THIRD FIVE-YEAR REVIEW REPORT FOR
INDUSTRIAL WASTE PROCESSING SUPERFUND SITE
PINEDALE, FRESNO COUNTY, CALIFORNIA

PREPARED BY

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List of Abbreviations

95UCL	95 percent upper confidence limit
ARAR	Applicable or Relevant and Appropriate Requirement
bgs	below ground surface
CA	California
CCR	California Code of Regulations
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CHHSL	California Human Health Screening Level
cm/sec	centimeters per second
COC	contaminant of concern
CSM	conceptual site model
DHS	California Department of Health Services
DTSC	Department of Toxic Substances Control
ESC	Environmental Strategies Corporation
EPA	U.S. Environmental Protection Agency
FDPU	Fresno Department of Public Utility
FRI	Focused Remedial Investigation
FYR	Five-Year Review
GAC	granular activated carbon
HI	Hazard Index
HQ	Hazard Quotient
IWP	Industrial Waste Processing
MCL	maximum contaminant level
µg/L	micrograms per liter
$\mu g/m^3$	micrograms per cubic meter
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
NCP	National Contingency Plan
ND	not detected above the quantitation limit
NPL	National Priority List
OEHHA	Office of Environmental Health Hazard Assessment
OU	Operable Unit
O&M	Operations and Maintenance
PCE	Tetrachloroethene
PGS	Pinedale Groundwater Site
PIA	Pinedale Industrial Area
PRG	Preliminary Remediation Goal

PRP	potentially responsible party
RAOs	Remedial Action Objectives
RCRA	Resource Conservation and Recovery Act
RI/FS	Remedial Investigation/Feasibility Study
RME	Reasonable Maximum Exposure
RSL	Regional Screening Level
Site	Industrial Waste Processing Superfund Site
SOU	Soils Operable Unit
TAT	technical assistance team
TBC	to be considered
TCE	Trichloroethene
TTLC	total threshold limit concentration
USACE	United States Army Corps of Engineers
VOC	volatile organic compound

Third Five-Year Review Report

for

Industrial Waste Processing Superfund Site

1. Introduction

The purpose of a Five-Year Review (FYR) is to evaluate the implementation and performance of a remedy in order to determine if the remedy will continue to be protective of human health and the environment. The methods, findings, and conclusions of FYRs are documented in FYR reports. In addition, FYR reports identify issues found during the review, if any, and document recommendations to address them.

The U.S. Environmental Protection Agency (EPA) prepares FYRs pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 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 are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take 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.*"

EPA interpreted this requirement further in the NCP, 40 Code of Federal Regulations (CFR) Section 300.430(f)(4)(ii), which 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 actions no less often than every five years after the initiation of the selected remedial action*."

The U.S. Army Corps of Engineers (USACE), Seattle District, conducted the FYR and prepared this FYR report for the response action implemented at the Industrial Waste Processing (IWP) Superfund Site (Site) in Pinedale, California. EPA Region 9 is the lead agency for developing and implementing the response action for the Site.

Soil contamination is the primary concern at the Site and has been the focus of the FYRs. The response action for the soils Operable Unit (SOU) involved a non-time-critical removal action for lead and trichloroethene (TCE). In its 1995 Action Memorandum for the Site (EPA 1995), EPA indicated that a groundwater OU exists and would be investigated separately. In 1999, EPA conducted a focused remedial investigation for the groundwater OU and concluded that no further remedial actions were needed.

This is the third FYR for the Site. Five Year Reviews are completed, as a matter of policy, for removal actions that takes place at a site on the NPL that leaves hazardous substances, pollutants, or contaminants on site above levels that allow for unlimited use and unrestricted exposure and where no remedial action has or will take place. The triggering action for this policy review is the previous FYR signed on September 29, 2009.

2. Site Chronology

Table 1 lists the important events and dates for the Site.

Table 1. Chronology of Site Events

Event	Date
IWP operated as a chemical reclamation facility for glycols and solder wastes, and as a distributor of various chemical solvents for Ashland Oil.	1967-1983
DTSC conducted a site investigation, and lead and zinc were found to be present in on-site soils at levels exceeding their respective total threshold limit concentration (TTLC) standards. DTSC's site mitigation unit submitted an incident report to EPA.	May 1988
EPA conducted a preliminary site assessment to compile an inventory and map materials at the site, and concluded that the site required an immediate response action.	June 7, 1988
An EPA technical assistance team (TAT) performed a time-critical removal action at the Site, removing the drums, tanks, and piles of waste left on the site when IWP ceased operations.	June/July, 1988
IWP Site is proposed to be listed on the National Priorities List (NPL).	October 26, 1989
IWP Site added to the NPL.	August 30, 1990
EPA began an investigation of residual soil contamination at the Site.	1992
EPA issued an Administrative Order on Consent for the Soils Operable Unit (SOU), requiring a remedial investigation/feasibility study (RI/FS).	May 1993
SOU RI/FS, which included a human health risk assessment, was completed	July 1995
EPA signed an Action Memorandum for a non-time-critical removal action based on the RI/FS to remove and dispose of lead and trichloroethene (TCE)-contaminated soil at concentrations greater than 400 milligrams per kilogram (mg/kg) and 7 mg/kg, respectively.	September 28, 1995
PRPs signed a Consent Decree and agreed to perform a removal of the surface soil as described in the Action Memorandum.	April 1997
Field activities for Site removal action were completed.	August 30, 1998
EPA approved the Remedial Action Report.	January 17, 1999
EPA issued a Certificate of Completion stating that all soil removal actions (excavation and placement of clean fill) had been completed as mandated in the Consent Decree and Action Memorandum.	January 27,1999

Event	Date
EPA completed Focused RI for soil gas and groundwater	May 1999
EPA issues Preliminary Closeout Report for the Site	September 28, 1999
IWP Site sold and redeveloped.	2001
First FYR completed.	September 2004
CH2M Hill prepared a technical memorandum for EPA regarding data evaluation of the September 2006 vapor intrusion investigation.	February 15, 2007
DSTC Monitoring Well decommissioned	September 2008
EPA conducts vapor intrusion investigation	April 2009
Second FYR completed.	September 2009
ITSI prepared final technical memorandum for April 2009 indoor air sampling	March 3, 2010

3. Background

3.1. *Physical Characteristics*

The Site is approximately 0.5 acre and islocated at 7140 North Harrison Street in Pinedale, a town north of Fresno, California (see Figure 1). As of 2010, approximately 1500 people resided within the Pinedale community and approximately 930,000 people resided in the greater Fresno area.

The San Joaquin River is located approximately 0.5 mile northwest of the Site. The Forkner Canal is approximately 2,000 feet to the north of the Site, and the Bullard Canal is located approximately 2,000 feet to the south. As of 2012, several species were listed as threatened or endangered within Fresno County, though generally along the San Joaquin River. Based upon limited landscaping at both the Site and the surrounding properties, it is unlikely that any significant ecological receptors would be supported at the Site.

Adjacent to the IWP site to the west is residential development consisting of single family homes; to the east, southeast, and northeast is a large tract of industrial land containing the Pinedale Industrial Area (PIA).

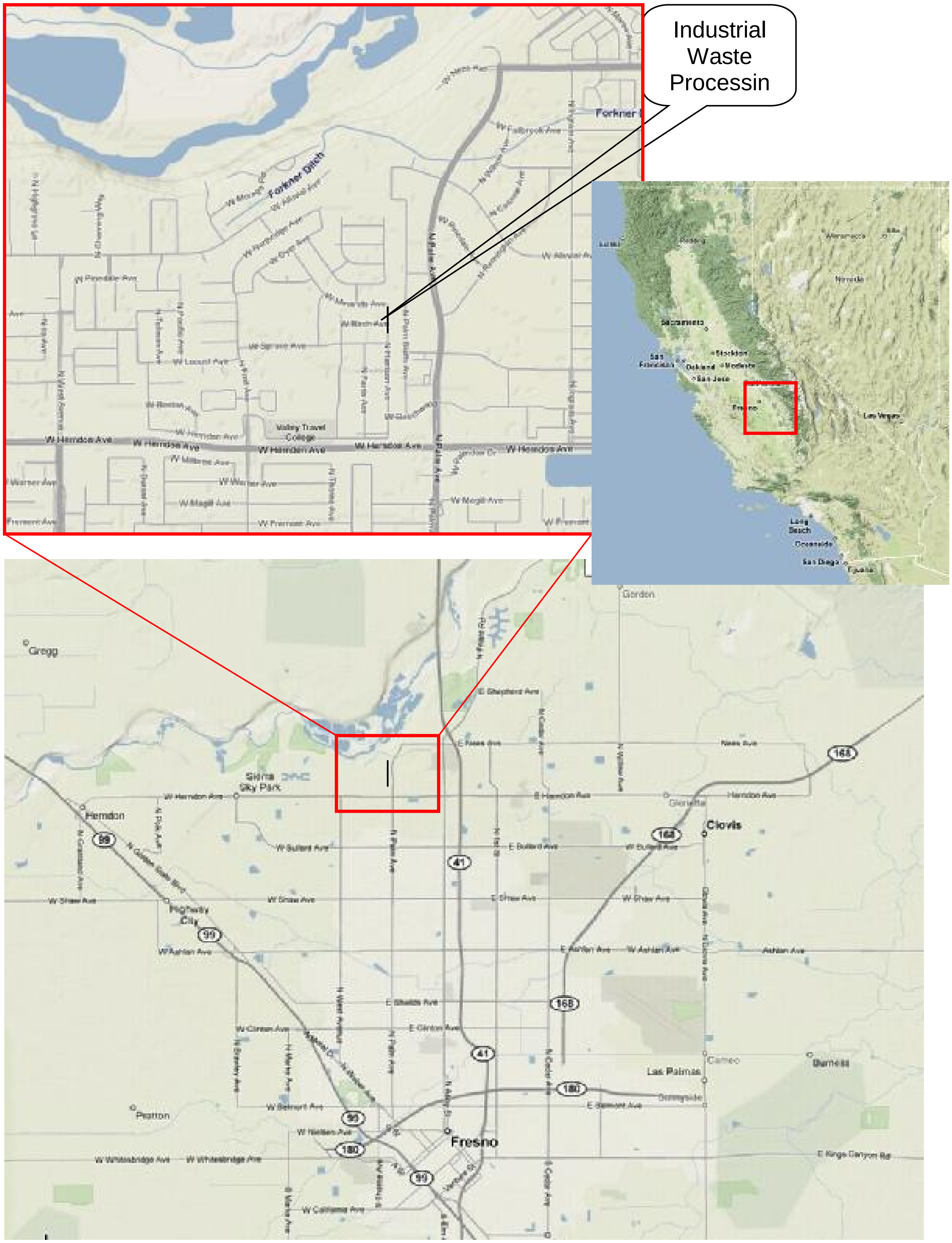

Figure 1. Location Map for the Industrial Waste Processing Superfund Site

3.2. *Hydrology*

3.2.1. Geology

The Site is located in the alluvial plain of the San Joaquin River in the Central Valley physiographic province of California. The province is a structural trough extending approximately 450 miles through central California from Redding (north) to the Tehachapi Mountains (south). The valley averages 50 miles in width and is bordered by the coastal ranges to the west and the Sierra Nevada range to the east.

Central Valley lithology is characterized by thick sequences of consolidated sedimentary and marine units and alluvial sediments eroded from the surrounding mountains and deposited in a westward-dipping monocline over crystalline basement rocks. The combined depth of consolidated and unconsolidated sedimentary units in the Central Valley ranges from approximately 3,000 feet beneath the Site to over 15,000 feet west of Fresno. The closest active fault to the Fresno area is the San Andreas Fault, located approximately 75 miles to the west. There is an extremely low probability of an earthquake with a magnitude of 6.5 or greater to occur in the Fresno area in the next 100 years.

Older alluvium deposits overlie the continental deposits as a series of combined alluvial fans between the San Joaquin and King River drainage systems, creating a complex sequence of channel and overbank deposits. Beneath the Site, these sediments are believed to be over 1,000 feet thick. A 50-foot-thick younger alluvial deposit, deposited by the San Joaquin River, overlies the older alluvial deposit. Both alluvial deposits are composed of silt and fine sand overbank deposits, with discontinuous channel deposits of coarser sand and gravel with cobbles. Layers of hardpan have been detected in the uppermost portion of the younger alluvium beneath the Site.

Borehole logging during the 1995 and 1999 remedial investigations identified relatively consistent sequences of soils beneath the Site. The studies indicate that the upper 10 to 30 feet of sediments beneath the Site are primarily silts and clays with one or more hardpan layers in the upper 20 feet. The hardpan layer ranges in permeability from 2×10^{-4} to 3×10^{-6} centimeters per second (cm/sec) and are continuous with the exception of a small area in the north-central portion of the Site. According to the 1995 remedial investigation, the hardpan layers beneath the Site inhibit the downward and lateral movement of infiltrating water and the upward movement of vapors in the vadose zone.

3.2.2. Hydrogeology

Regionally, alluvial sediments are present from the water table (120 feet below ground surface (bgs)) to at least 300 feet bgs, comprising a single aquifer. Numerous wells have been installed in this aquifer on adjacent Calcot and Vendo properties to monitor the Pinedale Groundwater Site (PGS) plume. Wells have been installed near the water table in a zone called the A-zone, and at deeper depths up to 300 feet bgs in a zone called the B-zone.

Regionally, groundwater recharge at the Site occurs through percolation of surface water in the San Joaquin River channel, in nearby recharge basins, and through leakage of canals. Percolation of rainfall or irrigation water is impeded by the regional indurated hardpan layers. At the Site, a sealant on the soil surface was installed from 1988 to 1998 that inhibited percolation of rainfall. A regional groundwater divide is located south of the San Joaquin River and is the result of extensive groundwater recharge occurring through the river channel. South of the Site in southwest Fresno, and north of the Site in Madera County, there are large regional cones of depression due to the municipal and agricultural groundwater pumping.

Locally, the dominant groundwater flow direction is to the southwest under unconfined conditions at a gradient of 0.0009 foot per foot. Shallow groundwater was encountered beneath the Site at depths of approximately 119 feet bgs and 128 feet bgs during the 1995 and 1999 remedial investigations, respectively.

3.3. *Land and Resource Use*

Industrial Waste Processing, formally known as "Chem-Serve," occupied approximately 0.5 acre on North Harrison Street in the community of Pinedale. From approximately 1967 to 1981, IWP was a chemical reclamation facility for glycols and solder wastes. From 1977 to 1983, IWP operated as a distributor of various chemical solvents for Ashland Oil. After 1983, the Site was used for storage of chemicals and equipment.

In 2001, the Site was sold to Pacific Tent & Awning, a manufacturer and distributor of fabric awnings and accessories. Pacific Tent & Awning developed the Site in 2001. The Site currently houses an 8,192-square-foot warehouse/office facility that covers approximately 80 percent of the Site area (see Figure 2) which also includes 2009 tetrachloroethene air sampling results. The remainder of the Site has been covered by asphalt, concrete, and landscaping (landscape covering is in compliance with city ordinances).

The Site is located in a highly developed area with a mix of commercial, industrial, and residential use. The Site itself is zoned commercial/light industrial, which it has been historically. Single-family residences are located approximately 200 feet west of the Site. The Site is bordered on the north, east, and south by newly developed office facilities on the former Calcot Ltd. property. The Vendo Company is located approximately 1,000 feet east of the Site, adjacent to the former Calcot Ltd. property (see Figure 3).

The Pinedale Groundwater Site (PGS), a non-NPL groundwater cleanup site regulated under DTSC, lies beneath and beyond the boundaries of the IWP Site.

Several recharge basins located within 1 mile of the Site are used intermittently to promote recharge to the groundwater aquifer. The groundwater aquifer beneath the Site is the primary source of public drinking water for the City of Fresno, with supplemental water delivered directly from the Sierra Nevada mountain range. The city delivers drinking water to about 500,000 urban residential, commercial, and industrial customers in over 114 square miles of the city and many county islands within the city's sphere of influence. Within 2,000 feet of the Site there are three inactive municipal water supply wells (PCWD-1, PCWD-2, and PCWD-3) and one private water well, PGW-11.

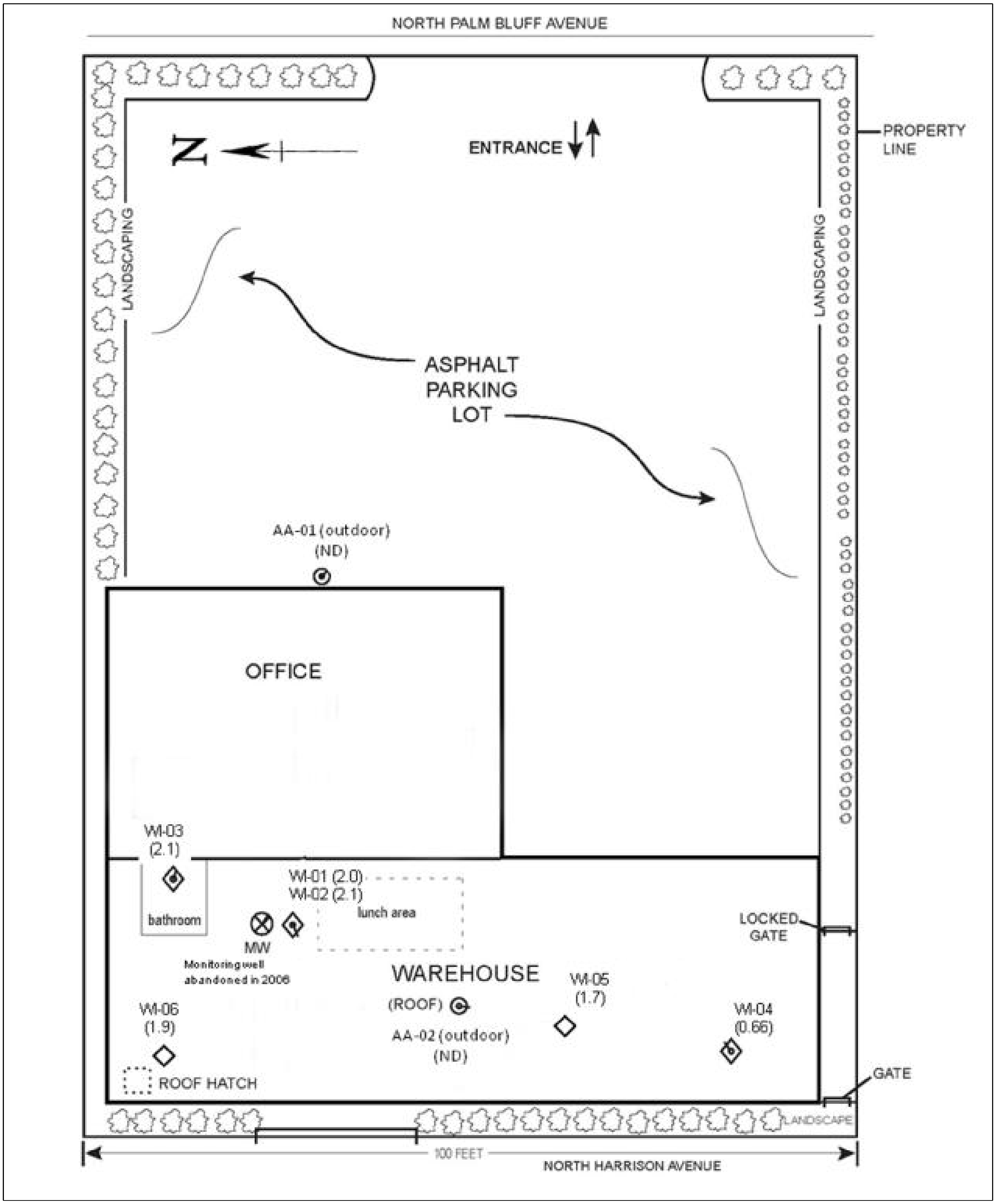

Figure 2. Detailed Map of Site with Summary of 2009 Tetrachloroethene Results (μg/m^3)

Figure 3. Map of IWP, Vendo, PGS, PIA, and Areas with TCE above 5 µg/L (BSK, 2013)

3.4. *History of Contamination*

Industrial Waste Processing, formerly known as "Chem-Serve," was a recycling facility that reclaimed various industrial waste materials. From approximately 1967 to 1981, IWP reclaimed solvents from printing operations, glycols from fluids used in natural gas dehydration, and lead solder and zinc from waste solder flux generated by the metal can manufacturing industry. From 1977 to 1983, IWP operated as a distributor of various chemical solvents for Ashland Oil Company. After 1983, the Site was used for storage of chemicals and equipment. Chemicals stored at the Site included alcohols, acetone, toluene, benzene, TCE, and tetrachloroethene (also known as perchloroethylene (PCE)). Spills, leaking drums, and improper storage of hazardous wastes are believed to be the main cause of contamination at the Site.

In July 1986, the Fresno County Department of Health and the California Department of Health Services (now DTSC) conducted a Site inspection in response to a citizen complaint. During the inspection, DTSC noted the presence of various tanks, waste piles, and process equipment containing crude oil, ethylene glycol, and zinc chloride. DTSC also identified various containers of flammable liquids such as xylene, isopropanol, and naphtha. In response to these observations, DTSC representatives collected three solder samples and analyzed the samples for zinc and lead. Zinc and lead were detected at concentrations above the California total threshold limit concentration (TTLC) standards established to determine hazardous levels.

In response to additional citizen complaints, on May 13, 1988, DTSC returned to the Site to conduct a more extensive site investigation. Areas of concern identified during the investigation included open containers of asbestos, approximately 300 drums containing solvents (some leaking), two waste piles of lead, and soil contaminated with lead and zinc beneath surface waste. Following the investigation, DTSC issued an incident report and contacted the EPA Emergency Response Division. The EPA Emergency Response Division and DTSC then conducted a joint inspection on June 7, 1988.

The Site was proposed for the National Priorities List (NPL) on October 26, 1989 and finalized on the NPL in August 30, 1990. At that time, EPA assumed lead responsibility for oversight of investigation and cleanup activities.

3.5. *Initial Response*

On June 7, 1988, EPA conducted a preliminary assessment of the Site. During the preliminary assessment, the EPA contractor compiled an inventory of materials, mapped the Site, and collected surface and subsurface soil samples. EPA found that some surface and subsurface soil samples collected contained lead and/or TCE.

Based upon the results found by EPA during the preliminary assessment, it was determined that a time-critical removal action was necessary. In August 1988, drums, tanks, sumps, containers, and the top 3 inches of contaminated soil were removed. A total of 19,000 gallons of hazardous liquids and 290 cubic yards of contaminated soil were also removed from the Site. Nine waste streams were sent off site for treatment or disposal, including acidic solids and sludge, base solids and sludge, halogenated liquids, solidified solvent sludge (>1,000 mg/kg halogenation), solidified solvent sludge (<1,000 mg/kg halogenation), asbestos, drums and piles of lead solder and surface soil, sterno waste, and tank oil. Following removal and sampling, a sealant was placed on the soil over the entire Site to prevent contaminant migration. Sampling results from surface soil and samples collected during the removal action confirmed that lead and zinc were present in on-site soil at levels exceeding their respective TTLC standards. Waste oils and water containing various halogenated compounds were also detected in samples collected from drums and tanks. The removal eliminated the immediate threat from the waste but did not address the residual contamination in the soil.

In 1992, EPA began an investigation of residual soil contamination at the Site. During May 1993, EPA issued an Administrative Order on Consent for the Soils Operable Unit (SOU), requiring a Remedial Investigation/Feasibility Study (RI/FS). From May 1993 until June 1995, the 12 PRPs conducted an RI/FS that included a human health risk assessment for the contaminated soil. In September 1995 EPA signed an Action Memorandum for a non-time-critical removal action at the Site for the SOU. The Action Memorandum proposed excavation and disposal of surface soil contaminated with lead and volatile organic compounds (VOCs) and no action (natural degradation) of VOCs in deeper soils. The Action Memorandum is the principal decision document governing the actions at this Site.

3.6. *Basis for Taking Action*

The primary contaminants of concern for the Site were VOCs and lead. The presence of these contaminants in residual soil provided the basis for taking action under CERCLA. Even though carcinogenic risks were found to be within the acceptable risk range ($1x10^{-6}$ to $1x10^{-4)}$, the main basis for action was a result of risk assessment findings showing potential increased noncarcinogenic risk to child residents from ingestion of lead-contaminated soil. A secondary pathway of concern is the inhalation of VOCs, specifically TCE.

During the 1995 RI/FS, drainage ways and downwind off-site locations immediately south of the site were sampled for total lead and/or metals. Off-site samples were collected 10 feet outside the fence line on each side of the Site. Eighteen off-site surface sample locations exceeded the preliminary remediation goal (PRG) for lead. The RI/FS showed that the detected average lead concentration was 2,140 mg/kg in surface soil. This value exceeded the 400 mg/kg 1995 PRG level established for lead by EPA.

Other on-site sampling results from the upper vadose zone (soil from the surface to 10 feet bgs) showed presence of VOCs exceeding their respective PRG levels in an isolated area of the Site. Only four VOCs were detected in the upper vadose zone at a concentration in excess of the preliminary cleanup goals including TCE (1,200 mg/kg), PCE (120 mg/kg), methylene chloride (1,000 mg/kg), and 1,1,2,2-tetrachloroethane (0.97 mg/kg). Most of these exceedances were detected in the soil sample collected from 2.5 feet bgs in one soil boring. The highest concentration of TCE detected in the lower vadose zone (soil from 10 feet to 119 feet bgs) was 0.11 mg/kg at a 100 foot depth.

Zinc was detected at concentrations greater than its PRG at locations where elevated lead concentrations were also present. Lead was therefore used as the primary indicator to evaluate the extent of contamination.

A human health risk assessment was conducted as a part of the 1995 RI/FS. Cancer risk and hazard indices were calculated using the validated data for chemicals detected at the Site provided in the 1994 Draft RI/FS. An evaluation of the potential adverse human health effects due to lead concentrations found at the Site used both the Integrated Exposure Uptake Biokinetic (IEUBK) model and the Cal/EPA model.

Based upon the risk assessment findings, the risks associated with ingestion of arsenic in soil contributed the most to average exposures; however, because the on-site concentrations were within regional background concentrations, arsenic was not an issue. Potential for ingestion of zinc was found to contribute the most to the overall hazard index calculation. In addition, overall risk estimates associated with inhalation of TCE in ambient air contributed the most to reasonable maximum exposures. Therefore, the risk assessment determined that ingestion of zinc in soil and inhalation of TCE in ambient outdoor air were the chemicals and pathways contributing the most to the overall hazard index. Despite these risk elements, the risk assessment concluded that the overall carcinogenic risk was within an acceptable cancer risk range (from 4×10^{-5} to 1×10^{-7}).

As part of the risk assessment, potential exposure to VOCs in indoor air was evaluated semi-quantitatively using measured site-specific total soil concentrations taken from the 1994 Draft RI/FS to calculate estimated soil gas concentrations. The future concentrations of VOCs within a residence located on the Site were estimated using a conservative attenuation factor approach, whereby an attenuation coefficient was multiplied by the estimated soil gas concentration. The model assumed that future property development would include a residence with a basement. This scenario was not included in the overall risk assessment because the models used were not considered valid by EPA at the time. The conclusion at that time was that the models used may have underestimated inhalation risks because VOCs in air were assumed to be in equilibrium with VOCs sorbed onto the soil (an incorrect assumption), and due to soil concentration measurements.

The risk assessment did not include vinyl chloride or chromium. Vinyl chloride, a biodegradation product of TCE, was not detected in samples from 1 to 10 feet bgs. Chromium was not included in cancer risk estimates because toxicity criteria were not available. Reasonable maximum exposure risks for chromium in soil from 0 to 5.5 feet bgs reveal that exclusion of potential risks may underestimate risks by a factor of 2. The IEUBK modeling for lead suggested that detected lead concentrations from 0 to 0.5 feet bgs may have adverse health effects on hypothetical residential children. Exposure to lead below 1 foot bgs, however, was not expected to result in adverse health effects. The major adverse effects in humans caused by lead include alterations in the hematopoietic and nervous systems.

4. Remedial Actions

4.1. *Remedy Selection*

Although the 1988 emergency response removal action was successful in limiting any imminent threat, it did not address residual soil contamination in the SOU. In its 1995 Action Memorandum, EPA determined that the proposed response action for the SOU should be performed as a removal action in accordance with CERCLA, as amended, and consistent with the NCP. Conditions at the Site met the NCP Section 300.415(b)(2) criteria for removal. This decision is based on the administrative record for the Site. The proposed action for the upper vadose zone soil was to excavate surface soils containing lead and VOCs in excess of the site remedial action objectives (RAOs) of 400 mg/kg for lead and 7 mg/kg for TCE. In the lower vadose zone soil, analytical results for the soil samples collected indicated that natural degradation of the VOCs in soil was feasible and occurring. The selected response action was intended to allow for unrestricted use of the property.

The 1999 Focused Remedial Investigation (FRI) was performed to assess if IWP was a significant contributor to the regional TCE Pinedale Groundwater Site (PGS) groundwater plume (EPA 1999a). The FRI concluded that IWP was not a significant contributor to the regional PGS VOC plume because of decreasing soil gas and groundwater concentrations with depth and VOC concentrations in groundwater that were orders of magnitude less than source areas within the plume. Therefore, no further action response at the Site under CERCLA was warranted.

4.2. *Remedy Implementation*

4.2.1. Non-Time-Critical Removal Action

The non-time-critical removal action work plan was approved by EPA on January 7, 1998. The work plan called for excavation and off-site disposal of TCE- and lead-impacted soil at concentrations greater than their respective RAOs, confirmation sampling, and backfilling with clean fill. Environmental Strategies Corporation (ESC), on behalf of the PRPs, performed the non-time-critical removal action from January 21, 1998 to August 30, 1998.

Approximately 2,352 tons of contaminated soil and debris were excavated from the Site to an average depth of 2 feet below original grade. Off-site areas surrounding 16 out of 18 samples that exceeded the PRG for lead during the RI/FS were excavated to an average of 1 foot below original grade at an approximate 5-foot radius around the fence line of the site.

Tests confirmed that the backfill material to be used at the Site was not contaminated. These samples were analyzed for VOCs, semi-volatiles, and metals. The backfill material contained lead at a concentration of 2.9 mg/kg, which was also below average lead background concentrations at the site (5.1 mg/kg).

Due to the heavy rainy season from January through May 1998, the base of the excavation was allowed to dry, and backfilling was performed from July 21 through July 24, 1998. Approximately 1,560 cubic yards of backfill material were placed at an average thickness of 2 feet across the Site.

All verification soil samples were analyzed for lead and TCE. Initial results indicated that most verification samples contained lead below the 400 mg/kg RAO and TCE below the 7 mg/kg RAO. Areas that exceeded the RAOs were excavated an additional foot, with two locations excavated to approximately five feet bgs and sampled again. The secondary verification samples contained lead and TCE at concentrations below the RAOs.

A total of 57 verification samples were collected from the base of the Site excavation. Laboratory analysis confirmed that the RAOs for lead and TCE were achieved in all of the final verification samples. Hence, all soils impacted with lead and TCE were removed to an acceptable level during the excavation phase for the RA.

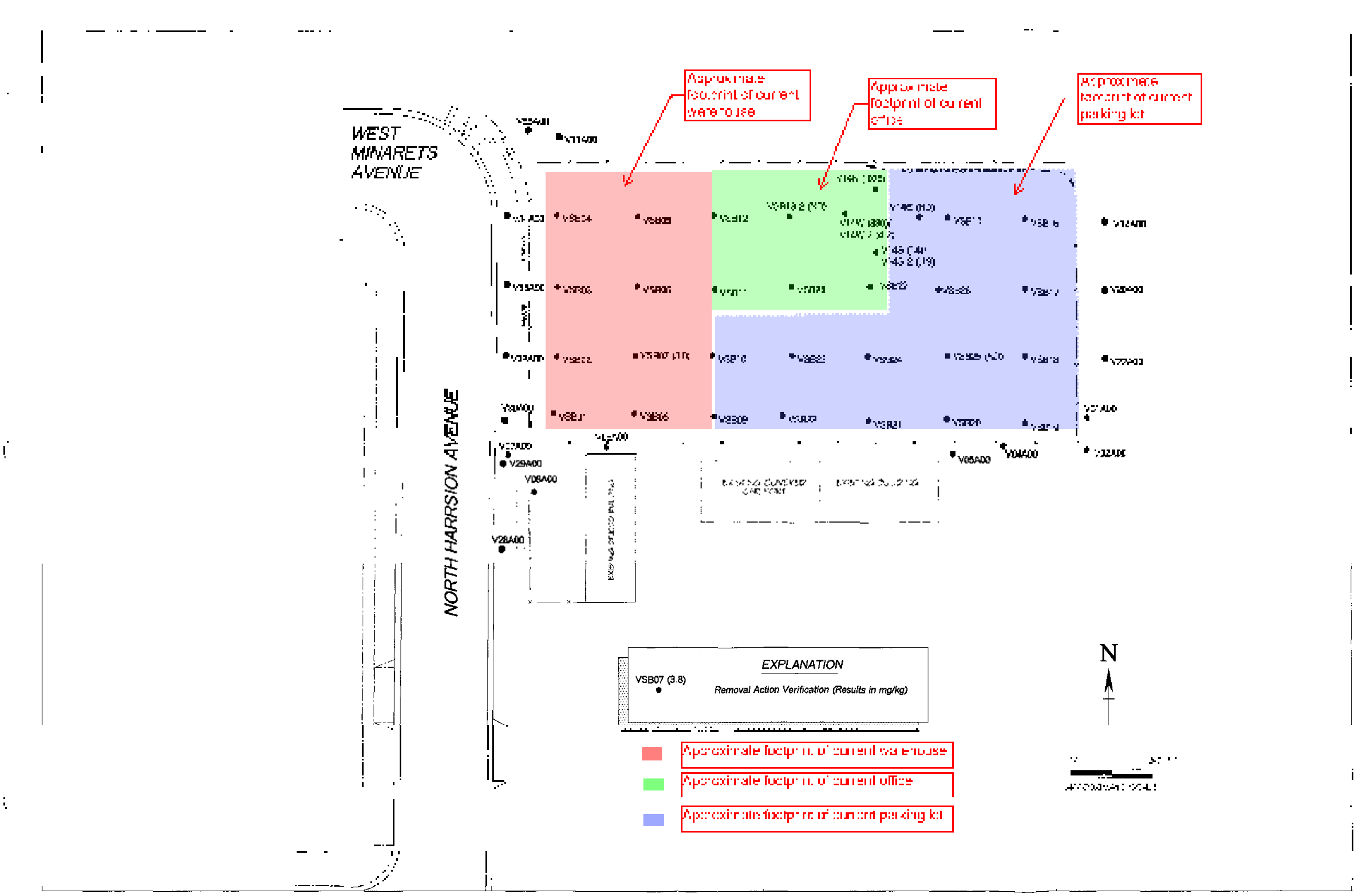

Figure 4. Current IWP building footprints superimposed on verification sample results for TCE.

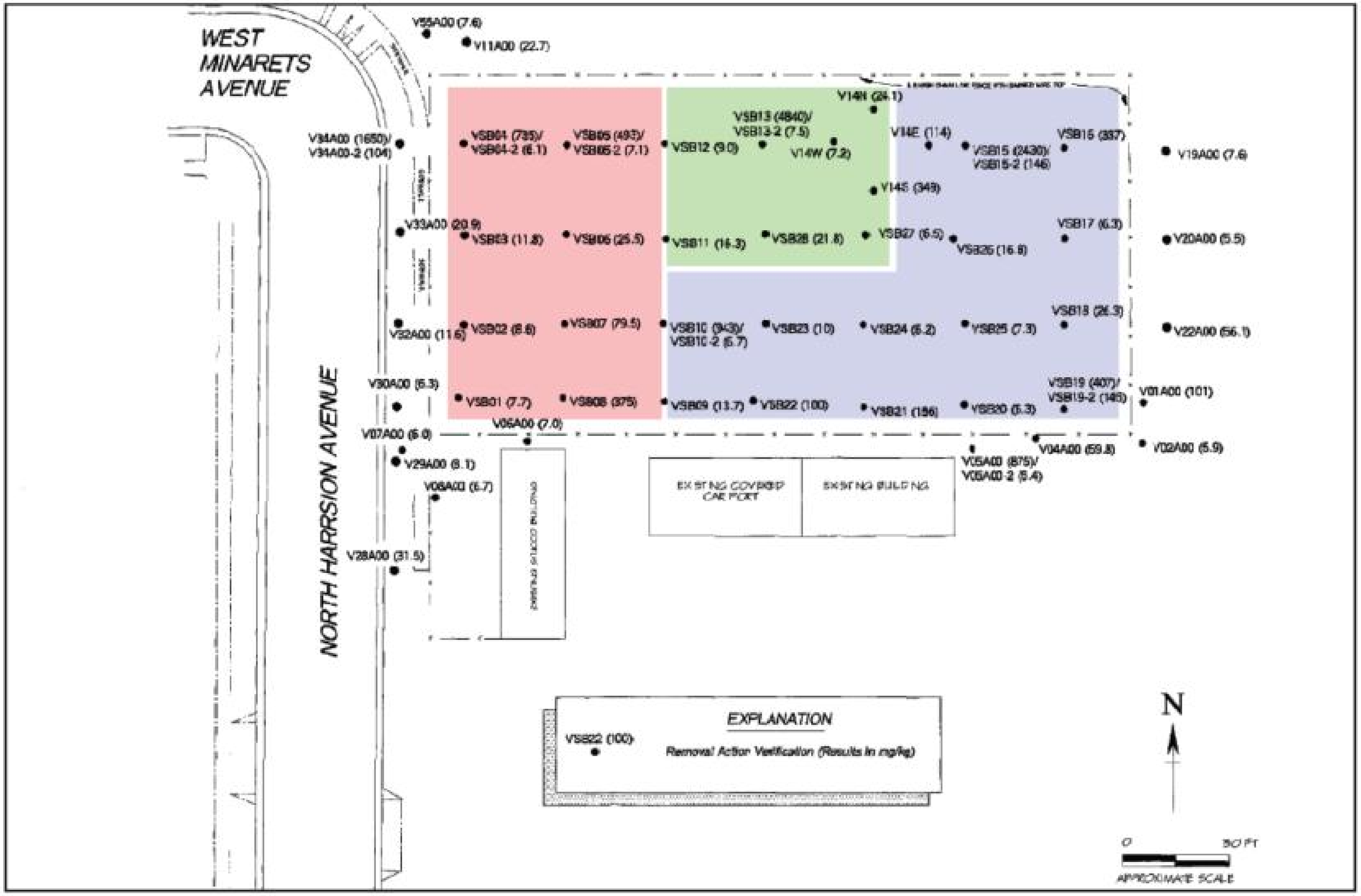

Figure 5. Current IWP building footprints superimposed on verification sample results for Lead.

4.2.2. Vapor Intrusion Investigation and Remediation, 2006 – 2009

In September 2006, EPA collected ambient and indoor air samples at the Site in response to recommendations presented in the first FYR report (EPA 2004). The objective was to evaluate the human health risk from selected indoor air VOCs to occupants of the buildings now located at the Site. Eight samples were collected: two ambient (outdoor) and six indoor. Two of the indoor samples were collected from the headspace of a monitoring well located inside the warehouse. Screening levels for PCE were exceeded for the indoor locations, including the monitoring well headspace location. The results from the 2006 sampling indicated that there was a complete vapor intrusion pathway allowing humans to be exposed to vapors.

In April 2007, a visual inspection of the building and foundation was conducted at the Site to identify all potential entry routes for VOC-contaminated soil gases. The findings and recommendations were presented in a technical memorandum in the second FYR report (EPA 2009). EPA believed that the source of the elevated indoor air concentrations was the on-site monitoring well, which acted as a conduit from the groundwater to the building. Subsequent work was completed in the building, including abandoning and sealing the well in 2008.

In April 2009, ambient and indoor air samples were collected at the Site. The objective was to evaluate the effect of sealing the monitoring well. PCE was detected in all indoor samples ranging from 0.66 to 2.1$\mu g/m^3$, but the maximum PCE value was within the acceptable risk range ($1x10^{-6}$ to $1x10^{-4}$). No other VOCs were detected.

4.3. *Operation and Maintenance (O&M)*

The Remedial Action Report for Removal Action (ESC 1998) included a plan for operations and maintenance (O&M) that recommended inspection of the Site's security fence and vegetative cover on a semi-annual basis. The purpose of these inspections was to check for breaches in both the security access and the vegetative cover. The inspections were to be conducted during the months of April and October; however, there have been no periodic inspections conducted since issuance of the remedial action report other than as part of the FYR process.

In 2001, the Site was sold and redeveloped by Pacific Tent & Awning, a manufacturer and distributor of fabric awnings and accessories. The property remains zoned as commercial/light industrial. The Site currently houses an 8,192-square-foot warehouse/office facility that covers approximately 80 percent of the Site area. The remainder of the Site has been covered by asphalt, concrete, and landscaping (landscape covering is in compliance with city ordinances).

5. Progress since the Last Five-Year Review

5.1. *Previous Five-Year Review Protectiveness Statement and Issues*

The protectiveness statement from the second FYR for the Site stated the following:

> *The remedy at the IWP site is protective of human health and the environment in the short-term. Exposure pathways that could result in unacceptable risks are currently being controlled. The most recent indoor air samples were at or below EPA's indoor air screening levels. However, the source of indoor air contamination is unknown, so further investigation is needed to develop a strategy to ensure long term protectiveness. This could include selection of further remedial actions in a Record of Decision.*

The second FYR included two issues and recommendations. Each recommendation and the actions taken are summarized in Table 2 below and discussed thereafter.

Table 2. Recommendations from the 2009 FYR and Actions Taken

Issues from previous FYR	Recommendations	Action Taken and Outcome	Date of Action
1) Hazardous substances may be present in subsurface soils at levels that pose a risk with unrestricted (e.g., residential) use or unlimited exposure (e.g., unlimited digging). Currently there are no deed restriction [sic]	Determine whether or not hazardous substances are present in subsurface soils at levels that do not allow for unrestricted use or unlimited exposure	An analysis of lead soil data was completed as part of this third FYR to determine whether concentrations of subsurface lead would allow for unlimited use or unrestricted exposure. Based on this analysis, unlimited use/unrestricted exposure of the property is appropriate, and no institutional controls are required.This analysis is presented below in Section 6.4.	N/A
	If so, a decision document should be completed that selects additional remedial action, which may include institutional controls.	N/A	N/A
2) Existing information is insufficient to determine if subsurface site contaminants are contributing to indoor air risks. Indoor air concentrations in a commercial building on the site are at or below EPA risk screening levels. However, these levels were achieved by improving ventilation and sealing potential vapor intrusion pathways. Although vapor	Determine whether contaminated indoor air is related to site contamination.	A review of indoor air data and was completed as part of this third FYR to compare the data to updated Regional Screening Levels (RSLs) and California Human Health Screening Levels (CHHSLs) to determine whether unacceptable exposure to VOCs via the vapor intrusion pathway was occurring at the site. Based on this analysis, unlimited use/unrestricted exposure of the property is appropriate, and no institutional controls are required. This analysis is presented below in Section 6.4.	N/A

Issues from previous FYR	Recommendations	Action Taken and Outcome	Date of Action
intrusion in the on-site building is currently controlled, there could be risks if the current building was altered or a new building constructed without similar controls.			

6. Five-Year Review Process

6.1. *Administrative Components*

EPA Region 9 initiated the FYR in November 2013 and scheduled its completion for August 2014. The EPA review team was led by Patricia Bowlin of EPA, remedial project manager for the IWP Site, and included Jayson Osborne (remediation biologist) and Rick Garrison (geologist) with USACE, Seattle District. In November 2013, EPA held a scoping call with the review team to discuss the Site and the status of the protectiveness of the response action. A review schedule was established that consisted of the following actions:

- Community Notification;
- Document review;
- Data review;
- Toxicity values review;
- Site inspection;
- Local interviews; and
- FYR report development and review.

6.2. *Community Notification*

On May 1, 2014, a public notice was published in the *Fresno Bee* announcing the commencement of the FYR process for the IWP Site, providing Patricia Bowlin's contact information, and inviting community participation. The press notice is available in Appendix B. No one has contacted EPA as a result of this advertisement.

When finalized, the FYR report will be made available to the public at the following web site: http://www.epa.gov/region09/IndustrialWasteProcessing.

6.3. *Document Review*

This FYR included a review of relevant, site-related documents including decision documents, remedial action reports, and recent monitoring data. A complete list of the documents reviewed can be found in Appendix A.

ARARs Review

Section 121 (d)(2)(A) of CERCLA specifies that Superfund remedial actions must meet any federal standards, requirements, criteria, or limitations that are determined to be legally Applicable or Relevant and Appropriate Requirements (ARARs). ARARs are those standards, criteria, or limitations promulgated under federal or state law that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site.

ARARs identified in EPA’s 1995 Action Memorandum were all action-specific and no longer apply since the removal action has now been completed.

Human Health Risk Assessment Review

A human health risk assessment was completed for the Site as part of the 1995 RI/FS. The risk assessment identified the exposure pathways at the Site as direct contact with soil via ingestion and as dermal contact for on-site workers and residents (i.e., child residents). The risk assessment also identified exposure pathways as volatilization and wind erosion with inhalation of on-site vapors by workers and residents. See section 3.6 above for additional discussion. Table 3 below presents the exposure pathways and associated risks identified in the risk assessment.

Table 3. Exposure Pathways and Risk

Exposure Scenario and Pathway	Risk Driver(s)	Risk Estimate
On-Site Resident Child - ingestion of contaminated soil	arsenic (cancer) zinc (non-cancer) lead (non-cancer)	$1x10^{-5}$ (cancer) RME HI = 2.5 (non-cancer)[1]
On-Site Resident Child – dermal contact with contaminated soil	arsenic (cancer) zinc (non-cancer) lead (non-cancer)	$3x10^{-6}$ (cancer) RME HI = 0.3 (non-cancer)
On-Site Resident Child – inhalation of vapors (outdoors)	TCE	$4x10^{-5}$ (cancer) RME HI = 0.6 (non-cancer)
On-Site Resident Child – inhalation of contaminated airborne dust	arsenic (cancer) zinc (non-cancer) lead (non-cancer)	$5x10^{-9}$ (cancer) RME HI = 0.03 (non-cancer)

1 – Reasonable Maximum Exposure (RME) Hazard Index (HI)

The risk assessment was reviewed to identify any changes in exposure or toxicity that would impact protectiveness. Although the risk assessment evaluated potential exposures to VOCs in indoor air, the results were not included in the overall risk estimate. The Vapor Intrusion Assessment is discussed in Section 6.Toxicity Values

EPA’s Integrated Risk Information System has a program to update toxicity values used by EPA in risk assessments when newer scientific information becomes available. In the past five years, there have been a number of changes to the toxicity values for certain contaminants of concern at the Site. Revisions to the toxicity values for TCE and PCE indicate differing risks from exposure to these chemicals than previously considered. The toxicity value and associated RSLs for lead in soil have not changed; however, the California OEHHA has revised soil screening lead numbers downward for industrial and residential sites in California.

Indoor air results are compared to EPA's RSLs for indoor air as a first step in determining whether response actions may beneeded to address potential human health exposures. The RSLs are chemical-specfic concentrations for individual contaminants that correspond to an excess cancer risk level of 1×10^{-6} (or a Hazard Quotient (HQ) of 1 for non-cancinogins), and they have been developed for a variety of exposures scenarios (e.g. residential, commercial/industrial).

RSLs are not de facto cleanup standards for a Superfund site, but they do provide a good indication of whether actions may be needed.

In September 2011, EPA completed a review of the TCE toxicity literature for both cancer and non-cancer toxicity effects, which resulted in lower RSLs for TCE. For industrial exposures, assuming an 8-hour work day, the screening level is 3.0 $\mu g/m^3$ for chronic exposure for cancer risk in excess of 1×10^{-6}. For residential exposures, the screening level is 0.43 $\mu g/m^3$ for chronic exposure for cancer risk in excess of 1×10^{-6}. EPA uses an excess cancer risk range between 10^{-4} and $10^{-6}$for assessing potential exposures, which corresponds to TCE concentrations between 3 and 300 $\mu g/m^3$ for industrial exposures and between 0.43 and 43 $\mu g/m^3$ for residential exposures. Also, as a result of the 2011 TCE reassessment, subchronic, non-cancer screening levels of 8.8 $\mu g/m^3$ (industrial) and 2.1 $\mu g/m^3$ (residential) for TCE were developed to account for the effect of short-term exposure on neonatal development.

EPA also reassessed PCE toxicity literature for both cancer and non-cancer toxicity effects in February 2012. However, California's Office of Environmental Health Hazard Assessment (OEHHA) has reservations on several science policy decisions in EPA's toxicity review. Cal OEHHA also reviewed the toxicity literature in 2001 and derived toxicity values that differ from the Federal values. Since these values are applicable in California, we calculated Cal-modified RSLs using the EPA RSL calculator using California's OEHHA derived toxicity information and EPA's 2014 exposure assumptions. Revisions to the TCE and PCE toxicity information and respective RSLs do not impact existing vapor intrusion evaluations. See Table 4 and Table 5 below for summaries of industrial and residential RSLs for contaminants of concern (COCs) at the Site.

Table 4. Summary of Industrial Air RSLs (Nov 2014) for COCs at the Site

Contaminant of Concern	RSL for cancer risk in excess of 1x10-6 (µg/m3)	RSL for non-cancer hazard (µg/m3)
TCE	3.0	8.8
PCE Cal –modified[1/]	2.1	180

1/ Calculated using California toxicity factor but EPA industrial exposure assumptions

Table 5. Summary of Residential Air RSLs (Nov 2014) for COCs at the Site

Contaminant of Concern	**RSL for cancer risk in excess of 1×10^{-6} ($\mu g/m^3$)**	**RSL for non-cancer hazard ($\mu g/m^3$)**
TCE	0.5	2
PCE Cal-modified	0.5	48

1/ Calculated using California toxicity factor but EPA residential exposure assumptions

The 1995 Action Memorandum established an RAO for lead in soil at 400 mg/kg. There have been no changes in the past five years to the RSL for lead in residential soil; it remains at 400 mg/kg.

The California OEHHA establishes human health screening levels for various chemicals in soil including lead. Screening numbers prior to 2009 for lead were 150 mg/kg in soil for residential use and 3500 mg/kg in soil for commercial/industrial use. These screening numbers were based on a blood lead level of concern of 10 micrograms per deciliter (µg/dL). The OEHHA has replaced the 10 µg/dL level of concern with a source-specific benchmark change of 1 µg/dL based on a recent Center for Disease Control assessment and management approach. In 2009, the OEHHA established new residential (80 mg/kg) and commercial/industrial (320 mg/kg) CHHSLs consistent with the newly established benchmark blood lead level of 1 µg/dL. Table 6 summarizes the various screening levels for lead in soil.

Table 6. Comparison of Screening Levels for Lead in Soil

Contaminant of Concern	**Lead**
Action Memorandum RAO for lead	400 mg/kg
EPA Region 9 RSL for lead in residential soil	400 mg/kg
California OEHHA Soil Screening Number for lead in residential soil	80 mg/kg
California OEHHA Soil Screening Number for lead in industrial soil	320 mg/kg
Difference from Action Memorandum RAOs?	**California standards are more stringent**

Ecological Review

The 1995 Action Memorandum notes that, "There are no sensitive ecosystems or surface waters in the immediate vicinity [of the IWP Site]." The response action performed at the Site removed contaminated soils from the site and replaced them with clean backfill soil. The Site has since been redeveloped for light industrial use. The bulk of contaminants at the Site have been removed. There are no complete ecological exposure pathways at the Site, and there are no ecological receptors that use the Site.

6.4. *Data Review*

Soil

Lead soil data reported in the 1995 RI/FS indicated that the average lead concentration at 2.5 ft bgs at the Site was 130.3 mg/kg. The 95 percent upper confidence limit (95UCL) for lead at this depth was calculated at 462.3 mg/kg. Both values are above the current California OEHHA soil screening number for lead for residential scenarios (80 mg/kg). Following cleanup activities in 1998, confirmation samples were taken at the base of the excavation prior to backfilling activities. Confirmation sample data show that the average level of lead contamination at the base of the excavation within the IWP property boundary (average 2 ft bgs) decreased to 55.2 mg/kg. The 95UCL decreased to 149.7 mg/kg lead. This value is above the California OEHHA soil screening number for lead for residential scenarios (80 mg/kg), but below the soil screening number for industrial scenarios (320 mg/kg).

However, the confirmation sample data very likely overestimate average soil lead concentrations at the Site. The soil in approximately the first two feet (backfill from source #4 placed during the 1998 remedial action) contains lead at very low levels, 2.9 mg/kg. The soil at the bottom of the excavation is a thin band of soil containing some residual contamination (between 80-400 mg/kg) that was not excavated during the removal action.

The sampling results from the remedial investigation indicated that onsite contammation is limited to the surficial soils (upper 12-inches), any downward migration of lead would ultimately be impeded by the contaminant's relative immobility and the existence of a hardpan layer from 3 to 7 feet bgs. Based on these assumptions, movement of lead laterally and downward in the soil profile would be facilitated only through bulk movement of soil particles (such as during construction activity). Therefore, undisturbed soil below the base of the excavation is expected to have a very low lead concentration. If a lead concentration study were performed at the site to determine average lead concentrations throughout the first ten feet from the surface, it is expected that average lead levels would be well under 80 mg/kg lead and the site would be shown to be suitable for residential or unlimited use/unrestricted exposure.

In addition, the removal action removed a small, isolated area of soil with elevated levels of TCE. The confirmation sampling ranged from non-detect to 3.8 mg/kg. The maximum concentration detected is within EPA's acceptable risk range for residential use (10^{-6} to 10^{-4}) which takes into consideration direct contact, as well as, off-gas inhalation exposure scenarios.

Based on this analysis, unrestricted exposure/unlimited use of the property is appropriate and no institutional controls are required.

Ground Water

VOCs in soil were listed as a COC in the Action Memo. TCE is a COC at the adjacent Pinedale Groundwater Site, a cleanup site regulated by the California Department of Toxic Substances Control (DTSC). The following paragraphs describe the relationship between IWP and the Pinedale Groundwater Site (PGS) and provide context for the discussion of the vapor intrusion studies in the subsequent Soil Gas/Indoor Air section.

Regionally, a Pinedale Groundwater Site (PGS) exists (see Figure 3), and the PGS groundwater treatment program has been under the regulatory authority of the DTSC since 1988. The PGS includes a plume of TCE-contaminated groundwater approximately 1.5 miles long (current length). This plume originated approximately 0.5 mile up-gradient (northeast) of the IWP Site and extends approximately 1.5 miles down-gradient (southwest) of the IWP site. Groundwater flows in a southwesterly direction.

The PGS encompasses both the IWP Site and the Pinedale Industrial Area (PIA).

In 1990, DTSC installed a monitoring well (DHS-IWP-A) on the IWP Site as part of the PGS groundwater investigation. TCE and other VOCs were detected in the groundwater at concentrations above federal and state maximum contaminant levels (MCLs) of 5 µg/L. The VOCs detected at the on-site well steadily declined from 1990 to 1998.

No water samples were collected on the IWP Site between 1999 and 2003 due to low water levels. The 1999 Focused Remedial Investigation (FRI) was performed to assess if IWP was a significant contributor to the PGS groundwater plume. The FRI concluded that IWP was not a significant contributor to the PGS plume because of decreasing soil gas and groundwater concentrations with depth and VOC concentrations in groundwater at the IWP Site that were orders of magnitude less than source areas within the PGS boundaries.

Groundwater contamination beneath the IWP Site is being addressed by the remediation of the PGS site and/or natural degradation. The current groundwater plume is shown in Figure 2 and indicates that the IWP Site is approximately 750 feet cross-gradient (to the west) from the PGS plume, with no monitoring well located between the PGS plume and the IWP Site. Since the previous FYR, the overall TCE concentrations have decreased across the PGS, with a smaller plume of groundwater still greater than 5 µg/L. The State continues to oversee semi-annual groundwater sampling events.

<u>Soil Gas/Indoor Air</u>

In 1999, EPA issued a Final Focused Remedial Investigation Report, Soil-Gas and Ground-Water Sampling which included soil gas samples from a depth of ten feet bgs to groundwater in four borings. Two samples in one boring exceed the current TCE RSL screening level for soil gas (21 μ/m^3) at a depth of 10 feet and 20 feet below ground. However, the 1995 RI/FS did not find PCE below the hardpan layer in the soil, and only found low levels of TCE at the same internal (maximum detection was 0.04 mg/kg). The 1995 RI/FS considered the potential migration of the VOCs from the limited VOC location found on the surface and determined that the hardpan layer located at 3 to 7 bgs impeded movement of VOCs to the deeper vadose zone. The remedy implemented removed the surface soils where the TCE and PCE had been found.

In 2006, EPA collected air samples next to the well (DHS-IWP-A) on the IWP Site. Analytical results for TCE and PCE exceeded screening levels with concentrations that were significantly higher than indoor air sampling results from other locations in the same building. In September 2008, the on-site well was decommissioned by DTSC because it appeared to create a preferential pathway for vapor intrusion into the current building.

Follow-up testing in 2009 indicated that VOC levels in all samples of indoor air had dropped below screening levels. Since VOC levels decreased following closure of the well, this result suggests that the vapor intrusion was due primarily to the PGS plume, rather than on-site contamination.

Results from 2006 and 2009 were compared to current RSLs for TCE and PCE at the Site. The 2006 results showed elevated levels of VOCs that exceeded the RSLs, and follow up samples taken post-mitigation in 2009 showed that VOC levels had dropped to, or below, the RSLs.

Additionally, there appears to be little correlation between the Vapor Intrusion sample results and TCE verification samples (see Figures 2 and 4). Figure 4 shows the location of TCE verification soil sample results and locations based on Figure 6.1 in the 1998 Remedial Action Report and building footprints approximated based on Figure 2. Residual soils left from 1998 removal action under the current warehouse building were non-detects for TCE; indoor air TCE concentrations was 0.18 µg/m^3 in 2006 in the warehouse in the vicinity of the well are likely a result of preferential migration of vapor from deeper VOC sources. After the monitoring well was decommissioned in 2008, the second indoor air sampling event in 2009 had no detections of TCE.

Table 7. Summary of Indoor Air Sampling Results

Analyte	2006 Maximum Concentrations (µg/m^3)			2009 Maximum Concentrations (µg/m^3)		Indoor Air RSLs	
						Industrial (µg/m^3)	Residential (µg/m^3)
	Ambient	Indoor	Well	Ambient	Indoor		
1,1-DCA	ND	ND	0.62	ND	ND	7	1.8
1,1-DCE				ND	ND	880	210
cis-1,2-DCE	ND	ND	0.77	ND	ND		
PCE	2.0	7.3	37	ND	2.1	2.1	0.5
1,1,1-TCA	0.14	0.12	0.58	ND	ND	22000	5200
TCE	0.065	0.18	1.0	ND	ND	3	0.43
VC				ND	ND	2.8	0.17

6.5. *Site Inspection*

The Five Year Review Site inspection was conducted on May 5, 2014 by U.S. EPA Remedial Project Manager, Patricia Bowlin. The property owner, Mike Mygind, was present during the site inspection. The reviewer visually inspected and documented the conditions of the site for inclusion in the third five year review report. See Appendix D for the Site Inspection Checklist. Photos from this site inspection are presented in Appendix E.

The Site currently houses a tent/awning manufacturing and repair company with eight employees. The Site is entirely covered by an 8,200 square foot manufacturing facility/warehouse/office, asphalt pavement, and landscaping. The Site appeared to be well-maintained and well ventilated with open doors, roof vents, fans and swamp coolers. During the inspection, the property owner pointed out the location of the decommissioned well as well as the previous improvements to the bathrooms (sealing of openings and new timer switches for the fans) that were documented in the previous five-year review report. The property owner also indicated that there were 72 solar panels installed on the roofs of the Site buildings.

6.6. *Interviews*

No formal interviews were conducted for this five-year review, but there were informal conversations with the property owner, regarding the current operations, including the heating, ventilation, and cooling (HVAC) systems in the office and manufacturing building.

6.7. *Institutional Controls*

The 1995 Action Memorandum did not require institutional controls, and none are in place.

7. Technical Assessment

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

All soil removal actions have been completed, as mandated in the 1995 Action Memorandum. The soil removal action, which consisted of excavation and placement of clean fill, was completed to the satisfaction of EPA, as documented in their Certificate of Completion dated January 27, 1999 (EPA 1999b). Therefore, the response action is functioning as intended.

There is no on-going monitoring requirement for shallow soil because it has met the RAOs. The 1998 Removal Action Report (ESC 1998) specified semi-annual monitoring of the Site fence and vegetative cover. However, redevelopment covered most of the Site with impermeable surfaces, and observations made during the 2004, 2008, and 2014 site inspections indicated no problems. Therefore, monitoring of the fence and vegetative cover is no longer warranted.

There is no active, ongoing remedial system in place since the remedy was a removal action. Therefore, there are no formal operations or maintenance components to the response action.

7.2. *Question B: Are the exposure assumptions, Toxicity Data, Cleanup Levels, and Remedial Action Objectives (RAOs) Used at the Time of Remedy Selection Still Valid?*

The Site is currently zoned for industrial use and is currently developed and used for industrial purposes. Land use and expected land use on and near the Site remains unchanged from the previous FYR. There are no newly identified contaminants or contaminant sources. There are no newly identified toxic byproducts of the response action or other physical changes at the site that affect the protectiveness of the response action. This FYR examined the vapor intrusion exposure pathway and found that it was no longer complete; no other new exposure pathways were identified.

The screening levels for lead in soil in California (set by the California OEHHA) and the screening levels for TCE and PCE in air (set by EPA Region 9) have changed since the last FYR. The newly promulgated standards do not affect protectiveness of the response action.

The exposure assumptions, toxicity levels, RAOs and clean-up levels are still valid.

7.3. *Question C: Has Any Other Information Come to Light That Could Call Into Question the Protectiveness of the Remedy?*

No, there is no other information that call into question the protectiveness of the remedy.

7.4. *Technical Assessment Summary*

According to the data reviewed and information obtained from the site inspection, the response action is functioning as intended by EPA's 1995 Action Memorandum. There have been no changes in the ARARs, standards, or To Be Considered requirements that could affect the protectiveness of the response action. The potential for unacceptable risk to on-site workers because of the presence of PCE in the warehouse/manufacturing building, although not associate with residual site contamination, has been mitigated following the decommissioning of the monitoring well and confirmed with additional air sampling.

8. Issues

No new issues were identified during this third FYR.

9. Recommendations and Follow-up Actions

There are no recommendations.

10. Protectiveness Statement

The response action at the Industrial Waste Processing Superfund Site is protective of human health and the environment.

11. Next Review

The next FYR will be due within five years of the signature date of this FYR.

Appendix A: List of Documents Reviewed

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List of Documents Reviewed

Applicable Local, State, and Federal Regulations

BSK Associates (BSK). 2013. *Pinedale Industrial Area Groundwater Treatment Program Semi-Annual Groundwater Remediation and Monitoring Report – April 2013*. November 6, 2013.

California Environmental Protection Agency (CEPA). 2011. *Final Guidance for the Evaluation and Mitigation of Subsurface Vapor Intrusion to Indoor Air (Vapor Intrusion Guidance).* Department of Toxic Substances Control. October, 2011.

CH2M Hill. 2007. *Technical Memorandum: Data Evaluation from the Vapor Intrusion Investigation at Industrial Waste Processing Superfund Site, Fresno*. February 15, 2007.

Environmental Protection Agency (EPA). 1995. *Action Memorandum: Request for Removal Action at Industrial Waste Processing Site Soils Operable Unit, Fresno, Fresno County, California.* September 1995.

EPA. 1999a. *Final Focused Remedial Investigation Report. Soil-Gas and Ground-Water Sampling. Industrial Waste Processing Facility.* May 1999.

EPA. 1999b. Certificate of Completion Letter. January 27, 1999.

EPA. 1999c. *Preliminary Closeout Report*. September 28, 1999.

EPA. 2002. *OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance)*. November 2002.

EPA. 2004. *First Five-Year Review for Industrial Waste Processing Superfund Site, Pinedale, Fresno County, California.* September 2004.

EPA. 2009. *Second Five-Year Review for Industrial Waste Processing Superfund Site, Pinedale, Fresno County, California*. July 2009.

Environmental Strategies Corporation (ESC). *Remedial Investigation/Feasibility Study*. June 1995.

ESC. 1998. *Remedial Action Report for Removal Action.* November 11, 1998.

Innovative Technical Solutions, Inc. (ITS). 2010. *Final Technical Memorandum: April 2009 Indoor Air Sampling at the Industrial Waste Processing Superfund Site in Fresno, California.* March 3, 2010.

Appendix B: Press Notices

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Press Notices

IN BRIEF

14 Valley schools honored

Fresno parents can soon get tested grade updates

Stroke awareness event at mall

Parkinson's walk Saturday

Visalia hosts Cinco de Mayo fest

Earth Day events set in Visalia

Big Brothers Big Sisters seeks Valley mentors for kids

HERB BAUER SPORTING GOODS

FYI

PAID ADVERTISEMENT

New developments in metabolic science has led to the unimaginable... weight-loss!

Scientists Predict End of Obesity by 2018

Appendix C: Interview Forms

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Interview Forms

No formal interviews were conducted for this five-year review.

Appendix D: Site Inspection Checklist

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Site Inspection Checklist

I. SITE INFORMATION	
Site name: IWP	**Date of inspection:** 5/5/14
Location and Region: Fresno, CA (R9)	**EPA ID:** CAD980736284
Agency, office, or company leading the five-year review: EPA	**Weather/temperature:** 71° Partly Sunny
Remedy Includes: (Check all that apply) G Landfill cover/containment G Access controls G Institutional controls G Groundwater pump and treatment G Surface water collection and treatment X Other Soil Excavation; soil offsite treatment; site cover	G Monitored natural attenuation G Groundwater containment G Vertical barrier walls
Attachments: G Inspection team roster attached	G Site map attached

II. INTERVIEWS (Check all that apply)

1. ~~O&M site manager~~ Mike Mygind (Name) Property & Business Owner (Title) 5/5/14 (Date)
   Interviewed G at site (circled) G at office G by phone Phone no. 559-436-8147
   Problems, suggestions; G Report attached

2. ~~O&M staff~~ Jennifer Hollesen (Name) Office Manager (Title) 5/5/14 (Date)
   Interviewed G at site (circled) G at office G by phone Phone no. 559-436-8147
   Problems, suggestions; G 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. N/A

Agency ______________________
Contact ______________________ ______________ ________ ________
Name Title Date Phone no.
Problems; suggestions; G Report attached ______________________________

Agency ______________________
Contact ______________________ ______________ ________ ________
Name Title Date Phone no.
Problems; suggestions; G Report attached ______________________________

Agency ______________________
Contact ______________________ ______________ ________ ________
Name Title Date Phone no.
Problems; suggestions; G Report attached ______________________________

Agency ______________________
Contact ______________________ ______________ ________ ________
Name Title Date Phone no.
Problems; suggestions; G Report attached ______________________________

4. **Other interviews** (optional) G Report attached. N/A

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)				
1.	**O&M Documents**			
	G O&M manual	G Readily available	G Up to date	G N/A
	G As-built drawings	G Readily available	G Up to date	G N/A
	G Maintenance logs	G Readily available	G Up to date	G N/A
	Remarks			
2.	**Site-Specific Health and Safety Plan**	G Readily available	G Up to date	G N/A
	G Contingency plan/emergency response plan	G Readily available	G Up to date	G N/A
	Remarks			
3.	**O&M and OSHA Training Records**	G Readily available	G Up to date	G N/A
	Remarks			
4.	**Permits and Service Agreements**			
	G Air discharge permit	G Readily available	G Up to date	G N/A
	G Effluent discharge	G Readily available	G Up to date	G N/A
	G Waste disposal, POTW	G Readily available	G Up to date	G N/A
	G Other permits	G Readily available	G Up to date	G N/A
	Remarks			
5.	**Gas Generation Records**	G Readily available	G Up to date	G N/A
	Remarks			
6.	**Settlement Monument Records**	G Readily available	G Up to date	G N/A
	Remarks			
7.	**Groundwater Monitoring Records**	G Readily available	G Up to date	G N/A
	Remarks In EPA Site File at Superfund Record Center			
8.	**Leachate Extraction Records**	G Readily available	G Up to date	G N/A
	Remarks			
9.	**Discharge Compliance Records**			
	G Air	G Readily available	G Up to date	G N/A
	G Water (effluent)	G Readily available	G Up to date	G N/A
	Remarks			
10.	**Daily Access/Security Logs**	G Readily available	G Up to date	G N/A
	Remarks			

IV. O&M COSTS N/A

1. **O&M Organization**

G State in-house　　G Contractor for State
G PRP in-house　　G Contractor for PRP
G Federal Facility in-house　　G Contractor for Federal Facility
G Other______________________________

2. **O&M Cost Records**

G Readily available　　G Up to date
G Funding mechanism/agreement in place
Original O&M cost estimate__________________ G Breakdown attached

Total annual cost by year for review period if available

From__________ To__________ __________________ G Breakdown attached
Date　Date　Total cost
From__________ To__________ __________________ G Breakdown attached
Date　Date　Total cost
From__________ To__________ __________________ G Breakdown attached
Date　Date　Total cost
From__________ To__________ __________________ G Breakdown attached
Date　Date　Total cost
From__________ To__________ __________________ G Breakdown attached
Date　Date　Total cost

3. **Unanticipated or Unusually High O&M Costs During Review Period**

Describe costs and reasons: ______________________________

V. ACCESS AND INSTITUTIONAL CONTROLS (G Applicable) G N/A

A. Fencing

1. **Fencing damaged**　G Location shown on site map　G Gates secured　G N/A

Remarks No damage to fencing. Public access from N. Palm Bluffs.

B. Other Access Restrictions

1. **Signs and other security measures**　G Location shown on site map　G N/A

Remarks Only Business signs. No signs indicating Superfund status.

C. Institutional Controls (ICs) None.

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented	G Yes	G No	G N/A
Site conditions imply ICs not being fully enforced	G Yes	G No	G 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	G Yes	G No	G N/A
Reports are verified by the lead agency	G Yes	G No	G N/A
Specific requirements in deed or decision documents have been met	G Yes	G No	G N/A
Violations have been reported	G Yes	G No	G N/A

Other problems or suggestions: G Report attached

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

Remarks

D. General

1. **Vandalism/trespassing** G Location shown on site map G No vandalism evident (circled)

Remarks

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

Remarks No changes since last 5YR

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

Remarks Area is zoned as "M-1" Light Manufacturing District

VI. GENERAL SITE CONDITIONS

A. Roads G Applicable G N/A

1. **Roads damaged** G Location shown on site map G Roads adequate (circled) G N/A

Remarks Asphalt drive/parking lot

B. Other Site Conditions

Remarks Site is fully covered by buildings, asphalt, concrete, and landscaping.

VII. LANDFILL COVERS G Applicable G N/A (circled)

A. Landfill Surface

1. **Settlement** (Low spots) G Location shown on site map G Settlement not evident
Areal extent_____________ Depth___________
Remarks____

2. **Cracks** G Location shown on site map G Cracking not evident
Lengths___________ Widths__________ Depths_________
Remarks____

3. **Erosion** G Location shown on site map G Erosion not evident
Areal extent_____________ Depth___________
Remarks____

4. **Holes** G Location shown on site map G Holes not evident
Areal extent_____________ Depth___________
Remarks____

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

6. **Alternative Cover (armored rock, concrete, etc.)** G N/A
Remarks____

7. **Bulges** G Location shown on site map G Bulges not evident
Areal extent_____________ Height___________
Remarks____

8. **Wet Areas/Water Damage** G Wet areas/water damage not evident
G Wet areas G Location shown on site map Areal extent______________
G Ponding G Location shown on site map Areal extent______________
G Seeps G Location shown on site map Areal extent______________
G Soft subgrade G Location shown on site map Areal extent______________
Remarks____

9. **Slope Instability** G Slides G Location shown on site map G No evidence of slope instability
Areal extent______________
Remarks____

B. Benches G Applicable G 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** G Location shown on site map G N/A or okay
Remarks____

2. **Bench Breached** G Location shown on site map G N/A or okay
Remarks____

3. **Bench Overtopped** G Location shown on site map G N/A or okay
Remarks____

C. Letdown Channels G Applicable G 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** G Location shown on site map G No evidence of settlement
Areal extent______________ Depth____________
Remarks____

2. **Material Degradation** G Location shown on site map G No evidence of degradation
Material type______________ Areal extent____________
Remarks____

3. **Erosion** G Location shown on site map G No evidence of erosion
Areal extent______________ Depth____________
Remarks____

4.	**Undercutting** G Location shown on site map G No evidence of undercutting Areal extent______________ Depth____________ Remarks____	
5.	**Obstructions** Type____________________ G No obstructions G Location shown on site map Areal extent_____________ Size___________ Remarks____	
6.	**Excessive Vegetative Growth** Type___________________ G No evidence of excessive growth G Vegetation in channels does not obstruct flow G Location shown on site map Areal extent_____________ Remarks____	
D. Cover Penetrations G Applicable G N/A		
1.	**Gas Vents** G Active G Passive G Properly secured/locked G Functioning G Routinely sampled G Good condition G Evidence of leakage at penetration G Needs Maintenance G N/A Remarks____	
2.	**Gas Monitoring Probes** G Properly secured/locked G Functioning G Routinely sampled G Good condition G Evidence of leakage at penetration G Needs Maintenance G N/A Remarks____	
3.	**Monitoring Wells** (within surface area of landfill) G Properly secured/locked G Functioning G Routinely sampled G Good condition G Evidence of leakage at penetration G Needs Maintenance G N/A Remarks____	
4.	**Leachate Extraction Wells** G Properly secured/locked G Functioning G Routinely sampled G Good condition G Evidence of leakage at penetration G Needs Maintenance G N/A Remarks____	
5.	**Settlement Monuments** G Located G Routinely surveyed G N/A Remarks____	

E. Gas Collection and Treatment G Applicable G N/A	
1.	**Gas Treatment Facilities** G Flaring G Thermal destruction G Collection for reuse G Good condition G Needs Maintenance Remarks____ ____
2.	**Gas Collection Wells, Manifolds and Piping** G Good condition G Needs Maintenance Remarks____ ____
3.	**Gas Monitoring Facilities** (*e.g.*, gas monitoring of adjacent homes or buildings) G Good condition G Needs Maintenance G N/A Remarks____ ____
F. Cover Drainage Layer G Applicable G N/A	
1.	**Outlet Pipes Inspected** G Functioning G N/A Remarks____ ____
2.	**Outlet Rock Inspected** G Functioning G N/A Remarks____ ____
G. Detention/Sedimentation Ponds G Applicable G N/A	
1.	**Siltation** Areal extent______________ Depth____________ G N/A G Siltation not evident Remarks____ ____
2.	**Erosion** Areal extent______________ Depth____________ G Erosion not evident Remarks____ ____
3.	**Outlet Works** G Functioning G N/A Remarks____ ____
4.	**Dam** G Functioning G N/A Remarks____ ____

H. Retaining Walls G Applicable G N/A		
1.	**Deformations** G Location shown on site map G Deformation not evident Horizontal displacement___________ Vertical displacement______________ Rotational displacement___________ Remarks____	
2.	**Degradation** G Location shown on site map G Degradation not evident Remarks____	
I. Perimeter Ditches/Off-Site Discharge G Applicable G N/A		
1.	**Siltation** G Location shown on site map G Siltation not evident Areal extent_____________ Depth___________ Remarks____	
2.	**Vegetative Growth** G Location shown on site map G N/A G Vegetation does not impede flow Areal extent_____________ Type___________ Remarks____	
3.	**Erosion** G Location shown on site map G Erosion not evident Areal extent_____________ Depth___________ Remarks____	
4.	**Discharge Structure** G Functioning G N/A Remarks____	
VIII. VERTICAL BARRIER WALLS G Applicable G N/A		
1.	**Settlement** G Location shown on site map G Settlement not evident Areal extent_____________ Depth___________ Remarks____	
2.	**Performance Monitoring** Type of monitoring_______________________ G Performance not monitored Frequency_____________________________ G Evidence of breaching Head differential_________________________ Remarks____	

IX. GROUNDWATER/SURFACE WATER REMEDIES G Applicable G N/A (circled)
A. Groundwater Extraction Wells, Pumps, and Pipelines G Applicable G N/A
1. **Pumps, Wellhead Plumbing, and Electrical** G Good condition G All required wells properly operating G Needs Maintenance G N/A Remarks
2. **Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances** G Good condition G Needs Maintenance Remarks
3. **Spare Parts and Equipment** G Readily available G Good condition G Requires upgrade G Needs to be provided Remarks
B. Surface Water Collection Structures, Pumps, and Pipelines G Applicable G N/A
1. **Collection Structures, Pumps, and Electrical** G Good condition G Needs Maintenance Remarks
2. **Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances** G Good condition G Needs Maintenance Remarks
3. **Spare Parts and Equipment** G Readily available G Good condition G Requires upgrade G Needs to be provided Remarks

C. Treatment System G Applicable G N/A

1.	**Treatment Train** (Check components that apply) G Metals removal G Oil/water separation G Bioremediation G Air stripping G Carbon adsorbers G Filters____ G Additive (*e.g.*, chelation agent, flocculent)____ G Others____ G Good condition G Needs Maintenance G Sampling ports properly marked and functional G Sampling/maintenance log displayed and up to date G Equipment properly identified G Quantity of groundwater treated annually____ G Quantity of surface water treated annually____ Remarks____	
2.	**Electrical Enclosures and Panels** (properly rated and functional) G N/A G Good condition G Needs Maintenance Remarks____	
3.	**Tanks, Vaults, Storage Vessels** G N/A G Good condition G Proper secondary containment G Needs Maintenance Remarks____	
4.	**Discharge Structure and Appurtenances** G N/A G Good condition G Needs Maintenance Remarks____	
5.	**Treatment Building(s)** G N/A G Good condition (esp. roof and doorways) G Needs repair G Chemicals and equipment properly stored Remarks____	
6.	**Monitoring Wells** (pump and treatment remedy) G Properly secured/locked G Functioning G Routinely sampled G Good condition G All required wells located G Needs Maintenance G N/A Remarks____	
D. Monitoring Data		
1.	Monitoring Data G Is routinely submitted on time G Is of acceptable quality	
2.	Monitoring data suggests: G Groundwater plume is effectively contained G Contaminant concentrations are declining	

D. Monitored Natural Attenuation

1. **Monitoring Wells** (natural attenuation remedy)
   G Properly secured/locked   G Functioning   G Routinely sampled   G Good condition
   G All required wells located   G Needs Maintenance   G 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.).

Site houses tent and awning manufacturing facility. Site is well maintained. Previous 5YR inspection documented the following: Decommissioned monitoring well, sealing of plumbing openings in [redacted] bathrooms, and installation of timer switches for bathroom fans. No changes. Office and manufacturing buildings are well ventilated. HVAC system consists of 1 AC/Heater for Office; 1 AC/Heater for Sewing room; Heater/Swamp Cooler/Ceiling Fans for Main Assembly Room; Heater/Swamp Cooler for Welding Room. Roof vents and rolling doors are generally open.

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.

No O&M required.

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. None.

D.	Opportunities for Optimization
	Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy. None

Notes from conversation w/ Property owner:

72 solar panels

8200 sf.

2002 / Occupied May 2002

Office – AC/Heater,

Sewing Room – [illegible] 1-man door, Double door to main shop, Heater/AC, 2/3 SC, 1 shared w/ S Ro[om]

Main Assembly Room – Rolling Door (2), 2 Roof vents, Heater, 2 1/3 S.C, 4 ceil fan

Welding Room – Rolling Door, Roof vent, Heater, SC.

S.C. = swamp cooler

Q – [illegible] Timer for fan

O – drain, sewage odor, add " water trap primer

) vents fan – filters removed – ~18 months – not regular

(8)

Thanksgiving weekend

Main Assembly Room – open only 1 rolling door every day for truck, open except [illegible]

Welding Room – RD open RD – half the time

O+M – remove filters trap primer

Appendix E: Photographs from Site Inspection Visit

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Photographs from Site Inspection Visit

Site is currently covered by buildings, asphalt pavement, and landscaping.

Decommissioned monitoring well is located under the table.


Timer switch for men's bathroom ventilation fan.


Sealed opening in men's bathroom.