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Second Five-Year Review Report

For

Lorentz Barrel and Drum Superfund Site

San Jose

Santa Clara County, California

September 2005

Prepared by:

**US EPA Region IX
75 Hawthorne Street, SFD-7-4
San Francisco, CA 94105**

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Approved by:

Date:



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Chief, Site Cleanup Branch
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September 28, 2005

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List of Acronyms

10 th Street	10 th Street Land Management
AOC	Administrative Order on Consent
ARARs	Applicable or Relevant and Appropriate Requirements
BAAQMD	Bay Area Air Quality Management District
bgs	Below Ground Surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CoC	Contaminant of Concern
COPC	Contaminant of Potential Concern
DHS	Department of Health Services (State of California)
DTSC	Department of Toxic Substances Control (State of California)
EE/CA	Engineering Evaluation/Cost Analysis
EPA	Environmental Protection Agency
ESD	Explanation of Significant Differences
FYR	Five Year Review
FSP	Field Sampling Plan
GAC	Granular Activated Carbon
GPM	Gallons Per Minute
HASP	Health and Safety Plan
IAG	Interagency Agreement
ICs	Institutional Controls
LB&D	Lorentz Barrel and Drum Co.
LSGTF	Lorentz Shallow Groundwater Task Force
MCL	Maximum Contaminant Level
MNA	Monitored Natural Attenuation
MSL	Mean Sea Level
mg/l	milligrams per liter
µg/l	micrograms per liter
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
Newark	The Newark Group, Inc.
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
O&M	Operation and Maintenance
OU	Operable Unit
PCBs	Polychlorinated biphenyls
ppb	Parts per billion
ppm	Parts per million
PRP	Potentially Responsible Party
PRG	Preliminary Remediation Goal
RAL	Risk Action Level
RAO	Remedial Action Objective
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision

RP	Responsible Parties
RPM	Remedial Project Manager
RWQCB	Regional Water Quality Control Board, San Francisco Bay Region
SCVWD	Santa Clara Valley Water District
SJSU	San Jose State University
SOP	Standard Operating Procedure
SVE	Soil Vapor Extraction
TAT	Technical Assistance Team
TCE	Trichloroethylene
USACE	U.S. Army Corps of Engineers
UV/Ox	Ultraviolet Oxidation
VOC	Volatile Organic Compound

Executive Summary

The U.S. Environmental Protection Agency (EPA) Region IX has conducted the second five-year review of the Lorentz Barrel and Drum (LB&D) Site in San Jose, California. The purpose of this five-year review is to determine whether the remedial actions implemented at the site are protective of human health and the environment. This five-year review is required because hazardous substances remain onsite above the risk-based levels determined in the Record of Decision (ROD), thereby preventing unlimited use and unrestricted exposure. The methods, findings, and conclusions of the review are documented in this report. In addition, this report summarizes issues identified during the review and includes recommendations and follow-up actions for them. The triggering action for this review was the completion of the first Five-Year Review (FYR) report on September 27, 2000.

The LB&D Site is located at 1515 South Tenth Street in San Jose, California, see Figure 1. The site includes 5.25 acres currently owned by 10th Street Land Management (10th Street), 1.47 acres owned by The Newark Group, Inc. (Newark), an adjacent city sidewalk, and a shallow groundwater plume extending north of the 10th Street and Newark properties, see Figures 2 and 4. The area north of the 10th Street and Newark properties includes sports fields and structures owned by San Jose State University (SJSU). The 10th Street and Newark properties are zoned for commercial and industrial use, as is most of the area within a one-mile radius of the site.

The former drum recycling facility accepted over 2 million drums from more than 3,000 parties beginning in 1947 until it was closed by a court action brought by the California Department of Health Services (DHS) in July 1987. The facility received drums that contained aqueous wastes, organic solvents, acids, oxidizers, and oils. The drums were reconditioned through a variety of methods such as caustic and acid washing, incineration, blasting with steel shot, and steam cleaning. The residues and cleaning materials were dumped into sumps and basins on-site, which drained into the site soils and into the local storm sewer. The drums were then resealed and repainted with substances such as phenolic epoxy resins, rust inhibitors and lead based paints. The drums were then either returned to the original owner or sold. Contaminated media includes site soils and the shallow groundwater aquifer beneath the northeastern portion of the site extending down gradient some 1500 feet north of the site.

The following chemical contaminants have been detected in the soil: volatile and semi-volatile organic compounds, pesticides, herbicides, polychlorinated biphenyls (PCBs), and inorganic compounds such as heavy metals. In addition, volatile and semi-volatile organic compounds have been found in the shallow groundwater. There was a concern during initial site characterization that the compounds could migrate further from the site, impacting drinking water aquifers, and adjacent surface waters (e.g., Coyote Creek).

Response actions at the site included a series of removal actions in which drums, heavily contaminated soils, buildings, tanks and sumps were removed and taken off-site for disposal. Concurrently with the removal activities, an Operable Unit-2 (OU-2) ROD (1988) was prepared to address the off-site shallow zone groundwater plume. The OU-2 ROD selected a pump and treat remedy consisting of 18 groundwater extraction wells and a granular activated carbon

(GAC) treatment system, which is operated by the Lorentz Shallow Groundwater Task Force (LSGTF) PRP group. An OU-1 ROD (1993) addressed the Site soils remedy and deep zone groundwater monitoring. The OU-1 remedial action, conducted by the EPA, removed the most contaminated soils remaining on site through excavation and disposal, capped the LB&D property, installed a soil vapor extraction (SVE) system, and put in place a monitoring program for the deeper drinking water aquifer to determine if any downward migration of contamination from the shallow aquifer was occurring.

A five-year review site inspection took place on April 20, 2005. During the site visit, a discussion among operating contractors for both OUs, U.S. Army Corps of Engineers (USACE), and the EPA Remedial Project Manager (RPM) was held. The five-year review was advertised in local newspapers to solicit public input.

The remedies were evaluated as individual operable units. The OU-1 remedy has three components: 1) an asphalt cap, 2) a soil vapor extraction (SVE) system to remove volatile organic compounds (VOCs), and 3) monitoring the deeper Zone C and D aquifers. There are three technical issues associated with SVE operation: 1) Procedures need to be identified to clarify how the remediation goal of 1 ppm total VOCs in soil specified in the OU-1 ROD will be implemented, and to measure progress toward the cleanup goal; 2) A systems optimization evaluation should be conducted; and 3) There are no current site soil data available to determine if soil cleanup criteria have been met. Current owners of properties adjacent to the 10th Street and Newark properties (City of San Jose and SJSU) should incorporate standard procedures to address worker safety during any intrusive activities in soils overlying the shallow groundwater plume. The potential for vapor intrusion following future building development overlying the shallow groundwater plume on the SJSU sports field between Spartan Stadium and the track was not addressed. Current owners should incorporate standard procedures to ensure future building development is not subject to unacceptable risks from a vapor intrusion pathway.

OU-2 shallow groundwater cleanup goals have not been clearly defined for the LSGTF to accelerate cleanup and achieve site close out. Trend analysis of concentrations of contaminants detected in the shallow aquifer zone show the plume is stable and concentrations are slightly decreasing in general. However, LSGTF needs to optimize the current groundwater extraction system to improve extraction efficiency because a qualitative capture zone analysis indicates that current extraction operation may not fully capture the contaminated plume.

Low concentrations of contaminants were detected down gradient of the groundwater extraction system. LSGTF needs to evaluate whether the monitored natural attenuation (MNA) process can achieve the goal of preventing low concentrations of contaminants from reaching the Coyote Creek although current results indicate that the contaminants do not reach the creek.

The OU-1 ROD requires EPA to monitor deep aquifer zones including Zone C and Zone D. The only monitoring well (MW-44) located in the deeper aquifer (Zone D) was screened in six zones. In 1998, EPA abandoned MW-44 well due to potential cross contamination concerns. Currently, EPA conducts quarterly water quality monitoring only in the Zone C aquifer. EPA has not found any contaminants in the Zone C and Zone D wells. There is a thick layer (approximately 150

feet) of marine clays separating the Zone C and Zone D aquifers. It is highly unlikely that contaminants will reach the deeper aquifer (Zone D) without contaminating Zone C first. EPA needs to conduct an assessment to determine whether a replacement monitoring well in zone D is necessary. If EPA determines that a monitoring well in the deeper aquifer is no longer necessary, an OU-1 ROD amendment or ESD will be required to address deeper aquifer monitoring issues.

Current sampling techniques (e.g., bailer) for VOCs groundwater sampling may not produce representative results. Low-flow sampling technique should be considered in the future sampling activities.

The remedy is considered protective in the short-term since there is no evidence of currently complete exposure pathways to contaminated soils and groundwater. However, in order for the remedy to remain protective in the long term until performance standards specified in the RODs are met, institutional controls for the site must be fully implemented.

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site name (from WasteLAN): Lorentz Barrel and Drum Site		
EPA ID (from WasteLAN): CAD029295706		
Region: 9	State: CA	City/County: San Jose/Santa Clara
SITE STATUS		
NPL status: <input checked="" type="checkbox"/> Final <input type="checkbox"/> Deleted <input type="checkbox"/> Other (specify)		
Remediation status (choose all that apply): <input type="checkbox"/> Under Construction <input checked="" type="checkbox"/> Operating <input type="checkbox"/> Complete		
Site Wide FYR <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	Construction completion date: <u>09</u> / <u>29</u> / <u>1998</u>	
Has site been put into reuse? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		
REVIEW STATUS		
Lead agency: <input checked="" type="checkbox"/> EPA <input type="checkbox"/> State <input type="checkbox"/> Tribe <input type="checkbox"/> Other Federal Agency _____		
Author name: Shiann-Jang Chern		
Author title: Remedial Project Manager Author affiliation: U.S. EPA		
Review period: <u>04</u> / <u>13</u> / <u>2005</u> to <u>09</u> / <u>15</u> / <u>2005</u>		
Date(s) of site inspection: <u>04</u> / <u>19-20</u> / <u>2005</u>		
Type of review: <div style="text-align: right; margin-top: 5px;"> <input checked="" type="checkbox"/> Post-SARA <input type="checkbox"/> Pre-SARA <input type="checkbox"/> NPL-Removal only <input type="checkbox"/> Non-NPL Remedial Action Site <input type="checkbox"/> NPL State/Tribe-lead <input type="checkbox"/> Regional Discretion </div>		
Review number: <input type="checkbox"/> 1 (first) <input checked="" type="checkbox"/> 2 (second) <input type="checkbox"/> 3 (third) <input type="checkbox"/> Other (specify) _____		
Triggering action: <div style="text-align: right; margin-top: 5px;"> <input type="checkbox"/> Actual RA Onsite Construction at OU # _____ <input type="checkbox"/> Actual RA Start at OU# _____ <input type="checkbox"/> Construction Completion <input checked="" type="checkbox"/> Previous Five-Year Review Report </div> <input type="checkbox"/> Other (specify)		
Triggering action date (from WasteLAN): <u>09</u> / <u>27</u> / <u>2000</u>		
Due date (five years after triggering action date): <u>09</u> / <u>27</u> / <u>2005</u>		

Five-Year Review Summary Form, cont'd.

Issues:

Protectiveness Issues

1. Potential exposure of construction/utility workers during intrusive activities in soils overlying the shallow groundwater plume may not be adequately addressed in areas of the SJSU property or the sidewalk adjacent to the 10th Street and Newark properties.
2. Potential vapor intrusion following future building development in areas overlying the shallow groundwater plume may not be adequately addressed in areas of the SJSU property.
3. Selected ICs are not fully implemented.

Technical Improvement

4. Efficiency and cost effectiveness of current soils remediation needs to be improved.
5. Efficiency and cost effectiveness of current groundwater remediation needs to be improved.
6. Low concentrations of contaminants were detected down gradient of the groundwater extraction system. It is unclear whether natural attenuation can achieve the goal to prevent low concentrations of contaminant from reaching the creek.
7. Groundwater sampling techniques for VOCs may not produce representative sampling results..

Future Site Closeout

8. An evaluation to determine if SVE has met soils cleanup criteria is not addressed in the ROD.
9. Quantitative remediation (cleanup) goals for shallow groundwater are not specified in the (OU-2) ROD.
10. The only monitoring well (MW-44) in Zone D deeper aquifer was abandoned by the EPA in 1998 due to cross contamination concentrations. There is no replacement well in the Zone D aquifer.

Recommendations and Follow-up Actions:

Recommendations to Improve Protectiveness

1. Current owners in area of the SJSU property or side walk adjacent to 10th Street and Newark properties should incorporate procedures to ensure construction-worker safety during intrusive activities (e.g., subsurface excavation for utility work) involving potential exposure to site-contaminated soils or groundwater.
2. Future building development in areas overlying the shallow groundwater plume in the SJSU property should incorporate procedures to evaluate the vapor intrusion pathway prior to the construction.

Five-Year Review Summary Form, cont'd.

3. ICs need to be evaluated and a comprehensive monitoring plan developed. Layering of ICs, including sign posting, is recommended to address properties not covered by existing covenants.

Recommendations for Technical Improvement

4. Optimization evaluation of soil vapor extraction system operations and sampling soils as needed to document progress toward cleanup goals.

5. Optimization evaluation of groundwater extraction system and bringing additional extraction wells on line to improve efficiency of groundwater extraction.

6. LSGTF needs conduct a Monitored Natural Attenuation (MNA) assessment to determine if natural attenuation processes will prevent the low concentrations of contaminants down gradient of groundwater extraction well system from reaching Coyote Creek.

7. Groundwater sampling techniques (e.g., low-flow sampling technique) need to be applied to the shallow zone groundwater sampling to reduce sampling cost and improve the reliability of VOC sampling results.

Recommendations for Future Site Closeout

8. Regulatory agencies should determine if SVE has met the 1 ppm total VOC soils cleanup criteria discussed in the OU-1 ROD.

9. Regulatory agencies should review existing decision documents and clarify remediation (cleanup) goals for OU 2 shallow groundwater.

10. An assessment should be conducted to determine whether a replacement Zone D monitoring well is necessary. If a replacement well is no longer needed, a ROD amendment or ESD should be issued.

Protectiveness Statement(s): The remedy is considered protective in the short-term since there is no evidence of currently complete exposure pathways to contaminated soils and groundwater. However, in order for the remedy to remain protective in the long term until performance standards specified in the ROD are met, institutional controls for the site must be fully implemented..

1.0. INTRODUCTION

This is the second site-wide FYR report of Remedial Actions for the LB&D Site located in San Jose, California. Response actions at the site included a series of removal actions in which drums, heavily contaminated soils, buildings, tanks and sumps were removed and taken off-site for disposal. Concurrently with the removal activities, an EE/CA and OU-2 ROD (1988) were prepared to address the off-site shallow zone groundwater plume. The OU-2 ROD selected a pump and treat system consisting of 18 groundwater extraction wells and a GAC treatment system, which is operated by the LSGTF PRP group. The OU-1 ROD (1993) addressed the Site soils remedy and deep zone groundwater monitoring. The OU-1 remedial action, conducted by the EPA, removed the most contaminated soils remaining on site through excavation and disposal, installed a SVE system to treat remaining soils contaminated with volatile organics, capped the LB&D property, and implemented a monitoring program for the deeper drinking water aquifer to determine if downward migration of contamination from the shallow aquifer was occurring.

The purpose of FYRs is to determine whether the remedy at a site is protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in FYR reports. In addition, FYR reports identify issues found during the review, if any, and identify recommendations to address them.

The EPA is preparing this FYR report pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) § 121 and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). CERCLA §121(c) states:

“If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.”

The EPA interpreted this requirement further in the NCP; 40 CFR § 300.430 (f) (4) (ii) states:

“If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after initiation of the selected remedial action.”

The purpose and focus of five-year reviews are further defined in United States Environmental Protection Agency (USEPA) Office of Solid Waste and Emergency Response (OSWER) Directive 9355.7-03B-P (USEPA, 2001).

The EPA Region IX has conducted a review of the remedial actions implemented at the LB&D Site, 1515 South 10th Street, San Jose, CA. This review was conducted between April and June 2005. This report documents the results of the review. The U.S. Army Corps of Engineers (USACE) provided analyses in support of the FYR through an Interagency Agreement (IAG) with EPA Region IX.

This is the second FYR for the LB&D Site. The trigger date for this FYR was the completion of the first FYR report on September 27, 2000. Statutory review is required for sites where the selected remedy does not allow unlimited use and unrestricted exposure after the ROD clean-up actions are completed and the clean-up goals have been met. The selected soil remedy for the site includes a *containment cap, which will not allow for unlimited use of the site in the future*, even if the completion of the remedial action satisfies the clean-up goals described in the ROD.

2.0. SITE CHRONOLOGY

TABLE 1: CHRONOLOGY OF SITE EVENTS	
EVENT	DATE
EPA performed a PA/SI	1984
EPA proposes Lorentz Site for NPL	1984
Lorentz Facility was permanently closed	1987
EPA begins drum removal, drains tanks and begins soils removal	1987
EE/CA Completed for OU-2 shallow groundwater	1988
EPA removes 26,000 drums and 3000 cubic yards (cy) of contaminated soil	1988
OU-2 ROD signed	1988
Lorentz Site placed on the NPL	1989
RI Report completed by the owner	1990
Consent Decree signed by LSGTF for OU-2	1990
RI/FS Report completed by the EPA	1990
Remedial design complete for OU-2	1991
Building structures, remaining debris, sumps, asbestos and drums are removed	1992
OU-2 Groundwater Treatment began	1992
Risk Assessment completed	1992
OU-1 ROD signed	1993
Remedial design complete for OU-1	1998
OU-2 ROD ESD signed	1998
OU-1 ROD ESD signed	1998
Remedial Action Construction completed	1998
First Five Year Review completed	2000
10th Street purchases property at the Site; Covenant on Parcel No. 477-09-037	2002
Consent Decree (cost recovery) signed by PRPs	2004
Covenant on Newark Parcel No. 477-09-034 and 477-09-036	2005

Some of the deep aquifer groundwater monitoring wells are located in this zone. No contamination has been found in this zone to date. Zone C is underlain by an approximately 100 foot-thick aquitard. General groundwater flow direction is to the northwest.

Zone D 230- 1,000 ft. bgs **Material: sand, gravel, silty sand**
Lenses: silt, clayey silt, silty clay

Zone D is the regional lower aquifer, which is used as a drinking water source. The producing zone is about 50 feet thick and contains the remaining deep aquifer groundwater monitoring wells. No contamination from the site has been found to date in this zone. General groundwater flow direction is to the north, and is influenced by pumping from the San Jose Water Company's 12th Street well field.

3.2. Land and Resource Use

The site is located at the edge of a large area zoned as an industrial area. The existing businesses to the south and the east of the site include a paper recycling facility, vehicle repair shops, metal plating and painting shops, and other similar types of industry. SJSU sports and recreation fields, a sports stadium, and an ice skating rink are to the northwest, north and east of the site, respectively. SJSU student housing is located 700 feet north of the site. The 10th Street property is now used as a fenced parking area for numerous auto dealers. No other land uses near the site have changed since the remedial actions were selected for the site. The resources potentially impacted by the site contamination are the intermediate and deep aquifers and Coyote Creek, which meanders in a northerly direction approximately 0.5 miles east of the LB&D property (see Figure 4).

In 1968, a San Jose industrial waste inspector discovered hazardous waste in Coyote Creek. The waste source was traced to the LB&D property. Shallow groundwater from Zone B near the site can recharge Coyote Creek. Current site treatment technology operations that discharge to Coyote Creek are subject to National Pollutant Discharge Elimination System (NPDES) permitting requirements. Zone B aquifer monitoring wells at multiple locations, including the area between the plume and the creek, are sampled annually by the Lorentz Shallow Groundwater Task Force (LSGTF) to verify the contaminant plume is still contained. Semi-annual sampling is required by the OU-2 ROD.

The Santa Clara Valley Water District (SCVWD) uses the deeper Zones C and D as a water supply source. Deep Zone C groundwater is currently monitored quarterly by the EPA to verify that the shallow Zone B contamination has not migrated to the deeper zones. Future monitoring may revert back to a semi-annual basis as originally stated in the OU-1 ROD.

3.3. History of Contamination

The drum recycling facility accepted over 2 million drums from more than 3,000 parties until it was closed by a court action brought by the DHS in July 1987. The facility received drums that

contained aqueous wastes, organic solvents, acids, oxidizers, and oils. The drums were reconditioned through a variety of methods such as: caustic and acid washing, incineration, blasting with steel shot, and steam cleaning. The residues and cleaning materials were dumped into sumps and basins on-site, which drained into the site soils and into the local storm sewer. The drums were then resealed and repainted with substances such as phenolic epoxy resins, rust inhibitors and lead based paints. The drums were then either returned to the original owner or sold.

3.4. Initial Response

Site operations at the LB&D property were temporarily shut down for three months in 1985 as a result of the Santa Clara County District Attorney obtaining a Temporary Restraining Order based on multiple violations of California Codes and Federal Regulations. In 1987, the LB&D facilities were permanently closed.

Multiple removal actions took place at the site before, as well as after, EPA issued the 1988 OU-2 ROD for the shallow groundwater and the 1993 OU-1 ROD for soils, the deep aquifer, and other actions not completely addressed by the OU-2 ROD. The first of these removal actions included the initial drum and soil removal effort performed by the Department of Health Services (DHS) and the EPA Technical Assistance Team (TAT) in 1987. The EPA paved the site with a chip seal material to prevent rainwater and surface water runoff from infiltrating through the contaminated soil, and potentially leaching contaminants into the shallow groundwater. The surface seal also prevented direct contact with the contaminated soil. In 1988, the EPA and DHS removed approximately 3,000 cubic yards of highly contaminated soil from the northern part of the site and removed 26,000 drums containing hazardous and other wastes. The EPA and a group of responsible parties signed an administrative order on consent (AOC) in 1992 to remove the remaining drums, asbestos containing materials, general site debris, above ground structures, and sumps from the site. Work associated with the AOC was completed in 1994.

3.5. Basis for Taking Action

The following chemical contaminants have been detected in the soil: volatile and semi-volatile organic compounds, pesticides, herbicides, polychlorinated biphenyls (PCBs), and inorganic compounds such as heavy metals. In addition, volatile and semi-volatile organic compounds have been found in the shallow groundwater. The potential exists for the compounds to migrate further from the LB&D property, impact deep zone drinking water aquifers, and impact adjacent surface waters (i.e., Coyote Creek).

The shallow groundwater pump and treat system is removing and treating the following contaminants: vinyl chloride; 1,1-dichloroethene (1,1-DCE); cis-1,2-dichloroethene (cis-1,2-DCE); 1,1-dichloroethane (1,1-DCA); 1,1,1-trichloroethane (TCA); 1,2-dichloroethane (1,2-DCA); trichloroethene (TCE); 1,2-dichloropropane (1,2-DCPA); and tetrachloroethene (PCE).

4.0. REMEDIAL ACTIONS

EPA started the Remedial Investigation and Feasibility Study (RI/FS) in 1988 and completed it in July 1990. EPA issued two RODs. The first ROD is the OU-2 ROD (1988), issued before completion of the RI/FS, which addresses the contaminated shallow zone groundwater. The OU-2 ROD selected pump and treat technology for the shallow zone groundwater remedy at the Lorentz site. The remedy is to control the shallow groundwater plume's off-site migration. The second ROD, the OU-1 ROD (1993), addresses the Site soils, and deep zone groundwater. The OU-1 ROD calls for contaminated subsurface soil removal, vadose zone soil vapor extraction, capping the Site, and deep zone groundwater monitoring. The OU-1 ROD includes remedial actions to remediate VOC-contaminated soil on-site and to encapsulate the soils contaminated with metals and organics. The OU-1 ROD contains provisions to address all remaining sources of contamination not already addressed by the removal of barrels, drums, and soils completed in 1998; the removal of structures, sumps, drums and debris in 1993 and 1994; and the OU-2 shallow groundwater extraction and treatment system. The OU-1 ROD is considered the "final remedy" for the LB&D site.

4.1. Operable Unit 1 - SVE System and Containment Cap

4.1.1. Remedy Selection

On August 26, 1993, EPA signed the ROD for OU-1. The stated objective in the ROD is to protect human health and the environment from all remaining releases or threats of releases of hazardous substances that were not addressed by previous or current cleanup actions at the LB&D property. The principal threat considered in the ROD is soil contaminated with VOCs and hazardous inorganic materials. The ROD selected an SVE system coupled with an asphalt cap. The SVE system was selected to remove VOC contamination from the vadose zone. In addition to its primary cleanup goal of preventing exposure to the soils contaminated with non-mobile compounds (e.g., PCBs, pesticides, herbicides, and metals), the asphalt containment cap was selected to prevent infiltration of precipitation and protect shallow groundwater from further degradation by mobile VOCs.

The cleanup standard selected in the ROD is 1 ppm total VOCs (assumed to be in soils). The ROD also provides for implementation of institutional controls (ICs) at the 10th Street property, Newark property, as well as the adjacent city sidewalk area. The ICs will limit excavation in these three areas to prevent contact with contaminated soils. Monitoring of the deeper Zone C and D aquifers was included to ensure cross-contamination does not occur via vertical or horizontal conduits from the shallow aquifer addressed in OU-2. The OU-1 selected remedy also addresses monitoring vadose zone soil gas near residences located above the shallow groundwater contaminant plume, removal of structures and debris, and removal of incinerator ash residues and other hazardous materials accepted at the site.

An Explanation of Significant Differences (ESD) was approved in 1998. The ESD allowed off-site disposal of 900 cubic yards (CY) of PCB-contaminated soils with concentrations below the

ROD-specified 50 ppm threshold. This was necessary due to the presence of debris in the stockpile, poor compaction qualities, and problems with incorporating this volume of soil into the grading scheme under the cap.

4.1.2. Remedy Implementation

The following activities occurred as a result of enforcement actions, or activities specified in the OU-1 ROD:

- Hazardous residues were removed from the sumps and basins on the site by EPA and DHS in 1987 as a result of 1985 violations cited by the state and federal governments. In addition, drums with hazardous residues were removed from the site in 1987 and 1988 by EPA and DHS.
- A second removal action involved excavation of highly contaminated soils containing PCBs greater than 50 ppm and other contaminants, which were removed and disposed of off-site in 1988 by EPA and DHS.
- As a result of an AOC signed in 1992, the PRP group completed the removal and off-site disposal of the structures and remaining drums, and sealed vertical and horizontal conduits in 1994.
- EPA completed design of the SVE system and asphaltic concrete cap in June 1998.
- EPA completed construction of the asphaltic concrete cap in September 1998.
- EPA completed construction of the SVE system in September 1998. The SVE system includes 7 vapor extraction wells, pumps, vapor-phase GAC units, and liquid-phase GAC units.
- An initial off-site soil gas survey was conducted by a contractor for the LB&D owner in 1987. The survey found that contaminated soil vapor had migrated down gradient of the LB&D property with the shallow groundwater plume. EPA expanded the area to be further studied in the OU-1 ROD and a subsequent soil-gas assessment was conducted in the residential areas above the shallow groundwater plume by an EPA contractor in 1996. The survey found that the contaminated soil vapor had not migrated to the residential areas near the site. In addition, evaluation of the results from the most recent shallow groundwater sampling round (conducted late 2004 by the LSGTF) using EPA *Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils* (EPA, 2002), *Screening for Environmental Concerns at Site with Contaminated Soil and Groundwater, Interim Final* (RWQCB, February 2005) indicated TCE and VC concentrations in the vicinity of the student housing would not be of concern.
- An EPA contractor began semi-annual groundwater monitoring of the deep aquifer on- and off-site in 1990. Monitoring has been done on a quarterly basis since 2004, but the

frequency will be reduced to semi-annually in 2006. Monitoring will continue until EPA confirms that the on-site VOC contamination in the soil has achieved the remedial goals identified in the OU-1 ROD, and groundwater remedial action objectives (RAOs) are also achieved. No contamination from the site has been detected in the deep aquifer through April 2005.

- ICs have been partially implemented. In 2002, a Restrictive Covenant was taken on the 10th Street property. In 2005, a Restrictive Covenant was taken on the Newark property. SCVWD well permitting procedures are functioning as ICs to prevent well construction for water supply purpose.

4.1.3. System Operations/ Operation and Maintenance (O&M)

The SVE system started extracting contaminants from the soil in September 1998 and was operated effectively by an EPA contractor for 6 months. Due to a change in EPA contract support, the system was shut down temporarily. The EPA entered into an IAG with the USACE to resume OU-1 site operations. The USACE has successfully operated the SVE system from June 2001 to June 2004. The system has been functioning well with normal maintenance required. During the fall of 2001, the off-gas treatment system was modified to include a permanganate scrubber to destroy vinyl chloride present in concentrations greater than the vapor phase GAC units could handle in a cost effective manner. The SVE system was turned off on June 6, 2004 due to low volatile organic compound recovery from the system and concerns about system efficiencies. An optimization evaluation of the SVE system was done by USACE in conjunction with the five-year review, and recommendations concerning improvements to the SVE system are included in paragraph 7.1.1.2. The cleanup level in the OU-1 ROD is stated as 1 ppm of total VOCs, but implementation of clean up goals is not addressed. There are no current site soil data available to determine if soil cleanup criteria have been met.

The containment cap and security fencing were completed in September 1998 and are in excellent condition. Only minor repairs are necessary to several of the SVE well vaults, which were damaged by cars parking on the pit access covers.

In 1998, Zone D monitoring well MW-44 was abandoned by the EPA. MW-44 was 600 feet deep and screened in six zones. It was intended to mirror the construction of the San Jose Water Company wells with sampling in each zone individually using packers to isolate the zone of interest. In an email from the SCVWD to the U.S. Army Corps of Engineers dated February 14, 2001, SCVWD indicated that sources were sufficiently removed and plumes sufficiently contained supporting EPA's decision to destroy the well. Screening multiple zones in a non-pumping well is also undesirable as it may introduce cross contamination. Site contamination was never detected during the time Zone D was routinely monitored. There is a thick layer of marine clays (approximately 150 feet thickness) separating the Zone C and the Zone D aquifers and there is no conduit between two deep aquifers; therefore, EPA's current deep zone aquifer monitoring is focusing on the Zone C aquifer.

Current operational costs are included in Table 2. The annual cost identified in the OU-1 ROD for O&M for Zone C & D monitoring and cap maintenance in Alternative 2 was \$63,000. Cost associated with the operation of the SVE system was assumed to average \$47,000 per year over a two-year period. This brings the OU-1 ROD's estimated annual O&M cost for the selected remedy to \$110,000 per year.

Table 2: Annual OU-1 System Operations/O&M Costs

Dates		Total Cost rounded to nearest \$1,000
From	To	
July 2002	December 2002	\$231,000
April 2003	April 2004	\$329,000
April 2004	December 2004*	\$ 79,000

*Note: No SVE system operation costs after June 2004

Costs in Table 2 reflect operations, maintenance, spare parts and labor for the SVE system, and monitoring costs for the Zones C and D aquifers.

4.2. Operable Unit 2 - Shallow Groundwater

4.2.1. Remedy Selection

On September 25, 1988, EPA signed the ROD for OU-2. Since there was an immediate need to proceed with containment of the shallow groundwater plume, the OU-2 ROD was issued before completion of the risk assessment in the RI/FS (July 1990). A screening level risk assessment looked at only carcinogens in shallow Zone B groundwater. The 1990 RI/FS addressed ARARs and contained a baseline risk assessment, which evaluated both carcinogenic risk and non-carcinogenic hazard of site contaminants. The Remedial Investigation Report: Addendum No. 3 (June 19, 1992) further addressed soils and the potential for vapor intrusion in residential areas overlying the shallow groundwater plume. The OU-1 ROD contained provisions to address those groundwater issues (vapor intrusion and deep Zones C and D monitoring) that were not addressed in the OU-2 ROD for a shallow groundwater extraction and treatment system. The OU-1 ROD is considered the "final remedy" for the LB&D site.

The objectives for the OU-2 remedy are: prevent further migration of the shallow groundwater plume; prevent the shallow groundwater plume from discharging into Coyote Creek; and prevent contamination of the deep groundwater aquifer located beneath the shallow-zone plume. To accomplish these goals, the OU-2 ROD selected a containment remedy consisting of a groundwater extraction system, ultraviolet/oxidation (UV/Ox) treatment, and disposal of treated water to the storm sewer. The cleanup goals in the ROD are to "substantially reduce or eliminate all groundwater contamination from the shallow groundwater". EPA and the PRP group have agreed that the shallow groundwater cleanup activities at the site will continue until the contaminants of concern identified in the ROD are reduced to the remediation (clean up) goals. EPA and the PRP are currently using established federal and state drinking water limits as the basis for evaluating the sampling information.

The OU-2 ROD also contained provisions for remediating PCB and nickel in the groundwater if these compounds were found. The subsequent remedial investigation did not find PCBs in either the shallow groundwater or deep aquifer during the sampling events. Nickel was not found above the background level in either the shallow groundwater or deep aquifer. Based on these results, the final Remedial Investigation Report, dated July 1990, concluded that no further remedial action was required for either PCBs or nickel in either the shallow groundwater or deep aquifer. Sampling efforts as recently as 2004 have verified the absence of PCBs and nickel in the groundwater. The remedial design for the groundwater treatment system without metals treatment was approved by EPA in July 1991.

4.2.2. Remedy Implementation

The construction of the shallow groundwater remedy by the LSGTF's contractor began with the excavation of a shallow area near East Alma Street for the treatment facility foundation. The concrete foundation was completed and a pre-engineered steel building was constructed after installation of the treatment equipment. During this time, the groundwater wells were drilled and the pneumatic pumps, controllers, and piping to the treatment plant were installed. Construction of the treatment system was completed, and the system was inspected and accepted by EPA in March 1992. The system has been in continuous operation since that time.

The extraction system includes 18, 4-inch cased groundwater extraction wells, see Figure 4. Groundwater is extracted by pneumatic extraction pumps, which are powered by a timed compressed air system. Of the original 18 wells installed, only 3 have been in operation since August 2000: wells EX-9, EX-13, and EX-19. The groundwater is pumped to the site through 2-inch diameter pipes at an average flow rate of 1.2 gallons per minute (gpm) and discharged into a 3000-gallon tank. When the high level is reached in the tank, the treatment cycle is initiated at a flow rate of 12 – 16 gpm until the tank reaches the low water level cut off. The original design selected for the groundwater treatment was an UV/Ox unit. This selection was based on the levels of vinyl chloride initially found in the groundwater samples. During operation, a GAC unit was added to the treatment process due to a lack of efficiency of the UV/Ox system. A system analysis showed the GAC system alone was more effective and less costly to operate than the combined UV/Ox, GAC system. The OU-2 ESD, approved by the EPA, eliminated the requirement to use the UV/Ox system and adopted GAC as the primary treatment process. Treated water is discharged to the storm sewer and eventually reaches Coyote Creek. Spent GAC is regenerated off-site in accordance with State and Federal regulations. Eleven piezometers are used to monitor the groundwater levels in the immediate vicinity of the extraction system.

4.2.3. System Operations / Operation and Maintenance (O&M)

The intent of the OU-2 ROD was to prevent groundwater contamination from migrating further from the 10th Street and Newark properties. To achieve compliance with the OU-2 ROD, the LSGTF group designed and constructed an extraction well field, which has successfully contained the plume and prevented further migration to the north and to the deep aquifer. Given

the extensive existing extraction well network, EPA anticipates that completion of the groundwater remedial action (whether restoration or containment) can be implemented without further construction, unless new technologies are implemented to accelerate cleanup.

The LSGTF has been systematically shutting down wells in the extraction system in an effort to optimize operations intended to maintain plume containment. The operations contractor handles minor equipment malfunctions and routine maintenance, generally during their weekly 3 – 5 hour site visits. The current piping system is subject to the formation of mineral deposits (iron and manganese), also known as “scaling.” The interior wall of the piping between the wells and treatment plant has been accumulating scale since the plant start up. To eliminate the potential for plugging the GAC and requiring filters prior to the GAC, the operators have installed strainers in several locations. The scale that flakes off is captured in the strainers. The strainers are cleaned during the weekly visit.

Current operational costs are included in Table 3. The annual cost identified in the ROD for the shallow groundwater (Zone B) extraction and treatment system O&M was \$198,000. These costs were based on use of an UV/Ox system. The UV/Ox system was replaced with a GAC system, which operates at a substantial cost savings. Costs associated with monitoring the Zone B aquifer were not included in the ROD.

Table 3: Annual OU-2 System Operations/O&M Costs

Dates		Total Cost rounded to nearest \$1,000
From	To	
January 2003	December 2003	\$87,000
January 2004	December 2004	\$85,000

Costs in Table 3 reflect operations, maintenance, spare parts and labor for the extraction and treatment system, and monitoring costs for the Zone B aquifer.

5.0. PROGRESS SINCE THE LAST REVIEW

Although formal protectiveness statements as identified in the 2001 EPA Guidance, OSWER No. 9355.7-03B-P were not made in the First Five Year review, the following statement was included which indicates the remedies in place were considered to be protective:

"The remedial actions selected and implemented at the Lorentz Barrel and Drum site remain protective of public health and the environment, however, the actions to date do not fully meet the objectives of the OU 1 or OU 2 RODs. By continuing the planned actions discussed in Section 4, Technology Review / Performance of Remedy, the EPA will fully meet the objectives discussed in both the OU 1 and OU 2 RODs. Subsequent five-year reviews will evaluate the success of this future work."

The recommendations suggested:

- The continued operation of the OU-2 pump and treat system.
- Resuming operation of the SVE system, which had been shut down due to the EPA changing contract strategy from the construction contractor to a long-term O&M contractor.
- Continued monitoring of the shallow groundwater to confirm that shallow plume contaminants do not reach Coyote Creek.
- Periodic inspection of the asphaltic concrete cap.

The above recommendations have been implemented. The OU-2 contractor has been systematically reducing the number of pumps and the extraction rate while continuing to monitor the plume boundaries. The OU-1 SVE system was restarted in 2001 and additional mass removed; however, the mass recovery rate of the system was declining significantly. The USACE evaluated the system to address operational issues in winter 2003. The system was shut down in June 2004. Monitoring Well 39 was removed due to construction in the vicinity of the well, and replaced with MW-39A. Monitoring of the Zone C aquifer was resumed in 2004.

The 5.25 acre LB&D property was sold in 2002 and a restrictive covenant on the property was taken by DTSC. In 2005, a restrictive covenant on the Newark property was also taken by DTSC.

6.0. FIVE YEAR REVIEW PROCESS

6.1. Administrative Components, Community Notification, Document Review

This FYR consisted of the following activities: public notification in prominent San Jose area newspapers that a FYR was under way; a review of relevant documents as listed in Attachment B; discussions with operation and maintenance contractors, the EPA RPM, and the PRP representative; and a site inspection. The RAOs, applicable or relevant and appropriate requirements (ARARs), and cleanup levels were obtained from the ROD for each OU. A copy of this completed report and an updated fact sheet will be available through the EPA Region IX Superfund Record Center located in San Francisco or from the information repository at the Martin Luther King, Jr. Library in San Jose. Notice of the completion of this report will also be announced in the local newspaper.

6.2. Data Review

Summary groundwater concentration data from the LSGTF Annual Groundwater Monitoring Report No. 36, November 2004, were reviewed for relevant trends. This report included historical monitoring results for most piezometers and monitoring wells at the site. Tabulated data that were evaluated may be found in Attachment C, Table C1. A qualitative capture zone analysis was also performed using aquifer transmissivity data from the 1990 RI report.

6.2.1. Relevant Trends

Concentrations of TCE have decreased slightly at piezometers P-6 and P-18, on and immediately downgradient of the LB&D property, respectively, see Figure 4. Concentrations of TCE have increased slightly at P-9 (further downgradient of the LB&D property) and at P-12 (in the middle of the plume) over the last five years. This tends to indicate reduced contaminant loading from the source and/or migration of the plume away from the LB&D property.

TCE concentrations in P-22 (due north of the LB&D property at Tenth Street and East Alma Avenue) have been increasing. Although the concentration increase has not been significant (from 1.5 to 7.8 $\mu\text{g/L}$, and the MCL is 5 $\mu\text{g/L}$), it could indicate potential transport of contamination from under the cap.

Generally, concentrations of 1,1-DCE are lower in wells downgradient of the extraction system as compared to wells upgradient of the system. Even so, concentrations of 1,1-DCE have increased slightly in piezometers P-28 and P-30 over the last five years to a maximum concentration of approximately four times the MCL. Piezometers P-28 and P-30 are located less than 75 feet downgradient of the extraction well system. All other volatile compounds assessed at these piezometers are less than their corresponding Federal or State MCL.

In piezometers P-26, P-28, and P-30, concentrations of 1,1-DCA exceed the State PRG of 2 $\mu\text{g/L}$ by a factor of one to five over the last five years.

Concentrations of 1,1-DCE in Well MW-38, located approximately 350 feet downgradient of the extraction system, have consistently been about four times the Federal MCL over the last five years. The latest sampling round in MW-38 shows concentrations for 1,1-DCA and 1,1-DCE to be about 1/20th to 1/30th the concentrations from samples collected the previous year (2003). This may indicate potential sampling or analytical error related to the 2004 sample collected from the well. It is unclear whether the chemical concentrations detected in the down gradient wells existed before the installation of groundwater extraction wells or after the initiation of extraction.

The plume appears bounded by wells MW-24, MW-41 and MW-42 on the north and east; wells MW-11 and MW-25 on the south; and by MW-22 to the west. The system has been successful in reducing contaminant concentrations at the downgradient end of the plume, but has not eliminated contamination completely. Low-level detections of site contaminants have been detected in Zone B wells downgradient of the extraction system, with some detections of 1,1-DCE exceeding Federal MCLs, and detections of 1,1-DCA exceeding the State-modified PRG. However, the system is considered protective due to the existence of institutional controls in the form of SCVWD permitting procedures (as described in Section 7 of this document) that prevent access to the Zone B aquifer.

The groundwater monitoring program also includes MW-45, a deep zone well located downgradient of the LB&D property to act as an early warning indicator of potential impacts to the existing SJSU Spartan Stadium irrigation well, and detect contamination in the Zone C and D aquifers.

After the start-up (December 7, 1998 to February 3, 1999) and shake down process for the SVE system, the mass removal rates trended significantly downward. Initial recovery rates were over 2 pounds per day of VOCs and Total Petroleum Hydrocarbons as Gasoline (TPH-G). Prior to temporary shutdown in December 2003, recovery rates dropped by an order of magnitude to less than 0.1 pounds per day.

6.2.2. Recommended Changes to Monitoring Programs

The current monitoring program frequency is sufficient to detect changes in trends. No changes are recommended to the sampling frequency. However, sampling methods for wells and piezometers should be standardized on the low-flow sampling method (EPA 540/S-95/504). The current practice is to use bailers to collect groundwater samples. Several studies have indicated that bailer sampling may result in loss of volatiles. Some unexplained decreases in volatile contaminant concentrations (e.g., P-18 in 2001, MW-38 in 2004) might be related to sampling or analytical problems. Standardizing on a more scientifically-defensible method such as low-flow sampling may reduce potential sampling artifacts.

6.3. Site Inspection

The USACE arrived at the site on April 19, 2005. The site inspection consisted of an inspection of the asphaltic concrete cap, the retaining walls, fencing, and SVE components visible from the

surface of the cap. The primary monitoring wells were located, as well as the extraction wells north of the LB&D property. On April 20, 2005 the EPA, USACE, LSGTF operations contractor, and the SVE operations contractor participated in a site inspection. The list of attendees is included in Attachment D. The inspection involved discussions with the site operators, a tour of each of the treatment facilities, and a question-and-answer session concerning operations at each OU.

6.3.1. OU-1 Summary

The asphaltic containment cap was in excellent condition with no signs of cracking or settlement visible in any of the cap components: the asphaltic concrete cap, concrete curbs and gutters, and the retaining walls (see photos in Attachment E). The SVE system components were inspected and found to be in fair condition. Many of the gauges, instruments, and piping have been impacted by the continuous exposure to the sun. Many of the clear plastic lenses have become discolored due to sun exposure and are no longer readable. The above-ground piping systems have experienced some breakage and have been repaired as necessary. The SVE system was operated for two time periods; the first immediately following construction between December 1998 to April 1999; the second when the system was restarted again in April 2001 and shut down in June 2004 to enable the USACE to assess the reason for the low contaminant recovery. The SVE and monitoring well vaults were in good condition with the exception of damage to the raised concrete curbing around two of the SVE vaults caused by automobiles running into the vaults and parking directly on top of them.

A permanent set of project documents including the health and safety plan, chemical quality assurance plan, operation and maintenance manual, and field sampling plan were not all present at the OU-1 treatment facility. The operator generally carried the documents in his vehicle for easier reference. The contractor was in the process of updating the plans to reflected current conditions. A set of the updated plans will be placed permanently at the plant.

6.3.2. OU-2 Summary

The site inspection of the groundwater pump and treat system found that it was operating in accordance with the current NPDES permit requirements. Three of the 18 wells used to contain the plume were in operation. The continuous flow rate to the plant is approximately 1.2 gpm. The current NPDES permit had a maximum allowable discharge rate to the storm drain/Coyote Creek of 14 gpm. The plant continues to operate free of discharge violations. The Regional Water Quality Control Board, San Francisco Bay Region (RWQCB) approved the LSGTF request to remove PCBs and pesticides from the analyte list in 1996 based on non-detect concentrations over a five-year period. At the insistence of the EPA, the LSGTF included PCBs and pesticides in the most recent sampling effort to ensure the influent did not contain any PCBs and pesticides. Results confirmed the absence of those contaminants. The treatment facility building and components were functioning properly. The UV/Ox equipment originally installed when the facility was constructed was taken off line in 1998 as identified in the OU-2 ESD, and abandoned in place. The health and safety plan, chemical quality assurance plan, operation and maintenance manual, and field sampling plan were present at the site. The documents at the site

reflected conditions at the plant when it was constructed. Following the site visit, the LSGTF updated the plans and replaced the outdated materials at the plant.

6.4. Interviews

The EPA contacted potential interested State of California and local agencies to discuss remedial activities at the site. No adverse comments were received. Representatives from the LSGTF and site contractors were interviewed to address various aspects of site operations. The USACE developed a series of questions that were deemed to be pertinent to operations at the site, and a telephone conference call was held to obtain input from site operators and responsible parties. The results of the call are included in the Attachment D.