samples will be chosen based on a statistical method. Composite sampling, if completed, will consist of compositing a maximum of four samples into one and will follow DTSC SW-846 guidelines for waste disposal. Compositing shall be completed by the laboratory.

Soils to be exported from the site, if any, will be sampled using the criteria stated above. Non-impacted soils will be defined using the Cleanup Standards presented in Section 6.2.3.

#### **6.4 Final Demolition Environmental Oversight Report**

The Final Demolition Environmental Oversight Report will be prepared following completion of the demolition activities and will document the results of the environmental issues associated with the demolition activities, if any. The final report will be submitted to the RWQCB for documentation purposes.

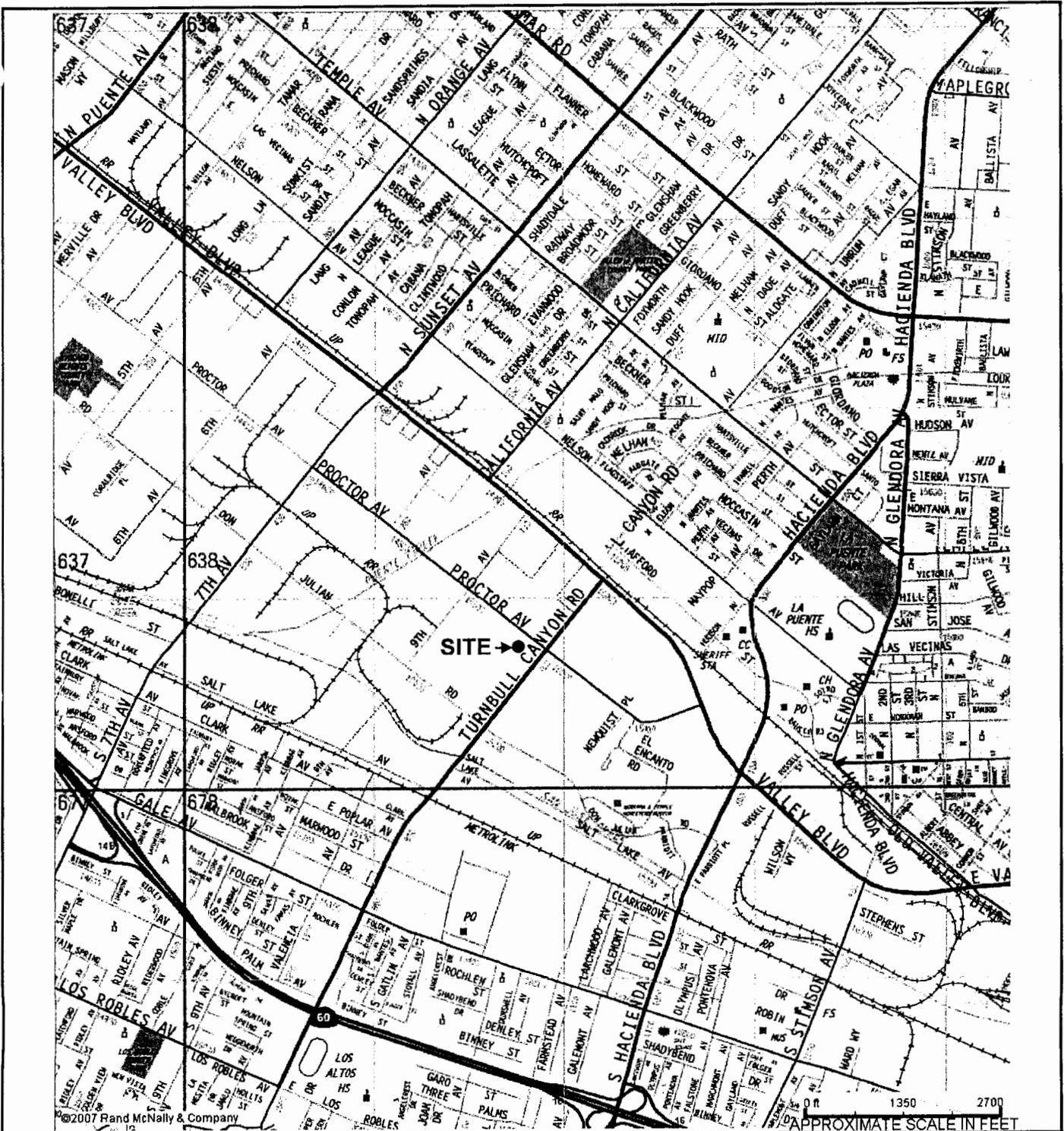
If regulated unknown environmental features are encountered, such as USTs or clarifiers, a separate document will be prepared and provided to the appropriate agency presenting the closure procedures and requesting a NFA or closure letter for each feature or group of features. A copy of any individual reports will be provided in the Appendix of the Final Demolition Environmental Oversight Report.

## REFERENCES

Ardent Environmental Group, Inc. (Ardent), 2010, Phase I Environmental Site Assessment and Document Review, 333 Turnbull Canyon Road, City of Industry, California: Report prepared for Industry Urban-Development Agency, City of Industry, California, dated December 10.

California Environmental Protection Agency (Cal-EPA), 2005, Use of California Human Health Screening Levels (CHHSLs) in Evaluation of Contaminated Properties, dated January.

Regional Water Quality Control Board, Los Angeles Region (RWQCB), 1996, Interim Site Assessment & Cleanup Guidebook, dated May.



REFERENCE: 2007 RAND MCNALLY DIGITAL EDITION FOR LOS ANGELES/ORANGE COUNTY, STREET GUIDE AND DIRECTORY



NOTE: ALL DIMENSIONS, DIRECTIONS, AND LOCATIONS ARE APPROXIMATE

	PROJECT NO. 100252001	<b>SITE LOCATION MAP</b>  333 TURNBULL CANYON ROAD CITY OF INDUSTRY, CALIFORNIA	FIGURE
	DATE 9/10		1



**LEGEND**

- Site Boundary
- - - Approximate area of the Waste Storage Area



NO SCALE

NOTE: ALL DIMENSIONS, DIRECTIONS, AND LOCATIONS ARE APPROXIMATE

REFERENCE: 2011 GOOGLE EARTH

	PROJECT NO. 100252002	SITE PLAN	FIGURE
	DATE 12/11	333 TURNBULL CANYON ROAD CITY OF INDUSTRY, CALIFORNIA	
		2	

333 Turnbull Canyon Road  
City of Industry, California

December 5, 2011  
Project No. 100252002

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**APPENDIX A**  
**HEALTH AND SAFETY PLAN**



**HEALTH AND SAFETY PLAN  
333 TURNBULL CANYON ROAD  
CITY OF INDUSTRY, CALIFORNIA**

**PREPARED FOR:**

City of Industry  
15625 Eats Stafford Street, Suite 100  
City of Industry, California 91744

**PREPARED BY:**

Ardent Environmental Group, Inc.  
1141 Pomona Road, Suite E  
Corona, California 92882

December 5, 2011  
Project No. 100252002

**APPROVED BY**

  
\_\_\_\_\_  
Health and Safety Manager

12/05/11  
\_\_\_\_\_  
Date

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  - Article 10 – Haulage and Earthmoving
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## **1 INTRODUCTION**

This document presents the health and safety procedures that are intended to guide field activities at the property located at 333 Turnbull Canyon Road in the City of Industry, California (site). The provisions of this plan apply to Ardent Environmental Group, Inc. (Ardent) employees and its subcontractors. Employees of the federal, state, and local agencies, the client, and the client-retained subcontractors are expected to observe the safety rules and regulations as established by their respective organizations and the entities project-specific Site Safety Plan (SSP), in addition to the requirements of this document (referred to herein as the Site Specific Health & Safety Plan [HSP]). The HSP is being presented as an appendix in the Soil Management Plan (SMP) and will be used during demolition activities presented in the SMP.

The scope of work presented in the SMP is to monitor demolition activities for known contaminants associated with the Waste Storage Area and to assess/mitigate unknown environmental concerns, if discovered. The scope of work will include air monitoring activities and site inspections, and might include drilling, excavating, and completing soil and/or soil gas sampling. This HSP will also be used during subsequent remediation activities.

## **2 PROJECT SAFETY PERSONNEL**

The Program Manager is responsible for delivering the plan and any addenda to the Field Coordinator. The Program Manager is responsible for distributing the plan to all field personnel and to an authorized representative of each firm that has a subcontract with Ardent to conduct on-site work. The Program Manager is also responsible for implementing the provisions of this plan and its addenda. Implementation includes review of HSP requirements, review of field personnel compliance with medical examination requirements, review of the provisions of this plan with Owners representative (and its subcontractors), field personnel involved with the project, provision for safety equipment specified in Subsection 5.4, and submission of the requisite health and safety documents, including the forms in Appendix A and Appendix B.

The Field Coordinator is responsible for assisting the Program Manager with on-site implementation of this HSP. His/Her responsibilities include: 1) maintaining safety equipment supplies, 2)

performing air quality measurements as specified herein, 3) directing decontamination operations and emergency response operations until public emergency personnel arrive on-site, 4) setting up work zone limits as specified herein, and 5) reporting all accidents, incidents, and infractions of safety rules and requirements to the Program Manager.

The Field Coordinator has the authority to suspend work any time he judges that the provisions of the site safety plan are inadequate to provide a working environment conducive to worker safety, and he is to inform the Program Manager of any individuals whose on-site presence jeopardizes their own health and safety or the health and safety of others. The responsible personnel for this project are listed below.

**Table 1 – Responsible Personnel for the Site**

<b>Title</b>	<b>Name</b>	<b>Daytime</b>	<b>After Hours</b>
Program Manager	Paul Roberts	(951) 736-5334	(951) 751-3198
Field Coordinator	Paul Roberts	(951) 736-5334	(951) 751-3198
Site Health and Safety Officer (SHSO)	Connie Lizarraga	(951) 736-5334	(323) 381-9329
Ardent Corporate Health and Safety Manager	Craig Metheny	(951) 736-5334	(951) 751-2996
Subcontractor	To Be Determined	To Be Determined	To Be Determined

### **3 WORK DESCRIPTION**

Based on the review of previous environmental reports completed at the site, soil, soil vapor and groundwater samples have shown elevated concentrations of volatile organic compounds (mostly trichloroethene [TCE] and tetrachloroethylene [PCE]) in a limited area known as the “Waste Storage Area.” The Waste Storage Area is located in the southwestern portion of the site, has been fully characterized under the direction and oversight of the Regional Water Quality Control Board, Los Angeles Region (RWQCB), and has received a no further action (NFA) letter. As discussed in the SMP, Ardent representatives will complete on-site monitoring during excavation of the known impacted soils (as per South Coast Air Quality Management’s [SCAQMD] Rule 1166) during removal of the building footings in the Waste Storage Area. Limited and periodic

air monitoring will be completed over the remainder of the site. If unknown environmental concerns are discovered, site characterization (including soil borings, soil gas surveys, excavation of test pits, etc.) will be completed and, if necessary, soil remediation by excavation may be performed. Monitoring activities will include field observations (i.e., odors, staining, and/or photoionization detector [PID] readings) of soil during demolition operations.

During investigation and/or remediation activities, Ardent personnel and subcontractors will have current HAZWOPER health and safety training. Ambient air quality within the work zone will be monitored for potentially hazardous materials (e.g., VOCs) using a PID or equivalent equipment calibrated to meet the requirements of the SCAQMD guidelines.

#### **4 HAZARD ASSESSMENT**

The following subsections include potential hazards that may be present at the site or created as a result of the operations being conducted at the site.

##### **4.1 Confined Spaces**

A "confined space" is defined by the United States Department of Health and Human Services as a space that has one of the following characteristics:

- Limited openings for entry and exit, such as tanks, tunnels, vaults, etc.,
- Not designed for continuous worker occupancy, or
- Unfavorable natural ventilation or other hazards.

Work will not be conducted in confined space as defined by 29 Code of Federal Regulations (CFR) 1910.146. Excavations greater than 4 feet deep will not be entered.

##### **4.2 Chemical Hazards**

According to historical land use and information obtained from previous investigations at the site, the majority of chemical compounds of concern that may be encountered during the

proposed investigations include VOCs. The two key volatile indicator chemicals (TCE and PCE) have been detected at the site at elevated concentrations in soil and soil vapor.

### 4.3 Inhalation Hazard

Although not expected, the vapor concentrations that may potentially be encountered during field activities may exceed currently published exposure limits. The following table provides guidelines as to the action required in response to a range of corresponding PID and/or Dräger tube measurements of some of the most conservative chemical compounds that might be encountered. The measurements will be collected in the ambient air in the breathing zone of personnel working in the area. The PID must be equipped with an electron-volt (eV) bulb of 10.2 or greater.

**Table 2 – Monitoring Methods and Action Levels for Volatile Organic Compounds Using Screening Survey Instruments**

Chemical	Routes of Entry	Respirator Protection Required	Stop Work	TLV	OSHA PEL
TCE	Inhalation, Dermal	OVA =>5 ppm or Dräger = >50 ppm	OVA =>100 ppm	50 ppm as TWA	100 ppm
PCE	Inhalation, Dermal	OVA =>5 ppm or Dräger = >25 ppm	OVA =>100 ppm	25 ppm as TWA	100 ppm

**Notes:**  
 If concentrations at or above the stop-work thresholds are encountered, work must cease and the SMP Program Manager and Corporate Health and Safety Director must be contacted to render judgment whether more stringent respiratory protection is required and extension of the restricted access work zone is necessary.  
 TWA – Time-Weighted Average concentration for a normal 8-hour work day and a 40-hour work week, to which nearly all workers may be repeatedly exposed, day after day, without adverse effect.  
 ppm – Parts per million. For inhalation exposure, the exposure concentration is measured in the breathing zone of the individual (i.e., within 3 inches of the nose and mouth).  
 ACGIH – American Conference of Governmental Industrial Hygienists.  
 TLV – Threshold Limit Value. The time-weighted concentration for a normal 8-hour workday and a 40-hour work week, to which nearly all workers may be repeatedly exposed, day after day, without adverse effect.  
 OSHA PEL – Occupation Safety and Health Administration Permissible Exposure Limit. Based on 5-minute maximum peak in any 3-hours.

#### **4.4 Dermal Exposure Hazard**

Contact of sufficient duration to cause significant skin absorption of toxic components is judged to be highly unlikely. Repeated daily or prolonged contact with the chemicals listed in Subsection 4.2 may potentially defat the skin and, over a long period of time, can lead to irritation and dermatitis. For this reason, wearing protective gloves and clothing as specified in Subsection 5.4 should minimize direct skin contact with chemicals potentially present. However, if dermal contact does occur, the exposed areas should be washed with soap and water immediately and rinsed thoroughly.

#### **4.5 Explosion and Fire Hazard**

Explosion hazards are not expected at the site during the planned operations. However, caution will be taken to minimize sources of ignition. Cigarettes and open flames are prohibited within the restricted access work zone (Subsection 5.3).

#### **4.6 Noise Hazard**

Exposure to high levels of noise, both chronic and acute, can lead to different types of reactions. Acute (impulse) noise, such as noise associated with heavy equipment operation, jackhammers, drilling activities, and work performed in the flight path of aircraft, can afflict the operator with a temporary loss of hearing at certain frequencies associated with the equipment being used. Ordinarily, this loss is reversible, and after a short period of time (less than a day) the hearing will return to normal. However, chronic exposure to this noise may eventually cause the hearing acuity to be permanently and irreversibly altered. The change may be subtle and could occur over a period of time.

Permanent noise-induced hearing loss is attributed to the intensity and frequency distribution of the noise, the time pattern and duration of exposure, and individual susceptibility. Sound levels (noise) are measured in decibels using an A-weighting filter (dB [A]). The Threshold Limit Values (TLV) for noise exposure is 85 dBA for an eight-hour duration and 90 dBA for a four-hour duration. It is not expected that the noise level generated during this phase of

work will exceed the TLV; however, hearing protection will be readily available on the site and will be mandated at SHSO discretion.

#### **4.7 Heat Stress Hazard**

Heat stress occurs when the body produces or absorbs more heat than it is able to dissipate. Heat is produced internally as the result of metabolic activity and increases with body activity or the level of physical work being performed. Heat can be absorbed by the body from ambient air and from the radiant heat of the sun.

The body's ability to absorb heat is therefore affected by factors such as the ambient air temperature and humidity, air density, radiant energy and cloud cover, wind velocity and airflow, and localized heat generation, such as that from power equipment. The body's ability to dissipate heat to the environment is dependent on factors such as the amount of heat and radiant energy in the ambient environment, exposure to the ambient or radiant heat in that environment, and its own inherent ability to cool itself (perspiration). Exposure to ambient conditions is affected by such factors as wind velocity or airflow, cloud cover or shade, and the type of protective clothing being worn. Its ability to cool itself is affected by its own inherent biovariability.

Any of these factors may contribute to a loss of body fluids and electrolytes, and an increase in body temperature. A significant increase in body temperature can be life threatening and can rapidly become fatal or result in permanent injury. Heat stress may cause any of the following conditions: heat cramps, heat syncope (fainting), heat exhaustion, and/or heat stroke. If one of these conditions is experienced, call emergency service personnel immediately. To help prevent heat stress, it is recommended that liquids be easily available and frequently consumed during the day. The SHSO will monitor workers visually during site work including body core temperature measurements when and if appropriate. Table 3 presents the action levels and appropriate action to be taken regarding body core temperature monitoring.

**Table 3 – Action Levels for Heat Stress**

Type Measurement	Action Level	Action
Ear insertable core temperature	100.4 degrees Fahrenheit or greater	Remove from work
Ear insertable core temperature	<99 degrees Fahrenheit	Return to work

#### **4.8 Electrical Hazard**

Contact with electrical current can cause shock and electrical burns and can be instantly fatal. The potential for exposure to electrical current exists through contact with electrical tools or equipment, generators and electrical control equipment, and overhead and underground power lines. Care must be taken to avoid contact with sources of electricity. Work will cease if lightning is observed or expected to occur.

Frayed electrical cords or electrical cords with damaged plugs shall not be used. Electrical cords shall not be used in proximity to water.

##### **4.8.1 Underground Utilities**

Prior to starting soil intrusive activities, all known underground utilities and lines shall be located and marked on the ground and on a site map. Locator services from Underground Service Alert (USA) and each utility company whose utility service may intersect the facility shall be requested. Soil intrusive work shall not proceed until all locating activities have been completed and are fully documented in the site records. The initial site safety orientation meeting for all personnel working on-site shall include a review of the underground utility locations and where the site map will be located that shows the positions of any underground utility lines. The site safety orientation shall include a site walkover of each marked utility or line.

During the performance of work, should personnel encounter a subsurface condition that creates suspicion that there may be an unidentified underground line or utility, such an individual shall immediately cease work, secure his/her equipment, and notify the General Contractor, Program Manager, and Field Coordinator.

**4.8.2 Overhead Power Lines**

Operation of equipment in the vicinity of overhead power lines shall be in accordance with California Occupational Safety and Health Administration (Cal-OSHA) Electrical Safety Orders. The subcontractor's field supervisors and operators shall take necessary precautions for implementing safe work practices under such conditions. The following information was excerpted from the Cal-OSHA Electrical Safety Orders.

Table 4 indicates the general clearances from electrical lines for personnel and erection, handling, or transportation of tools, machinery, materials, structures, or scaffolds from overhead high-voltage power lines. Table 5 indicates the general clearances for equipment such as drill rigs, cranes, and hoists.

**Table 4 – General Clearances Required from Energized Overhead High-Voltage Conductors**

<b>Normal Voltage (Phase to Phase)</b>	<b>Minimum Required Clearance (feet)</b>
600 to 50,000	6
50,000 to 345,000	10
345,000 to 750,000	16
750,000 to 1,000,000	20

**Table 5 – Boom-Type Lifting or Hoisting Equipment Clearances Required from Energized Overhead High-Voltage Lines**

<b>Normal Voltage (Phase to Phase)</b>	<b>Minimum Required Clearance (feet)</b>
600 to 50,000	10
50,000 to 75,000	11
75,000 to 125,000	13
125,000 to 175,000	15
175,000 to 250,000	17

**Table 5 – Boom-Type Lifting or Hoisting Equipment Clearances Required from Energized Overhead High-Voltage Lines**

<b>Normal Voltage (Phase to Phase)</b>	<b>Minimum Required Clearance (feet)</b>
250,000 to 370,000	21
370,000 to 550,000	27
550,000 to 1,000,000	42
<b>Notes:</b> Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.	

#### **4.9 Excavation Site Hazards**

The movement of grading equipment, tractors, backhoes, and trucks in the work zone, as it relates to the hazards associated with an excavation site, such as the cave-in of an excavation, requires a high awareness of safety on the part of the equipment operators. The subcontractors are expected to make sure that all of their operators at the site are experienced in excavations and are aware of the excavation site hazards. The boundary of the site is to be fenced, and movement of unauthorized personnel within the work zone prevented. The boundary of the site is to be clearly posted with the appropriate warning signs. Excavations greater than 4 feet will not be entered.

#### **4.10 Activity Hazard**

The principal type of activity hazard expected to be encountered during this operation includes the potential for falls, and adverse contact with tools and equipment. The experience of personnel with this type of equipment and the procedures outlined in this HSP should minimize potential safety hazards of this type. In addition, the safety equipment listed in Subsection 5.4 that is required to be used for this operation should minimize the potential for injury to personnel.

#### **4.11 Heavy Equipment Operations**

As heavy equipment operations are to be conducted at the site, all haulage, drilling, and earth moving shall, at a minimum, comply with the requirements set forth in Title 8, California Code of Regulations (CCR) Construction Safety Orders; a copy of this regulation is included in Appendix C, Article 10, Haulage and Earthmoving. As a part of the initial site safety orientation meeting (Subsection 5.2), equipment operators and any personnel (including foreman, supervisor, surveyors, grade checkers, etc.) associated with haulage and earth moving activity shall carefully review these regulations and any other site-specific requirements. It is the responsibility of the subcontractor to monitor its personnel for compliance with these regulations and requirements. In particular, the following guidelines are to be followed by those involved with haulage and earth moving.

- Subcontractor-authorized personnel, trained in and familiar with the equipment, its operation, and safety provisions, will perform operations.
- Maintenance and/or adjustments to machinery will not be conducted while the equipment is operating or energized, unless continued operation is necessary in accordance with the machinery manufacturer's written specifications. All repairs will be performed in a designated equipment-repair work zone. Power will be disconnected or engines shut off prior to servicing equipment unless continued operation is necessary in accordance with the machinery manufacturer's written specifications. Power supplies/switches will be clearly labeled as such, to prevent accidental startup. Equipment being repaired will be appropriately blocked and/or secured.
- Only equipment with all guards and safety controls in place are to be permitted by the subcontractor to operate on-site.
- Equipment is to meet all federal, state, and local standards and be mechanically sound and in good condition.
- Operators will perform daily safety inspections and necessary repairs are to be made before equipment is operated. If any equipment is judged to be unsafe during operation, it is to be taken out of service until it is repaired.
- When not in use, keys to equipment are to be removed and kept in a location remote from the equipment.

#### **4.12 Subsurface Earth Work**

At this point, excavation activities are not planned for the site. However, based on the results of the work described in the work plans, excavation of some impacted soils may be necessary. If excavation is completed, the following will be conducted.

At a minimum, all excavation activity conducted by subcontractors of Contractor shall comply with the requirements set forth in Title 8, CCR, Construction Safety Orders; a copy of this regulation is included in Appendix C, Article 6, Excavation, Trenches, and Earthwork. All bank, grades, and excavation walls shall be sloped to an angle of less than the angle of repose (but at no time at an angle of less than allowed in the regulations for the existing soil conditions) for the type of soil; alternatively, the excavation can be shored in accordance with applicable regulatory requirements. Trenches and pits more than 5 feet deep, and the bases of excavation embankments more than 5 feet high, will be considered hazardous areas, with no entry permitted unless the slope or shoring requirements have been met. Appendix C presents sloping and shoring information for the above-referenced section on Excavation, Trenches and Earthwork.

### **5 GENERAL HEALTH AND SAFETY REQUIREMENTS**

#### **5.1 Medical Clearance and Monitoring**

All project personnel who may be required to wear respirators must have on file evidence that they have been cleared by a physician to wear a respirator. All personnel under subcontract to Ardent must also provide this evidence to the Field Coordinator (upon request). All employees of Ardent are to be active participants in the Contractor Medical Surveillance Program.

#### **5.2 Safety Orientation Meeting**

All field personnel must attend a safety orientation meeting before commencing the fieldwork. The meeting will be scheduled and conducted by the Program Manager or the Field

Coordinator. The meeting will include presentation of the HSP and receipt of the required signed releases by the Field Coordinator.

### **5.3 Restricted Access Work Zone**

A restricted access work zone (a minimum of 25 feet wide when possible) will be maintained around the work areas. Due to site conditions and constraints, it may be necessary to make modifications to the width/circumference of the restricted access zone. The Field Coordinator has the authority to make reasonable adjustments as he/she judges necessary. Protective clothing and equipment, as described below in Subsection 5.4, are to be worn by all personnel working within the restricted access work zone. The purpose of the restricted access work zone is to provide points of ingress and egress for personnel and equipment. The zone is to be demarcated with caution/hazard tape and barricades (or similar restricting material). The restricted access work zone is to be clearly labeled as such. In addition to the restricted access work zone, a gate should restrict vehicular access to the site when possible.

### **5.4 Protective Equipment and Clothing**

#### **5.4.1 Equipment Required For Field Personnel While Working in the Restricted Access Work Zone**

Personnel working within the restricted access work zone are to wear the following equipment unless otherwise specified in writing by the Corporate Health and Safety Manager and/or the Program Manager.

- Hardhat
- Boots (steel-toed)
- Safety glasses
- Gloves (latex and/or nitrile)

#### **Equipment to be Available On-Site**

- First Aid Reference Guide

- Earplugs
- Two respirators (National Institute of Occupational Safety and Health/Mine Safety and Health Administration (NIOSH/MSHA)-approved half-mask with organic vapor cartridges)
- Dräger tubes and Dräger pump (optional)
- PID and calibration gas
- First-aid kit with eye wash
- Fire extinguisher
- Construction tape and barriers to delineate restricted access work zone
- Water and soap for washing
- A vehicle with keys in the ignition and headed in a direction for quick departure for the transport of slightly injured personnel to the hospital must be kept on-site when personnel are working. Severely injured personnel **MUST** be transported **ONLY** by paramedics (except as permitted in Subsection 7.1). A copy of the hospital address and route directions from Subsection 7.5 must remain in the vehicle.

#### **5.4.2 Respirator Usage**

The Program Manager is responsible for deciding if respiratory protection is required and if the level of respiratory protection used should be more stringent. If a decision is made to base respirator selection on PID and/or Dräger tube measurements, refer to the table in Subsection 4.3 for critical concentrations. Subsection 6.1 presents organic vapor monitoring frequency and duration.

The conditions in Subsection 5.1 are to be complied with. Cartridges for the respirators must be replaced daily or when breakthrough occurs, whichever occurs first. All individuals intending to wear respirators need to be fit-tested or provide evidence of fit testing.

### **5.4.3 Buddy System**

All field personnel while working in the restricted access work zone during the field activities are to work with another person at the site. The subcontractor's representative can serve as the second person while the work is being conducted in the field. Under no circumstances, other than completion of paper work at the end of the day, are field personnel to work alone at the site while conducting field activities.

## **6 ORGANIC VAPOR MONITORING**

### **6.1 Exposure Concerns**

In addition to the monitoring requirements established by SCAQMD during any excavation work, organic vapor concentrations (as measured by the PID) in the breathing zone (the area nearest to the individual's mouth) of the individual working nearest to the potential vapor source must be monitored during field operations. Monitoring, using the PID, should be conducted at approximate 15-minute intervals, for a sampling duration of approximately 60 seconds while work is being conducted. Occasionally, the monitoring frequency may be modified at the discretion of the Field Coordinator due to changes in field activities. All measurements, as well as the time of day the measurements were collected, must be documented. A form that can be used to document these measurements is presented in Appendix D. Daily field logs can be used to document these measurements also. Refer to Subsection 4.3 for guidelines to judge when respiratory protection is necessary based on PID measurements.

## **7 EMERGENCY RESPONSE PROCEDURES**

### **7.1 Physical Injury**

In the event of an accident resulting in physical injury, call emergency service personnel immediately and perform first aid commensurate with training and seriousness of the injury. Severely injured personnel are to be transported only by emergency service personnel and/or by ambulance personnel unless a life-threatening condition is judged to exist that must be

addressed immediately. If emergency or ambulance personnel transport injured personnel to the hospital, the hospital will be selected at the discretion of the emergency or ambulance personnel. The hospital selected may or may not be the hospital listed in Subsection 7.5 of this document. At the hospital, a physician's attention is mandatory regardless of how serious the injury appears.

The Program Manager is to be notified by the Field Coordinator, as soon after the injury as practical, regarding the nature of the accident. A written report is also to be prepared and submitted by the Field Coordinator to the Program Manager within 24 hours of the accident. If the Field Coordinator is unable to make the report (due to injury), an individual designated by the Program Manager shall make the report.

## **7.2 Fire, Explosion, and Property Damage**

In the event of a fire or explosion, notify the fire department immediately by dialing 911.

The Program Manager is to be notified by the Field Coordinator as soon as practical and a written report prepared within 24 hours of the accident.

In the event of any accident involving serious injury of sufficient magnitude, work at the site shall cease until the Corporate Health and Safety Manager and/or the Program Manager (or a designee) has completed a review of the events and site conditions and has authorized work to resume.

## **7.3 Emergency Telephone Numbers**

Fire Department	911
Police Department	911
Paramedics	911

**7.4 Work Site Address**

The site is located at 333 Turnbull Canyon Road, City of Industry, California.

**7.5 Hospital Address and Route**

For hospital route, see attached map from MapQuest.com.

Queen of the Valley Emergency Room  
1115 South Sunset Avenue  
West Covina, California 91790

Telephone: 626-962-4011

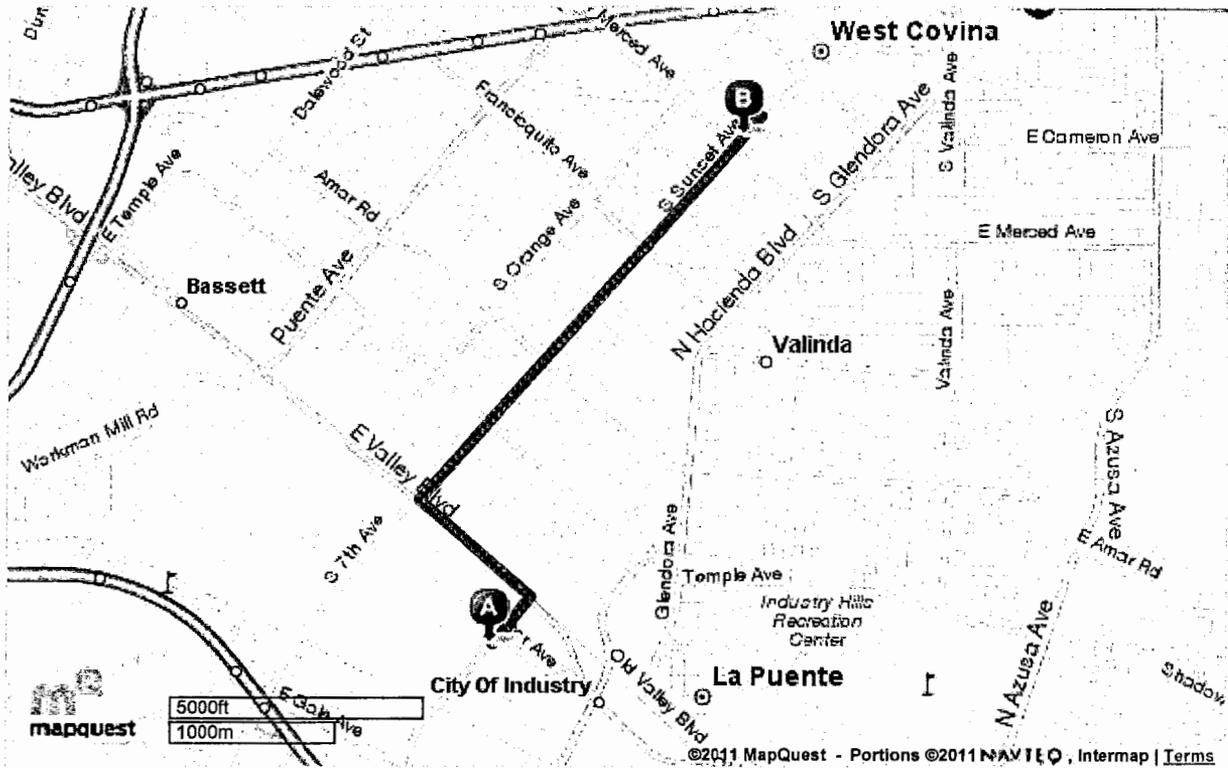


Notes

**Trip to:**  
 Cvhp Queen Of-Valley Campus  
 1115 S Sunset Ave  
 West Covina, CA 91790  
 (626) 962-4011  
**3.90 miles**  
**7 minutes**

A	<b>333 Turnbull Canyon Rd</b> City of Industry, CA 91745-1010	<b>Miles Per Section</b>	<b>Miles Driven</b>
●	1. Start out going <b>northeast</b> on <b>Turnbull Canyon Rd</b> toward <b>Proctor Ave.</b>	Go 0.3 Mi	0.3 mi
↶	2. Turn <b>left</b> onto <b>E Valley Blvd.</b> <i>Amor Indio Mexican Restaurant is on the corner</i>	Go 0.8 Mi	1.1 mi
↷	3. Take the 2nd <b>right</b> onto <b>N Sunset Ave.</b> <i>N Sunset Ave is 0.2 miles past S 8th Ave</i> <i>Burger King is on the left</i> <i>If you reach S 6th Ave you've gone about 0.2 miles too far</i>	Go 2.7 Mi	3.8 mi
↶↷	4. Make a <b>U-turn</b> onto <b>S Sunset Ave.</b> <i>If you reach W Roseway St you've gone a little too far</i>	Go 0.1 Mi	3.9 mi
■	5. <b>1115 S SUNSET AVE</b> is on the <b>left.</b> <i>If you reach W Merced Ave you've gone about 0.1 miles too far</i>		3.9 mi
B	<b>Cvhp Queen Of-Valley Campus</b> 1115 S Sunset Ave, West Covina, CA 91790 (626) 962-4011	3.9 mi	3.9 mi

Total Travel Estimate: 3.90 miles - about 7 minutes



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333 Turnbull Canyon Road  
City of Industry, California

December 5, 2011  
Project No. 100252002

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**APPENDIX A**

**HEALTH AND SAFETY COMPLIANCE AGREEMENT**

Copy: \_\_\_\_\_

## **CONTRACTOR HEALTH AND SAFETY COMPLIANCE AGREEMENT**

Project Name: \_\_\_\_\_

I, \_\_\_\_\_ (PRINT NAME), have received a copy of the entire Health and Safety Plan for the above-referenced project. I have read the plan, understand it, and agree to comply with all of the health and safety requirements. I understand that I may be prohibited from working on the project for violating any of the requirements.

I have been approved to wear a respirator by a physician based on medical examination. I have been trained in the appropriate use, care, and storage of respiratory equipment. I have been respirator fit-tested, and I will have my respirator available for use in the field. I understand that I am to use the equipment supplied to me by my employer. I further understand that this equipment is provided solely for my benefit with the intent to minimize my exposure to potentially hazardous conditions. In the event of such usage, I agree to indemnify and hold harmless Contractor and all of its employees from and against any and all losses, demands, claims, liabilities, lawsuits, damages, costs, and expenses arising, in any way, from the use of the equipment.

Visitors will not receive a copy of the Health and Safety Plan but will be required to review it. It is required that visitors be escorted in the restricted access work zone. Visitors must comply with the Contractor escort directions while on-site at all times. Non-compliance with escort directions will not be tolerated, and violators will be requested to leave the site immediately.

Thank you for your cooperation.

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

Note: This original signed agreement is to be placed in the referenced project file.

**APPENDIX B**

**HEALTH AND SAFETY ORIENTATION MEETING ATTENDANCE ROSTER**

## HEALTH AND SAFETY ORIENTATION MEETING ATTENDANCE ROSTER

The following personnel involved in the field activities have attended a Health and Safety Plan orientation meeting.

By initialing this form, each person acknowledges that he/she has read and understands the indicated, numbered copy of the Health and Safety Plan.

Copy	Name	Company	Date	Attendees Initial
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				

Meeting Date: \_\_\_\_\_

Meeting Leader: \_\_\_\_\_

Project Name: \_\_\_\_\_

**APPENDIX C**

**TITLE 8, CALIFORNIA CODE OF REGULATIONS  
CONSTRUCTION SAFETY ORDERS**

**ARTICLE 10**

**HAULAGE AND EARTHMOVING**

**ARTICLE 6**

**EXCAVATION, TRENCHES, AND EARTHWORK**

**TITLE 8. Industrial Relations****Division 1. Department of Industrial Relations****Chapter 4. Division of Industrial Safety****Subchapter 4. Construction Safety Orders****Article 10. Haulage and Earth Moving****§1590. Haulage and Earth Moving, General.****§1590. Haulage and Earth Moving, General.**• [Note](#) • [History](#)**(a) Private Roadways and Off-Highway Conditions.**

(1) Single-lane private roads with two-way traffic shall be provided with turnouts. Where turnouts are not practicable, a control system shall be provided to prevent vehicles from meeting on such single-lane roads.

(2) On private roads used for two-way traffic, arrangements shall be such that vehicles travel on the right side as much as possible. Signs shall be posted to clearly indicate variations from this system. Where practicable, separate haulage roads shall be provided between loaded and empty units. Haulage roads shall be wide enough to allow for safe passage. Safe distances between moving units shall be maintained.

Note: Left hand traffic patterns are permitted provided that vehicle operators are advised of the pattern and job site conditions warrant that the procedure is safe.

(3) Private roads shall be maintained free from holes and ruts that affect the safe control of the vehicle. Every emergency access ramp and berm used by an employer shall be constructed to restrain and control runaway vehicles.

(4) Where a hazard exists to employees because of traffic or haulage conditions, a system of traffic controls shall be required so as to abate the hazard. (See [Section 1598\(b\)](#)).

Note: Nothing in this subsection shall preclude the use of additional signs that are not included in the Manual referenced in [Section 1598\(b\)](#). Examples: "Haul Road," "Left Hand Pattern," "Scraper Crossing," etc.

(5) Employees, such as grade-checkers, surveyors and others exposed to vehicular traffic, shall wear flagging garments, or equivalent, as required for flaggers. (See [Section 1598\(c\)](#)).

Note: See Index No. 5-07 of the Manual referenced in [Section 1598](#).

**(b) Dust Control.** Action shall be taken to prevent dust from seriously reducing visibility. In dusty operations, equipment operators shall use adequate respiratory protection.

**(c) Equipment Control.**

(1) Equipment shall be under control at all times and shall be kept in gear when descending grades.

(2) No vehicle shall be driven at a speed greater than is reasonable and proper, with due regard for weather, traffic, intersections, width and character of the roadway, type of motor vehicle, and any other existing conditions.

**(d) Exhaust.** Arrangements shall be made to direct exhaust gases away from the operator's breathing zone.

**(e) Heat Shields.** When push-tractors are working in tandem, heat shields, or equivalent protection, shall be provided for operators.

## NOTE

Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

## HISTORY

1. Amendment of subsection (e) and new subsections (f), (g) and (h) filed 10-2-70; effective thirtieth day thereafter (Register 70, No. 40).
2. Amendment of subsections (a) and (d) filed 5-21-75; effective thirtieth day thereafter (Register 75, No. 21).
3. Repealer and new section filed 11-12-75; effective thirtieth day thereafter (Register 75, No. 46).
4. Amendment of subsections (a) and (c) filed 2-7-86; effective thirtieth day thereafter (Register 86, No. 6).

### §1591. Haulage Vehicles, Equipment-Construction and Maintenance.

§ • Note • History

(a) Windshields complying with the applicable provisions of the Vehicle Code shall be provided and maintained on haulage vehicles and scrapers.

(b) Equipment and accessories installed on haulage vehicles shall be arranged so as to avoid impairing the driver's operational vision to the front or sides.

(c) Brakes, General. Service brake systems for self-propelled, rubber-tired, off-highway equipment manufactured before January 1, 1972 (for scrapers January 1, 1971) shall meet minimum performance criteria for service brake systems as set forth in the Society of Automotive Engineers Recommended Practices listed below. Service, emergency and parking brake systems for self-propelled, rubber-tired, off-highway equipment manufactured after January 1, 1972 (for scrapers January 1, 1971) shall meet the applicable minimum performance criteria for each system as set forth in the same Society of Automotive Engineers Recommended Practices:

Self-Propelled Graders	SAE J236-1971
Trucks and Wagons	SAE J166-1971
Front-End Loaders & Dozers	SAE J237-1971
Self-Propelled Scrapers	SAE J319b-1971

Note: Equipment that meets the performance criteria of SAE Recommended Practice J1152-APR 1980, Braking Performance--Rubber-Tired Construction Machines, satisfies the requirements of this Section.

(d) Air Tank Service. Liquids should be drained automatically from vehicle's compressed air tanks, but if such automatic equipment is not provided, the tanks shall be drained manually at least once each operating shift.

(e) Cab Shield. Haulage vehicles, whose pay load is loaded by means of cranes, power shovels, loaders, or similar equipment, shall have a cab shield and/or canopy adequate to protect the operator from shifting or falling materials.

(f) Fenders. Fenders complying with the following standards from SAE Recommended Practice J321, November, 1967 or J321b April, 1978, shall be provided on new scrapers, carryalls, related power units, and trailed hauling units manufactured and placed into service after January 1, 1971.

(g) Lights. Whenever visibility conditions warrant additional light, all vehicles, or combinations

of vehicles, in use shall be equipped with at least two headlights and two taillights in operable condition.

(h) Canopy. Crawler tractors, bulldozers, carryalls and similar equipment manufactured and used prior to April 1, 1971, except for scrapers, front-end loaders and new equipment covered by 1596, shall have canopy protection and seat belts for the operator when used where there is exposure to falling or rolling objects.

(i) Operating Levers. Operating levers controlling hoisting or dumping devices on haulage bodies shall be equipped with a latch or other device which will prevent accidental starting or tripping of the mechanism.

(j) Trip Handles. Trip handles for tailgates of dump trucks shall be so arranged that in dumping, the operator will not be exposed either to the hazard of being struck by falling material or any part of the truck.

(k) Dump Bodies. Haulage vehicles equipped with dump bodies that tilt to release their load by gravity through an opening at the rear or side shall be provided with a device that gives the operator a clearly audible or visible warning when sufficient force is applied by the elevating mechanism to cause or sustain dump body elevation.

(l) Hazard Signals. Tractor-scrapers (self-propelled) pushed by other equipment during loading operations shall be provided with a clearly audible or visible warning device that can be activated by the operator of the tractor-scraper to communicate an "ALL STOP" warning to the pushing equipment in event of an emergency.

#### NOTE

Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

#### HISTORY

1. Repealer of subsection (d), renumbering of subsections (e)-(k) to subsections (d)-(j), and new subsections (k) and (l) filed 3-19-79; effective thirtieth day thereafter (Register 79, No. 12). For prior history, see Register 75, No. 21.
2. Amendment of subsection (k) EXCEPTION filed 4-27-79; effective thirtieth day thereafter (Register 79, No. 17).
3. Editorial correction of subsection (k) (Register 79, No. 24).
4. Repealer and new subsections (k) and (l) filed 5-6-81; effective thirtieth day thereafter (Register 81, No. 19).
5. Amendment of subsections (a)-(g) filed 2-7-86; effective thirtieth day thereafter (Register 86, No. 6).

**TITLE 8. Industrial Relations****Division 1. Department of Industrial Relations****Chapter 4. Division of Industrial Safety****Subchapter 4. Construction Safety Orders****Article 10. Haulage and Earth Moving****§1591. Haulage Vehicles, Equipment-Construction and Maintenance.****§1591. Haulage Vehicles, Equipment-Construction and Maintenance.**

 • Note • History

(a) Windshields complying with the applicable provisions of the Vehicle Code shall be provided and maintained on haulage vehicles and scrapers.

(b) Equipment and accessories installed on haulage vehicles shall be arranged so as to avoid impairing the driver's operational vision to the front or sides.

(c) Brakes, General. Service brake systems for self-propelled, rubber-tired, off-highway equipment manufactured before January 1, 1972 (for scrapers January 1, 1971) shall meet minimum performance criteria for service brake systems as set forth in the Society of Automotive Engineers Recommended Practices listed below. Service, emergency and parking brake systems for self-propelled, rubber-tired, off-highway equipment manufactured after January 1, 1972 (for scrapers January 1, 1971) shall meet the applicable minimum performance criteria for each system as set forth in the same Society of Automotive Engineers Recommended Practices:

Self-Propelled Graders	SAE J236-1971
Trucks and Wagons	SAE J166-1971
Front-End Loaders & Dozers	SAE J237-1971
Self-Propelled Scrapers	SAE J196-1971

Note: Equipment that meets the performance criteria of SAE Recommended Practice J1152-APR 1980, Braking Performance--Rubber-Tired Construction Machines, satisfies the requirements of this Section.

(d) Air Tank Service. Liquids should be drained automatically from vehicle's compressed air tanks, but if such automatic equipment is not provided, the tanks shall be drained manually at least once each operating shift.

(e) Cab Shield. Haulage vehicles, whose pay load is loaded by means of cranes, power shovels, loaders, or similar equipment, shall have a cab shield and/or canopy adequate to protect the operator from shifting or falling materials.

(f) Fenders. Fenders complying with the following standards from SAE Recommended Practice J321, November, 1967 or J321b April, 1978, shall be provided on new scrapers, carryalls, related power units, and trailed hauling units manufactured and placed into service after January 1, 1971.

(g) Lights. Whenever visibility conditions warrant additional light, all vehicles, or combinations of vehicles, in use shall be equipped with at least two headlights and two taillights in operable condition.

(h) Canopy. Crawler tractors, bulldozers, carryalls and similar equipment manufactured and used

prior to April 1, 1971, except for scrapers, front-end loaders and new equipment covered by 1596, shall have canopy protection and seat belts for the operator when used where there is exposure to falling or rolling objects.

(i) Operating Levers. Operating levers controlling hoisting or dumping devices on haulage bodies shall be equipped with a latch or other device which will prevent accidental starting or tripping of the mechanism.

(j) Trip Handles. Trip handles for tailgates of dump trucks shall be so arranged that in dumping, the operator will not be exposed either to the hazard of being struck by falling material or any part of the truck.

(k) Dump Bodies. Haulage vehicles equipped with dump bodies that tilt to release their load by gravity through an opening at the rear or side shall be provided with a device that gives the operator a clearly audible or visible warning when sufficient force is applied by the elevating mechanism to cause or sustain dump body elevation.

(l) Hazard Signals. Tractor-scrapers (self-propelled) pushed by other equipment during loading operations shall be provided with a clearly audible or visible warning device that can be activated by the operator of the tractor-scraper to communicate an "ALL STOP" warning to the pushing equipment in event of an emergency.

#### NOTE

Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

#### HISTORY

1. Repealer of subsection (d), renumbering of subsections (e)-(k) to subsections (d)-(j), and new subsections (k) and (l) filed 3-19-79; effective thirtieth day thereafter (Register 79, No. 12). For prior history, see Register 75, No. 21.
2. Amendment of subsection (k) EXCEPTION filed 4-27-79; effective thirtieth day thereafter (Register 79, No. 17).
3. Editorial correction of subsection (k) (Register 79, No. 24).
4. Repealer and new subsections (k) and (l) filed 5-6-81; effective thirtieth day thereafter (Register 81, No. 19).
5. Amendment of subsections (a)-(g) filed 2-7-86; effective thirtieth day thereafter (Register 86, No. 6).

#### §1592. Warning Methods.



• Note • History

(a) Every vehicle with a haulage capacity of 2 1/2 cubic yards or more used to haul dirt, rock, concrete, or other construction material shall be equipped with a warning device that operates automatically while the vehicle is backing. The warning sound shall be of such magnitude that it will normally be audible from a distance of 200 feet and will sound immediately on backing. In congested areas or areas with high ambient noise which obscures the audible alarm, a signaler, in clear view of the operator, shall direct the backing operation.

(b) Those vehicles not subject to 1592(a) and operating in areas where their backward movement would constitute a hazard to employees working in the area on foot, and where the operator's vision is obstructed to the rear of the vehicle shall be equipped with an effective device or method to safeguard employees such as:

- (1) An automatic back-up audible alarm which would sound immediately on backing, or
- (2) An automatic braking device at the rear of the vehicle that will apply the service brake immediately on contact with any obstruction to the rear, or

- (3) In lieu of 1 or 2 above, administrative controls shall be established such as:
- (A) A spotter or flagger in clear view of the operator who shall direct the backing operation, or
  - (B) Other procedures which will require the operator to dismount and circle the vehicle immediately prior to starting a back-up operation, or
  - (C) Prohibiting all foot traffic in the work area.
- (4) Other means shall be provided that will furnish safety equivalent to the foregoing for personnel working in the area.
- (c) All vehicles shall be equipped with a manually operated warning device which can be clearly heard from a distance of 200 feet.
- (d) The operator of all vehicles shall not leave the controls of the vehicle while it is moving under its own engine power.
- (e) Hauling or earth moving operations shall be controlled in such a manner as to ensure that equipment or vehicle operators know of the presence of rootpickers, spotters, lab technicians, surveyors, or other workers on foot in the areas of their operations.

NOTE

Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

HISTORY

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**TITLE 8. Industrial Relations****Division 1. Department of Industrial Relations****Chapter 4. Division of Industrial Safety****Subchapter 4. Construction Safety Orders****Article 10. Haulage and Earth Moving****§1592. Warning Methods.****§1592. Warning Methods.**• Note • History

(a) Every vehicle with a haulage capacity of 2 1/2 cubic yards or more used to haul dirt, rock, concrete, or other construction material shall be equipped with a warning device that operates automatically while the vehicle is backing. The warning sound shall be of such magnitude that it will normally be audible from a distance of 200 feet and will sound immediately on backing. In congested areas or areas with high ambient noise which obscures the audible alarm, a signaler, in clear view of the operator, shall direct the backing operation.

(b) Those vehicles not subject to 1592(a) and operating in areas where their backward movement would constitute a hazard to employees working in the area on foot, and where the operator's vision is obstructed to the rear of the vehicle shall be equipped with an effective device or method to safeguard employees such as:

- (1) An automatic back-up audible alarm which would sound immediately on backing, or
- (2) An automatic braking device at the rear of the vehicle that will apply the service brake immediately on contact with any obstruction to the rear, or
- (3) In lieu of 1 or 2 above, administrative controls shall be established such as:
  - (A) A spotter or flagger in clear view of the operator who shall direct the backing operation, or
  - (B) Other procedures which will require the operator to dismount and circle the vehicle immediately prior to starting a back-up operation, or
  - (C) Prohibiting all foot traffic in the work area.
- (4) Other means shall be provided that will furnish safety equivalent to the foregoing for personnel working in the area.

(c) All vehicles shall be equipped with a manually operated warning device which can be clearly heard from a distance of 200 feet.

(d) The operator of all vehicles shall not leave the controls of the vehicle while it is moving under its own engine power.

(e) Hauling or earth moving operations shall be controlled in such a manner as to ensure that equipment or vehicle operators know of the presence of rootpickers, spotters, lab technicians, surveyors, or other workers on foot in the areas of their operations.

**NOTE**

Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

**HISTORY**

1. New subsections (c) and (d) filed 5-21-75; effective thirtieth day thereafter (Register 75, No. 21).
2. Repealer and new section filed 7-3-80; effective thirtieth day thereafter (Register 80, No. 27).

3. Amendment of subsections (a), (b) and (e) filed 2-7-86; effective thirtieth day thereafter (Register 86, No. 6).

### §1593. Haulage Vehicle Operation.

 • Note • History

- (a) Vehicles shall not be operated at speeds which will endanger the driver or traffic.
- (b) Haulage vehicles shall be under positive control during all periods of operation. When descending grades, the vehicles shall be kept in gear.
- (c) When wire rope is being wound on a power-driven drum, a mechanical threading device shall be used, where practicable, to guide the cable. When this operation must be done manually, the feet shall not be used and the hands shall be kept at least 3 feet from the drum.
- (d) All vehicles in use shall be checked at the beginning of each shift to assure that the following parts, equipment, and accessories are in safe operating condition and free of apparent damage that could cause failure while in use: service brakes, including trailer brake connections; parking system (hand brake); emergency stopping system (brake); tires; horn; steering mechanism; coupling devices; seat belts; operating controls; and safety devices. All defects affecting safe operation shall be corrected before the vehicle is placed in service. These requirements also apply to equipment such as lights, reflectors, windshield wipers, defrosters, fire extinguishers, etc., where such equipment is necessary.
- (e) Exhaust Gases. Vehicle engines shall not be allowed to run in closed garages or other enclosed places, unless vents are provided which effectively remove the exhaust gases from the building.
- (f) Unstable Loads. Loads on vehicles shall be secured against displacement.
- (g) Tire Repair. Except for emergency field repairs, a safety tire rack, cage, or equivalent protection shall be used when inflating truck or equipment tires after mounting on a rim, if such tires depend upon a locking ring or similar device to hold them on the rim.
- (h) Parking Brakes. Whenever the equipment is parked, the parking brake shall be set. Equipment parked on inclines shall have the wheels chocked and the parking brake set or be otherwise prevented from moving by effective mechanical means.
- (i) Scissor points on all front-end loaders which constitute a hazard to the operator shall be adequately guarded.
- (j) A loader shall not travel without adequate visibility for the driver and stability of the equipment.
- (k) No loading device shall be left unattended until the load or bucket is lowered to the ground, unless proper precautions such as blocking are taken to prevent accidental lowering.
- (l) All high lift trucks (e.g., fork lifts), industrial trucks, and rider trucks used on a construction site shall conform with the applicable orders in Article 25 of the General Industry Safety Orders and:
  - (1) If a load is lifted by two or more trucks working in unison, the proportion of the total load carried by any one truck shall not exceed its capacity.
  - (2) Steering or spinner knobs shall not be attached to the steering wheel unless the steering mechanism is of a type that prevents road reactions from causing the steering handwheel to spin. The steering knob shall be mounted within the periphery of the wheel.
- (m) Loading buckets, scoops, blades or similar attachments on haulage vehicles which do not provide fall protection equivalent to that required by Section 3210 of the General Industry Safety

Orders or Article 24 of the Construction Safety Orders (starting with Section 1669) shall not be used as work platforms or to elevate or transport employees except as provided by Section 1597 of these Orders.

NOTE

Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

HISTORY

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**TITLE 8. Industrial Relations****Division 1. Department of Industrial Relations****Chapter 4. Division of Industrial Safety****Subchapter 4. Construction Safety Orders****Article 10. Haulage and Earth Moving****§1593. Haulage Vehicle Operation.****§1593. Haulage Vehicle Operation.**• Note • History

- (a) Vehicles shall not be operated at speeds which will endanger the driver or traffic.
- (b) Haulage vehicles shall be under positive control during all periods of operation. When descending grades, the vehicles shall be kept in gear.
- (c) When wire rope is being wound on a power-driven drum, a mechanical threading device shall be used, where practicable, to guide the cable. When this operation must be done manually, the feet shall not be used and the hands shall be kept at least 3 feet from the drum.
- (d) All vehicles in use shall be checked at the beginning of each shift to assure that the following parts, equipment, and accessories are in safe operating condition and free of apparent damage that could cause failure while in use: service brakes, including trailer brake connections; parking system (hand brake); emergency stopping system (brake); tires; horn; steering mechanism; coupling devices; seat belts; operating controls; and safety devices. All defects affecting safe operation shall be corrected before the vehicle is placed in service. These requirements also apply to equipment such as lights, reflectors, windshield wipers, defrosters, fire extinguishers, etc., where such equipment is necessary.
- (e) Exhaust Gases. Vehicle engines shall not be allowed to run in closed garages or other enclosed places, unless vents are provided which effectively remove the exhaust gases from the building.
- (f) Unstable Loads. Loads on vehicles shall be secured against displacement.
- (g) Tire Repair. Except for emergency field repairs, a safety tire rack, cage, or equivalent protection shall be used when inflating truck or equipment tires after mounting on a rim, if such tires depend upon a locking ring or similar device to hold them on the rim.
- (h) Parking Brakes. Whenever the equipment is parked, the parking brake shall be set. Equipment parked on inclines shall have the wheels chocked and the parking brake set or be otherwise prevented from moving by effective mechanical means.
- (i) Scissor points on all front-end loaders which constitute a hazard to the operator shall be adequately guarded.
- (j) A loader shall not travel without adequate visibility for the driver and stability of the equipment.
- (k) No loading device shall be left unattended until the load or bucket is lowered to the ground, unless proper precautions such as blocking are taken to prevent accidental lowering.
- (l) All high lift trucks (e.g., fork lifts), industrial trucks, and rider trucks used on a construction site shall conform with the applicable orders in Article 25 of the General Industry Safety Orders and:
  - (1) If a load is lifted by two or more trucks working in unison, the proportion of the total load

carried by any one truck shall not exceed its capacity.

(2) Steering or spinner knobs shall not be attached to the steering wheel unless the steering mechanism is of a type that prevents road reactions from causing the steering handwheel to spin. The steering knob shall be mounted within the periphery of the wheel.

(m) Loading buckets, scoops, blades or similar attachments on haulage vehicles which do not provide fall protection equivalent to that required by Section 3210 of the General Industry Safety Orders or Article 24 of the Construction Safety Orders (starting with Section 1669) shall not be used as work platforms or to elevate or transport employees except as provided by Section 1597 of these Orders.

#### NOTE

Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

#### HISTORY

1. New subsection (i) filed 5-21-75; effective thirtieth day thereafter (Register 75, No. 21).
2. Amendment of subsection (a), repealer of former subsection (c), relettering and amendment of former subsections (d) and (e) to subsections (c) and (d) and relettering of former subsections (f)-(i) to subsections (e)-(h) filed 2-7-86; effective thirtieth day thereafter (Register 86, No. 6).
3. New subsections (i)-(l) filed 8-29-86; effective thirtieth day thereafter (Register 86, No. 39).
4. Amendment of subsection (d) and new subsection (m) filed 4-11-94; operative 5-11-94 (Register 94, No. 15).

#### §1594. Fueling.



• Note • History

(a) No internal combustion engine fuel tank shall be refilled with a flammable liquid while the engine is running. Fueling shall be done in such a manner that the likelihood of spillage is minimal. If a spill occurs it shall be washed away completely, evaporated, or equivalent action taken to control vapors before restarting the engine. Fuel tank caps shall be replaced before starting the engine.

(b) A good metal-to-metal contact shall be kept between fuel supply tank or nozzle of supply hose and the fuel tank.

(c) No open lights, welding, or sparking equipment shall be used near internal combustion equipment being fueled or near storage tanks.

(d) No smoking shall be permitted at or near the gasoline storage area or on equipment being fueled. Post a conspicuous sign in each fuel storage and fueling area stating: "*NO SMOKING WITHIN 25 FEET.*"

(e) Class I liquids shall not be dispensed by pressure from drums, barrels, and similar containers. Approved pumps taking suction through the top of the container or approved self-closing faucets shall be used.

(f) No repairs shall be made to equipment while it is being fueled.

(g) Each fuel storage tank or drum shall have the word "Flammable" conspicuously marked thereon and should also have a similarly sized word indicating the contents of the container.

(h) A dry chemical or carbon dioxide fire extinguisher rated 6:BC or larger shall be in a location accessible to the fueling area.

#### NOTE

Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

HISTORY

1. New section title, and repealer and new subsection (a) filed 3-19-79; effective thirtieth day thereafter (Register 79, No. 12).
  2. Amendment of subsections (e) and (h) filed 2-7-86; effective thirtieth day thereafter (Register 86, No. 6).
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**TITLE 8. Industrial Relations****Division 1. Department of Industrial Relations****Chapter 4. Division of Industrial Safety****Subchapter 4. Construction Safety Orders****Article 10. Haulage and Earth Moving****§1594. Fueling.****§1594. Fueling.**• Note • History

(a) No internal combustion engine fuel tank shall be refilled with a flammable liquid while the engine is running. Fueling shall be done in such a manner that the likelihood of spillage is minimal. If a spill occurs it shall be washed away completely, evaporated, or equivalent action taken to control vapors before restarting the engine. Fuel tank caps shall be replaced before starting the engine.

(b) A good metal-to-metal contact shall be kept between fuel supply tank or nozzle of supply hose and the fuel tank.

(c) No open lights, welding, or sparking equipment shall be used near internal combustion equipment being fueled or near storage tanks.

(d) No smoking shall be permitted at or near the gasoline storage area or on equipment being fueled. Post a conspicuous sign in each fuel storage and fueling area stating: "*NO SMOKING WITHIN 25 FEET.*"

(e) Class I liquids shall not be dispensed by pressure from drums, barrels, and similar containers. Approved pumps taking suction through the top of the container or approved self-closing faucets shall be used.

(f) No repairs shall be made to equipment while it is being fueled.

(g) Each fuel storage tank or drum shall have the word "Flammable" conspicuously marked thereon and should also have a similarly sized word indicating the contents of the container.

(h) A dry chemical or carbon dioxide fire extinguisher rated 6:BC or larger shall be in a location accessible to the fueling area.

**NOTE**

Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

**HISTORY**

1. New section title, and repealer and new subsection (a) filed 3-19-79; effective thirtieth day thereafter (Register 79, No. 12).

2. Amendment of subsections (e) and (h) filed 2-7-86; effective thirtieth day thereafter (Register 86, No. 6).

**§1595. Repair of Haulage Vehicles, Tractors, Bulldozers and Similar Equipment.**• Note • History

(a) No repairs shall be attempted on power equipment until arrangements are made to eliminate possibility of injury, caused by sudden movements or operation of the equipment or its parts.

When the equipment being repaired is a bulldozer, carryall, ripper, or other machine having sharp or heavy moving parts such as blades, beds, or gates, such parts shall be lowered to the ground or securely and positively blocked in an inoperative position.

All controls shall be in a neutral position, with the engine(s) stopped and brakes set, unless work being performed requires otherwise.

(b) Trucks with dump bodies shall be equipped with positive means of support, permanently attached, and capable of being locked in position to prevent accidental lowering of the body while maintenance or inspection work is being done. In all cases where the body is raised for any work, the locking device shall be used.

#### NOTE

Authority cited: Section 142.3, Labor Code; Reference: Section 142.3, Labor Code.

#### HISTORY

1. Repealer of subsections (b) through (f) filed 10-2-70; effective thirtieth day thereafter (Register 70, No. 40).
2. Amendment filed 5-21-75; effective thirtieth day thereafter (Register 75, No. 21).
3. Amendment filed 3-19-79; effective thirtieth day thereafter (Register 79, No. 12).
4. Amendment of subsection (a) filed 2-7-86; effective thirtieth day thereafter (Register 86, No. 6).

#### **§1596. Roll-Over Protective Structures (ROPS).**

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**TITLE 8. Industrial Relations****Division 1. Department of Industrial Relations****Chapter 4. Division of Industrial Safety****Subchapter 4. Construction Safety Orders****Article 10. Haulage and Earth Moving****§1595. Repair of Haulage Vehicles, Tractors, Bulldozers and Similar Equipment.****§1595. Repair of Haulage Vehicles, Tractors, Bulldozers and Similar Equipment.**• [Note](#) • [History](#)

(a) No repairs shall be attempted on power equipment until arrangements are made to eliminate possibility of injury, caused by sudden movements or operation of the equipment or its parts. When the equipment being repaired is a bulldozer, carryall, ripper, or other machine having sharp or heavy moving parts such as blades, beds, or gates, such parts shall be lowered to the ground or securely and positively blocked in an inoperative position.

All controls shall be in a neutral position, with the engine(s) stopped and brakes set, unless work being performed requires otherwise.

(b) Trucks with dump bodies shall be equipped with positive means of support, permanently attached, and capable of being locked in position to prevent accidental lowering of the body while maintenance or inspection work is being done. In all cases where the body is raised for any work, the locking device shall be used.

**NOTE**

Authority cited: Section 142.3, Labor Code; Reference: Section 142.3, Labor Code.

**HISTORY**

1. Repealer of subsections (b) through (f) filed 10-2-70; effective thirtieth day thereafter (Register 70, No. 40).
2. Amendment filed 5-21-75; effective thirtieth day thereafter (Register 75, No. 21).
3. Amendment filed 3-19-79; effective thirtieth day thereafter (Register 79, No. 12).
4. Amendment of subsection (a) filed 2-7-86; effective thirtieth day thereafter (Register 86, No. 6).

**§1596. Roll-Over Protective Structures (ROPS).**• [Note](#) • [History](#)

(a) Installation Schedule. ROPS and seat belts (see [Section 1596\(g\)](#)) shall be installed and used on all equipment specified in this section in accordance with the following effective dates for each type or use of equipment listed below:

Note: The provisions of this section do not apply to non-rider equipment.

(1) Scrapers, tractors, front-end loaders, bulldozers, motor graders and water wagon prime movers having brake horsepower ratings above 20:

*Equipment Manufacture Dates*

*Effective Date for ROPS and Seat Belts*

(A) On or after April 1, 1971

April 1, 1971

- (B) On or after July 1, 1969  
and prior to April 1, 1971
- (C) On or after January 1, 1960  
and prior to July 1, 1969
- (D) Prior to January 1, 1960  
(If operated under any of  
the conditions specified  
in Section 1596(a)(2)(B),  
(i) or (ii) or (iii).)

January 1, 1977

July 1, 1977

July 1, 1977

EXCEPTIONS to Section 1596(a)(1):

- (1) Side boom, pipe-laying tractors.
- (2) An operator restraining system, acceptable to the Division, shall be permitted to be used in lieu of the required seat belts on motor graders not designed for seated operations.
- (3) ROPS or seat belts shall not be required for the equipment identified in Section 1596(a)(1)(D) when loading/unloading from transportation vehicles on relatively flat surfaces.

(2) Rollers and compactors having a weight greater than 5,950 pounds.

(A) Rollers or compactors having segmented and/or sheepsfoot-type wheels or drums by July 1, 1977.

(B) All rollers and compactors (other than those specified in Section 1596(a)(2)(A)) when operating under any of the following conditions on or after July 1, 1977:

- (i) Parallel to and within 3 feet of a down slope steeper than 3 feet horizontal to 1 foot vertical, or  
(ii) Within 3 feet of a vertical or nearly vertical drop-off exceeding 1 foot in height, or  
(iii) On any grade exceeding 15 percent (10 feet horizontal to 1 1/2 feet vertical).

EXCEPTIONS to Section 1596(a)(2)(B):

- (1) Smooth, steel wheel rollers where the operator stands at the extreme rear of the vehicle.
- (2) Rollers and compactors identified in Section 1596(a)(2)(B) when loading/unloading from transportation vehicles on relatively flat surfaces.

(b) ROPS Approval. ROPS shall be approved for their intended use as defined in Section 1505 of these Orders.

EXCEPTION: See Section 1596(i).

(c) Overhead Protection. ROPS shall provide operator protection against the hazard of falling objects.

(d) Retrofit Design Criteria. The following items comprise the basic design criteria for retrofit ROPS used on scrapers, tractors, front-end loaders, bulldozers, motor graders and water wagon prime movers manufactured prior to April 1, 1971, and for rollers and compactors manufactured

prior to July 1, 1977:

(1) Designs shall be based on one of the following:

(A) SAE Recommended Practice J-1040-a, February, 1975, or

(B) Structural analysis calculations equivalent to SAE J-1040-a, or

(C) Capability to support at least 2 times the gross machine weight applied vertically subsequent to an independently applied side load not less than 1.25 times the gross machine weight applied horizontally at the top of ROPS.

Note: 1. Gross vehicle weight includes the ROPS, all fuels and other components required for normal use of the vehicle.

2. The structural characteristics of the vehicle frame must be included in the design of the ROPS system.

3. The mounting brackets shall be capable of withstanding vibration and the design loads applied to the ROPS.

(2) The inside dimensions of the ROPS shall meet the deflection limiting volume requirements of SAE J-397-a, July, 1973.

(3) The design of the ROPS shall be approved by a registered civil or mechanical engineer.

EXCEPTION: See Section 1596(f).

(e) Modification or Repair. ROPS required by Section 1596(a) may be modified or repaired providing such modification or repair complies with the provisions of Section 1596(d) or Federal OSHA standard 1926.1000(c)(2).

(f) Labeling. Each ROPS shall bear a label with the following information:

(1) Name and address of manufacturer.

(2) Manufacturer's ROPS model number.

(3) Make and model of equipment for which the ROPS is designed.

Labels shall be stamped plates or other permanently attached means of identification, and shall not be obscured, obliterated or changed.

(g) Seat Belts (i.e., lap belts) and Combination Pelvic/Upper Torso Restraint Systems. Seat belts shall be adequate for the intended service and in good repair. Belts previously approved by the Division and installed prior to January 1, 1971, are acceptable provided they remain serviceable. Belts installed on or after January 1, 1971, shall be labeled as meeting the requirements of the Society of Automotive Engineers (SAE) standard in effect at the time the belt was manufactured. Where installed, combination pelvic/upper torso (Type 2) restraint systems shall be labeled as meeting the requirements of SAE J2292 AUG97, Combination Pelvic/Upper Torso (Type 2) Operator Restraint Systems For Off-Road Work Machines.

Note: For the purpose of subsection (g), the term "upper torso restraint" means a portion of a seat belt assembly intended to restrain movement of the chest and shoulder regions.

(1) Adjustment. The seat belts shall be capable of snug adjustment by the employee by a means easily within the employee's reach or shall be provided with an automatic locking or emergency locking retractor.

(2) Marking. Each seat belt and combination pelvic/upper torso restraint system shall be permanently and legibly marked or labeled with year of manufacture, model or style number and name or trademark of manufacturer or distributor, or of the importer if manufactured outside of the United States.

(3) Stiffness. To minimize "roping," the seat belt webbing shall be woven and/or treated to produce a stiffness in the transverse direction equal to or greater than that obtained with a weave

of double plain with one up, one down binder, without stuffers. This stiffness shall be effective for the usable life of the webbing. The webbing shall be flexible in the longitudinal direction to permit adjustment to -40°F.

(4) Material. The seat belt webbing material shall have a resistance to acids, alkalis, mildew, aging, moisture and sunlight equal to or better than that of untreated polyester fiber. The webbing shall not be less than three (3) inches in width; its ends shall be protected or treated to prevent unravelling and the breaking strength shall be at least 6,000 pounds.

Note: For seat belt requirements for agricultural and industrial tractors, see Section 3653, General Industry Safety Orders.

(5) Release. The seat belt buckle shall be designed so that it can be easily released with a single motion. It shall also be capable of being released with either available mittened hand.

(6) Closure. The seat belt buckle shall be designed so that it can be easily closed with mittened hands.

(7) Location. When a two-piece belt is used, the adjustment means shall be on each half of the belt to allow for the centering of the buckle on the operator.

(8) Operation. Each adjustment shall be capable of being made with the use of one mittened hand.

(9) Tests. A typical complete seat belt assembly, including webbing, straps, buckles, adjustment and attachment hardware, and retractors, shall be capable of passing the following destructive tests:

(A) The assembly loop shall withstand, without failure, a force of not less than 5,000 pounds and each structural component of the assembly a force of not less than 2,500 pounds.

(B) The length of the assembly loop between anchorages shall not increase more than 14 inches and each half of the assembly loop shall not increase more than 7 inches when subjected to a force of 5,000 pounds.

(C) Any webbing cut by the hardware during testing shall have a breaking strength at the cut of not less than 4,200 pounds.

(h) Wheel-type Agricultural or Industrial Tractors.

(1) ROPS and seat belts shall be installed and used on all wheel-type agricultural or industrial tractors used in construction in accordance with the installation schedule in Section 1596(a)(1).

(2) The ROPS specified above shall be approved for their intended use as defined in Section 1505.

(3) Protective enclosures, if used, shall be approved for their intended use as defined in Section 1505.

(4) ROPS approvals granted for wheel-type agricultural or industrial tractors will remain effective for the specified models of equipment for which they were granted, unless revoked for cause. These ROPS shall bear a label with their California State Approval Number.

(i) Existing ROPS Approvals. ROPS and canopies installed prior to July 24, 1976 and having a label with a California approval number on the specific model of construction equipment for which the approval was granted shall be deemed to be in compliance with the provisions of this section relating to ROPS.

#### NOTE

Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code

#### HISTORY

1. Amendment of subsections (a) and (d) filed 5-25-76 as an emergency; effective upon filing (Register 76, No. 22). For prior history, see Register 76, No. 6.

2. Repealer and new section filed 7-21-76; effective thirtieth day thereafter (Register 76, No. 30).
  3. Amendment of subsections (b) and (d) and new subsection (i) filed 3-28-78; effective thirtieth day thereafter (Register 78, No. 13).
  4. Amendment of subsections (a)(1) and (a)(2)(B) filed 5-6-81; effective thirtieth day thereafter (Register 81, No. 19).
  5. Amendment filed 2-7-86; effective thirtieth day thereafter (Register 86, No. 6).
  6. Amendment of subsections (g)-(g)(2) filed 3-4-98; operative 4-3-98 (Register 98, No. 10).
  7. Amendment of subsections (b), (f)(4), (h)(2) and (h)(3) filed 5-17-99; operative 6-16-99 (Register 99, No. 21).
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**TITLE 8. Industrial Relations**  
**Division 1. Department of Industrial Relations**  
**Chapter 4. Division of Industrial Safety**  
**Subchapter 4. Construction Safety Orders**  
**Article 6. Excavations**  
**§1539. Permits.**

**§1539. Permits.**



• Note • History

For regulations relating to Permits for excavations and trenches, refer to the California Code of Regulations Title 8, Chapter 3.2, Article 2, Section 341 of the California Occupational Safety and Health Regulations (Cal/OSHA).

NOTE

Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

HISTORY

1. New section filed 6-21-72; effective thirtieth day thereafter (Register 72, No. 26).
2. Repealer and new section filed 8-1-74 as an emergency; effective upon filing (Register 74, No. 31).
3. Certificate of Compliance filed 11-22-74 (Register 74, No. 48).
4. Certificate of Compliance refiled 11-27-74 (Register 74, No. 48).
5. Repealer and new section filed 11-29-74; effective thirtieth day thereafter (Register 74, No. 48).
6. Amendment of article heading and section filed 8-26-91; operative 9-25-91 (Register 92, No. 13).

**§1540. Excavations.**



• Note • History

(a) Scope and application. This article applies to all open excavations made in the earth's surface. Excavations are defined to include trenches.

(b) Definitions applicable to this article.

Accepted engineering practices means those requirements which are compatible with standards of practice required by a registered professional engineer.

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

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

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

Cave-in. The separation of a mass of soil or rock material from the side of an excavation, or the

loss of soil from under a trench shield or support system, and its sudden movement into the excavation, either by falling or sliding, in sufficient quantity so that it could entrap, bury, or otherwise injure and immobilize a person.

Crossbraces. The horizontal members of a shoring system installed perpendicular to the sides of the excavation, the ends of which bear against either uprights or wales.

Excavation. Any man-made cut, cavity, trench, or depression in an earth surface, formed by earth removal.

Faces or sides. The vertical or inclined earth surfaces formed as a result of excavation work.

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

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

Kickout. The accidental release or failure of a cross brace.

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

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

Registered professional engineer. A person who is registered as a professional engineer in the state where the work is to be performed. However, a professional engineer, registered in any state is deemed to be a "registered professional engineer" within the meaning of this standard when approving designs for "manufactured protective systems" or "tabulated data" to be used in interstate commerce.

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

Shield (Shield system). A structure that is able to withstand the forces imposed on it by a cave-in and thereby protect employees within the structure. Shields can be permanent structures or can be designed to be portable and moved along as work progresses. Additionally, shields can be either premanufactured or job-built in accordance with Section 1541.1(c)(3) or (c)(4). Shields used in trenches are usually referred to as "trench boxes" or "trench shields."

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

Sides. See "Faces."

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

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

Structural ramp. A ramp built of steel or wood, usually used for vehicle access. Ramps made of soil or rock are not considered structural ramps.

Support system. A structure such as underpinning, bracing, or shoring, which provides support to an adjacent structure, underground installation, or the sides of an excavation.

Tabulated data. Tables and charts approved by a registered professional engineer and used to design and construct a protective system.

Trench (Trench excavation). A narrow excavation (in relation to its length) made below the surface of the ground. In general, the depth is greater than the width, but the width of a trench (measured at the bottom) is not greater than 15 feet. If forms or other structures are installed or constructed in an excavation so as to reduce the dimension measured from the forms or structure to the side of the excavation to 15 feet or less, (measured at the bottom of the excavation), the excavation is also considered to be a trench.

Trench box. See "Shield."

Trench shield. See "Shield."

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

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

#### NOTE

Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

#### HISTORY

1. Repealer and new section filed 8-23-82; effective thirtieth day thereafter (Register 82, No. 35). For prior history, see Register 75, No. 21.
2. Amendment of subsection (b)(3) filed 11-18-83; effective thirtieth day thereafter (Register 83, No. 47).
3. Amendment of subsections (b)(2) and (b)(3) filed 5-1-87; operative 5-31-87 (Register 87, No. 19).
4. Repealer and new section filed 8-26-91; operative 9-25-91 (Register 92, No. 13).

**TITLE 8. Industrial Relations****Division 1. Department of Industrial Relations****Chapter 4. Division of Industrial Safety****Subchapter 4. Construction Safety Orders****Article 6. Excavations****§1540. Excavations.****§1540. Excavations.**• Note • History

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#### NOTE

Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

## HISTORY

1. Repealer and new section filed 8-23-82; effective thirtieth day thereafter (Register 82, No. 35). For prior history, see Register 75, No. 21.
2. Amendment of subsection (b)(3) filed 11-18-83; effective thirtieth day thereafter (Register 83, No. 47).
3. Amendment of subsections (b)(2) and (b)(3) filed 5-1-87; operative 5-31-87 (Register 87, No. 19).
4. Repealer and new section filed 8-26-91; operative 9-25-91 (Register 92, No. 13).

## §1541. General Requirements.

 • Note • History

(a) Surface encumbrances. All surface encumbrances that are located so as to create a hazard to employees shall be removed or supported, as necessary, to safeguard employees.

(b) Underground installations.

(1) The estimated location of utility installations, such as sewer, telephone, fuel, electric, water lines, or any other underground installations that reasonably may be expected to be encountered during excavation work, shall be determined prior to opening an excavation.

(2) All Regional Notification Centers as defined by Government Code Section 4216(h) in the area involved and all known owners of underground facilities in the area who are not members of a Notification Center shall be advised of the proposed work at least 2 working days prior to the start of any digging or excavation work. EXCEPTION: Emergency repair work to underground facilities.

(3) When excavation operations approach the estimated location of underground installations, the exact location of the installations shall be determined by safe and acceptable means.

(4) While the excavation is open, underground installations shall be protected, supported, or removed as necessary to safeguard employees.

(c) Access and egress.

(1) Structural ramps.

(A) Structural ramps that are used solely by employees as a means of access or egress from excavations shall be designed by a competent person. Structural ramps used for access or egress of equipment shall be designed by a competent person qualified in structural design, and shall be constructed in accordance with the design.

(B) Ramps and runways constructed of two or more structural members shall have the structural members connected together to prevent displacement.

(C) Structural members used for ramps and runways shall be of uniform thickness.

(D) Cleats or other appropriate means used to connect runway structural members shall be attached to the bottom of the runway or shall be attached in a manner to prevent tripping.

(E) Structural ramps used in lieu of steps shall be provided with cleats or other surface treatments to the top surface to prevent slipping.

(2) Means of egress from trench excavations.

A stairway, ladder, ramp or other safe means of egress shall be located in trench excavations that are 4 feet or more in depth so as to require no more than 25 feet of lateral travel for employees.

(d) Exposure to vehicular traffic. Employees exposed to public vehicular traffic shall be provided with, and shall wear, warning vests or other suitable garments marked with or made of reflectorized or high-visibility material.

(e) Exposure to falling loads. No employee shall be permitted underneath loads handled by

lifting or digging equipment. Employees shall be required to stand away from any vehicle being loaded or unloaded to avoid being struck by any spillage or falling materials. Operators may remain in the cabs of vehicles being loaded or unloaded when the vehicles are equipped, in accordance with Section 1591(e), to provide adequate protection for the operator during loading and unloading operations.

(f) Warning system for mobile equipment. When mobile equipment is operated adjacent to an excavation, or when such equipment is required to approach the edge of an excavation, and the operator does not have a clear and direct view of the edge of the excavation, a warning system shall be utilized such as barricades, hand or mechanical signals, or stop logs. If possible, the grade should be away from the excavation.

(g) Hazardous atmospheres.

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

(A) Where oxygen deficiency (atmospheres containing less than 19.5 percent oxygen) or a hazardous atmosphere exists or could reasonably be expected to exist, such as in excavations in landfill areas or excavations in areas where hazardous substances are stored nearby, the atmospheres in the excavation shall be tested before employees enter excavations greater than 4 feet in depth.

(B) Adequate precautions shall be taken to prevent employee exposure to atmospheres containing less than 19.5 percent oxygen and other hazardous atmospheres. These precautions include providing proper respiratory protection or ventilation.

(C) Adequate precaution shall be taken such as providing ventilation, to prevent employee exposure to an atmosphere containing a concentration of a flammable gas in excess of 20 percent of the lower flammable limit of the gas.

(D) When controls are used that are intended to reduce the level of atmospheric contaminants to acceptable levels, testing shall be conducted as often as necessary to ensure that the atmosphere remains safe.

(2) Emergency rescue equipment.

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

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

(h) Protection from hazards associated with water accumulation.

(1) Employees shall not work in excavations in which there is accumulated water, or in excavations in which water is accumulating, unless adequate precautions have been taken to protect employees against the hazards posed by water accumulation. The precautions necessary to protect employees adequately vary with each situation, but could include special support or shield systems to protect from cave-ins, water removal to control the level of accumulating water, or use of a safety harness and lifeline.

(2) If water is controlled or prevented from accumulating by the use of water removal equipment, the water removal equipment and operations shall be monitored by a competent person to ensure proper operation.

(3) If excavation work interrupts the natural drainage of surface water (such as streams), diversion ditches, dikes, or other suitable means shall be used to prevent surface water from entering the excavation and to provide adequate drainage of the area adjacent to the excavation. Excavations subject to runoff from heavy rains will require an inspection by a competent person and compliance with Sections 1541 (h)(1) and (h)(2).

(i) Stability of adjacent structures.

(1) Where the stability of adjoining buildings, walls, or other structures is endangered by excavation operations, support systems such as shoring, bracing, or underpinning shall be provided to ensure the stability of such structures for the protection of employees.

(2) Excavation below the level of the base or footing of any foundation or retaining wall that could be reasonably expected to pose a hazard to employees shall not be permitted except when:

(A) A support system, such as underpinning, is provided to ensure the safety of employees and the stability of the structure; or

(B) The excavation is in stable rock; or

(C) A registered professional engineer has approved the determination that such excavation work will not pose a hazard to employees.

(3) Sidewalks, pavements and appurtenant structure shall not be undermined unless a support system or another method of protection is provided to protect employees from the possible collapse of such structures.

(j) Protection of employees from loose rock or soil.

(1) Adequate protection shall be provided to protect employees from loose rock or soil that could pose a hazard by falling or rolling from an excavation face. Such protection shall consist of scaling to remove loose material; installation of protective barricades at intervals as necessary on the face to stop and contain falling material; or other means that provide equivalent protection.

(2) Employees shall be protected from excavated or other materials or equipment that could pose a hazard by falling or rolling into excavations. Protection shall be provided by placing and keeping such materials or equipment at least 2 feet from the edge of excavations, or by the use of retaining devices that are sufficient to prevent materials or equipment from falling or rolling into excavations, or by a combination of both if necessary.

(k) Inspection.

(1) Daily inspections of excavations, the adjacent areas, and protective systems shall be made by a competent person for evidence of a situation that could result in possible cave-ins, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions. An inspection shall be conducted by the competent person prior to the start of work and as needed throughout the shift. Inspections shall also be made after every rain storm or other hazard increasing occurrence. These inspections are only required when employee exposure can be reasonably anticipated.

(2) Where the competent person finds evidence of a situation that could result in a possible cave-in, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions, exposed employees shall be removed from the hazardous area until the necessary precautions have been taken to ensure their safety.

(l) Fall protection.

(1) Where employees or equipment are required or permitted to cross over excavations over 6 feet and wider than 30 inches, walkways or bridges with standard guardrails shall be provided.

(2) 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 other similar operations, temporary wells, pits, shafts, etc., shall be backfilled.

NOTE



**TITLE 8. Industrial Relations****Division 1. Department of Industrial Relations****Chapter 4. Division of Industrial Safety****Subchapter 4. Construction Safety Orders****Article 6. Excavations****§1541. General Requirements.****§1541. General Requirements.**• Note • History

(a) Surface encumbrances. All surface encumbrances that are located so as to create a hazard to employees shall be removed or supported, as necessary, to safeguard employees.

(b) Underground installations.

(1) The estimated location of utility installations, such as sewer, telephone, fuel, electric, water lines, or any other underground installations that reasonably may be expected to be encountered during excavation work, shall be determined prior to opening an excavation.

(2) All Regional Notification Centers as defined by Government Code Section 4216(h) in the area involved and all known owners of underground facilities in the area who are not members of a Notification Center shall be advised of the proposed work at least 2 working days prior to the start of any digging or excavation work. EXCEPTION: Emergency repair work to underground facilities.

(3) When excavation operations approach the estimated location of underground installations, the exact location of the installations shall be determined by safe and acceptable means.

(4) While the excavation is open, underground installations shall be protected, supported, or removed as necessary to safeguard employees.

(c) Access and egress.

(1) Structural ramps.

(A) Structural ramps that are used solely by employees as a means of access or egress from excavations shall be designed by a competent person. Structural ramps used for access or egress of equipment shall be designed by a competent person qualified in structural design, and shall be constructed in accordance with the design.

(B) Ramps and runways constructed of two or more structural members shall have the structural members connected together to prevent displacement.

(C) Structural members used for ramps and runways shall be of uniform thickness.

(D) Cleats or other appropriate means used to connect runway structural members shall be attached to the bottom of the runway or shall be attached in a manner to prevent tripping.

(E) Structural ramps used in lieu of steps shall be provided with cleats or other surface treatments to the top surface to prevent slipping.

(2) Means of egress from trench excavations.

A stairway, ladder, ramp or other safe means of egress shall be located in trench excavations that are 4 feet or more in depth so as to require no more than 25 feet of lateral travel for employees.

(d) Exposure to vehicular traffic. Employees exposed to public vehicular traffic shall be provided with, and shall wear, warning vests or other suitable garments marked with or made of reflectorized or high-visibility material.

(e) Exposure to falling loads. No employee shall be permitted underneath loads handled by lifting or digging equipment. Employees shall be required to stand away from any vehicle being loaded or unloaded to avoid being struck by any spillage or falling materials. Operators may remain in the cabs of vehicles being loaded or unloaded when the vehicles are equipped, in accordance with Section 1591(e), to provide adequate protection for the operator during loading and unloading operations.

(f) Warning system for mobile equipment. When mobile equipment is operated adjacent to an excavation, or when such equipment is required to approach the edge of an excavation, and the operator does not have a clear and direct view of the edge of the excavation, a warning system shall be utilized such as barricades, hand or mechanical signals, or stop logs. If possible, the grade should be away from the excavation.

(g) Hazardous atmospheres.

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

(A) Where oxygen deficiency (atmospheres containing less than 19.5 percent oxygen) or a hazardous atmosphere exists or could reasonably be expected to exist, such as in excavations in landfill areas or excavations in areas where hazardous substances are stored nearby, the atmospheres in the excavation shall be tested before employees enter excavations greater than 4 feet in depth.

(B) Adequate precautions shall be taken to prevent employee exposure to atmospheres containing less than 19.5 percent oxygen and other hazardous atmospheres. These precautions include providing proper respiratory protection or ventilation.

(C) Adequate precaution shall be taken such as providing ventilation, to prevent employee exposure to an atmosphere containing a concentration of a flammable gas in excess of 20 percent of the lower flammable limit of the gas.

(D) When controls are used that are intended to reduce the level of atmospheric contaminants to acceptable levels, testing shall be conducted as often as necessary to ensure that the atmosphere remains safe.

(2) Emergency rescue equipment.

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

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

(h) Protection from hazards associated with water accumulation.

(1) Employees shall not work in excavations in which there is accumulated water, or in excavations in which water is accumulating, unless adequate precautions have been taken to protect employees against the hazards posed by water accumulation. The precautions necessary to protect employees adequately vary with each situation, but could include special support or shield systems to protect from cave-ins, water removal to control the level of accumulating water, or use of a safety harness and lifeline.

(2) If water is controlled or prevented from accumulating by the use of water removal equipment, the water removal equipment and operations shall be monitored by a competent person to ensure

proper operation.

(3) If excavation work interrupts the natural drainage of surface water (such as streams), diversion ditches, dikes, or other suitable means shall be used to prevent surface water from entering the excavation and to provide adequate drainage of the area adjacent to the excavation. Excavations subject to runoff from heavy rains will require an inspection by a competent person and compliance with Sections 1541 (h)(1) and (h)(2).

(i) Stability of adjacent structures.

(1) Where the stability of adjoining buildings, walls, or other structures is endangered by excavation operations, support systems such as shoring, bracing, or underpinning shall be provided to ensure the stability of such structures for the protection of employees.

(2) Excavation below the level of the base or footing of any foundation or retaining wall that could be reasonably expected to pose a hazard to employees shall not be permitted except when:

(A) A support system, such as underpinning, is provided to ensure the safety of employees and the stability of the structure; or

(B) The excavation is in stable rock; or

(C) A registered professional engineer has approved the determination that such excavation work will not pose a hazard to employees.

(3) Sidewalks, pavements and appurtenant structure shall not be undermined unless a support system or another method of protection is provided to protect employees from the possible collapse of such structures.

(j) Protection of employees from loose rock or soil.

(1) Adequate protection shall be provided to protect employees from loose rock or soil that could pose a hazard by falling or rolling from an excavation face. Such protection shall consist of scaling to remove loose material; installation of protective barricades at intervals as necessary on the face to stop and contain falling material; or other means that provide equivalent protection.

(2) Employees shall be protected from excavated or other materials or equipment that could pose a hazard by falling or rolling into excavations. Protection shall be provided by placing and keeping such materials or equipment at least 2 feet from the edge of excavations, or by the use of retaining devices that are sufficient to prevent materials or equipment from falling or rolling into excavations, or by a combination of both if necessary.

(k) Inspection.

(1) Daily inspections of excavations, the adjacent areas, and protective systems shall be made by a competent person for evidence of a situation that could result in possible cave-ins, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions. An inspection shall be conducted by the competent person prior to the start of work and as needed throughout the shift. Inspections shall also be made after every rain storm or other hazard increasing occurrence. These inspections are only required when employee exposure can be reasonably anticipated.

(2) Where the competent person finds evidence of a situation that could result in a possible cave-in, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions, exposed employees shall be removed from the hazardous area until the necessary precautions have been taken to ensure their safety.

(l) Fall protection.

(1) Where employees or equipment are required or permitted to cross over excavations over 6 feet and wider than 30 inches, walkways or bridges with standard guardrails shall be provided.

(2) 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

other similar operations, temporary wells, pits, shafts, etc., shall be backfilled.

#### NOTE

Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code; and Section 4216, Government Code.

#### HISTORY

1. Repealer and new section filed 8-23-82; effective thirtieth day thereafter (Register 82, No. 35). For prior history, see Registers 75, No. 21; 74, No. 35; and 74, No. 17.
2. Repealer and new section filed 8-26-91; operative 9-25-91 (Register 92, No. 13).
3. Change without regulatory effect amending subsection (h)(3) filed 10-22-92 pursuant to section 100, title 1, California Code of Regulations (Register 92, No. 43).
4. Amendment of subsections (c)(2) and (l)(1) filed 1-24-94; operative 2-23-94 (Register 94, No. 4).
5. Change without regulatory effect amending subsection (b)(2) filed 2-10-94 pursuant to title 1, section 100, California Code of Regulations (Register 94, No. 6).
6. Editorial correction restoring amendment to subsection (l)(7) (Register 94, No. 16).

### §1541.1. Requirements for Protective Systems.



• Note • History

#### (a) Protection of employees in excavations.

(1) Each employee in an excavation shall be protected from cave-ins by an adequate protective system designed in accordance with Section 1541.1(b) or (c) except when:

(A) Excavations are made entirely in stable rock; or

(B) Excavations are less than 5 feet in depth and examination of the ground by a competent person provides no indication of a potential cave-in.

(2) Protective systems shall have the capacity to resist without failure all loads that are intended or could reasonably be expected to be applied or transmitted to the system.

(b) Design of sloping and benching systems. The slopes and configurations of sloping and benching systems shall be selected and constructed by the employer or his designee and shall be in accordance with the requirements of Section 1541.1(b)(1), Section 1541.1(b)(2), Section 1541.1(b)(3), or Section 1541.1(b)(4), as follows:

(1) Option (1) --Allowable configurations and slopes.

(A) Excavations shall be sloped at an angle not steeper than one and one-half horizontal to one vertical (34 degrees measured from the horizontal), unless the employer uses one of the other options listed below.

(B) Slopes specified in Section 1541.1(b)(1)(A) shall be excavated to form configurations that are in accordance with the slopes shown for Type C soil in Appendix B to this article.

(2) Option (2) --Determination of slopes and configurations using Appendices A and B. Maximum allowable slopes, and allowable configurations for sloping and benching systems, shall be determined in accordance with the conditions and requirements set forth in Appendices A and B to this article.

(3) Option (3) --Designs using other tabulated data.

(A) Designs of sloping or benching systems shall be selected from and be in accordance with tabulated data, such as tables and charts.

(B) The tabulated data shall be in written form and shall include all of the following:

1. Identification of the parameters that affect the selection of a sloping or benching system drawn from such data;
2. Identification of the limits of use of the data, to include the magnitude and configuration of slopes determined to be safe;
3. Explanatory information as may be necessary to aid the user in making a correct selection of a protective system from the data.
4. At least one copy of the tabulated data which identifies the registered professional engineer who approved the data, shall be maintained at the jobsite during construction of the protective system. After that time the data may be stored off the jobsite, but a copy of the data shall be made available to the Division upon request.

(4) Option (4) --Design by a registered professional engineer.

(A) Sloping and benching systems not utilizing Option (1) or Option (2) or Option (3) under Section 1541.1(b) shall be stamped and signed by a registered professional engineer.

(B) Designs shall be in written form and shall include at least the following:

1. The magnitude of the slopes that were determined to be safe for the particular project;
2. The configurations that were determined to be safe for the particular project;
3. The identity of the registered professional engineer approving the design.

(C) At least one copy of the design shall be maintained at the jobsite while the slope is being constructed. After that time the design need not be at the jobsite, but a copy shall be made available to the Division upon request.

(c) Design of support systems, shield systems, and other protective systems. Designs of support systems, shield systems, and other protective systems shall be selected and constructed by the employer or his designee and shall be in accordance with the requirements of Section 1541.1(c) (1); or, in the alternative, Section 1541.1(c)(2); or, in the alternative, Section 1541.1(c)(3); or, in the alternative, Section 1541.1(c)(4) as follows:

(1) Option (1) --Designs using Appendices A, C and D. Designs for timber shoring in trenches shall be determined in accordance with the conditions and requirements set forth in Appendices A and C to this article. Designs for aluminum hydraulic shoring shall be in accordance with Section 1541.1(c)(2), but if manufacturer's tabulated data cannot be utilized, designs shall be in accordance with Appendix D.

(2) Option (2) --Designs Using Manufacturer's Tabulated Data.

(A) Design of support systems, shield systems, or other protective systems that are drawn from manufacturer's tabulated data shall be in accordance with all specifications, recommendations, and limitations issued or made by the manufacturer.

(B) Deviation from the specifications, recommendations, and limitations issued or made by the manufacturer shall only be allowed after the manufacturer issues specific written approval.

(C) Manufacturer's specifications, recommendations, and limitations, and manufacturer's approval to deviate from the specifications, recommendations, and limitations shall be in written form at the jobsite during construction of the protective system. After that time this data may be stored off the jobsite, but a copy shall be made available to the Division upon request.

(3) Option (3) --Designs using other tabulated data.

(A) Designs of support systems, shield systems, or other protective systems shall be selected from and be in accordance with tabulated data, such as tables and charts.

(B) The tabulated data shall be in written form and include all of the following:

1. Identification of the parameters that affect the selection of a protective system drawn from such data;

2. Identification of the limits of use of the data;
3. Explanatory information as may be necessary to aid the user in making a correct selection of a protective system from the data.

(C) At least one copy of the tabulated data, which identifies the registered professional engineer who approved the data, shall be maintained at the jobsite during construction of the protective system. After that time the data may be stored off the jobsite, but a copy of the data shall be made available to the Division upon request.

(4) Option (4) --Design by a registered professional engineer.

(A) Support systems, shield systems, and other protective systems not utilizing Option 1, Option 2, or Option 3, above, shall be approved by a registered professional engineer.

(B) Designs shall be in written form and shall include the following:

1. A plan indicating the sizes, types, and configurations of the materials to be used in the protective system; and
2. The identity of the registered professional engineer approving the design.

(C) At least one copy of the design shall be maintained at the jobsite during construction of the protective system. After that time, the design may be stored off the jobsite, but a copy of the design shall be made available to the Division upon request.

(d) Materials and equipment.

(1) Materials and equipment used for protective systems shall be free from damage or defects that might impair their proper function.

(2) Manufactured materials and equipment used for protective systems shall be used and maintained in a manner that is consistent with the recommendations of the manufacturer, and in a manner that will prevent employee exposure to hazards.

(3) When material or equipment that is used for protective systems is damaged, a competent person shall examine the material or equipment and evaluate its suitability for continued use. If the competent person cannot assure the material or equipment is able to support the intended loads or is otherwise suitable for safe use, then such material or equipment shall be removed from service, and shall be evaluated and approved by a registered professional engineer before being returned to service.

(e) Installation and removal of supports.

(1) General.

(A) Members of support systems shall be securely connected together to prevent sliding, falling, kickouts, or other predictable failure.

(B) Support systems shall be installed and removed in a manner that protects employees from cave-ins, structural collapses, or from being struck by members of the support system.

(C) Individual members of support systems shall not be subjected to loads exceeding those which those members were designed to withstand.

(D) Before temporary removal of individual members begins, additional precautions shall be taken to ensure the safety of employees, such as installing other structural members to carry the loads imposed on the support system.

(E) Removal shall begin at, and progress from, the bottom of the excavation. Members shall be released slowly so as to note any indication of possible failure of the remaining members of the structure or possible cave-in of the sides of the excavation.

(F) Backfilling shall progress together with the removal of support systems from excavations.

(2) Additional requirements for support systems for trench excavations.

(A) Excavation of material to a level no greater than 2 feet below the bottom of the members of a

support system shall be permitted, but only if the system is designed to resist the forces calculated for the full depth of the trench, and there are no indications while the trench is open of a possible loss of soil from behind or below the bottom of the support system.

(B) Installation of a support system shall be closely coordinated with the excavation of trenches.

(f) Sloping and benching systems. Employees shall not be permitted to work on the faces of sloped or benched excavations at levels above other employees except when employees at the lower levels are adequately protected from the hazard of falling, rolling, or sliding material or equipment.

(g) Shield systems.

(1) General.

(A) Shield systems shall not be subjected to loads exceeding those which the system was designed to withstand.

(B) Shields shall be installed in a manner to restrict lateral or other hazardous movement of the shield in the event of the application of sudden lateral loads.

(C) Employees shall be protected from the hazard of cave-ins when entering or exiting the areas protected by shields.

(D) Employees shall not be allowed in shields when shields are being installed, removed, or moved vertically.

(2) Additional requirements for shield systems used in trench excavations. The sides of the shield shall extend a minimum of 18 inches above the vertical walls of compound excavations as shown in Appendix B, figures B-1, B-1.2 and B-1.3. On vertically cut trenches, the shield shall extend to at least the catch point of the trench. Excavations of earth material to a level not greater than 2 feet below the bottom of a shield shall be permitted, but only if the shield is designed to resist the forces calculated for the full depth of the trench, and there are no indications while the trench is open of a possible loss of soil from behind or below the bottom of the shield.

(h) Uprights shall extend to the top of the trench with the lower end of the upright not more than 2 feet from the bottom of the trench.



**TITLE 8. Industrial Relations****Division 1. Department of Industrial Relations****Chapter 4. Division of Industrial Safety****Subchapter 4. Construction Safety Orders****Article 6. Excavations****§1541.1. Requirements for Protective Systems.****§1541.1. Requirements for Protective Systems.**

 • Note • History

(a) Protection of employees in excavations.

(1) Each employee in an excavation shall be protected from cave-ins by an adequate protective system designed in accordance with Section 1541.1(b) or (c) except when:

(A) Excavations are made entirely in stable rock; or

(B) Excavations are less than 5 feet in depth and examination of the ground by a competent person provides no indication of a potential cave-in.

(2) Protective systems shall have the capacity to resist without failure all loads that are intended or could reasonably be expected to be applied or transmitted to the system.

(b) Design of sloping and benching systems. The slopes and configurations of sloping and benching systems shall be selected and constructed by the employer or his designee and shall be in accordance with the requirements of Section 1541.1(b)(1), Section 1541.1(b)(2), Section 1541.1(b)(3), or Section 1541.1(b)(4), as follows:

(1) Option (1) --Allowable configurations and slopes.

(A) Excavations shall be sloped at an angle not steeper than one and one-half horizontal to one vertical (34 degrees measured from the horizontal), unless the employer uses one of the other options listed below.

(B) Slopes specified in Section 1541.1(b)(1)(A) shall be excavated to form configurations that are in accordance with the slopes shown for Type C soil in Appendix B to this article.

(2) Option (2) --Determination of slopes and configurations using Appendices A and B. Maximum allowable slopes, and allowable configurations for sloping and benching systems, shall be determined in accordance with the conditions and requirements set forth in Appendices A and B to this article.

(3) Option (3) --Designs using other tabulated data.

(A) Designs of sloping or benching systems shall be selected from and be in accordance with tabulated data, such as tables and charts.

(B) The tabulated data shall be in written form and shall include all of the following:

1. Identification of the parameters that affect the selection of a sloping or benching system drawn from such data;

2. Identification of the limits of use of the data, to include the magnitude and configuration of slopes determined to be safe;

3. Explanatory information as may be necessary to aid the user in making a correct selection of a protective system from the data.

4. At least one copy of the tabulated data which identifies the registered professional engineer

who approved the data, shall be maintained at the jobsite during construction of the protective system. After that time the data may be stored off the jobsite, but a copy of the data shall be made available to the Division upon request.

(4) Option (4) --Design by a registered professional engineer.

(A) Sloping and benching systems not utilizing Option (1) or Option (2) or Option (3) under Section 1541.1(b) shall be stamped and signed by a registered professional engineer.

(B) Designs shall be in written form and shall include at least the following:

1. The magnitude of the slopes that were determined to be safe for the particular project;
2. The configurations that were determined to be safe for the particular project;
3. The identity of the registered professional engineer approving the design.

(C) At least one copy of the design shall be maintained at the jobsite while the slope is being constructed. After that time the design need not be at the jobsite, but a copy shall be made available to the Division upon request.

(c) Design of support systems, shield systems, and other protective systems. Designs of support systems, shield systems, and other protective systems shall be selected and constructed by the employer or his designee and shall be in accordance with the requirements of Section 1541.1(c) (1); or, in the alternative, Section 1541.1(c)(2); or, in the alternative, Section 1541.1(c)(3); or, in the alternative, Section 1541.1(c)(4) as follows:

(1) Option (1) --Designs using Appendices A, C and D. Designs for timber shoring in trenches shall be determined in accordance with the conditions and requirements set forth in Appendices A and C to this article. Designs for aluminum hydraulic shoring shall be in accordance with Section 1541.1(c)(2), but if manufacturer's tabulated data cannot be utilized, designs shall be in accordance with Appendix D.

(2) Option (2) --Designs Using Manufacturer's Tabulated Data.

(A) Design of support systems, shield systems, or other protective systems that are drawn from manufacturer's tabulated data shall be in accordance with all specifications, recommendations, and limitations issued or made by the manufacturer.

(B) Deviation from the specifications, recommendations, and limitations issued or made by the manufacturer shall only be allowed after the manufacturer issues specific written approval.

(C) Manufacturer's specifications, recommendations, and limitations, and manufacturer's approval to deviate from the specifications, recommendations, and limitations shall be in written form at the jobsite during construction of the protective system. After that time this data may be stored off the jobsite, but a copy shall be made available to the Division upon request.

(3) Option (3) --Designs using other tabulated data.

(A) Designs of support systems, shield systems, or other protective systems shall be selected from and be in accordance with tabulated data, such as tables and charts.

(B) The tabulated data shall be in written form and include all of the following:

1. Identification of the parameters that affect the selection of a protective system drawn from such data;
2. Identification of the limits of use of the data;
3. Explanatory information as may be necessary to aid the user in making a correct selection of a protective system from the data.

(C) At least one copy of the tabulated data, which identifies the registered professional engineer who approved the data, shall be maintained at the jobsite during construction of the protective system. After that time the data may be stored off the jobsite, but a copy of the data shall be made available to the Division upon request.

(4) Option (4) --Design by a registered professional engineer.

(A) Support systems, shield systems, and other protective systems not utilizing Option 1, Option 2, or Option 3, above, shall be approved by a registered professional engineer.

(B) Designs shall be in written form and shall include the following:

1. A plan indicating the sizes, types, and configurations of the materials to be used in the protective system; and

2. The identity of the registered professional engineer approving the design.

(C) At least one copy of the design shall be maintained at the jobsite during construction of the protective system. After that time, the design may be stored off the jobsite, but a copy of the design shall be made available to the Division upon request.

(d) Materials and equipment.

(1) Materials and equipment used for protective systems shall be free from damage or defects that might impair their proper function.

(2) Manufactured materials and equipment used for protective systems shall be used and maintained in a manner that is consistent with the recommendations of the manufacturer, and in a manner that will prevent employee exposure to hazards.

(3) When material or equipment that is used for protective systems is damaged, a competent person shall examine the material or equipment and evaluate its suitability for continued use. If the competent person cannot assure the material or equipment is able to support the intended loads or is otherwise suitable for safe use, then such material or equipment shall be removed from service, and shall be evaluated and approved by a registered professional engineer before being returned to service.

(e) Installation and removal of supports.

(1) General.

(A) Members of support systems shall be securely connected together to prevent sliding, falling, kickouts, or other predictable failure.

(B) Support systems shall be installed and removed in a manner that protects employees from cave-ins, structural collapses, or from being struck by members of the support system.

(C) Individual members of support systems shall not be subjected to loads exceeding those which those members were designed to withstand.

(D) Before temporary removal of individual members begins, additional precautions shall be taken to ensure the safety of employees, such as installing other structural members to carry the loads imposed on the support system.

(E) Removal shall begin at, and progress from, the bottom of the excavation. Members shall be released slowly so as to note any indication of possible failure of the remaining members of the structure or possible cave-in of the sides of the excavation.

(F) Backfilling shall progress together with the removal of support systems from excavations.

(2) Additional requirements for support systems for trench excavations.

(A) Excavation of material to a level no greater than 2 feet below the bottom of the members of a support system shall be permitted, but only if the system is designed to resist the forces calculated for the full depth of the trench, and there are no indications while the trench is open of a possible loss of soil from behind or below the bottom of the support system.

(B) Installation of a support system shall be closely coordinated with the excavation of trenches.

(f) Sloping and benching systems. Employees shall not be permitted to work on the faces of sloped or benched excavations at levels above other employees except when employees at the lower levels are adequately protected from the hazard of falling, rolling, or sliding material or

equipment.

(g) Shield systems.

(1) General.

(A) Shield systems shall not be subjected to loads exceeding those which the system was designed to withstand.

(B) Shields shall be installed in a manner to restrict lateral or other hazardous movement of the shield in the event of the application of sudden lateral loads.

(C) Employees shall be protected from the hazard of cave-ins when entering or exiting the areas protected by shields.

(D) Employees shall not be allowed in shields when shields are being installed, removed, or moved vertically.

(2) Additional requirements for shield systems used in trench excavations. The sides of the shield shall extend a minimum of 18 inches above the vertical walls of compound excavations as shown in Appendix B, figures B-1, B-1.2 and B-1.3. On vertically cut trenches, the shield shall extend to at least the catch point of the trench. Excavations of earth material to a level not greater than 2 feet below the bottom of a shield shall be permitted, but only if the shield is designed to resist the forces calculated for the full depth of the trench, and there are no indications while the trench is open of a possible loss of soil from behind or below the bottom of the shield.

(h) Uprights shall extend to the top of the trench with the lower end of the upright not more than 2 feet from the bottom of the trench.

#### NOTE

Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

#### HISTORY

1. New section including Appendices A-F filed 8-26-91; operative 9-25-91 (Register 92, No. 13).
2. Change without regulatory effect amending Appendix B, subsection (c)(3)(C) filed 6-29-92; operative 7-29-92 pursuant to section 100, title 1, California Code of Regulations (Register 92, No. 27).
3. Change without regulatory effect amending Appendix A, subsection (b), Soil classification system filed 10-22-92 pursuant to section 100, title 1, California Code of Regulations (Register 92, No. 43).
4. Change without regulatory effect amending subsection (b)(1)(B) filed 12-18-95 pursuant to section 100, title 1, California Code of Regulations (Register 95, No. 51).
5. Editorial correction restoring subsection (g)(1)(A) (Register 97, No. 6).
6. Amendment of subsections (b) and (b)(4)(A), new subsection (g)(1)(A), and amendment of subsection (g)(2) filed 3-5-97; operative 4-4-97 (Register 97, No. 10).
7. New subsection (h) and amendment of Appendix D, subsection (g)(7) filed 4-9-2001; operative 5-9-2001 (Register 2001, No. 15).

#### Appendix A

##### Soil Classification

(a) Scope and application.

(1) Scope. This appendix describes a method of classifying soil and rock deposits based on site and environmental conditions, and on the structure and composition of the earth deposits. The appendix contains definitions, sets forth requirements, and describes acceptable visual and manual tests for use in classifying soils.

(2) Application. This appendix applies when a sloping or benching system is designed in

accordance with the requirements set forth in Section 1541.1(b)(2) as a method of protection for employees from cave-ins. This appendix also applies when timber shoring for excavations is designed as a method of protection from cave-ins in accordance with Appendix C to this article, and when aluminum hydraulic shoring is designed in accordance with Appendix D. This appendix also applies if other protective systems are designed and selected for use from data prepared in accordance with the requirements set forth in Section 1541.1(c), and the use of the data is predicated on the use of the soil classification system set forth in this appendix.

(b) Definitions.

**Cemented soil.** A soil in which the particles are held together by a chemical agent, such as calcium carbonate, such that a hand-size sample cannot be crushed into powder or individual soil particles by finger pressure.

**Cohesive soil.** Clay (fine grained soil), or soil with a high clay content, which has cohesive strength. Cohesive soil does not crumble, can be excavated with vertical side slopes, and is plastic when moist. Cohesive soil is hard to break up when dry, and exhibits significant cohesion when submerged. Cohesive soils include clayey silt, sandy clay, silty clay, clay and organic clay.

**Dry soil.** Soil that does not exhibit visible signs of moisture content.

**Fissured.** A soil material that has a tendency to break along definite planes of fracture with little resistance, or a material that exhibits open cracks, such as tension cracks, in an exposed surface.

**Granular soil.** Gravel, sand, or silt (coarse grained soil) with little or no clay content. Granular soil has no cohesive strength. Some moist granular soils exhibit apparent cohesion. Granular soil cannot be molded when moist and crumbles easily when dry.

**Layered system.** Two or more distinctly different soil or rock types arranged in layers. Micaceous seams or weakened planes in rock or shale are considered layered.

**Moist soil.** A condition in which a soil looks and feels damp. Moist cohesive soil can easily be shaped into a ball and rolled into small diameter threads before crumbling. Moist granular soil that contains some cohesive material will exhibit signs of cohesion between particles.

**Plastic.** A property of a soil which allows the soil to be deformed or molded without cracking, or appreciable volume change.

**Saturated soil.** A soil in which the voids are filled with water. Saturation does not require flow. Saturation, or near saturation, is necessary for the proper use of instruments such as a pocket penetrometer or shear vane.

**Soil classification system.** A method of categorizing soil and rock deposits in a hierarchy of Stable Rock, Type A, Type B, and Type C, in decreasing order of stability. The categories are determined based on an analysis of the properties and performance characteristics of the deposits and the environmental conditions of exposure.

**Stable rock.** Natural solid mineral matter that can be excavated with vertical sides and remain intact while exposed.

**Submerged soil.** Soil which is underwater or is free seeping.

**Type A soil.** Cohesive soils with an unconfined, compressive strength of 1.5 ton per square foot (tsf) or greater. Examples of cohesive soils are: clay, silty clay, sandy clay, clay loam and, in some cases, silty clay loam and sandy clay loam. Cemented soils such as caliche and hardpan are also considered Type A. However, no soil is Type A if:

- (1) The soil is fissured; or
- (2) The soil is subject to vibration from heavy traffic, pile driving, or similar effects; or
- (3) The soil has been previously disturbed; or
- (4) The soil is part of a sloped, layered system where the layers dip into the excavation on a slope of four horizontal to one vertical (4H:1V) or greater; or

(5) The material is subject to other factors that would require it to be classified as a less stable material.

Type B soil:

- (1) Cohesive soil with an unconfined compressive strength greater than 0.5 tsf but less than 1.5 tsf; or
- (2) Granular cohesionless soils including: angular gravel (similar to crushed rock), silt, silt loam, sandy loam and, in some cases, silty clay loam and sandy clay loam.
- (3) Previously disturbed soils except those which would otherwise be classed as Type C soil.
- (4) Soil that meets the unconfined compressive strength or cementation requirements for Type A, but is fissured or subject to vibration; or
- (5) Dry rock that is not stable; or
- (6) Material that is part of a sloped, layered system where the layers dip into the excavation on a slope less steep than four horizontal to one vertical (4H:1V), but only if the material would otherwise be classified as Type B.

Type C soil:

- (1) Cohesive soil with an unconfined compressive strength of 0.5 tsf or less; or
- (2) Granular soils including gravel, sand, and loamy sand; or
- (3) Submerged soil or soil from which water is freely seeping; or
- (4) Submerged rock that is not stable, or
- (5) Material in a sloped, layered system where the layers dip into the excavation on a slope of four horizontal to one vertical (4H:1V) or steeper.

Unconfined compressive strength. The load per unit area at which a soil will fail in compression. It can be determined by laboratory testing, or estimated in the field using a pocket penetrometer, by thumb penetration tests, and other methods.

Wet soil. Soil that contains significantly more moisture than moist soil, but in such a range of values that cohesive material will slump or begin to flow when vibrated. Granular material that would exhibit cohesive properties when moist will lose those cohesive properties when wet.

(c) Requirements.

- (1) Classification of soil and rock deposits. Each soil and rock deposit shall be classified by a competent person as Stable Rock, Type A, Type B, or Type C in accordance with the definitions set forth in paragraph (b) of this appendix.
- (2) Basis of classification. The classification of the deposits shall be made based on the results of at least one visual and at least one manual analysis. Such analyses shall be conducted by a competent person using tests described in paragraph (d) below, or in other approved methods of soil classification and testing such as those adopted by the American Society for Testing Materials, or the U.S. Department of Agriculture textural classification system.
- (3) Visual and manual analyses. The visual and manual analyses, such as those noted as being acceptable in paragraph (d) of this appendix, shall be designed and conducted to provide sufficient quantitative and qualitative information as may be necessary to identify properly the properties, factors, and conditions affecting the classification of the deposits.
- (4) Layered systems. In a layered system, the system shall be classified in accordance with its weakest layer. However, each layer may be classified individually where a more stable layer lies under a less stable layer.
- (5) Reclassification. If, after classifying a deposit, the properties, factors, or conditions affecting its classification change in any way, the changes shall be evaluated by a competent person. The deposit shall be reclassified as necessary to reflect the changed circumstances.

(d) Acceptable visual and manual tests.

(1) Visual tests. Visual analysis is conducted to determine qualitative information regarding the excavation site in general, the soil adjacent to the excavation, the soil forming the sides of the open excavation, and the soil taken as samples from excavated material.

(A) Observe samples of soil that are excavated and soil in the sides of the excavation. Estimate the range of particle sizes and the relative amounts of the particle sizes. Soil that is primarily composed of fine-grained material is cohesive material. Soil composed primarily of coarse-grained sand or gravel is granular material.

(B) Observe soil as it is excavated. Soil that remains in clumps when excavated is cohesive. Soil that breads up easily and does not stay in clumps is granular.

(C) Observe the side of the opened excavation and the surface area adjacent to the excavation. Crack-like openings such as tension cracks could indicate fissured material. If chunks of soil spill off a vertical side, the soil could be fissured. Small spalls are evidence of moving ground and are indications of potentially hazardous situations.

(D) Observe the area adjacent to the excavation and the excavation itself for evidence of existing utility and other underground structures, and to identify previously disturbed soil.

(E) Observe the opened side of the excavation to identify layered systems. Examine layered systems to identify if the layers slope toward the excavation. Estimate the degree of slope of the layers.

(F) Observe the area adjacent to the excavation and the sides of the opened excavation for evidence of surface water, water seeping from the sides of the excavation, or the location of the level of the water table.

(G) Observe the area adjacent to the excavation and the area within the excavation for sources of vibration that may affect the stability of the excavation face.

(2) Manual tests. Manual analysis of soil samples is conducted to determine quantitative as well as qualitative properties of soil and to provide more information in order to classify soil properly.

(A) Plasticity. Mold a moist or wet sample of soil into a ball and attempt to roll it into threads as thin as 1/8-inch in diameter. Cohesive material can be successfully rolled into threads without crumbling. For example, if at least a two inch length of 1/8-inch thread can be held on one end without tearing, the soil is cohesive.

(B) Dry strength. If the soil is dry and crumbles on its own or with moderate pressure into individual grains or fine powder, it is granular (any combination of gravel, sand, or silt). If the soil is dry and falls into clumps which break up into smaller clumps, but the smaller clumps can only be broken up with difficulty, it may be clay in any combination with gravel, sand or silt. If the dry soil breads into clumps which do not break up into small clumps and which can only be broken with difficulty, and there is no visual indication the soil is fissured, the soil may be considered unfissured.

(C) Thumb penetration. The thumb penetration test can be used to estimate the unconfined compressive strength of cohesive soils. Type A soils with an unconfined compressive strength of 1.5 tsf can be readily indented by the thumb; however, they can be penetrated by the thumb only with very great effort. Type C soils with an unconfined compressive strength of 0.5 tsf can be easily penetrated several inches by the thumb, and can be molded by light finger pressure. This test should be conducted on an undisturbed soil sample, such as a large clump of spoil, as soon as practicable after excavation to keep to a minimum the effects of exposure to drying influences (rain, flooding), the classification of the soil must be changed accordingly.

(D) Other strength tests. Estimates of unconfined compressive strength of soils can also be obtained by use of a pocket penetrometer or by using a hand-operated shearvane.

(E) Drying test. The basic purpose of the drying test is to differentiate between cohesive material

with fissures, unfissured cohesive material, and granular material. The procedure for the drying test involves drying a sample of soil that is approximately one inch thick and six inches in diameter until it is thoroughly dry:

1. If the sample develops cracks as it dries, significant fissures are indicated.
2. Samples that dry without cracking are to be broken by hand. If considerable force is necessary to break a sample, the soil has significant cohesive material content. The soil can be classified as an unfissured cohesive material and the unconfined compressive strength should be determined.
3. If a sample breaks easily by hand, it is either a fissured cohesive material or a granular material. To distinguish between the two, pulverize the dried clumps of the sample by hand or by stepping on them. If the clumps do not pulverize easily, the material is cohesive with fissures. If they pulverize easily into very small fragments, the material is granular.

NOTE

Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

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**TITLE 8. Industrial Relations**  
**Division 1. Department of Industrial Relations**  
**Chapter 4. Division of Industrial Safety**  
**Subchapter 4. Construction Safety Orders**  
**Article 6. Excavations**  
**§1542. Shafts.**

**§1542. Shafts.**

 • Note • History

(a) General.

(1) All wells or shafts over 5 feet in depth into which employees are permitted to enter shall be retained with lagging, spiling, or casing.

EXCEPTION: Exploration shafts; see Section 1542(d).

(2) The lagging, spiling or casing shall extend at least one foot above ground level and shall be provided the full depth of the shaft or at least five feet into solid rock if possible.

(3) All wells, pits, shafts, caissons, etc. shall be barricaded or securely covered.

(4) Upon completion of exploration and similar operations, temporary wells, pits, shafts, etc., shall be backfilled.

(b) Small Shafts in Hard Compact Soil.

Two-inch (nominal) cribbing may be used in square shafts not over 4 feet square in hard compact soil. Each member shall be cut 1/2 way through the width of the member and dovetailed into position so each member will act as a shore as well as lagging. Strips shall be nailed in each corner to prevent the boards from dropping down.

(c) Shafts in Other Than Hard Compact Soil.

(1) A system of lagging supported by braces and corner posts shall be used for square or rectangular shafts. Corner posts of 4-inch by 4-inch material are normally acceptable in shafts 4 feet square, or smaller, if they are braced in each direction with horizontal 4-inch by 4-inch members at intervals not exceeding 4 feet. Braces and corner posts in larger shafts shall be correspondingly larger as determined by a civil engineer.

(2) Round shafts shall be completely lagged with 2-inch material which is supported at intervals not greater than 4 feet by means of adjustable rings of metal or timber that are designed to resist the collapsing force, or cased in a manner that provides equivalent protection.

(d) Exploration Shafts. Only a geotechnical specialist shall be permitted to enter an exploration shaft without lagging, spiling or casing for the purpose of subsurface investigations under the following conditions:

(1) Initial Inspection. The type of materials and stability characteristics of the exploration shaft shall be personally observed and recorded by the geotechnical specialist during the drilling operation. Potentially unsafe exploration shafts shall not be entered.

(2) Surface Casing. The upper portion of the exploration shaft shall be equipped with a surface ring-collar to provide casing support of the material within the upper 4 feet of the exploration shaft. The ring-collar shall extend at least 1-foot above the ground surface.

(3) Gas Tests. Prior to entry into exploration shafts, tests and/or procedures shall be instituted to

assure that the atmosphere within the shaft does not contain dangerous air contamination or oxygen deficiency. These tests and/or procedures shall be maintained while working within the shaft to assure that dangerous air contamination or oxygen deficiency will not occur. (See Section 5156 of the General Industry Safety Orders.)

(4) Unstable Local Conditions. The geotechnical specialist shall not descend below any portion of any exploration shaft where caving or groundwater seepage is noted or suspected.

(5) Ladder and Cable Descents. A ladder may be used to inspect exploration shafts 20 feet or less in depth. In deeper exploration shafts, properly maintained mechanical hoisting devices with a safety factor of at least 6 shall be provided and used. Such devices shall be under positive control of the operator being positive powered up and down with fail-safe brakes.

(6) Emergency Standby Employee. An emergency standby employee shall be positioned at the surface near the exploration shaft opening whenever a geotechnical specialist is inside the shaft.

(7) Communication. A two-way, electrically-operated communication system shall be in operation between the standby employee and the geotechnical specialist whenever boring inspections are being made in exploration shafts over 20 feet in depth or when ambient noise levels make communication difficult.

(8) Safety Equipment. The following safety equipment shall be used to protect the geotechnical specialist:

(A) An approved safety harness which will suspend a person upright and that is securely attached to the hoist cable.

(B) A 12-inch to 18-inch diameter steel coneshaped headguard/deflector that is attached to the hoist cable above the harness.

(C) A hoist cable having a minimum diameter of 5/16 inches.

(D) Approved head protection. (See Section 1515.)

(9) Electrical Devices. All electrical devices used within the exploration shaft by the geotechnical specialist shall be approved for hazardous locations.

(10) Surface Hazards. The storage and use of flammable or other dangerous materials shall be controlled at the surface to prevent them from entering the exploration shaft.

#### NOTE

Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

#### HISTORY

1. Amendment of subsection (e) filed 5-21-75; effective thirtieth day thereafter (Register 75, No. 21).
2. Amendment filed 8-23-82; effective thirtieth day thereafter (Register 82, No. 35).
3. Amendment of subsection (a) and new subsection (e) filed 11-12-82; effective thirtieth day thereafter (Register 82, No. 46).
4. Repealer of subsection (a) NOTE, adoption of subsections (a)(3) and (a)(4), repealer of subsection (d) text and relettering filed 8-26-91; operative 9-25-91 (Register 92, No. 13).
5. Change without regulatory effect amending subsection (a)(1) filed 8-19-92; operative 8-19-92 (Register 92, No. 34).
6. Editorial correction of printing error restoring designation of subsection (d) (Register 92, No. 34).
7. Change without regulatory effect amending subsection (a)(1) Exception filed 2-22-93; operative 3-24-93 pursuant to title 1, section 100, California Code of Regulations (Register 93, No. 9).

#### §1543. Cofferdams.

 • Note • History

- (a) If overtopping of the cofferdam by high waters is possible, means shall be provided for controlled flooding of the work area.
- (b) Warning signs for evacuation of employees in case of emergency shall be developed and posted.
- (c) Cofferdam walkways, bridges, or ramps with at least two means of rapid exit, shall be provided with guardrails as specified in Section 1620.
- (d) Cofferdams located close to navigable shipping channels shall be protected from vessels in transit, where possible.

NOTE

Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

HISTORY

- 1. New section filed 1-13-87; effective thirtieth day thereafter (Register 87, No. 3). For history of former section, see Registers 82, No. 35 and 70, No.48.
- 2. Adoption of NOTE filed 8-26-91; operative 9-25-91 (Register 92, No. 13).

**§1544. Earthwork and Excavating.**

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**TITLE 8. Industrial Relations**  
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**Chapter 4. Division of Industrial Safety**  
**Subchapter 4. Construction Safety Orders**  
**Article 6. Excavations**  
**§1543. Cofferdams.**

**§1543. Cofferdams.**

 • Note • History

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NOTE

Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

HISTORY

- 1. New section filed 1-13-87; effective thirtieth day thereafter (Register 87, No. 3). For history of former section, see Registers 82, No. 35 and 70, No.48.
- 2. Adoption of NOTE filed 8-26-91; operative 9-25-91 (Register 92, No. 13).

**§1544. Earthwork and Excavating.**

 • Note • History

NOTE

Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

HISTORY

- 1. Amendment of subsections (a), (d) and (e) filed 8-23-82; effective thirtieth day thereafter (Register 82, No. 35).
- 2. Repealer filed 8-26-91; operative 9-25-91 (Register 92, No. 13).

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**§1544. Earthwork and Excavating.**

 • [Note](#) • [History](#)

NOTE

Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

HISTORY

1. Amendment of subsections (a), (d) and (e) filed 8-23-82; effective thirtieth day thereafter (Register 82, No. 35).
2. Repealer filed 8-26-91; operative 9-25-91 (Register 92, No. 13).

**§1545. Overburden.**

 • [Note](#) • [History](#)

NOTE

Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

HISTORY



**TITLE 8. Industrial Relations**  
**Division 1. Department of Industrial Relations**  
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**§1545. Overburden.**

**§1545. Overburden.**

 • [Note](#) • [History](#)

NOTE

Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

HISTORY

1. Amendment of subsection (a) filed 8-23-82; effective thirtieth day thereafter (Register 82, No. 35).
2. Repealer filed 8-26-91; operative 9-25-91 (Register 92, No. 13).

**§1546. Face Inspection and Control.**

 • [Note](#) • [History](#)

NOTE

Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

HISTORY

**TITLE 8. Industrial Relations**  
**Division 1. Department of Industrial Relations**  
**Chapter 4. Division of Industrial Safety**  
**Subchapter 4. Construction Safety Orders**  
**Article 6. Excavations**  
**§1546. Face Inspection and Control.**

**§1546. Face Inspection and Control.**

 • [Note](#) • [History](#)

NOTE

Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

HISTORY

1. Amendment of subsections (a), (d) and (e) filed 8-23-82; effective thirtieth day thereafter (Register 82, No. 35).
2. Repealer filed 8-26-91; operative 9-25-91 (Register 92, No. 13).

**§1547. Protection of Workers at the Face.**

 • [Note](#) • [History](#)

NOTE

Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

HISTORY



**TITLE 8. Industrial Relations****Division 1. Department of Industrial Relations****Chapter 4. Division of Industrial Safety****Subchapter 4. Construction Safety Orders****Article 6. Excavations****§1547. Protection of Workers at the Face.****§1547. Protection of Workers at the Face.**• [Note](#) • [History](#)**NOTE**

Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

**HISTORY**

1. Amendment filed 8-23-82; effective thirtieth day thereafter (Register 82, No. 35).
2. Repealer filed 8-26-91; operative 9-25-91 (Register 92, No. 13).

**Article 7. Bins, Bunkers, Hoppers, and Material Storage****§1548. Bins, Bunkers, and Hoppers.**• [Note](#) • [History](#)

(a) Every open bin, bunker, hopper, and dangerous equipment whose upper edge is less than 36 inches above the floor or working level shall be equipped with a standard railing around its edges, or a grating or grille shall cover the top. Where grille or grating is the only protection, it shall have no opening whose least dimension exceeds 10 inches. Where railings are used they may be temporarily removed to provide necessary working openings.

(b) The grating or grille shall be of strength sufficient to withstand any load that is customarily imposed upon it.

(c) Where bins, bunkers, or hoppers are loaded by backing an automotive truck to one edge, there shall be installed bumper stops not less than 10 by 10 inches, securely fastened in a manner to prevent the truck overrunning the runway. At least 8- by 8-inch timbers or equivalent shall be securely fastened along the sides of the runway to prevent a truck overrunning the sides of the runway.

(d) Open Top Bins.

(1) Where employees are permitted or required to work in or above open top bins over 8 feet in depth, an upper working area consisting of a platform or walkway shall be provided, and shall be guarded with a standard railing and toeboard.

(2) Personal fall arrest or restraint systems complying with the requirements of [Section 1670](#) shall be provided and used by employees when above requirements are not met.

**NOTE**

Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

HISTORY

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333 Turnbull Canyon Road  
City of Industry, California

December 5, 2011  
Project No. 100252002

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**APPENDIX D**

**ORGANIC VAPOR MONITORING DOCUMENTATION FORM**



333 Turnbull Canyon Road  
City of Industry, California

December 5, 2011  
Project No. 100252002

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**APPENDIX B**  
**REGULATORY CLEANUP STANDARDS**

# OEHHA

## Office of Environmental Health Hazard Assessment

[Home](#) » [Risk Assessment](#) » [Soil](#) » **Soil-Screening Numbers**

### Risk Assessment

#### SOIL-SCREENING NUMBERS - UPDATED TABLE [09/23/10]

Three updated tables of OEHHA Soil Screening Numbers.

Table 1 - Soil-Screening Numbers (mg/kg soil) for Nonvolatile Chemicals Based on Total Exposure to Contaminated Soil: Inhalation, Ingestion and Dermal Absorption.

Table 2 - Soil-Gas-Screening Numbers for Volatile Chemicals below Buildings Constructed With Engineered Fill below Sub-slab Gravel.

Table 3 - Soil-Gas-Screening Numbers for Volatile Chemicals below Buildings Constructed Without Engineered Fill below Sub-slab Gravel

**TABLE 1.  
SOIL-SCREENING NUMBERS (MG/KG SOIL) FOR NONVOLATILE CHEMICALS BASED ON  
TOTAL EXPOSURE TO CONTAMINATED SOIL: INHALATION, INGESTION AND DERMAL  
ABSORPTION**

Chemical	Soil-Screening Number (mg per kg of dry soil)			
	Residential Scenario		Commercial/Industrial Scenario	
Organic Acidic Chemicals		Basis <sup>1</sup>		Basis <sup>1</sup>
2, 4-D	6.9E+02	(nc)	7.7E+03	(nc)
2,4,5-T	5.5E+02	(nc)	6.1E+03	(nc)
Pentachlorophenol	4.4E+00	(ca)	1.3E+01	(ca)
Organic Neutral Chemicals				
Aldrin	3.3E-02	(ca)	1.3E-01	(ca)
Benzo(a)pyrene	3.8E-02	(ca)	1.3E-01	(ca)
Chlordane	4.3E-01	(ca)	1.7E+00	(ca)
DDD	2.3E+00	(ca)	9.0E+00	(ca)

DDE	1.6E+00	(ca)	6.3E+00	(ca)
DDT	1.6E+00	(ca)	6.3E+00	(ca)
Dieldrin	3.5E-02	(ca)	1.3E-01	(ca)
1,4-Dioxane	1.8E+01	(ca)	6.4E+01	(ca)
Dioxin (2,3,7, 8-TCDD)	4.6E-06	(ca)	1.9E-05	(ca)
Endrin	2.1E+01	(nc)	2.3E+02	(nc)
Heptachlor	1.3E-01	(ca)	5.2E-01	(ca)
Lindane	5.0E-01	(ca)	2.0E+00	(ca)
Kepone	3.5E-02	(ca)	1.3E-01	(ca)
Methoxychlor	3.4E+02	(nc)	3.8E+03	(nc)
Mirex	3.1E-02	(ca)	1.2E-01	(ca)
PCBs	8.9E-02	(ca)	3.0E-01	(ca)
Toxaphene	4.6E-01	(ca)	1.8E+00	(ca)
<b>Inorganic Chemicals</b>				
Antimony and compounds	3.0E+01	(nc)	3.8E+02	(nc)
Arsenic <sup>2</sup>	7.0E-02	(ca)	2.4E-01	(ca)
Barium and compounds	5.2E+03	(nc)	6.3E+04	(nc)
Beryllium and compounds	1.6E+01 <sup>4</sup>	(nc)	1.9E+02 <sup>4</sup>	(nc)
Beryllium oxide	1.6E+01 <sup>4</sup>	(nc)	1.9E+02 <sup>4</sup>	(nc)
Beryllium sulfate <sup>3</sup>	2.9E+00 <sup>4</sup>	(ca)	6.3E+00 <sup>4</sup>	(ca)
Cadmium and compounds	1.7E+00	(ca)	7.5E+00	(ca)
Chromium III	1.0E+05	(nc,max)	1.0E+05	(nc,max)
Chromium VI	1.7E+01	(ca)	3.7E+01	(ca)
Cobalt	6.6E+02	(nc)	3.2E+03	(nc)

Copper and compounds	3.0E+03	(nc)	3.8E+04	(nc)
Fluoride	4.6E+03	(nc)	5.7E+04	(nc)
Lead and lead compounds	8.0E+01 <sup>4</sup>	(nc)	3.2E+02 <sup>4</sup>	(nc)
Lead acetate <sup>3</sup>	2.3E+00	(ca)	1.0E+01	(ca)
Mercury and compounds	1.8E+01	(nc)	1.8E+02	(nc)
Molybdenum	3.8E+02	(nc)	4.8E+03	(nc)
Nickel and compounds	1.6E+03	(nc)	1.6E+04	(nc)
Nickel subsulfide <sup>3</sup>	3.8E-01	(ca)	1.1E+04	(ca)
Perchlorate	2.8E+01 <sup>5,6</sup>	(nc)	3.5E+02 <sup>5,6</sup>	(nc)
Selenium	3.8E+02	(nc)	4.8E+03	(nc)
Silver and compounds	3.8E+02	(nc)	4.8E+03	(nc)
Thallium and compounds	5.0E+00	(nc)	6.3E+01	(nc)
Vanadium and compounds	5.3E+02	(nc)	6.7E+03	(nc)
Zinc	2.3E+04	(nc)	1.0E+05	(nc)

<sup>1</sup> (ca) denotes that the screening number is based on a carcinogenic potency factor, (nc) denotes that the screening number is based on a reference level in Table 3 for chronic toxic effects other than cancer, (max) denotes the screening number is based on the maximum concentration allowed, 100,000 mg/kg, and not toxicity.

<sup>2</sup> The screening numbers for arsenic are for contamination resulting from human activity. Concentrations of naturally occurring arsenic may be far above the screening number. When levels of arsenic at a site are a concern, the agency with authority over remediation decisions should be consulted.

<sup>3</sup> These metal salts are significantly (greater than 10-fold) more toxic than the values for the metals in general. If it is known that this chemical was used at the site, the screening number for this chemical should be used instead of the screening number for the metal and its compounds.

<sup>4</sup> Revised in 2009

<sup>5</sup> Added in 2010

<sup>6</sup> While these CHHSLs are considered safe for exposure to perchlorate in soil, the potential for significant groundwater contamination from soil contaminated with perchlorate at the CHHSLs levels may exist, since the PHG level for drinking water is 6 ppb or 6 µg/L.

**TABLE 2.  
SOIL-GAS-SCREENING NUMBERS FOR VOLATILE CHEMICALS BELOW BUILDINGS  
CONSTRUCTED WITH ENGINEERED FILL BELOW SUB-SLAB GRAVEL**

Chemical	Soil-Gas-Screening Number (µg per liter of soil gas)
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	Residential Scenario		Commercial/Industrial Scenario	
		Basis <sup>1</sup>		Basis <sup>1</sup>
Benzene	8.5 E-02	(ca) <sup>2</sup>	2.8 E-01	(ca)
Carbon Tetrachloride	6.3 E-02	(ca)	2.1 E-01	(ca)
1,2-Dichloroethane	1.1 E-01	(ca)	3.6 E-01	(ca)
<i>cis</i> -1,2-Dichloroethylene	4.1 E+01	(nc) <sup>2</sup>	1.2 E+02	(nc)
<i>trans</i> -1,2-Dichloroethylene	8.4 E+01	(nc)	2.4 E+02	(nc)
<b>Ethylbenzene</b>	<b>1.1 E+00<sup>4</sup></b>	(ca)	<b>3.6 E+00<sup>4</sup></b>	(ca)
Mercury (elemental)	2.0 E-01	(nc)	5.6 E-01	(nc)
Methyl <i>tert</i> -Butyl Ether	8.6 E+00	(ca)	2.9 E+01	(ca)
Naphthalene	9.3 E-02	(ca)	3.1 E-01	(ca)
Tetrachloroethylene	4.7 E-01	(ca)	1.6 E+00	(ca)
Tetraethyl Lead	1.6 E-03	(nc)	4.5 E-03	(nc)
Toluene	3.2 E+02	(nc)	8.9 E+02	(nc)
1,1,1-Trichloroethane	2.5 E+03	(nc)	7.0 E+03	(nc)
Trichloroethylene	1.3 E+00	(ca)	4.4 E+00	(ca)
Vinyl Chloride	2.8 E-02	(ca)	9.5 E-02	(ca)
<i>m</i> -Xylene	8.5 E+02	(nc)	2.4 E+03	(nc)
<i>o</i> -Xylene	7.4 E+02 <sup>3</sup>	(nc)	2.1 E+03 <sup>3</sup>	(nc)
<i>p</i> -Xylene	8.0 E+02	(nc)	2.2 E+03	(nc)

<sup>1</sup> (ca) denotes that the screening number is based on a carcinogenic potency factor, (nc) denotes that the screening number is based on a reference level in Table 3 for chronic toxic effects other than cancer, (max) denotes the screening number is based on the maximum concentration allowed, 100,000 mg/kg, and not toxicity.

<sup>2</sup> (ca) denotes that the screening number is based on a carcinogenic potency factor, (nc) denotes that the screening number is based on a reference level in Table 3 for chronic toxic effects other than cancer.

<sup>3</sup> Recommended soil-gas-screening number for xylenes. The representative value for xylenes is based on the calculated lowest health-protective one amongst the three isomers.

<sup>4</sup> Added in 2010

**TABLE 3.  
SOIL-GAS-SCREENING NUMBERS FOR VOLATILE CHEMICALS BELOW BUILDINGS  
CONSTRUCTED WITHOUT ENGINEERED FILL BELOW SUB-SLAB GRAVEL**

Chemical	Soil-Gas-Screening Number ( $\mu\text{g}$ per liter of soil gas)			
	Residential Scenario		Commercial/Industrial Scenario	
		Basis <sup>1</sup>		Basis <sup>1</sup>
Benzene	3.6 E-02	(ca) <sup>2</sup>	1.2 E-01	(ca)
Carbon Tetrachloride	2.5 E-02	(ca)	8.5 E-02	(ca)
1,2-Dichloroethane	5.0 E-02	(ca)	1.7 E-01	(ca)
<i>cis</i> -1,2-Dichloroethylene	1.6 E+01	(nc) <sup>2</sup>	4.4 E+01	(nc)
<i>trans</i> -1,2-Dichloroethylene	3.2 E+01	(nc)	8.9 E+01	(nc)
<b>Ethylbenzene</b>	<b>4.2 E-01<sup>4</sup></b>	(ca)	<b>1.4 E+00<sup>4</sup></b>	(ca)
Mercury (elemental)	4.5 E-02	(nc)	1.3 E-01	(nc)
Methyl <i>tert</i> -Butyl Ether	4.0 E+00	(ca)	1.3 E+01	(ca)
Naphthalene	3.2 E-02	(ca)	1.1 E-01	(ca)
Tetrachloroethylene	1.8 E-01	(ca)	6.0 E-01	(ca)
Tetraethyl Lead	2.1 E-04	(nc)	5.8 E-04	(nc)
Toluene	1.4 E+02	(nc)	3.8 E+02	(nc)
1,1,1-Trichloroethane	9.9 E+02	(nc)	2.8 E+03	(nc)
Trichloroethylene	5.3 E-01	(ca)	1.8 E+00	(ca)
Vinyl Chloride	1.3 E-02	(ca)	4.5 E-02	(ca)
<i>m</i> -Xylene	3.2 E+02	(nc)	8.9 E+02	(nc)
<i>o</i> -Xylene	3.2 E+02 <sup>3</sup>	(nc)	8.8 E+02 <sup>3</sup>	(nc)

p-Xylene	3.2 E+02	(nc)	8.9 E+02	(nc)
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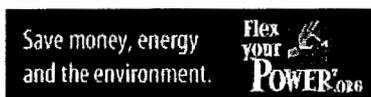
<sup>1</sup> (ca) denotes that the screening number is based on a carcinogenic potency factor, (nc) denotes that the screening number is based on a reference level in Table 3 for chronic toxic effects other than cancer, (max) denotes the screening number is based on the maximum concentration allowed, 100,000 mg/kg, and not toxicity.

<sup>2</sup> (ca) denotes that the screening number is based on a carcinogenic potency factor, (nc) denotes that the screening number is based on a reference level in Table 3 for chronic toxic effects other than cancer.

<sup>3</sup> Recommended soil-gas-screening number for xylenes. The representative value for xylenes is based on the calculated lowest health-protective one amongst the three isomers.

<sup>4</sup> Added 2010

**Flex Your Power Website**



Energy efficiency and conservation information. Find incentives/rebates, technical assistance, retailers, product guides, case studies and more.

**AMBER ALERT: Save a Child**



AMBER ALERT empowers law enforcement, the media and the public to combat abduction by sending out immediate information.

OEHHA is one of five agencies under the umbrella of the California Environmental Protection Agency (Cal/EPA).

[Air Resources Board](#) | [Department of Pesticide Regulation](#) | [Department of Toxic Substances Control](#)  
[Office of Environmental Health Hazard Assessment](#) | [State Water Resources Control Board](#)

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Table 4-1: Maximum Soil Screening Levels (mg/kg) for TPH and BTEX above Drinking Water Aquifers

T P H	Distance Above Groundwater	Carbon Range		
		C4-C12	C13-C22	C23-C32
	>150 feet	1,000	10,000	50,000
	20-150 feet	500	1,000	10,000
<20 feet	100	100	1,000	

B T E X	Distance Above Groundwater	Lithology			
		Gravel	Sand	Silt	Clay
	150 feet	B=0.044 T=2 E=8 X=23	B=0.077 T=4 E=17 X=48	B=0.165 T=9 E=34 X=93	B=0.8 T=43 E=170 X=465
	80 feet	B=0.022 T=1 E=4 X=11	B=0.033 T=2 E=7 X=20	B=0.066 T=4 E=15 X=40	B=0.34 T=18 E=73 X=200
20 feet	B=0.011 T=0.15 E=0.7 X=1.75	B=0.011 T=0.3 E=0.7 X=1.75	B=0.011 T=0.45 E=2 X=5.3	B=0.044 T=2.3 E=9 X=24.5	

- TPH = Total petroleum hydrocarbons.
- BTEX = benzene, toluene, ethylbenzene, and xylenes, respectively. MCLs (ppm): B=0.001, T=0.15, E=0.7, X=1.75.
- MTBE (methyl tertiary butyl ether) must be included in BTEX analyses.
- BTEX screening concentrations determined per the attenuation factor method as described in RWQCB Guidance for VOC Impacted Sites (March 1996), with a natural degradation factor of 11 for benzene. Table values for BTEX can be linearly interpolated between distance above groundwater and are proportional to fraction of each lithological thickness.
- Values in Table 4-1 are for soils above drinking water aquifers. All groundwaters are considered as drinking water resources unless exempted by one of the criteria as defined under SWRCB Resolution 88-63 (TDS>3000 mg/L, or deliverability <200 gal/day, or existing contamination that cannot be reasonably treated). Regional Board staff will make a determination of potential water use at a particular site considering water quality objectives and beneficial uses. For non-drinking water aquifers, regardless of depth, TPH for ">150 feet" category in the table should be used; BTEX screening levels are set at 100 times respective MCLs as preliminary levels determined to be protective of human health and the environment.
- Distance above groundwater must be measured from the highest anticipated water level. Lithology is based on the USCS scale.
- For BTEX, each component is not to exceed the specified screening level.
- For TPH, the total allowable for each carbon range is not to be exceeded. In areas of naturally-occurring hydrocarbons, Regional Board staff will make allowance for TPH levels.
- BTEX to be analyzed by EPA Method 8020 or EPA Method 8260 (usually for confirmation).
- TPH to be analyzed by EPA Methods 418.1 plus 8015 (Modified). Ranges of TPH to be analyzed by GC/MS carbon range methods (EPA Method 8260) or EPA Method 8015 (Modified).

## 5. Average Attenuation Factor Table

To simplify the calculation, a table for average attenuation factors is prepared. Given the overall average  $AF_{MAX}$  for 29 VOCs equal to 255 (Table 2) and using equations (8), (9), (10), and (12),  $AF_T$  is calculated for each depth interval and lithological class in Table 4. Distance above ground water (D) in Table 4 is first used to calculate  $AF_D$  and then let D in equation (12) equal to TGR, TSA, TSI, and TCL, respectively, to obtain  $AF_T$  under each lithological class. Table 4 suggests that AF should be 1 at a primary gravel site with ground water at 40 feet or shallower; and on the other hand, AF should be 255 at a site with all clay and ground water at 150 feet or deeper.

Table 4: Attenuation Factors ( $AF_T$ ) for Different Distance above Ground Water and Lithology

DISTANCE ABOVE G.W. FEET	LITHOLOGY			
	GRAVEL	SAND	SILT	CLAY
150	13	26	51	255
120	10	19	39	193
100	8	15	30	151
80	5	11	22	109
60	3	7	13	67
40	1	3	5	26
20	1	1	3	13
10	1	1	1	7

Distance (ft) Between Ground Water (G.W.) and the Measured Point;  
Lithology (USCS Standard) Between Ground Water and the Measured Point.



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## ***STOCKPILED SOIL TESTING REQUIREMENTS FACT SHEET***

This fact sheet is provided for contaminated soil which will be disposed off-site and for stockpiled soils anticipated to be returned to excavations. Prior to contaminated soils being disposed off site, a hazardous waste determination per Title 22 CCR and 40 CFR shall be performed. The sampling should give a result that is representative of the entire waste and has a high degree of confidence (80 % confidence interval) for the findings. The US EPA defines a representative sample as exhibiting average properties of the whole waste.

In order to return stockpiled soils to an excavation, at a minimum, the stockpiled soil shall be sampled in accordance with the random sampling requirements below. Random sampling requirements are based on the RWQCB's guide for soil piles. Authoritative or composite sampling may be performed in addition to the minimum sampling requirements.

### Random Sampling

- Minimum of one sample for 100 cubic yards (cy) or less
- Minimum of 3 samples for greater than 100 cy to 500 cy
- Minimum of 5 samples with one sample every 500 cy up to 2500 cy
- Minimum of 1 sample for every 500 cy greater than 2500 cy

### Authoritative Sampling

This is a sampling method where the registered professional chooses the locations and number of samples to be taken, based on the inspection of the materials. The inspector may also request additional sampling based on site conditions.

### Composite Sampling

If warranted, samples can be composited in accordance with DTSC requirements. All sample compositing shall be done at the laboratory and not in the field. A maximum of four (4) samples can be composited as long as the dilution does not exceed the detection limit for the elements of concern.

# Information Advisory

## Clean Imported Fill Material



October 2001

**DEPARTMENT OF TOXIC SUBSTANCES CONTROL**

*It is DTSC's mission to restore, protect and enhance the environment, to ensure public health, environmental quality and economic vitality, by regulating hazardous waste, conducting and overseeing cleanups, and developing and promoting pollution prevention.*

State of California



California  
Environmental  
Protection Agency



### Executive Summary

*This fact sheet has been prepared to ensure that inappropriate fill material is not introduced onto sensitive land use properties under the oversight of the DTSC or applicable regulatory authorities. Sensitive land use properties include those that contain facilities such as hospitals, homes, day care centers, and schools. This document only focuses on human health concerns and ecological issues are not addressed.*

*It identifies those types of land use activities that may be appropriate when determining whether a site may be used as a fill material source area. It also provides guidelines for the appropriate types of analyses that should be performed relative to the former land use, and for the number of samples that should be collected and analyzed based on the estimated volume of fill material that will need to be used. The information provided in this fact sheet is not regulatory in nature, rather is to be used as a guide, and in most situations the final decision as to the acceptability of fill material for a sensitive land use property is made on a case-by-case basis by the appropriate regulatory agency.*

### Introduction

The use of imported fill material has recently come under scrutiny because of the instances where contaminated soil has been brought onto an otherwise clean site. However, there are currently no established standards in the statutes or regulations that address environmental requirements for imported fill material. Therefore, the California Environmental Protection Agency, Department of Toxic Substances Control (DTSC) has prepared this fact sheet to identify procedures that can be used to minimize the possibility of introducing contaminated soil onto a site that requires imported fill material. Such sites include those that are undergoing site remediation, corrective action, and closure activities overseen by DTSC or the appropriate regulatory agency. These procedures may also apply to construction projects that will result in sensitive land uses. The intent of this fact sheet is to protect people who live on or otherwise use a sensitive land use property. By using this fact sheet as a guide, the reader will minimize the chance of introducing fill material that may result in potential risk to human health or the environment at some future time.

*The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption. For a list of simple ways you can reduce demand and cut your energy costs, see our website at [www.dtsc.ca.gov](http://www.dtsc.ca.gov).*

## Overview

Both natural and manmade fill materials are used for a variety of purposes. Fill material properties are commonly controlled to meet the necessary site specific engineering specifications. Because most sites requiring fill material are located in or near urban areas, the fill materials are often obtained from construction projects that generate an excess of soil, and from demolition debris (asphalt, broken concrete, etc.). However, materials from those types of sites may or may not be appropriate, depending on the proposed use of the fill, and the quality of the assessment and/or mitigation measures, if necessary. Therefore, unless material from construction projects can be demonstrated to be free of contami-

nation and/or appropriate for the proposed use, the use of that material as fill should be avoided.

## Selecting Fill Material

In general, the fill source area should be located in nonindustrial areas, and not from sites undergoing an environmental cleanup. Nonindustrial sites include those that were previously undeveloped, or used solely for residential or agricultural purposes. If the source is from an agricultural area, care should be taken to insure that the fill does not include former agricultural waste process byproducts such as manure or other decomposed organic material. Undesirable sources of fill material include industrial and/or commercial sites where hazardous ma-

### Potential Contaminants Based on the Fill Source Area

#### Fill Source:

#### Target Compounds

Land near to an existing freeway

Lead (EPA methods 6010B or 7471A), PAHs (EPA method 8310)

Land near a mining area or rock quarry

Heavy Metals (EPA methods 6010B and 7471A), asbestos (polarized light microscopy), pH

Agricultural land

Pesticides (Organochlorine Pesticides: EPA method 8081A or 8080A; Organophosphorus Pesticides: EPA method 8141A; Chlorinated Herbicides: EPA method 8151A), heavy metals (EPA methods 6010B and 7471A)

Residential/acceptable commercial land

VOCs (EPA method 8021 or 8260B, as appropriate and combined with collection by EPA Method 5035), semi-VOCs (EPA method 8270C), TPH (modified EPA method 8015), PCBs (EPA method 8082 or 8080A), heavy metals including lead (EPA methods 6010B and 7471A), asbestos (OSHA Method ID-191)

*\*The recommended analyses should be performed in accordance with USEPA SW-846 methods (1996). Other possible analyses include Hexavalent Chromium: EPA method 7199*

## Recommended Fill Material Sampling Schedule

<b>Area of Individual Borrow Area</b>	<b>Sampling Requirements</b>
2 acres or less	Minimum of 4 samples
2 to 4 acres	Minimum of 1 sample every 1/2 acre
4 to 10 acres	Minimum of 8 samples
Greater than 10 acres	Minimum of 8 locations with 4 subsamples per location
<b>Volume of Borrow Area Stockpile</b>	<b>Samples per Volume</b>
Up to 1,000 cubic yards	1 sample per 250 cubic yards
1,000 to 5,000 cubic yards	4 samples for first 1000 cubic yards + 1 sample per each additional 500 cubic yards
Greater than 5,000 cubic yards	12 samples for first 5,000 cubic yards + 1 sample per each additional 1,000 cubic yards

materials were used, handled or stored as part of the business operations, or unpaved parking areas where petroleum hydrocarbons could have been spilled or leaked into the soil. Undesirable commercial sites include former gasoline service stations, retail strip malls that contained dry cleaners or photographic processing facilities, paint stores, auto repair and/or painting facilities. Undesirable industrial facilities include metal processing shops, manufacturing facilities, aerospace facilities, oil refineries, waste treatment plants, etc. Alternatives to using fill from construction sites include the use of fill material obtained from a commercial supplier of fill material or from soil pits in rural or suburban areas. However, care should be taken to ensure that those materials are also uncontaminated.

### Documentation and Analysis

In order to minimize the potential of introducing contaminated fill material onto a site, it is necessary

to verify through documentation that the fill source is appropriate and/or to have the fill material analyzed for potential contaminants based on the location and history of the source area. Fill documentation should include detailed information on the previous use of the land from where the fill is taken, whether an environmental site assessment was performed and its findings, and the results of any testing performed. It is recommended that any such documentation should be signed by an appropriately licensed (CA-registered) individual. If such documentation is not available or is inadequate, samples of the fill material should be chemically analyzed. Analysis of the fill material should be based on the source of the fill and knowledge of the prior land use.

Detectable amounts of compounds of concern within the fill material should be evaluated for risk in accordance with the DTSC Preliminary Endangerment Assessment (PEA) Guidance Manual. If

metal analyses are performed, only those metals (CAM 17 / Title 22) to which risk levels have been assigned need to be evaluated. At present, the DTSC is working to establish California Screening Levels (CSL) to determine whether some compounds of concern pose a risk. Until such time as these CSL values are established, DTSC recommends that the DTSC PEA Guidance Manual or an equivalent process be referenced. This guidance may include the Regional Water Quality Control Board's (RWQCB) guidelines for reuse of non-hazardous petroleum hydrocarbon contaminated soil as applied to Total Petroleum Hydrocarbons (TPH) only. The RWQCB guidelines should not be used for volatile organic compounds (VOCs) or semi-volatile organic compounds (SVOCS). In addition, a standard laboratory data package, including a summary of the QA/QC (Quality Assurance/Quality Control) sample results should also accompany all analytical reports.

When possible, representative samples should be collected at the borrow area while the potential fill material is still in place, and analyzed prior to removal from the borrow area. In addition to performing the appropriate analyses of the fill material, an appropriate number of samples should also be determined based on the approximate volume or area of soil to be used as fill material. The table above can be used as a guide to determine the number of samples needed to adequately characterize the fill material when sampled at the borrow site.

### **Alternative Sampling**

A Phase I or PEA may be conducted prior to sampling to determine whether the borrow area may have been impacted by previous activities on the property. After the property has been evaluated, any sampling that may be required can be determined during a meeting with DTSC or appropriate regulatory agency. However, if it is not possible to analyze the fill material at the borrow area or determine that it is appropriate for use via a Phase I or PEA, it is recommended that one (1) sample per truckload be collected and analyzed for all com-

pounds of concern to ensure that the imported soil is uncontaminated and acceptable. (See chart on Potential Contaminants Based on the Fill Source Area for appropriate analyses). This sampling frequency may be modified upon consultation with the DTSC or appropriate regulatory agency if all of the fill material is derived from a common borrow area. However, fill material that is not characterized at the borrow area will need to be stockpiled either on or off-site until the analyses have been completed. In addition, should contaminants exceeding acceptance criteria be identified in the stockpiled fill material, that material will be deemed unacceptable and new fill material will need to be obtained, sampled and analyzed. Therefore, the DTSC recommends that all sampling and analyses should be completed prior to delivery to the site to ensure the soil is free of contamination, and to eliminate unnecessary transportation charges for unacceptable fill material.

Composite sampling for fill material characterization may or may not be appropriate, depending on quality and homogeneity of source/borrow area, and compounds of concern. Compositing samples for volatile and semivolatile constituents is not acceptable. Composite sampling for heavy metals, pesticides, herbicides or PAH's from unanalyzed stockpiled soil is also unacceptable, unless it is stockpiled at the borrow area and originates from the same source area. In addition, if samples are composited, they should be from the same soil layer, and not from different soil layers.

When very large volumes of fill material are anticipated, or when larger areas are being considered as borrow areas, the DTSC recommends that a Phase I or PEA be conducted on the area to ensure that the borrow area has not been impacted by previous activities on the property. After the property has been evaluated, any sampling that may be required can be determined during a meeting with the DTSC.

*For further information, call Richard Coffman, Ph.D., R.G., at (818) 551-2175.*

**Article 3. Characteristics of Hazardous Waste****§66261.20. General.**

(a) A waste, as defined in section 66261.2, which is not excluded from regulation as a hazardous waste pursuant to section 66261.4(b), is a hazardous waste if it exhibits any of the characteristics identified in this article.

(b) A waste which is identified as a hazardous waste pursuant to one or more of the characteristics set forth in section 66261.21, 66261.22(a)(1), 66261.22(a)(2), 66261.23 or 66261.24(a)(1) is assigned the EPA Hazardous Waste Number set forth in this article for each characteristic that is applicable to that waste. These numbers shall be used in complying with the notification requirements of Health and Safety Code section 25153.6 and, where applicable, in the recordkeeping and reporting requirements under chapters 12 through 15, 18 and 20 of this division.

(c) Sampling and sample management of wastes and other materials for analysis and testing pursuant to this article shall be in accord with the sampling planning, methodology and equipment, and the sample processing, documentation and custody procedures specified in chapter nine of "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846, 3rd edition, U.S. Environmental Protection Agency, 1986 (incorporated by reference, see section 66260.11 of this chapter). In addition to the sampling methods in chapter nine of SW-846, the Department will consider samples obtained using any of the other applicable sampling methods specified in Appendix I of this chapter to be representative samples.

NOTE: Authority cited: Sections 208, 25141 and 25159, Health and Safety Code. Reference: Sections 25141, 25159 and 25159.5, Health and Safety Code and 40 CFR Section 261.20.

**HISTORY**

1. New section filed 5-24-91; effective 7-1-91 (Register 91, No. 22).

**§66261.21. Characteristic of Ignitability.**

(a) A waste exhibits the characteristic of ignitability if representative samples of the waste have any of the following properties:

(1) it is a liquid, other than an aqueous solution containing less than 24 percent alcohol by volume, and has a flash point less than 60°C (140°F), as determined by a Pensky-Martens Closed Cup Tester, using the test method specified in ASTM Standard D-93-79 or D-93-80 (incorporated by reference, see section 66260.11), or a Setafash Closed Cup Tester, using the test method specified in ASTM Standard D-3278-78 (incorporated by reference, see section 66260.11), or as determined by an equivalent test method approved by the Department pursuant to section 66260.21;

(2) it is not a liquid and is capable, under standard temperature and pressure, of causing fire through friction, absorption of moisture or spontaneous chemical changes and, when ignited, burns so vigorously and persistently that it creates a hazard;

(3) it is an ignitable compressed gas as defined in 49 CFR section 173.300 (as amended September 30, 1982) and as determined by the test methods described in that regulation or equivalent test methods approved by the Department pursuant to section 66260.21;

(4) it is an oxidizer as defined in 49 CFR section 173.151 (as amended May 31, 1979).

(b) A waste that exhibits the characteristic of ignitability has the EPA Hazardous Waste Number of D001.

NOTE: Authority cited: Sections 208, 25141 and 25159, Health and Safety Code. Reference: Sections 25117, 25120.2, 25141, 25159 and 25159.5, Health and Safety Code and 40 CFR Section 261.21.

**HISTORY**

1. New section filed 5-24-91; effective 7-1-91 (Register 91, No. 22).

**§66261.22. Characteristic of Corrosivity.**

(a) A waste exhibits the characteristic of corrosivity if representative samples of the waste have any of the following properties:

(1) it is aqueous and has a pH less than or equal to 2 or greater than or equal to 12.5, as determined by a pH meter using either the EPA test method for pH or an equivalent test method approved by the Department pursuant to section 66260.21. The EPA test method for pH is specified as Method 9040 in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846, 3rd edition and updates, (incorporated by reference, see section 66260.11);

(2) it is a liquid and corrodes steel (SAE 1020) at a rate greater than 6.35 mm (0.250 inch) per year at a test temperature of 55°C (130°F) as determined by the test method specified in NACE Standard TM-01-69 as standardized in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846, 3rd edition and updates (incorporated by reference, see section 66260.11) or an equivalent test method approved by the Department pursuant to section 66260.21;

(3) it is not aqueous and, when mixed with an equivalent weight of water, produces a solution having a pH less than or equal to 2 or greater than or equal to 12.5, as determined by a pH meter using either Method 9040 in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846, 3rd edition and updates (incorporated by reference, see section 66260.11) or an equivalent test method approved by the Department pursuant to 66260.21;

(4) it is not a liquid and, when mixed with an equivalent weight of water, produces a liquid that corrodes steel (SAE 1020) at a rate greater than 6.35 mm (0.250 inch) per year at a test temperature of 55°C (130°F) as determined

by the test method specified in NACE Standard TM-01-69 as standardized in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846, 3rd edition and updates (incorporated by reference, see section 66260.11) or an equivalent test method approved by the Department pursuant to 66260.21.

(b) A waste that exhibits the characteristic of corrosivity specified in subsection (a)(1) or (a)(2) of this section has the EPA Hazardous Waste Number of D002.

NOTE: Authority cited: Sections 25141, 25159, 58004 and 58012, Health and Safety Code. Reference: Sections 25117, 25120.2, 25141, 25159 and 25159.5, Health and Safety Code and 40 CFR Section 261.22.

#### HISTORY

1. New section filed 5-24-91; effective 7-1-91 (Register 91, No. 22).
2. Amendment of subsections (a)(1)-(4) and NOTE filed 10-13-98; operative 11-12-98 (Register 98, No. 42).

#### §66261.23. Characteristic of Reactivity.

(a) A waste exhibits the characteristic of reactivity if representative samples of the waste have any of the following properties:

- (1) it is normally unstable and readily undergoes violent change without detonating;
- (2) it reacts violently with water;
- (3) it forms potentially explosive mixtures with water;
- (4) when mixed with water, it generates toxic gases, vapors or fumes in a quantity sufficient to present a danger to human health or the environment;
- (5) it is a cyanide or sulfide bearing waste which, when exposed to pH conditions between 2 and 12.5, can generate toxic gases, vapors or fumes in a quantity sufficient to present a danger to human health or the environment;
- (6) it is capable of detonation or explosive reaction if it is subjected to a strong initiating source or if heated under confinement;
- (7) it is readily capable of detonation or explosive decomposition or reaction at standard temperature and pressure;
- (8) it is a forbidden explosive as defined in 49 CFR section 173.51 (as amended April 20, 1987), or a Class A explosive as defined in 49 CFR section 173.53 (as amended April 5, 1967) or a Class B explosive as defined in 49 CFR section 173.88 (as amended May 19, 1980).

(b) A waste that exhibits the characteristic of reactivity has the EPA Hazardous Waste Number of D003.

NOTE: Authority cited: Sections 208, 25141 and 25159, Health and Safety Code. Reference: Sections 25117, 25120.2, 25141, 25159 and 25159.5, Health and Safety Code and 40 CFR Section 261.23.

#### HISTORY

1. New section filed 5-24-91; effective 7-1-91 (Register 91, No. 22).

#### §66261.24. Characteristic of Toxicity.

(a) A waste exhibits the characteristic of toxicity if representative samples of the waste have any of the following properties:

(1) when using the Toxicity Characteristic Leaching Procedure (TCLP), test Method 1311 in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," EPA Publication SW-846, third edition and Updates (incorporated by reference in section 66260.11 of this division), the extracts from representative samples of the waste contain any of the contaminants listed in Table I of this section at a concentration equal to or greater than the respective value given in that table unless the waste is excluded from classification as a solid waste or hazardous waste or is exempted from regulation pursuant to 40 CFR section 261.4. Where the waste contains less than 0.5 percent filterable solids, the waste itself, after filtering using the methodology outlined in Method 1311, is considered to be the extract for the purposes of this section;

(A) a waste that exhibits the characteristic of toxicity pursuant to subsection (a)(1) of this section has the EPA Hazardous Waste Number specified in Table I of this section which corresponds to the toxic contaminant causing it to be hazardous;

(B) Table I - Maximum Concentration of Contaminants for the Toxicity Characteristic:

EPA Hazardous Waste Number	Contaminant	Chemical Abstracts Service Number	Regulatory Level Mg/l
D004	Arsenic	7440-38-2	5.0
D005	Barium	7440-39-3	100.0

EPA Hazardous Waste Number	Contaminant	Chemical Abstracts Service Number	Regulatory Level Mg/l
D018	Benzene	71-43-2	0.5
D006	Cadmium	7440-43-9	1.0
D019	Carbon tetrachloride	56-23-5	0.5
D020	Chlordane	57-74-9	0.03
D021	Chlorobenzene	108-90-7	100.0
D022	Chloroform	67-66-3	6.0
D007	Chromium	7440-47-3	5.0
D023	o-Cresol	95-48-7	200.0 <sup>1</sup>
D024	m-Cresol	108-39-4	200.0 <sup>1</sup>
D025	p-Cresol	106-44-5	200.0 <sup>1</sup>
D026	Cresol		200.0 <sup>1</sup>
D016	2,4-D	94-75-7	10.0
D027	1,4-Dichlorobenzene	106-46-7	7.5
D028	1,2-Dichloroethane	107-06-2	0.5
D029	1,1-Dichloroethylene	75-35-4	0.7
D030	2,4-Dinitrotoluene	121-14-2	0.13
D012	Endrin	72-20-8	0.02
D031	Heptachlor (and its epoxide)	76-44-8	0.008
D032	Hexachlorobenzene	118-74-1	0.13
D033	Hexachlorobutadiene	87-68-3	0.5
D034	Hexachloroethane	67-72-1	3.0
D008	Lead	7439-92-1	5.0
D013	Lindane	58-89-9	0.4
D009	Mercury	7439-97-6	0.2
D014	Methoxychlor	72-43-5	10.0
D035	Methyl ethyl ketone	78-93-3	200.0
D036	Nitrobenzene	98-95-3	2.0
D037	Pentachlorophenol	87-86-5	100.0
D038	Pyridine	110-86-1	5.0 <sup>2</sup>

EPA Hazardous Waste Number	Contaminant	Chemical Abstracts Service Number	Regulatory Level Mg/l
D010	Selenium	7782-49-2	1.0
D011	Silver	7440-22-4	5.0
D039	Tetrachloroethylene	127-18-4	0.7
D015	Toxaphene	8001-35-2	0.5
D040	Trichloroethylene	79-01-6	0.5
D041	2,4,5-Trichlorophenol	95-95-4	400.0
D042	2,4,6-Trichlorophenol	88-06-2	2.0
D017	2,4,5-TP (Silvex)	93-72-1	1.0
D043	Vinyl chloride	75-01-4	0.2

<sup>1</sup> If o-, m- and p-Cresol concentrations cannot be differentiated, the total cresol (D026) concentration is used. The regulatory level of total cresol is 200 mg/l.

<sup>2</sup> Quantitation limit is greater than the calculated regulatory level. The quantitation limit therefore becomes the regulatory level.

(2) it contains a substance listed in subsections (a)(2)(A) or (a)(2)(B) of this section at a concentration in milligrams per liter of waste extract, as determined using the Waste Extraction Test (WET) described in Appendix II of this chapter, which equals or exceeds its listed soluble threshold limit concentration or at a concentration in milligrams per kilogram in the waste which equals or exceeds its listed total threshold limit concentration;

(A) Table II - List of Inorganic Persistent and Bioaccumulative Toxic Substances and Their Soluble Threshold Limit Concentration:

(STLC) and Total Threshold Limit Concentration (TTLC) Values.

Substance <sup>a,b</sup>	STLC mg/l	TTLC Wet-Weight mg/kg
Antimony and/or antimony compounds	15	500
Arsenic and/or arsenic compounds	5.0	500
Asbestos		1.0 (as percent)
Barium and/or barium compounds (excluding barite)	100	10,000 <sup>c</sup>
Beryllium and/or beryllium compounds	0.75	75
Cadmium and/or cadmium compounds	1.0	100
Chromium (VI) compounds	5	500
Chromium and/or chromium (III) compounds	5 <sup>d</sup>	2,500
Cobalt and/or cobalt compounds	80	8,000
Copper and/or copper compounds	25	2,500
Fluoride salts	180	18,000
Lead and/or lead compounds	5.0	1,000
Mercury and/or mercury compounds	0.2	20

Substance <sup>a,b</sup>	STLC mg/l	TTLIC Wet-Weight mg/kg
Molybdenum and/or molybdenum compounds	350	3,500 <sup>e</sup>
Nickel and/or nickel compounds	20	2,000
Selenium and/or selenium compounds	1.0	100
Silver and/or silver compounds	5	500
Thallium and/or thallium compounds	7.0	700
Vanadium and/or vanadium compounds	24	2,400
Zinc and/or zinc compounds	250	5,000

<sup>a</sup>STLC and TTLIC values are calculated on the concentrations of the elements, not the compounds.

<sup>b</sup>In the case of asbestos and elemental metals, the specified concentration limits apply only if the substances are in a friable, powdered or finely divided state. Asbestos includes chrysotile, amosite, crocidolite, tremolite, anthophyllite, and actinolite.

<sup>c</sup>Excluding barium sulfate.

<sup>d</sup>If the soluble chromium, as determined by the TCLP set forth in Appendix I of chapter 18 of this division, is less than 5 mg/l, and the soluble chromium, as determined by the procedures set forth in Appendix II of chapter 11, equals or exceeds 560 mg/l and the waste is not otherwise identified as a RCRA hazardous waste pursuant to section 66261.100, then the waste is a non-RCRA hazardous waste.

<sup>e</sup>Excluding molybdenum disulfide.

(B) Table III - List of Organic Persistent and Bioaccumulative Toxic Substances and Their Soluble Threshold Limit Concentration (STLC) and Total Threshold Limit Concentration (TTLIC) Values:

Substance	STLC mg/l	TTLIC Wet Weight mg/kg
Aldrin	0.14	1.4
Chlordane	0.25	2.5
DDT, DDE, DDD	0.1	1.0
2,4-Dichlorophenoxyacetic acid	10	100
Dieldrin	0.8	8.0
Dioxin (2,3,7,8-TCDD)	0.001	0.01
Endrin	0.02	0.2
Heptachlor	0.47	4.7
Kepone	2.1	21
Lead compounds, organic	--	13
Lindane	0.4	4.0
Methoxychlor	10	100
Mirex	2.1	21
Pentachlorophenol	1.7	17
Polychlorinated biphenyls (PCBs)	5.0	50
Toxaphene	0.5	5
Trichloroethylene	204	2,040
2,4,5-Trichlorophenoxypropionic acid	1.0	10

- (3) it has an acute oral LD<sub>50</sub> less than 2,500 milligrams per kilogram;
- (4) it has an acute dermal LD<sub>50</sub> less than 4,300 milligrams per kilogram;
- (5) it has an acute inhalation LC<sub>50</sub> less than 10,000 parts per million as a gas or vapor;
- (6) it has an acute aquatic 96-hour LC<sub>50</sub> less than 500 milligrams per liter when measured in soft water (total hardness 40 to 48 milligrams per liter of calcium carbonate) with fathead minnows (*Pimephales promelas*), rainbow trout (*Salmo gairdneri*) or golden shiners (*Notemigonus crysoleucas*) according to procedures described in Part 800 of the "Standard Methods for the Examination of Water and Wastewater (16th Edition)," American Public Health Association, 1985 and "Static Acute Bioassay Procedures for Hazardous Waste Samples," California Department of Fish and Game, Water Pollution Control Laboratory, revised November 1988 (incorporated by reference, see section 66260.11), or by other test methods or test fish approved by the Department, using test samples prepared or meeting the conditions for testing as prescribed in subdivisions (c) and (d) of Appendix II of this chapter, and solubilized, suspended, dispersed or emulsified by the cited procedures or by other methods approved by the Department;

(7) it contains any of the following substances at a single or combined concentration equal to or exceeding 0.001 percent by weight:

- (A) 2-Acetylaminofluorene (2-AAF);
- (B) Acrylonitrile;
- (C) 4-Aminodiphenyl;
- (D) Benzidine and its salts;
- (E) bis (Chloromethyl) ether (BCME);
- (F) Methyl chloromethyl ether;
- (G) 1,2-Dibromo-3-chloropropane (DBCP);
- (H) 3,3'-Dichlorobenzidine and its salts (DCB);
- (I) 4-Dimethylaminoazobenzene (DAB);
- (J) Ethyleneimine (EL);
- (K) alpha-Naphthylamine (1-NA);
- (L) beta-Naphthylamine (2-NA);
- (M) 4-Nitrobiphenyl (4-NBP);
- (N) N-Nitrosodimethylamine (DMN);
- (O) beta-Propiolactone (BPL);
- (P) Vinyl chloride (VCM);

(8) it has been shown through experience or testing to pose a hazard to human health or environment because of its carcinogenicity, acute toxicity, chronic toxicity, bioaccumulative properties or persistence in the environment.

(b) A waste containing one or more materials which exhibit the characteristic of toxicity because the materials have the property specified in subsection (a)(5) of this section may be classified as nonhazardous pursuant to section 66260.200 if the waste does not exhibit any other characteristic of this article and is not listed in article 4 of this chapter and its head space vapor contains no such toxic materials in concentrations exceeding their respective acute inhalation LC<sub>50</sub> or their LC<sub>L0</sub>. The head space vapor of a waste shall be prepared, and two milliliters of it shall be sampled using a five milliliter gas-tight syringe, according to Method 5020 in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846, 2nd edition, U.S. Environmental Protection Agency, 1982 (incorporated by reference, see section 66260.11). The quantity in milligrams of each material, which exhibits the characteristic of toxicity because it has the property specified in subsection (a)(5) of this section, in the sampling syringe shall be determined by comparison to liquid standard solutions according to the appropriate gas chromatographic procedures in Method 8010, 8015, 8020, 8030 or 8240 in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846, 3rd edition, U.S. Environmental Protection Agency, 1986 (incorporated by reference, see section 66260.11). The concentration of each material in the head space vapor shall be calculated using the following equation:

		Q <sub>A</sub>		29.8ml		1
C <sub>A</sub>	=		x		x	
		MW		mmole		2 x 10 <sup>-6</sup> M <sup>3</sup>

where C (in parts per million) is the concentration of material A in head space vapor, Q (in milligrams) is the quantity of material A in sampling syringe and MW (in milligrams per millimole) is the molecular weight of material A. Where an acute inhalation LC<sub>50</sub> is not available, an LC<sub>50</sub> measured for another time (t) may be converted to an eight-hour value with the following equation:

$$\text{Eight-hour LC}_{50} = (t/8) \times (t\text{-hour LC}_{50}).$$

(c) A waste containing one or more materials which exhibit the characteristic of toxicity because the materials have either of the properties specified in subsection (a)(3) or (a)(4) of this section may be classified as nonhazardous pursuant to section 66260.200 if the waste does not exhibit any other characteristic of this article and is not listed in article 4 of this chapter and the calculated oral LD<sub>50</sub> of the waste mixture is greater than 2,500 milligrams per kilogram and the calculated dermal LD<sub>50</sub> is greater than 4,300 milligrams per kilogram by the following equation:

$$\text{Calculated oral or dermal } LD_{50} = \frac{100\%}{\sum_{x=1}^n \frac{\%A_x}{T_{A_x}}}$$

where %A<sub>x</sub> is the weight percent of each component in the waste mixture and T<sub>A<sub>x</sub></sub> is the acute oral or dermal LD<sub>50</sub> or the acute oral LD<sub>LO</sub> of each component.

NOTE: Authority cited: Sections 25141, 25159, 58004 and 58012, Health and Safety Code. Reference: Sections 25117, 25120.2, 25141, 25159 and 25159.5, Health and Safety Code and 40 CFR Section 261.24.

#### HISTORY

1. New section filed 5-24-91; effective 7-1-91 (Register 91, No. 22).
2. Amendment of table II filed 1-31-94; operative 1-31-94 (Register 94, No. 5).
3. Editorial correction of equation (Register 95, No. 36).
4. Amendment of subsection (a)(1) and NOTE filed 10-13-98; operative 11-12-98 (Register 98, No. 42).
5. Change without regulatory effect amending subsections (a)(3) and (c) filed 6—3—2004 pursuant to section 100, title 1, California Code of Regulations (Register 2004, No. 23).

**APPENDIX C**

**FIELD PROCEDURES**

## APPENDIX C

### FIELD PROCEDURES

#### **Drilling and Soil Sampling Procedures**

1. The borings will be drilled using a truck-mounted drill rig equipped with nominal 6-inch hollow-stem augers or using direct-push equipment. Drilling services will be provided by a State-licensed drilling contractor.
2. The augers and sampling equipment will be steam-cleaned prior to the drilling.
3. Soil cuttings from the drilling operations will be stored on-site in Department of Transportation (DOT)-approved 55-gallon drums, pending disposal disposition. The drums will be labeled with the boring designation from which the soil was collected, date, and project number.
4. Soil descriptions, in general accordance with the Unified Soil Classification System, sample type and depth, and related drilling information, will be recorded on a boring log under the supervision of a California Professional Geologist from Ardent Environmental Group, Inc.
5. Soil samples will be collected using a split-barrel modified California sampler at approximately 5 feet below the ground surface (bgs) and at approximate 5-foot-depth intervals thereafter, and continue to the bottom of the boring or at significant changes in lithology. Some samples will be collected at shallower depths.
6. The sampler will be washed between sampling intervals, using a bristle brush, with an Alconox solution (an inorganic detergent); followed by a tapwater rinse and a final distilled water rinse. The sampler will be dried by air or with a paper towel prior to being used for sampling.
7. Soil samples will be collected (at each sample interval) in three 6-inch-long stainless steel or brass sampling rings inside the sampler. Prior to initiation of the field program, the sample rings will be cleaned and dried in a similar fashion as described above in item 6.
8. The sampler will be driven using a 140-pound hammer (approximate weight) dropping approximately 30 inches. The number of blows (blow count) required to advance the sampler 18 inches will be recorded on the boring log.
9. Following retrieval of the sampler, the first 6-inch-long ring from the shoe of the sampler will be removed from the sampler; the ends will be covered with Teflon and capped with PVC end caps. The sample will be labeled with the sample number, collection date, and project number and will be retained for potential laboratory analysis.

10. The soil in the second sample tube from the shoe of the sampler will be used to describe the soil, measure volatile organic compounds (VOCs) using a Photoionization Detector (PID) equipped with an 11.7 electronvolt (eV) bulb, and collect a sample using EPA Method 5035. Following retrieval of the sample ring, a plastic syringe will be used to collect three samples of approximately 5 grams of soil. The first two soil samples will be ejected into a pre-weighed, laboratory supplied, 40-milliliter, VOA vial containing sodium bisulfate. One additional sample weighing approximately 5 grams of soil will be collected using the syringe and ejected into a VOA vial containing methanol. A new syringe will be used for each sampling interval. Approximately half of the remaining soil in the ring will be removed and placed in a Ziploc bag. The bag will then be agitated and set aside for approximately 15 to 30 minutes to allow organic vapors, if present, to accumulate in the void space (headspace) of the sample tube. The headspace will then be "sniffed" using the PID. The measurements will be considered in the selection of soil samples for laboratory analyses. The PID will be calibrated daily as per the manufactures specifications.
11. The borings will be backfilled with bentonite grout or hydrated granular bentonite to ground surface.

#### **Soil Sampling from Excavations, Test Pits, or Stockpiles**

1. Soil samples will be collected from the excavation, test pits, and stockpiles using a backhoe bucket or clean spade. The samples will be placed into 4-ounce glass jars supplied by the laboratory or stainless steel rings with PVC end caps. Soil sampling will be conducted under the supervision of a California Professional Geologist from Ardent.
2. Samples to be chemically analyzed for total petroleum hydrocarbons as gasoline (TPHg) or VOCs will be collected in accordance with EPA Method No. 5035, as described above.

#### **Sample Handling**

1. The soil samples retained for chemical analyses will be placed in Ziploc bags and stored in an ice chest cooled, using ice, to a temperature of approximately 40 degrees Fahrenheit.
2. The samples will be delivered to a State-certified environmental laboratory within 24 hours of collection. Sample handling, transport, and delivery to the laboratory will be documented using chain-of-custody procedures, including the use of chain-of-custody forms.

#### **Quality Assurance/Quality Control (QA/QC)**

1. QA will be implemented to assess whether the data obtained are comparable and representative of actual field conditions. The QC checks will be controlled samples that will be introduced into the sample analysis stream, and will be used to assess the performance of the laboratory, and to evaluate the accuracy, precision, and completeness of the laboratory analytical procedures.

2. The QA/QC program will consist of the minimization of possible cross-contamination during sample collection, and included decontamination of sampling equipment; the preparation of a trip blank sample and the internal QA/QC procedures that will be conducted by the laboratory: laboratory blanks, laboratory surrogate spikes, and laboratory matrix spike samples.

**APPENDIX D**

**SOUTH COAST AIR QUALITY MANAGEMENT**

**DISTRICT RULES**

(Adopted May 7, 1976)

**RULE 402. NUISANCE**

A person shall not discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health or safety of any such persons or the public, or which cause, or have a natural tendency to cause, injury or damage to business or property.

The provisions of this rule shall not apply to odors emanating from agricultural operations necessary for the growing of crops or the raising of fowl or animals.

(Adopted May 7, 1976)(Amended November 6, 1992)  
(Amended July 9, 1993)(Amended February 14, 1997)  
(Amended December 11, 1998)

**RULE 403. FUGITIVE DUST**

(a) Purpose

The purpose of this rule is to reduce the amount of particulate matter entrained in the ambient air as a result of anthropogenic (man-made) fugitive dust sources by requiring actions to prevent, reduce or mitigate fugitive dust emissions.

(b) Applicability

The provisions of this rule shall apply to any activity or man-made condition capable of generating fugitive dust.

(c) Definitions

(1) ACTIVE OPERATIONS shall mean any activity capable of generating fugitive dust, including, but not limited to, earth-moving activities, construction/demolition activities, or heavy- and light-duty vehicular movement.

(2) ANEMOMETERS are devices used to measure wind speed and direction in accordance with the performance standards, and maintenance and calibration criteria as contained in the most recent Rule 403 Implementation Handbook, now or hereafter adopted by the Governing Board.

(3) BEST AVAILABLE CONTROL MEASURES represent fugitive dust control actions which are required to be implemented within the boundaries of the South Coast Air Basin. A detailed listing of best available control measures for each fugitive dust source type shall be as contained in the most recent Rule 403 Implementation Handbook, now or hereafter adopted by the Governing Board.

(4) BULK MATERIAL is sand, gravel, soil, aggregate material less than two inches in length or diameter, and other organic or inorganic particulate matter.

(5) CHEMICAL STABILIZERS mean any non-toxic chemical dust suppressant which must not be used if prohibited for use by the Regional Water Quality Control Boards, the California Air Resources Board, the U.S. Environmental Protection Agency (U.S. EPA), or any applicable law,

rule or regulation; and should meet any specifications, criteria, or tests required by any federal, state, or local water agency. Unless otherwise indicated, the use of a non-toxic chemical stabilizer shall be of sufficient concentration and application frequency to maintain a stabilized surface.

- (6) CONSTRUCTION/DEMOLITION ACTIVITIES are any on-site mechanical activities preparatory to or related to the building, alteration, rehabilitation, demolition or improvement of property, including, but not limited to the following activities; grading, excavation, loading, crushing, cutting, planing, shaping or ground breaking.
- (7) CONTINGENCY NOTIFICATION means that the U.S. EPA has determined and notified the District in writing that PM<sub>10</sub> contingency requirements must be implemented based on a finding that: (1) PM<sub>10</sub> and PM<sub>10</sub> precursor emissions reductions were less than required at any three-year milestone reporting interval, or (2) the region failed to attain the PM<sub>10</sub> standards within the time frames allotted under the Federal Clean Air Act, or (3) if as part of an Attainment/Maintenance Plan, the region is no longer in attainment of the PM<sub>10</sub> standards.
- (8) CONTRACTOR means any person who has a contractual arrangement to conduct an active operation for another person.
- (9) DISTURBED SURFACE AREA means a portion of the earth's surface which has been physically moved, uncovered, destabilized, or otherwise modified from its undisturbed natural soil condition, thereby increasing the potential for emission of fugitive dust. This definition excludes those areas which have:
  - (A) been restored to a natural state, such that the vegetative ground cover and soil characteristics are similar to adjacent or nearby natural conditions;
  - (B) been paved or otherwise covered by a permanent structure; or
  - (C) sustained a vegetative ground cover over at least 95 percent of an area for a period of at least 6 months.
- (10) DUST SUPPRESSANTS are water, hygroscopic materials, or non-toxic chemical stabilizers used as a treatment material to reduce fugitive dust emissions.
- (11) EARTH-MOVING ACTIVITIES shall include, but not be limited to, grading, earth cutting and filling operations, loading or unloading of dirt

- or bulk materials, adding to or removing from open storage piles of bulk materials, landfill operations, or soil mulching.
- (12) FUGITIVE DUST means any solid particulate matter that becomes airborne, other than that emitted from an exhaust stack, directly or indirectly as a result of the activities of man.
  - (13) INACTIVE DISTURBED SURFACE AREA means any disturbed surface area upon which active operations have not occurred or are not expected to occur for a period of ten consecutive days.
  - (14) LARGE OPERATIONS means any active operations on property which contains in excess of 100 acres of disturbed surface area; or any earth-moving operation which exceeds a daily earth-moving or throughput volume of 7,700 cubic meters (10,000 cubic yards) three times during the most recent 365-day period.
  - (15) MEDIUM OPERATIONS means any active operations on property which contains between 50 and 100 acres of disturbed surface area; or any earth-moving operation with a daily earth-moving or throughput volume of between 3,850 cubic meters (5,000 cubic yards) and 7,700 cubic meters (10,000 cubic yards) three times during the most recent 365-day period.
  - (16) NON-ROUTINE means any non-periodic active operation which occurs no more than three times per year, lasts less than 30 cumulative days per year, and is scheduled less than 30 days in advance.
  - (17) OPEN STORAGE PILE is any accumulation of bulk material with 5 percent or greater silt content which is not fully enclosed, covered or chemically stabilized, and which attains a height of three feet or more and a total surface area of 150 or more square feet. Silt content level is assumed to be 5 percent or greater unless a person can show, by sampling and analysis in accordance with ASTM Method C-136 or other equivalent method approved in writing by the Executive Officer, the California Air Resources Board, and the U. S. EPA, that the silt content is less than 5 percent. The results of ASTM Method C-136 or equivalent method are valid for 60 days from the date the sample was taken.
  - (18) PARTICULATE MATTER means any material, except uncombined water, which exists in a finely divided form as a liquid or solid at standard conditions.
  - (19) PAVED ROAD means an improved street, highway, alley, public way, or easement that is covered by typical roadway materials excluding access

roadways that connect a facility with a public paved roadway and are not open to through traffic. Public paved roads are those open to public access and that are owned by any federal, state, county, municipal or any other governmental or quasi-governmental agencies. Private paved roads are any paved roads not defined as public.

- (20) PM<sub>10</sub> is particulate matter with an aerodynamic diameter smaller than or equal to 10 microns as measured by the applicable State and Federal reference test methods.
- (21) PROPERTY LINE means the boundaries of an area in which either a person causing the emission or a person allowing the emission has the legal use or possession of the property. Where such property is divided into one or more sub-tenancies, the property line(s) shall refer to the boundaries dividing the areas of all sub-tenancies.
- (22) REASONABLY AVAILABLE CONTROL MEASURES are appropriate techniques and procedures used to prevent or reduce the emission and airborne transport of fugitive dust, outside the boundaries of the South Coast Air Basin. These include, but are not limited to, application of dust suppressants, use of coverings or enclosures, paving, enshrouding, planting, reduction of vehicle speeds, and other measures as specified by the Executive Officer. A detailed listing of reasonably available control measures for each fugitive dust source type shall be as contained in the most recent Rule 403 Implementation Handbook, now or hereafter adopted by the Governing Board.
- (23) SILT means any aggregate material with a particle size less than 74 micrometers in diameter which passes through a No. 200 Sieve.
- (24) SIMULTANEOUS SAMPLING means the operation of two PM<sub>10</sub> samplers in such a manner that one sampler is started within five minutes of the other, and each sampler is operated for a consecutive period which must be not less than 290 minutes and not more than 310 minutes.
- (25) SOUTH COAST AIR BASIN means the non-desert portions of Los Angeles, Riverside, and San Bernardino counties and all of Orange County as defined in California Code of Regulations, Title 17, Section 60104. The area is bounded on the west by the Pacific Ocean, on the north and east by the San Gabriel, San Bernardino, and San Jacinto Mountains, and on the south by the San Diego county line.
- (26) STABILIZED SURFACE means:

- (A) any disturbed surface area or open storage pile which is resistant to wind-driven fugitive dust;
  - (B) any unpaved road surface in which any fugitive dust plume emanating from vehicular traffic does not exceed 20 percent opacity.
- (27) UNPAVED ROADS are any unsealed or unpaved roads, equipment paths, or travel ways that are not covered by one of the following: concrete, asphaltic concrete, recycled asphalt, asphalt or other materials with equivalent performance as determined by the Executive Officer, the California Air Resources Board, and the U.S. EPA. Public unpaved roads are any unpaved roadway owned by Federal, State, county, municipal or other governmental or quasi-governmental agencies. Private unpaved roads are all other unpaved roadways not defined as public.
- (28) VISIBLE ROADWAY DUST means any sand, soil, dirt, or other solid particulate matter which is visible upon paved road surfaces and which can be removed by a vacuum sweeper or a broom sweeper under normal operating conditions.
- (29) WIND-DRIVEN FUGITIVE DUST means visible emissions from any disturbed surface area which is generated by wind action alone.
- (30) WIND GUST is the maximum instantaneous wind speed as measured by an anemometer.
- (d) Requirements
- (1) A person shall not cause or allow the emissions of fugitive dust from any active operation, open storage pile, or disturbed surface area such that the presence of such dust remains visible in the atmosphere beyond the property line of the emission source.
  - (2) A person conducting active operations within the boundaries of the South Coast Air Basin shall utilize one or more of the applicable best available control measures to minimize fugitive dust emissions from each fugitive dust source type which is part of the active operation.
  - (3) A person conducting active operations outside the boundaries of the South Coast Air Basin may utilize reasonably available control measures in lieu of best available control measures to minimize fugitive dust emissions from each fugitive dust source type which is part of the active operation.

- (4) A person shall not cause or allow PM<sub>10</sub> levels to exceed 50 micrograms per cubic meter when determined, by simultaneous sampling, as the difference between upwind and downwind samples collected on high-volume particulate matter samplers or other U.S. EPA-approved equivalent method for PM<sub>10</sub> monitoring. If sampling is conducted, samplers shall be:
  - (A) Operated, maintained, and calibrated in accordance with 40 Code of Federal Regulations (CFR), Part 50, Appendix J, or appropriate U.S. EPA-published documents for U.S. EPA-approved equivalent method(s) for PM<sub>10</sub>.
  - (B) Reasonably placed upwind and downwind of key activity areas and as close to the property line as feasible, such that other sources of fugitive dust between the sampler and the property line are minimized.
- (5) Any person in the South Coast Air Basin shall:
  - (A) prevent or remove within one hour the track-out of bulk material onto public paved roadways as a result of their operations; or
  - (B) take at least one of the actions listed in Table 3 and:
    - (i) prevent the track-out of bulk material onto public paved roadways as a result of their operations and remove such material at anytime track-out extends for a cumulative distance of greater than 50 feet on to any paved public road during active operations; and
    - (ii) remove all visible roadway dust tracked-out upon public paved roadways as a result of active operations at the conclusion of each work day when active operations cease.
- (e) Contingency Requirements

When a contingency notification has occurred, the requirements of this subdivision shall become effective in the county subject to the notification 60 days after the first publication date in newspapers of general circulation in that county. Such publication shall specify that a contingency notification has occurred, and that any person who conducts or authorizes the conducting of a medium operation shall be required to comply with the provisions of subdivision (f), in addition to the requirements of subdivision (d).

- (f) Special Requirements for Large Operations, and Medium Operations Under a Contingency Notification
- (1) Any person who conducts or authorizes the conducting of either a large operation which is subject to the requirements of this rule, or a medium operation under a contingency notification as set forth in subdivision (e), shall either:
- (A) take the actions specified in Tables 1 and 2 for each applicable source of fugitive dust within the property lines and shall:
- (i) notify the Executive Officer not more than 7 days after qualifying as a large operation or as a medium operation under a contingency notification;
  - (ii) include, as part of the notification, the items specified in subparagraphs (f)(3)(A) and (f)(3)(B);
  - (iii) maintain daily records to document the specific actions taken;
  - (iv) maintain such records for a period of not less than 6 months; and
  - (v) make such records available to the Executive Officer upon request; or
- (B) obtain an approved fugitive dust emissions control plan (plan).
- (2) Any person subject to paragraph (f)(1) who elects to obtain an approved fugitive dust emission control plan must submit the plan to the Executive Officer no later than 30 days after the activity becomes a large operation.
- (3) Any plan prepared pursuant to subparagraph (f)(1)(B) shall include:
- (A) The name(s), address(es), and phone number(s) of the person(s) responsible for the preparation, submittal, and implementation of the plan;
  - (B) A description of the operation(s), including a map depicting the location of the site;
  - (C) A listing of all sources of fugitive dust emissions within the property lines;
  - (D) A description of the required control measures as applied to each of the sources identified in subparagraph (f)(3)(C). The description must be sufficiently detailed to demonstrate that the applicable best available control measures or reasonably available

control measures will be utilized and/or installed during all periods of active operations.

- (4) In the event that there are special technical (e.g., non-economic) circumstances, including safety, which prevent the use of at least one of the required control measure for any of the sources identified in subparagraph (f)(3)(C), a justification statement must be provided in lieu of the description required in subparagraph (f)(3)(D). The justification statement must explain the reason(s) why the required control measures cannot be implemented.
- (5) Within 30 calendar days of the receipt of a plan submitted pursuant to subparagraph (f)(1)(B), the Executive Officer will either approve, conditionally approve, or disapprove the plan, in writing. For a plan to be approved or conditionally approved, three conditions must be satisfied:
  - (A) All sources of fugitive dust emissions must be identified (e.g., earth-moving, storage piles, vehicular traffic on unpaved roads, etc.).
  - (B) For each source identified, at least one of the required control measures must be implemented, or an acceptable justification statement pursuant to paragraph (f)(4) must be provided; and
  - (C) If, after implementation of the required control measures, visible dust emissions are crossing the property line(s), then high wind measures (e.g., increased watering) must be specified for immediate implementation.
- (6) Conditional approval will be made if conditions are met, but the stated measures do not satisfactorily conform to the guidance contained in the applicable Rule 403 Implementation Handbook. If a plan is conditionally approved, the conditions necessary to modify the plan will be provided in writing to the person(s) identified in subparagraph (f)(3)(A). Such modifications must be incorporated into the plan within 30 days of the receipt of the notice of conditional approval, or the plan shall be disapproved. A letter to the Executive Officer stating that such modifications will be incorporated into the plan shall be deemed sufficient to result in approval of the plan.
- (7) If a plan is disapproved by the Executive Officer:
  - (A) The reasons for disapproval shall be given to the applicant in writing.

- (B) Within 7 days of the receipt of a notice of a disapproved plan, the applicant shall comply with the actions specified in Tables 1 and 2 for each applicable source of fugitive dust within the property lines.
  - (C) The applicant may resubmit a plan at any time after receiving a disapproval notification, but will not be relieved of complying with subparagraph (f)(7)(B) until such time as the plan has been approved.
- (8) Failure to comply with any of the provisions in an approved or conditionally approved plan shall be a violation of subdivision (f).
  - (9) Any approved plan shall be valid for a period of one year from the date of approval or conditional approval of the plan. Plans must be resubmitted annually, at least 60 days prior to the expiration date, or the plan shall become disapproved as of the expiration date. If all fugitive dust sources and corresponding control measures or special circumstances remain identical to those identified in the previously approved plan, the resubmittal may contain a simple statement of no-change. Otherwise, a resubmittal must contain all the items specified in subparagraphs (f)(3)(A through D).
  - (10) Any person subject to the requirements of paragraph (f)(1) who no longer exceeds, and does not expect to exceed for a period of at least one year, the criteria for a large operation or a medium operation under a contingency notification may request a reclassification as a non-large operation not subject to subparagraph (f). To obtain this reclassification, a person must submit a request in writing to the Executive Officer specifying the conditions which have taken place to reduce the disturbed surface area and/or the earth-moving or throughput conditions to levels below the criteria for large operations. A person must further indicate that the criteria for large operations are not expected to be exceeded during the subsequent 12-month period. The Executive Officer shall either approve or disapprove the reclassification within 60 days from receipt of the reclassification request. The Executive Officer will disapprove the request if the indicated changes can not be verified to be below the criteria for large operations or a medium operation under a contingency notification. If approved, the person shall be relieved of all requirements under subdivision (f). Any person so reclassified would again be subject to the

requirements of subdivision (f) if at any time subsequent to the reclassification the criteria for large operations or a medium operation under a contingency notification are met.

- (11) A person responsible for more than one operation subject to subparagraph (f) at non-contiguous sites may submit one plan covering multiple sites provided that:
  - (A) the contents of the plan apply similarly to all sites; and
  - (B) specific information is provided for each site, including, map of site location, address, description of operations, and a listing of all sources of fugitive dust emissions within the property lines.
  
- (g) Compliance Schedule

All the newly amended provisions of this rule shall become effective upon adoption of this Rule Amendment. Pursuant to subdivision (f), any fugitive dust emission control plan which has been approved or conditionally approved prior to the date of adoption of these amendments shall remain in effect and the plan approval date and annual resubmittal date shall remain unchanged. If any changes to such plans are necessary as a result of these amendments, such changes shall not be required until the annual resubmittal date, pursuant to paragraph (f)(9).
  
- (h) Exemptions
  - (1) The provisions of this rule shall not apply to:
    - (A) Agricultural operations outside the boundaries of the South Coast Air Basin, agricultural operations directly related to the raising of fowls or animals, and agricultural operations conducted within the boundaries of the South Coast Air Basin provided that the combined disturbed surface area within one continuous property line and not separated by a paved public road is 10 acres or less.
    - (B) Agricultural operations within the South Coast Air Basin, until June 30, 1999, whose combined disturbed surface area includes more than 10 acres. All provisions of this Rule shall become applicable to agricultural operations exceeding 10 acres beginning July 1, 1999, excluding those listed in (h)(1)(A), unless the person responsible for such operations voluntarily implements the conservation practices contained in the most recent Rule 403

Agricultural Handbook, now or hereafter adopted by the Governing Board. The person responsible for such operations must complete and maintain the self-monitoring form documenting sufficient conservation practices, as described in the Rule 403 Agricultural Handbook, and must make it available to the Executive Officer upon request.

- (C) Any disturbed surface area less than one-half (1/2) acre on property zoned for residential uses.
- (D) Active operations conducted during emergency life-threatening situations, or in conjunction with any officially declared disaster or state of emergency.
- (E) Active operations conducted by essential service utilities to provide electricity, natural gas, telephone, water and sewer during periods of service outages and emergency disruptions.
- (F) Any contractor subsequent to the time the contract ends, provided that such contractor implemented the required control measures during the contractual period.
- (G) Any grading contractor, for a phase of active operations, subsequent to the contractual completion of that phase of earth-moving activities, provided that the required control measures have been implemented during the entire phase of earth-moving activities, through and including five days after the final grading inspection.
- (H) Weed abatement operations ordered by a county agricultural commissioner or any state, county, or municipal fire department, provided that:
  - (i) mowing, cutting or other similar process is used which maintains weed stubble at least three inches above the soil;  
or
  - (ii) any discing or similar operation which cuts into and disturbs the soil is used and meets the following conditions:
    - [a] A determination is made by the issuing agency of the weed abatement order that, due to fire hazard conditions, rocks, or other physical obstructions, it is not practical to meet the conditions specified in clause (h)(1)(H)(i); and

[b] Such determination is made in writing and provided to the person conducting the weed abatement operation prior to beginning such activity; and

[c] Such written determination is provided to the Executive Officer upon request from the person conducting the weed abatement operation.

(Note: The provisions of clause (h)(1)(H)(ii) do not exempt the owner of any property from controlling fugitive dust emissions emanating from disturbed surface areas which have been created as a result of the weed abatement actions.)

- (I) sandblasting operations.
- (2) The provisions of paragraphs (d)(1) and (d)(4) shall not apply:
  - (A) When wind gusts exceed 25 miles per hour, provided that:
    - (i) The required control measures for high wind conditions are implemented for each applicable fugitive dust source type, as specified in Table 1, and;
    - (ii) Records are maintained in accordance with clauses (f)(1)(A)(iii), (f)(1)(A)(iv) and (f)(1)(A)(v); and
    - (iii) In the event there are technical (e.g., non-economic) reasons, including safety, why any of the required control measures in Table 1 cannot be implemented for one or more fugitive dust source categories, a person submits a "High Wind Fugitive Dust Control Plan" (HW-Plan). The HW-Plan must further provide an alternative measure of fugitive dust control, if technically feasible. Such plan will be subject to the same approval conditions as specified in subparagraphs (f)(5) and (f)(6).
  - (B) To unpaved roads, provided such roads:
    - (i) are used solely for the maintenance of wind-generating equipment; or
    - (ii) are unpaved public alleys as defined in Rule 1186; or
    - (iii) meet all of the following criteria:
      - (a) are less than 50 feet in width at all points along the road;
      - (b) are within 25 feet of the property line; and

- (c) have a traffic volume less than 20 vehicle-trips per day.
  - (C) To any active operation, open storage pile, or disturbed surface area for which necessary fugitive dust preventive or mitigative actions are in conflict with the federal Endangered Species Act.
  - (D) To non-routine or emergency maintenance of flood control channels and water spreading basins.
- (3) The provisions of paragraphs (d)(1), (d)(2), and (d)(4) shall not apply to:
  - (A) Blasting operations which have been permitted by the California Division of Industrial Safety; and
  - (B) Motion picture, television, and video production activities when dust emissions are required for visual effects. In order to obtain this exemption, the Executive Officer must receive notification in writing at least 72 hours in advance of any such activity and no nuisance results from such activity.
- (4) The provisions of paragraph (d)(4) shall not apply if the dust control actions, as specified in Table 2, are implemented on a routine basis for each applicable fugitive dust source type. To qualify for this exemption, a person must:
  - (A) maintain records to document the dates of active operations, all applicable fugitive dust source types, and the actions taken consistent with Table 2;
  - (B) retain such records for a period of at least six months; and
  - (C) make such records available to the Executive Officer upon request.
- (5) The provisions of paragraph (d)(5) shall not apply to earth coverings of public paved roadways where such coverings are approved by a local government agency for the protection of the roadway, and where such coverings are used as roadway crossings for haul vehicles.
- (6) The provisions of subdivision (f) shall not apply to:
  - (A) officially-designated public parks and recreational areas, including national parks, national monuments, national forests, state parks, state recreational areas, and county regional parks;
  - (B) any construction and/or earth-moving activity in which the completion date is expected to be less than 60 days after the beginning date. To qualify for this exemption, a person must:

- (i) notify the Executive Officer not more than 7 days after qualifying as a large operation or a medium operation under a contingency notification;
    - (ii) include, as part of the notification, the items specified in subparagraphs (f)(3)(A) and (f)(3)(B); and
    - (iii) take the actions specified in Tables 1 and 2 at such time as the construction and/or earth-moving activities extend more than 60 days after qualifying as a large operation or a medium operation under a contingency notification.
  - (C) any large operation or a medium operation under a contingency notification which is required to submit a dust control plan to any city or county government which has adopted a District-approved dust control ordinance. To qualify for this exemption, a person must submit a copy of the city- or county-approved dust control plan to the Executive Officer within 30 days of the effective date of this rule or within 30 days of receiving approval from the city or county government, whichever is later.
  - (D) any large operation or a medium operation under a contingency notification subject to Rule 1158, which has an approved dust control plan pursuant to Rule 1158, provided that all sources of fugitive dust are included in the Rule 1158 plan.
- (i) Fees
- (1) Any person subject to a plan submittal pursuant to subparagraph (f)(1)(B) or clause (h)(2)(A)(iii) or subparagraph (h)(1)(B) shall be assessed applicable filing and evaluation fees pursuant to Rule 306. Any person who simultaneously submits a plan pursuant to subparagraph (f)(1)(B) and clause (h)(2)(A)(iii) shall, for the purpose of this rule, be deemed to submit one plan.
  - (2) The submittal of an annual statement of no-change, pursuant to paragraph (f)(9), shall not be considered as an annual review, and therefore shall not be subject to annual review fees, pursuant to Rule 306.
  - (3) The owner/operator of any facility for which the Executive Officer conducts upwind/downwind monitoring for PM<sub>10</sub> pursuant to paragraph (d)(4) shall be assessed applicable Ambient Air Analysis Fees pursuant to Rule 304.1. Applicable fees shall be waived for any facility which is

exempted from paragraph (d)(4) or meets the requirements of paragraph (d)(4).

TABLE 1

## BEST [REASONABLY]\* AVAILABLE CONTROL MEASURES FOR HIGH WIND CONDITIONS

<b>FUGITIVE DUST SOURCE CATEGORY</b>	<b><u>CONTROL MEASURES</u></b>
<b>Earth-moving</b>	(1A) Cease all active operations; OR (2A) Apply water to soil not more than 15 minutes prior to moving such soil.
<b>Disturbed surface areas</b>	(0B) On the last day of active operations prior to a weekend, holiday, or any other period when active operations will not occur for not more than four consecutive days: apply water with a mixture of chemical stabilizer diluted to not less than 1/20 of the concentration required to maintain a stabilized surface for a period of six months; OR (1B) Apply chemical stabilizers prior to wind event; OR (2B) Apply water to all unstabilized disturbed areas 3 times per day. If there is any evidence of wind driven fugitive dust, watering frequency is increased to a minimum of four times per day; OR (3B) Take the actions specified in Table 2, Item (3c); OR (4B) Utilize any combination of control actions (1B), (2B), and (3B) such that, in total, these actions apply to all disturbed surface areas.
<b>Unpaved roads</b>	(1C) Apply chemical stabilizers prior to wind event; OR (2C) Apply water twice [once] per hour during active operation; OR (3C) Stop all vehicular traffic.
<b>Open storage piles</b>	(1D) Apply water twice [once] per hour; OR (2D) Install temporary coverings.
<b>Paved road track-out</b>	(1E) Cover all haul vehicles; OR (2E) Comply with the vehicle freeboard requirements of Section 23114 of the California Vehicle Code for both public and private roads.
<b>All Categories</b>	(1F) Any other control measures approved by the Executive Officer and the U.S. EPA as equivalent to the methods specified in Table 1 may be used.

\* Measures in [brackets] are reasonably available control measures and only apply to sources not within the South Coast Air Basin.

**TABLE 2**  
**DUST CONTROL ACTIONS FOR EXEMPTION FROM PARAGRAPH (d)(3)\***

<b><u>FUGITIVE DUST SOURCE CATEGORY</u></b>	<b><u>CONTROL ACTIONS</u></b>
<b>Earth-moving (except construction cutting and filling areas, and mining operations)</b>	<p>(1a) Maintain soil moisture content at a minimum of 12 percent, as determined by ASTM method D-2216, or other equivalent method approved by the Executive Officer, the California Air Resources Board, and the U.S. EPA. Two soil moisture evaluations must be conducted during the first three hours of active operations during a calendar day, and two such evaluations each subsequent four-hour period of active operations; OR</p> <p>(1a-1) For any earth-moving which is more than 100 feet from all property lines, conduct watering as necessary to prevent visible dust emissions from exceeding 100 feet in length in any direction.</p>
<b>Earth-moving: Construction fill areas:</b>	<p>(1b) Maintain soil moisture content at a minimum of 12 percent, as determined by ASTM method D-2216, or other equivalent method approved by the Executive Officer, the California Air Resources Board, and the U.S. EPA. For areas which have an optimum moisture content for compaction of less than 12 percent, as determined by ASTM Method 1557 or other equivalent method approved by the Executive Officer and the California Air Resources Board and the U.S. EPA, complete the compaction process as expeditiously as possible after achieving at least 70 percent of the optimum soil moisture content. Two soil moisture evaluations must be conducted during the first three hours of active operations during a calendar day, and two such evaluations during each subsequent four-hour period of active operations.</p>

\* Measures in [brackets] are reasonably available control measures and only apply to sources not within the South Coast Air Basin.

TABLE 2 (Continued) \*

<b><u>FUGITIVE DUST SOURCE CATEGORY</u></b>	<b><u>CONTROL ACTIONS</u></b>
<b>Earth-moving: Construction cut areas and mining operations:</b>	(1c) Conduct watering as necessary to prevent visible emissions from extending more than 100 feet beyond the active cut or mining area unless the area is inaccessible to watering vehicles due to slope conditions or other safety factors.
<b>Disturbed surface areas (except completed grading areas)</b>	(2a/b) Apply dust suppression in sufficient quantity and frequency to maintain a stabilized surface. Any areas which cannot be stabilized, as evidenced by wind driven fugitive dust must have an application of water at least twice per day to at least 80 [70] percent of the unstabilized area.
<b>Disturbed surface areas: Completed grading areas</b>	(2c) Apply chemical stabilizers within five working days of grading completion; OR  (2d) Take actions (3a) or (3c) specified for inactive disturbed surface areas.
<b>Inactive disturbed surface areas</b>	(3a) Apply water to at least 80 [70] percent of all inactive disturbed surface areas on a daily basis when there is evidence of wind driven fugitive dust, excluding any areas which are inaccessible to watering vehicles due to excessive slope or other safety conditions; OR  (3b) Apply dust suppressants in sufficient quantity and frequency to maintain a stabilized surface; OR  (3c) Establish a vegetative ground cover within 21 [30] days after active operations have ceased. Ground cover must be of sufficient density to expose less than 30 percent of unstabilized ground within 90 days of planting, and at all times thereafter; OR  (3d) Utilize any combination of control actions (3a), (3b), and (3c) such that, in total, these actions apply to all inactive disturbed surface areas.

\* Measures in [brackets] are reasonably available control measures and only apply to sources not within the South Coast Air Basin.

TABLE 2 (Continued)\*

<u>FUGITIVE DUST SOURCE CATEGORY</u>	<u>CONTROL ACTIONS</u>
<b>Unpaved Roads</b>	(4a) Water all roads used for any vehicular traffic at least once per every two hours of active operations [3 times per normal 8 hour work day]; OR (4b) Water all roads used for any vehicular traffic once daily and restrict vehicle speeds to 15 miles per hour; OR (4c) Apply a chemical stabilizer to all unpaved road surfaces in sufficient quantity and frequency to maintain a stabilized surface.
<b>Open storage piles</b>	(5a) Apply chemical stabilizers; OR (5b) Apply water to at least 80 [70] percent of the surface area of all open storage piles on a daily basis when there is evidence of wind driven fugitive dust; OR (5c) Install temporary coverings; OR (5d) Install a three-sided enclosure with walls with no more than 50 percent porosity which extend, at a minimum, to the top of the pile.
<b><u>All Categories</u></b>	(6a) Any other control measures approved by the Executive Officer and the U.S. EPA as equivalent to the methods specified in Table 2 may be used.

\* Measures in [brackets] are reasonably available control measures and only apply to sources not within the South Coast Air Basin.

**TABLE 3**  
**TRACK-OUT CONTROL OPTIONS**  
**PARAGRAPH (d)(5)(B)**

CONTROL OPTIONS

(1)	Pave or apply chemical stabilization at sufficient concentration and frequency to maintain a stabilized surface starting from the point of intersection with the public paved surface, and extending for a centerline distance of at least 100 feet and a width of at least 20 feet.
(2)	Pave from the point of intersection with the public paved road surface, and extending for a centerline distance of at least 25 feet and a width of at least 20 feet, and install a track-out control device immediately adjacent to the paved surface such that exiting vehicles do not travel on any unpaved road surface after passing through the track-out control device.
(3)	Any other control measures approved by the Executive Officer and the U.S. EPA as equivalent to the methods specified in Table 3 may be used.

(Adopted August 5, 1988)(Amended July 14, 1995)(Amended May 11, 2001)

**RULE 1166. VOLATILE ORGANIC COMPOUND EMISSIONS FROM DECONTAMINATION OF SOIL**

(a) Applicability

This rule sets requirements to control the emission of Volatile Organic Compounds (VOC) from excavating, grading, handling and treating VOC-contaminated soil as a result of leakage from storage or transfer operations, accidental spillage, or other deposition.

(b) Definitions

- (1) EXCAVATION is the process of digging out and removing materials, including any material necessary to that process such as the digging out and removal of asphalt or concrete necessary to expose, dig out and remove known VOC contaminated soil.
- (2) GRADING is the process of leveling off to produce a smooth surface including the removal of any material necessary to that process such as asphalt and concrete necessary to expose known VOC contaminated soil.
- (3) SOIL DECONTAMINATION MEASURE is any process approved by the Executive Officer to remediate, destroy, remove, or encapsulate VOC and VOC-contaminated soil.
- (4) UNDERGROUND STORAGE TANK means any one or combination of tanks, including pipes connected thereto, which is used for the storage of organic liquid which is more than 50% beneath the surface of the ground.
- (5) VOC CONTAMINATED SOIL is a soil which registers a concentration of 50 ppm or greater of Volatile Organic Compounds as measured before suppression materials have been applied and at a distance of no more than three inches from the surface of the excavated soil with an organic vapor analyzer calibrated with hexane.
- (6) VOC CONTAMINATED SOIL MITIGATION PLAN is a plan to minimize VOC emissions to the atmosphere during excavation and any subsequent handling of VOC-contaminated soil.

- (7) VOLATILE ORGANIC COMPOUND (VOC) is any volatile compound of carbon, excluding methane, carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, ammonium carbonate, and exempt compounds. Exempt compounds are defined in Rule 102—Definition Of Terms.
  - (8) VOLATILE ORGANIC MATERIALS include gasoline, diesel, crude oil, lubricant, waste oil, adhesive, paint, stain, solvent, resin, monomer, and/or any other material containing VOC.
- (c) Requirements
- (1) A person excavating an underground storage tank and/or transfer piping storing or previously storing VOC materials, or excavating or grading soil containing VOC materials shall:
    - (A) Apply for, obtain and operate pursuant to a mitigation plan approved by the Executive Officer prior to commencement of excavation or handling. The mitigation plan general requirement and application requirements are found in Attachment A to this rule. A copy of the approved plan must be on site during the entire excavation period.
    - (B) Notify the Executive Officer at least 24 hours prior to excavation using a form approved by the Executive Officer which is fully completed.  
If the excavation does not commence on start date, renotification is required.  
An alternative notification procedure may be authorized for multiple excavations within a single facility, with prior written approval from the Executive Officer.
    - (C) Monitor for VOC contamination pursuant to subdivision (e), at least once every 15 minutes commencing at the beginning of excavation or grading and record all VOC concentration readings in a format approved by the Executive Officer; and
    - (D) When VOC-contaminated soil is detected during excavation or grading:
      - (i) Implement the approved mitigation plan (Attachment A).
      - (ii) Notify the Executive Officer within 24 hours of detection of VOC-contaminated soil.

- (iii) Monitor and record VOC concentration readings as prescribed in the plan. Monitoring records must be kept available on site.
  - (iv) Keep calibration records for all monitoring instruments available on site.
- (2) A person handling VOC-contaminated soil at or from an excavation or grading site shall:
  - (A) Segregate VOC-contaminated stockpiles from non-VOC contaminated stockpiles such that mixing of the stockpiles does not take place.
  - (B) Spray VOC-contaminated soil stockpiles with water and/or approved vapor suppressant and cover them with plastic sheeting for all periods of inactivity lasting more than one hour.
  - (C) Conduct a daily visual inspection of all covered VOC contaminated soil stockpiles to ensure the integrity of the plastic covered surfaces. A daily inspection record must be maintained on site.
  - (D) Comply with the provisions in subparagraph (c) (1)(A) and clause (c)(1)(D)(i).
  - (E) Maintain a record of the identification and business addresses of the generator, transporter and storage/treatment facilities. Such record shall be signed by each party at the time custody is transferred.
  - (F) Treat or remove contaminated soil from an excavation or grading site within 30 days from the time of excavation.
- (3) If the VOC concentration in the excavated soil is measured at greater than 1000 ppm, spray the soil with water or vapor suppressant and:
  - (A) As soon as possible, but not more than 15 minutes, place the soil in sealed containers, or
  - (B) As soon as possible, but not more than 15 minutes, load into trucks, moisten with additional water, cover and transport off site, or
  - (C) Implement other alternative storage methods approved in writing by the Executive Officer.

- (4) A person treating VOC-contaminated soil shall:
  - (A) Obtain a permit to construct and operate treatment equipment, as applicable, from the Executive Officer, and
  - (B) Implement VOC-contaminated soil decontamination measures, as approved by the Executive Officer in writing, which result in Best Available Control Technology applied during all segments, and which include, but are not limited to, at least one of the following:
    - (i) Installation and operation of an underground VOC collection system and a disposal system prior to excavation.
    - (ii) Collection and disposal of the VOC from the excavated soil on-site using equipment approved by the Executive Officer.
    - (iii) Any equivalent VOC-contaminated soil control measure previously approved in writing by the Executive Officer.
- (5) A person shall not engage in or allow any on-site or off-site spreading, grading or screening of VOC-contaminated soil, which results in uncontrolled evaporation of VOC to the atmosphere.
- (6) Loading trucks for contaminated soil must meet the following:
  - (A) The truck and trailer shall be adequately tarped prior to leaving the site; no excavated materials shall extend above the sides or rear of the truck or trailer to prevent soil spillage during transport, and
  - (B) The exterior of the truck, trailer and tires shall be cleaned off prior to the truck leaving the site.
- (d) Exemptions
  - (1) The provisions of this rule shall not apply to the following:
    - (A) Excavation, handling, and treating of less than one (1) cubic yard of contaminated soil.
    - (B) Removal of soil for sampling purposes.
    - (C) Accidental spillage of five (5) gallons or less of VOC containing material.

- (2) The provisions of paragraphs (c)(1) and (c)(2) shall not apply to soil excavation or handling as a result of an emergency as declared by an authorized health officer, agricultural commissioner, fire protection officer, or other authorized agency officer. Whenever possible, the Executive Officer shall be notified by telephone prior to commencing such excavation. The Executive Officer shall be notified in writing no later than 48 hours following such excavation. Written notification shall include written emergency declaration from the authorized officer.
- (e) Test Methods
  - (1) A person shall measure excavated soils for volatile organic compounds to determine contamination by:
    - (A) Using an organic vapor analyzer calibrated with hexane, complying with 40 CFR Part 60 Appendix A, EPA Reference Method 21 Section 3 or any equivalent method with prior approval in writing by the Executive Officer. If other calibrating gases are used, then the measured readings shall be correlated to and expressed as hexane.
    - (B) Placing the probe inlet at a distance of no more than three inches from the surface of the excavated soil and while slowly moving the probe across the soil surface, observe the instrument readout. If an increased meter reading is observed, continue to sample the excavated soil until the maximum meter reading is obtained. Leave the probe inlet at this maximum reading location for approximately double the instrument response time. If the maximum observed meter reading is greater than the 50 ppm standard in the regulation, record and report the results.
  - (2) The presence of VOC in stored or spillage materials shall be determined by SCAQMD Method 313 [Determination of Presence of Volatile Organic Compounds (VOC) in Headspace] and/or Method 304 (Determination of Volatile Organic Compounds in Various Materials) contained in the SCAQMD "Laboratory Methods of Analysis for Enforcement Samples" manual.

(f) Enforcement

- (1) Violation of any provision of this rule or the violation of the approved mitigation plan shall be grounds for the Executive Officer to amend or revoke the mitigation plan, in addition to penalties provided by the Health & Safety Code.
- (2) If the owner or operator is served with a Notice of Violation for creating a public nuisance, the owner or operator shall suspend operation until the public nuisance is mitigated to the satisfaction of the Executive Officer.

ATTACHMENT A  
GENERAL MITIGATION PLANS REQUIREMENTS

VOC Contaminated Soil Mitigation Plans shall be written to minimize VOC emissions to the atmosphere during excavation, grading, handling and treatment of VOC contaminated soil. VOC Contaminated Soil Mitigation Plans shall consist of three types: Various Locations, Site Specific and Facility Treatment.

- (1) General Requirements
  - (A) A plan is not transferable.
  - (B) A person responsible for the excavation, grading or handling of VOC contaminated soil must be completely familiar with the plan and must adhere to the plan requirement. The Executive Officer may require that the plan be signed by the owner and/or operator.
  - (C) A plan may be amended upon renewal.
  - (D) Permission to excavate, grade or handle VOC contaminated soil may be withdrawn by the District upon a finding by the Executive Officer that the excavation, grading or handling of the VOC contaminated soil is causing a public nuisance or violating other AQMD rules or regulations.
- (2) Various Location Plans:
  - (A) Shall be limited to the excavation of 2000 cubic yards or less of VOC contaminated soil in any consecutive 12 month period at the same site.
  - (B) Shall not be used in conjunction with any other various location plan at the same site within a consecutive 12-month period.
  - (C) Shall expire after one year from issuance unless renewed.
  - (D) Shall not be issued for nor used for operations that involve grading, soil treatment or remediation, or landfills.
- (3) Site Specific Plans:
  - (A) Shall be for excavation of greater than 2000 cubic yards of VOC contaminated soil.
  - (B) Shall be issued for specific excavation or grading locations for a period not to exceed two years.
  - (C) Shall not be renewable.

- (4) Facility Treatment Plans:
  - (A) Shall be issued for a treatment facility at a permanent location.
  - (B) Shall expire after one year from issuance unless renewed.
- (5) Applications for Site Specific Plans shall contain as a minimum:
  - (A) Reasons for excavation or grading.
  - (B) Cause of VOC soil contamination and history of the site.
  - (C) Description of tanks or piping associated with the soil contamination.
  - (D) An estimate of the amount of contaminated soil.
  - (E) The operating schedule for excavation and removal.
  - (F) Description of how the excavation or grading will be conducted.
  - (G) Description of mitigation measures for dust, odors and VOC.
  - (H) Details of disposal of VOC contaminated soil, including the ultimate receptor.
  - (I) Description of monitoring equipment and techniques.
  - (J) A map showing the facility layout, property line, and surrounding area up to 2500 feet away, and including any schools, residential areas or other sensitive receptors such as hospitals or locations where children or elderly people live or work.
  - (K) Designation of a person who can conduct a site inspection with the Executive Officer prior to issuance of the plan.
- (6) Applications for Facility Treatment Plans shall at a minimum:
  - (A) Include a list of all AQMD permits to construct or operate which have been issued for that treatment and control equipment.
  - (B) Provide for the implementation of VOC-contaminated soil decontamination measures, as approved by the Executive Officer in writing, which result in Best Available Control Technology during all operations.
  - (C) Provide a map showing the facility layout including the location of all proposed VOC and non-VOC contaminated soil stockpiles.
  - (D) Specify the total amount of VOC contaminated soil proposed to be stockpiled on site.
  - (E) Provide for VOC contaminated soil stockpiles to be kept moist with water or suppressant and be covered to prevent fugitive emissions.

- (F) Provide for VOC contaminated soil stockpiles to be segregated from non-VOC contaminated soil stockpiles.
  - (G) Provide for maintenance of records for stockpiles according to the source name, address and dates of reception.
  - (H) Provide for records of the generator, transporter and storage/treatment facilities and indicate their identification and business addresses. Such records shall be signed by each party at the time custody is transferred.
  - (I) Provide a map showing the facility layout, property line, and surrounding area up to 2500 feet away, and including any schools, residential area or other sensitive receptors such as hospitals, or locations where children or elderly people live or work.
  - (J) Designation of a person who can conduct a site inspection with the Executive Officer prior to issuance of the plan.
  - (K) Specify the operating schedule and maximum amount of VOC-contaminated soil proposed to be remediated on a daily basis.
- (7) In approving a plan, the Executive Officer require reasonable conditions deemed necessary to ensure the operations comply with the plan and AQMD rules. The conditions may include, but shall not be limited to, procedures for ensuring responsibility for the implementation of the plan, accessibility to the site for AQMD staff, notification of actions required by the plan, identification of emission receptors, monitoring and testing, suppression and covering of stockpiles, prevention of public nuisance from VOC or dust emissions, prevention of fugitive emissions of VOC contaminated soil, loading of truck trailers, and disposal and treatment.
- (8) In approving a plan, the Executive Officer may require any records deemed necessary to be maintained by the operator to demonstrate compliance with the plan. Such records shall be retained for at least 2 years and be made available to the Executive officer upon request.