

**Bay Area Air Quality Management District
939 Ellis Street
San Francisco, CA 94109**

**PROPOSED AMENDMENTS TO
DISTRICT REGULATION 8, RULE 40:
AERATION OF CONTAMINATED SOIL AND REMOVAL
OF UNDERGROUND STORAGE TANKS**

STAFF REPORT

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STAFF REPORT

REGULATION 8, RULE 40: Aeration of Contaminated Soil and Removal of Underground Storage Tanks

Executive Summary

Amendments to Regulation 8, Rule 40 (8-40) are being proposed in order to achieve emission reductions incorporated into the Final San Francisco Bay Area Ozone Attainment Plan (OAP) adopted June 1999. The United States Environmental Protection Agency (EPA) called for submittal of the OAP in a notice published July 10, 1998, which revoked the region's ozone attainment status. A key plan element of the OAP is the Emission Inventory of Volatile Organic Compounds (VOCs). Using 1995 as a base year, the Emission Inventory found that uncontrolled aeration of contaminated soil in the Bay Area results in emissions of 4.07 tons per day of VOC.

8-40 was originally adopted in 1986 to reduce the potential for nuisance complaints and to prevent any one site from exceeding the Best Available Control Technology (BACT) trigger level in the District's New Source Review Rule (Regulation 2, Rule 2) of 150 pounds per day (1986 trigger level). Depending on the level of contamination, the current rule allows aeration of contaminated soil at various daily rates to stay below the daily emission limits. As such, the current rule provides limited emissions reductions, because the emissions may be simply spread out over time. Under current Regulation 2, Rule 2, aeration projects are exempt from permitting so long as the aeration project is completed in three months or less. An aeration project could potentially emit as much as 6.75 tons of VOC in this 90-day period and not be required to obtain a permit, nor control emissions from aeration of the soil.

Most of the Air Quality Management Districts (AQMDs) and Air Pollution Control Districts (APCDs) throughout California have adopted prohibitory rules specific to soil aeration or have in-house policy memorandums or other procedures which often repeat the same aeration rate table found in 8-40. Only the South Coast Air Quality Management District (SCAQMD) and the Ventura County APCD have prohibitory rules which effectively ban the aeration of contaminated soil except for limited exemptions. These two Districts are in the extreme and severe categories respectively for non-attainment for the Federal ozone standard.

Major proposed amendments to Regulation 8, Rule 40 include:

- Effective June 1, 2000, uncontrolled aeration of contaminated soil is prohibited.
- Contaminated soil is defined as soil having an organic content exceeding 50 parts per million by weight (ppmw).
- Add provisions for the use of an organic vapor analyzer (OVA) as a real time monitor of compliance.
- Add exemptions for small volumes of contaminated soil or soil contaminated by limited accidental spills.

- Add exemption from notification for aeration projects which emit less than 150 pounds and less than the Toxic Trigger Levels as per Regulation 2, Rule 1, Section 316.
- Add emission reduction measures for excavation and removal of contaminated soil.
- Add more specific reporting requirements for soil excavations and tank removals.
- Add definitions for greater clarity.

The proposed amendments to Regulation 8, Rule 40 would prohibit uncontrolled aeration of contaminated soil beyond set exemption limits, effective June 1, 2000. District-wide emission reductions as a result of adoption of the proposed amendments are estimated to range between 2.6 and 2.8 tons per day of VOC.

Background

Emission Source

VOC contaminated soil comes from a variety of sources including spills at chemical processing plants and petroleum refineries, pesticide spills, and leaks from storage tanks and product delivery systems. With over 34,000 cases reported as of March 1999, by far the most common source of VOC contaminated soil in California is from Leaking Underground Storage Tanks (LUST). Of the nearly 16,000 currently open LUST cases in California, roughly a third are within the San Francisco Bay Area. Regional Water Quality Control Boards or local implementing agencies often require excavation and/or remediation of VOC contaminated soil to protect nearby groundwater sources as well as human health and safety. Remediation processes include biodegradation, soil vapor extraction either in-situ (soil remains in place) or ex-situ (soil is treated above ground after first being excavated), thermal treatment, asphalt incorporation, and aeration or landfarming. Air emissions from these latter two techniques are virtually uncontrolled and have been estimated to account for over 4 tons of VOC per day District-wide. Much of this uncontrolled aeration occurs at solid waste disposal sites, where the contaminated soil is used as daily cover material. It is estimated that nearly 400,000 tons per year of VOC contaminated soil is excavated and transferred to solid waste landfills throughout the Bay Area.

Means for Controlling Emissions

Since passive aeration of soil relies on ambient environmental effects (sunlight and convective winds), emission controls would be difficult to implement while still allowing aeration to take place; however, there are many other means of decontaminating soil in which emissions may be significantly controlled. These treatment methods may be performed in-situ or ex-situ.

In-situ treatment techniques include soil vapor extraction, biodegradation, and leaching.

With approximately 200 permitted systems currently operating within the District, soil vapor extraction is the most commonly used treatment method. The latter two techniques are usually associated with groundwater remediation and implementation is highly dependent on the nature of the contaminants as well as the soil and groundwater characteristics of the particular site. Biodegradation or leaching is most likely to be implemented at sites where the contamination is low or consists of compounds of low volatility; therefore, air emissions from these methods are minimal in most cases.

Soil vapor extraction removes VOC from contaminated soils by mechanically drawing air through the soil matrix via an array of subsurface wells drilled in the area of highest contamination. The well casings are solid near the surface and slotted or perforated below grade so that vapor may be drawn from the surrounding soil. A vacuum pump or blower is connected either individually or by manifold to the array of wells to extract the vapor from the subsurface contaminant plume. Ventilation wells may be installed around the perimeter of the plume to encourage the flow of induced air toward the extraction wells. The vapor-laden air passes through a liquid/vapor separator, and is then processed through an aboveground treatment unit.

When the vapor extraction operation is first implemented, inlet vapor concentrations are often high enough to sustain a combustion based abatement device such as an internal combustion engine, or a thermal or catalytic oxidizer. As concentrations decline, supplemental fuel such as natural gas may be added to the vapor stream to maintain the oxidation reaction. As concentrations further decline, vapor abatement may take the form of adsorption by way of activated carbon vessels or resin-based systems. In the case of soils contaminated with chlorinated solvents, these adsorption devices may be employed exclusively to prevent secondary emissions of hazardous pollutants. In some cases where recovery of the contaminant poses an economic benefit, condensation processes are employed as the above ground treatment method.

Ex-situ treatment techniques include ex-situ soil vapor extraction, asphalt incorporation, and thermal treatment. All ex-situ techniques involve excavation of the contaminated soil during which emissions of VOC and particulate matter can occur. Measures to minimize the release of these pollutants include:

- Covering soil stockpiles and pits with plastic sheeting or a layer of clean soil.
- Moistening the soil with water spray.
- Applying vapor suppressant foam or other material.
- Limiting the size of excavated stockpiles.
- Storing excavated soil in sealed containers.

Ex-situ soil vapor extraction incorporates the same methods as that for in-situ soil vapor extraction, however the VOC contaminated soils are excavated and placed in one or more covered piles. Horizontal slotted piping is placed within the pile to serve the same function as the vacuum extraction wells for the in-situ method. Treatment times are greatly decreased for this aboveground method due to the increased porosity in the soil

created by the excavation. It is also much easier to verify soil cleanup due to improved access to the soil.

Asphalt incorporation involves the use of petroleum impacted soil as a partial substitute for stone aggregate in hot asphalt mixes. This mixture can then be utilized for asphalt paving. In practice, the contaminated soil feed is limited to less than 5 percent of the total mix to maintain final product quality and minimize air emissions from volatilization of the compounds. The soil contamination must consist of heavy-end petroleum products such as diesel or fuel oil, since light fraction hydrocarbons tend to act as a solvent, softening the asphalt cement binder. The constitution of the contaminated soil matrix (i.e. sandy soil) may also preclude its use as substitute aggregate. The inclusion of VOC laden soil in hot mix asphalt operations may require the addition of an afterburner to the aggregate dryer; however, average dryer temperatures and aggregate retention times are usually sufficient to completely oxidize the hydrocarbon contaminants. Prior to addition of the contaminated soil to the aggregate mix, it must be stored in such a way as to minimize emissions to the air. Due to the need for heavy end hydrocarbon contamination, asphalt incorporation is not likely to be used for soil which would otherwise be amenable to passive aeration.

Thermal treatment involves heat application and agitation of the soil to volatilize and/or destroy the contaminants depending on the intensity of the heat applied. The excavated soil is loaded into a rotary dryer or kiln for the application of heat, introduction of combustion air, and the addition of supplemental fuel should it be necessary to maintain proper combustion temperatures. The air stream is vented to a cyclone separator or bag house to remove particulate matter and may be processed through a heat exchanger/recovery device. In some cases, the desorption process occurs at a relatively low temperature and the air stream is vented through a condenser to recover the contamination. In most cases, however, the air stream is vented to a secondary thermal oxidizer to ensure complete combustion of the contaminants. These devices can process large amounts of soil relatively quickly with rates as high as 50 tons of soil per hour. VOC destruction rates routinely meet or exceed Best Available Control Technology abatement levels (>98.5% destruction).

History of Control

In July of 1986, the BAAQMD Board of Directors adopted Regulation 8, Rule 40 (8-40) to reduce VOC emissions resulting from the aeration of contaminated soil and the removal of underground storage tanks. This action was taken in response to the growing number of these operations following the 1984 amendments to the Resource Conservation and Recovery Act (RCRA). These amendments developed a formal regulatory program to deal with the problem of leaks from underground storage tanks (USTs) and enabled states to enforce environmental standards for USTs, with most states encouraging the removal or replacement of all UST's after 25 years of service. In California, the State Water Resources Control Board (SWRCB) has required that all USTs installed before 1984 be removed, replaced, or upgraded by December 22, 1998.

This deadline was established by the US EPA in the fall of 1988 and became a California State requirement soon thereafter.

As originally adopted in 1986, 8-40 limits the volume of soil that may be aerated in a given day depending on the level of VOC concentration in the soil. For soils contaminated with VOC greater than 50 ppmw, a table of allowed aeration rates was established to preclude exceedance of the 1986 New Source Review trigger of 150 pounds per day. For soil contaminated with VOC above 2,000 ppmw, the allowable aeration rates were determined based on modeled emissions so as not to create a public nuisance. Soils contaminated with known non-volatile organic compounds (initial boiling point greater than 302 degrees F) were exempted from the rule.

In addition to the aeration guidelines, tank decommission requirements were adopted to detail the manner in which the tank would be cleaned and/or purged of VOC. Any person performing an aeration project was required to notify the district by telephone 24 hours in advance of any aeration of any contaminated soil. A soil sampling procedure was included requiring one composite sample for every 50 cubic yards of contaminated soil to be collected and analyzed for organic content. In conjunction with the Board's adoption of 8-40, Regulation 2, Rule 1 was amended to exempt from permitting any soil aeration project which does not exceed three months duration.

8-40 was amended in February of 1989 to require written notification five days prior to startup of an underground storage tank removal and/or excavation or contaminated soil. Amendments also clarified the composite sampling requirements to ensure that they be representative of the entire soil pile. The written notification requirement was added to afford District staff ample time to schedule site inspections if deemed necessary. Guidelines were provided for the nature of the notification, with exemptions to ease the notification requirements in cases of emergency excavation operations required by State or Local authority, excavation to repair pipeline leaks, and excavation unrelated to UST activities. In October 1993, and June 1994, minor amendments to 8-40 were made to clarify some language and to identify the test methodology for determination of organic content of the soil.

Most of the single county Air Pollution Control Districts (APCDs) throughout California have adopted regulations to address emissions from aeration of contaminated soil, with many adapting the text of 8-40 to their individual regulation templates. The APCDs without prohibitory rules specific to soil aeration rely on in-house policy memorandums or other procedures which often repeat the same aeration rate table as found in 8-40. Only the South Coast Air Quality Management District (SCAQMD) and the Ventura County APCD have prohibitory rules which effectively ban the aeration of contaminated soil except with limited exemptions. These two Districts are in the extreme and severe categories respectively for non-attainment of the Federal ozone standard.

In 1988, SCAQMD adopted Rule 1166, Volatile Organic Compound Emissions from Decontamination of Soil, to implement a Control Measure as part of the 1987 revisions to their Air Quality Management Plan. As originally proposed, Rule 1166 required control measures to reduce emissions from excavated soil or removal of the soil in closed

containers for off-site treatment or disposal. Soil contamination is defined by organic vapor analysis measurement of greater than 50 ppmv (expressed as hexane, C6) in the air space above the soil surface. On-site treatment of the soil required mitigation measures at least 90% efficient in reducing emissions of VOC under approval by the Executive Officer of SCAQMD. Persons handling or treating VOC contaminated soil were required to provide notification within 24 hours from detecting contaminated soil. The rule included exemptions for small volumes of soil or limited spills of VOC. Rule 1166 was amended in 1995 to clarify notification requirements and update the definitions and control requirements to reflect current treatment practices. Record keeping requirements were added along with the requirement that all persons excavating USTs or transfer piping obtain an approved mitigation plan prior to commencement of the excavation.

Ventura County APCD adopted Rule 74.29, Soil Decontamination Operations in 1995. This rule allows aeration of soil contaminated with gasoline, diesel fuel, or jet fuel, only if the aeration does not cause a nuisance, and provided that one of the following is met:

1. Contaminated soil does not emit vapors sufficient to cause a calibrated organic vapor analyzer to register 50 ppmv or more (as hexane) above background levels.
2. Amount of contaminated soil is less than 10 cubic yards, and contains less than 8,000 ppmw VOC.
3. Soil is contaminated by a leaking UST used in an agricultural operation.
4. Soil contamination resulted from a spill or release of less than one barrel (42 gallons) of gasoline, diesel fuel, or jet fuel.
5. Contaminated soil is used as alternative daily cover at a permitted Class II Solid Waste Disposal site. Gasoline contaminated soil cannot exceed 100 ppmv, Diesel contaminated soil cannot exceed 1,000 ppmv.

If none of these criteria apply, an exemption request may be granted for aeration projects which result in VOC emissions of less than 200 pounds per rolling 12-month period. The project must not take place within 1,000 feet of a school and cannot cause a public nuisance.

The APCDs adjacent to BAAQMD allow limited uncontrolled aeration projects to occur with some districts requiring permits for larger projects or if toxic compounds are present. The Monterey Bay Unified APCD is the only district which requires permits for all aeration projects. Allowable aeration rates are determined on a case-by-case basis through emissions modeling to ensure that the operation does not result in a cancer risk of greater than 10 in 1,000,000. On-site aeration projects within Northern Sonoma County APCD are exempt from permitting provided the aeration is performed according to a table similar to that listed in 8-40 with reduced aeration rates for sites near residences. Should the aeration project result from off-site imported soil, it would require a permit and then be subject to control requirements. Yolo/Solano AQMD, and Sacramento Metropolitan AQMD have in-house policies allowing the aeration of contaminated soil provided it is performed according to a table similar to that listed in 8-40 and emissions of toxic compounds do not pose an unacceptable level of risk. Permits are required in

some cases where emissions exceed set levels or BACT is triggered (50#/day for Sacramento, 10#/day for Yolo/Solano). Lake County AQMD does not require permits nor have any prohibitory rules regarding aeration of contaminated soil; however, aeration of contaminated soil is allowed only in rural areas away from residences. San Joaquin Valley Unified APCD does not normally require permits, but does have a prohibitory rule with a table similar to that in 8-40. Exemptions from the rule are allowed for small volumes of soil or for contamination resulting from accidental spillage of one barrel (42 gallons) or less of liquid VOC.

Purpose of Proposed New Amendments

Amendments to Regulation 8, Rule 40 are being proposed in order to achieve emission reductions incorporated into the San Francisco Bay Area OAP which has been approved for submittal to US EPA by the California Air Resources Board (July 22, 1998). A key plan element of the OAP is the Emission Inventory of VOC. Using 1995 as a base year, the Emission Inventory found that uncontrolled aeration of contaminated soil in the Bay Area results in emissions of 4.07 tons per day of VOC. The proposed amendments to Regulation 8, Rule 40 would prohibit uncontrolled aeration of contaminated soil beyond set exemption limits. Adoption of the proposed amendments will result in emission reductions estimated to range between 2.6 and 2.8 tons per day of VOC for the year 2000. These reductions represent 22-24% of the 11.8 tons per day emission reductions needed to attain the federal 1-hour ozone standard.

Under current BAAQMD Regulations 2-2 and 8-40, aeration projects in the Bay Area can emit up to 150 pounds of VOC a day without the need for a District operating permit so long as the aeration project is completed in three months or less. An aeration project could potentially emit as much as 6.75 tons of VOC in this 90-day period and not be required to obtain a permit, nor control emissions from aeration of the soil. Adoption of the proposed amendments to 8-40 would eliminate the potential for these emissions.

Proposed Amendments

The goal of the amendments is to effectively ban uncontrolled aeration of soils contaminated with VOC above 50 ppmw. This will be done by defining "contaminated soil" as that which has an organic content exceeding 50 ppmw or which registers 50 ppmv (expressed as methane, C1) measured above the surface of the soil. This latter criterion is included to allow onsite compliance determination without the time lag associated with reliance on laboratory testing. Throughout the regulation, the word "contaminated" has been inserted before "soil" to clarify that the control requirements apply to contaminated soil rather than to all excavated soil regardless of contamination. The major changes to the rule's administrative requirements will become effective June 1, 2000. A few additional definitions and clarifications of requirements will become effective immediately upon adoption of the amendments by the BAAQMD Board of Directors. The regulation will be amended again some time after the effective date to remove the outdated requirements.

The amendments by section are as follows:

8-40-100 GENERAL

8-40-101 Description: The words “to describe an acceptable aeration procedure” will be deleted to clarify that uncontrolled aeration projects will not be allowed after June 1, 2000. Removal of these words should not affect aeration projects performed after adoption but prior to the effective date.

8-40-110 Exemption Storage Piles: The storage pile standard has been amended to differentiate between active and inactive storage piles (see sections 8-40-304&-305 below). Reference to the new standard for inactive storage piles has been amended to reflect the new section number. Active storage piles remain exempt from calculation of aeration volume.

8-40-112 Exemption Sampling: A 1-hour time period for cover removal has been specified to allow for sampling of soil contained in inactive soil piles.

8-40-114 Exemption, Contaminated Soil Excavation During Organic Liquid Service Pipeline Leak Repairs: The words “contaminated” and “organic liquid service” have been added to clarify the exemption. As previously worded, the regulation required notification for any excavation of soil associated with any pipeline leak repair, regardless of whether the soil was contaminated or whether the pipeline conveyed organic liquids. A definition of “Organic Liquid Service” has been added (see section 8-40-212 below), and section 8-40-404 has been amended to clarify that notification is required only during repairs of pipelines which are likely to result in contamination of soil with organic compounds.

8-40-116 Exemption, Small Volume: This section has been added to exempt small projects with minor emission from regulatory control requirements. Uncontrolled aeration of one cubic yard of contaminated soil is not likely to result in more than 30 pounds of emissions, and maximum emissions from uncontrolled aeration of 8 cubic yards of soil contaminated with less than 500 ppmw would be less than 11 pounds. To prevent circumvention of the regulation through multiple application of the second exemption, it may be applied at a given site or facility only once in any three-month period. For the purpose of this exemption a site would not include two separate facilities if connected only by a pipeline, whereas several excavations along a pipeline located on a single facility would be subject to the quarterly limitation. Circumvention of the rule requirements by over-use of the first exemption is unlikely to occur due to the small size of soil covered (one cubic yard).

8-40-117 Exemption, Accidental Spills: This section exempts soil contaminated by less than 5 gallons of VOC liquid from regulatory control. Uncontrolled emissions from such an event would likely be no more than 35 pounds of VOC.

8-40-118 Exemption, Aeration Projects of Limited Impact: The amended rule allows aeration of any volume of soil with organic content less than 50 ppmw. Should the volume of soil be such that the aeration project results in excessive emissions of VOC or

emissions of Toxic Air Contaminants above accepted trigger levels, notification is required so that District staff can determine the need for a permit, and ensure that the control requirements of the rule are being met. Given that nearly all soil contains some small level of organic content, this exemption is necessary so that notification is not required whenever any soil is disturbed.

8-40-200 DEFINITIONS

8-40-201 Active Storage Pile: The definition was amended so that activity cannot exceed a normal operating day. Activity must have occurred within one hour to be current. The words, “or be anticipated to occur” have been removed to ensure enforceability.

8-40-202 Aeration: The definition of aeration has been changed, replacing the words “contaminated soil” to “soil containing volatile organic compounds.” This change was necessary since “contaminated soil” is defined as soil which contains more than 50 ppmw organic compounds. Effective June 1, 2000, uncontrolled aeration will be limited to soil which contains 50 ppmw or less VOC.

8-40-204 Aeration Volume: Reference to the deleted Section 8-40-303 has been changed to 8-40-305, the new standard for inactive storage piles.

8-40-205 Contaminated Soil: The definition has been amended to allow for the use of on-site measurement via organic vapor analyzer as a means of determining compliance. Soils which cause such a device to register greater than 50 ppmv at a distance of three inches above the soil surface, would now be defined as “contaminated soil.” This is in addition to the previous determination by soil sampling and subsequent laboratory analysis. Soil sampling conducted prior to excavation of the soil may also serve to determine whether the soil is contaminated.

8-40-207 Organic Content: The word “volatile” has been added to this definition to clarify the intent of the control measures contained in the rule. A definition for “Volatile Organic Compounds (VOC)” has been added as well (see section 8-40-213 below).

8-40-210 Emergency Removal or Replacement or Excavation: The word “contaminated” has been inserted before soil to clarify the intent of the control measures contained in the rule.

8-40-211 Organic Concentration: This definition has been added to differentiate measurement by soil sampling (organic content) from measurement by organic vapor analyzer (organic concentration).

8-40-212 Organic Liquid Service: This definition has been added to clarify the notification requirements related to excavation of soil related to pipeline leak repairs. This amendment helps to eliminate unnecessary notification requirements for pipeline repairs which are unlikely to disturb contaminated soil. Should contaminated soil be discovered during such a repair, it would require notification under Section 8-40-405 and

would be subject to the control provisions of the rule.

8-40-213 Volatile Organic Compound: This definition has been added to clarify the intent of the control measures contained in the rule. Organic compounds which will not volatilize need not be included when measuring organic content of contaminated soil.

8-40-214 Vapor Suppressant: This definition has been added to allow for the use of other means than water spray to reduce emissions of VOC from contaminated soil.

8-40-215 Backfill: This definition has been added to describe replacement of excavated contaminated soil into the original excavated pit location or another excavated pit located on the same site as the original excavation. This includes relocation of soil such that a new grade is established. Use of contaminated soil at landfills as cover material has been specifically excluded from this definition. Language has also been added to the Standards Section to detail an acceptable procedure to minimize exposure of the excavated contaminated soil to the atmosphere during backfilling (see Section 8-40-306.6).

8-40-216 Storage Pile: This definition has been added to differentiate a storage pile located above existing grade from backfill or any other placement of contaminated soil.

8-40-300 STANDARDS

8-40-301 Uncontrolled Soil Aeration: The current standard has been clarified somewhat by the addition of "Soil" in the title, and the word "contaminated" in the body of the description. An express reference to the use of contaminated soil as alternate daily cover at solid waste disposal sites has been added as well. This practice has always been subject to this rule; however, all of the regulated community may not be aware that this is the case. The limited aeration rates apply to aeration at the excavation site as well as all subsequent locations including the use of contaminated soil as landfill cover material. Effective June 1, 2000, aeration of contaminated soil may only occur provided the mitigation methods are in place as addressed in sections 8-40-304 through 306.

8-40-302 Controlled Aeration: A sunset clause has been added to allow this practice until the effective date of June 1, 2000. To date, BAAQMD has not received any proposals for projects employing a control device so as to increase the rate of allowed aeration. After the effective date, this section will be deleted.

8-40-303 Storage Piles: This section has been deleted and two sections have been added differentiating between "active storage piles" and "inactive storage piles" (see below).

8-40-304 Active Storage Piles: Effective June 1, 2000, all contaminated soil shall be kept visibly moist or be treated with a vapor suppressant to minimize emissions of organic compounds into the atmosphere. A covering or heavy-duty plastic sheeting or similar material may also be used to cover areas of the pile which are not active. A maximum surface area of activity is established to prevent excessively large active storage piles which increase emissions.

8-40-305 Inactive Storage Piles: This section describes the covering requirements previously addressed in section 8-40-303. The use of “clean” soil as a cover has been eliminated due to enforcement concerns. A one-hour time limit for applying the cover is established for inactive storage piles.

8-40-306 Contaminated Soil - Excavation and Removal: This section provides the mitigation steps necessary to reduce emissions of organic compounds from soil excavation projects. Effective June 1, 2000, all soils shall be subject to the mitigation requirements if sample results show that the organic content exceeds 50 ppmw, or a field measurement of organic concentration registers more than 50 ppmv. Procedures for minimizing emissions during excavation, storage, and transfer of the soil off-site are included. A 45-day time limit is established for initiating treatment, backfill, or offsite removal of all contaminated soils. This time limit is extended to 90 days for soil of organic content less than 500 ppmw as determined by sampling and laboratory analysis. Any treatment of contaminated soil to remove the contamination is subject to all applicable District Rules and Regulations. Procedures have been added to ensure the minimization of emissions during backfilling. These procedures are similar to those required for active storage piles, but require that for periods of inactivity longer than 12 hours, soil must be covered by at least 6 inches of clean fill, plastic, or other covering.

8-40-310 Underground Storage Tanks - Removal and Replacement: Amendments to this section, effective June 1, 2000, require that contaminated soil disturbed and/or excavated as part of a UST removal is subject to the mitigation steps addressed in the previous sections. For soils associated with the removal of underground storage tanks, a field measurement of organic content registering less than 50 ppmv does not serve as a basis for deeming the soil to be not contaminated. Soil sampling results indicating that the soil is not contaminated are required to exempt excavated soil from the mitigation steps required by the previous sections.

8-40-311 Vapor Freeing: This section has been amended to reflect the tank degassing requirements as stated in Regulation 8, Rule 5, Storage of Organic Liquids. The previous limitation based on the volume of organic liquid in the tank was difficult to verify in the field for most cases, and so was not enforceable. The language of the section has been modified to clarify that only underground storage tanks of 250 gallons or greater capacity are subject to this section.

8-40-312 Ventilation: This section has also been amended to reflect the tank degassing requirements as stated in Regulation 8, Rule 5, Storage of Organic Liquids.

8-40-400 ADMINISTRATIVE REQUIREMENTS

8-40-401 Reporting, Removal or Replacement of Tanks: The reporting requirements have been amended to include procedures employed to meet the requirements addressed in sections 8-40-301 through 8-40-306. For cases where advance notification is not possible (emergency excavations and tank removals) a 30-day time period has been added for subsequent submittal of written notification. All reporting amendments will be effective upon rule adoption.

8-40-402 Reporting, Excavation of Contaminated Soil: The word “contaminated” has been added to both the title and in the body of the text to clarify the applicability of the section. The word “known” has been added to differentiate the notification requirements for cases where contamination has been determined from that where it is discovered after excavation has commenced (see Section 8-40-405). The reporting requirements have been amended to include procedures employed to meet the requirements addressed in sections 8-40-301 through 8-40-306. For cases where advance notification is not possible (emergency excavations and tank removals) a 30-day limit has been added for subsequent submittal of written notification. Notification will also include an estimate of the quantity of soil to be excavated as well as the average organic content of the soil.

8-40-403 Reporting, Aeration of Soil: The word “contaminated” has been removed since after June 1, 2000, uncontrolled aeration of soils will be allowed only if the organic content is 50 ppmw or less. Telephone notification at least 24 hours prior to excavation has been changed to written notification at least 5 days prior to the excavation. The words “degree of contamination” have been deleted to specify that the notification provide the organic content of the soil. The language regarding estimations of the soil contamination has also been made more specific. Contact information for the person performing the aeration project, and the location of the activity have been added to the list of items to be included with the notification.

8-40-404 Reporting, Contaminated Soil Excavation During Organic Liquid Service Pipeline Leak Repairs: The words “contaminated” and “organic liquid service” have been added to clarify the exemption. As previously worded, the section required notification for any excavation of soil associated with any pipeline leak repair, regardless of whether the soil was contaminated or whether the pipeline conveyed organic liquids. The reporting requirements have been amended to include procedures employed to meet the requirements addressed in sections 8-40-301 through 8-40-306. The words “degree of contamination” have been deleted to specify that the notification provide the organic content of the soil. The deadline for submittal of written notification has been increased to 30 days for consistency with the other notification sections.

8-40-405 Reporting, Contaminated Soil Excavation Unrelated to Underground Storage Tank Activities: The word “contaminated” has been added to both the title and in the body of the text to clarify the applicability of the section. The reporting requirements have been amended to include procedures employed to meet the requirements addressed in sections 8-40-301 through 8-40-306. The words “degree of contamination” have been deleted to specify that the notification provide the organic content of the soil. A 30-day time period has been added for subsequent submittal of written notification.

8-40-600 MANUAL OF PROCEDURES

8-40-601 Soil Sampling: Reference to “aeration,” and “uncontaminated” have been removed to accommodate the proposed changes to the rule. The section has been divided into subsections to specify when sampling is required. Composite laboratory sampling is only required for contaminated soil which will be actively aerated prior to June 1, 2000,

excavation or aeration projects seeking exemptions or resolution time extensions based on low organic content, and for excavated soil associated with the removal of Underground Storage Tanks. One composite sample is required for every 50 yards of contaminated soil to be aerated at rates provided in Table 1 of Section 8-40-301. The time frame for sampling of excavated contaminated soil has been reduced from 24 hours to 12 hours, in order to reduce the potential for natural aeration prior to determining contamination of the soil. For those excavation projects involving greater than 250 cubic yards of soil, the sampling frequency has been reduced from at least one sample per 50 yards of contaminated soil to at least one for every 100 yards. The subsection specifying the collection procedures has been amended to require that samples be taken from at least 12 inches below the soil surface, rather than 3 inches as before.

8-40-602 Measurement of Organic Content: Reference to obsolete EPA reference methods and Regional Water Quality Control Board analytical methods has been removed. Provisions for the use of future revisions or alternate versions of the cited EPA sampling methods have been added.

8-40-604 Measurement of Organic Concentration: This section has been added to provide the methodology for use of an Organic Vapor Analyzer for real-time determination of contamination. Provisions are included to allow for disturbing the soil to determine contamination.

8-40-605 Analysis of Samples, Initial Boiling Point: This section has been added to provide the analysis methodology for determining exemption under 8-40-113, due to non-volatility of the contaminating compounds.

Emissions and Emission Reductions

As part of the Final San Francisco Bay Area Ozone Attainment Plan (OAP) adopted June 1999, an Emission Inventory has been prepared identifying emissions of major source categories using 1995 as a base year. For the source category of Contaminated Soil Aeration, VOC emissions were found to be 4.07 tons per day. This value was estimated based on a review of the written reports submitted in 1990, as required by Regulation 8, Rule 40. For each soil aeration event, a generalized emission factor was established of 2,370 pounds VOC. This assumes that the soil aeration project emits 120 pounds per day initially, with emissions halving every tenth day, and emissions set at zero for the 90th day.

In 1990, BAAQMD had 1254 reported tank excavation events, with the annual number exceeding 1,100 for the years 1991 and 1992. For the base year of 1995, the number of excavation events was assumed to be 1254. The product of the number of excavation events and the generalized emission factor yields annual emissions of 1,486 tons, and daily emissions of 4.07 tons. The total number of excavation events is expected to decline following 1998 as a result of compliance with the mandated deadline for UST retrofits. For the year 2000, the number of excavation events is estimated to be 953. This

would yield annual emissions of 1,130 tons and daily emissions of 3.09 tons.

The mitigation requirements of the proposed amendments are assumed to result in a reduction in emissions of between 85% and 90%. This is consistent with the assumed reduction of 90% for similar amendments made in 1995 to SCAQMD Regulation 1166. The daily emissions reduction as a result of these amendments beginning June 1, 2000 would then range between 2.62 and 2.77 tons per day.

Economic Impacts

Incremental Cost Effectiveness

Under Health and Safety Code Section 40920.6, the District is required to perform an incremental cost analysis for a proposed rule. To perform this analysis, the District must (1) identify one or more control options achieving the emission reduction objectives for the proposed rule, (2) determine the cost effectiveness for each option, and (3) calculate the incremental cost effectiveness for each option.

These amendments to 8-40 were originally proposed to implement control measures SS-09 and SS-10 of the Final San Francisco Bay Area Ozone Attainment Plan (OAP) adopted June 1999. This plan was developed in response to EPA's redesignation of the Bay Area to non-attainment for the federal one-hour ozone standard. Under the federal Clean Air Act, the District was required to identify measures to reduce emissions of ozone precursors. The result of the proposed amendments to the regulation will effectively be a ban on uncontrolled aeration of contaminated soil. District staff is unable to identify any alternative control options which can achieve the emission reduction objectives for these amendments. In the absence of alternative control options, an incremental cost analysis cannot be prepared. Cost effectiveness of the proposed amendments to 8-40 is analyzed below.

Cost Effectiveness

When ground water or soil contamination is discovered at a given site, the Regional Water Quality Board or local implementing agency will request that the responsible party complete a remedial investigation, followed by the submittal of a Corrective Action Plan (CAP). In nearly every CAP, leaving the soil in place or "no action" is included along with the evaluation of the various treatment options; however, this option is rarely chosen, and when chosen it is because the soil contamination is either minimal or consists of highly stable or non-volatile compounds. For these reasons, the soil would not likely

be aerated either. While leaving the soil in place without treatment is a control option to aeration, it is not likely to be a practical alternative and so is not included in the analysis below.

In the case of leaking UST removal and remediation, other factors often dictate the chosen control option. Such factors may include the development density at the site, the potential for impact to groundwater, and the geologic and hydrologic properties of the affected soil. The economic analysis performed below does not take into account such factors, and may be somewhat constrained to simplify the calculations. In many cases, the costs may be significantly reduced should the quantity of soil be much larger than that chosen in the example.

To determine the cost effectiveness of the control options we examine costs of these various treatment options as applied to a typical soil aeration event, as that used in the Emission Inventory described in the previous section. For that generalized case, 2,370 pounds are emitted due to uncontrolled aeration of the contaminated soil. The soil is assumed to result from the removal of two 12,000-gallon tanks with 300 tons of affected soil. Costs for the replacement and/or disposal of tanks are not included.

A total of eight scenarios will be evaluated in which: a) the contaminated soil remains on site (four cases); and b) the contaminated soil is exported off site (four cases). For each of these two general categories, a baseline scenario is included in which the soil is passively aerated without control (A0 and B0). These may be compared to the likely control options for each category. Emission reductions will be based on BACT or equivalent control which is dependant on the concentration of VOC in the effluent stream (90% for less than 200 ppmv, 97% for greater than 200 ppmv but less that 2,000 ppmv, and 98% for greater than 2,000 ppmv). In addition, emission reductions may vary by scenario due to losses incurred during the transfer of contaminated soil.

Material handling and treatment costs were determined through interviews with personnel at waste disposal facilities in the Bay Area, equipment venders, and several environmental consultants that perform work associated with tank pulls and aeration of contaminated soil. These cost factors are summarized in the following table:

OPERATION	COST IN DOLLARS PER TON OF SOIL	NOTES:
In Situ Soil Vapor Extraction	400	
Disposal at Class I Facility	175	Includes transportation
On site Thermal Treatment	150	

Ex Situ Soil Vapor Extraction	80	Does not include excavation
Off site Thermal Treatment	75	Includes transportation and disposal
Disposal at Class II Facility as Daily Cover Material	25	Includes transportation and assumes that contamination has been reduced below 50 ppmw in the soil
Excavation	27	
Soil Aeration (turning)	25	
Backfilling and Compaction	15	
Clean Fill Replacement	10	Includes material and transportation

A0 On site Aeration

Contaminated soil would be excavated, passively aerated on site, and backfilled into the excavated area. There are no transportation costs and no emission reductions.

Total cost: \$20,100.00

Emission reduction: none

A1 In situ Soil Vapor Extraction

Contaminated soil would be left in place and treated in situ by means of Soil Vapor Extraction. There are no transfer losses, and BACT level control of VOC emissions is assumed (97%).

Total cost: \$120,000.00

Emission reduction: 1.15 tons

A2 Ex situ Soil Vapor Extraction

Contaminated soil would be excavated and stockpiled on site with horizontal piping placed within the piles and the treatment piles would be covered with plastic. Air would be drawn through the soil by vacuum blower with VOC emissions treated to BACT level control (98.5%). In excavating the soil and stockpiling 5% of VOC is expected to be lost. Once the treatment process is complete, the soil would be backfilled into the excavated area.

Total cost: \$36,600.00

Emission reduction: 1.11 tons

A3 On site Thermal Treatment

Contaminated soil would be excavated and stockpiled prior to being processed through a rotary kiln with VOC emissions abated by thermal oxidation to BACT level control (98.5%). In excavating the soil, stockpiling, and loading into thermal treatment unit, 7.5% of VOC is expected to be lost. Once the treatment process is complete, the soil would be backfilled into the excavated area.

Total cost: \$57,600.00

Emission reduction: 1.08 tons

B0 Off Site Aeration

Contaminated soil would be excavated, taken to an offsite location for passive aeration, and disposed at a Class II soil waste facility. The excavated area would be backfilled with clean fill. There are no emission reductions.

Total cost: \$30,600.00

Emission reduction: none

B1 Disposal without Treatment

Contaminated soil would be excavated and disposed at a Class I solid waste facility. The excavated area would be backfilled with clean fill. During excavation, stockpiling, transportation, and off loading at the Class I facility, 10% of VOC is expected to be lost.

Total cost: \$68,100.00

Emission reduction: 1.07 tons

B2 Disposal with Treatment

Contaminated soil would be excavated and treated off site prior to disposal at a Class II solid waste facility. The excavated area would be backfilled with clean fill. Off site treatment would be either by rotary kiln followed by thermal oxidation, or ex situ soil vapor extraction, BACT level of control is assumed (98.5%). During excavation of the soil, stockpiling, and off loading prior to treatment, 12.5% of VOC is expected to be lost.

Total cost: \$60,600.00

Emission reduction: 1.02 tons

B3 Offsite Treatment facility

Contaminated soil would be excavated and treated at an off site thermal treatment facility with disposal costs integral to treatment costs. The excavated area would be backfilled with clean fill. Off site treatment would be by rotary kiln followed by thermal oxidation,

BACT level of control is assumed (98.5%). During excavation of the soil, stockpiling, and off loading prior to treatment, 10% of VOC is expected to be lost.

Total cost: \$38,100.00

Emission reduction: 1.05 tons

Cost Effectiveness Summary

SOIL DISPOSITION METHOD	TOTAL COST IN DOLLARS	EMISSION REDUCTION IN TONS OF VOC	COST EFFECTIVENESS IN DOLLARS PER TON
A0 On site Aeration	20,100.00	--	--
A1 In situ Soil Vapor Extraction	120,000.00	1.15	86,870.00
A2 Ex situ Soil Vapor Extraction	36,600.00	1.11	14,865.00
A3 On site Thermal Treatment	57,600.00	1.08	34,722.00
B0 Off Site Aeration	30,600.00	--	--
B1 Disposal without Treatment	68,100.00	1.07	35,047.00
B2 Disposal with Treatment	60,600.00	1.02	29,412.00
B3 Offsite Treatment facility	38,100.00	1.05	7,143.00

Socioeconomic Impact

Subdivision (a) of the Health and Safety Code section 40728.5 states:

(a) Whenever a district intends to propose the adoption, amendment, or repeal of a rule or regulation that will significantly affect air quality or emissions limitations, that agency shall, to the extent data are available, perform an assessment of the socioeconomic impacts of the adoption, amendment, or repeal of the rule or regulation.

The District has commissioned Applied Development Economics to perform a Socioeconomic Analysis of the amendments to 8-40 (see attached analysis). This report examines the effect of the amendments for a variety of businesses based on estimates for control options as detailed below in the incremental cost section. Affected businesses include chemical and petroleum manufacturers, gasoline stations, utilities, and landfills. The report found that the control options should not significantly impact most of the affected businesses. Gas stations could be adversely affected by several of the control options; however, cost recovery may be available in this case from the State Water Resources Control Board UST clean-up fund.

Environmental Impacts

Pursuant to the California Environmental Quality Act (Public Resources Code Section 21000 et seq.), District staff has conducted an initial study for the proposed amendments to Regulation 8, Rule 40 and has determined, based on the whole record before it, that the proposed amendments would not have any significant environmental impacts. Notice was issued October 18, 1999 that the District intends to adopt a negative declaration for the proposed amendments to Regulation 8, Rule 40 pursuant to Public Resources Code Section 21080(c) and CEQA Guidelines 15070 et seq. District staff recommends adoption of a negative declaration for these amendments. The negative declaration and initial study are included in the Board package.

Regulatory Impacts

Section 40727.2 of the Health and Safety Code requires the District to identify existing federal and district air pollution control requirements for the equipment or source type affected by the proposed change in district rules. The District must then note any differences between these existing requirements and the requirements imposed by the proposed change. Where the District proposal does not impose a new standard, make an existing standard more stringent, or impose new or more stringent administrative requirements, the district may simply note this fact and avoid the analysis otherwise required.

The amendments to Regulation 8, Rule 40 are in harmonious and not in conflict nor contradictory to existing statutes, court decisions, federal or state regulations, such as the requirements of the State Water Resources Control Board, local fire regulations, and Integrated Waste Management Board. District Staff has determined that there are no State or federal regulations addressing the potential for air emissions from aeration of contaminated soil and the removal of USTs. To comply with Health and Safety Code Section 40727.2, the District therefore simply notes that no other federal, State or District standards apply.

District Staff Impacts

The proposed amendments to 8-40 may initially require increased staff resources for the preparation of Compliance Assistance Advisories as well as revisions to existing notification forms. Additional staff time may be required for review of these forms since they will contain more information regarding the manner of compliance with the control requirements; however, there may be an overall savings of staff time since the extra step of telephone notification has been eliminated in the amended rule.

The amendments to the rule will aid enforcement of the regulation as the language has been clarified and made more specific overall. This is likely to help Inspection Staff in performance of their duties. The increased complexity of the emission reduction requirements will likely demand more inspection time at individual sites and present the potential for more Violation Notices to be issued. The amendments proposed for 8-40

will not result in any increase in the number of facilities subject to the rule, as the definition of contaminated soil is the same as the current exemption limit of 50 ppmw. The exemptions added to 8-40 may in fact result in less sites subject to notification requirements, and in some limited cases, the rule as a whole. The reduction in the number of sites subject to the rule will serve to mitigate somewhat the demand on Inspection Staff. In the long term, as the regulated community understands what is necessary for compliance, Staff time is not likely to be overburdened.

Rule Development History

Preliminary Development

The use of contaminated soil as cover material at landfills was first identified as an area of concern by an internal District Landfill Work Group, which was created in October of 1997 and which met monthly from December 1997 through April 1998. The work group consisted of staff from Permit Services, Compliance and Enforcement, and Technical (Source Test Section) Divisions. A Compliance and Enforcement Guideline concerning the use of contaminated soil at landfills was issued in November of 1997 as a result of discussions within this Work Group.

Amendments to 8-40 are being proposed in order to achieve emission reductions incorporated into the OAP adopted June 1999; specifically, Control Measures SS-09, Prohibition of Contaminated Soil as Alternate Cover at Landfills, and SS-10, Prohibition of Contaminated Soil Aeration. Development of these control measures was accomplished through consultation between District staff in the Planning and Permit Services Divisions begun in January 1999. Through the course of these discussions, a timetable was established for amendment of 8-40.

Public Workshop

District Staff conducted a public workshop on September 3, 1999 to review and discuss the proposed amendments to 8-40. Fifteen industry representatives and consultants attended the workshop, along with District staff from Permit Services, Compliance and Enforcement, Planning, and Legal Divisions. A representative from the Department of Toxic Substances Control also attended the workshop. Verbal comments received during the workshop are discussed in the comments and responses section below along with written comments that have been received.

Written Comment Period

Written comments to the proposed amendments to 8-40 were received through the month of September following the workshop. District Staff has responded to all written comments in writing. Comments and response by the District are discussed in detail in

the Comments and Responses section of this report found below. All issues raised during the workshop and through the written comments have been resolved in the current version of 8-40. A second workshop was deemed unnecessary.

Comments and Responses

The intent of the amendments to 8-40 was generally accepted as necessary by workshop attendees; however, attendees raised several concerns with the preliminary draft. The preliminary draft of the amended rule contained language deemed vague by the workshop participants, and this is reflected in several comments below. District staff has addressed this by including several new definitions in the text of the regulation along with the insertion of qualifying terms where appropriate. Some of the emission reduction measures were found to be excessive or inappropriate in some circumstances. District staff has relaxed measures in some cases to accommodate relevant concerns raised by the affected parties. Written comment letters were submitted by CARB, the Department of Toxic Substance Control (DTSC), Pacific Gas and Electric (PG&E), the operators of the Altamont Landfill (Waste Management), a soil remediation contractor (CEECON), and a representative for New Pacific Properties (NPP), a land management company currently engaged in a large scale contaminated soil management operation. Verbal comments received during the workshop, along with written comments received thereafter are discussed below.

In the week immediately prior to the Public Hearing held on November 17th, written comments were received from the Western States Petroleum Association (WSPA) and from the Bay Area Smart Growth Working Group (BASG WG). The representative who had commented previously on behalf of NPP provided comments for this latter group. Additional comments received after publication of the Public Hearing Notice have been included below.

Comment #1 Time Limit for Storage Piles

As originally proposed, 8-40 would set a 14 day time limit for stockpiling of contaminated soil at a given site. The limit was deemed necessary, as the emission reduction from covering is limited and dependent on the integrity of the cover material. Several comments were made during the workshop indicating that this was too short a period for adequate characterization and subsequent management of contaminated soil. The turn-around time for soil sampling results is routinely 14 days. Five written comments were also received to that effect, with suggested time frames of at least 30 days, 30 to 45 days, 90 days, and an unspecified period. The latter comment asked for a period to be determined on a case-by-case basis for sites with large quantities of soil, especially those unrelated to UST investigations.

Response #1

The time limit has been increased for initiation of treatment, backfill or removal from the site. The time limit for resolution of excavated contaminated soil is 45 days in general

and 90 days for soil containing less than 500 ppmw volatile organic compounds. Extending the time frame will not likely result in significant emissions provided the soil cover is maintained as required. This should allow for adequate characterization and management of the soil. For the unusual cases cited by the latter comment, treatment and management plans should be developed to ensure that excavated soil is not stockpiled above grade for more than 90 days. Larger excavations may be portioned so that although the entire volume of soil is stockpiled for a longer period, no one storage pile remains above grade for longer than the appropriate time period. The language specifying treatment was amended to specify that treatment be initiated within the time frame. This should clarify that the treatment need not be completed by that time, which would be unreasonable given currently available remediation technology.

Comment #2 Organic Liquid Service

Comments were received asking for specification as to the intent of the rule provisions. Given the broad language contained in the previous version, nearly every excavation of soil would require notification, quantification, and possible mitigation, even in cases of insignificant contamination. PG&E asked in a comment letter that the rule be limited to UST, organic liquid service pipelines, planned excavations of known contaminated soil, and excavation projects unrelated to contaminated soil which continue after contaminated soil is discovered.

Response #2

The language in the regulation has been refined so that the intent of the provisions should be clear in the current draft. "Organic Liquid Service" has been added to sections regarding pipeline leak repair to clarify that pipeline leak repair operations where contaminated soil is not likely to be encountered are not automatically subject to the notification requirements of 8-40. This has been defined in Section 8-40-212, to specify that soil excavation associated with sewer, water service, and other pipeline leak repair are not subject to these notification requirements. The provisions regarding notification in the event of discovery of contaminated soil are needed to ensure that proper emission reduction efforts have been made. Stopping excavation is one method of reducing emissions. It should not serve as an exemption from notification requirements as this would be difficult to enforce without knowledge of the event.

Comment #3 Active Storage Pile Emission Reduction Methods

Many workshop participants questioned the use of water spray as a means of reducing emissions. The preliminary draft seemed to indicate that excavation walls would need to be sprayed down with water. This would likely result in collapse of trench walls, unsafe working conditions in general, and could encourage the spread of contamination through the undisturbed soil. Reliance on water spray could also render excavated soil unfit for subsequent backfill. Some participants suggested that a definition be provided for the

term “visibly moist” to aid in enforcement. Waste Management was concerned that too much water would be added, and could present leachate problems for contaminated soil disposed at landfills. PG&E requested that the use of heavy-duty plastic be allowed for the contaminated portions of an active storage pile.

Response #3

The language of 8-40 has been amended to make clear that emission reduction procedures only apply to excavated soils above existing grade. It was never the intent of District staff to require that excavation surfaces be sprayed down with water so as to create unsafe working conditions. The use of water to maintain a visibly moist condition need not be so excessive that it will cause water runoff problems. It may be necessary to address this issue, along with other aspects of the rule, in a Compliance and Enforcement Advisory provided after adoption. The term “visibly moist” need not be defined, as doing so would require unnecessary specification and monitoring protocol for the moisture content of the soil. Allowance for the use of a heavy-duty plastic cover has been included in the standard for active storage piles.

Comment #4 Inactive Storage Pile Emission Reduction Methods

Waste Management requested verbally at the workshop, and subsequently in writing that the use of 6 inches of clean fill be retained as an alternate means of cover for inactive storage piles. This was allowed under the original version of 8-40. Waste Management questioned the efficacy of plastic covering as an emission limiting device, and expressed concern for worker safety in the event of large piles of soil and the high winds often present at their facility. NPP also requested in writing that clean soil cover provisions be retained and further requested that, as an alternative to such a covering, contaminated soil be watered and compacted to 95% maximum dry density. As part of a variance application, NPP has previously performed calculations indicating that such a compaction procedure would be at least as effective at reducing emissions as the use of 6 inches of clean fill.

Response #4

At the workshop, other participants pointed out that the use of clean soil as a cover is not a particularly effective means of reducing emissions from contaminated soil. More importantly, including it as a means of emission reduction presents enforceability concerns. The first six inches of a storage pile of contaminated soil, given enough time, may aerate to such an extent that it falls below 50 ppmw organic content. The language of the rule allows for “other covering”. Given the volume of contaminated soil managed at the Altamont Landfill, it may be appropriate to construct an enclosure for its contaminated soil. This method has been employed at other contaminated soil treatment facilities. The compaction procedure requested by NPP would provide only marginally more effective emission reduction in the end product of compacted soil. This comparison

of clean fill versus compacted soil fails to take into account the emissions likely to occur during the compaction process. As such it does not present a viable option for emission reduction.

Comment #5 Broad Language and Rule Intent

Several comments were received regarding the ambiguity of the language contained in the rule. This was raised at the workshop and through written comments. In particular, the word “soil” was used in the workshop draft of 8-40 with out qualifying terms such as “excavated”, or “contaminated.” The definitions of “aeration”, “contaminated soil”, and “organic content”, were seen as too broad given that they relied on the fairly all-inclusive definition of “organic compound.” Nearly all soil contains at least some non-zero organic content, and given the language of the workshop draft, almost any time soil was disturbed it would trigger some requirement of 8-40. Some written comments requested that “aeration” be redefined to include phrases like, “for the purpose of reducing the organic content of the soil,” or some other wording establishing intent to cause emissions.

Response #5

A definition has been added to 8-40 for “Volatile Organic Compound (VOC).” This should clarify the scope of the rule to soil excavation and removal which would likely result in emissions of VOC to the atmosphere. The word “volatile” has been inserted into related sections to limit notification, sampling, and emission reduction requirements to such cases. Aeration of soil containing VOC occurs to some extent whenever such soil is excavated or otherwise disturbed. Intent would be difficult to establish and specifying it in the definition would severely limit the enforceability of the regulation.

Comment #6 Notification Requirements

Several comments were received to the effect that the notification requirements in the workshop draft 8-40 are excessive and unnecessary. This was seen as partly due to ambiguity of the language as addressed in the previous comment. During the workshop it was suggested that aeration projects involving soil contaminated with less than 50 ppmw require notification only in the event that emissions exceed ½ the toxic trigger levels listed in Table 2-1-316 of District Regulations. PG&E also requested this in its written comments. Other participants felt that notification should be triggered by emissions of VOC. At the workshop, some participants requested that an alternative means of notification be added to 8-40 so that facilities which encounter contaminated soil on a regular basis be allowed to provide notification periodically (monthly, quarterly, or annually). Waste Management requested annual notification provisions in their written comments. PG&E also requested an alternate method of providing notification given that they may be required to conduct multiple excavations of known contaminated soil in a single day. WSPA requested that Section 8-40-403 be deleted entirely, and suggested that for all other notification sections, the time limits for submittal be increased from 5 days since laboratory testing usually requires a two-week turnaround. This would make it

impossible to submit notification within 5 days.

Response #6

To some degree, these concerns regarding excessive notification are eliminated by the clarification of language as addressed in the previous response. To ensure that notification only be required in the event of significant emissions to the atmosphere, section 8-40-118, Aeration Projects of Limited Impact has been added to the regulation. This section exempts from the notification requirements of 8-40-403, aeration projects in which the total project emissions are less than 150 pounds VOC, and less than the toxic trigger levels as found in Table 2-1-316 of District Regulations. Regarding periodic notification, the provisions specify that notification be submitted at least 5 days prior to activity; there is nothing in Section 8-40-403 which would preclude periodic notification within reason. A monthly or perhaps quarterly notification would be much more tenable. Regarding alternate notification for multiple sites, the provisions specify that notification be submitted at least 5 days prior to activity; again, there is nothing in Section 8-40-403 which would preclude an alternate notification process within reason. These concerns may be moot, however, considering the previously mentioned clarification to the language of the regulation. Regarding the 5 day submittal requirement, this has been increased to 30 days. A deadline was required for enforceability, but it need not be 5 days. The added time should allow for the return of Laboratory sampling results, although OVA measurements could also be used to determine contamination.

Comment #7 Small Volume Exemptions

The Small Volume and Accidental Spill exemptions contained in Sections 8-40-116 and 8-40-117 raised several questions during the workshop, particularly regarding intent, and applicability. Some affected parties felt that the volume of soil should be larger, and some regulatory staff felt it to be too large. One workshop participant referred to these sections as “homeowner exemptions”. In written comments CARB expressed concern that the one cubic yard exemption does not take into account the level of contamination. CARB suggested that a contamination level be specified to improve the effectiveness of the rule. DTSC requested in written comments that a basis be provided for these exemptions, and that they be specified as “Homeowners Exemptions” if that is in fact their intent. Waste management requested that the volume of soil be raised to 10 cubic yards given that it would be unusual for an organic liquid release to only effect one cubic yard of soil. Increasing the volume would encourage “a more complete environmental remediation.” NPP suggested in writing that a more appropriate exemption limit would be 50 cubic yards. This section also suffered from vague language, given that “soil” was not modified by the word “contaminated.” WSPA requested that the accidental spill exemption be raised from 5 gallons to one barrel (42 gallons) to be consistent with reporting exemptions for the Regional Water Quality Control Board (RWQCB). WSPA also asked that the 1 cubic yard exemption be provided with an unrestricted application for any given site.

Response #7

In developing the amendments to 8-40, District staff felt it necessary to include some de minimus exemption level. A spill of 5 gallons of solvent would likely result in emissions of 35 pounds or less VOC. Even at a contamination level of 10,000 ppmw VOC (fairly saturated soil), one cubic yard of soil would contain only 27 pounds of VOC. A much more likely degree of contamination would be half that level or on the order of 5,000 ppmw. In this event, one cubic yard of soil would result in VOC emissions of 14 pounds at most. The contamination level for the one cubic yard exemption is unspecified simply so that sampling requirements need not be addressed. To accommodate requests for a larger exemption level, an additional exemption has been added to Section 8-40-116 for excavation and aeration projects that involve no more than 8 cubic yards of contaminated soil and the organic content does not exceed 500 ppmw. This exemption does require soil sampling for verification purposes. Maximum emissions from such an event would be no more than 1.4 pounds VOC. An exemption level of 50 cubic yards is simply unreasonable regardless of the level of contamination. Likewise an exemption level of one barrel could lead to emissions of nearly 300 pounds which is significantly higher than the appropriate exemption level of approximately 35 pounds.

These exemption levels are not specifically designed to be “homeowners exemptions,” and so have not been identified as such. These exemptions are intended to provide de minimus levels, which would not likely cause unacceptable emissions to the atmosphere. In the event of soil significantly contaminated by toxic compounds, the activity would be subject to permit requirements by District Regulation 2-1-316, regardless of whether it was subject to 8-40. Due to the relatively small volumes, these exemptions are not likely to result in excess emissions District-wide. Nevertheless, language has been included to prevent circumvention of the regulation by multiple application of the exemption at a particular site. A soil treatment facility that only accepts soil from 8 cubic yard capacity trucks would not be exempt from the rule. The 8 cubic yard exemption may be applied once per quarter at any given site or facility.

Comment #8 Sample Collection

Several participants of the workshop raised concerns that the originally proposed 15-minute cover removal time limit for sampling purposes was insufficient. This was repeated in several written comments. Several of the workshop attendees felt the laboratory sampling requirements were unnecessary and possibly redundant or duplicative of that ordinarily required by the RWQCB, and Integrated Waste Management Board (IWMB). PG&E stated in written comments that it was unclear whether soil sampling was required if the volume of soil was less than 50 cubic yards. They suggested that laboratory sampling of contaminated soil only be required for volumes of 8 cubic yards or greater stored above existing grade for a period exceeding 12 hours. NPP requested that the regulation include language giving the APCO authority to allow a less stringent sampling frequency for large projects, so long as this sampling frequency has been approved by the RWQCB. Waste Management suggested in written comments that the

section be replaced with language that would ensure that representative samples be collected and analyzed in accordance with the current edition of U.S. EPA's Test Methods for Evaluating Solid Waste (SW-846). Waste Management also provided a copy of the requirements for petroleum contaminated soil monitoring which provided sampling frequencies and analysis methods. WSPA pointed out that the requirement for sampling "and analysis" was unreasonable given that this implies that the results would be made available within 12 hours. This is not reasonable given the usual two-week turnaround for independent laboratory sampling analysis.

Response #8

The time limit for cover removal has been increased to one hour. The words "and analyzed" have been removed from Section 8-40-601.1 to clarify that samples must be collected within 12 hours. Analysis requirements are addressed in later sections. Section 8-40-602 has been divided into sections to more clearly delineate when samples are required and at what frequency. Laboratory Sampling is only required for the following cases: a) One composite sample for every 50 yards of contaminated soil that to be aerated according to Table 1 in Section 8-40-301 (until June 1, 2000); b) One composite sample for contaminated soil subject to the 8-40-116.2 exemption based on contamination of less than 500 ppmw; and c) Excavation projects seeking the 90 day resolution limit based on organic content (less than 500 ppmw); and d) Composite sampling for contaminated soil associated with UST removals with frequency based on size of project. The frequency for this latter case has been halved (1 sample per 100 yd³ rather than 1 per 50 yd³) for projects involving greater than 250 cubic yards of contaminated soil. The regulation should not provide the APCO with undue discretionary powers as suggested by NPP. While coordination with other agencies is important to avoid redundancy, the concerns of RWQCB and IWMB do not focus on air quality. Review of SW-846 and the sampling schedule provided by Waste Management found it insufficient and too general to cite for the purposes of the Regulation.

Comment #9 Soil Analysis Methods

Workshop participants expressed concerns that the cited EPA test methods were outdated or insufficient to adequately characterize the contaminated soil. In written comments, DTSC express concern that the optional methods may not detect all compounds of concern at a given site. They suggested that methodology using of a Mass Spectrometer be required to ensure adequate characterization of the soil. Waste Management requested in written comments that SW-846 methods be cited.

Response #9

The section has been revised to specify that organic content be determined by EPA reference methods 8015B, and 8021B. These methods have been determined by District Laboratory Staff to be sufficient to characterize soil for the purpose of determining emissions of VOC and relevant toxic air contaminants. SW-846 is such a large and

general document that simple citation of the “SW-846 test methods” would be vague and unclear. Both of the cited methods are contained within SW-846.

Comment #10 Covering and Headspace

Several workshop attendees felt that the language was too restrictive regarding the elimination of headspace for covered storage piles and for soil loaded into trucks. The simplest way to ensure that no headspace is created would be to use clean soil over the plastic covering as a means of weighing down the cover. This would most likely cause the plastic cover to be incorporated into the contaminated soil, and thereby limiting its ability to be remediated or otherwise reused. In written comments, Waste Management indicated that cover requirements for soils loaded into trucks would substantially increase labor costs and work against waste management by incorporating plastic contaminants into soil. They requested that this requirement be deleted from the regulation.

Response #10

The language regarding the requirements for inactive storage piles, and soil loaded into trucks for offsite disposal has been adjusted to soften the “zero tolerance” level. Covers are required to be secured such that headspace is minimized rather than eliminated. This should prevent the use of clean soil as a means of weighing down covers. Due to the increased convection losses inherent to transport, the covering requirements are necessary for soils loaded into trucks and cannot be deleted from the rule.

Comment #11 Soil Relocation Project Exemptions

NPP requested in writing the creation of an exemption from the regulation for on-site soil excavation, transport, and relocation projects so long as active aeration of contaminated soil is not intended, and the action is authorized by the RWQCB.

Response #11

Simply stated, the concerns of the RWQCB are not those of the District, and should not form the basis for regulation of sources of emissions to the atmosphere. Active aeration of soil is likely to occur whether intended or not, and determination of intent presents concern regarding enforceability. Such a sweeping exemption would substantially reduce the effectiveness of the rule.

Comment #12 50 ppmw Contamination Trigger

NPP requested in writing that the 50 ppmw limit for uncontrolled aeration projects be raised to 100 ppmw on average, and no greater than 500 ppmw for any one composite sample. These values were based on NPP’s understanding of the clean-up standards required by the RWQCB. NPP felt that this would result in application of the rule to many activities not historically subject to the rule.

Response #12

The clean-up standards of the RWQCB are often determined on a case-by-case basis, and may be quite high if groundwater contamination is not a concern. According to the Tri-Regional Board Staff Recommendations for Preliminary Investigation and Evaluation of UST Sites (August 10, 1990), a 100 ppmw contamination level measured in soil beneath the tank is a trigger for action. In other words, it is likely that a release of liquid organic material has occurred. A measurement of 50 ppmw for contaminated soil would seem to be consistent with this level. Furthermore, 50 ppmw has been the exemption level previously cited in all versions 8-40.

Comment #13 Treatment

NPP requested clarification in writing as to treatment requirements. NPP expressed that it would be unjustified, excessive, impose drastic costs, and serve as a disincentive to remediation of Brownfield sites, if the District intends to require thermal treatment of all excavated contaminated soil, even if it is being relocated from one site to another on the same property.

Response #13

This was never the intent of the District. The section regarding management of excavated contaminated soil has been divided into subsections to clarify that treatment is an option to backfilling, or removal from the site. Backfilling has been defined to ensure that it be performed in such a way as to minimize the potential for unintended aeration of the contaminated soil. Treatment must be “initiated” rather than “completed” within the time frame, to allow for other means of treatment which may be as effective at reducing VOC emissions as thermal treatment, but which may take more time to execute. Whatever chosen treatment method is subject to all applicable prohibitory and permitting regulations of the District. This has been made more explicit in the language of 8-40.

Conclusion

Pursuant to the California Health and Safety Code, Section 40727, regulatory amendments must meet findings of necessity, authority, clarity, consistency, non-duplication, and reference. The proposed amendments are:

- Necessary to limit emission of Volatile Organic Compounds from the excavation of contaminated soil and the removal of Underground Storage Tanks, and necessary to satisfy stationary source Control Measures SS-09 and SS-10 in the District’s 1999 Ozone Attainment Plan for the federal one- hour ozone standard;
- Authorized by Sections 40000, 40001, 40702, 40725 through 40728 of the California Health and Safety Code;

- Clear, in that the rule is written or displayed so that it can be easily understood by the persons directly affected by it.
- Consistent with other District Rules and not in conflict with, nor contradictory to state or federal law;
- Non-duplicative of other statutes, rules, or regulations.
- Implementing, interpreting, or making specific the provisions of California Health and Safety Code Sections 40001 (Adoption and Enforcement of Rules and Regulations) and 40702 (Adoption of Rules and Regulations).

District Staff has made every effort to provide drafted amendments that meet these findings. This determination has been investigated and tested through the workshop and public comment process. The amended Rule does not impose the same requirement as any existing state or federal regulation, and the proposed rule is necessary and proper to execute the powers and duties granted to and imposed upon the District. District staff is confident that these findings have been met and recommend that the Board adopt these amendments to Regulation 8, Rule 40.

REC:rec

References

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Soil Decontamination, Compliance Assistance Program, Air Resources Board, Compliance Division, Carl M. Brown, July 1991.

Use of Petroleum Contaminated Soil in Cold-mix Asphalt Stabilized Base Course, Technical Letter No. 1110-3-487, U.S. Army Corps of Engineers, Washington D.C., 1 March 1998.

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Policy for Approving Requests to Aerate Gasoline Contaminated Soil, Monterey Bay Unified Air Pollution Control District, September 1998.

Contaminated Soil Aeration Policy Memo, Northern Sonoma Air Pollution Control District.

List of the Current Rules in Each of the 35 Air Districts, California Air Resources Board
Website address - <http://arbis.arb.ca.gov/drdb/drdbltxt.htm>