Nowell, Keith, Env. Health

From: Nowell, Keith, Env. Health
Sent: Wednesday, July 29, 2015 4:19 PM
To: 'Lynn Worthington'
Cc: Pat Hoban (pat@weber-hayes.com); 'Jeffrey Lawson'; Roe, Dilan, Env. Health
Subject: Fuel Leak Case RO271 and GeoTracker Global ID T0600100538, EXXON, 3055 35th Avenue, Oakland
Attachments: PHIS Characterization Reuse Guidance-Oct06.pdf

Dear Mr. Worthington:

Thank you for the opportunity to discuss the subject case with you today. As discussed in the meeting, I've providing the San Francisco Bay Region, Regional Water Quality Control Board (SFBR-RWQCB) Technical Reference Document as an attachment regarding the reuse of petroleum hydrocarbon impacted soil.

ACEH looks forward to working with you and your consultants to advance the case toward closure. Should you have any questions regarding this correspondence or your case, please call me at (510) 567-6764 or send an electronic mail message at keith.nowell@acgov.org.

Regards,
Keith Nowell

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PDF copies of case files can be reviewed/downloaded at:

http://www.acgov.org/aceh/lop/ust.htm

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D R A F T

TECHNICAL REFERENCE DOCUMNET

CHARACTERIZATION AND REUSE OF PETROLEUM HYDROCARBON IMPACTED SOIL AS INERT WASTE

October 20, 2006

1.0 INTRODUCTION

Staff of the San Francisco Bay Regional Water Quality Control Board (Water Board) has prepared a ***draft*** technical reference document entitled *Characterization and Reuse of Petroleum Hydrocarbon Impacted Soil as Inert Waste* (Interim Final – October 2006). This document presents a method for characterizing non-hazardous petroleum hydrocarbon impacted soil that is proposed for reuse (or disposal) on the same contiguous property where it was generated (i.e., "**on-site**"). Furthermore, the document presents petroleum hydrocarbon testing requirements and conditions/restrictions for the soil reuse. The testing requirements and restrictions are intended to address human and ecological health concerns and protect the beneficial uses of waters of the State.

The Water Board typically considers requests for on-site reuse of soil based on the overall threats to human and environmental health and water quality. Such threats are a function of petroleum constituent concentrations, toxicity, soil volume, contaminant mass, and the reuse location among others. The intent of this document is to assure that the reuse (or disposal) of PHIS is protective of human and environmental health and the beneficial uses of waters of the State by establishing testing requirements and conditions for reuse.

The petroleum hydrocarbon standards applied in this document meet risk-based screening levels for industrial and residential reuse. Furthermore, the standards are intended to demonstrate that the soil is inert as defined in Title 27, Section 20230 of the California Code of Regulations with respect to the water quality objectives set forth in the San Francisco Bay Regional Water Quality Control Board's Water Quality Control Plan. Due to these conditions, the Water Board does not intend to issue Waste Discharge Requirements (WDRs) or WDR waivers for soil reuse in accordance with this document.

For the purpose of this document petroleum hydrocarbon impacted soil (PHIS) is defined as soil impacted with gasolines and/or middle distillates, including diesel, kerosene, and jet fuel, collectively referred to as "diesel". Inert waste is defined in Title 27, Section 20230 of the California Code of Regulations, to be “a subset of solid waste that does not contain hazardous waste or soluble pollutants at concentrations in excess of applicable water quality objectives, and does not contain significant quantities of decomposable waste”. On-site refers to the same contiguous property where the PHIS was generated.

This document does not apply to hazardous waste, nor does it apply to the off-site reuse or disposal of soil, or the import of soil for construction or other uses. The Department of Toxic Substances Control has prepared an Information Advisory that addresses the import of fill material on sensitive lands (DTSC, Oct. 2001).

This guidance is intended to address the reuse of soils impacted with gasolines and middle distillate fuels. It is not intended to address reuse of soils impacted with heavier petroleum products (e.g., fuel oil Nos. 4, 5, and 6, lubricating oils, motor oil, etc.) or any other contaminant. Used motor oil, hydraulic fluids and other common types of heavy petroleum products/wastes may contain significant amounts of polynuclear aromatic hydrocarbons (PAHs), heavy metals, polychlorinated biphenyls (PCBs), chlorinated solvents, pesticides, volatile organic compounds (VOCs) and other potentially harmful chemicals. Evaluation of soil impacted with heavy petroleum hydrocarbons or other contaminants for reuse should be based on a more complete assessment of potential constituents and exposure concerns.

In order to expedite reuse issues, this document is intended to establish a “self-certification” process whereby the property owner and waste discharger retain the necessary documentation, but no formal approval by Water Board staff is provided. For sites under Water Board oversight, documentation (see Section 6.0) must be submitted to the Water Board staff case handler. For sites not under Water Board oversight, documentation should be retained by the property owner and waste discharger and provided to the Water Board only upon request.

This document is <u>not</u> intended to establish policy or regulation. Use of this document is entirely optional on the part of the discharger. This document provides conservative guidance to streamline the request/approval process for on-site soil reuse. Site-specific decisions made by the Water Board or other lead agencies regarding the reuse of PHIS and/or the management of impacted or suspect soil may supersede the guidance provided in this document. Conversely, this document is not intended to supersede any site-specific Water Board or other lead agency decisions regarding cleanup, cleanup standards, or reuse of impacted soil.

This document will be periodically updated as needed. Please send comments in writing to the contact noted below. Water Board staff overseeing work at a specific site should be contacted prior to use of this document in order to ensure that the document is applicable to the site and that the user has the most up-to-date version available.

For further information, please contact:

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2.0 DEFINITIONS

Petroleum Hydrocarbon Impacted Soil (PHIS) is defined as soil impacted with gasolines (C_6 - C_{12}) and/or middle distillates (C_9 - C_{25}) including diesel, kerosene, and jet fuel, collectively referred to as "diesel".

Inert Waste is defined in the California Code of Regulations, Division 2, Title 27, Subdivision 1, Chapter 3, Subchapter 2, Article 2, Section 20230, to be “a subset of solid waste that does not contain hazardous waste or soluble pollutants at concentrations in excess of applicable water quality objectives, and does not contain significant quantities of decomposable waste”.

Water Quality Objectives are those specified in the San Francisco Bay Regional Water Quality Control Board’s Water Quality Control Plan (Basin Plan)

On-Site refers to the same contiguous property where the PHIS was generated.

3.0. CONDITIONS FOR REUSE

3.1 Restrictions

1. The PHIS proposed for reuse must be inert waste as defined in Title 27, Section 20230 (e.g., non-hazardous solid waste that does not contain soluble pollutants of any kind in excess of applicable water quality objectives).

2. The proposed reuse location must be on-site (e.g., the same contiguous property where the PHIS was generated). The Department of Toxic Substances Control and local regulatory agencies should be contacted for proposed off-site reuse or disposal at non-permitted (e.g., landfill) locations.

3.2 Site Conditions

The proposed reuse location shall meet the following conditions to the extent practicable. In all cases, the discharger shall demonstrate that the reuse location is protective of beneficial uses of waters of the State in a manner consistent with Title 27.

1. Separation from Ground Water: The PHIS shall be placed at least five feet above the highest anticipated level of ground water.

2. Separation from Surface Water: The PHIS shall be placed at least 100 feet from the nearest surface water body.

3. Flood Plain Protection: The PHIS shall be protected against 100-year peak stream flows as defined by the County flood control agency.

4. Cover and Erosion Protection: The PHIS shall be buried at least three feet beneath the surface grade. It shall also be capped with erosion-resistant materials such as compacted soil, rock, asphalt, concrete, etc. The PHIS shall be protected from erosion and exposure at the ground surface for as long as it remains in place and has detectable concentrations of petroleum hydrocarbons.

5. Property Owner Acknowledgement: By written correspondence to Water Board staff, the owner of the property where the PHIS is proposed for reuse shall acknowledge their acceptance of the placement of the PHIS and any maintenance required to comply with the above conditions.

4.0 SAMPLING AND CHARACTERIZATION

All stockpiled soil must be characterized in accordance with the methodology set forth in the most recently promulgated edition of "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846", U.S. Environmental Protection Agency (EPA SW-846).

4.1. Sampling Frequency

Procedures in EPA Publication SW-846 provide a method for determining the mean concentration of a given contaminant within a soil mass and the appropriate number of samples necessary to calculate this mean to within a specified confidence level. Initial sampling should generate a minimum number of samples/analyses as described below. Additional sample analyses may be required to meet the confidence levels specified in EPA SW-846, therefore, archiving of samples may be appropriate. Archived samples must be appropriately preserved and analyzed within maximum holding times.

The minimum number of discrete samples necessary to adequately characterize the PHIS shall be determined in accordance with the statistical procedure in EPA SW-846. The following schedule can be used to estimate the minimum number of samples necessary to meet the statistical requirements in EPA SW-846, in most cases. If the number of samples collected is fewer than indicated in the following schedule, then the statistical basis for the deviation must be provided.

- Stockpiles less than 500 cubic yards: One sample for every 25 cubic yards (*e.g., 20 samples for a 500 cubic yard stockpile*).

- Stockpiles from 500 to 1,000 cubic yards: Twenty (20) samples plus one sample for every 100 cubic yards in excess of the initial 500 cubic yards (*e.g., 25 samples for a 1000 cubic yard stockpile*).

- Stockpiles from 1,000 to 10,000 cubic yards: Twenty-five (25) samples plus one sample for every 500 cubic yards in excess of the initial 1,000 cubic yards (*e.g., 43 samples for a 10,000 cubic yard stockpile*).

- Stockpiles greater than 10,000 cubic yards: Forty-three (43) samples plus one sample for every 5,000 cubic yards in excess of the initial 10,000 cubic yards (*e.g., 61 samples for a 100,000 cubic yard stockpile*).

Table 1 and Figure 1 illustrate the relationship between soil volume and the minimum number of samples provided in the above schedule.

4.2 Discrete vs. Composite Sampling

The statistical method in EPA SW-846 assumes that contaminants are heterogeneously distributed within the soil mass and that hotspots exist and are of concern. Composite sampling is not well suited for identifying hotspots because of the "dilution" or

"averaging" effect of mixing samples to create a single composite. Furthermore, composite sampling is not appropriate when sampling for volatile organic compounds, due to the losses inherent in the composite mixing process. Therefore, discrete sampling is required for volatile compounds.

Additionally, the statistical method in EPA SW-846 requires a reasonably accurate measure of sample variability in order to estimate a reasonably accurate confidence interval (CI) about the mean for each constituent in the soil mass. Variability between composite sample results tends to be muted due to the averaging effect of the mixing process, which generally leads to a falsely narrow CI about the mean. It is the upper limit of the CI that is compared to the regulatory limit to determine if a sufficient number of samples have been collected to identify hotspots and capture the true range of contaminant concentrations. Therefore, if contaminants are heterogeneously distributed, and if hotspots are a concern, composite sampling is not appropriate and discrete sampling is required.

4.3 Sample Location

Sample locations should be random, uniform, or biased toward hotspot areas, based on professional judgment and field screening indications.

4.4 Analyses

A two-tiered evaluation approach is required to determine if soil is suitable for reuse under this guidance. Therefore, two types of sample analyses may be required. The Tier 1 analyses consist of measuring the total concentrations of contaminants in the soil. The Tier 2 analyses consist of measuring the leachable concentration of contaminants from the soil. Section 5.0 discusses how the results from the Tier 1 and 2 analyses are evaluated.

Tier 1 Analyses

The Tier 1 analyses necessary to adequately characterize the PHIS shall be in accordance with protocol described below and in Table 2 (attached).

a. Gasolines ($C_6 - C_{12}$)

Soils impacted with gasolines shall be analyzed using the DHS/EPA Method 8015 modified to quantify the total petroleum hydrocarbons (TPH) through the carbon range C_6 to C_{12}. The minimum laboratory reporting limit for this method of analysis shall be no greater than 10 mg/kg. Additionally, soil sample results for TPH shall be ranked from highest concentration to lowest. The highest 25% of samples for TPH (minimum of four samples) shall be further analyzed using EPA Method 8021, 8260B (or equivalent) to quantify the concentrations of benzene, toluene, ethylbenzene, total xylenes (BTEX), methyl-tertiary butyl ether (MtBE) and other fuel oxygenates as required on a case-by-case basis. The minimum

laboratory reporting limit for volatile organic compounds in soil using EPA method 8021, 8260B (or equivalent), shall be no greater than 5 ug/kg.

b. Middle Distillates ($C_9 – C_{25}$)

Soils impacted with middle distillate petroleum fuels such as diesel shall be analyzed using the DHS/EPA Method 8015 modified to quantify the total petroleum hydrocarbons through the carbon range C_9 to C_{25}. The minimum laboratory reporting limit for this method of analysis shall be no greater than 10 mg/kg. Additionally, soil sample results for TPH shall be ranked from highest concentration to lowest. The highest 25% of samples for TPH (minimum of four samples) shall be further analyzed using EPA Method 8021, 8260B (or equivalent) to quantify the concentrations of BTEX and naphthalene. Analysis for MtBE and other fuel oxygenates may be required on a case-by-case basis. The minimum laboratory reporting limit for volatile organic compounds in soil using EPA method 8021, 8260B (or equivalent), shall be no greater than 5 ug/kg.

Tier 2 Analyses

The Tier 2 analyses necessary to adequately characterize the PHIS shall be in accordance with protocol described below and in Table 3 (attached).

a. Gasolines ($C_6 – C_{12}$)

The same 25% of soil samples with the highest TPH concentrations as ranked in the Tier 1 analyses (minimum of four samples) shall be extracted using the Synthetic Precipitation Leaching Procedure (SPLP). Procedures for the SPLP are described in EPA SW-846 (EPA Method 1312). The SPLP extract shall be analyzed for gasolines using DHS/EPA Method 8015 modified to quantify the total petroleum hydrocarbons in the carbon range C_6 through C_{12}, BTEX, MtBE and other fuel oxygenates as required on a case-by-case basis using Method 8021, 8260B (or equivalent). The minimum laboratory reporting limit for this method of analysis for gasolines in water shall be no greater than 100 ug/L. The minimum laboratory reporting limit for volatile organic compounds in water using EPA method 8021, 8260B (or equivalent), shall be no greater than 1.0 ug/L.

b. Middle Distillates ($C_9 – C_{25}$)

The same 25% of soil samples with the highest TPH concentrations as ranked in the Tier 1 analyses (minimum of four samples) shall be analyzed using the SPLP described above. The SPLP extract shall be analyzed for diesel using DHS/EPA Method 8015 modified to quantify the total petroleum hydrocarbons in the carbon range C_9 through C_{25}, plus BTEX and naphthalene using Method 8021, 8260B (or equivalent). The minimum laboratory reporting limit for this method of analysis for middle distillates in water shall be no greater than 100 ug/L. The minimum laboratory reporting limit for volatile organic compounds in water using EPA method 8021, 8260B (or equivalent), shall be no greater than 1.0 ug/L.

5.0 EVALUATION CRITERIA AND REGULATORY LIMITS

There are three types of regulatory limits applicable to the reuse of PHIS. These include 1) the Not-to-Exceed soil concentration limits, 2) the Tier 1 soil concentration limits, and 3) the Tier 2 leachate concentration limits. The Tier 1 and Not-to-Exceed soil limits are listed in Table 2 and the Tier 2 leachate limits are listed in Table 3.

5.1 Evaluation Process

Figure 2 illustrates the process for determining if the PHIS is acceptable for reuse in accordance with this guidance.

Category 1

After ranking the soil results from highest to lowest, if the highest concentration for each constituent does not exceed the Tier 1 soil limits (Table 2), then no further evaluation is necessary and the soil is suitable for reuse in accordance with this document.

Category 2

Conversely, if any constituent concentration exceeds the Not-to-Exceed soil limits (Table 2), then the soil is **not** suitable for reuse, without further remedial action, such as hotspot removal or treatment, confirmation sampling, and re-evaluation.

Category 3

If the soil does not fall into categories 1 or 2, then the 95% upper confidence limit (UCL) of the mean, as computed from the soil characterization data for each constituent, can be used for comparison to the applicable regulatory limits for each constituent.

Tier 1 Soil Limits:

If the 95% UCL of the mean for any constituent exceeds its Tier 1 soil concentration limit listed in Table 2 (but is less than its Not-to-Exceed soil limit per Category 2 restrictions), then the Tier 2 leachability analyses described in section 4.4 must be performed.

Tier 2 Leachate Limits:

If the 95% UCL of the mean of the leachate concentrations, for any constituent, exceeds its Tier 2 leachate limit listed in Table 3, then the soil is **not** suitable for reuse in accordance with this document, without further remedial action and re-evaluation.

5.2 Computing the 95% UCL of the Mean

After an appropriate number of samples have been collected from the stockpiled soil (see Section 4.1), the 95% UCL of the mean must be determined for each constituent of concern. If a data set is not normally distributed, it must be appropriately transformed. Guidance on determining the 95% UCL of the mean is found in EPA SW-846 (see Section 4.0) and in the EPA publication titled "Supplemental Guidance to RAGS: Calculating the Concentration Term" as presented in "Risk Assessment Guidance for Superfund (RAGS) Volume I, Human Health Evaluation Manual", publication 9285.7, May 1992.

6.0 REPORTING REQUIREMENTS

For sites under Water Board oversight, a technical report, containing the compliance information summarized below, must be submitted to the Water Board staff case handler for review and placement in the public record. For sites not under Water Board oversight, the compliance documentation must be retained by the property owner and waste discharger and provided to the Water Board only upon request:

1. Source of the PHIS (e.g., gas station, tank farm, refinery, industrial facility, etc.)
2. An estimate of the volume of impacted soil
3. A description of the contaminant(s) (e.g., gasoline, diesel, aviation fuel, etc.)
4. A description of the sampling methodology and the sample location/selection process
5. A plot plan detailing the stockpile and sample locations
6. A copy of all sample results, chain of custody documents, and QA/QC supporting data (electronic format preferred)
7. A one-page summary table of the laboratory results for the stockpile sampling
8. Statistical calculations for all stockpiles
9. A tabular comparison of the statistical results for each constituent for each stockpile to the Table 2 and Table 3 regulatory limits
10. A statement signed by the discharger/responsible party and a registered professional certifying compliance with the restrictions, site conditions, sampling and analysis, and evaluation criteria described in this guidance
11. Description and map of the reuse location and site
12. A statement signed by the property owner acknowledging the reuse of the impacted soil on his/her property and responsibility for maintaining compliance with the conditions of this guidance

Attachments: Attachment 1 - Table 1, Figure 1
Attachment 2 - Tables 2 & 3
Attachment 3 - Figure 2
Attachment 4 - References

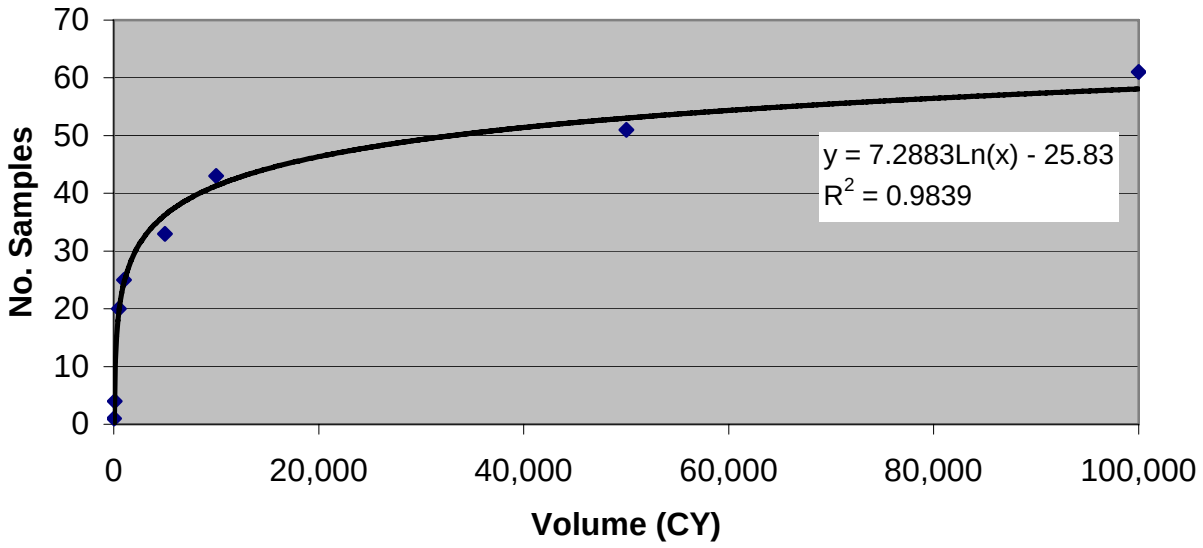
ATTACHMENT 1

Table 1. Number of Samples per Soil Volume in Cubic Yards (cy)

	< 500 cy	500 to 1,000 cy	1,000 to 10,000 cy	10,000 to 100,000 cy	> 100,000 cy
Frequency[1]	1 per 25 cy	1 per 100 cy	1 per 500 cy	1 per 5,000 cy	1 per 5,000 cy
Min. No. Samples	2 to 20	20 to 25	25 to 43	43 to 61	> 61

[1] Frequency is for the portion of the stockpile within the specified volume range.

Figure 1: Relationship of No. Samples to Soil Volume



ATTACHMENT 2

Table 2: Tier 1 Analytical Methods and Concentration Limits for Gasoline and Diesel[1] in Soil

Contaminant	Constituent of Concern	Carbon Range	Preparation Method[3]	DHS/EPA Method of Analysis[3]	Soil Concentration Limits[4] (mg/kg)	Not To Exceed Limits[5] (mg/kg)
Gasoline	TPH-Gasoline	C_6-C_{12}	3550	8015M	100	400
Diesel	TPH Diesel	C_9-C_{25}	3550	8015M	100	400
Gasoline/Diesel	Benzene		5030	8021/8260B	0.044	0.18
Gasoline/Diesel	Toluene		5030	8021/8260B	2.9	100
Gasoline/Diesel	Ethylbenzene		5030	8021/8260B	3.3	390
Gasoline/Diesel	Xylenes		5030	8021/8260B	2.3	310
Gasoline	MtBE[2]		5030	8021/8260B	0.023	2
Diesel	Naphthalene		5030	8021/8270	0.46	1.5

1. Includes comparable middle distillates ($C_9 – C_{25}$) including diesel, kerosene, and jet fuel.
2. Testing for other fuel oxygenates may be required on a case-by-case basis.
3. Or equivalent laboratory method.
4. Soil concentration limits may be compared to the 95% upper confidence limit of the mean calculated from the stockpile sample data for each constituent. Soil concentration limits are based on the lowest Environmental Screening Level ("ESL") as presented in the Region 2 Technical Document, Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater, Interim Final, February 2005, Appendix 1, Volume 2, Table A-1 for protection of 1) human health via drinking water consumption, 2) human health via direct contact, 3) human health via indoor air exposure, or 4) nuisance concerns. Additional assumptions include residential landuse, groundwater is a source of drinking water, and soils are shallow (< 10 feet). Soil concentration limits for TPH as gasoline & diesel are based on gross contamination ceiling (i.e., nuisance) limits. Soil concentration limits for BTEX and MtBE are based on a generalized leaching model for the protection of groundwater as a potential source of drinking water. Soil concentration limits for naphthalene are based on protection of human health via indoor air exposure. Updates to the Region 2 ESLs will supersede the concentration limits listed in this table.
5. Soil not-to-exceed limits must be compared to individual stockpile sample results for each constituent. Soil not-to-exceed limits are based on the second lowest ESL as presented in the Region 2 Technical Document, Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater, Interim Final, February 2005, Appendix 1, Volume 2, Table A-1 for protection of 1) human health via drinking water consumption, 2) human health via direct contact, 3) human health via indoor air exposure, or 4) nuisance concerns. Additional assumptions include residential landuse, groundwater is a source of drinking water, and soils are shallow (< 10 feet). Soil not-to-exceed limits for TPH as gasoline & diesel, BTEX, MtBE, and naphthalene are based on protection of human health via direct exposure. Updates to the Region 2 ESLs will supersede the concentration limits listed in this table.

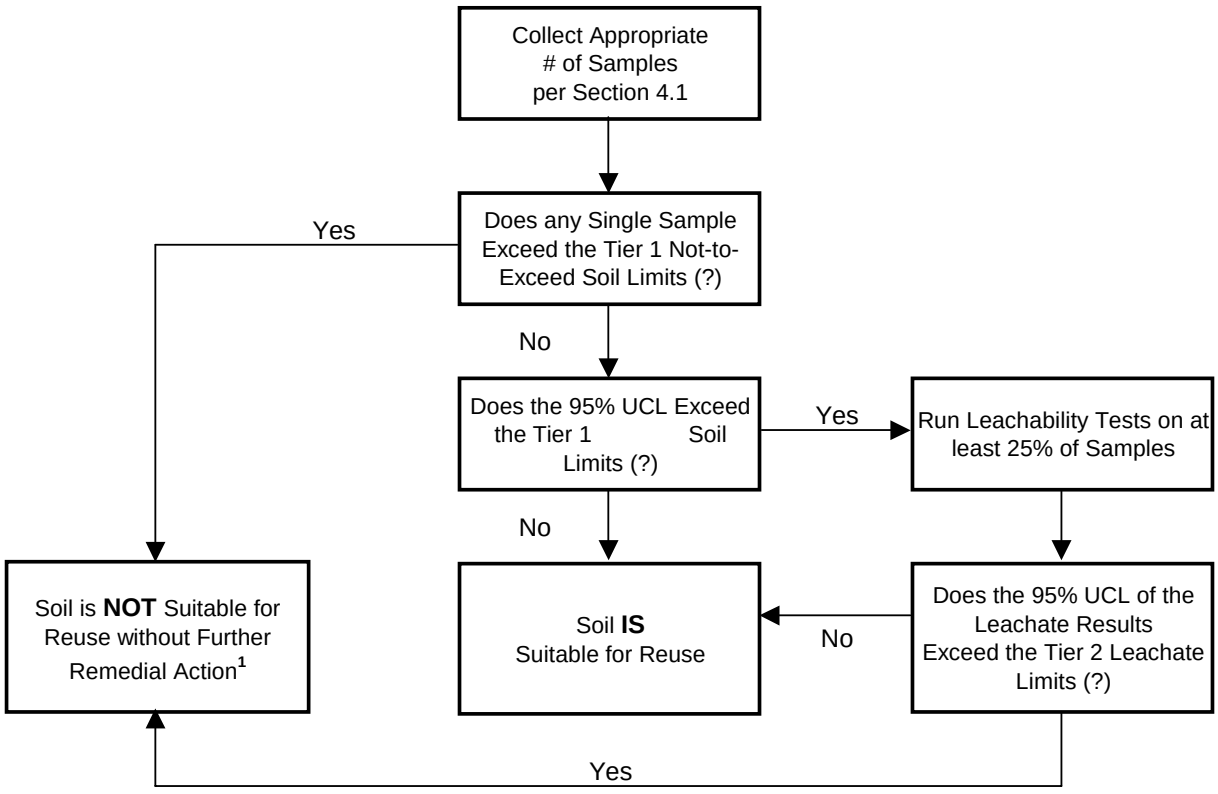
Table 3: Tier 2 Analytical Methods and Concentration Limits for Gasoline and Diesel[1] Leachable Extract

Contaminant	Constituent of Concern	Extraction Method	Carbon Range	Preparation Method[3]	DHS/EPA Method of Analysis[3]	Leachate Concentration Limits[4] (ug/l)
Gasoline	TPH-Gas	SPLP	C_6-C_{12}	3510	8015M	100
Diesel	TPH-Diesel	SPLP	C_9-C_{25}	3510	8015M	100
Gasoline/Diesel	Benzene	SPLP		5030	8021/8260B	1.0
Gasoline/Diesel	Toluene	SPLP		5030	8021/8260B	40
Gasoline/Diesel	Ethylbenzene	SPLP		5030	8021/8260B	30
Gasoline/Diesel	Xylenes	SPLP		5030	8021/8260B	20
Gasoline	MtBE[2]	SPLP		5030	8021/8260B	5
Diesel	Naphthalene	SPLP		5030	8021/8270	17

1. Includes comparable middle distillates ($C_9 – C_{25}$) including diesel, kerosene, and jet fuel.
2. Testing for other fuel oxygenates may be required on a case-by-case basis.
3. Or equivalent laboratory method.
4. The leachate concentration limits for all constituents are based on the lowest groundwater screening level that is protective of nuisance odors or human health (via drinking water or indoor air impacts), as presented in the Region 2 Environmental Screening Levels ("ESLs") Technical Document, Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater, Interim Final, February 2005, Appendix 1, Volume 2, Table F-1a (groundwater is a current or potential drinking water resource). Updates to the Region 2 ESLs will supersede the concentration limits listed in this table.

ATTACHMENT 3

Figure 2: Evaluation Process for Reuse of Non-Hazardous PHIS



[1] Additional remedial action may include removal and/or treatment of the hotspot with additional confirmation sampling and re-evaluation.

ATTACHMENT 4

References:

1. California Code of Regulations, Division 2, Title 27, Subdivision 1, *Consolidated Regulations for Treatment, Storage, Processing, or Disposal of Solid Waste*.

2. California Department of Toxic Substances Control, Information Advisory, *Clean Imported Fill Material*, October 2001.

3. California Regional Water Quality Control Board, San Francisco Bay Region, *Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater*, Interim Final, February 2005.

4. San Francisco Bay Regional Water Quality Control Board, *Water Quality Control Plan*, June 1995.

5. San Francisco Bay Regional Water Quality Control Board, Technical Memorandum, *Regulatory Status of Soils Excavated During Installation, Maintenance, or Repair of Underground Equipment*, April 1995.

6. State Water Resources Control Board, Chapter 15 Program Note #8, *Management of Petroleum Contaminated Soils*, November 1993.

7. U.S. Environmental Protection Agency, *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, Publication SW-846, Third Edition, 1986.

8. U.S. Environmental Protection Agency, *Supplemental Guidance to RAGS: Calculating the Concentration Term*, Publication 9285.7-081, May 1992.

9. U.S. Environmental Protection Agency, Region 9, *Preliminary Remediation Goals*, November 2000.