DRAFT

Remedial Action Plan

Lubrication Company of America
12500 Lang Station Road
Canyon Country, California

Prepared By:
Department of Toxic Substances Control
Glendale, California

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TABLE OF CONTENTS

TABLES

FIGURES

ATTACHMENT

ACRONYMS AND ABBREVIATIONS

ARAR	Applicable or relevant and appropriate requirement
BGS	Below ground surface
CCR	California Code of Regulations
DTSC	Department of Toxic substances Control
DCA	Dichloroethane
HI	Hazard Index
ISD	Interim Status Document
LCA	Lubrication Company of America
MCL	Maximum Contaminant Level
PAH	Poly aromatic hydrocarbon
PCB	Polychlorinated biphenyl
PRP	Potentially responsible party
RAP	Remedial Action Plan
RAO	Remedial action objectives
RI/FS	Remedial Investigation/Feasibility Study
SVE	Soil Vapor Extraction
PCE	Tetrachloroethylene
TCA	Trichloroethane
TCE	Trichloroethylene
VOC	Volatile organic compounds
UV	Ultraviolet

EXECUTIVE SUMMARY

Pursuant to the National Contingency Plan (NCP), Title 40 of the Code of Federal Regulations (40CFR), Section 300.1 and Title 22 of the California Code of Regulations (22 CCR), Section 68500.1, this Remedial Action Plan (RAP) specifies the activities required to mitigate threat to human health and the environment resulting from hazardous substances releases at the Lubrication Company of America (LCA)

LCA operated a waste oil recycling facility at this property from 1956 to 1989. During this period, sulfur-cutting oil was produced using diesel, bunker and jet fuels, and hydraulic and engine oils. Byproducts of the recycling processes conducted at LCA facility included lard and pale oils, active and inactive sulfur, sulfur monochloride, and acidic liquids.

The Department of Toxic Substances Control (DTSC) performed a removal action at LCA between 1989 and 1992. DTSC removed waste from 61 aboveground tanks, disposed of 358 drums containing waste, and removed all asbestos containing material from the site.

DTSC completed a Remedial Investigation/Feasibility Study (RI/FS) at LCA and a supplemental RI/FS in 1992 and 1998 respectively. The RI revealed extensive soil contamination down to a depth of 70 feet. Soil gas investigation revealed high soil gas concentrations in the northeastern portion of the site. Volatile organic compounds (VOCs) were detected in the groundwater beneath the site. Onsite groundwater wells adjacent to the waste showed concentrations of VOCs above Maximum Contaminant Levels (MCL). A downgradient groundwater well did not reveal any contamination

Remedial alternatives evaluated by DTSC included:

1. No Action. Both surface and subsurface contamination will be left in place.

2. Dismantle onsite structures, excavate all contaminated soil onsite and offsite in the railroad spur area, offsite disposal of contaminated soil, backfill to grade.

3. Dismantle onsite structures, excavate surface and near surface onsite soil (down to ten feet) and contaminated offsite soil in the railroad spur area (down to two feet), offsite disposal, backfill to grade, and perform groundwater monitoring.

4. Dismantle onsite structures, excavate and dispose of contaminated offsite soils in the railroad spur area, backfill to grade, cap the onsite soil, and perform groundwater monitoring.

5. Dismantle onsite structures, excavate and dispose of contaminated offsite soil in the railroad spur area, backfill to grade, cap the onsite soil, construct and operate a soil vapor extraction (SVE) system, and perform groundwater monitoring.

6. Alternative 5 plus groundwater treatment using air sparging Bioventing techniques would be incorporated in conjunction with the SVE to remediate the heavy-end petroleum hydrocarbons in the soil.

7. Alternative 5 plus in-situ treatment of groundwater using oxygen-enhanced bioremediation.

8 Alternative 5 plus groundwater pump and treat using UV oxidation.

Alternative 6 was identified as the preferred remedy based on comparative analysis of alternatives.

The RAP process provides for public participation in the identification and analysis of project environmental impact and remedy selection for the site. Specific public participation tasks include public notice of the draft RAP, preparation and distribution of a site specific fact sheet to all interested parties, 30 day public comment period, and a public meeting during which DTSC will accept comments on the project. After review of the received public comments, DTSC will modify and/or approve the draft RAP. The complete administrative record for the site is available at DTSC's regional office located at 1011 North Grandview Avenue, Glendale, California. Attachment 1 is an administrative record list The draft RAP and environmental analysis documents are available at the site repository, Canyon Country public library, located at 18536 Soledad Canyon Road, Canyon Country, California.

1.0 INTRODUCTION

This RAP was prepared in accordance with the NCP, Title 40 CFR Section 300.1, Title 22 CCR and DTSC Policy and Procedure EO-95-007-PP. This RAP summarizes the results of soil and groundwater investigations conducted at LCA, presents the remediation alternatives evaluated by DTSC and proposes a remediation alternative for LCA. The proposed alternative was selected based on comparative analysis of alternatives in the RI/FS and its supplement.

The proposed remedy includes removal of all aboveground structures; construction of an asphalt cap with a sealant over the entire site; construction of diversion structures on the south and east sides of the site; removal and proper disposal of any contaminated soil on the railroad spur; construction and operation of a soil vapor extraction (SVE) system; groundwater treatment using air sparging; and periodic groundwater monitoring. The remedy also includes incorporating bioventing techniques with the SVE to remediate the heavy-end petroleum hydrocarbons in the soil.

1.1 SITE BACKGROUND

1.1.1 Site Description

LCA served as an oil processing and recycling facility on a 4-acre fenced property at 12500 Lang Station Road in Canyon Country, California. Figure 1 (Figure 1.1 of the RI/FS) shows the location of the site. Figure 2 (Figure 1-2 of the Supplemental RI/FS Report) shows the facility layout

The LCA site is located at 12500 Lang Station Road in Canyon Country, California. LCA is situated on the south bank of the Santa Clara River LCA is bounded on the southern side by Angeles National Forest. Rock quarry operations are conducted to the west and southwest. The nearest residential area is 1/4 miles east of the site. There are several residential communities one to two miles west of the site. State Highway 14 runs approximately ½ miles north of the site

LCA facility received, stored and processed/reclaimed waste oils. Waste oil was transported to LCA by rails and tanker trucks, where it was reclaimed by adding sulfur monochloride and sulfuric acid, to precipitate the metals contained in the waste oils. Cutting oils produced through this process were then skimmed off the top, treated with acid and sold.

The Ivy family was the only owner and operator of the facility from its inception in 1956 to its closure in 1989.

1.1.2 Site History

On March 30, 1981, DTSC (former Department of Health Services), issued an Interim Status Document (ISD) to LCA, a temporary permit to operate a hazardous waste facility. LCA applied for a permanent operating permit (Part B permit application) in April 1983. DTSC denied LCA permit.

From November 1980 to March 1986, DTSC's inspectors observed releases or threatened releases at the site and confirmed these releases by taking soil and water samples. Also, DTSC inspectors noted various violations of the ISD. DTSC issued Notice of Violation and Schedule of Compliance to LCA in November 1986 and a Remedial Action Order in March 1987. DTSC issued a Notice of Final Determination of Noncompliance to LCA in October 1987.

In September 1985, LCA filed for bankruptcy. In January 1987, DTSC listed the LCA site on the Bond Expenditure Plan, which provided state funding for investigation and cleanup activities at the site. Between 1988 and June 1992, DTSC conducted removal action and completed an RI/FS.

In June 1991, DTSC finalized a potential responsible party (PRP) search report, which identified parties required to fund DTSC's past costs and future remediation costs at LCA. DTSC negotiated consent agreements with the PRPs. In September 1996, DTSC entered into a consent order with 19 non-military PRPs. Thereafter other non-military PRPs joined this consent order. In November 1996, DTSC entered into a consent decree with the US military, the major PRP at this site.

In 1998, DTSC installed soil gas and groundwater monitoring wells at LCA to assess extent of soil vapor contamination and site impact on the groundwater. DTSC completed a supplemental RI/FS in March 1999.

1.1.3 Summary of Previous Studies

The RI showed that soil contamination extends from ground surface to 70 feet below ground surface (bgs). Contaminants include petroleum hydrocarbons and aliphatic oils, volatile aromatic compounds (ethylbenzene, toluene, xylene), volatile halogenated organics [1,1 Dichloroethane, (DCA), 1,1,1 Trichloroethane (TCA), Trichloroethylene (TCE), tetrachloroethylene (PCE)] Polycyclic aromatic hydrocarbons (PAHs), PCB, lead and acids.

The impact of soil contamination to groundwater was not addressed during the 1992-RI/FS. Subsequently, in August 1995 a groundwater well was constructed in the northwestern portion of the site by the PRPs under DTSC oversight. Groundwater sampling revealed VOCs contamination. Thereafter, DTSC determined that an additional groundwater investigation and a soil gas investigation were essential in defining the full extent of soil and groundwater contamination at LCA. DTSC directed its contractor to prepare a workplan for additional site investigation and a supplemental RI/FS in April 1997. DTSC approved the final workplan in January 1998.

Between March and June 1998, DTSC's contractor installed 3 groundwater monitoring wells and 5 multi-level soil gas monitoring wells. All groundwater and vapor wells were sampled in July 1998. Soil gas samples showed high VOC concentrations in the northeastern portion of the site. Groundwater samples revealed VOCs contamination beneath the site. DTSC completed the Supplemental RI/FS in March 1999.

2. REMEDIAL INVESTIGATION

2.1 Remedial Investigation (1992)

DTSC completed an RI in June 1992 The site was investigated by collecting and analyzing samples of soil, tanks content, drums content, surface water and groundwater The RI was performed into two phases: 1) Phase I, intended to characterize surface and near surface soil; 2) Phase II, to determine the vertical extent of contamination and investigate groundwater beneath the site.

Phase I sampling locations were chosen based on available information, location of facility operations, areas of known and reported spills and anticipated zones of high contamination Phase I utilized hollow stem auger drilling to obtain samples up to depths of 15 to 35 feet Boreholes were sampled every five feet until refusal was encountered or vertical extent of contamination was delineated. Figure 3 (Figure 4.1 of the RI) shows sampling locations.

Six background soil samples were collected south, east and west of the LCA site. No background samples were collected north of LCA since it is a potential direction of offsite migration.

Phase II sampling was conducted using air rotary drilling technique Samples were collected around tank farms and processing areas At least two locations within each tank farm were sampled Samples were collected to assess offsite migration in the railroad spur area, north of LCA. Samples were collected at five or ten feet intervals Samples were not collected below 75 feet because field screening indicated no contamination below that depth. Figure 3 shows sampling locations.

Surface, subsurface and background soil samples collected during Phase I and II were analyzed for the following constituents:

- Total recoverable petroleum hydrocarbons by EPA Method 418 1
- Total Petroleum hydrocarbon, gasoline by Method 8015 modified
- Oil and grease by Method 413 2
- Volatile organic compounds (VOCs) by Method 8240
- SVOCs by Method 8270
- PCBs by Method 8080
- Metals by Method 6000 and 7000 series
- Soluble lead by WET analysis
- Corrosovity (PH) by Method 9045

2.2 Supplemental Remedial Investigation (1998)

Subsequent to the 1992-RI, DTSC determined that a supplement to the RI was required since soil gas and groundwater data were not collected. This data was needed in order to develop an appropriate remedy for the site. DTSC completed a supplemental RI/FS in March 1999.

Three groundwater monitoring wells and four multilevel soil gas monitoring wells were installed onsite. One downgradient groundwater monitoring well was installed offsite, northwest of the site, on the railroad spur, and a vapor well was installed immediately north of LCA. Figure 13 (Figure 3-1 of the Supplemental RI/FS) shows the location of the groundwater and vapor wells.

Soil gas wells were installed to assess nature and extent of VOCs in soil. Locations of the vapor wells were chosen based on the 1992- RI/FS data, iso-concentration maps. Two wells were placed in the middle of the waste mass, in the most contaminated area onsite, and three wells were placed at the perimeter of the waste mass toward the LCA north and west property boundary.

Groundwater wells were installed to assess site impact on the groundwater Three groundwater wells were installed onsite: two downgradient wells at the edge of the waste and one upgradient from the waste One downgradient well was installed offsite.

2.3 Extent of Contamination

Soil at the site was found to be contaminated with petroleum hydrocarbons, oil and grease, volatile aromatic hydrocarbons, halogenated VOCs, Polyaromatic hydrocarbons (PAH), PCBs and lead. Figure 4 (Figure 4.3, overlay A of the RI) shows the lateral extent of hydrocarbon contamination. Organic contamination is shown on Figure 5 (Figure 4.3, overlay D of the RI). Figure 6 and 7 (Figure 4.3, overlay E and F of the RI) show the lead and PCB contamination respectively. Figure 8 shows location of cross sections. Figures 9, 10 and 11 show the extent of vertical contamination.

Petroleum hydrocarbon contaminated areas cover approximately half of the site surface. Processing and storage areas north of the site are contaminated with petroleum hydrocarbons up to 140,000 parts per million (ppm). Petroleum hydrocarbons detected in soil were generally of heavier molecular weight SVOCs, as expected since the site handled mostly waste oil. Ethylbenzene, toluene and xylene are VOCs associated with petroleum hydrocarbons and were found to a depth of 50 feet. TCE was detected to 65 feet. PCE and DCA were detected sporadically in subsurface soil over the entire site. PAHs were detected to 65 feet. PCBs were generally limited to surface soil along the eastern fence line, with concentrations to 2.1 ppm. A PCB concentration of 0.41 ppm was detected at 60 feet depth. Surface soil pH in some areas ranged from three to five.

Groundwater samples were collected from municipal wells around the LCA facility in 1992. Figure 12 (Figure 3.5 of the RI) shows the locations of the wells. Samples were obtained from taps attached on the top of the wells. No VOCs were detected in any of the wells.

Soil gas sampling showed high vapor concentration in the northeastern portion of the site. Also, VOCs were detected in the groundwater beneath the site. VOCs were not detected in the downgradient groundwater well.

3. SUMMARY OF REMOVAL ACTIONS

Removal actions were conducted at LCA to mitigate an immediate threat to public health and the environment. Removal activities consisted of:

- Locating and abating asbestos containing material on-site. A state licensed contractors appropriately encapsulated, removed, transported and properly disposed of the asbestos containing material.

- Collecting, characterizing and disposing of 358 drums. Some drums were leaking and needed to be overpacked

- Characterizing the contents from 120 above ground tanks. The tanks ranged in size from 370 to 20,500 gallons. Tanks were prioritized based on content and structural condition. Liquid and semi-solid hazardous waste were removed from the tanks and stored in containers for disposal.

A total of approximately 134,049 gallons of hazardous substances was removed from 61 above ground storage tanks. Approximately 339 cubic yards of excavated soil were properly transported and disposed of

DTSC emptied 61 tanks, 26 tanks still have residual contamination, and remaining tanks are empty.

4. SUMMARY OF SITE RISKS

DTSC conducted health risk assessment and a supplemental risk assessment in 1992 and 1998 respectively. The risk assessment evaluated health risks from chemicals of concern (COCs) at the site. The steps conducted as part of the risk assessment included identification of COCs, exposure assessment (exposure routes and population), toxicity assessment and risk characterization.

4.1 Contaminants of Concern

A wide range of chemicals was detected in soil at LCA. Several types of selection processes were used to develop a list of chemicals representative of soil conditions. The selection process was based on a concentration-toxicity screening method, sample locations, comparison of metal concentrations to background and number of detected values for organic chemicals. Chemicals that were determined to represent COCs in soil at LCA included lead, ethylbenzene, toluene, xylene, 1,1,1 TCA, 1,1 DCA, PCE, TCE, PCBs, PAHs. VOCs were determined to be the only COCs in groundwater. Chemicals that represent groundwater COCs at LCA are: benzene, 1,1 DCA, cis 1,2 DCA, ethylbenzene, 1,1,2,2 TCA, 1,1,1 TCA, 1,1,2 TCA, Vinyl Chloride and Xylenes

4.2 Risk Characterization

Quantitative exposure and risk analysis were conducted for COCs. Receptors considered in the exposure analysis include onsite residents, onsite worker and nearby residents using groundwater. Exposure routes considered in the risk evaluation included ingestion, dermal contact and inhalation.

Risk characterization provided a quantitative estimate of potential health risks due to these chemicals. Risks were calculated for individual chemical parameters as well as additive effects. Estimates of carcinogenic risks and noncarcinogenic health effects were presented separately. The estimates represented upper-bound risk value. Actual health effect risks may however be lower.

Carcinogenic risks were compared to a generally acceptable risk range of $1X10^{-6}$ to $1X10^{-4}$. According to the NCP, carcinogenic risks from exposure at Superfund sites are considered to be unacceptable at levels exceeding 10^{-4}, while risks smaller than 10^{-6} are considered to be of minimal concern. A potential excess individual lifetime cancer risk of 10^{-6} is used by DTSC when determining whether chemical exposures represent a potentially unacceptable level of risk to public health.

Noncarcinogenic health effects were determined based on a hazard index (HI). A HI value greater than one indicates adverse health effects may occur due to chemical exposure. HI values account for chemical exposure occurring over several exposure pathways or for chemicals with similar toxic effects.

Risks to future site residents potentially exposed to COCs in soil and/or groundwater exceeded the generally accepted level for carcinogenic ($<10^{-6}$) and noncarcinogenic (HI<1) risk. Consequently, this RAP proposes to limit site use to industrial purpose and construct remediation systems that would minimize exposure to site contaminants.

Carcinogenic risk for future onsite workers exposed to contaminated soil exceeded the generally accepted level for carcinogenic risk ($<10^{-6}$). The proposed remediation systems in this RAP would prevent exposure to site contaminants.

Based on modeling results in the Supplemental RI/FS, carcinogenic risks to offsite residents potentially exposed to contaminated groundwater exceed the acceptable level of 10^{-6}. However, actual sampling results from offsite downgradient groundwater wells did not reveal any contamination. This RAP proposes treatment of groundwater underneath LCA and quarterly groundwater monitoring to ensure that LCA groundwater contamination is not migrating offsite

4.3 Ecological Risk Assessment

An ecological assessment was conducted by DTSC to determine site impact on ecological receptors (plant and animal life) in the area. Since this RAP proposes to cap the site and construct berms around the cap, it is unlikely that ecological receptors will be exposed to contaminants at the site. Animals will not be attracted to the site, which is devoid of plant life. The closest entry point at the edge of the cap is a formidable distance from the contaminated area. Therefore, exposure of ecological receptors is improbable.

5. SUMMARY AND EVALUATION OF ALTERNATIVES

5.1 Remedial Action Objectives

Remedial alternatives were developed to meet the remedial action objectives (RAOs). RAOs are media specific objectives established to protect human health and the environment. RAOs are based on contaminants of concern, media of concern, exposure pathways and receptors and acceptable contaminant levels for each exposure route. DTSC has developed the following RAOs for the site media of concern:

- Air RAOs: protect human health and the environment by preventing release and migration of subsurface VOCs in the ambient air in excess of South Coast Air Quality Management District requirements.

- Soil RAOs: prevent exposure through ingestion, inhalation and direct contact of soil contaminated at levels that may pose a risk to human health and the environment. Minimize production and migration of contaminants from soil to air, surface water or groundwater. Minimize erosion of contaminated soil by wind or water.

- Groundwater RAOs: prevent exposure through ingestion, inhalation and dermal adsorption of groundwater contaminated at levels that may pose a risk to human health and the environment.

5.2 Site Specific Preliminary Cleanup Goals

Site specific clean up goals that meet the RAOs were established in the Supplemental RI/FS Cleanup goals are acceptable chemical concentrations that are protective of human health and the environment. Cleanup goals are based on site specific risk based factors and chemical specific ARARs. Preliminary cleanup goals for soil gas and groundwater are included in Table 1 and Table 2 respectively.

Achievement of cleanup goals may be limited by site geology and hydrogeology and remediation systems performance. Preliminary Cleanup goals listed in Table 1 and 2 may prove difficult or impossible to achieve. In this case, DTSC will revise the cleanup goals and/or use performance measures to evaluate site cleanup (refer to Section 6.4).

5.3 Alternatives Evaluation Criteria

Alternatives were developed by combining compatible and complimentary technologies into remedial scenarios that would address media of concern at the site. Nine Evaluation criteria specified in the NCP were used as a basis for conducting detailed analysis of the alternatives. The following summarizes the evaluation criteria:

1. <u>Overall Protection of Human Health and the environment:</u> addresses whether or not a remedy provides adequate protection and describes how risk posed through each exposure pathway is eliminated, reduced or controlled through treatment, engineering controls, or institutional controls.

2. <u>Compliance with State and Federal Requirements:</u> addresses whether or not a remedy will meet all appropriate federal, state, and local environmental laws and regulations.

3. <u>Long-term Effectiveness and Permanence:</u> refers to the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup goals have been met.

4. <u>Reduction of Toxicity, Mobility and Volume through Treatment:</u> refers to the ability of the remedy to reduce toxicity, mobility and volume of hazardous substances or constituents present at the site.

5. <u>Cost: 30-year Present Worth:</u> evaluates the estimated capital and operation and maintenance costs of each alternative.

6. <u>Short term effectiveness:</u> addresses the period of time needed to complete the remedy, and any adverse impact on human health and the environment that may be posed during the construction and implementation period, until cleanup standards are achieved.

7. <u>Implementability:</u> refers to the technical and administrative feasibility of the remedy, including the availability of material and services needed to carry out a particular option.

8. <u>Regulatory Agency Acceptance:</u> Indicates whether, based on its review of the information, the applicable regulatory agencies would agree to the preferred alternative.

9. <u>Community Acceptance:</u> Indicates whether community concerns are addressed by the remedy, and whether or not the community has a preference for a remedy.

In order for a remedy to be eligible for selection, it must meet the first two criteria, called the "threshold criteria." Criteria 3 through 7 are the "primary balancing criteria," and criteria 8 and 9 are modifying criteria.

5.4 Description and Evaluation of Alternatives

DTSC evaluated the following remedial alternatives:

1. <u>*No Action:*</u>

Both surface and subsurface contamination would be left in place under this alternative. Soil contamination will prevent the site from use for any purpose. There would be potential for offsite migration of contaminants.

The no action alternative serves as a baseline against which other remedial action alternatives can be evaluated. Both surface and subsurface contamination would be left in place. This alternative is not protective of human health and the environment. Surface run off may degrade surface water quality. This alternative does not meet regulatory agencies requirements for site closure/cleanup.

Since no remediation is included, risk from the site under this alternative will always be the same. There will not be any reduction in toxicity, mobility or volume of contaminants. There is no cost associated with this alternative.

It is anticipated that this alternative will not be accepted by regulatory agencies and the surrounding community.

2. *Dismantle onsite structures, excavate all contaminated soil onsite and offsite in the railroad spur area, offsite disposal, backfill to grade.*

This alternative includes removal of above ground structures (tanks, processing equipment and buildings, buried pipelines), assessment of soil condition in the tank farms under the tanks, excavation of all contaminated soil (to a depth of 70 feet below which petroleum hydrocarbon contamination is less than 100 ppm), offsite treatment of contaminated soil at an incineration facility and backfilling and compacting to original grade with clean imported fill.

This alternative allows the site to be developed into a residential community or commercial industrial zone. Groundwater monitoring will not be required since surface and subsurface contamination would be eliminated.

This alternative is protective of human health and the environment and complies with ARARs

Dust control measures and air monitoring would be implemented during construction activities at the site. Work at the site would be conducted by trained workers under a health and safety plan approved by DTSC. Cleanup levels will be met by removal of all contaminated soil. This remedy is effective and reliable in the long term. The toxicity, mobility and volume of contaminated waste would be eliminated. This remedy can be implemented since excavation and backfilling are well demonstrated technologies. The cost of this alternative is very high relative to other alternatives, since it requires removal of large quantities of soil.

Community and regulatory agencies input is considered when making final decision on the remedy. DTSC may modify and/or change the selected remedy based on comments received during the public comment period.

3. *Dismantle onsite structures, excavate surface and near surface soils (down to 10 feet) and contaminated offsite soils in the railroad spur area (down to 2 feet), dispose of at an appropriate disposal facility, backfill to grade, and perform groundwater monitoring.*

This alternative includes removal of above ground structures (tanks, processing equipment and buildings, buried pipelines), assessment of soil condition in the tank farms under the tanks, excavation of the top ten feet of onsite soil and two feet in the railroad spur, disposal of contaminated soil at an appropriate facility and backfill up to original grade with clean imported fill. The site would be graded to prevent surface water ponding. Institutional controls would be imposed to prevent excavation below ten feet (otherwise unlimited commercial/industrial development would be permitted). Groundwater monitoring would be required to assess potential migration of subsurface contaminants.

This alternative allows the site to be developed into an industrial/commercial facility. Excavation down to ten feet would allow installation and maintenance of utility lines and landscaping Subsurface contamination below ten feet would be left in place.

Contaminated soil below ten feet will not pose a threat to site users Therefore, this alternative will provide adequate protection of human health and the environment. Potential migration of subsurface contaminants, below ten feet, to groundwater remains.

Dust control measures and air monitoring would be implemented during construction activities at the site. Work at the site would be conducted by trained workers under a health and safety plan approved by DTSC. This alternative provides control of residual risk through groundwater monitoring. Deed restrictions on soil and/or groundwater imposed minimize the chance of exposure to contaminants. Controls used under this alternative are reliable and effective in the long term. This alternative reduces toxicity, mobility and volume of contaminants, but does not eliminate them. This remedy can be easily implemented, since excavation and backfilling are well demonstrated technologies The cost for this alternative is high relative to other alternatives

This alternative may be acceptable to the community and regulatory agencies. Community and regulatory agencies input is considered when making final decision on the remedy. DTSC may modify and/or change the selected remedy based on comments received during the public comment period.

4. *Dismantle onsite structures, excavate and dispose of contaminated offsite soils in the railroad spur area, backfill to grade, cap the onsite soil, and perform groundwater monitoring.*

This alternative includes removal of above ground structures (tanks, processing equipment and buildings), buried pipelines, assessment of soil condition in the tank farms under the tanks

Excavate contaminated offsite soil in the railroad spur down to two feet depth. Construct an asphalt cap over the entire site. Build diversion structures on the south and east side of the site to protect the cap against erosion. Impose deed restrictions to control excavation and limit use to industrial commercial facility. Monitor groundwater to assess potential migration of subsurface contaminants.

Contaminants will be left in place under this alternative. The cap will prevent contact with contaminated soil. The site may be used for limited industrial/commercial purposes. Potential for degradation of groundwater remains. The deed restriction requires the cap to be maintained and not disturbed. Future site use must be approved by DTSC.

This alternative limits the future land use of the site to industrial/commercial purposes, with no disturbances to the final cover. Strict institutional control will minimize the potential for exposure to subsurface contaminants. Groundwater will be monitored to determine if the aquifer is being degraded.

Due to the asphalt cap, site users would be protected and degradation of surface water would be prevented. Migration of contaminants to groundwater will be reduced. No sensitive receptors have been identified on or near the site. ARARs will be met under this alternative.

Dust control measures and air monitoring should be implemented during construction activities at the site. Work at the site would be conducted by trained workers under a health and safety plan approved by DTSC. This alternative controls risk through site maintenance, institutional control and groundwater monitoring. These controls are reliable and effective in the long term. This alternative does not reduce toxicity or volume of contaminants, but the cap reduces mobility of contaminants. This alternative can be easily implemented by trained personnel according to well demonstrated technologies and industry standards. The cost of this alternative is moderate relative to the other alternatives.

This alternative may be acceptable to the community and regulatory agencies. Community and regulatory agencies input is considered when making final decision on the remedy. DTSC may modify and/or change the selected remedy based on comments received during the public comment period.

5. *Dismantle onsite structures, excavate and dispose of contaminated offsite soil in the railroad spur area, backfill to grade, cap the onsite soil, construct and operate a soil vapor extraction (SVE) system, and perform groundwater monitoring.*

This alternative is the same as alternative 3 with an SVE system. The SVE system will extract vapor under the cap to minimize vapor migration to the surface at cap boundaries and to groundwater. Data from site investigations indicated that soil beneath the site has adequate air permeability. SVE is a well demonstrated technology, and SVE equipment is readily available from many vendors. SVE is effective in removing VOC contaminants from permeable soil such as the LCA area.

This alternative is protective of human health and the environment and complies with ARARs.

Dust control measures and air monitoring would be implemented during construction activities at the site. Work at the site would be conducted by trained workers under a health and safety plan approved by DTSC. This alternative controls risk through site maintenance, institutional control and groundwater monitoring. These controls are reliable and effective in the long term. This alternative will reduce toxicity mobility and volume of contaminants. This alternative will prevent/minimize soil gas migration to the surface and into groundwater. This alternative can be easily implemented by trained personnel according to well demonstrated technologies and industry standards. The cost of this alternative is moderate relative to other alternatives.

It is anticipated that this alternative would be acceptable to the community and regulatory agencies. Community and regulatory agencies input is considered when making final decision on the remedy. DTSC may modify and/or change the selected remedy based on comments received during the public comment period.

6. *Alternative 5 plus groundwater treatment using air sparging. Bioventing techniques would be incorporated in conjunction with the SVE to remediate the heavy-end petroleum hydrocarbons in the soil.*

This alternative is the same as alternative 5 plus groundwater treatment using air sparging. Air is injected into the groundwater to volatilize VOCs from groundwater to soil. VOCs are then captured by the SVE system. Subsurface soil underneath LCA has high air permeability and good hydraulic conductivity which is ideal for air sparging. Equipment and labor required to construct and operate the air sparging system are readily available. Air sparging is effective in removing VOCs from groundwater, and SVE is effective in removing VOCs from the soil Because SVE is only effective in remediating VOCs and is generally ineffective in remediating non-VOCs and heavy-end hydrocarbons, bioventing techniques would be incorporated in conjunction with the SVE to remediate soil at the site. Bioventing uses air injection to enhance biodegradation of heavy-end hydrocarbons in the soil.

This alternative is protective of human health and the environment and complies with ARARs.

Dust control measures and air monitoring would be implemented during construction activities at the site. Work at the site would be conducted by trained workers under a health and safety plan approved by DTSC. This alternative controls risk through site maintenance, institutional control and groundwater monitoring. These controls are reliable and effective in the long term. This alternative will reduce toxicity or volume of contaminants. This alternative will prevent/minimize offsite migration of contaminants in soil gas and groundwater. This alternative can be easily implemented by trained personnel according to well demonstrated technologies and industry standards. The cost of this alternative is moderate relative to other alternatives.

It is anticipated that this alternative would be acceptable to the regulatory agencies, since the proposed remediation systems have proven to be effective in remediating sites that are similar to LCA. It is also anticipated that this alternative would be acceptable to the public. Community and regulatory agencies input is considered when making final decision on the remedy. DTSC may modify and/or change the selected remedy based on comments received during the public comment period.

7. *Alternative 5 plus in-situ treatment of groundwater using oxygen-enhanced bioremediation.*

This alternative is the same as alternative 5 with in-situ groundwater treatment using oxygen-enhanced bioremediation. Hydrogen peroxide (or other solution) will be introduced into the groundwater to increase the oxygen content of groundwater, thereby enhancing the rate of biodegradation of contaminants of concern. This technology requires a pilot study prior to implementation to determine design parameters. Factors, such as subsurface heterogeneity and contaminants escaping from the zone of biodegradation, limit the effectiveness of groundwater treatment. Groundwater treatment with oxygen-enhanced biodegradation may require a groundwater circulation system.

This alternative is protective of human health and the environment and complies with ARARs

Dust control measures and air monitoring would be implemented during construction activities at the site. Work at the site would be conducted by trained workers under a health and safety plan approved by DTSC. This alternative controls risk through site maintenance, institutional control and groundwater monitoring. These controls are reliable and effective in the long term. Groundwater treatment with this alternative is easy to implement compared to air sparging or ex-situ treatment. This alternative reduces toxicity and mobility of contaminants. The cost of this alternative is relatively high as compared to alternatives 5 and 6.

It is anticipated that this alternative would be acceptable to the regulatory agencies since the proposed remediation systems have proven to be effective in remediating sites that are similar to LCA. It is also anticipated that this alternative would be accepted by the public. Community and regulatory agencies input is considered when making final decision on the remedy. DTSC may modify and/or change the selected remedy based on comments received during the public comment period.

8. *Alternative 5 plus groundwater pump and treat using UV oxidation.*

This alternative is the same as alternative 5 with groundwater pump and treat using UV oxidation. The major advantage of UV oxidation is its effectiveness in destroying a variety of VOCs and SVOCs including chlorinated VOCs. This technology costs more than in-situ treatment technologies and is less effective in removing VOCs from groundwater. In addition, the time to meet RAOs is longer when compared to in-situ treatment.

This alternative is protective of human health and the environment and complies with ARARs

Dust control measures and air monitoring would be implemented during construction activities at the site. Work at the site would be conducted by trained workers under a health and safety plan approved by DTSC. This alternative controls risk through site maintenance, institutional control and groundwater monitoring. These controls are reliable and effective in the long term. Equipment and labor required for this alternative are readily available. Under this alternative a treatment area would be constructed. Treated groundwater would require offsite disposal or discharge to storm drain. This alternative reduces toxicity, mobility and volume of contaminants. Pump and treat has a higher cost than in-situ treatment technologies.

It is anticipated that this alternative would be acceptable to the regulatory agencies since the proposed remediation systems has proven to be effective in remediating sites that are similar to LCA. It is also anticipated that this alternative would be acceptable to the public. Community and regulatory agencies input is considered when making final decision on the remedy. DTSC may modify and/or change the selected remedy based on comments received during the public comment period.