SOIL MANAGEMENT PLAN: TREATMENT CELL OPERATION AND SITE EXCAVATION

DEFENSE FUEL SUPPORT POINT NORWALK
15306 Norwalk Boulevard
Norwalk, California

04-NDLA-007

Prepared For:

Defense Logistics Agency - Energy
8725 John J. Kingman Drive
Fort Belvoir, VA 22060-6222

For Submittal To:

Paul Cho, P.G. Engineering Geologist
California Regional Water Quality Control Board, Site Cleanup Unit III
Los Angeles Region
320 West Fourth Street, Suite 200
Los Angeles, California 90013

Prepared By:

SGI environmental THE SOURCE GROUP, INC.
1962 Freeman Avenue
Signal Hill, California 90755

November 5, 2014

Prepared By:

Ken Wall
Senior Project Engineer

Reviewed By:

Neil F. Irish, P.G. 5484
Principal Geologist

TABLE OF CONTENTS

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

LIST OF ACRONYMS

DLA Energy	Defense Logistics Agency - Energy
SGI	The Source Group, Inc.
WDR	Waste Discharge Requirement
MTBE	Methyl tertiary-Butyl Ether
TBA	Tertiary-Butyl alcohol
1,2-DCA	1,2-Dichloroethane
ft bgs	Feet Below Ground Surface
DPT	Direct Push Technology
LARWQCB	California Regional Water Quality Control Board, Los Angeles Region
SCP	Site Cleanup Program
SLIC	Spills, Leaks, Investigation and Cleanup
EPA	United States Environmental Protection Agency
F4	F4 Remediation, LLC
ECM	Earth Cleaning Machine
cu yd	Cubic Yard
SWPPP	Stormwater Pollution Prevention Plan
HASP	Health and Safety Plan
CFR	Code of Federal Regulations
HAZWOPER	Hazardous Waste Site Operations and Emergency Response Rule
SCAQMD	South Coast Air Quality Management District
VOCs	Volatile Organic Compounds
SVE	Soil Vapor Extraction
HDPE	High-density Polyethylene
PVC	Polyvinyl Chloride
GAC	Granular Activated Carbon
mil	Thousandths of an Inch
TPHg	Total Petroleum Hydrocarbons as Gasoline
TPHd	Total Petroleum Hydrocarbons as Diesel
1166 Plan	Site-specific Rule 1166 Contaminated Soil Mitigation Plan
ppmv	Parts per Million by Volume
UCL	Upper Confidence Limit
COC	Contaminant of Concern

BMP	Best Management Practice
PID	Photoionization Detector
PTO	Permit to Operate
OVA	Organic Vapor Analyzer
$\mu g/m^3$	Micrograms per Cubic Meter
BTEX	Benzene, Toluene, Ethylbenzene, and Total Xylenes
SFPP	Santa Fe Pacific Pipelines Partners, L.P.
GWE	Groundwater Extraction
LNAPL	Light Non-Aqueous Phase Liquid
VES	Soil Vapor Extraction System
GWETS	Groundwater Extraction and Treatment System
NPDES	National Pollutant Discharge Elimination System
OM&M	Operations, Maintenance, and Monitoring
ELAP	Environmental Laboratory Accreditation Program
SM	Standard Method

1.0 INTRODUCTION

On behalf of our client, Defense Logistics Agency - Energy (DLA Energy), The Source Group, Inc. (SGI) is submitting this Land Treatment Operations Plan (Plan) for the temporary construction of designated bioremediation areas (treatment cells) at the former Defense Fuel Support Point (DFSP) Norwalk facility (site).

Parsons prepared a *Conceptual Site Model and Remedial Action Evaluation for Soil, Groundwater, and LNAPL* (CSM, Parsons, 2013). This report compiled extensive characterization data and evaluated remedial alternatives. The conceptual site model (CSM) described in Parson's document was subsequently approved by the Los Angeles Regional Water Quality Control Board (LARWQCB). Parson's originally proposed the excavation and off-site disposal of the upper 10 feet of petroleum contaminated soil present at the site. The RWQCB-approved site soil clean up goals are provided in Table 5-2 of the CSM.

However, upon further evaluation, deeper excavations and on-site treatment were evaluated and selected as a preferable remedy by DLA Energy. Therefore, on October 2, 2014, SGI, on behalf of DLA, submitted the required Form 200 and supporting information to apply for a Waste Discharge Requirement (WDR) under General WDR, Order No. 90-148; General Waste Discharge Requirements for Land Treatment of Petroleum Hydrocarbon Contaminated Soil in Los Angeles and Santa Clara River Basins. The WDR will be needed to allow excavated, petroleum containing soil to be treated on site using bioremediation techniques and then returned to the ground once confirmation soil analyses demonstrate that site cleanup goals have been met.

The site remedial strategy entails the excavation and on-site treatment of any soil containing chemicals of concern (COCs), principally petroleum hydrocarbons, that exceed defined site cleanup goals. The removal and treatment of the upper 10 feet of soil was designed to ready the property for eventual conveyance for use as recreational park land or for redevelopment as commercial property. As an extension of the excavation and on-site treatment of shallow contaminated soil, the DLA Energy has determined that it is beneficial to treat deeper contaminated soil. The removal and treatment of deeper contaminated soil will be done to promote the remediation of groundwater. The excavation of the deeper soil will be a component of a larger strategy for deep soil treatment that will include in-site treatment methods (such as vapor extraction, air sparging, and ISCO methods) and long-term monitored attenuation. Therefore, the excavation of deeper soils will be performed only in those areas that contain the highest concentrations of residual COCs (based both on excavation confirmation and historical soil analytical data.

In order for the areas of land to be utilized for land treatment, information delineating the construction, operation, maintenance, and monitoring of the treatment cells is imperative to ensure there are no unintended, adverse, environmental impact on soil of the treatment area or of other environmental media.

The current Plan serves two objectives. The first is to provide requisite information for the design, construction, operation and closure of areas used for soil treatment by means of bioremediation. The second objective of the Plan is to describe methods and means to be employed while completing the excavation and trenching planned for contaminated areas present at the Site.

1.1 Background

This site is located at 15306 Norwalk Boulevard, in Norwalk, California. Figure 1 is a site map.

The real property is owned by the Air Force and controlled through the offices of March Air Reserve Base. DLA Energy is responsible for environmental site restoration. The facility was formerly used to receive, store, and distribute military grade jet fuel. Active operations ceased in the 1990s and the tanks and above ground infrastructure were removed in 2012. As a result of fuel handling operations, soil and groundwater at the site have been contaminated with petroleum hydrocarbons. The primary chemicals of concern at the site include petroleum hydrocarbons (fuel products), benzene, methyl tertiary butyl ether (MTBE), tertiary butyl alcohol (TBA), and 1,2-dichloroethane (1,2-DCA).

In-situ remedies for soil have essentially been exhausted. The feasibility of excavation and onsite treatment was assessed and deemed the optimum remedy. Further, this remedy will substantially improve efforts to cleanup groundwater by removing source material from proximity of groundwater.

The purpose of temporarily establishing these treatment cells is for the remediation of soil from around the site. There are essentially 12 clusters of excavations planned for the site. Soil from depths of 0 to 25 feet below ground surface (feet bgs) will be excavated. Some contaminated soil within the excavations resides below clean overburden. For this reason soil will be actively managed to segregate potentially clean soil from impacted soil.

The setting of the site has conditions favorable to establishing areas for on-site treatment of soil. The site has manned security 24 hours a day and seven days a week and is completely fenced off. Further, because the historical use of the site was operating several above ground storage tanks, there are existing berms, originally constructed for secondary spill containment, which make for ideal protection against storm water impacts.

Site characterization has verified that chemicals of concern (COC) are limited to petroleum hydrocarbons and associated constituent chemicals (including benzene, toluene, ethylbenzene, and toluene) are present in the soil to be excavated and treated. Therefore, no treatment of hazardous wastes will be performed.

1.2 Specific Goal of the Excavation and Treatment Project

For the purposes of this plan shallow soil is defined as soil between 0 and 10 feet (ft) below ground surface (bgs). Soil between 10.5 ft bgs and 25 ft bgs is considered deep soil. The primary goal is to make the site suitable for transfer and development. To that end the objective is to excavate all

impacted soil between 0 and 10 ft bgs and treat the soil on-site. Excavation of deeper soil serves a secondary objective to reduce source hydrocarbon contamination that is impacting groundwater.

Based on substantial characterization data, the excavation area and depth estimates are very conservative. Excavations which are planned for no greater than 10 ft bgs, should serve to remove all hydrocarbon impacted soil. However, in the event contamination appears to be deeper there is no requirement to excavate further. In the event it is decided to not excavate deeper and contamination still exists, a delineation layer of aggregate material will be placed in the bottom of the excavation between 10 ft bgs to 10.5 ft bgs. A field decision may be made to excavate deeper or expand the footprint. Conversely, because the footprints were bounded very conservatively, some excavations may not need to be as large as originally estimated.

1.3 Characterization of Waste to be Treated

Table 4-1, of CSM summarizes soil data acquired utilizing direct push technology (DPT) from 174 locations throughout the site. All waste to be treated is exclusively hydrocarbon-impacted soil and is considered non-hazardous.

In addition, site demolition activities to remove above ground storage tanks, concrete pads, an underground storage tank, an oil water separator and associated conveyance piping occurred in 2012. In February 2013, Parsons submitted a report *Concrete Demolition and Soil Confirmation Sampling Completion Report* (Parsons, 2013). 1856 tons of soil were disposed of and were profiled as non-hazardous.

1.4 Scope of Operation Plan

The LARWQCB is the State of California designated regulatory agency assigned to oversee all aspects of the remediation of the DSFP Norwalk site. This is done as part of the Site Cleanup Program (SCP), formerly the Spills, Leaks, Investigation and Cleanup (SLIC) program. The approval of use of land for the purpose of land treatment is administered through the LARWQCB Land Disposal Unit. The primary purpose of the plan is to specify how the site will be designed, constructed, operated, managed, and closed. The secondary purpose is to convey how soil will be screened (assumed clean versus contaminated) and the process to confirm soil is clean either without treatment or post treatment. Further, because the plan addresses segregation of assumed clean soil, management of that soil is also discussed.

1.5 Excavation and Treatment Overview

Figure two shows the site layout, the proposed excavations, the layout of one treatment cell and candidate staging locations for clean soil. This section describes the process and activities that will be performed on-site.

As shown on figure 2, excavation sites are identified as 0-5 ft bgs, 5-10 ft bgs, 10-15 ft bgs and 15-25 ft bgs. Surface release of COCs was very limited and occurred primarily from beneath above ground storage tanks from and from subsurface conveyance piping. As the majority of COC

releases occurred in the subsurface, a substantial volume of soil to be handled during the site excavation activities will be clean overburden. As an example, if an area is identified with a 5-10 ft bgs excavation interval, potentially, 5 feet of clean over burden exists above the contaminated interval.

Excavations ranging from 0-5 ft bgs and 0-10 ft bgs will be conducted first. Once those excavations are completed, and provided field conditions, and technical aspects associated with the extent of contamination are not significantly different than originally characterized, the deeper excavations will commence. Because of this approach there will be multiple open excavations present at the site during the course of the project. These excavations will be secured, safety sloped, with plastic sheeting placed to control VOC emissions from exposed, contaminated soils.

Before soil can be placed in a biotreatment stockpile, it must be processed adding surfactant and bacteria to the soil. The bacteria and surfactant are proprietary material provided by F4 Remediation, Inc. (F4). See Appendix A. The liquid solution (Bio-Reclaim™) is an approved bioremediation agent on the United States Environmental Protection Agency's (EPA) National Oil and Hazardous Substances Pollution Contingency Plan (NCP). The surfactant is a non-toxic, biodegradable solution designed to enhance air and water penetration, ensure desorption of hydrocarbons from the soil, and maximize nutrient and hydrocarbon assimilation by the microbes. F4 will amend the soil utilizing F4's custom designed Earth Cleaning Machine (ECM). The ECM can process 1,000 to 2,000 cubic yards (cu yd) per day. Soil to be processed will be placed in a staging area in close proximity to a treatment cell. An excavator will load soil into the ECM where the operator will apply the surfactant and the bacterial solution. The soil will then be transferred either by conveyor or heavy equipment for placement into the soil biotreatment stockpile.

Soil will remain in an engineered and monitored biotreatment stockpile until COCs are reduced to site clean-up goals. The estimated treatment time is on the order of 60 days to 90 days. The soil requires no additional treatment or manipulation after it is placed in the treatment stockpile.

In addition to soil undergoing the bioremediation treatment, soil segregated as clean will be staged in and around the excavation of origin. Figure 2, identifies candidate staging areas for clean soil. Clean soil will be managed carefully implementing Best Management Practices (BMPs) as prescribed by the Stormwater Pollution Prevention Plan (SWPPP).

All soil, other than soil removed and transported off site for disposal, is intended to be used on site to back-fill excavations.

2.0 HEALTH AND SAFETY PLAN

A site-specific health and safety plan (HASP) is in effect at this site. It was prepared in general conformance with the federal requirements of 29 Code of Federal Regulation (CFR) Title 8 Section 5192, Hazardous Waste Site Operations and Emergency Response Rule (HAZWOPER).

The HASP includes protocols for safe work practices throughout the operation of the treatment areas. All project team members who will be performing work on site will be responsible for reading and conforming to the HASP.

The RWQCB will be notified a minimum of 48 hours prior to the initiation of field activities.

3.0 CELL DESIGN AND CONSTRUCTION

The design and construction of the treatment cell areas incorporate requirements and permit conditions as specified by the South Coast Air Quality Management District (SCAQMD). The SCAQMD Rule 1166 provides conditions to be followed during the handling of volatile organic compound (VOC) contaminated soil. The SCAQMD has preliminarily approved a site-specific permits for both the excavation of VOC and on-site treatment of VOC containing soils. A copy of the two draft permits and monitoring provisions is included in Appendix B of this plan.

3.1 Cell/Treatment Stockpile Design

Figure 3 provides the fundamental design for a given soil treatment cell. A cell is simply the location of up to six stockpile rows. The rows within the historical tank basins are completely contained by berms originally constructed for secondary containment.

It is planned to use up to four basins for treatment cells, with a fifth cell designated as an alternate location for the treatment of additional soil. Initially, two basins will be prepared as treatment cells to receive soil. The first excavation event will occur and soil will be placed in the cells. When it has been adequately established that soil treatment is progressing as planned, two additional cells will be established. Each cell will contain up to approximately 10,000 cu yd. As a result, excavation events of 20,000 cu yd will be alternating with backfilling operations of the previous excavation event.

In the event more capacity is required, an adjoining basin would be constructed in identical fashion. SGI would notify the LARWQCB prior to constructing another cell or using a different location.

3.2 Baseline Sampling

There is no recognized surface contamination in the areas that are to be used for treatment cells. However, baseline sampling will be conducted and reported in the final report for comparison to sampling conducted after use of the treatment areas has concluded. Calibrated PID readings will be taken approximately every 20 feet along a treatment row area. If any location registers greater than 50 ppm, the location will be logged and a surface sample will be taken. Each designated row will have at least four, baseline, surface samples taken. Soil will be analyzed for TPH (speciated for carbon chain range) using EPA Method 8015.

3.3 Treatment Stockpile Construction

The area where a treatment row will be constructed will have the first six inches of soil removed and the soil placed into temporary stockpiles. High-density polyethylene (HDPE) liner material will then be laid in rows as shown in design figure 3. The temporarily stockpiled soil will then be used to cover the liner to protect the integrity of the liner and to ensure that the liner remains secured in place. The perimeter of the buried liner will be marked with wooden takes and caution tape.

After the liner material is in place it will be ready to receive soil. Soil that has been processed with surfactant and bacteria will be placed in the row in a series of lifts. At spacing of approximately 50 feet and at approximately two feet above grade, lateral piping (constructed of schedule 40 polyvinyl chloride (PVC) will be placed perpendicular to the long dimension of the pile stockpile. The lateral piping will be used to reduce the air pressure in the covered treatment piles to facilitate treatment (by inducing fresh, oxygen-rich air to seep into the piles) and to mitigate VOC emissions. Soil will be added until the stockpile is approximately 8 feet in height.

Each lateral pipe will be connected with a PVC ball valve to a main header and the header will, in turn, be connected to the on-site SVE system. The vapor extraction system consists of an electric motor and blower to extract soil vapors from the subsurface at a maximum rate of 1,500 cubic feet per minute. Subsurface extraction will limited during the course of the excavation so that the majority of the system capacity will be available for connection to the treatment piles. The extracted vapors will be conveyed to a knock-out tank that separates any entrained moisture from the soil vapors prior to entering the blower. Accumulated moisture in the knock-out tank will be transferred to and treated by the existing groundwater extraction and treatment system. The soil vapors will then treated through multiple granular activated carbon (GAC) vessels prior to be discharged to the atmosphere (the GAC vessels operated under conditions specified by a site-specific SCAQMD permit).

Soaker hoses will be placed on the stockpile to augment the moisture content of the soil, if necessary. Moisture will be maintained at 40 to 85% of field capacity. A tensiometer or equivalent monitoring device will be used to monitor moisture, and water will be added if the soil moisture falls below the optimum range.

Each pile will be covered with a 10 to 20 thousandths of an inch (mil) heavy duty plastic. Enough covering material to cover all piles at the production rates projected will be staged on site. The plastic sheeting will be overlapped, and seams and edges will be secured with sand bags, ropes, and/or sealants, as appropriate and needed.

Each cell and row will have a unique identity and each lot processed within a row will have a unique identity.

4.0 STOCKPILE MANAGEMENT

This section describes the segregation of soil, monitoring of soil treatment, monitoring of VOC emissions and dust, and management of stockpiles. This includes the verification and management of stockpiles of clean soil, the characterization of soil designated for treatment and soil designated for off-site disposal. In general, field observations (i.e. visual staining, strong odors, photo-ionization detector readings of greater than 50 parts per million) will serve as the first line of screening. During treatment soil will be monitored for progress toward achievement of cleanup goals. Assumed clean soil, and treated soil will undergo confirmation sampling with the methodology set forth in EPA's Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (EPA SW-486). Soil will be analyzed for TPH (GRO and DRO) using EPA Method 8015 and VOCs using EPA Method 8260B. Once confirmation samples demonstrate that contaminant concentrations have been reduced to below site cleanup goals, the treated soil will be removed from the treatment cell and staged for backfilling on-site.

4.1 VOC-Containing Soil Stock Pile Operational Conditions

As a limitation of stockpile size, the site-specific Rule 1166 Contaminated Soil Mitigation Plan (1166 Plan) with Application Number 566483, specifies the following provisions:

1. Section I, General Requirements item 5: At no time shall the total quantity of VOC contaminated soil stockpiled not undergoing onsite treatment exceed 5,000 cubic yards;
2. Section III, Monitoring item 17: a VOC contaminated stockpile created for onsite storage only shall not contain more than 400 cubic yards of soil;
3. Section IV – Handling and Storage Item 18 D: Onsite treatment of soil which falls into the category of 50-1,000 parts per million by volume (ppmv) as hexane shall be initiated within 30 days; and
4. Section IV – Handling and Storage Item 19 A iii: Onsite treatment for the VOC contaminated soil for category (>1,000 ppmv) as hexane shall be initiated within 3 days of excavation.

4.2 Handling of Assumed Clean Soil

As previously described, field screening will be utilized to segregate assumed clean soil from contaminated soil. Assumed clean soil will be stockpiled proximal to the originating excavation in stockpiles not to exceed 2,000 cu yd. The stockpiles will be placed on plastic liners of 30-mil or greater. During construction, the piles will be lightly sprayed with water and covered with plastic sheeting of 10-mil or greater. Plastic sheeting will be secured with sandbags.

To verify that the stockpiled soil is clean, sixteen soil samples will be collected from each 2,000 cu yd clean soil stockpile. Data will be statistically analyzed to calculate the 95% upper confidence limit (UCL) for contaminants of concern (COCs) and compared to the predetermined cleanup goals

(See Table 2). If the UCL for the COCs meet or exceed site cleanup target concentrations, the soil pile will be deemed acceptable for reuse. As subsequent soil is deemed acceptable; stockpiles may be consolidated.

In the event a stockpile fails to meet the clean-up goal criteria, the stockpile will be routed to the designated soil preparation area where the soil will be augmented with surfactant and bacteria and then placed in a treatment pile.

Each stockpile originally field screened as assumed clean will be given a unique identification number which will be logged.

The structure of the number will be nine digits. The information of the digits is as follows:.

1. Digits 1 and 2: Excavation number (e.g. as excavation in a new area is begun it will be given a sequence number of 01, 02, 03, etc.);
2. Digits 3 and 4: Excavation interval (e.g. 05 signifies the soil was removed from the top five feet, approximately); 10 would signify soil was removed between 5 and 10 ft bgs
3. Digits 5, 6, and 7: Ordinal Date (e.g. day designation 1 through 365); and
4. Digits 8 and 9: Lot number (e.g. each stockpile within a given excavation area will be given a specific lot number).

Samples collected from the stockpile will be sequentially numbered 01 through 16. Acceptance sampling and evaluation is discussed in a later section.

Once a stockpile is covered and secured, the identification number will be clearly marked on the stockpile.

If analytical results indicate the stockpile is clean, the stockpile will be clearly marked as clean. If multiple clean stockpiles need to be consolidated due to space constraints or to facilitate field operations, the consolidation of stockpiles will be logged.

4.3 Handling of Assumed Contaminated Soil

Soil that is field screened and determined to be VOC containing, as defined by the SCAQMD (i.e. VOCs detected at a concentration greater than 50 ppmv when measured within 3 inches of the soil with a calibrated PID), will be directed to staging. Staging will consist of stockpiles no greater than 400 cu yd. Once a 400 cu yd stockpile is created, a composite sample of soil collected from 10 random locations on the stockpile will be taken. The sample number assigned will be a number that will be a combination of area, and sequence received. The purpose of the composite sample will be to pre-characterize the soil prior to treatment and placement in treatment cell. This baseline data will assist in estimating how long soil will need to be in a treatment pile.

The soil will then be treated with surfactant and bacteria. After treatment, the soil will be placed in a treatment row.

Stockpiles will be placed sequentially in the rows such that composite sample results can be traced to locations within the row. Soil designated for treatment will be added to a given row until the capacity of the row has been reached.

Once a row has been completed it will be given a designation number. The digits of the number are as follows:

1. Digit 1 represents the treatment cell: 1,2, 3 or 4.
2. Digit 2 represents the treatment row: 1, 2, 3 4, 5 or 6
3. Digit 3 represents the sequential number of the use of that row. A treatment row (location) will only be used to treat a few stockpile lots of soil.

Monitoring of the soil treatment progress and confirmation sampling will be discussed in subsequent sections.

4.4 Handling of Soil Not Suitable for On-site Treatment

It is anticipated that there will be a small percentage (approximately 1% to 2%) of the soil that will need to be disposed of by sending offsite. A field screening determination will be based on the appearance of excessive contamination, the presence of debris, and/or physical characteristics that will preclude processing the soil through the ECM. Once soil is designated as not practical or desirable for treatment; sampling will be done to provide the waste disposal facility the requisite profile for offsite disposal; this soil will be removed from the site within 30 days of generation and will be stored in accordance with SCQAMD Rule 1166 conditions.

4.5 Debris Management Procedures

Soil has the potential to adhere to subsurface debris, which has not been previously identified. Debris encountered during excavation activities may be impacted with former DFSP residuals; such has soil impacted with TPH. All effort should be taken to remove the soil from the debris, prior to disposal of the debris. It is anticipated that soil will be easily displaced from debris, and as a result will not require special handling. In cases where soil is not easily displaced from debris, the following decontamination activities may be implemented, pending the approval of DLA and/or its delegated Consultant:

1. A decontamination station consisting of plastic sheeting (10-mil or greater in thickness) shall be placed on the ground in the area where decontamination operations will be conducted. The plastic will be secured with sand bags or the equivalent such that wind or other environmental conditions will not lift the plastic off the ground, reducing the potential for creating a dust related hazard.

2. All impacted debris will be cleaned over the plastic sheeting by means of shovels and stiff-bristled brooms or brushes until they are fully cleaned. Upon completion of cleaning, any impacted debris will be placed in the appropriate container for proper disposal. If shovels/brooms cannot clean the impacted material off the debris, other means and methods may be used, including wire brushes.

Prior to loading of soil removed from debris, the plastic sheeting will be placed on the ground such that any spilled material will be prevented from contacting the ground surface. Upon completion of loading, the plastic sheeting will be folded and placed in the bin used for soil transport and disposal.

Personal Protective Equipment, such as disposable coveralls, will be removed and discarded in the decontamination areas. In order to decontaminate reusable items such as work boots, a two-stage decontamination process will be used. This process will include washing in a detergent solution with a stiff-bristled brush and rinsing with clean water. The rinseate water will be distributed over contaminated soil (to be exported) for dust control purposes.

4.6 Stockpile Monitoring and Maintenance

The combined goal of soil monitoring and acceptance sampling is to ensure treatment is working and that the soil will ultimately be suitable for reuse onsite. Air monitoring specific to treatment biopiles serves to meet compliance requirements as specified in the 1166 Plan with the objective of protecting human health and the environment. In addition, job site and perimeter air monitoring associated with fugitive dust serve to ensure appropriate dust control in order to protect the public and site workers. Stockpile maintenance is necessary to ensure the stockpile integrity is maintained, to maximize the treatment efficiency of the bacteria, and to ensure that BMPs are performing as designed.

4.6.1 Stockpile Monitoring

Progress samples will be collected at approximately 30-day intervals following initiation of treatment to evaluate the effectiveness of the biotreatment process. Samples will be collected at a rate of approximately one sample per 500 CY. Sampling locations will be determined by subdividing each batch into approximately equal grid cells. One sample will be collected at a randomly selected location from within each grid cell during each successive sampling event. Progress samples will be analyzed for TPH (speciated by carbon chain ranges) using EPA Method 8015B; monitoring the progress of TPH reduction will provide data as to the overall reduction in VOCs present in the soil.

Based on the combined data a decision to continue monitoring or to schedule acceptance sampling will be made.

4.6.2 Acceptance Sampling

Soil from each treatment stockpile will be characterized in accordance with the methodology as prescribed in Test Methods for Evaluating Solid Waste, Physical/Chemical methods, SW-846, U.S. Environmental Protection Agency (EPA SW-846). The number of soil samples will be based on the statistical requirements stated in EPA SW-486 (See Table 1). Soil will be analyzed for TPH (speciated by carbon chain ranges) using EPA Method 8015 and VOCs using EPA Method 8260B.

The typical pile is designed to hold approximately 1,700 cu yd. Accordingly, this amount of soil will require at least 27 samples to characterize the treated soil. The data set will be statistically

analyzed to calculate the 95% Upper Confidence Level (UCL) for each COC. Provided all parameters are at or below the cleanup goals, the given lot will be deemed suitable for reuse.

The LARWQCB will be notified one week in advance that treatment pile acceptance sampling, to determine suitability for soil reuse, will be conducted. LARWQCB, at their discretion, may send a representative to witness sampling, collect soil samples or splits of soil samples, and/or review bio-treatment pile construction and maintenance records.

Samples will be taken at uniform intervals along the biopile and at depths of one to two feet. Interval spacing will be dependent upon final length of a treatment row. In general, samples will be taken on each of the ends of the biopile, and samples will be distributed evenly along both sides of the treatment stockpile.

Stockpiles that have been evaluated and deemed acceptable for reuse will be logged and SGI will inform the LARWQCB that the soil has met the acceptance criteria and will be used for backfill. The cleanup goals are variable with respect to depth. If soil analytical data indicates that the soil does not meet the most stringent cleanup goals, the soil will only be used at intervals where the soil meets the cleanup goals.

If sampling results indicate that the soil does not meet cleanup goals and is not suitable for reuse in its current state, the soil will remain under treatment and monitoring.

4.6.3 Air Monitoring

Air monitoring will be performed in accordance with the SCAQMD 1166 Plan and the SVE system Permit to Operate (PTO) G12863.

4.6.3.1 Stockpile Air Monitoring

During the excavation process, an organic vapor analyzer (OVA) such as RAE Systems Inc.'s MiniRAE 3000 PID, or equivalent, will be used to monitor VOCs. The PID will be calibrated by the manufacturer at least once every three months and calibration shall be verified using certified calibration gas at the beginning of each work day. If a calibration gas other than hexane is used, each measured reading shall be correlated to and expressed as hexane.

All monitoring shall be conducted at a distance no more than three inches above the soil surface. Initially, monitoring shall be conducted at a frequency of one reading every 15 minutes. Upon detection of VOCs greater than 50 ppmv, monitoring will be conducted at a frequency of one reading for every five cubic yards of soil excavated. Readings will be collected no later than three minutes after soil is excavated.

Written records will be maintained documenting calibrations and monitoring records. Upon detection of VOCs greater than 50 ppmv, the SCAQMD shall be notified per the 1166 Plan.

4.6.3.2 SVE Air Monitoring

Vapors will be extracted from the stockpiles via temporary soil vapor extraction piping constructed of scheduled 40 PVC as detailed in Section 3.1.1. Vapor concentrations will be measured utilizing a PID at the inlet and and outlet of each GAC vessel on a weekly basis. Vapor samples will be collected from the SVE system inlet and outlet and analyzed for VOCs by EPA Method 8015 and for benzene by EPA Method 8260B; the frequency of this sampling and analysis will be as described in the SVE system SCAQMD permit.

4.6.3.3 Fugitive Dust Control and Monitoring

To comply with SCAQMD rules and the HASP, dust control measures will be implemented during excavation activities. Dust control will be completed through the application of a water mist on drive roads, the working face of excavations, and on excavated soil. Potential dust and fugitive emission receptors include on-Site workers, Site personnel, oversight personnel, general public, pedestrians adjacent to the Site, and nearby workers and residents. A primary objective of these measures is to protect these potential receptors. The closest sensitive receptors are identified as the residents to the north, south, and west and Holifield Park users to the east, and Dolland Elementary School adjacent to Holifield Park to the east.

Dust monitoring will be conducted during excavation, processing of soil and construction of biopiles. Dust monitoring will consist of data collection of particulates using a Thermo Scientific pDR-1000AN (pDR-1000AN) particulate dust monitor (or equivalent). The dust monitoring data will be used to help evaluate when further engineering controls or modified work practices are needed to reduce airborne particulates. This may include the use of additional water application or modified work practices to reduce dust generation.

Dust levels at site perimeters will also be monitored during excavation and loading activities. If the monitoring data at the site perimeter indicates that dust levels are beyond the SCAQMD Rule 403 limit of 50 micrograms per cubic meter ($\mu g/m^3$) based on the difference between upwind and downwind measurements, then additional engineering control measures, listed above, will be implemented to reduce the dust level. In the event that stockpiles are left overnight, the exposed portion will be properly covered with plastic to reduce any dust emission.

The equipment to be used for excavation and treatment will be maintained properly so that exhaust emissions will be within acceptable standards. If necessary, the tires of trucks or equipment leaving the site will be washed in order to prevent tracking of soils or mud, which could increase fugitive dust levels outside the Site perimeter.

4.6.4 Stockpile Maintenance

Throughout the duration the soil is in a treatment row, the row will be visually inspected weekly in conjunction with weekly SWPPP inspections. As required by the SCAQMD permit, vapor and flow monitoring will be conducted. Damaged plastic will immediately be repaired and any exposed soil will be covered. Maintenance activities will be logged.

4.6.5 Waste Management

Waste such as decontamination water and oily waste from equipment maintenance will be placed in a United Nations-approved 55-gallon drums, labeled, and stored on site pending characterization for off-site disposal. Waste will be profiled in accordance with California Code of Regulations, Title 22, Division 4.5, Chapters 10 through 32, and Federal RCRA regulations. After analytical results have been received and evaluated, the drums will be transported off site under manifest to a permitted recycling/disposal facility.

5.0 TREATMENT CELL SITE CLEAN CLOSURE

It is not anticipated that biotreatment of soil will contaminate surface soil or subsurface soil because all of the treatment cell rows will be lined with HDPE. The soil placed on the HDPE will have been amended with bacteria and surfactant. However, those areas used for the land treatment of soil will be characterized after the treatment cells have been removed to provide a documented record of the underlying soil post-treatment. All areas used for treatment will be characterized. In addition, former tank containment basins that were not subject to excavations during the project will transected with trenches to a depth of 10 feet to document the remaining soil conditions.

5.1 Post Treatment Surface Sampling Beneath Each Treatment Row

After all treated soil has been removed from the liner, the liner will be inspected for any breaches. If the liner has been penetrated sampling will be conducted in proximity of the damage to determine if any contamination has occurred. The liner will then be removed to allow the underling soil to be inspected and tested. PID readings will be taken approximately every 50 feet along a treatment row area. Any locations registering greater than 50 ppm or greater will be logged and a surface sample will be taken. Any impacted soil will either be disposed of off site or, if a treatment cell is still active, the soil may be treated on site. A minimum of three surface soil samples will be collected along each former treatment row. The soil samples will be analyzed for TPH (speciated by carbon chain ranges) using EPA Method 8015 and VOCs using EPA Method 8260B.

5.2 Treatment Cell Reporting

A final report documenting the use and closure of the treatment cell areas will include the following:

1. Baseline sampling results and documentation,
2. Photo documentation of the installation of lining material,
3. Analytical data associated treatment row monitoring data and post-treatment sampling, and
4. Post characterization data of the cells used for treatment.

Provided the characterization of deconstructed treatment areas is adequate, SGI on behalf of DLA will request a determination of no further action (NFA) for each area used for soil treatment.

6.0 EXCAVATION SAMPLING AND REPORTING

This section provides additional information regarding the excavations (prior to backfilling) as well as exploratory trenching in areas that did not require excavation.

6.1 Excavation Confirmation Sampling

As figure 2 reflects there are essentially 12 clusters of excavations. As originally, stated the primary objective of this excavation and treatment effort is to clean the upper 10 feet of impacted soil. However, deeper soil excavation will be performed, but with different remedial objectives.

6.1.1 Confirmation Sampling of Shallow (< 10 Feet Deep) Excavations

Field screening with the PID will be used to help evaluate the extent of excavation. Excavation will continue to the full planned area and depth if PID readings are in excess of 50 ppm. If shallow soil contamination appears to occupy a larger area than originally estimated it will likely be deemed necessary for further excavation.

When it appears all contamination has been removed, confirmation samples of the sidewalls and bottoms will be collected from the excavation bucket. Sidewall sampling will be spaced apart at approximately 25 linear feet. Samples will be taken from the excavator bucket at depths of 2.5 feet and 7.5 feet below surface grade. Bottom samples will be collected at a frequency of one sample for every 800 square feet. Soil will be analyzed for TPH (speciated by carbon chain ranges) using EPA Method 8015 and VOCs using EPA Method 8260B.

6.1.2 Confirmation Sampling of Deep (> 10 Feet Deep) Excavations

The removal of deeper contaminated soil will be done to promote the remediation of groundwater. The excavation of the deeper soil will be a component of a larger strategy for deep soil treatment that will include in-site treatment methods (such as vapor extraction, air sparging, and ISCO methods) and long-term monitored attenuation. Therefore, the excavation of deeper soils will be performed only in those areas that contain the highest concentrations of residual COCs (based both on excavation confirmation sampling as described in Section 6.1.1. and historical soil analytical data. Due to funding limitations and permit limitations (the on-site soil treatment WDR prohibits the on-site treatment of greater than 100,000 cubic yards of soil), it is anticipated that no more than 40,000 cubic yards of soil will be generated from the deeper excavations.

After the deep excavations are completed, confirmation samples of the sidewalls and bottoms will be collected from the excavation bucket. Sidewall sampling will be spaced apart at approximately 25 linear feet. Samples will be taken from the excavator bucket at five-foot depth increments extending to the bottom of the excavation. Bottom samples will be collected at a frequency of one sample for every 800 square feet. Soil will be analyzed for TPH (speciated by carbon chain ranges) using EPA Method 8015 and VOCs using EPA Method 8260B.

6.2 Exploratory Trenching

Exploratory trenching to 10 feet bgs is planned in paths as shown in figure 2. This includes Treatment Cell #1 (Powerine Basin) and Treatment Cell #2 (location of tank 80004). The objective is to ensure the absence of soil contamination in areas that did not require excavation. As soil is being removed it will be field screened using a PID and will be inspected for stain and odor.

If contamination is not observed soil samples will be collected from the bucket of the excavator at approximate depths of 5 and 10 ft bgs and spaced at approximately 20-ft intervals. Depending on the location of utilities and existing remediation infrastructure, trenching may not be continuous for the planned paths.

In the event contaminated soil is observed a sample will be taken. The location and depth will be logged. Additional trenching will continue until all contaminated soil has been removed and routed for treatment on site or transported for disposal off-site.

Soil assumed clean will be stockpiled and sampled per EPA SW-486. Soil will be analyzed for TPH (GRO and DRO) using EPA Method 8015 and VOCs using EPA Method 8260B. If soil meets cleanup goal criteria it will be reused to backfill the trenches. Treatment Cell #1 will be the last area for trenching. If contaminated soil is found, that soil will be disposed of off site. Clean, back-fill material will be imported.

6.3 Clean Soil Import Criteria

In the event that excavated soil deemed appropriate for on-Site backfill re-use is insufficient to fill excavation cavities, import fill material may be necessary. The Department of Toxic Substance Control (DTSC) has defined procedures that must be used to minimize the possibility of introducing impacted soil onto a site that requires imported fill material. These procedures are defined in a Fact Sheet titled Information Advisory Clean Imported Fill Material, October 2001 (Appendix C). The fact sheet defines fill material sources; potential contaminants based on fill material sources, and recommended sampling requirements (type of analysis, frequency and risk criteria.). Prior to importing clean fill and backfilling, all imported fill must be evaluated per the clean imported fill material fact sheet and must meet the screening criteria defined in the advisory.

6.4 Discovery of Impacted Soil and Debris During remediation Activities

During excavation activities it is possible that affected soil and debris not previously characterized could be encountered. In the event of unexpected exposure of impacted soil, excavation-related activities in the area should be stopped immediately and the area should be covered with plastic sheeting and cordoned off until an evaluation of Site conditions can be made by a qualified environmental professional. DLA and/or its delegated Consultant should conduct no further work without verbal or written approval. The Contractor may be directed to segregate and temporarily store more heavily impacted material separately. When handling impacted material, the Contractor will be required to use appropriate PPE, as outline in the Contractor's HASP. If work in these areas is approved and below grade debris (i.e. man-made materials) is encountered, this debris must be

decontaminated prior to off-Site transport and recycling/disposal or treatment prior to re-use on-Site.

6.5 Reporting

A letter report will be generated for each of the different excavation and trenching areas. The final size and depth as well as all supporting analytical data will be provided. SGI on behalf of DLA will request concurrence by letter response that the specified area is clean of contamination to the depth specified in the letter report.

Once all areas have been completed a final report will be generated summarizing excavation results for the entire site.

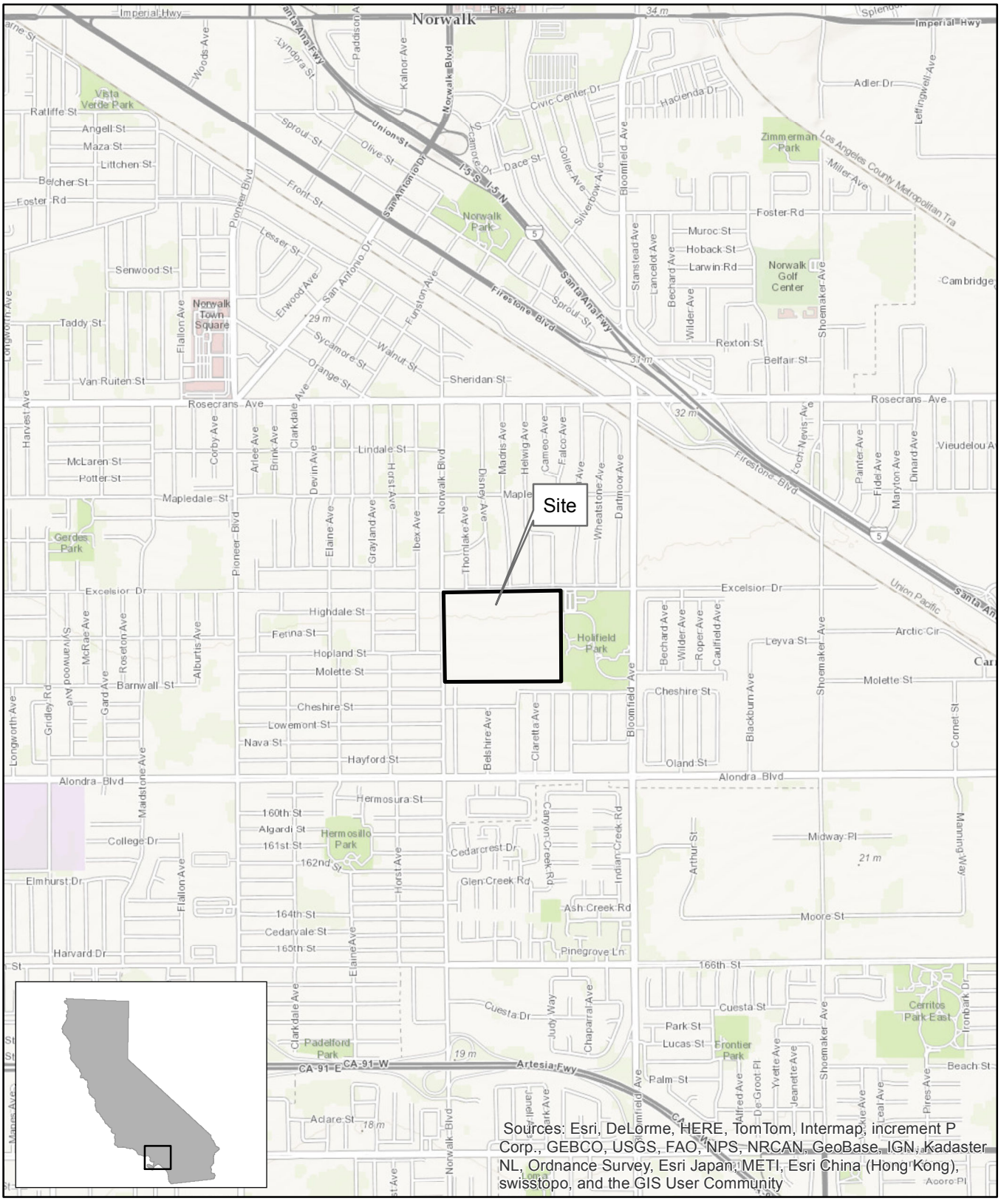
6.6 Schedule

Figure 4 provides a construction schedule. The schedule is dependent upon obtaining approved permits and plans.

7.0 LIMITATIONS

This document was prepared for the exclusive use of the Defense Logistics Agency - Energy (DLA Energy) and the California Regional Water Quality Control Board, Los Angeles Region (LARWQCB) for the express purpose of complying with a client or regulatory directive for environmental investigation or restoration. SGI and DLA Energy must approve any re-use of this work product in whole or in part for a different purpose or by others in writing. If any such unauthorized use occurs, it shall be at the user's sole risk without liability to SGI or DLA Energy. To the extent that this report is based on information provided to SGI by third parties, including DLA Energy, their direct contractors, previous workers, and other stakeholders, SGI cannot guarantee the completeness or accuracy of this information, even where efforts were made to verify third-party information. SGI has exercised professional judgment to collect and present findings and opinions of a scientific and technical nature. The opinions expressed are based on the conditions of the Site existing at the time of the field investigation, current regulatory requirements, and any specified assumptions. The presented findings and recommendations in this report are intended to be taken in their entirety to assist DLA Energy and LARWQCB personnel in applying their own professional judgment in making decisions related to the property. SGI cannot provide conclusions on environmental conditions outside the completed scope of work. SGI cannot guarantee that future conditions will not change and affect the validity of the presented conclusions and recommended work. No warranty or guarantee, whether expressed or implied, is made with respect to the data or the reported findings, observations, conclusions, and recommendations.

FIGURES



SOURCE: ESRI 7.5 MINUTE TOPOGRAPHIC MAP. http://resources.esri.com/arcgisonlineservices	PROJECT NO.: 04-NDLA-001	DATE: 5/28/2014	DR.BY: JK	APP.BY: PP	SCALE= 1:24,000 (0 1,000 2,000 4,000 Feet)

N

SGI environmental THE SOURCE GROUP, INC.
1962 FREEMAN AVENUE
SIGNAL HILL, CA 90755
(562) 597-1055

DEFENSE FUEL SUPPORT POINT NORWALK
15306 NORWALK BOULEVARD
NORWALK, CALIFORNIA

SITE LOCATION MAP

FIGURE **1**

Document Name: Fig-1_Norwalk_Topo_Site_Location_Map

Excelsior Dr

Norwalk Blvd

Treatment Cell # 3

Treatment Cell # 1

Treatment Cell # 2

Treatment Cell # 4

Treatment Cell
Alternate Location

80001

80002

80004

80005

80006

80007

80008

80009

80013

55003

55004

80017

Tank

Tank

Legend

- Former Above Ground Storage Tanks
- DFSP Norwalk Border
- Excavations 0-5ft bgs
- Excavation 5-10ft bgs
- Excavation 10-15ft bgs
- Excavation 15-25ft bgs
- Clean Soil Stockpile Staging Areas
- Treatment Cells
- Existing Soil Vapor Extraction System
- Treated Soil Staging Area for Placement in Treatment Cell (Excavation Event # 1)
- Contaminated Soil Staging Area Prior to Treatment (Excavation Event # 1)
- Exploratory Trenching

Notes:

1. Up to four treatment cells will be established.
2. Staging areas of contaminated soil and treated soil prior to placement in treatment cell will move throughout site as field conditions dictate.
3. Production rate ranges between 1,000 cubic yards and 2,000 cubic yards per day.
4. Bio-piles for only 1 of 4 cells shown.

N

DFSP Norwalk

15306 Norwalk Boulevard
Norwalk, California

Project Number:	Date:	Drawn By:	Approved By:
04-NDLA-007	10/27/2014	A. Czuba	K. Wall

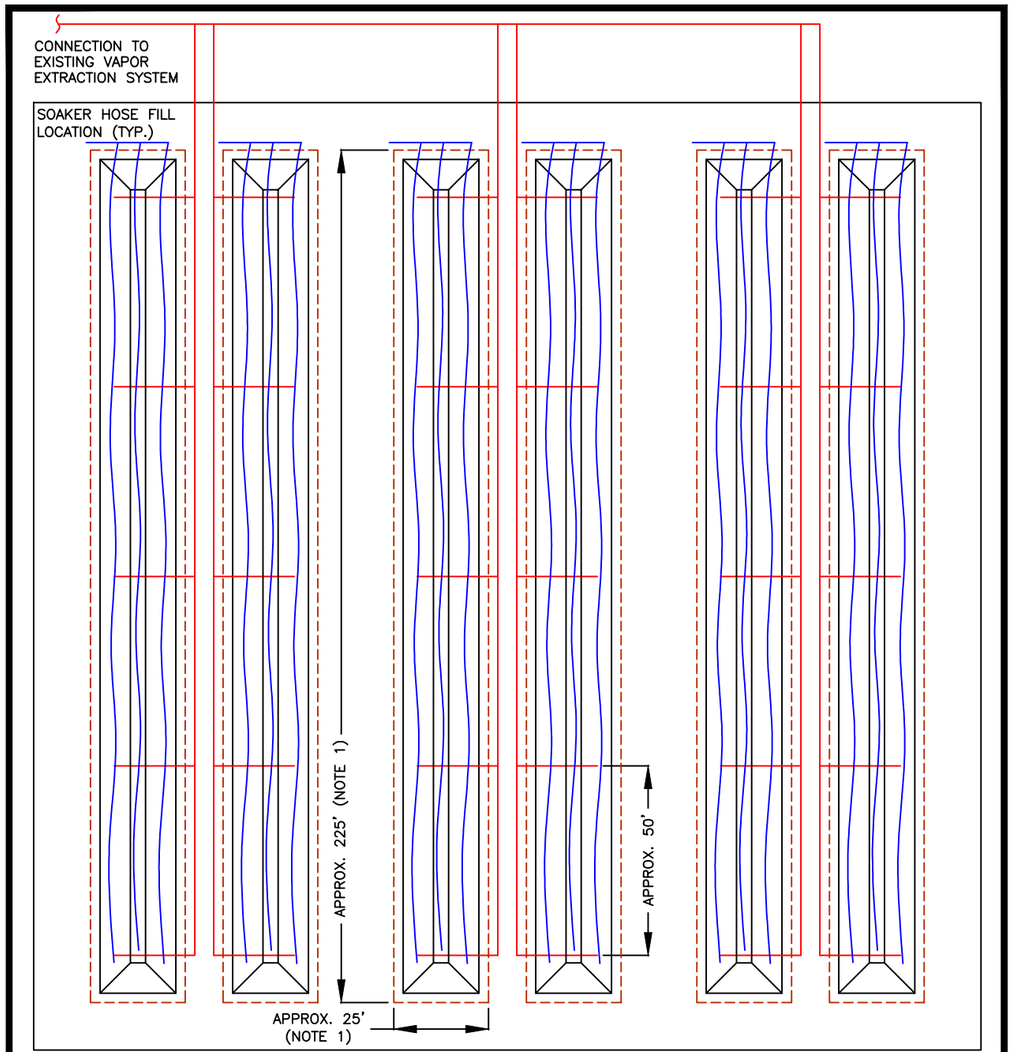
0 75 150 300 Feet

Operation Plan

SGI environmental THE SOURCE GROUP, INC.
1962 Freeman Avenue
Signal Hill, CA 90755
(562) 597-1055

Figure 2

Document Path: C:\Users\sgi.TSGLB\Documents\GIS Mapping\DLA-Norwalk\GIS Maps\Excavation Map\Fig-2 DFSP Norwalk Operation Plan Map.mxd



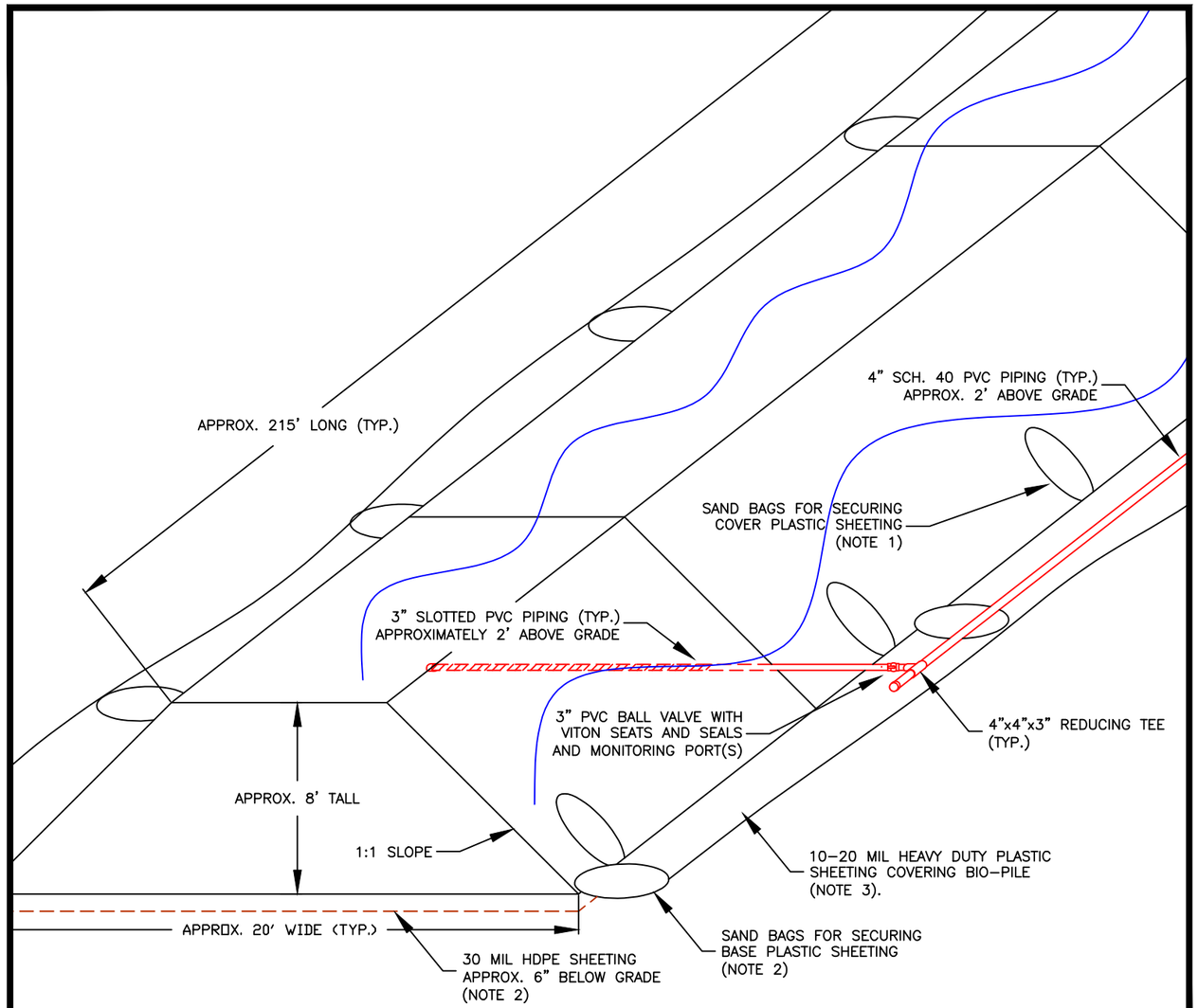
PLAN VIEW

SINGLE BASIN BIO-PILE LAYOUT

TYPICAL

0 40 80

HORIZONTAL SCALE IN FEET



ISOMETRIC VIEW

BIO-PILE CONSTRUCTION DETAIL

TYPICAL - NOT ALL LATERALS SHOWN

0 6 12

HORIZONTAL SCALE IN FEET

LEGEND

- APPROXIMATE LOCATION OF PROPOSED VES CONVEYANCE PIPING (50' SPACING BETWEEN LATERALS)
- APPROXIMATE LOCATION OF PROPOSED SOAKER HOSE
- HDPE SHEETING BENEATH BIO-PILE

1. HIGH DENSITY POLYETHYLENE (HDPE) SHEETING FOOTPRINT IS APPROXIMATELY 225' X 25'.
2. 30 MIL HDPE TO BE PLACED BENEATH BIO-PILE APPROXIMATELY 6" BELOW GRADE (TO PROTECT LINER INTEGRITY DURING PILE CONSTRUCTION AND DESTRUCTION).
3. 10-20 MIL HEAVY DUTY PLASTIC SHEETING TO COVER BIO-PILE.

DFSP NORWALK
15306 NORWALK BLVD
NORWALK, CA

PROJECT NO.	DATE	DRAWN BY:	APP. BY:
04-NDLA-002	09/19/14	AD	NI

BIO-PILE DESIGN DETAILS

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1962 FREEMAN AVENUE
SIGNAL HILL, CA 90755

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FIGURE 3

/Volumes/Data/DFSP Norwalk/DFSP Norwalk/04-NDLA-007/Bio-pile Design.dwg

ID	Task Name	Duration	Start	Finish
1	**Preparatory Tasks - Plan Development and Project Permitting**	**49 days**	**Mon 9/22/14**	**Thu 11/27/14**
2	Resource Assignment/Kick-off	1 day	Mon 9/29/14	Mon 9/29/14
3	**Select/Activate Sub-Contractors**	**5 days**	**Mon 9/29/14**	**Fri 10/3/14**
9	**SCAQMD 1166 Permit - Vapor monitoring**	**43 days**	**Mon 9/22/14**	**Wed 11/19/14**
10	Draft Permit	0 days	Mon 9/22/14	Mon 9/22/14
11	SCAQMD Review	40 days	Mon 9/22/14	Fri 11/14/14
12	Final Permit	3 days	Mon 11/17/14	Wed 11/19/14
13	**SCAQMD Modify Permit to Operate**	**43 days**	**Mon 9/22/14**	**Wed 11/19/14**
14	Draft Permit	0 days	Mon 9/22/14	Mon 9/22/14
15	SCAQMD Review	40 days	Mon 9/22/14	Fri 11/14/14
16	Final Permit	3 days	Mon 11/17/14	Wed 11/19/14
17	**LARWQCB WDR - Soil Reuse**	**44 days**	**Mon 9/22/14**	**Thu 11/20/14**
18	Draft Permit	20 days	Mon 9/22/14	Fri 10/17/14
19	LARWQCB Review	21 days	Mon 10/20/14	Mon 11/17/14
20	Final Permit	3 days	Tue 11/18/14	Thu 11/20/14
21	**LA County Public Works- Well Abandonment**	**15 days**	**Fri 11/7/14**	**Thu 11/27/14**
22	Prepare permits	5 days	Fri 11/7/14	Thu 11/13/14
23	LA County Review & Approval	7 days	Fri 11/14/14	Mon 11/24/14
24	Final Permit	3 days	Tue 11/25/14	Thu 11/27/14
25	**Storm Water Pollution Protection Plan (SWPPP) Update**	5 days	Mon 11/10/14	Fri 11/14/14
26	**City of Norwalk-Access Agreement**	**33 days**	**Wed 9/24/14**	**Fri 11/7/14**
27	Draft Agreement	20 days	Wed 9/24/14	Tue 10/21/14
28	City of Norwalk Review	10 days	Wed 10/22/14	Tue 11/4/14
29	Final Permit	3 days	Wed 11/5/14	Fri 11/7/14
30	**City of Norwalk-Excavation Plan**	**43 days**	**Wed 9/24/14**	**Fri 11/21/14**
31	Draft	30 days	Wed 9/24/14	Tue 11/4/14
32	City of Norwal Review	10 days	Wed 11/5/14	Tue 11/18/14
33	Final Permit	3 days	Wed 11/19/14	Fri 11/21/14
34	**Field Preparatory Tasks**	**20 days**	**Fri 11/21/14**	**Thu 12/18/14**
35	Mobilization	5 days	Fri 11/21/14	Thu 11/27/14
36	Geophystical Survey - Ultility clearance	5 days	Fri 11/28/14	Thu 12/4/14
37	Site Survey - excavation limits and infrastructure location	2 days	Fri 11/21/14	Mon 11/24/14
38	Well Removal	15 days	Fri 11/28/14	Thu 12/18/14
39	Treatment Cells 1&2 Set-Up	4 days	Fri 11/21/14	Wed 11/26/14
40	**Soil Excavation/Treatment and Fill**	**264 days**	**Thu 11/27/14**	**Tue 12/1/15**
41	**Excavation Event #1 (20,000 cy)**	**81 days**	**Thu 11/27/14**	**Thu 3/19/15**
42	Excavations 0'-5'	14 days	Thu 11/27/14	Tue 12/16/14
43	Stockpile Treatment	60 days	Wed 12/17/14	Tue 3/10/15
44	Prep Treatment Cells #3 and #4	3 days	Wed 12/17/14	Fri 12/19/14
45	Back-Fill	7 days	Wed 3/11/15	Thu 3/19/15
46	**Excavation Event #2 (20,000 cy)**	**85 days**	**Mon 12/22/14**	**Fri 4/17/15**
47	Excavations '0-5'/0'-10'	14 days	Mon 12/22/14	Thu 1/8/15

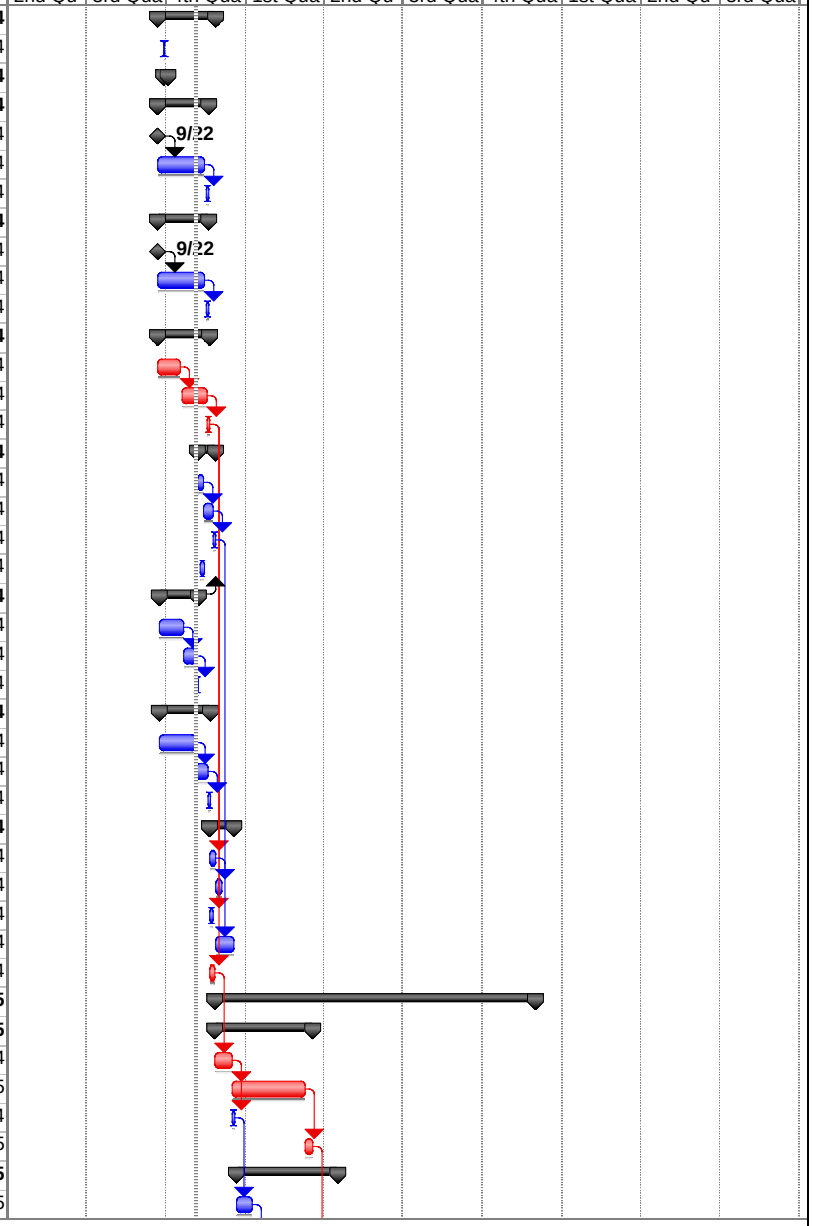


Figure 4 - Project Schedule
DSFP Norwalk ExcavationTreatment

Task
Critical Task
Progress
Milestone
Summary
Rolled Up Task
Rolled Up Critical Task
Rolled Up Milestone
Rolled Up Progress
Split
External Tasks
Project Summary
Group By Summary
Deadline

ID	Task Name	Duration	Start	Finish
48	Stockpile Treatment	60 days	Fri 1/9/15	Thu 4/2/15
49	Back-Fill	7 days	Thu 4/9/15	Fri 4/17/15
50	**Excavation Event #3 (20,000 cy)**	**81 days**	**Fri 3/20/15**	**Fri 7/10/15**
51	Excavation 0'-10'	14 days	Fri 3/20/15	Wed 4/8/15
52	Stockpile Treatment	60 days	Thu 4/9/15	Wed 7/1/15
53	Back-Fill	7 days	Thu 7/2/15	Fri 7/10/15
54	**Excavation Event #4 (20,000 cy)**	**81 days**	**Mon 4/20/15**	**Mon 8/10/15**
55	Excavations 10'-15'	14 days	Mon 4/20/15	Thu 5/7/15
56	Stockpile Treatment	60 days	Fri 5/8/15	Thu 7/30/15
57	Back-Fill	7 days	Fri 7/31/15	Mon 8/10/15
58	**Excavation Event #5 (20,000 cy)**	**81 days**	**Mon 7/13/15**	**Mon 11/2/15**
59	Excavations 15'-25'	14 days	Mon 7/13/15	Thu 7/30/15
60	Stockpile Treatment	60 days	Fri 7/31/15	Thu 10/22/15
61	Back-Fill	7 days	Fri 10/23/15	Mon 11/2/15
62	**Excavation Event #6 (20,000 cy)**	**81 days**	**Tue 8/11/15**	**Tue 12/1/15**
63	Excavations 15'-25'	14 days	Tue 8/11/15	Fri 8/28/15
64	Stockpile Treatment	60 days	Mon 8/31/15	Fri 11/20/15
65	Back-Fill	7 days	Mon 11/23/15	Tue 12/1/15
66	**Exploratory Trenching**	**20 days**	**Tue 11/3/15**	**Mon 11/30/15**
67	Exploratory Trenching	20 days	Tue 11/3/15	Mon 11/30/15
68	**Cell Closures**	**26 days**	**Tue 11/3/15**	**Tue 12/8/15**
69	Cell 1 and 2	5 days	Tue 11/3/15	Mon 11/9/15
70	Cell 3 and 4	5 days	Wed 12/2/15	Tue 12/8/15
71	**Well Replacement**	**115 days**	**Tue 12/1/15**	**Mon 5/9/16**
72	**LA County Public Works- Well Replacement Permit**	**70 days**	**Tue 12/1/15**	**Mon 3/7/16**
73	Prepare application and well designs	30 days	Tue 12/1/15	Mon 1/11/16
74	LA County Review & Approval	30 days	Tue 1/12/16	Mon 2/22/16
75	Final Permits	10 days	Tue 2/23/16	Mon 3/7/16
76	**Install Wells**	45 days	Tue 3/8/16	Mon 5/9/16
77	Final Report	60 days	Tue 5/10/16	Mon 8/1/16

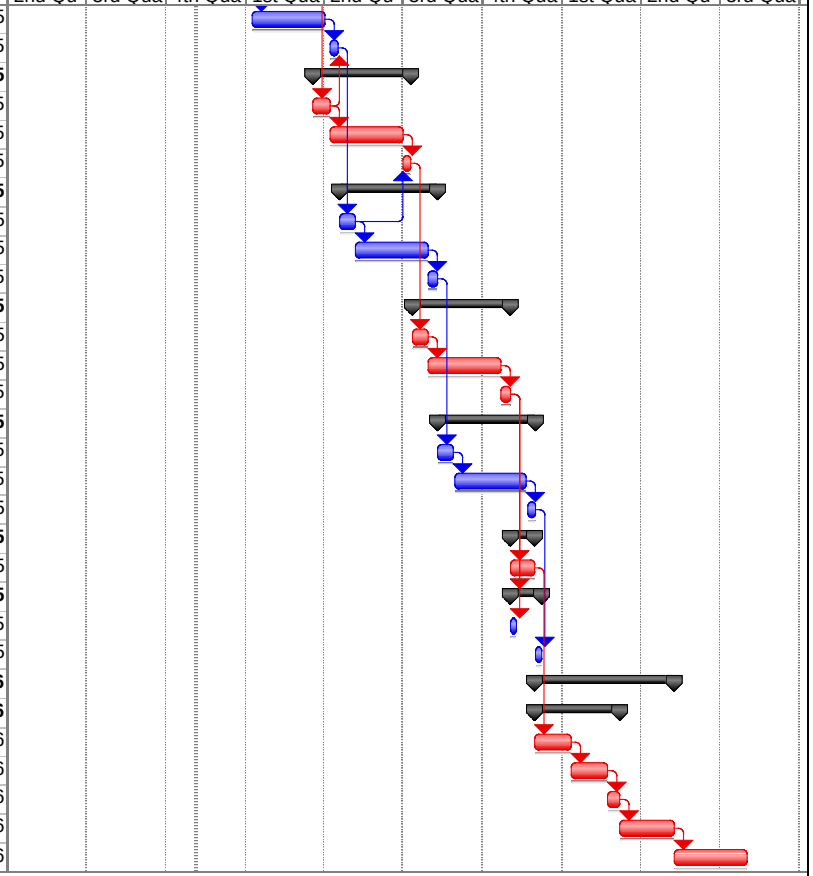


Figure 4 - Project Schedule
DSFP Norwalk ExcavationTreatment

Task
Critical Task
Progress
Milestone
Summary
Rolled Up Task
Rolled Up Critical Task
Rolled Up Milestone
Rolled Up Progress
Split
External Tasks
Project Summary
Group By Summary
Deadline

TABLES

Table 1:
Protocol to Estimate the minimum number of samples: Test Methods for Evaluation Solid Waste, Physical/Chemical methods, SW-846, U.S. Environmental Protection Agency (EPA SW-846)

Stockpile Size Unit=cubic yards 9cy)	Sampling Frequency
<500	1 sample for every 25 cy (e.g., 20 samples for a 500 cy stockpile)
500 to < 1,000	20 samples plus 1 sample for every 100 cy in excess of the initial 500 cy (e.g., 25 samples for 1,0000 cy stockpile)
1,000 to 10,000	25 samples plus 1 sample for every 500 cy in excess of the initial 1,000(e.g., 43 samples for a 10,0000 cy stockpile)
>10,000	43 samples plus 1 for every 5,000 cy in excess of the initial 10,000 cy (e.g., 61 samples for a 100,000 cy stockpile)

TABLE 5-2
Soil Cleanup Goals
DFSP Norwalk Site, Norwalk California

	(feet below ground surface)					
Depth Below Ground Surface	**0.5**	**5**	**10**	**15**	**20**	**25**
Depth to Groundwater	**25.5**	**21**	**16**	**11**	**6**	**1**
Constituent	**Soil Cleanup Goal (mg/kg)**					
TPH as Gasoline (C4-C12)	500	500	100	100	100	100
TPH as JP-5 (C8-C17)	500	500	100	100	100	100
TPH as Diesel (C5-C25)	1,000	1,000	100	100	100	100
Benzene	0.015	0.013	0.012	0.013	0.011	0.012
Toluene	0.614	0.440	0.391	0.423	0.356	0.367
Ethylbenzene	2.07	1.44	1.19	1.33	1.07	1.10
Xylenes	5.55	3.77	3.09	3.47	2.76	2.84
1,1,2,2-Tetrachloroethane	0.0023	0.0020	0.0015	0.0012	0.0006	0.0002
1,1,2-Trichloroethane	0.0032	0.0029	0.0023	0.0020	0.0012	0.0008
1,2,3-Trichlorobenzene	0.0740	0.0634	0.0467	0.0356	0.0162	0.0034
1,2,3-Trichloropropane	8.74E-07	7.66E-07	5.87E-07	4.79E-07	2.56E-07	1.23E-07
1,2,4-Trimethylbenzene	2.10	1.80	1.34	1.03	0.478	0.120
1,2-Dibromo-3-chloropropane	2.50E-04	2.19E-04	1.68E-04	1.37E-04	7.31E-05	3.52E-05
1,2-Dibromoethane	3.05E-06	2.78E-06	2.27E-06	2.04E-06	1.30E-06	9.60E-07
1,2-Dichloroethane	1.06E-04	1.04E-04	9.37E-05	9.60E-05	7.29E-05	6.92E-05
1,3,5-Trimethylbenzene	2.06	1.77	1.31	1.01	0.470	0.118
2-Butanone	0.557	0.607	0.617	0.713	0.612	0.661
2-Chlorotoluene	0.558	0.481	0.358	0.278	0.132	0.039
2-Hexanone	0.0073	0.0072	0.0065	0.0066	0.0050	0.0047
4-Chlorotoluene	0.547	0.472	0.351	0.273	0.130	0.038
Acetone	0.994	1.17	1.28	1.57	1.42	1.60
Bromomethane	0.0015	0.0014	0.0013	0.0013	0.0010	0.0010
Carbon disulfide	0.049	0.046	0.039	0.038	0.026	0.023
Chlorobenzene	0.119	0.104	0.079	0.063	0.032	0.013
Chloroethane (Ethyl Chloride)	2.23	2.47	2.55	2.98	2.59	2.83
Chloroform	7.38E-05	6.82E-05	5.67E-05	5.25E-05	3.48E-05	2.75E-05
Dichlorodifluoromethane	0.984	0.868	0.672	0.559	0.309	0.167
Diisopropyl Ether (DIPE)	0.449	0.424	0.364	0.350	0.246	0.212
Isopropylbenzene	5.56	4.78	3.53	2.71	1.26	0.303
Methylene Chloride	7.78E-04	7.99E-04	7.61E-04	8.27E-04	6.69E-04	6.82E-04
Methyl-t-Butyl Ether (MTBE)	9.07E-04	9.10E-04	8.43E-04	8.89E-04	6.97E-04	6.86E-04
Naphthalene	0.270	0.231	0.170	0.130	0.059	0.012
n-Butylbenzene	3.97	3.40	2.50	1.91	0.867	0.179
n-Propylbenzene	2.18	1.87	1.39	1.06	0.489	0.114
p-Isopropyltoluene	2.82	2.42	1.79	1.37	0.636	0.154
sec-Butylbenzene	2.59	2.22	1.64	1.26	0.576	0.129
Styrene	0.463	0.399	0.296	0.229	0.108	0.030
Tert-Butyl Alcohol (TBA)	0.0010	0.0012	0.0013	0.0016	0.0014	0.0016
tert-Butylbenzene	2.07	1.78	1.32	1.01	0.465	0.110
Trichloroethene	0.0070	0.0061	0.0047	0.0038	0.0020	0.0009

Notes:

mg/kg = milligram per kilogram
NA = not applicable

APPENDICES

APPENDIX A

F4 REMEDIATION

F4 REMEDIATION

GREEN REMEDIATION TECHNOLOGY SPOTLIGHT

EPA Approved

F4 REMEDIATION'S EARTH CLEANING SYSTEM

A proven, cost-effective ***bioremediation system*** for cleaning petroleum impacted soils and drill cuttings, production sumps and large scale oil spills. *A permanent solution* using a ***ONE-time application*** at a *fraction of the cost* of conventional methods.

F4 REMEDIATION

The Technology

- A proprietary blend of microbes, compounds and surfactant that degrades hydrocarbons and other organic compounds to CO_2 and H_2O
- A purpose-built Earth Cleaning Machine (ECM) that can process 2,500 tons of soil per day
- A permanent solution for the treatment of crude oil and sludges, light-end hydrocarbons and PAHs
- **One-time application**: no additional soil manipulation or aeration required
- Approved Bioremediation Agent on the EPA's National Oil and Hazardous Substances Pollution Contingency Plan (NCP). DNA-tested and pathogen free.
- Can be sprayed directly or processed by the ECM

How You Benefit

- Total hydrocarbon degradation from a one-time onsite application
- Substantial cost saving - no more costly transportation and tipping fees
- Elimination of landfill liability issues
- Safe and clean reusable soil. No backfill required.
- ***Remediation success within days or weeks rather than years AND at a fraction of the cost***

Our Clients

Canadian Natural · Apache · Plains All American Pipeline, L.P. · SPYGLASS Resources Corp.

Contacts

Jeremy Davey
Principal
310.994.4469
jdavey@f4remediation.com

Bruce Thrupp
Principal
510.410.8140
bthrupp@f4remediation.com

F4 REMEDIATION

Introduction

F4 Remediation's technology is the culmination of more than 25 years R&D into environmentally friendly alternatives to cleaners, acids and degreasers. Founded in 1988 by Marlin Rudolph, a former mechanic, the company began as a very successful manufacturing and distribution business servicing automotive and industrial markets with ready-to-use formulas and concentrates that were safer, healthier options without sacrificing efficiency. Products included multipurpose cleaners with superior penetration properties but no VOC's, *Nonylphenol Ethoxylates* or *Butoxyethanol*, and metal cleaners, brighteners, and concrete cleaners that use organic salts instead of traditional acids (like hydrofluoric). All products are 100% water-soluble, and classified as non-corrosive to skin (OSHA, DOT, WHMIS, and TDG), and therefore ideal for large-scale industrial projects with strict safety policies.

In 2003 Rudolph began researching the use of bacteria in cleaning applications specifically in relation to hydrocarbons and in 2007 he launched his own water-based biological parts washer as a replacement for solvent-based parts washers. The 30 gallon machines use a proprietary (recyclable) parts washing fluid, developed by Rudolph, containing trillions of non-pathogenic live bacteria that consume organic materials like oil and grease without any disposal issues. As long as the bacteria have parts to clean (and hydrocarbons to mineralize), the machines require virtually no maintenance other than a monthly top up of fluids. They are now being used by Canada's Department of National Defence and as far away as New Zealand.

In 2009, after several visits to an auto dealership in Vermilion, Alberta, an environmental consultant working for Canadian Natural Resources Limited (CNRL), one of the largest independent crude oil and natural gas producers in the world, wondered if Rudolph's technology would transfer to the oil field. Later that year, after considerable review and at the request of CNRL, Rudolph completed 12 test sites in a variety of different settings including clay soils, sandy soils, and muskeg (a swamp or bog frequently covered by a layer of sphagnum or other mosses) and F4 Environmental was born. Since then Rudolph has successfully completed 32 projects including the treatment of oil sumps, closed loop water systems, oil spills and grease traps as well as multiple soil remediation applications.

Rudolph's technology consists of a proprietary blend of biology (different strains of *Pseudomonas* bacteria and nutrients) and chemistry (surfactants and compounds) that can clean soil and water contaminated by Petroleum Hydrocarbons (PHCs). The name F4 comes from the CCME (Canadian Council of Ministers of the Environment)'s definition of Extremely Heavy Extractable Petroleum Hydrocarbons equivalent to C34-50 (see comparison below). F4 Environmental is so called because it can remediate everything from F4s to BTEX using a onetime application.

Hydrocarbon designation	Carbon chain length
F1 VOLATILE PHCs	C6-C10
F2 LIGHT EXTRACTABLE PHCs	C10-C16
F3 HEAVY EXTRACTABLE PHCs	C16-C34
F4 EXTREMELY HEAVY EXTRACTABLE	C34-C50

F4 REMEDIATION

Rudolph has developed several bio remediation products including Bio Reclaim™, Bio Treat™ and Bio Surf™ all of which use the same ground-breaking bacteria used in his parts washers. In 2011 Bio-Aquatic Testing in Carrollton, Texas, a testing agency of the EPA, tested the efficacy of Bio Reclaim™ on ANS 521 Oil and determined that the product should be included on the EPA's National Oil and Hazardous Substances Pollution Contingency Plan (NCP) list of approved bio-remediation products.

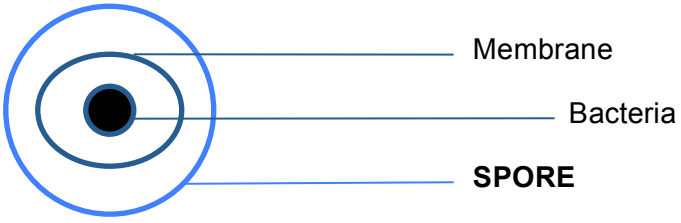
F4 Environmental Inc. is ISN certified and has recently signed an exclusive licensing agreement with F4 Remediation LLC, a Californian company to market the technology and establish operations in the US. For the purposes of this document F4 Environmental and F4 Remediation are interchangeable and known collectively as F4.

F4 has been successful at degrading the following chemicals:

- Dichlorobenzene
- Dichlorotoluene
- Methyl Ethyl Ketone
- Methylene Chloride
- Napthalene
- Fluorine
- Benzene
- Toluene
- Ethylbenzene
- Xylene
- Crude oils/sludge
- Petroleum
- Isoprenoids
- Limonene
- Citronello
- Chlorinated Solvents
- Aliphatic Hydrocarbons
- Creosote

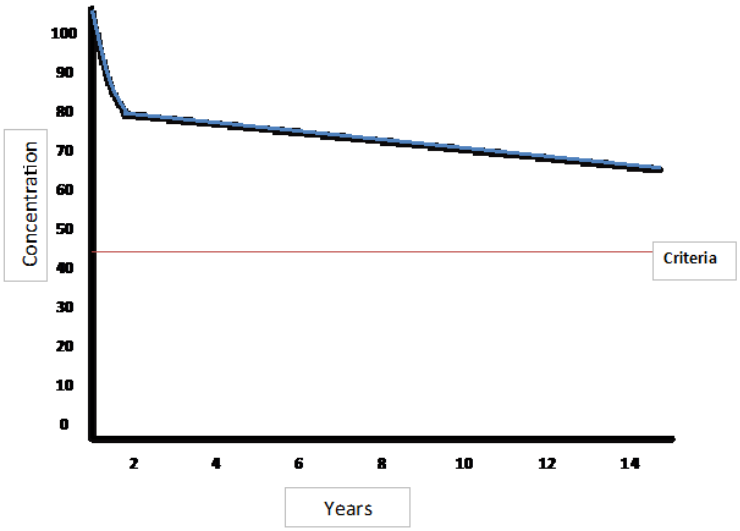
The Bacteria

Certain strains of bacteria have an extraordinary ability to mineralize PHCs by degrading them into water and a small amount of CO_2 Indigenous bacteria are usually of the *Bacillus* group which have an affinity for vegetable oils and animal fats but cannot assimilate mineral oil. This is in part because the *Bacillus* sporify when exposed to adverse environmental conditions such as highly contaminated soil.



When this occurs the *Bacillus* create a shell around themselves as a protective layer, and essentially go dormant until the surrounding area becomes safe for the spores to drop and the bacteria to resume their lifespan. A spore can stay like this, depending on circumstances and type of bacterium, for months and years, even centuries.

When sporification occurs degradation ceases before criteria is reached as represented by the typical hockey curve below:



Rudolph realized that in order to clean up F4 long chain hydrocarbon molecules (C34-C50 and above) he would need to use a different type of bacteria known as *Pseudomonas* that have a particular appetite for long chain hydrocarbons. *Pseudomonas* are different from *Bacillus* in that they cannot spore up, meaning they cannot protect themselves when exposed to high concentrations of contaminated soil and will continue to assimilate PHCs until there is no nothing left for them to eat.

Science has proven that *Pseudomonas* are successful at degrading mineral oil and petroleum grease quickly but are limited by having only a 20 minute lifespan making them virtually impossible to transport and remain active. To combat this issue, in conjunction with microbiologists in the US, Rudolph developed a patented process that allows *Pseudomonas* cultures to be transported in a live vegetative state. He also determined a methodology for maximizing their reproductive capabilities from 7 to 12 times in 20 minutes.

F4 uses multiple strains of *Pseudomonas* in its blend of microbes. The microbes are naturally occurring and were taken from oil spills and PHC contaminated soil and water. They are cultured in the US to Rudolph's specifications and each batch undergoes strict 48 hour quality control to insure they are pathogen free. Together with a proprietary surfactant (see below) and some "secret" all natural ingredients this combination makes F4's technology extremely effective.

The Surfactant

A surfactant by definition lowers the surface tension between two liquids or between a liquid and a solid. Part of F4's unique offering is that it has successfully married biology and chemistry by developing a surfactant that not only provides rapid penetration of a variety of different soils (with a remarkable ability to clean where agitation is restricted), but one that is also microbe friendly.

Rudolph's research team improved the surfactant used in his water-based parts washers to create a surfactant with an eco profile that is marine safe and yet works very well at distributing microbes. The end result is particularly effective at treating heavy oil and oilfield degreasing applications. Note: the product contains no phosphates or Alkyl Phenol Ethoxylates (APEs) and is VOC exempt.

The Process




In addition to developing a proprietary blend of microbes and surfactant F4 further distinguishes itself by offering its own Earth Cleaning Machine (ECM) which can be mobilized in less than ten minutes. Capable of processing up to 1500 M^3 of soil per day (assuming a 10 hour day with 8 hours spraying), this is a custom built machine and unique in the industry. After trying multiple aggregate and rock crushers, garbage shredders, roto tillers and a variety of augur based homogenizers, none of which worked fast enough or effectively, Rudolph used his earlier training to design and build his own machine, the 4^{th} generation of which is shown above. Note: the ECM is self contained and comes with its own conveyor.

For large volume projects, contaminated soil is dug out from the contaminated area using a standard hoe and then fed into the ECM where it is tumbled and sprayed with a solution of microbes and surfactant. This insures complete contact of the formula combination with the soil. The treated soil is taken up a conveyor and placed on a liner where it is piled into windrows 3-12 feet high. Analysis using approved sampling procedures is performed to confirm biodegradation (see case studies to follow).

The microbial portion of the product is supplied in 1kg bags. The bags must be kept at -20°C and are stable for two years at this temperature. Each 1kg of microbes is added to a 55 gallon drum of water together with some nutrients and proprietary compounds. The microbes inoculate for a 24 hour period and form a Concentrated Bioremediation Solution (CBS). The CBS is then further diluted with water prior to use in the field. The diluted CBS is sprayed through directional spray bars in the ECM which insure soil saturation and maximize penetration of the microbes.

For oil spills on open water, the CBS should be applied via spraying directly onto the surface. The spray should also be applied on any soil contaminated on banks, etc. Note the product can also be used in fresh or salt water and may be applied at temperatures between 40°F and 120°F.

Case Study 1

A Phase II Environmental Site Assessment (Phase II ESA) was completed on June 21, 2007 at a wellsite in High Prairie, Northern Alberta, Canada. The Phase II ESA identified a drilling sump in the southeast portion of the wellsite that exceeded allowable guideline limits for benzene, ethylbenzene, F2 hydrocarbons and F3 hydrocarbons. In July 2010 approximately 5000 M^3 of sump material was excavated and placed on a liner within the boundaries of the wellsite. A microbiological treatment was applied to ~750 M^3 of the sump material over a 1 week period beginning August 25, 2010. As part of the process, treated material was transferred and placed on a separate liner.

The following table shows the results of composite sampling of the sump material with respect to the concentrations of volatile and petroleum hydrocarbons. Sampling took place on July 30, September 22, and November 1, 2010 and in each case 10 composite samples were taken by an independent third party to protect chain of custody. A fourth sampling was completed on May 27, 2011 which showed that the concentration of all volatile and petroleum hydrocarbons were within allowable guideline limits. A final sampling was completed on July 7, 2011 that showed the concentration of all volatile and petroleum hydrocarbons remained within allowable guideline limits.

Hydrocarbon	Units	Sampling before Bio-Reclaim application **Aug 2010**	Composite sampling taken **Sept 2010**	Composite sampling taken **May 2011**	Alberta Environment Criteria
Benzene	mg/kg	0.08	<0.005	<0.005	0.046
Toluene	mg/kg	<0.05	<0.05	<0.05	0.52
Ethylbenzene	mg/kg	0.254	<0.015	<0.015	0.11
Xylenes	mg/kg	<0.1	<0.1	<0.05	15
F1	mg/kg	181	50	<10	210
F2	mg/kg	926	225	<10	150
F3	mg/kg	2180	816	132	1300
F4	mg/kg	1560	241	56	5600

Case Study 2

A Phase II ESA was completed in August 2007 at a drilling sump located north of Mayerthorpe in Alberta. The Phase II ESA indicated that the drilling waste disposal area did not meet the applicable remediation guidelines for Benzene, Toluene, Ethylbenzene, F2 hydrocarbons, and F3 hydrocarbons. Beginning on July 7, 2010 approx. 1750 M^3 of impacted soil was excavated and placed on a temporary lined containment area. In July 2011, a microbiological treatment was applied to the impacted soil. As part of the process, the impacted soil was relocated to a 30mm lined containment area. Environmental sampling on the treatment pile was conducted from September 2010 to August 2011 by a third party environmental service provider. All of the soil samples collected throughout the sampling program were submitted to AGAT Laboratories for hydrocarbon (BTEX / F1- F4) and available nutrient analysis.

Five composite soil samples were initially collected from the impacted soil on July 9, 2010 prior to the microbiological treatment being applied to provide a baseline for soils comparison. The first sampling conducted on the treatment pile was completed on September 1, 2010. Seven composite soil samples were collected from the treatment pile. The second sampling was completed on October 26, 2010. Fifteen composite soil samples were collected from the treatment pile. The third sampling was completed on June 2, 2011. Fifteen composite soil samples were collected from the treatment pile. The fourth sampling was completed on July 18, 2011. Fifteen composite soil samples were collected from the treatment pile. The final sampling took place on August 21, 2011. Fifteen composite soil samples were collected from the treatment pile. The soil samples analyzed for hydrocarbons during the environmental sampling program were compared to the Alberta Environment Tier 1 guidelines for fine grained surface soils under agricultural area land use (AENV 2010). Based on the results of the laboratory analysis from the environmental sampling to date, the impacted soil within the drilling waste disposal area treatment piles met the applicable remediation guidelines.

Hydrocarbon	Units	Sampling before Bio-Reclaim application **July 2010**	Composite sampling taken **Oct 2010**	Composite sampling taken **June 2011**	Alberta Environment Criteria
Benzene	mg/kg	0.30	0.020	<0.005	0.046
Toluene	mg/kg	0.53	0.12	<0.05	0.52
Ethylbenzene	mg/kg	3.36	0.05	<0.01	0.11
Xylenes	mg/kg	14.6	0.28	<0.05	15
F1	mg/kg	180	10	<10	210
F2	mg/kg	485	35	<10	150
F3	mg/kg	611	271	32	1300
F4	mg/kg	230	103	<10	5600

F4 REMEDIATION

Examples of F4 applied to surface water. The blue/black liquid in the photographs is crude oil.

F4 Remediation LLC • 3478 Buskirk Avenue, Suite 100, Pleasant Hill, CA 94523
W. www.f4remediation.com • T. 510-410-8140 • E. info@f4remediation.com

APPENDIX B

SITE SPECIFIC 1166 MITIGATION PLAN

PLAN ISSUE DATE: **September 17, 2014**

COMPANY I.D. #: **177847**

MITIGATION PLAN #: **566483**

Company: **Defense Fuel Support Point Norwalk**
c/o Defense Logistics Agency
1962 Freeman Avenue, Signal Hill, CA 90755

Site: **15306 Norwalk Blvd.,**
Norwalk, CA 90650

Attn: **Everett Bole (Restoration Project Manager)**

Phone **(703) 767-4520** **Fax – Not Given**

SITE SPECIFIC
RULE 1166 CONTAMINATED SOIL MITIGATION PLAN

Reference is made to your Application **(A/N 566483)** for the excavation and handling of VOC-contaminated soil **at 15306 Norwalk Blvd., Norwalk, CA 90650.** In accordance with Rule 1166 (c), this plan is required prior to commencing excavation of any underground storage tank or transfer piping which has previously been used to store or transfer volatile organic compounds (VOC) and during the excavation, handling, or storage of VOC-contaminated soils.
The rights and privileges granted through the issuance of this plan are restricted exclusively to the plan holder to whom it was issued, and are non-transferable, even with the written or expressed consent of the plan holder listed above. No other excavation plan issued by the SCAQMD can be used at this site.

This plan has been approved under the provisions of Rule 1166 of the Rules and Regulations of the SCAQMD and is subject to the following conditions.

RULE 1166 CONDITIONS:

SECTION I – GENERAL REQUIREMENTS

1. THIS EXCAVATION PLAN SHALL EXPIRE **SEPTEMBER 16, 2016.**

2. A SIGNED COPY OF THIS PLAN SHALL BE PRESENT AT THE EXCAVATION SITE AT ALL TIMES AND SHALL BE MADE AVAILABLE TO SCAQMD PERSONNEL UPON REQUEST.

3. THIS PLAN IS NOT VALID FOR THE EXCAVATION OF VOC CONTAMINATED SOILS AT LANDFILLS OR SITES USED FOR DISPOSAL OF REFUSE OR OTHER TYPES OF WASTE.

4. THIS PLAN by itself DOES NOT ALLOW THE TREATMENT OF VOC-CONTAMINATED SOIL BY THERMAL, CHEMICAL, biological, OR MECHANICAL PROCESSES. ANY OF THE ABOVE TREATMENT PROCESSES REQUIRES A PERMIT TO OPERATE FROM THE SCAQMD which will be obtained prior to initiating treatment onsite.

5. THE TOTAL QUANTITY OF VOC CONTAMINATED SOIL EXCAVATED UNDER THIS PLAN SHALL NOT EXCEED 125**,000** CUBIC YARDS. AT NO TIME SHALL THE TOTAL QUANTITY OF VOC CONTAMINATED SOIL STOCKPILED not undergoing onsite treatment AT THIS SITE EXCEED 5**,000** CUBIC YARDS. Total Amount of soil undergoing various forms of treatment ----------shall not exceed ----------

6. THE SCAQMD SHALL BE IMMEDIATELY NOTIFIED OF ANY COMPLAINTS RECEIVED AS A RESULT OF ACTIVITIES CONDUCTED UNDER THIS PLAN. SUCH NOTIFICATION SHALL INCLUDE THE NATURE OF THE COMPLAINT, NUMBER OF COMPLAINANTS, COMPLAINANT NAME, ADDRESS, PHONE NUMBER, ETC., AND THE ACTION TAKEN BY THE PLAN HOLDER TO MITIGATE THE SOURCE OF THE COMPLAINT.

7. DURING EACH STEP OF THE PROCESS UP TO AND INCLUDING THE REMOVAL, treatment, AND DISPOSAL PROCESS, ALL PRECAUTIONS AND MEASURES SHALL BE TAKEN TO MINIMIZE THE RELEASE OF VOC, ODOR AND DUST. THIS INCLUDES BUT IS NOT LIMITED TO:

   A) THE USE OF ADDITIONAL PLASTIC SHEETING OR SUPPRESSANTS ON EXPOSED SOIL SURFACES & WORK AREAS,
   B) MAINTAINING PAVED PUBLIC STREETS FREE OF SOIL DEPOSITS, AND
   C) OPERATING SUCH THAT VOC SOIL SHALL NOT BE SPREAD ON-SITE OR OFF-SITE; AND NOT PERFORMING ANY UNNECESSARY MOVEMENT OR AGITATION OF SOIL, INCLUDING THE RESHAPING OR RELOCATION OF STOCKPILES, THAT MAY CAUSE THE UNCONTROLLED EVAPORATION OF VOCs INTO THE ATMOSPHERE.

8. FOR THE PURPOSES OF RULE 1166 AND THIS PLAN, SOIL MEASURED PURSUANT TO RULE 1166 AS VOC CONTAMINATED SOIL, IS CONSIDERED AS VOC CONTAMINATED SOIL FROM THE TIME OF MEASUREMENT ONWARD, UNTIL THE SOIL IS TREATED PURSUANT TO AN APPROVED SCAQMD TREATMENT PROCESS.

SECTION II – PRIOR TO EXCAVATION

9.

A) AT LEAST 24 HOURS PRIOR TO COMMENCING EXCAVATION OR GRADING OF SOIL AT THE SITE, THE EXECUTIVE OFFICER OR DESIGNEE SHALL BE NOTIFIED OF THE EXCAVATION BY FAX USING A FORM APPROVED BY THE EXECUTIVE OFFICER WHICH IS FULLY COMPLETED AND INCLUDING, THE NAME OF THE COMPANY PERFORMING THE EXCAVATION, AND THE APPLICATION NUMBER LISTED ON THIS MITIGATION PLAN. THE NOTIFICATION SHALL BE MADE BY FAXING THE NOTIFICATION FORM AT (909) 396-3342. FAX NOTIFICATIONS WILL RECEIVE A REFERENCE NUMBER BY RETURN FAX OR CAN BE OBTAINED REFERENCING THE FAX NOTIFICATION BY PHONE TUESDAY THROUGH FRIDAY DURING BUSINESS HOURS AT 909 396-2326. THE REFERENCE NUMBER SHALL BE RETAINED AS PROOF OF COMPLIANCE WITH THIS REQUIREMENT.

REFERENCE NO: ---------- NOTIFICATION DATE: ----------

B) AT LEAST 24 HOURS PRIOR TO COMMENCING EXCAVATION OR GRADING OF SOIL AT THE SITE, ALL SENSITIVE RECEPTORS WITHIN 1,000 FEET FROM THE SITE SHALL BE NOTIFIED OF THE EXCAVATION BY LETTER USING A FORMAT APPROVED BY THE EXECUTIVE OFFICER WHICH INCLUDES THE NAME, ADDRESS AND PHONE NUMBER OF THE COMPANY PERFORMING THE EXCAVATION, THE DURATION OF THE EXCAVATION AND THE SCAQMD COMPLAINT HOTLINE NUMBER (909) 288-7664.

10. COMPLETE VERIFICATION INFORMATION IN CONDITION NO. 28 AND OBTAIN REQUIRED SIGNATURES, PRIOR TO COMMENCING EXCAVATION.

11. DURING THE EXCAVATION PROCESS, AN ORGANIC VAPOR ANALYZER (OVA) SHALL BE ON SITE AT ALL TIMES. THE OVA SHALL BE MAINTAINED IN GOOD WORKING ORDER AT ALL TIMES. AND SHALL BE CALIBRATED BY THE MANUFACTURER AT LEAST ONCE EVERY THREE MONTHS. THE CALIBRATION OF THE OVA SHALL BE VERIFIED USING CERTIFIED CALIBRATION GAS AT THE BEGINNING OF EACH WORKING DAY WITH THE PROCEDURES SPECIFIED BY THE MANUFACTURER. IF A CALIBRATION GAS OTHER THAN HEXANE IS USED, EACH MEASURED READING SHALL BE CORRELATED TO AND EXPRESSED AS HEXANE, USING EQUIVALENCY FACTORS PROVIDED BY THE MANUFACTURER. IN THE EVENT THAT INCONSISTENT OR ERRATIC READINGS ARE EXPERIENCED, OR THE OVA BECOMES OTHERWISE INOPERABLE, ALL EXCAVATION ACTIVITIES WILL CEASE UNTIL THE OVA IS REPAIRED OR REPLACED.

SECTION III – MONITORING

12. ALL MONITORING SHALL BE CONDUCTED AT A DISTANCE NO MORE THAN 3 INCHES ABOVE THE SOIL SURFACE USING AN OVA DESCRIBED IN CONDITION NO. 11 ABOVE. MONITORING SHALL BE INITIALLY CONDUCTED AT A MINIMUM FREQUENCY OF ONE READING EVERY FIFTEEN MINUTES. UPON DETECTION OF VOC CONTAMINATION, MONITORING SHALL BE CONDUCTED AT A MINIMUM RATE OF ONE READING FOR EVERY FIVE CUBIC YARDS EXCAVATED. ALL READINGS SHALL BE TAKEN NO LATER THEN THREE (3) MINUTES AFTER EACH LOAD OF SOIL IS EXCAVATED.

13. ALL MONITORING SHALL BE CONDUCTED BY TRAINED PERSONNEL WHO ARE PROFICIENT IN THE USE OF THE HYDROCARBON MONITOR SELECTED FOR USE AT THIS SITE.

14. WRITTEN RECORDS OF OVA MONITORING AND CALIBRATIONS REQUIRED ABOVE SHALL BE KEPT IN A FORMAT APPROVED BY THE SCAQMD. THE APPROVED FORMAT IS INCLUDED ON PAGE 11 OF THIS PLAN. THE CERTIFICATION ON ALL RECORDS SHALL BE SIGNED AND DATED ON THE DAY THE MEASUREMENTS ARE OBSERVED.

15. UPON DETECTION OF VOC CONTAMINATED SOIL (READINGS 50 PPM OR GREATER), THE EXECUTIVE OFFICER OR DESIGNEE SHALL BE NOTIFIED WITHIN 24 HOURS OF THE FIRST DETECTION OF VOC CONTAMINATION. THE NOTIFICATION SHALL BE MADE BY FAXING THE NOTIFICATION FORM TO (909) 396-3342 OR CALLING (909) 396-2326. A REFERENCE NUMBER WILL BE FAXED BACK OR WILL BE ISSUED WHEN THE PHONE NOTIFICATION IS RECEIVED. ALL PHONE NOTIFICATIONS SHALL BE FOLLOWED BY MAILING THE NOTIFICATION FORM TO THE DISTRICT POSTMARKED WITHIN 48 HOURS. THE REFERENCE NUMBER WILL BE RETAINED AS PROOF OF COMPLIANCE WITH THIS REQUIREMENT.

REFERENCE NO:---------- NOTIFICATION DATE:----------

SECTION IV –HANDLING & STORAGE

16. ALL VOC-CONTAMINATED SOIL BELOW 1000 PPM SHALL BE STOCKPILED, COVERED WITH PLASTIC SHEETING AND STORED SEPARATELY FROM NON-VOC-CONTAMINATED SOIL, OR STOCKPILED FOR ONSITE TREATMENT, OR IMMEDIATELY TRANSPORTED TO A TREATMENT FACILITY. CONTAMINATED SOIL ONCE EXCAVATED AND STOCKPILED WILL BE CONSIDERED CONTAMINATED AT ALL TIMES AND CANNOT BE BACKFILLED UNLESS TREATED TO LESS THAN 50 PPM LEVELS WITH PRIOR SCAQMD APPROVAL AND SCAQMD PERMITTED EQUIPMENT. WHENEVER THE SOIL STOCKPILES ARE UNDERGOING TREATMENT, STOCKPILES SHALL BE COVERED AS CONDTION NO. 18B AND WEEKLY INSPECTIONS SHALL BE COMPLETED AS PER THE GUIDANCE IN CONDITION NO. 22.

17. A VOC CONTAMINATED STOCKPILE created for onsite storage only SHALL NOT CONTAIN MORE THAN 400 CUBIC YARDS OF SOIL.

18. IF THE OVA MEASUREMENT SPECIFIED IN CONDITION NO. 12 IS GREATER THAN 50 PPMV, BUT LESS THAN 1000 PPMV,

A) THE AFFECTED WORK AREA AND LOAD OF SOIL SHALL BE SPRAYED WITH WATER AND/OR APPROVED VAPOR SUPPRESSANT.

B) CONTAMINATED SOIL IN STOCKPILES created for temporary storage SHALL BE COVERED WITH PLASTIC SHEETING WHICH OVERLAP A MINIMUM OF TWENTY FOUR INCHES AND ARE SECURED SO THAT NO PORTION OF THE CONTAMINATED SOIL IS EXPOSED TO THE ATMOSPHERE. IN THE COURSE OF HANDLING THE STOCKPILE, ONLY THE WORKING FACE OF THE STOCKPILE MAY BE UNCOVERED.

C) SOIL SHALL BE TRANSFERRED IN COVERED BINS/TRAILERS FOR TEMPORARY OFFSITE STORAGE BEFORE IT CAN BE TAKEN TO DISPOSAL FACILITY WITH IN 30 DAYS OF EXCAVATION.

D) Onsite treatment for the VOC contaminated soil which falls in the category of 50-1000 PPMV as hexane shall be initiated within ----------30 days of excavation.

19. IF THE SOIL OVA MEASUREMENT EQUALS OR IS GREATER THAN 1000 PPMV, NOTIFY THE DISTRICT IMMEDIATELY OR WITHIN ONE HOUR OF DETECTION, AND,

A) THE AFFECTED SOIL AND WORKING AREA SHALL BE IMMEDIATELY SPRAYED WITH WATER OR AN APPROVED VAPOR SUPPRESSANT, AND EITHER:

i) THE CONTAMINATED SOIL EXCAVATED SHALL BE IMMEDIATELY PLACED IN SCAQMD APPROVED SEALED CONTAINERS EQUIPPED WITH VAPOR TIGHT LIDS, OR,

ii) THE SOIL SHALL BE DIRECTLY LOADED IN TRUCKS, SPRAYED WITH ADDITIONAL WATER OR APPROVED VAPOR SUPPRESSANTS, COVERED, AND TRANSPORTED IMMEDIATELY OFF SITE TO AN APPROVED TREATMENT FACILITY, OR,

iii) Onsite treatment for the VOC contaminated soil for this category (>1000 PPMV as hexane) shall be initiated within ----------3 days of excavation, or,

B) HANDLED BY ALTERNATIVE STORAGE METHODS WITH PRIOR WRITTEN APPROVAL FROM THE SCAQMD.

C) Soil with contamination greater than 1,000 PPMV as hexane shall not be treated with biological methods.

20. DURING EXCAVATION, THE EXPOSED VOC CONTAMINATED SOIL SHALL BE RESTRICTED TO THE IMMEDIATE WORKING AREA OF THE STOCKPILE ONLY. ALL OTHER PORTIONS OF THE STOCKPILE SHALL BE COVERED WITH PLASTIC SHEETING, WITH SEAMS WHICH OVERLAP A MINIMUM OF TWENTY-FOUR (24)

INCHES AND ARE SECURED WITH DUCT TAPE. ALL EXPOSED VOC-CONTAMINATED SOIL SURFACES (WORK FACE) SHALL BE KEPT MOIST WITH WATER OR OTHER APPROVED SUPPRESSANTS AT ALL TIMES, AND SHALL BE RE-COVERED DURING PERIODS OF INACTIVITY LONGER THAN ONE (1) HOUR. AT THE END OF EACH WORKING DAY, ALL STOCKPILES SHALL BE COMPLETELY COVERED AND SECURELY ANCHORED TO PREVENT ANY EXPOSURE OF SOIL TO THE ATMOSPHERE.

21. ONCE COVERED WITH PLASTIC SHEETING, STOCKPILES SHALL REMAIN COVERED AND UNDISTURBED UNTIL REMOVED FROM THE SITE.

22. DAILY INSPECTIONS SHALL BE CONDUCTED OF ALL COVERED VOC-CONTAMINATED STOCKPILES TO ENSURE THE INTEGRITY OF THE PLASTIC COVER. SUCH INSPECTIONS SHALL INCLUDE A VISUAL INSPECTION OF ALL SEAMS AND PLASTIC COVER SURFACES. ANY HOLES, TEARS OR ANY OTHER POTENTIAL SOURCES OF FUGITIVE VOC EMISSIONS SHALL BE REPAIRED IMMEDIATELY. DAILY RECORDS SHALL BE MAINTAINED TO ENSURE COMPLIANCE WITH THIS CONDITION.

SECTION V –SOIL REMOVAL AND DISPOSAL

23. ALL VOC-CONTAMINATED SOIL SHALL BE REMOVED FROM THE SITE/OFFSITE STORAGE WITHIN THIRTY (30) DAYS OF ITS EXCAVATION or treatment shall be initiated with SCAQMD permitted system.

24. ALL VOC-CONTAMINATED SOIL REMOVED FROM THE SITE SHALL COMPLY WITH THE FOLLOWING:

    A) BE TRANSPORTED TO AN APPROVED TREATMENT/DISPOSAL FACILITY. IT SHALL BE THE RESPONSIBILITY OF THE PLAN HOLDER TO ENSURE THAT THE RECEIVING TREATMENT/DISPOSAL FACILITY HAS RECEIVED APPROVAL FROM THE APPROPRIATE ENVIRONMENTAL OVERSIGHT AGENCIES TO HANDLE AND TREAT VOC CONTAMINATED SOILS.

    B) WHEN LOADING IS COMPLETED AND DURING TRANSPORTATION, NO EXCAVATED MATERIAL SHALL EXTEND ABOVE THE SIDES OR REAR OF THE TRUCK OR TRAILER.

    C) PRIOR TO COVERING/TARPING, LOADED CONTAMINATED SOIL SHALL BE TREATED BY SPRAYING WITH WATER OR DUST SUPPRESSANTS.

    D) THE TRUCK OR TRAILER SHALL BE COMPLETELY COVERED/TARPED PRIOR TO LEAVING THE SITE TO PREVENT PARTICULATE EMISSIONS TO THE ATMOSPHERE.

E) THE EXTERIOR OF THE TRUCKS (INCLUDING THE TIRES) SHALL BE CLEANED OFF PRIOR TO THE TRUCKS LEAVING THE EXCAVATION SITE.

SECTION VI – RECORDS AND REPORTING

25. A WRITTEN REPORT SHALL BE GENERATED WHICH INCLUDES:

A) For the amount of soil treated onsite: type of treatment method used, duration of treatment each pile,

B) For the amount of soil treated offsite: THE FACILITY SELECTED TO TREAT THE VOC-CONTAMINATED SOIL, QUANTITY OF SOIL REMOVED FROM SITE, STATUS OF EXCAVATION PIT, AND ANY VOC CONTAMINATED SOIL REMAINING ON SITE.

C) A BRIEF SUMMARY INDICATING IF ADDITIONAL CLEAN UP EFFORTS ARE NECESSARY, THE ADDITIONAL QUANTITY OF VOC CONTAMINATED SOILS TO BE EXCAVATED AND THE PROJECTED SCHEDULE OF THE EXCAVATION.

26. RECORDS OF TREATMENT/DISPOSAL SHALL BE MAINTAINED FOR ALL VOC-CONTAMINATED SOIL excavated FROM THIS SITE. SUCH RECORDS SHALL BE CLEARLY LABELED "**SCAQMD RULE 1166-VOC CONTAMINATED SOIL"** AND SHALL INCLUDE THE IDENTIFICATION AND THE LOCATION OF, 1) THE GENERATOR, 2) TRANSPORTER AND 3) RECEIVING FACILITY. IN ADDITION, SUCH RECORDS SHALL BE SIGNED AND DATED BY EACH OF THE ABOVE PARTIES INDICATING RECEIPT OR RELINQUISHMENT OF THE VOC-CONTAMINATED SOIL AT THE TIME CUSTODY IS TRANSFERRED.

27. WITHIN FORTY (40) DAYS OF INITIAL DETECTION OF VOC-CONTAMINATION, THE WRITTEN RECORDS UNDER CONDITION NO. 22 AND WITHIN THIRTY (30) DAYS OF EXCAVATION PROJECT COMPLETION RECORDS UNDER CONDITION NOS. 14, 22, AND 25 SHALL BE SUBMITTED TO THE SCAQMD AT THE FOLLOWING ADDRESS.

SOUTH COAST AIR QUALITY MGMT DISTRICT
ENGINEERING & COMPLIANCE DIVISION.
RULE 1166 TOXICS AND WASTE MANAGEMENT SECTION
21865 COPLEY DR.
DIAMOND BAR, CA. 91765-4182

SECTION VII – SPECIAL CONDITIONS

A. TOTAL NUMBER OF ROUND TRIP TRUCK MILES DRIVEN (if excavated voc contaminated soil or hazardous material are taken offsite) PER DAY FROM THE DISPOSAL SITES IN THE SCAQMD BASIN SHALL NOT BE MORE THAN 2,800.

- APPLICANT SHALL RETAIN THE COPIES OF THE MANIFESTS GENERATED AT THE EXCAVATION SITE TO SHOW THE LOCATIONS WHERE THE EXCAVATED MATERIAL WAS TAKEN TO.

- WHILE CALCULATING THE MILES DRIVEN IN SCAQMD JURISDICTION, GUIDANCE TABLE SHOWN BELOW SHALL BE USED.

SITE NAME	ROUND TRIP DISTANCE IN SCAQMD BASIN	MAXIMUM NO. OF ROUND TRIPS PER DAY IF GOING TO ONLY ONE SITE (MENTIONED IN COLUMN ON THE LEFT)	
CLEAN HARBORS, MCKITTRICK, CA	80	35	
CHIQUITA CANYON LANDFILL, CASTAIC, CA	80	35	
US ECOLOGY, BEATTY, NV	120	23	
LA PAZ COUNTY LANDFILL, PARKER, AZ	380	7	TOTAL DISTANCE TRAVELLED IN SCAQMD BASIN NEEDS TO BE LESS THAN 2,800 MILES ON ANY GIVEN DAY.35
WASTE MANAGEMENT/TRS 1211 WEST GLADSTONE STREET AZUSA, CA 91702	44	64	
CHEMICAL WASTE MANAGEMENT 35251 OLD SKYLINE ROAD KETTLEMEN CITY, CA 93239	80	35	
SOIL SAFE, INC. 12328 HIBISCUS AVENUE ADELANTO, CA 92301	120	23	
SOUTH YUMA COUNTY LANDFILL 19536 S AVE #1E, YUMA, AZ	96 (via I-5 & I-8)	29	

B. EXCAVATED SOIL FROM THIS PROJECT SHALL ONLY BE STORED ONSITE AT LOCATION AS PER THE MAP ATTACHED WITH THIS PLAN. SOIL STORED ONSITE SHALL BE CLEARLY MARKED AND SEGREGATED FROM ANY OTHER SOILS STOCKPILED FROM OTHER PROJECTS.

C. ALL METAL CONTAMINATED EXCAVATED MATERIAL STOCKPILED SHALL BE KEPT SUFFICIENTLY DAMP TO PREVENT THE POSSIBLE RELEASE OF FUGITIVE EMISSIONS AND SHALL BE COVERED WITH APPROVED HEAVY-DUTY PLASTIC

SHEETING (VISQUEEN) AND ALSO COVERED AT THE END OF EACH WORKING DAY. PLASTIC SHEETING MUST BE SECURED.

D. ALL MATERIALS THAT ARE LISTED AS HAZARDOUS BY A FEDER**AL OR S**TATE AGENCY SHALL BE CONSIDERED "HAZARDOUS MATERIALS" FOR THE PURPOSE OF THIS PERMIT.

E. ALL HAZARDOUS EXCAVATED MATERIAL SHALL BE TRANSPORTED IN SUCH A MANNER AS TO PREVENT ANY EMISSIONS OF HAZARDOUS MATERIALS.

F. ALL HAZARDOUS MATERIALS SHALL BE TRANSPORTED IN CONTAINERS CLEARLY MANIFESTED AS TO THE TYPE OF MATERIAL CONTAINED AND WHAT PROCEDURES SHOULD BE FOLLOWED IN CASE OF ACCIDENTAL SPILLS.

G. EXCAVATED LIQUID HAZARDOUS MATERIALS WITH THE POTENTIAL TO CAUSE AIR EMISSIONS SHALL BE ENCAPSULATED OR ENCLOSED IN CONTAINERS WITH SEALED LIDS BEFORE LOADING INTO THE TRANSPORT VEHICLES.

28. THIS PLAN IS NOT VALID UNTIL ALL PARTIES HAVE REVIEWED AND SIGNED THE VERIFICATION STATEMENT BELOW.

Site Name		Type of Business	
Address	City		Zip
Responsible Party (Owner/Operator)			Phone
Address	City		Zip

I CERTIFY THAT I HAVE REVIEWED AND UNDERSTAND THE CONDITIONS CONTAINED WITHIN THIS PLAN. IN SIGNING BELOW, I ACKNOWLEDGE THAT UNDER THE PROVISIONS OF RULE 1166, I CAN BE HELD RESPONSIBLE FOR THE REQUIREMENTS SET FORTH IN THIS PLAN.

Responsible Party	Responsible Party Signature	Date Signed
General Contractor	General Contractor Signature	Date Signed
Excavation Contractor	Excavation Contractor Signature	Date Signed
Excavation Contractor	Excavation Contractor Signature	Date Signed
Environmental Consultant	Environmental Consultant Signature	Date Signed

DEFINITIONS	
Excavation	Is the process of digging out and removing materials including any material necessary to that process such as the digging out and removal of asphalt or concrete necessary to expose, dig out and remove known VOC contaminated soil.
Organic Vapor Analyzer (OVA)	For the purposes of this plan, an OVA is an hydrocarbon monitor utilizing flame ionization, photo ionization or other analytical methods complying with 40 CFR PART 60 APPENDIX A, EPA METHOD 21 SECTION 3, "DETERMINATION OF VOLATILE ORGANIC COMPOUND LEAKS, MONITORING INSTRUMENT SPECIFICATIONS. The monitor shall be capable of being calibrated using hexane at a range of 0 parts per million by volume (PPMV) to 50 PPMV, and at a detection range of at least 30 PPMV to 1100 PPMV
Sensitive Receptor	A sensitive receptor is defined as: Schools (Kinder-garden through grade 12), licensed daycare centers, hospitals and convalescent homes.
Responsible Party	For the purposes of this plan, is the party financially responsible for initiating the excavation. This may include the property owner or the operator of the transfer, storage equipment. This excludes contractors working for the property owner or operator, and any other party that lacks the direct authority to immediately treat all VOC contaminated soils generated at the excavation site.
VOC Contaminated Soil	Is soil that registers a concentration of 50 PPM or greater of volatile organic compounds as measured before suppression materials have been applied and at a distance of no more than three inches from the surface of the excavated soil with an organic vapor analyzer calibrated with hexane.
Volatile Organic Compound (VOC)	Is any volatile compound of carbon, excluding methane, carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, ammonium carbonate, and exempt compounds. Exempt compounds are as defined in Rule 102 – Definitions of Terms.

Once issued, this plan is subject to further review by the SCAQMD and may be revoked if excavation activities are found in violation of plan conditions or SCAQMD's Rules and Regulations. Failure to comply with one or more of the conditions contained within this plan constitutes a violation of Rules 221 and 1166.

Other governmental agencies may require approval before any excavation begins. It shall be the responsibility of the applicant to obtain that approval. The South Coast Air Quality Management District shall not be responsible or liable for any losses because of measures required or taken pursuant to the requirements of this approved 1166 Contaminated Soil Mitigation Plan.

If you have any questions concerning this plan, please call David Jones at (909) 396-2317.

Very truly yours,

David Jones
A.Q.A.C. Supervisor

Rule 1166 Soil Monitoring Records

ID No: 177847 Plan No: 566483	Facility/Site Information
Defense Fuel Support Point Norwalk c/o Defense Logistics Agency 1962 Freeman Avenue, Signal Hill, CA 90755	**15306 Norwalk Blvd., Norwalk, CA 90650**
Reference No(s).	

Monitor Information	Calibration Data	Monitoring Personnel	Excavation Summary (Upon completion of each page)	
Brand:	Gas:	Name:	Total Cubic Yds (This page)	
Model:	Date	Company:	Total Cubic Yds (To date)	
Type	By	Phone:	Removed from Site (To date)	

Time	VOC Concentration (PPMV) @ Excavated Load			Comment	Time	VOC Concentration (PPMV)@ Excavated Load			Comment
Every 15 min.	Reading	Hexane Factor	Adjusted Reading		Every 15 min.	Reading	Hexane Factor	Adjusted Reading	

I certify that the information contained in the above document is true and correct. I further certify that the above listed hydrocarbon monitor was operated in a manner consistent with the manufacturer's specifications and the conditions specified within this plan. In addition, I certify that the above readings represent the actual measurements I observed and recorded during the excavation process.

SIGNATURE:_____ DATE:_____

APPENDIX C

DTSC INFORMATION ADVISORY

Information Advisory
Clean Imported Fill Material

October 2001

DEPARTMENT OF TOXIC SUBSTANCES CONTROL

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

State of California

California Environmental Protection Agency

Executive Summary

This fact sheet has been prepared to ensure that inappropriate fill material is not introduced onto sensitive land use properties under the oversight of the DTSC or applicable regulatory authorities. Sensitive land use properties include those that contain facilities such as hospitals, homes, day care centers, and schools. This document only focuses on human health concerns and ecological issues are not addressed. It identifies those types of land use activities that may be appropriate when determining whether a site may be used as a fill material source area. It also provides guidelines for the appropriate types of analyses that should be performed relative to the former land use, and for the number of samples that should be collected and analyzed based on the estimated volume of fill material that will need to be used. The information provided in this fact sheet is not regulatory in nature, rather is to be used as a guide, and in most situations the final decision as to the acceptability of fill material for a sensitive land use property is made on a case-by-case basis by the appropriate regulatory agency.

Introduction

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

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

Overview

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

Selecting Fill Material

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

Potential Contaminants Based on the Fill Source Area

Fill Source:	Target Compounds
Land near to an existing freeway	Lead (EPA methods 6010B or 7471A), PAHs (EPA method 8310)
Land near a mining area or rock quarry	Heavy Metals (EPA methods 6010B and 7471A), asbestos (polarized light microscopy), pH
Agricultural land	Pesticides (Organochlorine Pesticides: EPA method 8081A or 8080A; Organophosphorus Pesticides: EPA method 8141A; Chlorinated Herbicides: EPA method 8151A), heavy metals (EPA methods 6010B and 7471A)
Residential/acceptable commercial land	VOCs (EPA method 8021 or 8260B, as appropriate and combined with collection by EPA Method 5035), semi-VOCs (EPA method 8270C), TPH (modified EPA method 8015), PCBs (EPA method 8082 or 8080A), heavy metals including lead (EPA methods 6010B and 7471A), asbestos (OSHA Method ID-191)

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

Recommended Fill Material Sampling Schedule

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

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

Documentation and Analysis

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

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

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

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

Alternative Sampling

A Phase I or PEA may be conducted prior to sampling to determine whether the borrow area may have been impacted by previous activities on the property. After the property has been evaluated, any sampling that may be required can be determined during a meeting with DTSC or appropriate regulatory agency. However, if it is not possible to analyze the fill material at the borrow area or determine that it is appropriate for use via a Phase I or PEA, it is recommended that one (1) sample per truckload be collected and analyzed for all compounds of concern to ensure that the imported soil is uncontaminated and acceptable. (See chart on Potential Contaminants Based on the Fill Source Area for appropriate analyses). This sampling frequency may be modified upon consultation with the DTSC or appropriate regulatory agency if all of the fill material is derived from a common borrow area. However, fill material that is not characterized at the borrow area will need to be stockpiled either on or off-site until the analyses have been completed. In addition, should contaminants exceeding acceptance criteria be identified in the stockpiled fill material, that material will be deemed unacceptable and new fill material will need to be obtained, sampled and analyzed. Therefore, the DTSC recommends that all sampling and analyses should be completed prior to delivery to the site to ensure the soil is free of contamination, and to eliminate unnecessary transportation charges for unacceptable fill material.

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

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

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