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Five-Year Review Report

Second Five-Year Review Report

Selma Pressure Treating Superfund Site

Selma, California

September, 2006

Approved by: **Date:**

Elizabeth J. Adams September 29, 2006

Elizabeth J. Adams
Chief, Site Cleanup Branch
USEPA, Region 9

Five-Year Review Report
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List of Acronyms

ARARs	Applicable or Relevant and Appropriate Requirements
bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
COCs	Contaminants of 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
gpm	Gallons per Minute
HAZWOPR	Hazardous Waste Operations (Training)
IAG	Interagency Agreement
ICs	Institutional Controls
MCL	Maximum Contaminant Level
mg/l	milligrams per liter
μg/l	micrograms per liter
NPL	National Priorities List
O&M	Operation and Maintenance
PCP	Pentachlorophenol
ppb	Parts per billion
ppm	Parts per million
RAOs	Remedial Action Objectives
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RPM	Remedial Project Manager
RWQCB	Regional Water Quality Control Board, San Francisco Bay Region
SPT	Selma Pressure Treating
USACE	U.S. Army Corps of Engineers

Executive Summary

The remedy at the Selma Pressure Treating (SPT) Site included excavation of soils that exceeded cleanup levels, and placement of the soils in an on-site impoundment with a RCRA-equivalent cap. The groundwater remedy consists of a pump and treatment system to restore the aquifer to beneficial use and in-situ bio-remediation to optimize cleanup. Decision documents for remedial actions include the: 1988 Record of Decision (ROD), 1993 Explanation of Significant Differences (ESD), 1997 ESD, 2003 ROD Amendment and 2005 ESD.

The chemical contaminants detected in the soil are pentachlorophenol (PCP), dioxins/furans, and heavy metals such as chromium, arsenic and copper. The primary contaminant of concern (COC) in the groundwater is hexavalent chromium.

Between 1991 and 1993, approximately 13,000 cubic yards of soil were excavated, fixed, placed in an on-site impoundment and capped.

In 2003, additional contaminated soil (approximately 40,000 cubic yards) was excavated to depths up to five feet, and placed in the on-site impoundment. The original cap was removed to enable placement of the additional soil and then the impoundment was recapped. Backfilled areas with contaminated soils below five feet were capped with a low permeability asphalt cap.

In 1998, the groundwater extraction system and treatment system began operating and has been operating at full capacity since then. In 2005, an in-situ bioremediation process was added to the groundwater remedy to optimize and accelerate cleanup.

This five-year review found that the remedy was constructed in accordance with requirements of the Record of Decision, the Record of Decision Amendment and the three ESDs.

The soil remedy (OU1) is protective. All contaminated soil above the cleanup levels to five foot below ground surface has been excavated and capped. Areas of deeper soil contamination have been capped in-place in accordance with the 2003 ROD Amendment. Institutional controls are in

place for all components of the soil remedy where contaminated soils remain. All remedial action objectives for soil have been met.

The groundwater remedy (OU2) currently protects human health and the environment because the plume is controlled and there is no current exposure. Institutional controls are in place to restrict use of on-property groundwater. The groundwater extraction and treatment system is effectively removing contaminated water and discharging water below the treatment standard into the aquifer. However, an institutional control should be developed for off-property contaminated groundwater, such as written notification to property owners, the local well permitting authority and county department of health to ensure continued protectiveness until the aquifer is restored.

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site name: Selma Pressure Treating		
EPA ID: CAD029452141		
Region: 9	**State: CA**	**City/County: Selma/Fresno**
SITE STATUS		
NPL status: √ Final		
Remediation status : Operating		
Multiple OUs?* YES	**Construction completion date:** 01/26/2005	
Has site been put into reuse? No		
REVIEW STATUS		
Lead agency: √ EPA State Tribe Other Federal Agency _____		
Author name: Charnjit Bhullar		
Author title: RPM	**Author affiliation: EPA**	
Review period:** 02/25/2006 to 09/28/2006		
Date(s) of site inspection: 03/27-28/2006		
Type of review: √ Post-SARA Pre-SARA NPL-Removal only Non-NPL Remedial Action Site NPL State/Tribe-lead Regional Discretion		
Review number: 2 (second)		
Triggering action: Actual RA On-site Construction at OU #____ Actual RA Start at OU#____ Construction Completion √ Previous Five-Year Review Report Other (specify)		
Triggering action date *(from WasteLAN)*: 09/28/2001		
Due date *(five years after triggering action date)*: 09/28/2006		

Five-Year Review Summary Form cont'd.

Issues:

1. No institutional control or other risk management strategy is in place for private wells downgradient of the SPT property. It is anticipated that the aquifer will be restored in the near future. The affected property owners have been kept informed of the groundwater contamination.
2. Several monitoring wells need locks and maintenance.
3. Elevated arsenic concentrations in groundwater have been detected at in-situ bio-remediation areas.
4. Insufficient documentation of operating parameters and maintenance activities exists for the groundwater extraction and treatment system.
5. Monitoring well RA-3 does not show the positive response to bioremediation that other wells in the area have shown.
6. Soil impoundment and cap inspection and maintenance activities are not documented on a regular basis.

Corresponding Recommendations and Follow-up Actions:

1. Issue letters to affected property owners, the local well permitting authority, and county department of health, to inform their well construction and use decisions. Recommend that the contaminated groundwater not be used for domestic purposes.
2. Establish routine procedures to make replacement locks for the wells readily available to the field crews. Repair bollards (protective outer poles for wells).
3. Continue monitoring arsenic levels in the bio-remediation monitoring wells and wells immediately downgradient, to verify that arsenic concentrations return to normal and do not migrate.
4. Use operator logs and checklists displayed in the O&M Manual to document plant parameters and maintenance items.
5. Re-visit the data from the molasses application in the RA-3 well area and any other relevant data in that area. Determine the nature of the anomaly and whether it is of significance to the success of the bio-remediation program.
6. Develop an inspection and maintenance form to document the O&M activities for the soil impoundment and caps.

Five-Year Review Summary Form cont'd.

Protectiveness Statement(s):

The soil remedy (OU1) is protective. All contaminated soil above the cleanup levels to five feet below ground surface has been excavated and capped. Areas of deeper soil contamination have been capped in accordance with the 2003 ROD Amendment. Institutional controls are in place for all components of the soil remedy where contaminated soil remains. The remedial action objectives have been met.

The groundwater remedy (OU2) currently protects human health and the environment because the plume is controlled. Drinking water in the area is supplied by the City of Selma and the site groundwater is not used for municipal water supply. Institutional controls are in place to restrict use of on-property groundwater. The groundwater extraction and treatment system is effectively removing contaminated water and discharging water well below the treatment standard into the aquifer. An institutional control should be developed for off-property contaminated groundwater, such as written notification to property owners, the local well permitting authority, and county department of health to ensure continued protectiveness until the aquifer is restored.

Five-Year Review Report

1. Introduction

The purpose of the five-year review is to determine whether the remedy at Selma Pressure Treating (SPT) Site is protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in five-year review reports. In addition, five-year review reports identify issues found during the review, if any, and make recommendations to address them.

The EPA, Region IX, with assistance from the U.S. Army Corps of Engineers, has prepared this five-year review report pursuant to CERCLA §121 and the National Contingency Plan (NCP). CERCLA §121 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 is being protective 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 or require 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 National Contingency Plan (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 the initiation of the selected remedial action.

EPA has conducted a review of the remedial actions implemented at the SPT Site, 1735 Dockery Avenue and Adjoining, Selma, California. EPA's review was conducted with assistance from USACE personnel between March 2006 and June 2006. The site inspection was conducted by USACE

in March 2006. This report documents the results of the review.

This is the second five-year review for the SPT Site. The triggering action for this review is the date of the first five-year review report, September 28, 2001. The five-year review is required due to the fact that hazardous substances, pollutants, or contaminants remain at the site above levels that allow for unlimited use and unrestricted exposure.

2. Site Chronology

Table 1: Chronology of Site Events

Event	Date
RWQCB regulated discharge under Waste Discharge Requirements Order	1971 to 1981
U.S. EPA field team conduct Uncontrolled Hazardous Site Investigation	1/31/81
RWQCB issues a Cleanup and Abatement Order to Owners requesting a timetable for cleanup	September 1981
Site placed on National Priorities List (NPL) ranked as number 195 with a Hazardous Ranking of 43.83	September 1983
RWQCB referred the Order to California Attorney General's office based on non-response of Owner regarding a timetable for cleanup	September 1984
Initiation of RI/FS process	1984
Soil investigations carried out	1988
Remedial Investigation Report issued	1988
Feasibility Study Report issued	1988
ROD Signature	9/24/88
First Soil Remedial Design Start	9/21/89
First Soil Remedial Design Completion	6/30/92
First Soil Remedial Action Implementation	7/22/92 to1993
ESD #1 – Revision of soil cleanup standards	10/26/93
First Soil Remedial Design as-built drawings issued	6/30/95
Groundwater Remedial Design Phase I Start	9/29/90
Groundwater Remedial Design Phase I Completion	3/31/92
Groundwater Remedial Design Phase II Start	9/9/97

Table 1: Chronology of Site Events

Event	Date
ESD # 2 – Specifying groundwater discharge to percolation ponds	4/18/97
Perimeter fence installed and parts of wood treatment facility demolished	October 1997
Groundwater Remedial Design Phase II Completion	3/30/98
Groundwater Treatment System Construction	4/20/98 to 9/29/98
Groundwater Treatment System Online	9/29/98
Final Closeout Report for Groundwater Treatment System Construction	2000
Additional soil data collected	1994 to 1999
Excavation of approximately 5,000 cubic yards of soil with COCs greater than cleanup levels from office yard and vineyard	September 1999
Revised Focused Feasibility Study Issued	2001
Remediation System Evaluation	January 2002
Work Plan for Installation of Monitoring Wells (at soil impoundment and percolation ponds	July 2002
Hydrogeology Site Conceptual Model and Groundwater Modeling Update	2003
Focused Feasibility Study Finalized	June 2003
Proposed Plan for modified soil remedy	July 2003
Record of Decision Amendment for modified soil remedy	September 2003
Soil Remedy Construction Plan	October 2003
Soil excavated, placed in impoundment, and capped	October/December 2003
Work Plan for Hydrogeologic Investigation in Support of Additional Extraction Well Installation and Retort Area Plume Delineation	February 2004

Table 1: Chronology of Site Events

Event	Date
Initiate sampling of downgradient residential wells and irrigation wells	February 2004
Asphalt cap installed over excavation areas	May 2004
Final inspection of soil remedy	June 2004
Remedial Action Report for Soils (EPA)	September 2004
In-situ bioremediation pilot test (Phase 1)	Late 2004 – early 2005
Preliminary Close-Out Report	January 2005
ESD # 3 – In-situ bioremediation of groundwater	August 2005
Work Plan for in-situ bioremediation phases 2A, 2B, and 3	September 2005
Implementation of in-situ bioremediation phase 2A	November 2005
Implementation of in-situ bioremediation phase IA	January 2006
Land Use Covenant (LUC) finalized	April 2006
O&M of Soil RCRA Cap and Asphalt RCRA Cap	Ongoing

3. Background

3.1 Physical Characteristics

The SPT Site is a former wood treating facility, approximately 15 miles south of the City of Fresno, in Selma, California. The SPT Site is located at 1735 Dockery Avenue and Adjoining. The site occupies approximately 18 acres, which includes a paved area where the former wood treatment and storage facility operated, percolation ponds, a building housing a water treatment facility, and a capped soil impoundment area. The site includes an area of adjacent vineyard that received contaminated SPT wastewater drainage. Contaminated groundwater extends to the southwest across Highway 99.

The aquifer underlying the site is unconfined and consists of discontinuous fine-grained lenses and cemented zones that act as localized barriers to groundwater flow and contaminant transport. The water-bearing unit is divided into zones based on some degree of stratification of groundwater flow and contaminant transport: a shallow zone from about 20 to 50 feet below ground surface (bgs), an intermediate zone from about 45 to 75 feet bgs, and a deep zone from about 75 to 120 feet bgs.

3.2 Land and Resource Use

The SPT Site is zoned for heavy industrial use, and is located in a transition zone between agricultural, residential, and industrial areas. Twelve residences and businesses are within a quarter of a mile of the site. A former business, Upright Scaffolding, and a small transmission repair shop border the site to the north, and residences border the site to the east. Vineyards and farms border the site to the south and west. No land uses near the site have changed since the remedial actions were selected with the exception of a small portion of adjacent vineyard which became a recycling facility. The site is currently not in use, though a real estate transaction is being pursued by the current property owner.

Groundwater downgradient of the former wood treating facility is pumped from several private wells for irrigation and residential use. Several of the wells are sampled as part of the SPT Site groundwater monitoring program. There are no surface water bodies affected by the site. The surface irrigation water in the area is supplied by the California Irrigation District.

3.3 History of Contamination

Wood treatment operations began at the site in 1936. The wood treatment process originally involved dipping wood into a mixture of pentachlorophenol (PCP) and oil, then drying the wood on open racks. In 1965, a new pressure treating facility began operating at the site. The pressure-treating process consisted of impregnating the wood in pressurized vessels with chemical preservatives, including fluor-chromium-arsenate-phenol, chromated copper arsenate, PCP, copper-8-quinolinolate, LST concentrate, Woodtox 140 RTU, and Heavy Oil Penta 5% solution. The pressure treated wood was placed on racks on the drip pad area, and then moved to the wood storage area. The operating area and wood storage area were paved with asphalt in 1982. Prior to 1982, discharge practices included: (1) runoff into drainage and percolation ditches, (2) drainage into dry wells, (3) spillage onto open ground, (4) placement into an unlined pond and a sludge pit, and (5) discharges to the adjacent vineyards. Wood treatment activities were suspended in 1994. In November 1997 all pressure vessels and tanks were removed from the SPT Site. All buildings, except the office, were demolished and the debris removed from the site.

3.4 Initial Response

Between 1971 and 1981, the RWQCB regulated the discharges from SPT, under a waste discharge requirements order. An Uncontrolled Hazardous Site Investigation was conducted on January 31, 1981, by EPA's Field Investigation Team, the California Department of Health Services (DHS), and the RWQCB. This inspection raised concerns about the potential for groundwater contamination from the site. Investigation activities were then conducted by the State and EPA to assess contamination problems. In 1981, the RWQCB issued a cleanup and abatement order to SPT, requiring a timetable for cleanup. The timetable for cleanup was not submitted and in 1984, the RWQCB referred the order to the California Attorney General's office for further action. EPA added the site to the National Priority list (NPL) in September 1983, and became the lead agency for response work at the site.

3.5 Basis for Taking Action

The following chemical contaminants have been detected in the soil: chromium, arsenic, copper, dioxins/furans, and PCP. Arsenic, dioxins/furans, and PCP were found at concentrations that posed a risk to human health through exposure to soil. Hexavalent chromium was the only chemical of concern above the cleanup level in groundwater.

4. Remedial Actions

In 1986 and 1987, soil investigations were performed as a part of EPA's Remedial Investigation/Feasibility Study (RI/FS). A ROD for both soil and groundwater was signed in 1988, based on the RI/FS. The ROD included the initial remedial action for the soil remedy, additional soil investigation efforts, and the groundwater remedy. During remedial design, changes were made in cleanup levels, and the configuration of both soil and groundwater remedies. These changes were implemented with the first and second ESDs. After the remedial action, a series of additional soil studies were performed, leading to a 2003 ROD Amendment. The remedy for hexavalent chromium in groundwater was an extraction and treatment system, with disposal of treated and tested groundwater into the aquifer, and off-site disposal of sludge generated by the treatment process. The groundwater extraction and treatment system, including eight extraction wells, was installed in 1998 and began operation that same year. The third ESD augments the groundwater remedy with in-situ bioremediation, which is currently underway. The initial ROD did not establish operable units (OUs) for the site. As the remedy changed over time, the soil remedy was designated as OU1, and the groundwater remedy as OU2.

4.1 Soil Remedy (OU1)

4.1.1 Remedy Selection

The 1988 ROD included: (1) excavating soil containing COCs at concentrations that exceed cleanup levels, (2) treating the soils with a fixing agent, (3) placing the fixed soils into an impoundment, and (4) covering the soils with a RCRA cap. Long-term monitoring of the fixed soils for 30 years, and long-term access and institutional controls were also included.

The cleanup levels selected in the ROD for soil were: arsenic, 50 parts per million (ppm); and dioxins/furans, 1 part per billion (ppb). In the 1993 ESD, the cleanup level for arsenic in soil was modified to 25 ppm and a cleanup level for PCP in soil was established at 17 ppm.

The 2003 ROD Amendment included: (1) excavation of additional contaminated soil to depths up to five feet in the processing areas of the site, (2) removal of the upper portion of the RCRA cap over the impounded soil from the previous soil remediation activity, (3) placement of the newly excavated soil and demolition debris in the same impoundment with 5,000 cubic yards of stockpiled soil from a 1999 removal, (4) recapping of the soil impoundment with a RCRA–equivalent cap, (5) backfilling excavated areas and capping them with a low permeability asphalt cap, and (6) establishing institutional controls to prevent exposure to contaminated soil below depths of five feet.

4.1.2 Soil Remedy Implementation

The following soil cleanup actions occurred as specified in the 1988 ROD, 1993 ESD and 2003 ROD Amendment:

- In the 1988 ROD, four initial areas were identified for excavation of soils: (1) an on-site unlined pond, (2) a sludge pit, (3) percolation ditches, and (4) dry wells used to drain surface runoff. The volume of soil removed was approximately 13,000 cubic yards. The work was accomplished between 1991 and 1993.

- The 1993, ESD included additional soil remediation, more stringent cleanup levels for arsenic (25 ppm) and pentachlorophenol (17 ppm), additional areas of soil cleanup, and documentation of compliance with RCRA Land Disposal Restrictions.

- In 1997, a perimeter fence was installed to provide site security and portions of the existing wood treatment facility were demolished.

- In 1999, additional excavation of 5,000 cubic yards of soil was performed, excavated soil was stockpiled and covered on-site and the excavation area was backfilled with clean soil.

- The 2003 ROD amendment included removing the existing RCRA cap and adding 40,000 cubic yards of soil and demolition debris to the soil impoundment. The RCRA cap was re-installed on the impoundment. A fence was installed around the impoundment in 2003. The excavated areas with contaminated soils remaining below five feet were backfilled and covered with a low-permeability asphalt cap in 2004.

- A Land Use Covenant (LUC) was entered into by the State and the property owner in April 2006. This LUC covers 14 acres where the SPT operations took place, the capped areas, and the groundwater treatment system. All soils containing COCs above cleanup levels that remain on-site are within the restricted 14 acre area.

4.1.3 Soil Remedy Monitoring and Maintenance

Three shallow wells were installed around the capped impoundment soil in 2002 to monitor the potential contaminant migration. These wells were added to the site-wide groundwater monitoring program. The site was graded and drainage ditches were installed to control run-off. The final inspection by EPA and the State of the soil remedy was conducted on June 10, 2004, and was considered operational and functional. The cap is inspected twice a year. The RCRA cap is maintained by a once- a-year mowing and application of herbicide to control broad-leaf weeds. A site inspection was documented on January 4, 2005; however, documentation of the site inspection and maintenance activities has not occurred on a regular basis. Responsibility for maintenance of the soil remedy was transferred to the State in June 2005.

4.2 Groundwater Remedy (OU2)

4.2.1 Remedy Selection

The 1988 ROD groundwater remedy included: (1) conventional extraction, (2) ex-situ precipitation, coagulation, and flocculation treatment to remove chromium to meet the MCL, (3) either re-injection or off-site disposal of the treated effluent, and (4) groundwater monitoring to verify contaminant cleanup. The 1997 ESD, allowed discharge of the treated effluent to percolation ponds to recharge water to the aquifer.

In a 2005 ESD, in-situ bioremediation was added to the groundwater remedy to accelerate cleanup. The technology consists of injecting a carbohydrate source (molasses) into the aquifer to create a reducing environment to convert chromium from the mobile and more toxic hexavalent state to the relatively immobile trivalent state.

4.2.2 Remedy Implementation

The groundwater extraction and treatment system was constructed in the summer of 1998 as specified in the ROD and the first two ESDs.
The extraction system included 8 extraction wells. Over time, 3 wells have been replaced or taken off-line due to the decrease in chromium levels in those wells. An additional extraction well, EW-1a, has been taken offline more recently due to the overall success of the in-situ bioremediation process in the plume source area. To speed the clean-up of the site plume, the pumping rates of the remaining wells, EW-3a, EW-4, EW-5 and EW-6 have been increased to a total of 200 gpm. The in-situ bioremediation in the upgradient portions of the plume combined with the increased pumping in the downgradient portions will greatly accelerate the groundwater clean-up.

The treatment system is located inside a prefabricated building on a concrete pad. The process consists of an equalization tank, mixing tank/reactor, flash mixer/flocculator, clarifier, filter feed tank, multi-media filter, pH adjustment, and discharge to one of two recharge basins. Solids from the clarifier are held in sludge thickening tanks and then run through a filter press. A filter cake waste product is generated from the process and disposed of off-site at a permitted RCRA disposal facility.

After construction, inspection, and operational testing, the extraction and treatment system has continued to operate. In February 1999 the sampling of monitoring wells and private wells within the perimeter of the contaminant plume began on a tri-annual basis. The private residential wells are not used for drinking water, but for landscape irrigation and other outdoor uses. In addition, samples were collected monthly, flow rates recorded, and water levels measured in each of the eight extraction wells. Sampling the wells on a tri-annual basis will meet monitoring objectives. The monitoring system supporting the extraction and treatment system initially included 29 monitoring wells and 10 private wells. It now includes a network of 40 monitoring wells, 29 private wells, and 4 offline extraction wells (Sampling report, October 2005). In the latest sampling event in

October 2005, 44 wells were sampled. The primary objective for sampling the wells is to monitor and evaluate the effectiveness of the hexavalent chromium removal and containment.

In 2003 the groundwater flow model used to design the groundwater remediation system was updated, transport modeling was performed, and a hydrogeologic site conceptual model was developed. The modeling effort determined that the groundwater extraction wells provided adequate capture of the plume, but that two additional extraction wells could increase the rate of chromium removal.

In 2004, the concept of using in-situ bioremediation to treat the source area was in development, and implementation of that more aggressive approach was given priority over installation of additional extraction wells. Bench testing and pilot testing identified molasses as the most cost effective material for stimulating biological activity at the SPT Site. The implementation of the in-situ bioremediation is being carried out in phases; each phase designed for a specific area. Thus far, Phase 1 (pilot test), Phase 1A, and Phase 2A have been completed. Phases 2B and 3 are in progress.

4.2.3 System Operation and Maintenance

The treatment system operates 24 hours per day, 7 days per week. The treatment operator maintains the system 8 hours per day, 5 days per week. The O&M activities include: inspection of the plant, and recording flow rates, pressure readings, pH, chromium concentrations and other system parameters on a daily basis. During the weekends, the system parameters are accessible to the operator remotely through a computer hook- up, via a phone line. The operator is paged if system alarms are set off. A backup system emergency contact is located in Concord, California.

Since the last five-year review, the treatment system has operated without significant problems. System flows have been maintained near full plant capacity. System effluent samples show that chromium is consistently removed to concentrations well below the treatment standard of 50μg/L.

As noted previously, the groundwater monitoring well network has grown significantly since 1999, from 39 total wells to 63 as of October 2005. In addition to the 63 network wells, there are an additional eight monitoring wells specifically associated with the in-situ bioremediation, which are

sampled at greater frequency to satisfy data needs for that effort. Not all of the wells enumerated in the network can be consistently sampled, however. A declining water table has rendered most of the shallow wells dry; 12 wells as of the October 2005 event. In addition, property owners have denied access to one irrigation well and one residential well; and sometimes power is not available at irrigation wells when sample crews are there.

Current operational costs for the extraction and treatment system are included in Table 3. The annual cost identified in the 1988 ROD was $1,300,000. At the time of the last five-year review, the cost was approximately $24,000 per month. However, in the course of several years of the operation, the cost increased to approximately $50,000 per month. Costs are currently stable at approximately $35,000 per month due to the system achieving steady state, and system optimization. Increased costs since startup are due to increases in the scope of the monitoring program, cost of chemicals, cost of power, and disposal of filter cake.

Table 2: Groundwater Remedy Annual System Operations/O&M Costs

Dates		Total Cost rounded to nearest $1,000
From	To	
September 2001	September 2002	$400,000
September 2002	September 2003	$587,000
September 2003	September 2004	$729,000*
September 2004	September 2005	$391,000
September 2005	February 2006	$163,000 (for 5 months)

Annual costs in Table 3 reflect operations, maintenance, spare parts, chemicals, and labor for the extraction and treatment system, and groundwater monitoring costs.

* *FY 2004 cost increase due to hydrogeologic investigations/modeling in support of additional extraction wells for the pump and treat system (approximately $130,000).*

5. Progress since the Last Review

The first five-year review identified several specific issues and recommendations. Implementation of the final soil remedy has addressed a large number of the issues including:

- Institutional controls have been established on property.
- Significant efforts were made to evaluate effectiveness of plume capture.
- The bio-remediation process and increased pumping downgradient appear to have resolved the plume capture issue.

However, some O&M issues from the first five-year review have not been adequately addressed, such as documentation and replacement of damaged well locks.

6. Five-year Review Process

6.1 Administrative Components, Community Notification

This five-year review consisted of review of the relevant documents listed in Attachment A, discussions with O&M contractors and the EPA RPM, and a site inspection. The RAOs, ARARs, and cleanup levels were obtained from the ROD and subsequent ESDs and ROD Amendment. A public notice was published in the Selma Enterprise on May 3, 2006 notifying the community of the initiation of this five-year review. Another public notice will be published in the same newspaper when the review is complete which will inform the community that the five-year review report will be placed in the Fresno County Library, Selma Branch, 2200 Selma Avenue, Selma, California. A copy will also be available at the EPA Region IX Superfund Record Center located in San Francisco.

6.2 Data Review

A detailed data review was completed, and the significant trends and issues include:

1. Since the last five-year review, the potentiometric surface has declined approximately 18 feet, from 30 feet below ground surface to approximately 48 feet below ground surface. This is likely an ongoing trend; full recovery is not expected. Twelve shallow zone monitoring wells have gone dry; only the shallow wells near the

percolation ponds still contain water.

2. One of the shallow wells that was dry is on the downgradient side of the capped soil impoundment. That well is one of the three wells installed to fulfill the ARAR for monitoring the waste management unit. The well was sampled for five events before going dry in Summer 2004. There were four chromium detections, with a high value of 48.9 μg/L, and a low value of 5.2 μg/L. However, this well has since had water in it and has been sampled twice since February 2006. The recent samples indicated low levels of hexavalent chromium (February 2006, 11.3 μg/L, and July 2006, 28.0 μg/L). This well could be replaced if it becomes dry again, but is currently useable. However groundwater data from the three wells at the soil impoundment have not shown consistent detections to indicate leaching of contaminants to the groundwater. This will continue to be monitored.

3. Water level data in the shallow zone indicates mounding at the percolation ponds. The mounding appears to dissipate at approximately 500 feet distance, with insignificant effect on the overall groundwater flow pattern.

4. Data in the vicinity of EW-6 suggest that EW-6 may be successfully preventing further spread of chromium in the intermediate zone to the southwest. Wells EW-7 and 12632 South McCall show downward trends, even though EW-6 continues to show an upward trend. This may be attributable to the change in pumping rates from EW-6.

5. Downgradient of the site, additional wells showing downward trends in contaminant levels are P15D, EW-3A, EW-4, and P6D. Wells showing relatively flat trends include EW-1A, EW-2A, and EW-5. Upward trends are observed in Wells P2I. This well is upgradient of the extraction wells and the trend may reflect the migration of the plume toward the extraction wells.

6. One ARAR has changed since the last five-year review. The MCL for arsenic has been reduced from 50 μg/L to 10 μg/L. A review of the groundwater monitoring data from February 1999 to October 2005 indicates that while there are a small number of detections above the new MCL, there is no consistent arsenic plume above that MCL.

EPA intends to continue analyzing arsenic levels as part of the monitoring program, to further evaluate its occurrence in groundwater at the site.

7. Chromium concentrations in the wells monitored for the in-situ bioremediation process show hexavalent chromium being reduced to levels well below the cleanup level within one month, and trivalent chromium concentrations decreasing at a slower rate. Monitoring well RA-3 is an exception, as it shows no apparent affect from the injection of molasses. Reasons for the anomalous data at RA-3 should be investigated.

8. Arsenic concentrations in the new wells installed to monitor the in-situ bioremediation process, beginning in October 2005, show that the process is mobilizing some arsenic, with levels above the MCL appearing in the bio-remediation areas. It is expected that the arsenic concentrations will return to their previous levels when the aquifer redox-state returns to normal. Continued monitoring of this condition, and evaluation of the molasses dosage are recommended.

9. Thirteen downgradient private residential wells and seven private irrigation wells have been sampled since 1997. In the past five years, only one residential well had chromium concentrations slightly above the State MCL of 50 μg/L, but below the Federal MCL of 100 μg/L. The levels were below EPA Region IX preliminary remediation goal for tap water, which is based on non-cancer hazard risk. The most recent sample (total chromium) was 59.8 μg/L in July 2006. The hexavalent chromium value was 47 μg/L. The property owner informed EPA that this well is used for residential irrigation, and not for household use. In addition, three irrigation wells had chromium concentrations that exceeded both State and Federal MCLs in 2004 and half of 2005. The concentrations have dropped below 50 μg/L since mid-2005, probably due to an increase in pumping rates from the remediation system extraction wells. The sampling frequency of several of these wells has not been consistent due to access issues.

6.3 Site Inspection

The five-year review site inspection began March 27, 2006 and was conducted by the USACE. It consisted of an inspection of the capped soil impoundment, the asphalt cap, the monitoring wells, vineyard wells, the site fencing, and the extraction and treatment system. On March 28, 2006, EPA, USACE, and the SPT O&M contractor participated in the site inspection, which involved a discussion with the site operator, a tour of the treatment plant, and a tour of the areas planned for in-situ bioremediation.

6.3.1 Soil Remedy Condition

The soil impoundment and RCRA equivalent cap was in good condition, with no significant ponding on top of the mound. It had been raining frequently over the previous days, as well as earlier that morning. There were minor ponded areas in the drainage swale near the culvert and the top of the impoundment was slightly soggy. The vegetation on the soil impoundment cap was robust, and no erosion or sloughing was observed. The asphalt cap was in good condition and well-drained. Several small areas of patched asphalt were observed where the in-situ bioremediation was performed. The patching appeared adequate to maintain the integrity of the cap. Fencing was installed around the treatment plant, soil impoundment, and percolation ponds, and it was in good repair. There was a pile of asphalt debris on the ground outside the fence, between the treatment plant and the remediation area drainage swale. The pile had been deposited by a prospective purchaser of the property for future use and will be appropriately disposed of.

6.3.2 Groundwater Remedy Condition

The treatment system components were inspected including the influent line, reactor, chemical storage and piping, flocculator, clarifier, sludge tanks, filter press, sand filters, control system, and effluent analyzer components. Each step was documented and photographed. All processes were functioning satisfactorily. Effluent limits are consistently met, as evidenced by the in-line analyzer and frequent field Hach tests. The Hach testing is recorded in a log book. Operating parameters are not regularly documented at the plant. O&M manuals and Health and Safety plans were on-site. The operator's HAZWOPR training is up-to-date. The percolation ponds on-site are constructed as sand-bottom and sidewall reservoirs cut into the natural

site soils and have been functioning well. Percolation ponds allow successful recharge of the treated groundwater to the aquifer reducing the risk of creating unwanted subterranean water movement or displacement of the contaminant plume. On the day of the site visit, there was little water in the ponds, in spite of the very wet weather conditions. Several monitoring wells were inspected. Some had locks missing or damaged. Some had rather insubstantial bollards around them, with some significantly damaged.

A monthly report of the operating flow rates, down times, and daily maintenance procedures is provided to USACE and EPA. The groundwater treatment plant (GWTP) influent and effluent samples are analyzed monthly at a fixed laboratory and the extraction wells are sampled monthly and analyzed on-site with a HACH colorimetric kit. All reports, field sample logs and analytical reports are filed at the contractor's (Shaw Environmental and Infrastructure) Irvine office. Operation chemical dosages were adjusted routinely in the first three years of operation; however, in the last three years the adjustments have been very few. Filter cake from the filter press is generated at a rate of one 10-yard bin per month. This waste stream is profiled once each year. The filter cake is shipped and disposed as hazardous waste at the Clean Harbors Buttonwillow disposal site in Buttonwillow, California.

6.4 Interviews

Interviews were conducted with EPA, and treatment operator (contractor) at the site on March 28, 2006. The remediation activities at the site were discussed in a conference call with EPA, USACE, and the contractor site-manager on April 19, 2006. The results of the interviews and the call are included in the Technical Memorandum: Site Inspection Report and Interview Report (Attachment C). The interviewees have the overall impression that the remedy is effective and that contaminant concentrations in groundwater are decreasing with time as a result of the existing groundwater extraction system and optimization.

7.0 Technical Assessment

7.1 Soil Remedy

7.1.1 Question A: ***Is the remedy functioning as intended by the decision documents?***

7.1.1.1 Remedial Action Performance, Operations, and Opportunities for Optimization:

The existing capped soil impoundment is functioning as designed. The construction of the remedy was considered operational and functional one year after the final inspection. At the time of this five-year review, the impoundment cover showed no signs of damage, and drainage appeared adequate. Current operations include sampling of three shallow zone monitoring wells (SE-4S, 5S, and 6S) installed around the impoundment three times per year. Groundwater data from the three wells at the soil impoundment have not shown consistent detections to indicate leaching of contaminants to the groundwater. This will continue to be monitored. Concentrations of total chromium at SE-5S were elevated above 50 μg/L for three events in 2003/2004, but have remained below that level since then. Monitoring Well SE-4S has been dry since summer 2004. This well has had water in it and has been sampled twice in 2006. The recent samples indicated no hexavalent chromium in this well.

The asphalt cap over the excavated areas is in good shape. Rain water that fell immediately before the five-year review site visit had apparently run off to the designed drainage swales.

7.1.1.2 Implementation of Institutional Controls

Institutional controls have been established to maintain industrial use of the SPT Site and to limit future construction activities to protect the integrity of the capped areas. An LUC has been signed which covers the 14 acre site where the SPT operations took place, and where the soil and groundwater remediation features are located. All soils contaminated to levels above cleanup levels remaining on-site are capped and within the area addressed in the LUC. Specific responsibilities for the property owners are outlined in the LUC. Fencing was observed to be in good condition. At the time of this review, the institutional control had not been in place for long, and the property use had not changed. Thus, there was no basis yet to evaluate how

well the IC is functioning. The State Department of Toxic Substances Control assumed CERCLA Lead Agency responsibility for maintaining the soil remedy, including the institutional control, in June 2005.

7.1.2 Question B: ***Are the exposure assumptions, toxicity data, cleanup levels and remedial action objectives (RAOs) used at the time of the remedy selection for soils still valid?***

7.1.2.1 Changes in standards, newly promulgated standards, and TBCs

All action-specific ARARs listed in the 1988 ROD, 1993 ESD, and the 2003 ROD Amendment has been complied with for soils. There have been no changes to standards or TBCs identified in the ROD that question remedy protectiveness.

7.1.2.2 Changes in Soil Exposure Pathways

There have been no significant changes to either existing or expected land use on or near the site. There have been no newly identified contaminants or contaminant sources since the last five-year review. There have been no unanticipated toxic byproducts of the remedy not previously addressed. There has been no change to the physical site conditions other than that resulting from the required soil remedial actions that could affect remedy protectiveness.

7.1.2.3 Changes in Toxicity

Since the 1990 risk assessment, there have been a number of changes to the toxicity values for certain contaminants of concern at the SPT Site. Some toxicity values indicate a lower risk from exposure to COCs than previously considered; others indicate higher risks. Although, the toxicity values changed, there is no exposure pathway with the caps in place, the site fenced and the LUC implemented.

7.1.2.4 Changes in Risk Assessment Methods

No standardized risk assessment methodologies have changed that could affect the protectiveness of the remedy. Methodologies for assessing dioxin risks are currently under review at the National Research Council. This has potential for future changes in EPA guidelines, which will be assessed in future five-year reviews.

7.1.2.5 Expected Progress Toward Meeting Remedial Action Objectives (RAOs)

The soils containing concentrations above the ROD cleanup levels to a depth of 5 foot below grade surface have been excavated and consolidated in the capped soil impoundment. Institutional controls and an asphalt cap prevent exposure to residual soils left at depth in the excavated areas. Therefore, the RAOs for the soil remedy have been met.

7.1.3 Question C: ***Has any other information come to light that could call into question the protectiveness of the soil remedy?***

There are no complete exposure pathways to ecological receptors. The completed soil remediation protects wildlife against direct exposure. There is no evidence of any site impact due to natural disasters. There is no other new information that might affect the soil remedy protectiveness.

7.2 Groundwater Remedy

7.2.1 Question A: I***s the groundwater remedy functioning as intended by the decision documents?***

7.2.1.1 Remedial Action Performance, Operations

The primary remedial focus of the groundwater remedy in the ROD is to reduce chromium concentrations in the aquifer to below the more stringent of the State and Federal MCLs. The groundwater extraction and treatment system is required to return water to the aquifer that meets that same standard. There was no information found that would call into question the protectiveness of the groundwater treatment system. Improved documentation of operation parameters, chemical usage, and maintenance activities will be implemented to support future reviews.

Data indicate containment of the intermediate zone plume to the southwest. Decreases in contaminant levels in downgradient wells since mid-2005 imply that increased pumping of the four downgradient extraction wells is having the desired effect.

The in-situ bioremediation process has shown rapid success in achieving the chromium remediation standard in most areas where the treatment has been directly applied. There is one area where the treatment has not shown much

effect, which should be evaluated. At present it is too early to evaluate the downgradient effect of the source area treatment. Groundwater extraction wells close to the treatment area have been taken off-line, and pumping has been increased further downgradient to potentially accelerate cleanup in those areas where the bioremediation may not be performed.

7.2.1.2 Implementation of Groundwater Institutional Controls

The ROD stated that institutional controls should be placed on use of groundwater impacted by the site. Such institutional controls have been enacted as part of the LUC for the SPT property. While there are private wells located in the downgradient portion of the plume, none of them are currently believed to be used as a drinking water source. Additionally, the pumping rates of the remaining wells, EW-3a, EW-4, EW-5 and EW-6 have been increased to a total of 200-210 gpm. This has effectively contained the plume to the area upgradient of the extraction wells between the site and 1600 feet south of Hwy 99. It is anticipated that this change will result in aquifer restoration in the next few years. The ROD required that institutional controls be implemented to control and limit use of contaminated portions of the aquifer. A LUC implements this ROD requirement with respect to contaminated groundwater beneath the former wood treating facility. However, low levels of chromium, sometimes in excess of the state MCL, have been detected in downgradient private wells.

Additional monitoring of the groundwater will be conducted, in part, to verify the restoration of the aquifer. An IC, in the form of a written advisory to property owners, the local well permitting authority, and local department of health to inform their well use decisions is needed. EPA believes that this approach is protective in the near term.

7.2.1.3 Opportunities for Optimization

It is reasonable to expect that concentrations of chromium in the treatment plant influent will decrease eventually as a result of the recent significant reduction of the available mass in the source area. Adjustment to chemical dosages in the treatment system at that time is recommended.

7.2.1.4 Early Indicators of Potential Issues

The in-situ bioremediation appears to have dramatically reduced the amount of dissolved chromium available that could move downgradient. This,

combined with increased pumping of the downgradient extraction wells may accelerate progress toward the remediation standard in the foreseeable future. It would be beneficial for the project team to determine the data needed to demonstrate permanent achievement of the goal.

Increased arsenic concentrations as a result of the in-situ bioremediation are believed to be temporary, based on previous testing and implementation of the technology at other sites. This situation must be monitored closely to either demonstrate the disappearance of the arsenic or develop a contingency plan.

7.2.2 Question B: ***Are the exposure assumptions, toxicity data, cleanup levels and remedial action objectives (RAOs) used at the time of the remedy selection still valid for groundwater?***

7.2.2.1 Changes in standards, newly promulgated standards, and TBCs

The 1988 ROD groundwater remedy cleanup level is the maximum contaminant level (MCL) established under both the Federal and State Safe Drinking Water Acts. Since hexavalent chromium was the only contaminant of significance detected in the groundwater, additive effects were not of concern. The cleanup level for chromium at the time of remedy selection was 50 μg/L (State MCL), which is still in effect.

The Federal MCL for arsenic was lowered from 50 μg/L to 10 μg/L in January 2006. The ROD established a cleanup level for arsenic of 50 μg/L based on the MCL in existence at the time that the ROD was signed. Arsenic levels in groundwater at the site are generally below the current MCL, but there have been sporadic detections of arsenic above the MCL. However, these MCL exceedences are in groundwater beneath the former wood treating facility which has a groundwater IC in place. Therefore, despite the change in the arsenic MCL, the remedy remains protective. It is also thought that some arsenic is being mobilized in groundwater beneath the former wood treating facility as a result of the bioremediation process. But it is expected these arsenic levels will decline over time as the groundwater conditions in the bioremediated areas return to ambient conditions. The ambient groundwater is expected to re-oxidize the dissolved arsenic back to its less mobile state. Arsenic levels will continue to be monitored to assess this situation and determine its significance and the need for adjustment to molasses dosage.

7.2.2.2 Changes in Groundwater Exposure Pathways, Toxicity and Other Contaminant Characteristics

There have been no changes to either existing or expected land use on or near the site. There has been no change to the physical site conditions that could affect the protectiveness of the groundwater remedy.

There has been some mobilization of arsenic in groundwater as a result of the in-situ bioremediation process. This situation is being closely monitored to ensure that arsenic concentrations return to normal, as expected. The elevated concentrations are currently limited to the immediate vicinity of the treatment area.

7.2.2.3 Changes in Risk Assessment Methods

There have been no changes in the risk assessment methodologies that could affect the protectiveness of the groundwater remedy.

7.2.2.4 Expected Progress towards Meeting Remedial Action Objectives (RAOs)

The in-situ bioremediation appears to be dramatically reducing the amount of dissolved chromium available from the source areas to move downgradient. This, combined with increased pumping of the downgradient extraction wells is expected to accelerate progress toward meeting the remediation action objectives.

7.2.3 Question C: ***Has any other information come to light that could call into question the protectiveness of the remedy?***

There are no complete exposure pathways to ecological receptors. There is no evidence of any site impact due to natural disasters. There is no other new information that might affect the protectiveness of the groundwater remedy.

8. Issues

Issues for the SPT site are presented in Table 3. This table summarizes some of the deficiencies raised in the previous sections.

Table 3: Issues

Issue	Affects Current Protectiveness (Y/N)?	Affects Future Protectiveness (Y/N)?
1. There is no institutional control or other risk management strategy in place for groundwater downgradient of the SPT property. It is anticipated that the aquifer will be restored in the near future.	N	N
2. No locks exist on some of the monitoring wells.	N	N
3. Elevated arsenic concentrations have been detected in groundwater at the in-situ bioremediation area.	N	N
4. Insufficient documentation of operating parameters and maintenance activities is maintained.	N	N
5. Monitoring well RA-3 does not show response to bioremediation that other wells in the area have shown.	N	N
6. Soil impoundment inspection and maintenance activities are un-documented.	N	N

9. Recommendations and Follow-up Actions

Recommendations for the SPT site are presented in Table 4. This table provides recommendations for each of the issues in Table 3.

Table 4: Recommendations

Issue	Recommendation	Party Responsible	Oversight Agency	Milestone
1	Issue letters to property owners, the county well permitting authority, and the county department of health to update them on the existing chromium plume, and to facilitate health-protective well use and installation decisions. (EPA has kept private well owners and the county informed of the contaminated groundwater to date.)	EPA	EPA	January 2007
2	Establish a routine to make replacement locks for the wells readily available to the field crews.	EPA	EPA	December 2006 (Already in progress)
3	Continue monitoring for arsenic in the bio-remediation monitoring wells and wells immediately downgradient, to verify that concentrations return to normal and do not spread downgradient.	EPA	EPA	All subsequent monitoring events
4	Use operator logs and checklists displayed in the O&M Manual to document plant parameters and maintenance items.	EPA	EPA	January 2007
5	Re-visit the data from the molasses application in the well RA-3 as well as any other relevant site data in that area. Determine the nature of the anomaly and whether it is of significance to the success of the remedy.	EPA	EPA	April 2007
6	Develop an inspection and maintenance form to document the soil impoundment O&M activities.	DTSC	DTSC	March 2007

10. Protectiveness Statement(s)

10.1 Soil Remedy Protectiveness Statement:

The soil remedy (OU1) is protective. All contaminated soil above the cleanup levels to five feet below ground surface, has been excavated and capped. Areas of deeper soil contamination have been capped in accordance with the 2003 ROD Amendment. Institutional controls are in place for all components of the soil remedy where contaminated soils remain. All remedial action objectives have been met.

10.2 Groundwater Remedy Protectiveness Statement:

The groundwater remedy (OU2) currently protects human health and the environment because the plume is controlled. Drinking water in the area is supplied by the City of Selma and the site groundwater is not used for municipal water supply. Institutional controls are in place to restrict use of on-property groundwater. The groundwater extraction and treatment system is effectively removing contaminated water and discharging water well below the treatment standard into the aquifer. An institutional control should be developed for off-property contaminated groundwater such as written notification to property owners, the local well permitting authority, and county department of health to ensure continued protectiveness until the aquifer is restored.

11. Next Review

The next review will be performed in 2011, and will address the soil and groundwater remedies. The next five-year review will be due in September 2011.

ATTACHMENT A

LIST OF DOCUMENTS REVIEWED

DOCUMENTS REVIEWED

- OSWER Directive 9355.7-03B-P, Comprehensive five-year review Guidance

- Superfund Record of Decision, Selma Pressure Treating Company, CA, First Remedial Action – Final. U.S. Environmental Protection Agency, Report No. EPA/ROD/RO9-88/025, September 24, 1988.

- Selma Pressure Treating Company Superfund Site, Explanation of Significant Differences, OU1 October 26, 1993.

- Selma Pressure Treating Company Superfund Site, Explanation of Significant Differences from 1988 Record of Decision, April 18, 1997.

- Selma Pressure Treating Company Superfund Site, Record of Decision Amendment, September 2003.

- Selma Pressure Treating Company Superfund Site, Explanation of Significant Differences, OU2 Groundwater, August 2005.

- Remedial Investigation Report for the Selma Pressure Treating Site, Selma, California, March 1988, CDM Federal Programs Corporation.

- Endangerment Assessment for the Selma Pressure Treating Site, Selma, California, April 1988, CDM Federal Programs Corporation.

- Feasibility Study Report for the Selma Pressure Treating Site, Selma, California, June 1988, CDM Federal Programs Corporation.

- Operations and Maintenance Manual, Selma Pressure Treating Superfund Site, January 1999, IT Corporation.
- Remediation System Evaluation, Selma Pressure Treating Superfund Site, Selma, California, Final Report, U.S. Corps of Engineers, January 31, 2002.

- Work Plan for Groundwater Monitoring Well Installation, Selma Pressure Treating Superfund Site, Selma, California, Shaw Environmental & Infrastructure, Inc., July 2002.

- 2002 Revised Monitoring Well Sampling and Analysis Plan, Selma Pressure Treating Superfund Site, Selma, California, IT Corporation, Inc., August 2002.

- First five-year review Report for Selma Pressure Treating Superfund Site, Selma, California, Geomatrix Consultants, Inc., July 2001

- Focused Feasibility Study Report, Final Document, Selma Pressure Treating Superfund Site, Selma, California, Geomatrix Consultants, Inc., April 17, 2001.

- Quality Assurance and Field Sampling Plan, July 2002, Geomatrix Consultants

- Final Construction Plan, Selma Pressure Treating Site Soil Remediation Project, October 2003, Shaw Environmental Inc.

- Final Work Plan, Hydrogeologic Investigation in Support of Additional Extraction Well Installations and Retort Area Plume Delineation, Selma Pressure Treating Site, February 2004, Shaw Environmental Inc.

- Remedial Action Report: Soil Remedy, U.S. Environmental Protection Agency, Selma Pressure Treating Superfund Site, Selma, California, September 29, 2004.

- Report of Monitoring Well Sampling, July 2005., Selma Pressure Treating Superfund Site, Selma, California, Shaw Environmental & Infrastructure, Inc.

- Report of Monitoring Well Sampling, Selma Pressure Treating Superfund Site, Selma, October 2005, Shaw Environmental & Infrastructure, Inc.

- Final Work Plan, In-Situ Bioremediation: Phase 2A/2B and Phase 3, Shaw Environmental, Inc., Selma Pressure Treating, Selma California, September 2005.

- Technical Presentation: In-Situ Hexavalent Chromium Reduction and Geochemical Fixation in Varied Geohydrologic Regimes, Jim V. Rouse, MWH, Inc., March 2006.

- Deed Restriction: Selma Pressure Treating Company, Selma, California, April 2006, California Environmental Protection Agency.

- U.S. Army Corps of Engineers and Shaw Environmental and Infrastructure, Inc., Memorandum from Wally Shaheen, Larry Hudson, and Daniel Leigh to Charnjit Bhullar Re: Recommedation to Delineate Retort Area Around Phase I Bioremediation, Selma Pressure Treating Site, Selma, California, October 28, 2005.

- U.S. Army Corps of Engineers and Shaw Environmental and Infrastructure, Inc., Memorandum from Wally Shaheen, Larry Hudson, and Daniel Leigh to Charnjit Bhullar Re: Recommendation to Delineate Western Portions of Phase 2B/Phase 3, Selma Pressure Treating Site, Selma, California, October 28, 2005.

- Shaw Environmental and Infrastructure, Inc. and U.S. Army Corps of Engineers, Memorandum from Tom Barry, Larry Hudson, and Wally Shaheen to Charnjit Bhullar Re: Recommendation for In-Situ Bioremediation Phase 1A/Retort Area, Selma Pressure Treating Site, Selma, California, December 1, 2005.

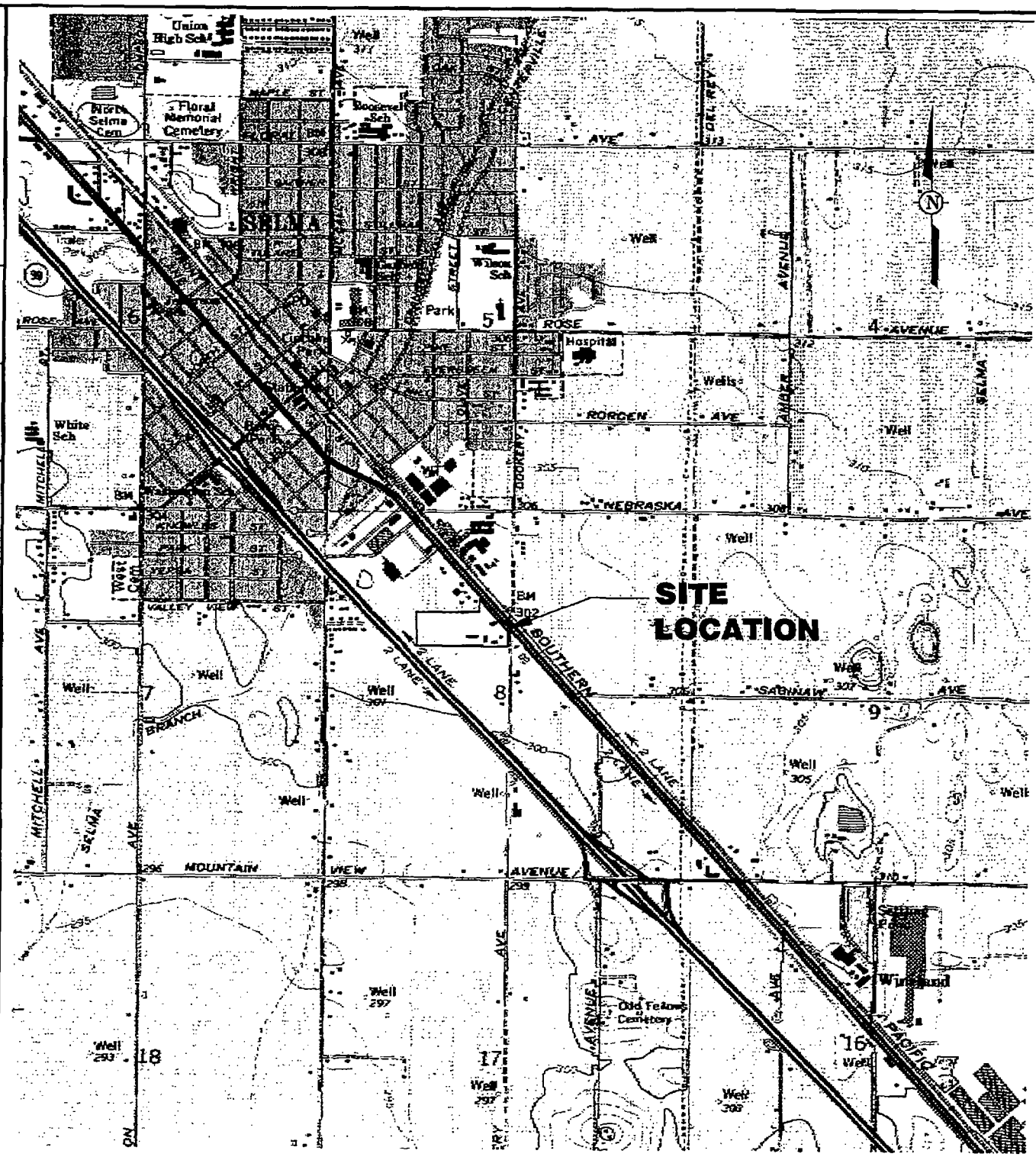
- Technical Memorandum, second five-year review for the Selma Pressure Treating Superfund Site, Site Inspection Report and Interview Report.

- Technical Memorandum, second five-year review for the Selma Pressure Treating Superfund Site, data Review.
- Treatment Plant Influent and Effluent Sample Results.
- January 2006, Monthly Report.
- In-Situ Bioremediation, Phase1, 1A, and 2A Results.
- Historical Groundwater Data.
- Chromium Concentration Trend Charts.
- Technical Memorandum, Status of Recommendation from the last five-year review.
- Technical Memorandum, Institutional Controls Review.
- Deed Restriction
- Technical Memorandum, ARARs Review.
- Technical Memorandum, Risk Assessment and Toxicology Analysis.

ATTACHMENT B

SITE MAPS

IMAGE	X-REF	OFFICE	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
H-03611965.tif		Concord	SJZ 1/8/03			772738-A25



SCALE

0 2000 4000 FEET

REFERENCE:
7.5' USGS TOPOGRAPHIC
QUADRANGLE OF: SELMA, CALIF.;
DATED:1964; PHOTOREVISED 1981;
SCALE: 1:24,000

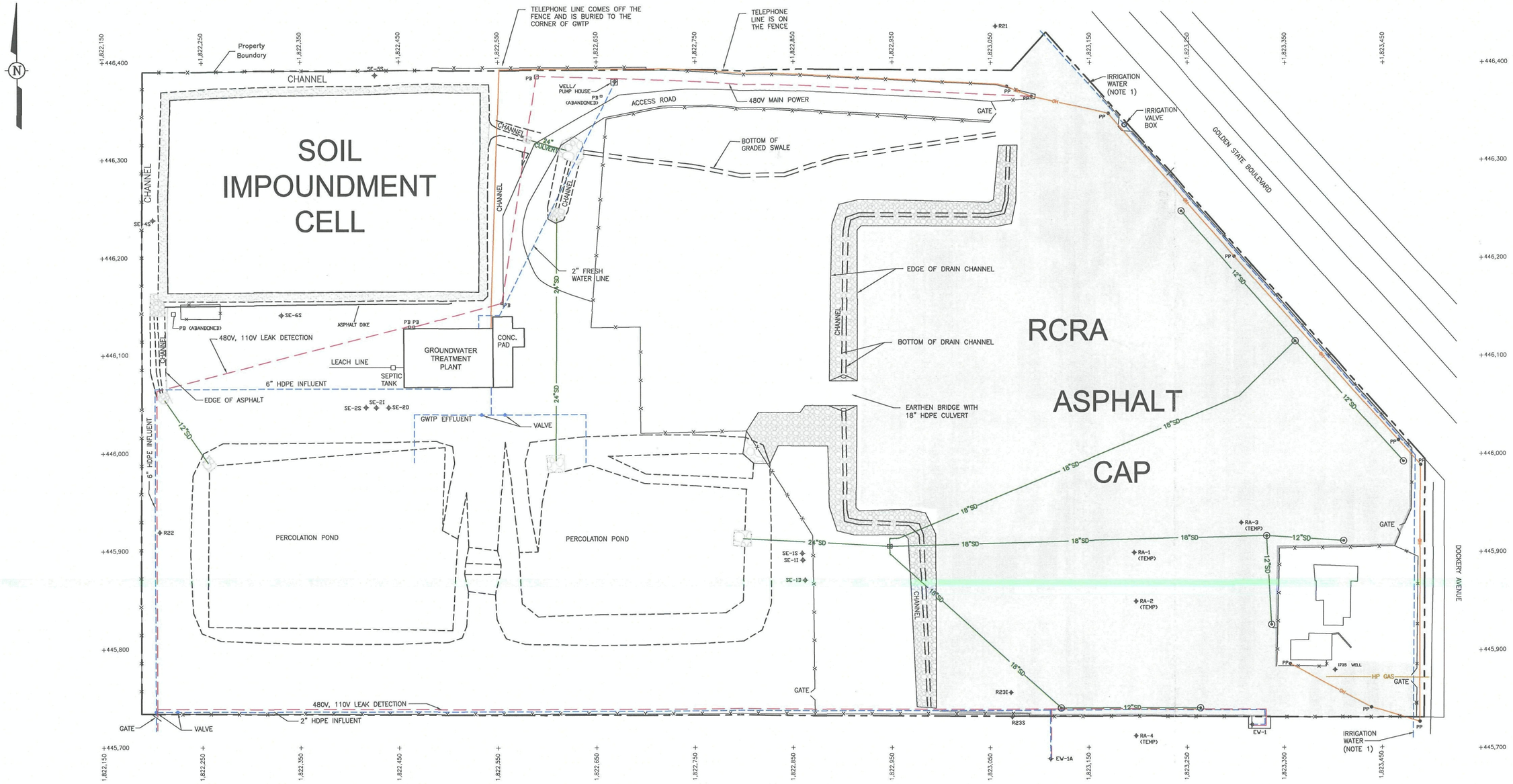
Shaw
Shaw E & I, Inc.

SELMA PRESSURE TREATING
SUPERFUND SITE
SELMA, CALIFORNIA

FIGURE 1

SITE LOCATION MAP

IMAGE	X-REF	OFFICE	DRAWN BY		CHECKED BY		APPROVED BY		DRAWING NUMBER
---		CONC	SJZ	9/15/05	CC	9/15/05	LH	9/15/05	845729-D1



LEGEND

- PROPERTY BOUNDARY
- FENCE
- PB — PULL BOX
- MONITORING WELL
- STORM WATER CATCH BASIN (PVC)
- STORM WATER CATCH BASIN (PCC)
- STORM DRAIN
- ELECTRICAL LINE (BURIED)
- PP — TELEPHONE LINE (OH: OVERHEAD, PP: POWER POLE)
- WATER LINE (BURIED)
- DOMESTIC HIGH PRESSURE GAS LINE (BURIED)
- RCRA ASPHALT CAP BOUNDARY (DARKER SHADE DENOTES CURBED EDGE)
- TYPE A ROCK RIPRAP
- TYPE B ROCK RIPRAP
- GRAVEL

SURVEY COORDINATES FOR ONSITE MONITORING WELLS

WELL	NORTH	EAST
1735	445787.54	1823398.93
EW-1	445723.29	1823317.07
SE-1S	445897.57	1822859.44
SE-1I	445890.61	1822859.95
SE-1D	445870.20	1822869.38
SE-2S	446046.92	1822416.82
SE-2I	446046.64	1822427.34
SE-2D	446046.66	1822439.89
SE-4S	446238.87	1822201.04
SE-5S	446386.41	1822425.98
SE-6S	446140.77	1822331.19
R22	445919.57	1822207.37
R23I	445756.11	1823071.12

NOTES:

1. LOCATIONS OF SITE UTILITIES ARE APPROXIMATE. USER SHOULD PERFORM UNDERGROUND UTILITY LOCATION BEFORE ANY EXCAVATION OR EARTH WORK ACTIVITIES.
2. ANY EXCAVATION, EARTH WORK ACTIVITY, OR MODIFICATION TO THE CAPS OR SITE FEATURES MUST BE COORDINATED THROUGH THE U.S. ENVIRONMENTAL PROTECTION AGENCY OR THE CALIFORNIA DEPARTMENT OF TOXIC SUBSTANCE CONTROL.

SCALE
0 50 100 150 FEET

Shaw Shaw Environmental, Inc.

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
OMAHA, NEBRASKA

SELMA PRESSURE TREATING SUPERFUND SITE
SITE COMPOSITE PLAN

SELMA CALIFORNIA

ATTACHMENT C

SITE INSPECTION REPORT AND INTERVIEW REPORT

TECHNICAL MEMORANDUM
SECOND FIVE-YEAR REVIEW FOR THE
SELMA PRESSURE TREATING SUPERFUND SITE

SITE INSPECTION REPORT AND INTERVIEW REPORT

INTRODUCTION

This memorandum is prepared as a supporting document to the second Five-Year Review for the Selma Pressure Treating (SPT) Site. The Environmental Protection Agency (EPA) has tasked the U.S. Army Corps of Engineers (USACE), Sacramento District to perform the five year review. The scope of the tasking includes several memoranda providing detailed analysis of specific topics to be included in the final report:

- ARAR Analysis
- Risk Assessment and Toxicology Analysis
- Data Review
- Institutional Controls Assessment
- Site Inspection Report
- Status of Recommendations from Previous Five-Year Review

These memoranda are prepared in advance of the final report, and provide a tool for focused discussion between EPA and USACE during development of the Five-Year Review.

This memorandum provides the Trip Report from the Site Inspection as well as an interview summary from a follow-up conference call.

The SPT site is the result of spillage from wood treating operations that were conducted from 1936 to 1994. Contaminants of concern in the soil include chromium, arsenic, copper, dioxins/furans, pentachlorophenol (PCP), and trichlorophenols (TCPs). The contaminant of primary concern in the groundwater is chromium.

The selected remedy for the site includes the following general features:

- Excavation of contaminated soil and consolidation of the soil in an impoundment covered with a RCRA vegetative cover
- Backfill of excavated areas and covering with a RCRA asphalt paving
- Institutional controls to prevent exposure to soils below excavation depth and in the impoundment, as well as to control use of groundwater
- Extraction, treatment, and subsequent on-site disposal of contaminated groundwater
- In-situ bioremediation of contaminated groundwater.

All of the physical features of the remedy were inspected during the site inspection. Following the site inspection, a conference call was held to clarify issues with project team members who were not able to be present during the site visit.

CESPK-ED-GD 09 May 2006

MEMORANDUM FOR FILE

SUBJECT: Trip Report and Conference Call, Selma Pressure Treating, Selma, CA, EPA ID: CAD029452141

1. The Selma Pressure Treating site was visited by Doug Mackenzie (USACE) and Pamela Amie (USACE) on 27 and 28 March 2006. The purpose of the visit was to perform a general site tour and discuss the progress of the remediation occurring at the site. This information would be later used to generate a five year review of the on-going activities at the site. The site can be accessed by taking CA-99 south to Fresno followed by turns onto Second Street Exit, Whitson Street, and Golden State Boulevard. The property upon which the site is located is managed by The Shaw Group, Inc. located at 949 Golden State Highway Blvd in Selma. Shaw is under contract and being managed by USEPA Region 9 and USACE, Rapid Response Program. We were on site from 4:00 pm to 5:00 pm on the 27th. The weather was slight overcast, with temperature ~65°F. Several wells in the vicinity of the treatment plant were observed. Photos were taken (photos 1 and 2).

2. The following morning, 28 March 06, we arrived at the treatment plant to meet up with Charnjit Bhullar, the remedial project manager (RPM) and Gary Smith, the Operation and Maintenance (O&M) manager. We met with Mr. Bhullar at 8:00 am for a general site tour. Mr. Bhullar described the latest remediation activities which included the molasses injection. We were shown on a map the planned phases of the project and then we traveled to each of the planned phases. We were told that Phases 1 and 1A have been completed. Phase 2A (Direct push injection) which is located on the property south of the site (Larry Johnson property) has also been completed. The area between 2A and CA-99 was hydro-punched to refine the delineation of Cr contamination in groundwater and levels were found to be below cleanup standards in some areas previously believed to be contaminated. The area between 2A and the CA-99 was hydro-punched and levels were found to be below cleanup goals. Phases 3 (groundwater/substrate recirculation underneath CA-99) and 4 (down gradient portion of plume in vineyard, pasture and residential areas) have not been implemented. Phase 4 may not be needed if the contaminant levels drop off well below cleanup goals in these areas. Mr. Bhullar said that groundwater is no longer being pumped up-gradient of the freeway.

3. In the morning, the following group of wells were inspected and discussed:

- Group P5: Inspected 4 wells. Each well was inspected for secured lock and intact bollards. All wells were in good condition. Mr. Bhullar indicated that the monitoring wells were inspected tri-annually with each sample event.
- Group P2: Inspected 3 wells. All wells were in good condition. A photo was taken, labeled (photo 3).
- Vineyard Wells: Inspected 4 wells. Wells P15I2 and R241 had no locks.
- Observed some residences that have been sampled in the past. Mr. Bhullar indicated that some of the landowners cooperate with having their private wells sampled and some do not.

- Mr Bhullar indicated that residences west of McCall Avenue had levels below cleanup goal, and residences east of McCall Avenue had levels slightly above.

4. Returned to site. Inspected asphalt pile east of the treatment plant that a potential future landowner placed there (photo 4). The soil impoundment was examined during a break in the rain (photos 5, 6, 7 and 8). The vegetation is strong and there is no significant ponding on top of mound. There were minor ponded areas in the drainage swale near the culvert. The top of the impoundment was a bit soggy.

5. In the mid-morning, we went into the treatment plant to talk with O&M operator, Gary Smith and Mr. Bhullar. Inspection checklist items were discussed as well as the operator's daily duties. Mr. Smith indicated that he has no problem in obtaining the equipment, chemicals, etc., that is needed to do his job.

6. Plant Tour: Mr. Smith walked us through each process of the treatment starting at the influent tanks. All tanks were properly marked with signs and permit. The following equipment and/or processes were observed and inspected: influent line, reactor, chemical storage and piping, flocculator, clarifier, sludge tanks, filter press, sand filters, control system, and effluent analyzer. Each step was documented and photographed. Mr. Smith said that all the processes were functioning satisfactorily. Pallets containing bags of sand were noted in an open floor space in the treatment building. Mr. Smith explained that the backwash of the sand filters works only to a point, and then has to be replaced (photos 9-17).

7. Digital photos were taken and a photo log is attached to this memorandum.

Pamela O. Amie
Environmental Chemist
Environmental Design Section

ENCLOSURE: Photo Log

PHOTO LOG – SELMA PRESSURE TREATING

Monitoring Wells

1. Monitoring well P4S, improvement of well protection recommended

2. Site view from EW1 looking west-northwest. Note evidence of Phase 1A in-situ bioremediation borings in foreground

3. Well P21, P2D, R25, better protection

Impoundment Area

4. Looking at east wall of treatment building. Asphalt rubble pile and drainage swale in foreground

5. Top of soil impoundment looking east toward asphalt paved soil remediation area.

6. North edge of soil impoundment looking west

7. Top of soil impoundment looking east toward access road and impoundment drainage culvert.

8. Percolation ponds from west end looking east.

Treatment Plant

9. Treatment plant influent line, flow indicator and sample tap.

10. Chemical tank containment area wall. Pipes labeled, eye wash present.

11. Reactor tank

12. Flocculation tank

13. Clarifier

14. Sludge tanks, pumps

15. Sludge filter at top, filter cake in bin below

16. Sand filters, remove last suspended solids before discharge

17. Chrome analyzer on discharge line

Photo 1 – Monitoring well P4S, improvement of well protection recommended.

Photo 2 – Site view from EW1 looking west-northwest. Note evidence of Phase 1A in-situ bioremediation boring in foreground

Photo 3 – Wells P2I, P2D, R25, better protection

Photo 4 – Looking at east wall of treatment building. Asphalt rubble pile and drainage swale in foreground

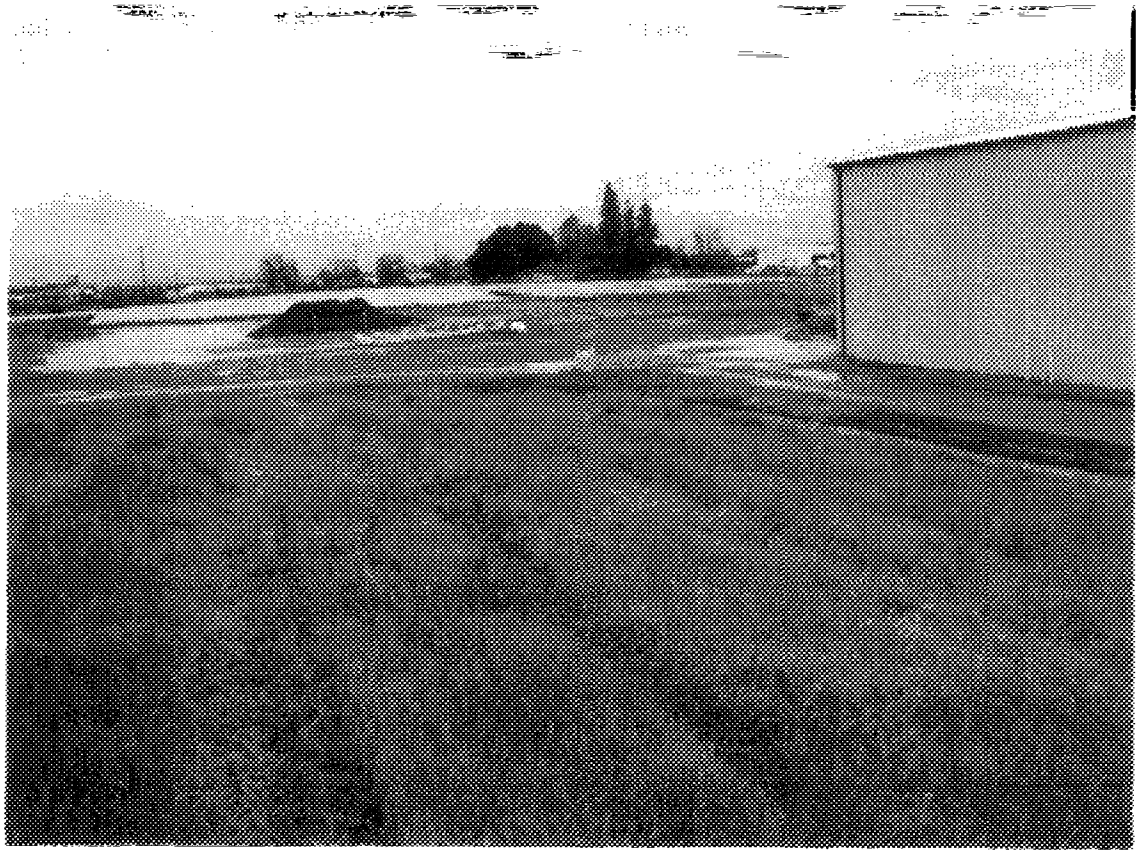


Photo 5 – Top of soil impoundment looking east toward asphalt paved soil remediation area

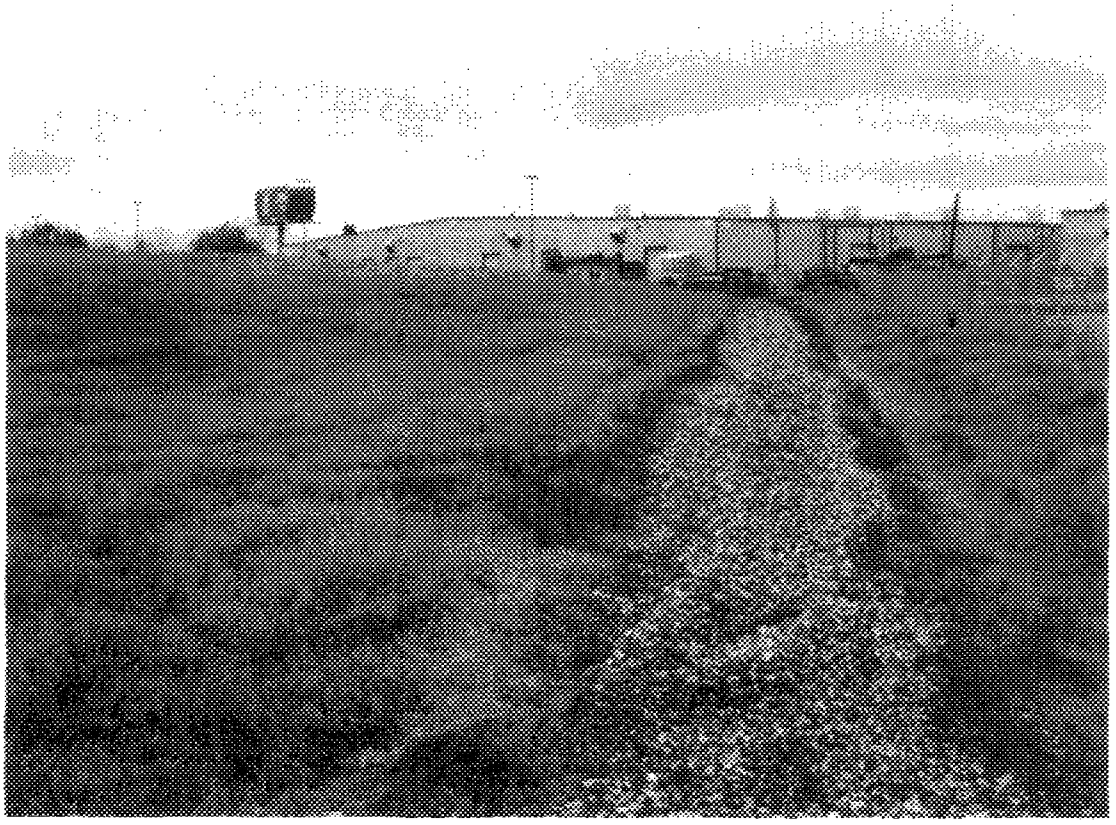


Photo 6 – North edge of soil impoundment looking west

Photo 7 – Top of soil impoundment looking east toward access road and impoundment drainage culvert

Photo 8 – Percolation ponds from west end looking east

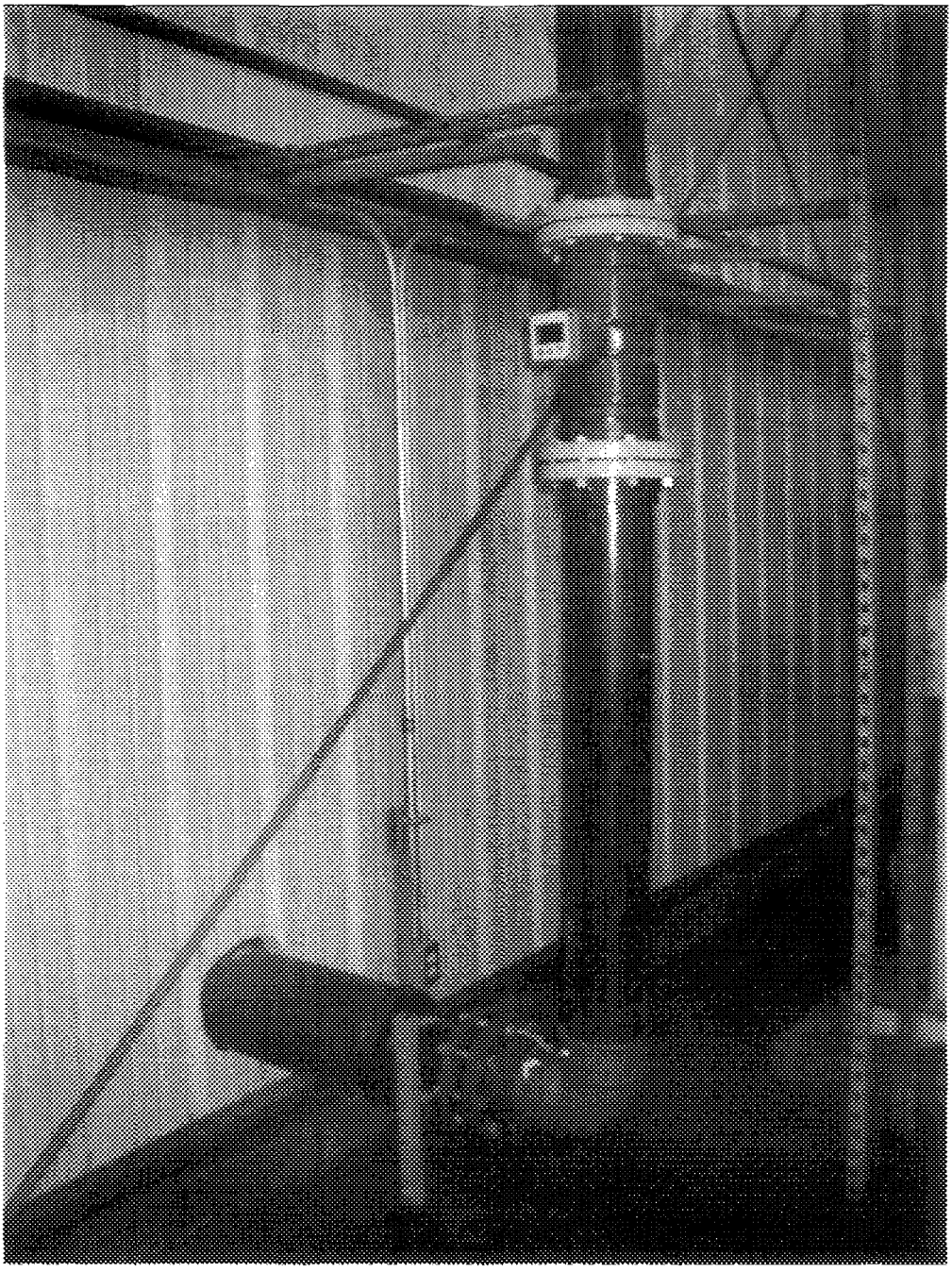


Photo 9 – Treatment plant influent line, flow indicator and sample tap

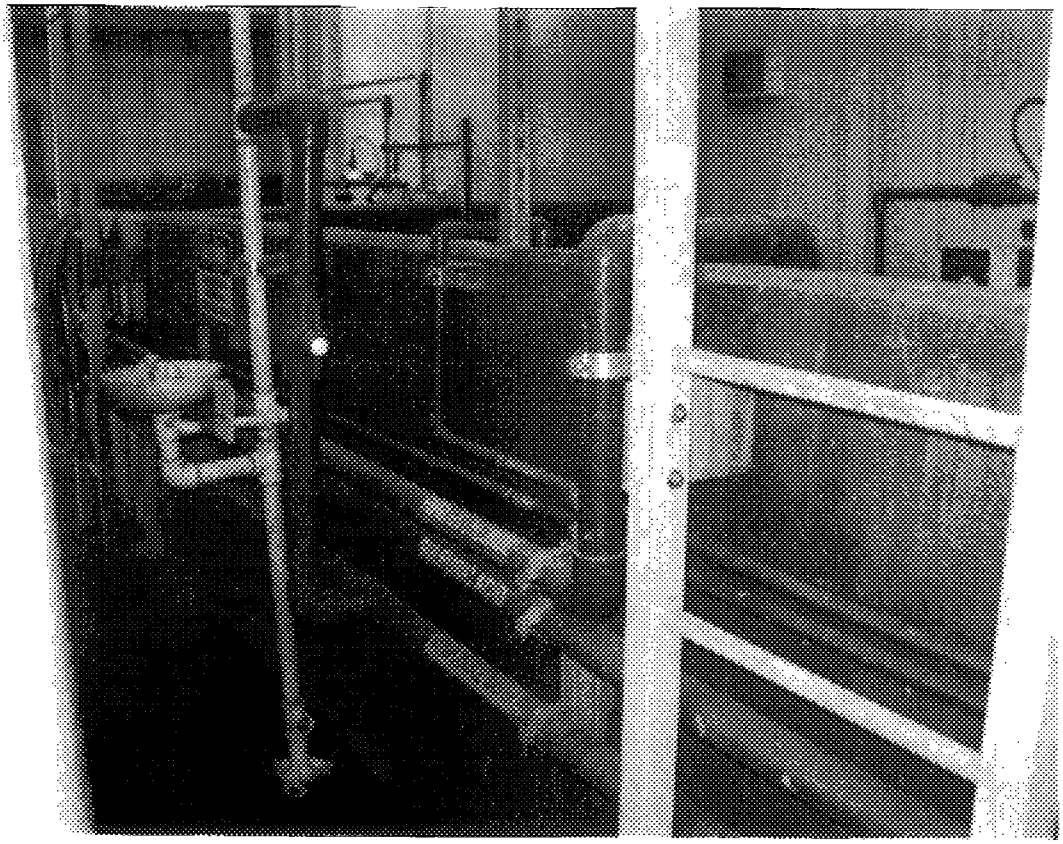


Photo 10 – Chemical tank containment area wall. Pipes labeled, eye wash present.

Photo 11 – Reactor tank

Photo 12 – Flocculation tank

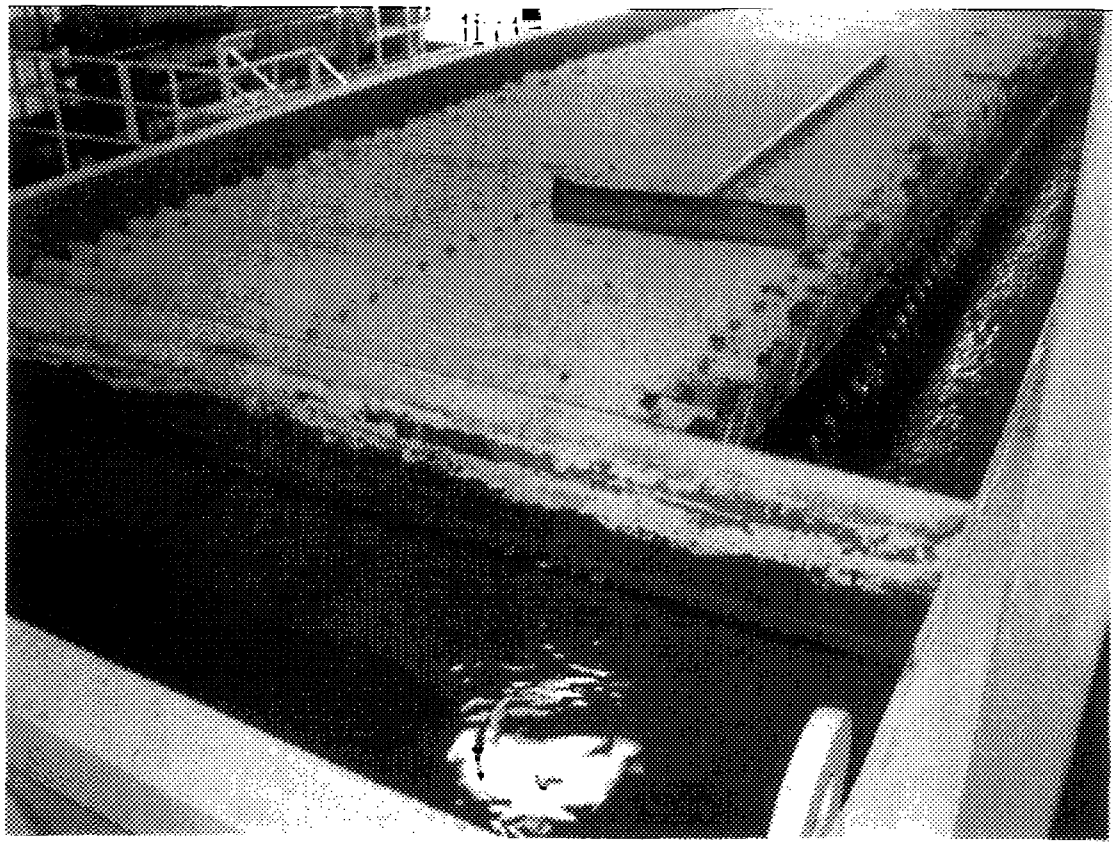


Photo 13 - Clarifier

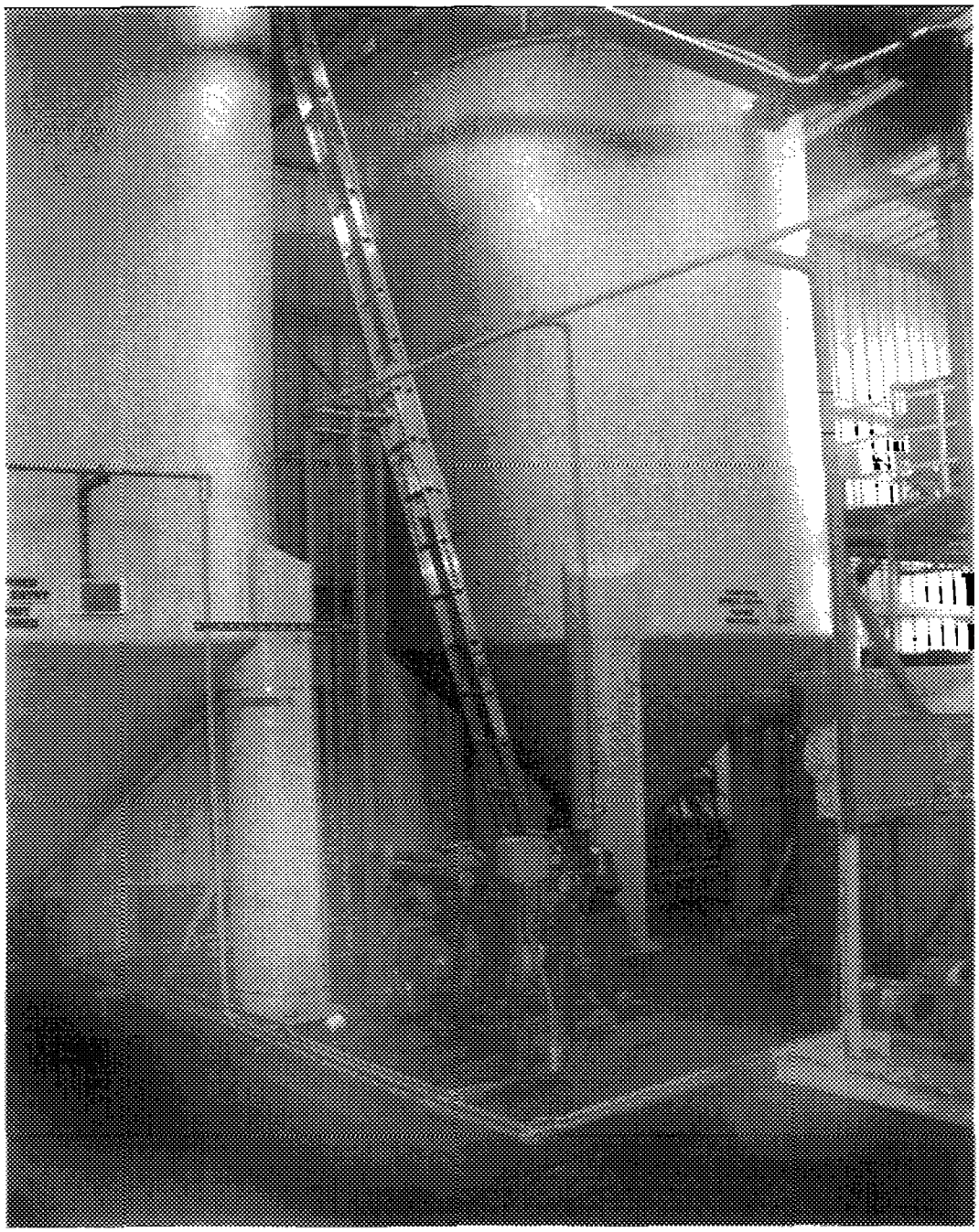


Photo 14 – Sludge tanks, pumps

Photo 15 – Sludge filter at top, filter cake bin below

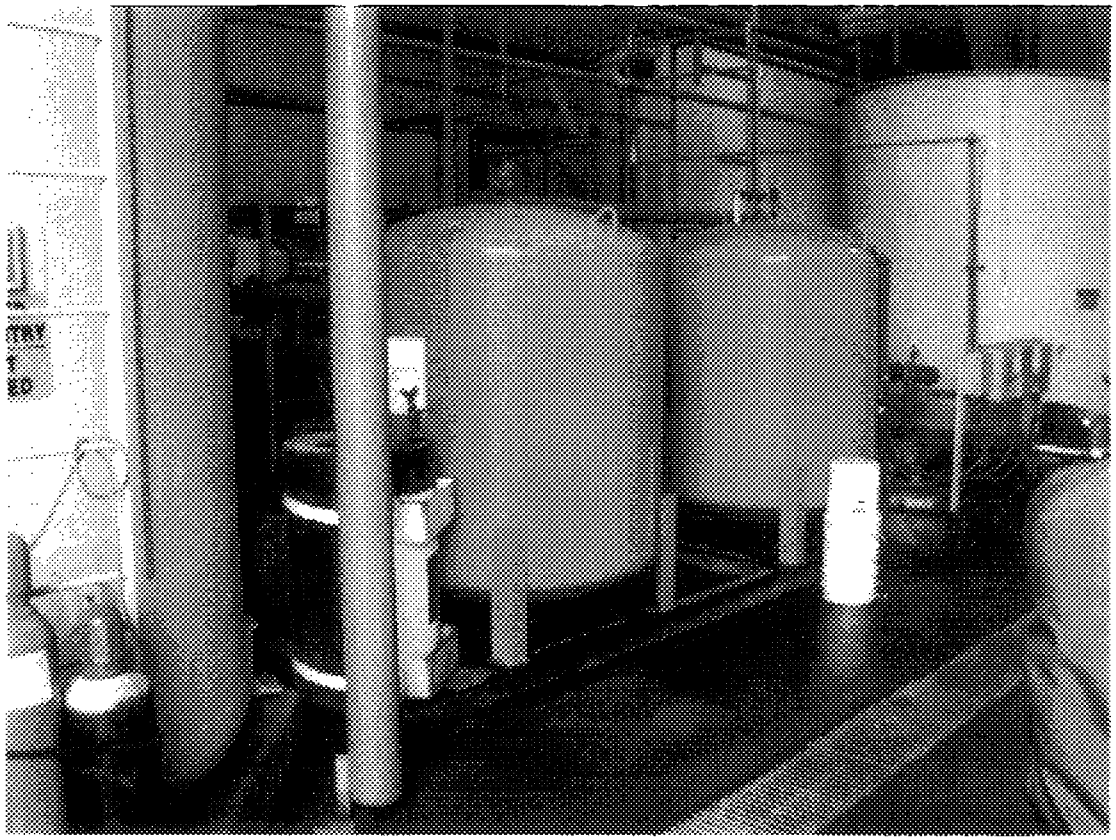


Photo 16 – Sand filters, remove last suspended solids before discharge

Photo 17 – Chrome analyzer on discharge line

Interview with Gary Smith, O&M Operator, The Shaw Group, Inc., March 28, 2006

Mr. Smith is on-site from 7 am to 3 pm, six days per week and can be reached 24 hours/7days per week. Mr. Smith has been operating this treatment plant for approximately six years and has over 20 years of treatment plant experience. He performs all of the maintenance and repairs at the plant. Larry Hudson, the Shaw project manager, also helps maintain the plant.

There was general discussion regarding the O&M record keeping and reporting. Mr. Smith indicated that a monthly report is provided to USACE who forwards to EPA the operating flow rates, down times, and daily maintenance procedures. He also indicated that GWTP influent and effluent samples are analyzed monthly at a fixed laboratory and the extraction wells are sampled monthly and analyzed on-site with a HACH colorimetric kit. Mr. Smith indicated that all reports, field sample logs and analytical reports are being filed at Shaw's Irvine office.

There was some discussion on optimization of the treatment plant system. Overall, Mr. Smith referred questions regarding past optimization efforts to Larry Hudson. Mr. Smith indicated that in the first years of operation chemical dosages were adjusted routinely, however, in the last three years the adjustments have been very few.

Filter cake from the filter press is generated at a rate of one 10-yard bin per month. This waste stream is profiled once each year, and this year's profiling is currently underway. The filter cake is shipped and disposed as hazardous waste at the Clean Harbors Buttonwillow disposal site in Buttonwillow, California.

Interview with Larry Hudson, Project Manager, The Shaw Group, Inc., April 19, 2006

Progression of the remediation activities at the site were discussed in a conference call that included Charnjit Bhullar, EPA; Wally Shaheen, USACE; Doug Mackenzie, USACE; and Pamela Amie, USACE.

Mr. Hudson mentioned that since the molasses additions, extraction wells 1A and 2A are off line and 3A, 4, 5, and 6 are on line. The total flow capacity of the treatment system is approximately 200 GPM; and with wells 1A and 2A down, more water is pumped from the remaining wells. Mr. Shaheen believes this scenario is responsible for declining concentrations down gradient. Mr. Hudson said the extraction wells have had no significant problems in the past and the leak detection systems show no problems, as well.

Mr. Hudson also provided a cost breakdown from the start of the system until present. At the start of the system, September 1998, the cost was approximately $24 K per month. However, in the course of several years of the operation, the cost increased to approximately $50K per month. Costs are currently stable at approximately $40K per month due to the system achieving steady state. This was primarily due to the employment of a process engineer to facilitate system optimization. Increased costs since startup are due to increases in the monitoring program, cost of chemicals, costs of power, and disposal of filter cake. Mr Hudson did mention that optimization of the chemical usage was performed a couple of years ago, but not much work has been done on the optimization of the system now that steady state has been achieved. The O&M operator will make adjustments to chemical dosage based on maintaining the proper pH and floc, from time to time.

All data for the operation are maintained at the Irvine office. It was mentioned that no operating records were kept other than sampling data. For example, the soil impoundment area gets inspected two times a year. It is mowed in the summer and sprayed for broadleaf weeds in the spring. However, there is no written maintenance program and no documentation of the inspections.

Low-flow purging was considered for sampling the monitoring wells. It was not implemented due to concern regarding the relatively flat groundwater gradient. The radius of the influence of the wells (hydraulic capture zone) was stated to be 100-200' based only on the flow rate and the drawdown in the well. Monitoring well coverage is not adequate for a more reliable measurement of influence. The monitoring wells are inspected with each sampling event. There has been consideration of additional monitoring wells, but at this time there is no funding.

As far as the progress on the issues and recommendations from the first five-year review, one point made was that the current extraction system fails to capture the plume. Current data from areas around and beyond EW-5 do not show much delineation. Contaminant levels in some of the irrigation wells may be declining; however, access to these areas has proven difficult.

In 2003, there was some modeling done to determine the value of additional wells. The analysis indicated that two to three wells might be beneficial and hydro geological investigation. However, the in-situ biological reduction effort (phase 2A and 2B) has been given priority over the additional modeling planned in support of additional wells.

INTERVIEW DOCUMENTATION FORM

The following is a list of individual interviewed for this five-year review. See the attached contact record(s) for a detailed summary of the interviews.

Name	Title/Position	Organization	Date
Gary Smith	O&M Operator	Shaw Environmental	3/28/06
Larry Hudson	Plant Operator	Shaw Environmental	4/19/06

INTERVIEW RECORD

Site Name: Selma Pressure Treating	EPA ID No.: CAD029452147
Subject: O&M Progress/Issues	Time: 1000 am Date: 3/28/06
Type: 9 Telephone √9 Visit 9 Other Location of Visit:	9 Incoming 9 Outgoing

Contact Made By:

Name: Pamela Amie & Doug Mackenzie	Title: Chemist & Sr Env. Engineer	Organization: USACE

Individual Contacted:

Name: Gary Smith	Title: O&M Operator	Organization: Shaw
Telephone No: (925) 288-2160 Fax No: E-Mail Address:	Street Address: 949 Golden State Hwy City, State, Zip: Selma, CA 93662	

Summary Of Conversation

See Attached Discussion.

INTERVIEW RECORD

Site Name: Selma Pressure Treating		EPA ID No.: CAD029452141
Subject: O&M Progress / Issues	Time:	Date: 4/19/06
Type: ✓ Telephone 9 Visit 9 Other Location of Visit:		9 Incoming ✓ Outgoing

Contact Made By:

Name: Doug Mackenzie	Title: SE. Env. Engineer	Organization: USACE

Individual Contacted:

Name: Larry Hudson	Title: Sr. Project Manager	Organization: Shaw Environmental
Telephone No: (360) 546-2516 Fax No: E-Mail Address: Larry.Hudson@shawgrp.com	Street Address: City, State, Zip:	

Summary Of Conversation

See Attached Discussion.

Site Inspection Checklist

I. SITE INFORMATION

Site name: Selma Pressure Treating	**Date of inspection:** March 27-28, 2006
Location and Region: Selma, CA Reg. IX	**EPA ID:** CAD029452141
Agency, office, or company leading the five-year review: US Army Corps of Engineers	**Weather/temperature:** Overcast and Rainy

Remedy Includes: (Check all that apply)

- ✓ Landfill cover/containment
- ✓ Access controls
- ✓ Institutional controls
- ✓ Groundwater pump and treatment
- Surface water collection and treatment
- ✓ Other In-situ reduction-biological

Monitored natural attenuation
Groundwater containment
Vertical barrier walls

Attachments: Inspection team roster attached Site map attached

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** Larry Hudson (Name) Plant Operator (Title) 4/19/06 (Date)
   Interviewed at site at office ✓ by phone Phone no. (360) 546 2516
   Problems, suggestions; ✓ Report attached _____

2. **O&M staff** Gary Smith (Name) O&M Operator (Title) 3/28/06 (Date)
   ✓ Interviewed at site at office by phone Phone no. (925) 288-2160
   Problems, suggestions; ✓ Report attached _____

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

Agency EPA
Contact Charnjit Bhullar RPM 3/28/06 _____
Name Title Date Phone no.
Problems; suggestions; Report attached _____

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.
Problems; suggestions; Report attached _____

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.
Problems; suggestions; Report attached _____

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.
Problems; suggestions; Report attached _____

4. ***Other interviews*** *(optional)* ✓ Report attached.

Conference Call with Larry Hudson, Plant Operator on April 19, 2006.
Other Attendees:
Wally Shaheen - USACE
Charnjit Bhullar - US EPA
Pamela Amie - USACE

IV. O&M COSTS

1. **O&M Organization**
   State in-house — Contractor for State
   PRP in-house — Contractor for PRP
   Federal Facility in-house — Contractor for Federal Facility
   Other Contractor for USACE in support of EPA.

2. **O&M Cost Records**
   Readily available — Up to date
   Funding mechanism/agreement in place
   Original O&M cost estimate $1,289,200 Breakdown attached

   Total annual cost by year for review period if available

   From ____ Date To ____ Date $284,820 Total cost — Breakdown attached
   From ____ Date To ____ Date $600,000 Total cost — Breakdown attached
   From ____ Date To ____ Date $480,000 Total cost — Breakdown attached
   From ____ Date To ____ Date ____ Total cost — Breakdown attached
   From ____ Date To ____ Date ____ Total cost — Breakdown attached

   *See attached discussion

3. **Unanticipated or Unusually High O&M Costs During Review Period**
   Describe costs and reasons: ____

V. ACCESS AND INSTITUTIONAL CONTROLS ✓Applicable G N/A

A. Fencing

1. **Fencing damaged** Location shown on site map ✓Gates secured N/A
   Remarks No damage to gates.

B. Other Access Restrictions

1. **Signs and other security measures** ✓ Location shown on site map N/A
   Remarks Alarm system and signs on perimeter fence.

CDM SAN FRANCISCO COST ESTIMATE DATE: 17-MAY-88

PROJECT: SELMA PRESSURE TREATING ALTERNATIVE 3: CONVENTIONAL WATER TREATMENT AND ON-SITE FIXATION WITH RCRA CAPPING
PROJ. NO.:7777-123
EST LEVEL:-30%/+50%

ITEM NO.	DESCRIPTION	QUANTITY OR MEASURE	UNIT OF MEASURE	UNIT COST	ITEM COST	REFERENCE
1.0	OPERATIONS AND MAINTENANCE 5 YEAR					
	5 YEAR INSPECTION	1	LS	$1,600	$1,600	CDM/M&M BRAKES, 1988
	SOIL SAMPLING	0	EA	$600	$0	CDM/WOODBURY CHEMICAL COST ESTIMATE, 1987
	GROUNDWATER SAMPLING	12	EA	$500	$6,000	CDM/WOODBURY CHEMICAL COST ESTIMATE, 1987
				SUBTOTAL O&M COST =	$7,600	
				CONTINGENCY (20%) =	1500	
				TOTAL O&M COST = 5 YEAR	9100	
				O&M-PRESENT WORTH COSTS = N=30YR INT=8% INF=4%	$29,700	
2.0	OPERATIONS AND MAINTENANCE ANNUAL					
	CHEMICAL COST	1	LS	$120,000	$120,000	CDM/SELMA COST ESTIMATE, 1988
	LABOR (6 PEOPLE)	1	LS	$567,000	$567,000	CDM/SELMA COST ESTIMATE, 1988
	POWER	1	LS	$75,000	$75,000	CDM/SELMA COST ESTIMATE, 1988
	REPAIR AND REPLACE	1	LS	$25,000	$25,000	CDM/SELMA COST ESTIMATE, 1988
	SLUDGE MANAGEMENT	1	LS	$280,000	$280,000	CDM/SELMA COST ESTIMATE, 1988
	GROUNDWATER SAMPLING	100	EA	$25	$2,500	CDM/SELMA COST ESTIMATE, 1988
	CAP MAINTENANCE	12	EA	$400	$4,800	CDM/SELMA COST ESTIMATE, 1988
				SUBTOTAL O&M COST =	$1,074,300	
				CONTINGENCY (20%) =	$214,900	
				TOTAL O&M COST = ANNUAL	$1,289,200	
				O&M PRESENT WORTH COSTS = N=5YR INT=8% INF=4%	$4,752,100	
				*TOTAL PRESENT WORTH COSTS =	$11,278,400	

*TOTAL PRESENT WORTH = CAPITAL COSTS + O&M PRESENT WORTH COSTS

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented — Yes / No / N/A

Site conditions imply ICs not being fully enforced — Yes / No / N/A

Type of monitoring (*e.g.*, self-reporting, drive by) _____

Frequency _____

Responsible party/agency _____

Contact _____ _____ _____ _____

Name / Title / Date / Phone no.

Reporting is up-to-date — Yes / No / N/A

Reports are verified by the lead agency — Yes / No / N/A

Specific requirements in deed or decision documents have been met — Yes / No / N/A

Violations have been reported — Yes / No / N/A

Other problems or suggestions: Report attached

Other than fencing ICs were not in place at time of site visit.

2. **Adequacy** ICs are adequate / ICs are inadequate / N/A

Remarks _____

D. General

1. **Vandalism/trespassing** Location shown on site map / No vandalism evident

Remarks Two burgularies at treatment plant - stolen property.

2. **Land use changes on site** N/A

Remarks One real estate transaction where vineyard became recycling facility.

3. **Land use changes off site** N/A

Remarks No change.

VI. GENERAL SITE CONDITIONS

A. Roads ✓Applicable / N/A

1. **Roads damaged** Location shown on site map / ✓Roads adequate / N/A

Remarks _____

B. Other Site Conditions

Remarks Asphalt pile discarded by the potential future landowner located in capped area. Scheduled to have hauled away is on-going.

VII. LANDFILL COVERS ✓Applicable N/A

A. Landfill Surface

1. **Settlement** (Low spots) Location shown on site map Settlement not evident
   Areal extent_____ Depth_____
   Remarks_____

2. **Cracks** Location shown on site map Cracking not evident
   Lengths_____ Widths_____ Depths_____
   Remarks_____

3. **Erosion** Location shown on site map Erosion not evident
   Areal extent_____ Depth_____
   Remarks_____

4. **Holes** Location shown on site map Holes not evident
   Areal extent_____ Depth_____
   Remarks_____

5. **Vegetative Cover** ✓Grass ✓Cover properly established ✓No signs of stress
   Trees/Shrubs (indicate size and locations on a diagram)
   Remarks Photos available.

6. **Alternative Cover (armored rock, concrete, etc.)** ✓N/A
   Remarks_____

7. **Bulges** Location shown on site map Bulges not evident
   Areal extent_____ Height_____
   Remarks_____

8. **Wet Areas/Water Damage** ✓Wet areas/water damage not evident
   Wet areas Location shown on site map Areal extent_____
   Ponding Location shown on site map Areal extent_____
   Seeps Location shown on site map Areal extent_____
   Soft subgrade Location shown on site map Areal extent_____
   Remarks Inspection performed during extremely rainy month; cover quite soggy.

9.	**Slope Instability** Slides Areal extent_____ Remarks_____	Location shown on site map ✓	No evidence of slope instability
B. Benches	Applicable ✓ N/A (Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)		
1.	**Flows Bypass Bench** Remarks_____	Location shown on site map	N/A or okay
2.	**Bench Breached** Remarks_____	Location shown on site map	N/A or okay
3.	**Bench Overtopped** Remarks_____	Location shown on site map	N/A or okay
C. Letdown Channels	Applicable ✓ N/A (Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)		
1.	**Settlement** Areal extent_____ Depth_____ Remarks_____	Location shown on site map	No evidence of settlement
2.	**Material Degradation** Material type_____ Areal extent_____ Remarks_____	Location shown on site map	No evidence of degradation
3.	**Erosion** Areal extent_____ Depth_____ Remarks_____	Location shown on site map	No evidence of erosion

4. **Undercutting** Location shown on site map ✓ No evidence of undercutting
Areal extent_____ Depth_____
Remarks_____

5. **Obstructions** Type_____ ✓ No obstructions
Location shown on site map Areal extent_____
Size_____
Remarks_____

6. ✓ **Excessive Vegetative Growth** Type_____
No evidence of excessive growth
Vegetation in channels does not obstruct flow
Location shown on site map Areal extent_____
Remarks_____

D. Cover Penetrations Applicable ✓ N/A

1. **Gas Vents** Active Passive
Properly secured/locked Functioning Routinely sampled Good condition
Evidence of leakage at penetration Needs Maintenance
✓ N/A
Remarks_____

2. **Gas Monitoring Probes**
Properly secured/locked Functioning Routinely sampled Good condition
Evidence of leakage at penetration Needs Maintenance ✓ N/A
Remarks_____

3. **Monitoring Wells** (within surface area of landfill)
Properly secured/locked Functioning Routinely sampled Good condition
Evidence of leakage at penetration Needs Maintenance N/A
Remarks_____

4. **Leachate Extraction Wells**
Properly secured/locked Functioning Routinely sampled Good condition
Evidence of leakage at penetration Needs Maintenance ✓ N/A
Remarks_____

5. **Settlement Monuments** Located Routinely surveyed N/A
Remarks_____

E. Gas Collection and Treatment Applicable ✓ N/A

1. **Gas Treatment Facilities**
   Flaring Thermal destruction Collection for reuse
   Good condition Needs Maintenance
   Remarks_____

2. **Gas Collection Wells, Manifolds and Piping**
   Good condition Needs Maintenance
   Remarks_____

3. **Gas Monitoring Facilities** (*e.g.*, gas monitoring of adjacent homes or buildings)
   Good condition Needs Maintenance N/A
   Remarks_____

F. Cover Drainage Layer Applicable ✓ N/A

1. **Outlet Pipes Inspected** Functioning ✓ N/A
   Remarks Geonet layer drains directly to perimeter drainage channel.

2. **Outlet Rock Inspected** Functioning ✓ N/A
   Remarks_____

G. Detention/Sedimentation Ponds Applicable ✓ N/A

1. **Siltation** Areal extent_____ Depth_____ N/A
   Siltation not evident
   Remarks_____

2. **Erosion** Areal extent_____ Depth_____
   Erosion not evident
   Remarks_____

3. **Outlet Works** Functioning N/A
   Remarks_____

4. **Dam** Functioning N/A
   Remarks_____

H. Retaining Walls Applicable ✓N/A

1. **Deformations** Location shown on site map Deformation not evident
   Horizontal displacement_____ Vertical displacement_____
   Rotational displacement_____
   Remarks_____

2. **Degradation** Location shown on site map Degradation not evident
   Remarks_____

I. Perimeter Ditches/Off-Site Discharge ✓Applicable N/A

1. **Siltation** Location shown on site map ✓Siltation not evident
   Areal extent_____ Depth_____
   Remarks_____

2. **Vegetative Growth** Location shown on site map ✓N/A
   Vegetation does not impede flow
   Areal extent_____ Type_____
   Remarks_____

3. **Erosion** Location shown on site map ✓Erosion not evident
   Areal extent_____ Depth_____
   Remarks_____

4. **Discharge Structure** ✓Functioning N/A
   Remarks perc ponds functioning well; only 1 of 2 operating today.

VIII. VERTICAL BARRIER WALLS Applicable ✓N/A

1. **Settlement** Location shown on site map Settlement not evident
   Areal extent_____ Depth_____
   Remarks_____

2. **Performance Monitoring** Type of monitoring_____
   Performance not monitored
   Frequency_____ _____ Evidence of breaching
   Head differential_____
   Remarks_____

IX. GROUNDWATER/SURFACE WATER REMEDIES ✓Applicable N/A

A. Groundwater Extraction Wells, Pumps, and Pipelines ✓Applicable N/A

1. **Pumps, Wellhead Plumbing, and Electrical**
   Good condition ✓All required wells properly operating Needs Maintenance N/A
   Remarks Control panels need replacing on some of the wells due to weathering

2. **Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
   ✓Good condition Needs Maintenance
   Remarks

3. **Spare Parts and Equipment**
   ✓Readily available Good condition Requires upgrade Needs to be provided
   Remarks Readily available parts often needed.

B. Surface Water Collection Structures, Pumps, and Pipelines ✓Applicable N/A

1. **Collection Structures, Pumps, and Electrical**
   ✓Good condition Needs Maintenance
   Remarks Lined drainage ditches drain to percolation ponds.

2. **Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
   Good condition Needs Maintenance
   Remarks NA

3. **Spare Parts and Equipment**
   Readily available Good condition Requires upgrade Needs to be provided
   Remarks NA

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Documents**

O&M manual	✓ Readily available	✓ Up to date 1998	N/A
As-built drawings	✓ Readily available	✓ Up to date	N/A
Maintenance logs	Readily available	Up to date	N/A

Remarks Maintenance logs are sent to Larry Hudson - PM for compiling report to MCX

2. **Site-Specific Health and Safety Plan** ✓ Readily available ✓ Up to date N/A
   Contingency plan/emergency response plan ✓ Readily available ✓ Up to date N/A
   Remarks

3. **O&M and OSHA Training Records** Readily available Up to date ✓ N/A
   Remarks Records are kept at main office Hazwopper Refresher Certificate posted on wall

4. **Permits and Service Agreements**

Air discharge permit	Readily available	Up to date	(N/A)
Effluent discharge	Readily available	Up to date	N/A
Waste disposal, POTW	✓ Readily available	✓ Up to date	N/A
Other permits	Readily available	Up to date	N/A

   Remarks

5. **Gas Generation Records** Readily available Up to date ✓ N/A
   Remarks

6. **Settlement Monument Records** Readily available Up to date ✓ N/A
   Remarks

7. **Groundwater Monitoring Records** ✓ Readily available ✓ Up to date N/A
   Remarks Groundwater monitoring records are sent to office in Irvine, CA.

8. **Leachate Extraction Records** Readily available Up to date ✓ N/A
   Remarks

9. **Discharge Compliance Records**

Air	Readily available	Up to date	✓ N/A
Water (effluent)	✓ Readily available	✓ Up to date	N/A

   Remarks Records are kept when system on-line analyzer shuts down. Hourly readings are recorded and HACH test to verify.

10. **Daily Access/Security Logs** Readily available Up to date ✓ N/A
    Remarks None. When there is a project underway at site, then logs are maintained.

C. Treatment System ✓ Applicable N/A

1. **Treatment Train** (Check components that apply)
   - ✓ Metals removal — Oil/water separation — Bioremediation
   - Air stripping — Carbon adsorbers
   - ✓ Filters Plate and frame filters and sand filters
   - Additive (*e.g.*, chelation agent, flocculent) _____
   - Others _____
   - ✓ Good condition — Needs Maintenance
   - ✓ Sampling ports properly marked and functional
   - ✓ Sampling/maintenance log displayed and up to date
   - ✓ Equipment properly identified
   - Quantity of groundwater treated annually _____
   - Quantity of surface water treated annually NA - water goes to lined drainage ditches.
   - Remarks _____

2. **Electrical Enclosures and Panels** (properly rated and functional)
   - N/A ✓ Good condition Needs Maintenance
   - Remarks _____

3. **Tanks, Vaults, Storage Vessels**
   - N/A ✓ Good condition ✓ Proper secondary containment Needs Maintenance
   - Remarks _____

4. **Discharge Structure and Appurtenances**
   - N/A ✓ Good condition Needs Maintenance
   - Remarks _____

5. **Treatment Building(s)**
   - N/A ✓ Good condition (esp. roof and doorways) Needs repair
   - ✓ Chemicals and equipment properly stored
   - Remarks _____

6. **Monitoring Wells** (pump and treatment remedy)
   - Properly secured/locked Functioning ✓ Routinely sampled Good condition
   - All required wells located Needs Maintenance N/A
   - Remarks Some wells not locked and a few had bent bollards.

D. Monitoring Data

1. Monitoring Data
   - ✓ Is routinely submitted on time ✓ Is of acceptable quality

2. Monitoring data suggests: Data doesn't suggest containment at this time.
   - Groundwater plume is effectively contained Contaminant concentrations are declining

D. Monitored Natural Attenuation

1. **Monitoring Wells** (natural attenuation remedy)

Properly secured/locked — Functioning — Routinely sampled — Good condition
All required wells located — Needs Maintenance — ✓ N/A
Remarks

X. OTHER REMEDIES

If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

Molasses - On-going in-situ groundwater remediation at this time. Remedy includes in-situ biological chromium reduction by molasses injection. Initial results promising.
Soil - No issues observed that would question effectiveness of soil remedy.
Water - Groundwater extraction and treatment adequately functional. Monitoring currently indicates incomplete capture of containment.

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

Operation of the treatment plant seems to be running satisfactorily, however, not well documented. This is the same situation for monitoring and maintenance of the cap. Monitoring wells need maintenance e.g. locks, bollards.

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs, that suggest that the protectiveness of the remedy may be compromised in the future.

Some property owners have denied access to their residential wells and that leads to uncertainty of the reliability of the downgradient network of wells.

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

Potentially the monitoring could be scheduled on a bi-annual basis. Currently due to the molasses injection treatment, the triannual schedule is satisfactory.

ATTACHMENT D

TECHNICAL MEMORANDUM
ARARS REVIEW

TECHNICAL MEMORANDUM
SECOND FIVE-YEAR REVIEW FOR THE
SELMA PRESSURE TREATING SUPERFUND SITE

ARARS REVIEW

INTRODUCTION

This memorandum is prepared as a supporting document to the second Five-Year Review for the Selma Pressure Treating (SPT) Site. The Environmental Protection Agency (EPA) has tasked the U.S. Army Corps of Engineers (USACE), Sacramento District to perform the five year review. The scope of the tasking includes several memoranda providing detailed analysis of specific topics to be included in the final report:

- ARAR Analysis
- Risk Assessment and Toxicology Analysis
- Data Review
- Institutional Controls Assessment
- Site Inspection Report
- Status of Recommendations from Previous Five-Year Review

These memoranda are prepared in advance of the final report, and provide a tool for focused discussion between EPA and USACE during development of the Five-Year Review.

The SPT site is the result of spillage from wood treating operations that were conducted from 1936 to 1994. Contaminants of concern in the soil include chromium, arsenic, copper, dioxins/furans, pentachlorophenol (PCP), and trichlorophenols (TCPs). The contaminant of primary concern in the groundwater is chromium.

The selected remedy for the site includes the following general features:

- Excavation of contaminated soil and consolidation of the soil in an impoundment covered with a RCRA vegetative cover
- Backfill of excavated areas and covering with a RCRA asphalt paving
- Institutional controls to prevent exposure to soils below excavation depth and in the impoundment, as well as to control use of groundwater
- Extraction, treatment, and subsequent on-site disposal of contaminated groundwater
- In-situ bioremediation of contaminated groundwater.

The remedy was developed and modified as documented in the Record of Decision (ROD), three Explanations of Significant Difference (ESDs), and one ROD Amendment. The pertinent features of these documents are outlined in Table 1.

Table 1
Record of Decision and Modifying Decision Documents

Document	Remedy/Modification
Record of Decision, September 1998	- Excavation of four areas of contaminated soil - Soil fixation, capping the fixated soil with a RCRA cap - Extracting and treating chromium contaminated groundwater by conventional treatment - Disposal of treated water by injection or off-site as appropriate. - Additional site investigation as part of remedial design outlined in ROD
Explanation of Significant Differences, October 1993	- Modified soil cleanup standard for arsenic - Set cleanup standards for PCP in groundwater and soil - Identified additional areas for soil remediation - Established consolidation of treated soil under one cap - Changed the design of the groundwater treatment system to a phased approach - Documented compliance with LDRs by treatability variance for contaminated soil.
Explanation of Significant Differences, April 1997	- Changed method of disposal of treated groundwater to on-site percolation ponds.
Record of Decision Amendment, September 2003	- Excavate additional 21,000 yards of soil to a maximum depth of 5 feet. - Place soil in existing soil impoundment after removing RCRA cap - Place new cap over impoundment, RCRA vegetative cover - Fence the impoundment - Backfill the excavated area and cover with low-permeability RCRA asphalt cap
Explanation of Significant Differences, August 2005	Groundwater remediation supplemented with in-situ bioremediation . Addition of molasses to groundwater creates a reducing environment, thus converting Cr+6 to Cr+3.

The previous Five-year Review was signed in September 2001. This evaluation of ARARs provides discussion of any changes since that date, and the potential for those changes to affect protectiveness of the remedy.

CURRENT SITE ARARS

A listing of the site ARARs for the remedy as it exists at this time is presented in Table 2. The table includes ARARs as listed in the original ROD and the ROD amendment. Several of the ARARs listed in the ROD have been superceded or rendered obsolete as a result of the modifications to the remedy documented in the ESDs and the ROD amendment. Since the last Five-year review, the revised soil remedy was implemented under the ROD Amendment. The ARARs pertaining to soil remediation were refined in the ROD Amendment, and those are presented in Table 2 in place of the equivalent ARARs in the ROD. ARARs pertaining to air emissions are maintained in the table, though their significance is greatly diminished at this time. The only construction activity remaining is installation of in-situ bioremediation wells, which may emit minimal amounts of dust. ARARs pertaining to underground injection were rendered obsolete by the second ESD.

TABLE 2
FEDERAL AND STATE CHEMICAL AND ACTION SPECIFIC ARARS
Selma Pressure Treating Superfund Site
Selma, California

REQUIREMENT	DESCRIPTION	COMMENTS
FEDERAL REQUIREMENTS*		
Safe Drinking Water Act 42 U. S. C. SS300A et seq. 40 CFR Part 141	Maximum Contaminant Levels for chromium and arsenic in groundwater	This chemical-specific ARAR is applied as the aquifer cleanup goal as well as the treatment discharge requirement
Safe Drinking Water Act 42 U. S. C. SS1424 (E)	Prohibits any project with federal financing assistance from contaminating a sole source aquifer	
22CCR 66261	Establishes criteria for identifying hazardous waste subject to the Subtitle C treatment, storage, and disposal requirements. Applicable for determining whether items such as excavated soils, treatment residuals,(e.g., filter cake), or drilling wastes are to be classified as hazardous waste.	This is a chemical-specific requirement for all site activities that involve excavation of hazardous media or other handling of hazardous waste on site. Only substantive requirements are ARARs.
22 CCR 66262 et seq. (Standards Applicable to Generators of Hazardous Waste)	Standards for generators of hazardous waste when the remedial action constitutes treatment, storage, or disposal of hazardous waste.	These action-specific requirements apply to generation of hazardous wastees, such as the excavation and staging of contaminated soil prior to further treatment, storage, or disposal. Only substantive requirements are ARARs.
22 CCR 66264.90 through 66264.101 (Releases from Solid Waste Management Units)	Applicable to owners or operators of facilities that treat, store, or dispose of hazardous waste. Specifies that COCs must be listed, point of compliance established, and concentration limits for COCs defined. Detection monitoring and point of compliance monitoring programs must be implemented to include groundwater monitoring at appropriate levels.	Specifies location of groundwater monitoring wells.
22 CCR 66264 110 through 66264.120 (Closure and Post-Closure)	All permitted RCRA hazardous waste management units must submit a closure and post-closure plan designed to prevent hazardous wastes from entering groundwater, surface waters, and atmosphere. Establishes controls to prevent releases of hazardous wastes. Requirements include decontamination of equipment, structures, and soils. Post-closure care, which includes monitoring and reporting, must continue for 30 years.	This action-specific ARAR is applicable to all site activities involving the equivalent of RCRA waste management units such as landfills, waste piles, and surface impoundments.
22 CCR 66264.310 Closure and Post-Closure Care	Requires that a cap covering hazardous waste left in place meet certain design requirements aimed at maintaining the integrity of the cover and minimizing the migration of liquids through the capped area. Includes requirement that cover maintains integrity	Portions of these requirements are applicable to the cap; those portions requiring MTRs, such as leachate collection systems, are relevant and appropriate.

REQUIREMENT	DESCRIPTION	COMMENTS
	when subject to earthquake forces.	
Occupational Safety and Health Act. 29 U. S. C. SS651 et seq. 40 CFR SS300.38	OSHA requirements apply to all activities conducted under the NCP.	

* State of California hazardous waste regulations that are part of the approved federal program are considered federal ARARs.

REQUIREMENT	DESCRIPTION	COMMENTS
STATE ARARS		
California Safe Drinking Water and Toxic Enforcement Act. California HSC SS252.5 et seq.	California MCLs	This chemical-specific ARAR is applied as the aquifer cleanup goal as well as the treatment discharge requirement
California Air Resources Act. California HSC SS39650 et seq.	Discharge limits for activities conducted during the remedial action. Includes clean air act requirements.	
Porter Cologne Water Quality Control Act. California Water Code SS13000 et seq.	Waste discharge requirements, NPDES discharges, specific cleanup standards established on a site-specific basis.	Discharge at the site is to percolation ponds. Site specific standard has been set at MCL.
California "Superfund" Law – Hazardous Substances Account Act/Hazardous substances Cleanup Bond Act. California HSC SS25300	Substantive requirements of a Remedial Action Plan.	
California Occupational Safety and Health Act. California Laboratory Code SS6300 et seq.	Standards for worker protection during remediation	
San Joaquin Valley Unified Air Pollution Control District (SJVUAPCD) Rule 403	Requires reasonable precaution to prevent fugitive dusts from being airborne beyond the boundaries of the property from which the emissions originate.	This is an action-specific ARAR applicable to any remedial activity that may cause the release of fugitive dust.
SJVUAPCD Rule 4201	Prohibits the release or discharge from any single-source operation of dust, fumes, or total suspended particulate matter emission in excess of 0.1 grain per standard cubic foot.	This is an action-specific ARAR applicable to any remedial activity that may cause the release of particulate matter, including excavation and construction.

SJVUAPCD Rule 4202	Sets emission rates for the discharge of dust and condensed fumes into the atmosphere.	This is an action-specific ARAR applicable to any remedial activity that may cause the release of dust or condensed fumes, including excavation and construction.
SJVUAPCD Rule 8020	Requires appropriate dust control measures, stabilization of disturbed areas during construction activity to effectively limit visible dust emissions (VDE) (defined as view opacity greater than 40% for threee minutes in any one hour), effective limitation of VDE on unpaved on-site and off-site access roads, and minimization of accumulated mud or dirt from adjacent public paved roads.	This action-specific ARAR applies to any construction, demolition, excavation, extraction, or water mining-related disturbances of soil including land clearing, ground excavation, land leveling, grading, cut and fill operations, travel on and to the site, demolition and the initial construction of landfills.

* State of California hazardous waste regulations that are part of the approved federal program are considered federal ARARs.

SIGNIFICANT CHANGES TO ARARS

ARARs pertaining to the management of hazardous wastes, activities at the soil impoundment, and worker health and safety are all fundamentally un-changed since the last Five-year Review. One change of significance has been noted. The Federal MCL for arsenic has been reduced from 50 ug/L to 10 ug/L as of January 2006.

The Monitoring Well Sampling Reports include a table (Table 2) of all historic results, and this was reviewed in the October 2005 report to evaluate the ramifications of the reduced MCL for arsenic. The data set includes two sampling events in 1997, then three sampling events per year from 1999 through 2005. Forty-four wells were sampled in the October 2005 event.

The data set shows two samples with arsenic detections above 50 ug/L and another 18 samples above 10 ug/L. In addition, there were 7 results reported at non-detect, with the reporting limit above 10 ug/L. The spatial distribution of the detections indicates that they may be site related, however the temporal distribution is quite sporadic. As an example, well R23I is located at the primary source area and has five of the twenty detections, three in un-filtered samples and two in filtered samples. There were 32 samples in all at this well, with 25 of them non-detect at 5 ug/L reporting limit. There were four additional wells with two detections each above 10 ug/L. Table 3 provides a summary of arsenic detections above 10ug/L.

The reduction of the MCL for arsenic from 50ug/L to 10 ug/L has resulted in an increase in detections above the cleanup goal. Due to the infrequency of such detections however, it can not be stated that there is a plume of arsenic contaminated groundwater. The risk calculations used in deriving the MCLs include conservative assumptions with respect to exposure duration. The sporadic detections above MCL at this site do not indicate enough exposure to present an unacceptable risk. It may therefore be argued that the infrequent detections of arsenic above the MCL through October 2005 have not compromised the protectiveness of the remedy.

In October 2005, in-situ bioremediation of chromium was begun. A reducing environment is created in the groundwater by injection of molasses. One effect of this process is

that arsenic is temporarily mobilized. Sampling results have shown consistent results above 10ug/L in the immediate vicinity of the injection areas. Experience at other sites (Ref. 1) has shown this effect to be temporary, with the arsenic concentrations returning to their pre-remediation levels once the groundwater returns to its original, more neutral state. That is expected to happen at the Selma site also, and the arsenic concentrations are being closely monitored.

Table 3
Arsenic in Groundwater – Values Above MCL

Well	Concentration ug/L	Date
L1I	12.7	Aug 1997
P2D	ND (RL =11.5)	Feb 2005
P5D	ND (RL = 10.2)	Feb 2005
P11I	ND (RL = 15.9)	Aug 2005
R21	19.4	Nov 2001
	14.6	Apr 2002
R22	14.9	Nov 1999
	13.8	Nov 2001
R23S (unfiltered)	68.2	Feb 1999
	12.6	Jul 1999
R23I (unfiltered)	14.6	Jul 2002
	47.7	Feb 2003
	38.9	Nov 2003
	ND (RL = 19.6)	Oct 2005
R23I (filtered)	46.4	Feb 2003
	42.3	Nov 2003
	ND (RL = 15.2)	Oct 2005
R25	15.7	Aug 1997
SE-1D	ND (RL = 10.4)	Feb 2005
SE-2S	ND (RL = 15.5)	Jul 2005
SE-4S	12	Feb 2003
SE-5S	72.9	Nov 2003
UR 18	16.8	Oct 2004
UR 24	18.9	Feb 1999
	11.2	Apr 2000
899 S. Golden State	10.3	Jul 2004
Irrigation Well 7	10.6	Jan 2005

SUMMARY

Site ARARs, as listed in the decision documents, were reviewed for significant changes since the first Five-Year Review. One change was found. The MCL for arsenic has been reduced fro 50 ug/L to 10 ug/L. While this change resulted in more detections above the cleanup goal, there does not appear to be enough detections up to October 2005 to indicate a consistent problem with arsenic in groundwater.

The in-situ bioremediation of chromium in groundwater is causing mobilization of arsenic in groundwater that is believed to be temporary. This should be monitored closely to ensure that arsenic concentrations return to below 10 ug/L.

REFERENCE

Technical Presentation: *In-Situ Hexavalent Chromium Reduction and Geochemical Fixation in Varied Geohydrologic Regimes,* Jim V. Rouse, MWH Inc. March 2006

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