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SECOND FIVE-YEAR REVIEW REPORT

FOR
WESTINGHOUSE SUPERFUND SITE
SUNNYVALE, CALIFORNIA

September 2006

Prepared for
Contract No. 68-W-98-225/WA NO. 219-FRFE-0997
U.S. Environmental Protection Agency
Region 9
75 Hawthorne Street
San Francisco, California 94105

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Acronyms and Abbreviations

µg/kg	micrograms per kilogram
µg/L	micrograms per liter
ARAR	Applicable or Relevant and Appropriate Requirements
CDHS	California Department of Health Services
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CFR	Code of Federal Regulations
COC	contaminants of concern
DTSC	Department of Toxic Substances Control
ESD	Explanation of Significant Differences
FS	Feasibility Study
gpd	gallons per day
IC	Institutional Control
LUC	Land Use Covenants
MCL	Maximum Contaminant Level
MW	Monitoring Well
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
O&M	Operation and Maintenance
OU	Operable Unit
PCB	Polychlorinated Biphenyl
PRG	Preliminary Remediation Goal
PRPs	Potentially Responsible Parties
RAO	Remedial Action Objectives
RI	Remedial Investigation
ROD	Record of Decision

TBC	To Be Considered
TI	Technical Impracticability
USEPA	United States Environmental Protection Agency
QAPP	Quality Assurance Project Plan
QA/QC	Quality Assurance and Quality Control
Water Board	California Regional Water Quality Control Board, San Francisco Bay Region

Five-year Review Summary Form

SITE IDENTIFICATION

Site name : Westinghouse Superfund Site

EPA ID: CAD001864081 **CERCLIS ID :** 0997

Region: 9 **State:** CA **City/County:** Sunnyvale/Santa Clara County

SITE STATUS

NPL status: ☒ Final ☐ Deleted ☐ Other (specify)

_____

Remediation status (choose all that apply): ☐ Operating ☒ Complete

Multiple OUs? ☐ YES ☒ NO **Construction completion date:** October 2001

Has site been put into reuse? ☒ YES ☐ NO

REVIEW STATUS

Reviewing agency: ☒ EPA ☐ State ☐ Tribe ☐ Other Federal Agency

_____

Author name: Gary Riley

Author title: Remedial Project Manager **Author affiliation:** EPA Region 9

Review period: March – June 2006

Date(s) of Site inspection: May 22, 2006

Type of review: ☒ Statutory

☐ Policy ☒ Post-SARA ☐ Pre-SARA ☐ NPL-Removal only

☐ Non-NPL Remedial Action Site ☐ NPL State/Tribe-lead

☐ Regional Discretion)

Review number: ☐ 1 (first) ☒ 2 (second) ☐ 3 (third) ☐ Other (specify)

Triggering action:

☐ Actual RA Onsite Construction at OU #__

☐ Actual RA at OU #__

☒ Previous Five-Year Review Report

☐ Construction Completion

☐ Other (specify) _____

Triggering action date: September 28, 2001

Due date (five years after triggering action date): September 28, 2006

Issues and Recommendations

Issue

Surface cracks are visibly evident on the capping system at the Site. Although this is currently not affecting the protectiveness of the remedy, protectiveness of the remedy may be in question in the future.

Recommendation

Continual cap inspections are required on a routine basis to assess any further propagation of surface cracks and any potential erosion from the capping system. Areas that show signs of deterioration and a potential for exposure of the underlying material are to be repaired in a timely manner.

Issue

The 1991 ROD required institutional controls be implemented. Institutional controls, including deed restrictions to prevent well construction and or/excavation in source areas that remain contaminated, are not yet in place.

Recommendation

The deed restriction should be completed for the site. Appropriate institutional control monitoring and reporting requirements will be included in the land use covenant. Areas of the Site where PCBs remain at levels above those suitable for direct contact should be capped with pavement. The cap should be regularly inspected and repaired on an as-needed basis.

Issue

The asphalt cap in the vicinity of Building 67 is deteriorated. This area was a prior removal area for shallow soil contamination with PCBs. The remedy requires areas with PCBs above levels suitable for unrestricted use to be covered with an asphalt cap.

Recommendation

This area should be paved to prevent exposure to contaminants. The pavement should be regularly inspected and any cracks or other breeches should be repaired.

Protectiveness Statement

The remedy at the Westinghouse Superfund Site currently protects human health and the environment because routine cap inspections are conducted, groundwater extraction and treatment continues, and access controls are in place. However, in order for the remedy to be protective in the long-term, deed restrictions should be completed for the Site.

Executive Summary

A 5-year review of the Westinghouse Superfund Site (the Site) in Sunnyvale, Santa Clara County, California was prepared for completion in September 2006. A 5-year review is required by statute and conducted because hazardous substances, pollutants, or constituents remain at the Site at concentrations above levels that would allow for unrestricted use and unlimited exposure. This is the second 5-year review for the Site. The triggering action for this review is the United States Environmental Protection Agency (USEPA) approval date of the first 5-year review report on September 28, 2001.

The 1991 Record of Decision (ROD) addressed remediation of the contaminated shallow groundwater and soil, which pose the primary risks at the Site. The primary contaminants of concern affecting the soil and ground water were identified in the ROD as PCBs, solvents, and fuel compounds. The ROD presents the selected remedial action implemented at the Site. The remedial action goals of the Site were developed based on applicable or relevant and appropriate requirements (ARARs). Major components of the remedy included:

- Permanent containment, by means of groundwater extraction, of contaminated groundwater in the source area where DNAPLs were detected.
- Restoration of contaminated groundwater, using extraction, to the California Division of Health Services (CDHS) Action Level for 1,3-DCB, the proposed maximum contaminant levels (MCL) for 1,2,4-TCB and Federal and state MCLs for other contaminants. The ROD included a Technical Impracticability Waiver for PCBs in the on-site source area where DNAPL occurs.
- Treatment of the extracted groundwater to meet all applicable or relevant and appropriate requirements (ARARs) identified in the ROD for discharge, prior to discharge to the on-site storm sewer, unless an evaluation indicates that an alternative "end-use" for the treated effluent can be practicably implemented.
- Removal of soil containing greater than 25 mg/kg PCBs to a depth of eight feet.
- Institutional controls that limit future land use; restrict excavation of soil below 8 feet in prior soil removal areas; require that soils above 8 feet in prior soil removal areas may be only temporarily excavated and must be restored if disturbed; and require restoration of the asphalt cap after any soil disturbance in these areas.
- A requirement that USEPA be notified of any future intention to cease operations in, abandon, demolish, or perform construction in Building 21.
- Permanent and ongoing monitoring of the affected aquifers to verify that the extraction system is effective in capturing and reducing chemical concentrations and extent of the aqueous phase plume and in containing aqueous phase contamination in the DNAPL source area.

The remedy at the Westinghouse Superfund Site currently protects human health and the environment because routine cap inspections are conducted, groundwater extraction and

treatment continues, and access controls are in place. However, in order for the remedy to be protective in the long-term, the area near Building 67 needs to be paved to prevent exposure to PCBs, and deed restrictions should be completed for the Site.

SECTION 1.0

Introduction

This report summarizes findings of a 5-year review of the remedial actions implemented at the Westinghouse Superfund Site (the Site) in Sunnyvale, California. The 5-year review evaluates whether the remedy at the Site remains protective of human health and the environment.

The United States Environmental Protection Agency, Region 9 (USEPA) conducted the 5-year review from March to May 2006. To assist the USEPA in documenting the methods, findings, and conclusions of this review, CH2M HILL prepared this report in accordance with USEPA's guidance document, *Comprehensive Five-Year Review Guidance* (USEPA 2001b). In addition, this report identifies any deficiencies found during the review and provides recommendations to address these deficiencies.

This 5-year review report is prepared pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), Section 121(c), the National Oil and Hazardous Substances Pollution Contingency Plan Section 300.400 (f)(4)(ii). CERCLA Section 121(c) states:

> If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the Site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented.

This requirement is further interpreted in the National Contingency Plan. Title 40 of the Code of Federal Regulations, Section 300.400 (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.

Federal statute requires that 5-year reviews be conducted because the implemented remedy at the Site results in hazardous substances, pollutants, or constituents remaining at the Site above levels that allow for unrestricted use and unlimited exposure. The reviews are required within 5 years of the remedial action and every 5 years thereafter to ensure that the remedy continues to be protective of human health and the environment.

This is the second 5-year review for the Westinghouse Superfund Site. The trigger date for this review is September 28, 2001, the USEPA approval date of the first Five-Year Review report (USEPA 2001a). This report evaluates the remedial action objectives (RAOs) of the Site, as stated in the Record of Decision (ROD) (USEPA 1991) and Explanation of Significant Differences (ESD) (USEPA 1997).

This report is organized in the following manner:

- Section 1.0 provides an introduction.
- Section 2.0 provides a chronology of Site events.
- Section 3.0 describes Site background, and initial response, and basis for taking cleanup actions.
- Section 4.0 discusses the implemented remedial action, current status, and monitoring of the remedy at the Site.
- Section 5.0 describes activities conducted and progress since the last 5-year review.
- Section 6.0 outlines findings from the 5-year review process.
- Section 7.0 discusses the technical assessment of the remedial action implemented at the Site.
- Section 8.0 provides issues and recommendations.
- Section 9.0 provides a protectiveness statement for the Site.
- Section 10.0 discusses the next 5-year review.
- Section 11.0 provides a list of works cited during the preparation of this document.

SECTION 2.0

Site Chronology

Table 2-1 provides a chronology of events at the Site.

TABLE 2-1
Chronology of Site Events
Second 5-Year Review Report for Westinghouse, Sunnyvale, California

Event	Date
Westinghouse Electric Corporation conducts study to determine the extent and nature of PCB soil contamination on the Site.	1981
Lead Agency, California State Water Quality Control Board, orders and oversees investigation and remediation of PCB-contaminated shallow soils in Reservoir 2 area, railroad spurs, and fence lines at the Site.	1981-1987
Site Listed on the USEPA National Priorities List.	6/1/1986
USEPA assumes lead oversight role.	12/18/1987
Administrative Order of Consent for the Remedial Investigation and Feasibility Study (RI/FS) signed by Westinghouse and USEPA.	8/24/1988
Public Notice of Feasibility Study completion and USEPA Proposed Plan for remedial action; start of public comment period.	6/1/1991
ROD selecting preferred remedy is signed.	10/16/1991
Westinghouse initiates Remedial Design pursuant to Administrative Consent Order.	2/6/1992
Phase 1 soil remediation begins; soil excavation and removal.	October 1992
Pilot groundwater extraction and treatment system installed on-site.	December 1992
USEPA issues Administrative Order for Remedial Design and Remedial Action.	9/29/1993
PRP Final Remedial Design for soil and groundwater remediation approved by USEPA (Phase 2).	6/28/1994
PRP Phase 2 Remedial Action Work Plan approved by USEPA.	8/24/1994
Start of Phase 2 on-site construction activities (soils remediation and final groundwater extraction and treatment system.	10/1/1994
ESD issued by USEPA for expanded soils remediation and groundwater monitoring in the North Parking Lot area of the Site.	3/14/1997
Pre-final inspection of Phase 2 and ESD remedial actions.	December 1998 and August 2000
Additional investigation and remediation of soils inside Building 21 completed.	July 2000
Preliminary Close Out Report signed.	9/27/2000
Water Treatment System Inspections.	January 2000, August 2000, and July 16, 2001

TABLE 2-1
Chronology of Site Events
Second 5-Year Review Report for Westinghouse, Sunnyvale, California

Event	Date
Five Year Groundwater Status Report submitted by PRPs.	February 2001
Work Plan For Project Upgrades Groundwater Remediation System submitted by PRPs.	4/10/2001
Five-Year Review Report completed by USEPA.	9/28/2001
Upgrades to groundwater extraction and treatment system completed.	October 2001
Five Year Groundwater Status Report Submitted by PRPs	May 2006

SECTION 3.0

Site Background

This section provides Site background including the Site description, the current land use, the physical setting, the history of contamination, and the initial response and basis for taking action of cleanup.

3.1 Site Description and Current Land Uses

The Site is located approximately 5 miles south of San Francisco Bay and 5 miles northeast of the Santa Clara Mountains, in the Santa Clara Valley of California. It occupies a 75 acre parcel of land, located at 401 Hendy Avenue in Sunnyvale, California. It is bounded by California Avenue to the north, North Sunnyvale Avenue to the west, and North Fair Oaks Avenue to the east. In addition, a parking lot, referred to as the North Parking Lot, is located on the north side of California Avenue. A Site location map is provided in Figure 3-1 (Site Location Map). The entire Site is referred to as Operable Unit 01 (OU-01).

The Site is currently operating as a Northrop Grumman plant site. The Site was previously owned and operated by the Marine Division of Westinghouse Electric Corporation. Northrop Grumman Corporation purchased the business and property in March 1996. The Site currently manufactures steam generators, marine propulsion systems, and missile-launching systems for the U.S. Government. The area around the Site has been developed for light industrial, commercial, and residential uses. A building (Building 21) used for transformer manufacturing exists on Site. No significant changes to land use, future land use, and land-use restrictions are anticipated at the Site in the foreseeable future.

Although contaminants of concern (COCs) are present in low levels in numerous areas of the Site, the main focus of remedial actions under USEPA oversight has been in the southeast corner of the Site near Reservoir 2 (see Figure 3-2 – Site Plan).

3.2 Physical Setting

The Site is located approximately 5 miles south of San Francisco Bay in the Santa Clara Valley of California. The surrounding area is heavily urbanized and is currently zoned and used for commercial, residential and industrial use. Some residential parcels adjoin the facility on the west side. The RI Report indicates that municipal and industrial water supplies are drawn from groundwater aquifers below a depth of 250 feet and that no groundwater from depths shallower than 250 feet is used for drinking water.

3.2.1 Lithology

The majority of the Site either contains building improvements or is paved. Underneath the pavement is alternating, discontinuous gravels, sands, silts and clays typical of alluvial overbank and estuarine deposits.

3.2.2 Hydraulics

The soils have highly variable percentages of clay, silt, sand, and gravel, and stratigraphic contacts between soil types vary from sharp to gradational.

The coarse alluvial materials (sand and gravel) form a series of aquifers and the interlayered fine grained deposits (silt and clay) act as confining layers or aquitards that restrict vertical movement of groundwater between adjacent aquifers. The subsurface geologic materials are grouped into three different units to reflect relative permeability contrasts. Medium to high permeability materials include medium to coarse grained sands and gravels which typically have permeabilities that range from 10^{-3} to 10^{-1} cm/sec. Low to medium permeability materials include fine to very fine sands, clayey and silty sand, and clayey and silty gravel, which typically have permeabilities ranging from 10^{-5} to 10^{-3} cm/sec.

The California Regional Water Quality Control Board (Water Board) established a series of aquifer designations in the Santa Clara Valley area. The shallowest of these is designated as the A-aquifer. The A-aquifer is underlain by the B-aquifer zone, which has been divided into the B1-, B2-, and B3-aquifers (from shallowest to deepest). The approximate depths below ground surface at which these aquifer zones occur in the vicinity of the Site are: A, 0 to 50 feet; B1, 50 to 70 feet; B2, 75 to 90 feet; and B3, 90 to 115 feet. One or more water-bearing sand/gravel layers may occur within a particular aquifer zone. Near the Site, the A-aquifer generally has one or more medium to coarse grained (sand/gravel) units within the interval that extends from the water table (approximately 16 to 20 feet below ground surface (bgs)) to a depth of 45 to 52 feet bgs.

The total thickness of sand/gravel units in the A-aquifer averages approximately 5 feet (ranging from 0 to 15 feet), while in the B1 aquifer, the total thickness of sand/gravel ranges from 5 to 15 feet. The fine grained materials of the A/B1 aquitard average 5 to 8 feet in thickness.

Groundwater flow in both A and B aquifer zones is to the north-northeast, consistent with the topography which slopes gently downward toward the north-northeast (toward San Francisco Bay). The regional hydraulic gradient is relatively flat: A, 0.005 to 0.010 and B1, 0.001 to 0.002. Groundwater levels fluctuate seasonally, and are typically lowest in late fall and highest (1 to 2 feet increase) in late spring.

Rise in Groundwater Levels

There has been a long term general rise in groundwater levels in the area from record lows in 1991. Groundwater elevations in the A-aquifer have now stabilized as much as 15 feet higher than 1991 levels. Peak groundwater levels were observed in 2000 and 2001 and have gradually declined approximately 0.6 to 0.8 feet per year over the Five Year Review period. Groundwater monitoring reports for 2005 show stabilized groundwater levels with a slight (0.5 to 1 foot) seasonal variation. In 1998, the impact of the rising groundwater levels was evaluated with respect to the design and performance of the groundwater extraction and treatment system (note: this evaluation is discussed in the prior Five Year Groundwater Status Report). As a part of this evaluation, both long and short term pump tests were

performed in system extraction wells and the corresponding transmissivities were calculated and compared to those developed for the design of the groundwater extraction system. This data in turn was used to design the upgrades to the groundwater extraction and treatment system that were implemented in 2001. The calculated transmissivity values are shown below. Note that the "Original Design' values are those that were used for the original (1992) design of the system, while the "Adjusted for Rising Groundwater" values represent the original values adjusted for the thicker saturated thickness due to the rising groundwater levels.

Table 3-1: Rising Groundwater Transmissivity Values
Source: *GeoSyntec Consultants / ALTA Geosciences, Inc., Five-Year Groundwater Status Report, Westinghouse Sunnyvale Superfund Site, Sunnyvale, California. May 2006.*

Evaluation	Transmissivity Range (gpd/ft)	Geometric Mean (gpd/ft)
Original Design (1992)	60 to 1600	410
Adjusted for Rising Groundwater	95 to 3800	95 to 3800
Calculated Based On 1998 Pump Tests	25 to 12700	880

Although the change in mean transmissivities appears mainly due to the thicker saturated thickness, the range in values is much greater from the 1998 pump tests than from the pump tests performed in 1992. This is interpreted as being the result of more permeable strata being saturated as the groundwater levels have risen.

Vertical Hydraulic Gradient Reversal

During the RI (1990), it was noted that the vertical hydraulic gradient between the A and B1 aquifer was downward, with the water level in the A aquifer 2 to 3 feet higher than the level in the B aquifer. Groundwater levels in the monitoring wells (see Figure 3-3 – Monitoring and Extraction Well Locations) have been monitored as part of routine groundwater monitoring since the RI. In general, this vertical gradient reversed in the mid-1990s (circa 1995-1997) and has been upward since. The water level in the A aquifer has been 2 to 3 feet lower than that in the B aquifer since the reversal. This vertical hydraulic gradient reversal is likely to be the result of the regional rise in groundwater levels, which has affected the deeper (B1 and B2) aquifer zones to a greater degree than the shallow (A) aquifer zone, rather than the localized influence of groundwater extraction at the Site. This is supported by the vertical gradient reversal exhibited by well nests that appear to be far beyond the influence of the extraction wells (e.g.: W-27, -25, 75 (upgradient); W-58, -59 (cross gradient); and W-43, -52 (downgradient)).

Additionally, the vertical gradients continued to be upward even when the extraction system was shut down from mid July 2001 to mid October 2001 to allow construction of upgrades to the extraction and treatment system. The October 2001 groundwater monitoring event shows that the vertical gradients were consistent from the fall of 2000

through the fall of 2002, with no apparent impact on the vertical gradients resulting from the system shutdown.

During the RI/FS, aquifer hydraulic conductivity and groundwater flow velocities for the A and B1-aquifers were estimated as shown below:

Table 3-2: Groundwater Flow Velocities
Source: *GeoSyntec Consultants / ALTA Geosciences, Inc., Five-Year Groundwater Status Report, Westinghouse Sunnyvale Superfund Site, Sunnyvale, California. May 2006.*

Aquifer zone	Hydraulic Conductivity range (ft/sec)	Groundwater velocity range (feet per year)
A	3.3×10^{-4} to 3.3×10^{-6}	2.6 to 522
B1	3.3×10^{-4} to 3.3×10^{-6}	0.7 to 73

Aquifer transmissivity values calculated from step drawdown tests conducted in the A aquifer during remedial design in 1992 range from 60 to 1600 gallons per day per foot [gpd/ft] with a geometric mean of 410 gpd/ft.

Groundwater Mound Reduced

Prior to completion of the RI, there was a groundwater "mound" centered just north of Reservoir 2, resulting in several feet of anomalously high groundwater elevations. It was interpreted at the time that this mound was the result of leakage from the reservoir or associated piping. Since that time, the mound has dissipated and is no longer evident in water level measurements and groundwater contour diagrams developed for the routine groundwater monitoring reports. Possible explanations for the mound dissipation are:

- Plant staff have made repeated efforts to seal the bottom of the reservoir which may have been successful;
- Pumping of the A-aquifer may be extracting sufficient water to essentially overcome the effects of the leakage; and/or
- The regional rise in groundwater levels may be masking the influence of the leakage, and/or the cause of the mounding.

3.3 History of Contamination

Prior to 1906, the Site area was used as agricultural land, principally orchards. The first structures on the Site were constructed as the Joshua Hendy Iron Works in 1906. The plant has been in the business of manufacturing ship propulsion systems since World War I, and these activities continue to the present day, along with other defense related manufacturing. Historic Westinghouse operations also included the manufacture of transformers, which resulted in the contamination present at the Site. Transformer manufacturing began in the mid 1950s and ended in 1964.

Westinghouse manufactured transformers primarily in Building 21 utilizing Inerteen and mineral oil as thermal insulating fluids during its operations. Inerteen is a DNAPL that contains approximately 60 percent PCBs, predominantly Aroclor 1260, and 40 percent trichlorobenzene (TCB). The transformer manufacturing operations were located in the southeast section of the property, in Building 21 and adjacent areas south and east of Reservoir 2. Reservoir 2, a large cone-shaped in-ground water reservoir, was constructed in the late 1940s or early 1950s and has always been used to store fire protection water. The reservoir is approximately 100 feet in diameter and 18 feet deep.

Above-ground storage tanks for the transformer fluids (mineral oil, plus Inerteen) were located south and east of Reservoir No. 2. Inerteen was delivered in rail cars that were also sometimes staged along the railroad tracks at the eastern edge of the Site between Building 21 and the above ground storage tanks. The Inerteen was stored in one 7,000-gallon tank and three 16,000-gallon tanks. These tanks were removed in 1971. Two sets of underground piping ran from the above ground tanks to the eastern portion of Building 21, which was the primary area used for transformer construction. A 20,000 gallon underground storage tank was also located south of Reservoir 2, which is believed to have held only petroleum hydrocarbons.

3.4 Basis for Taking Action

As a result of public concern about PCB contamination, Westinghouse conducted an investigation in 1981 to determine the nature and extent of contamination. The lead agency overseeing the Westinghouse investigations at that time was the California Regional Water Quality Control Board (Water Board). The Water Board ordered the removal of PCB contaminated shallow soils along property fence lines and nearby railroad spurs in 1984 and 1985. The Site was proposed for listing on the Federal Superfund National Priorities List (NPL) in October 1984, and finalized on this list on June 1, 1986. USEPA assumed the lead oversight role on December 18, 1987 and the RI/FS was initiated.

The completed RI/FS and the USEPA Proposed Plan for remediation were presented to the public for comment on June 1, 1991. The ROD was signed by the USEPA October 16, 1991. Contaminants identified during the ROD as the chemicals of concern (COCs) in the groundwater are:

- Benzene
- Polychlorinated biphenyls (PCBs)
- 1,2,4-Trichlorobenzene (1,2,4-TCB)
- 1,4-Dichlorobenzene (1,4-DCB)
- 1,2-Dichloroethane (1,2-DCA)

Contaminants identified during the ROD as the chemicals of concern (COCs) in the soil include all of the above, and:

- Ethylbenzene
- Chlorobenzene (CB)
- 1,2-Dichlorobenzene (1,2-DCB)
- Toluene
- 1,3-Dichlorobenzene (1,3-DCB)

- Trichloroethane (1,1,1-TCA)
- Trichloroethene (TCE)
- 1,1-Dichloroethene (1,1-DCE)
- Xylene
- cis-1,2-Dichloroethene (cis-1,2-DCE)

Both soil and groundwater with the highest concentrations were discovered in the area around Reservoir 2 and in a small area just south of Building 21 near where the pipelines entered the building northwest of Reservoir 2. Release mechanisms near Reservoir 2 are believed to have included surface spills and leakage from underground piping. PCBs in soil around Reservoir 2 ranged up to 28,000 mg/kg and elevated PCB concentrations in soils were encountered as deep as 45 feet bgs. Investigations also indicated the presence of PCBs along the top of the A/B1 aquitard. A DNAPL thickness of 2.8 feet was discovered in well W48, and a LNAPL thickness of 1.1 feet was found in well W3. Measurable LNAPL and DNAPL have not been observed during groundwater monitoring in several years.

Two DNAPL source areas were identified as part of the ROD: to the south and east of Reservoir 2 (Reservoir 2 source area), and in the vicinity of the Building 21 Breezeway (Breezeway source area) (see Figure 3-4 – Source Area and Well Location Map). The "groundwater impact area" is the area adjacent to the source areas where groundwater has had detections of Site COCs.

N

FIGURE 3-1
SITE LOCATION MAP
WESTINGHOUSE FIVE-YEAR REVIEW REPORT
SUNNYVALE, CALIFORNIA

Source: ALTA Geosciences, Inc.,
Annual Groundwater Monitoring Report - December 2005 Event, February 2006.

CH2MHILL

ES092006004BAO_Fig 3-1_siteLocationMap.ai_090806_ll

Photo Source: Google 2005

Legend

- Property currently owned by Northrop Grumman
- Eastern portion of north parking lot formerly owned by Northrup Grumman
- Former Inerteen pipeline

0 200 400
scale in feet

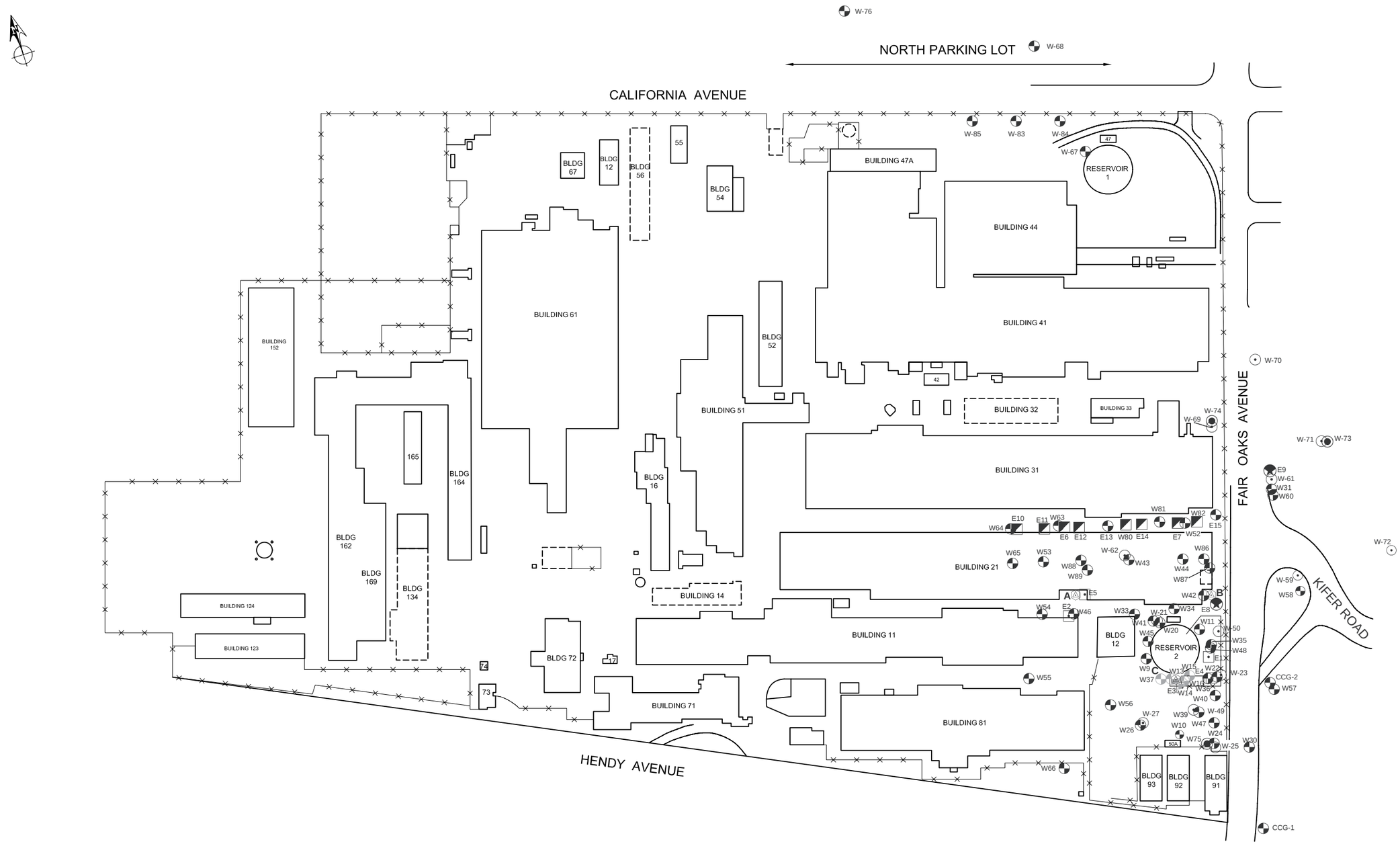
FIGURE 3-2
SITE PLAN

WESTINGHOUSE FIVE-YEAR REVIEW REPORT
SUNNYVALE, CALIFORNIA

Source: GeoSyntec Consultants/ALTA Geosciences, Inc., *Five-Year Groundwater Status Report*, May 2006.

CH2MHILL

ES092006004BAO_Fig 3-2_sitePlan.ai_090806_ll



Legend

- Building or Fenceline Removed
- Fence
- C — A-Aquifer Groundwater Depression Well and Number
- E4 — A-Aquifer Source Area Extraction Well and Number
- E10 — A-Aquifer Barrier System Extraction Well and Number
- W55 — A-Aquifer Monitoring Well and Number
- E8 — B-Aquifer Extraction Well and Number
- W25 — B1-Aquifer Monitoring Well and Number
- W75 — B2-Aquifer Monitoring Well and Number
- W14 — Former Well

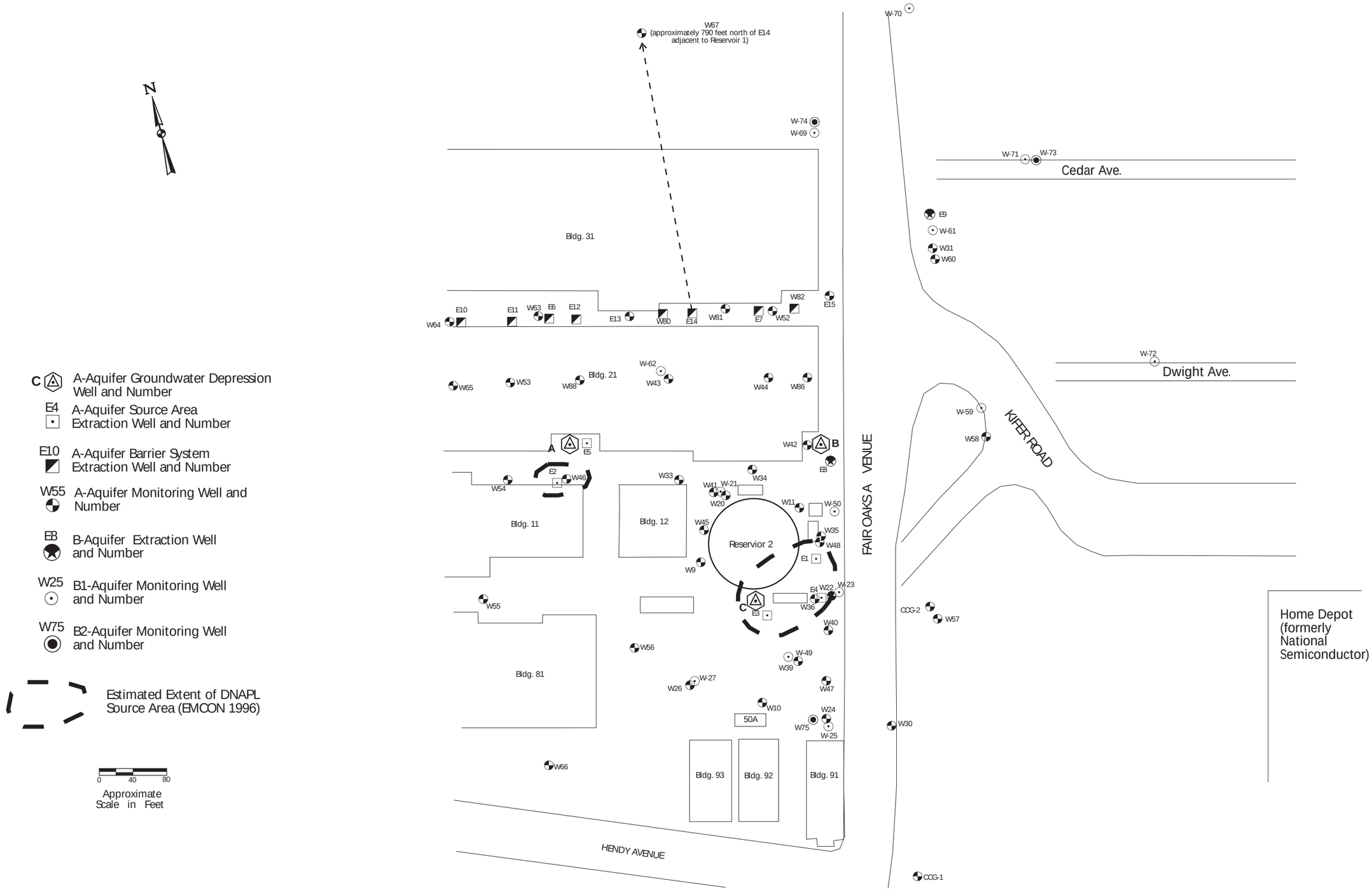
0 100 200
SCALE IN FEET

Source: GeoSyntec Consultants/ALTA Geosciences, Inc., *Five-Year Groundwater Status Report*, May 2006.

FIGURE 3-3
MONITORING AND EXTRACTION WELL LOCATION
WESTINGHOUSE FIVE-YEAR REVIEW REPORT
SUNNYVALE, CALIFORNIA

CH2MHILL

ES092006004BAO_Fig 3-3_monitoringandextraction.ai_090806_ll



ref: site2.cdr

Source: ALTA Geosciences, Inc., *Annual Groundwater Monitoring Report - December 2005 Event*, February 2006.

FIGURE 3-4
SOURCE AREA AND WELL LOCATION MAP
WESTINGHOUSE FIVE-YEAR REVIEW REPORT
SUNNYVALE, CALIFORNIA

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ES092006004BAO_Fig 3-4_SourceArea_WellLocation.ai_090806_ll

SECTION 4.0

Remedial Actions

This section summarizes the remedial actions selected and implemented at the Site, as well as operations and maintenance (O&M) of the remedy. The ROD and the ESD for the Site were signed in 1991 and 1997, respectively.

4.1 Remedial Actions Selection

The remedial action goals for the Site were developed based on ARARs and results from the human health and ecological risk assessment. The remedy presented in the ROD was selected to address both the groundwater and soil contamination. Major components of the remedy included:

- Permanent containment, by means of groundwater extraction, of contaminated groundwater in the source area where DNAPLs are detected.
- Treatment of the extracted groundwater to meet all ARARs identified in the ROD for this discharge, prior to discharge to the onsite storm sewer, unless an evaluation indicates that an alternative "end-use" for the treated effluent (such as use for facility process water) can be practicably implemented.
- Removal of contaminated soil containing greater than 25 parts per million PCB to a depth of eight feet.
- Filling the excavated areas with clean soil and installing an asphalt cap.
- Offsite incineration of excavated soils at a federally permitted facility.
- Institutional controls, such as land use restrictions, to prevent well construction (for water supply purposes) in source areas that remain contaminated. Excavation below the eight feet where soil has been removed will be restricted. Restrictions will also preclude excavation, other than temporary subsurface work in the upper eight feet and will require complete restoration of any disturbed fill or the asphalt cap once any such temporary work was completed.
- A requirement that USEPA receive notification of any future intention to cease operations in, abandon, demolish, or perform construction in (including partial demolition or construction) Building 21.
- Permanent and ongoing monitoring of the affected aquifers to verify that the extraction system is effective in capturing and reducing the chemical concentrations and extent of the aqueous phase plume, and containing the aqueous phase contamination in the DNAPL source area.

The 1997 Explanation of Significant Differences (ESD) established the following remedy change:

- A change in the disposal method for soils contaminated with PCBs at less than 500 parts per million (ppm) was permitted; the change was from incineration to landfill disposal for soils removed from the North Parking Lot area only, where contamination is thought to have been a result of using PCB's as a weed killer. The landfill chosen for disposal was required to meet the requirements for Toxic Substances Control Act (TSCA) Chemical Waste Landfills as described in 40 CFR Section 761.75, and was required to be in compliance with the procedures for planning and implementing off-site response actions described in 40 CFR Section 300.440. All soils, other than those removed from the North Parking Lot area, found during excavation with PCB concentrations greater than 500 ppm were to be incinerated as required in the 1991 ROD.

Groundwater cleanup criteria from the ROD are shown on Table 4-1.

Table 4-1: Groundwater Cleanup Criteria
Source: *GeoSyntec Consultants / ALTA Geosciences, Inc., Five-Year Groundwater Status Report, Westinghouse Sunnyvale Superfund Site, Sunnyvale, California. May 2006.*

Compound	**ROD Cleanup Level (µg/L)**	
Benzene	1[1]	
Chlorobenzene	30[1]	
1,2-Dichlorobenzene	600[2]	
1,3-Dichlorobenzene	130[3]	
1,4-Dichlorobenzene	5[1]	
1,2,4-Trichlorobenzene	5[2]	
Polychlorinated Biphenyls	0.5[2]	
1,1-Dichloroethane	5[1]	
1,2-Dichloroethane	0.5[1]	
1,1-Dichloroethene	6[1]	
cis-1,2-Dichloroethene	6[1]	
1,1,1-Trichloroethane	200[2]	
Ethylbenzene	680[1]	
Toluene	1000[2]	
Trichloroethene	5[2]	
Xylene	1750[1]	

Notes:
µg/L – micrograms per liter
Bold indicates a change from ROD cleanup level
MCL – Maximum Contaminant Level
[1]State MCL
[2]Federal MCL
[3]State Department of Health Services Action Level

The cleanup plan outlined in the ROD includes leaving contamination above health-based levels in both soil and groundwater on the Site. In the absence of a known technology to effectively remove the DNAPL containing PCB from the subsurface, a technical impracticability (TI) waiver was invoked in the ROD. This legal mechanism waived the requirement to meet the standard for PCB in the source area where DNAPL is present. The

ROD requires that this area be permanently contained and that land use restrictions prevent access to this contamination. Compliance points were set at the perimeter of the DNAPL source area in the groundwater.

Soil cleanup levels were determined based on the historical industrial use of the property and the possibility of workers coming into contact with contaminated soil. The aquifers were classified as a potential source of drinking water. Although the cleanup criteria are based on industrial use, the ROD evaluated the hypothetical future residential scenario for potential exposure to COCs in the groundwater and soil.

4.2 Remedial Actions Implementation

4.2.1 Groundwater Remediation

The groundwater remediation system was designed to control migration of COCs:

1. From the A aquifer into the PCB source areas adjacent to and northwest of Reservoir 2;
2. In the A aquifer down-gradient from the source areas; and
3. In the B aquifer on and off site.

Pilot-Scale Groundwater Extraction and Treatment System

The groundwater system included a “Pilot System” which provided for groundwater extraction in the source areas and treatment with an on-site treatment plant. It was intended that the Pilot System would ultimately be incorporated into the final remediation system. The Pilot System construction was started in December 1992 and completed the following year.

Five extraction wells (designated E1 through E5) were installed in the A aquifer as a part of the Pilot System to maintain containment in the Reservoir 2 source area and the Building 21 Breezeway source area. Four other wells were later installed: wells E6 and E7 in the A aquifer in the alleyway between Buildings 21 and 31, well E8 in the B1 aquifer northeast of the treatment plant, and well E9 in the B1 aquifer east of Building 31, across Fair Oaks Boulevard. During the Pilot System construction wells E1 through E5 and E8 were equipped with pumps and piped to the pilot treatment plant. The other three wells were not connected to the treatment plant during the Pilot System installation and were reserved for later use when the full-scale system was installed. Field tests and pilot-scale operations were used to evaluate aquifer properties and for design of the necessary additional components of the extraction/treatment system.

Full-Scale Groundwater Extraction and Treatment System

The Pilot System was incorporated into the full-scale system and expanded in 1994-1995 with the addition of six extraction wells (E10, E11, E12, E14, W80, and W82) installed in the alley-way between Buildings 21 and 31. Extraction wells E13 and E15 were also installed but because of poor performance, monitoring wells W80 and W82 were converted to extraction

wells and wells E13 and E15 were converted to monitoring wells. These six wells together with wells E6 and E7 installed during 1992 were intended to operate as a "barrier system" downgradient of the PCB source areas. These eight wells were operational from 1995 to 2001.

During that time, groundwater from these wells was not contaminated, but operation of these extraction wells continued as an assurance that potentially impacted water would not leave the containment area. The wells were shut down in 2001 in conjunction with installation of the treatment system upgrades made in accordance with the recommendations in the 2001 Five Year Groundwater Status Report. The upgrades included the installation of extraction wells A, B, and C, and discontinuation of pumping at extraction well E9. Pumping at well E9 was discontinued in 2001 because groundwater concentrations at this well had met the ROD cleanup criteria for several years and operation of the well was no longer considered to be necessary for containment of the source area. (Well E9, east of Fair Oaks Boulevard, was connected to the treatment system in 1995.)

The ROD originally provided for discharge of the treated water to the on-site storm sewer. Due to the complexities of obtaining a NPDES permit, USEPA agreed at the time that the Pilot System be initiated to allow discharge to the sanitary sewer which connects to the City of Sunnyvale Sewage Treatment Plant. The City of Sunnyvale agreed to allow this on a year-by-year basis.

Subsequent negotiations between Northrop Grumman, the Water Board, the City of Sunnyvale, and USEPA concluded that:

- Discharge to the storm sewer would not be in the best interests of the environment;
- Continued discharge to the sanitary sewer and the City of Sunnyvale sewage treatment plant was a preferred alternative; and
- The City of Sunnyvale was willing to accept the discharge on a permanent basis. This plan was approved by USEPA as an alternative to the storm sewer discharge provided for in the ROD.

4.2.2 Soil Remediation

Prior to USEPA assuming lead agency responsibility for the Site, investigations and remediation for PCB impacts were initiated in 1981 by Brown and Caldwell Consulting Engineers (BCCE) on behalf of Westinghouse under oversight of the Regional Water Board. Two phases of investigation were undertaken, with the first in 1981 and the second in 1982.

These investigations addressed in a preliminary way the Reservoir 2 area (Inerteen tank and pipelines) and more thoroughly, the plant site perimeter, central railroad tracks, and graveled yard areas in the northeast and northwest part of the plant site. Aside from the handling, storage, and piping of PCBs in and around the Reservoir 2 Area, the other PCB impacted areas were believed to have resulted from the use of transformer oil as an herbicide or for dust control on fence lines, roadways, and parking areas. Investigations

involved hundreds of surface and near surface samples, and resulted in several episodes of soils removal with off-site disposal.

The soil remediation was conducted under Regional Water Board Order No. 84-63 to meet the applicable cleanup criteria identified at the time. Regional Water Board Order No. 84-63 directed that impacted soil outside the fence line was to be cleaned up to 0.05 mg/Kg total PCBs, to a depth of 2 feet, or to a lesser depth if verification data showed compliance with the 0.05 mg/Kg criterion. Regional Water Board Order No. 85-94 required cleanup of soil inside the fence line to <50 mg/Kg PCBs. No specific depth is mentioned in this order, but sampling was required only to a depth of 12 inches. Once USEPA assumed the lead agency role in 1987, the cleanup criteria for on-site soils was reduced to 25 mg/Kg.

Letter designations for the various soil removal areas are shown on Figure 4-1 (Remedial Excavation Areas). The following areas were remediated in accordance with Regional Water Board requirements.

West Perimeter Remediation – Areas A, B, and C

According to the *GeoSyntec Consultants / ALTA Geosciences, Inc., Five-Year Groundwater Status Report, Westinghouse Sunnyvale Superfund Site, Sunnyvale, California. May 2006*, Phase I soils investigations (BCCE, 1981 and 1983) identified numerous areas with PCB impacts along the western perimeter. Regional Water Board Order No. 84-63 directed that impacted soil outside the fence line was to be cleaned up to 0.05 mg/Kg, to a depth of 2 feet, or to a lesser depth if verification data showed compliance. Soil inside the fence was to be cleaned up to <50 mg/Kg PCBs. Three areas (A, B, and C) were designated by BCCE for the removal action. Impacted soil outside the fence was removed to 2 feet deep or until verification testing demonstrated compliance had been attained (BCCE, 1984). Inside the fence, the removal depth varied from 6-inches to 2 feet. The remediation in this area was completed to the requirements of the Regional Water Board.

Northwest Yard – Building 67 Remediation – Area G

According to the *GeoSyntec Consultants / ALTA Geosciences, Inc., Five-Year Groundwater Status Report, Westinghouse Sunnyvale Superfund Site, Sunnyvale, California. May 2006*, Phase I and II investigations identified PCB impacts to the area around Building 67 and east around Building 54. Two phases of PCB remediation and a third phase of hydrocarbon remediation were completed in these areas. The conclusions were that "the results of the verification sampling and analysis indicate that PCB-impacted soils with concentrations greater than 25 mg/Kg have been removed." The remediation in this area was completed to the requirements of the Regional Water Board.

Northeast Yard – Reservoir 1 Remediation – Area F

According to the *GeoSyntec Consultants / ALTA Geosciences, Inc., Five-Year Groundwater Status Report, Westinghouse Sunnyvale Superfund Site, Sunnyvale, California. May 2006*, Phase I and II investigations identified PCB impacts in the area around Reservoir 1. Regional Water Board Order No. 85-94 required cleanup to <50 mg/Kg PCBs. BCCE developed a removal design

(their Sheet G101) which designated the areas surrounding investigation sampling points that should be removed, based on requirements in the Regional Water Board Order. Removal depths varied between 6 and 12 inches. OHM, Inc. (October 1985) documents that remediation was completed in 1985 to the depths and limits designated by BCCE. The BCCE removal design was based on a required cleanup to <50 mg/Kg PCBs. A review of the Phase I investigation data (BCCE 1981) shows five samples between the USEPA criteria of 25 and the State criteria of 50 mg/Kg (Nos. 44, 57, 67, 71, and 74), with test values ranging from 25.0 to 48 mg/Kg. The remediation in this area was completed to the requirements of the Regional Water Board.

Central Railroad Tracks – Remediation – Area H

According to the *GeoSyntec Consultants / ALTA Geosciences, Inc., Five-Year Groundwater Status Report, Westinghouse Sunnyvale Superfund Site, Sunnyvale, California. May 2006*, similar to that for the Reservoir 1 Area F, a removal design based on cleanup to <50 mg/Kg was developed by BCCE, based on 1981 investigation data. OHM (October 1985) documents that remediation was completed in 1985 to the depths and limits designated by BCCE. BCCE (1985) Sheet G103 shows the limits and depth of excavation that was completed. The remediation in this area was completed to the requirements of the Regional Water Board.

East Perimeter Remediation – Areas D and E

According to the *GeoSyntec Consultants / ALTA Geosciences, Inc., Five-Year Groundwater Status Report, Westinghouse Sunnyvale Superfund Site, Sunnyvale, California. May 2006*, two perimeter areas, opposite Reservoir 2 and the east end of Building 21, were designated for removal by BCCE as a result of Phase I and II investigations. The first Regional Water Board Order No. 84-63 addressed both the east and west perimeter cleanup. BCCE (1984) indicates the east fenceline cleanup was completed in the required areas, however, no confirmation sampling was done for these areas. As before, the cleanup criteria was to remove soil >50 mg/Kg. One sample, No. 20 (29 mg/Kg) on the fenceline was excluded from the removal areas, but slightly exceeds current USEPA criteria of 25 mg/Kg. This sample was located just opposite the SE corner of Building 21. The remediation in this area was completed to the requirements of the Regional Water Board.

Phase I Soils Remediation

After USEPA assumed lead agency responsibility for the Site, the initial soils remediation program (Phase I Soils Remediation) was started in October 1992 and completed in 1993 in conjunction with installation of the pilot groundwater extraction and treatment system.

According to the *GeoSyntec Consultants / ALTA Geosciences, Inc., Five-Year Groundwater Status Report, Westinghouse Sunnyvale Superfund Site, Sunnyvale, California. May 2006*, the easterly of two PCB and mineral oil impacted pipelines running from the former above ground storage tank area into Building 21 was removed, along with surrounding impacted soils. PCB impacted soil from the treatment plant site and pipeline routes for the pilot groundwater treatment system was also removed at this time. Approximately 76 cubic yards (111 tons) of soil were removed and sent to Aptus, Inc. in Aragonite, Utah for incineration and

subsequent landfill disposal of ash and burn residue. A total of 39 soil samples were taken for confirmation purposes. Site restoration included backfilling excavated trenches, replacement of asphalt paving, and construction of the concrete slab for the groundwater treatment plant.

Phase II Soils Remediation

The Phase II Soils Remediation was started in October 1994, under the construction oversight of ALTA Geosciences. During Phase II, the westerly of two PCB and mineral oil pipelines running from the tank area south of Reservoir 2 toward Building 21 was removed. Impacted soils surrounding the pipelines and underlying parts of the former tank site also were removed.

According to the *GeoSyntec Consultants / ALTA Geosciences, Inc., Five-Year Groundwater Status Report, Westinghouse Sunnyvale Superfund Site, Sunnyvale, California. May 2006*, the PCB pipeline excavation was approximately 425 feet in length and varied in depth from about 2 feet to a maximum of 8 feet (as required by the ROD). Approximately 280 feet of the total length was excavated to a 5-foot width, and the remaining length was excavated to 5-20 feet in width (the very wide portions were predominantly in the tank subgrade zone). Steel pipelines that were 2- and 3-inch nominal size were removed. These pipes had carried Inerteen and mineral oil. Approximately 585 feet of pipe was removed, cut in 5-6 foot lengths, and cleaned with kerosene and a high-pressure wash. Pipe would still not pass a wipe-test for PCBs, so it had to be sent for incineration along with the soils.

Approximately 948 tons of PCB impacted soils removed during the Phase II cleanup were shipped to and incinerated at the Aptus facility in Aragonite, Utah. A small area in the alley-way between Buildings 21 and 31 was also excavated because of PCB impacts, possibly associated with a former (temporary) PCB tank placed near the Building 21 Breezeway. The impact to these soils was discovered during installation of the piping for the groundwater extraction system. A total of 550 confirmation soil samples were collected from pipeline trenches and PCB tank subgrade soils at approximately 5-foot intervals during the Phase II remediation work. If testing results exceeded 25 mg/kg PCBs, the area represented by the subject sample was re-excavated and re-tested.

Restoration work included backfill of excavations with imported backfill and replacing asphalt or concrete areas. Fencing and utilities that were disrupted by the construction were replaced.

Underground Storage Tank Removal

According to the *GeoSyntec Consultants / ALTA Geosciences, Inc., Five-Year Groundwater Status Report, Westinghouse Sunnyvale Superfund Site, Sunnyvale, California. May 2006*, and as part of the October 1994 Phase II Soils Remediation, a 20,000 gallon underground storage tank was removed from the Area 91 parking lot, approximately 75-100 feet south of Reservoir 2. This tank is reported to have contained mineral oil until about 1974 when it was converted to a fuel tank. For removal, the tank was inerted with dry ice, excavated, and taken to H&H Environmental Services in San Francisco for disposal. Five confirmation samples were

collected from the surrounding tank soils, and only one was found to contain low level PCB impact, which did not require remediation.

North Parking Lot Soils Remediation

PCB impacts to North Parking Lot soils were documented in reports covering three phases of investigation. These reports were published in May 1992, August 1992, and July 1993, and were submitted to USEPA in 1993. ALTA Geosciences supervised the remedial work beginning in April 1997.

On March 14, 1997, USEPA signed an Explanation of Significant Difference (ESD), relating to soils disposal from the North Parking Lot. Soils containing greater than 25 mg/kg PCB but less than 50 mg/kg could be disposed of in a RCRA Subtitle C permitted landfill as non-hazardous waste. Soils containing 50 to 500 mg/kg PCBs could be disposed in a TSCA permitted landfill, and soils containing greater than 500 mg/kg were to be treated at a TSCA permitted incinerator.

According to the *GeoSyntec Consultants / ALTA Geosciences, Inc., Five-Year Groundwater Status Report, Westinghouse Sunnyvale Superfund Site, Sunnyvale, California. May 2006*, the average PCB content of North Parking Lot soils was about 150 mg/kg, these soils were not considered a "Principal Threat", and in accordance with 40 CFR, Section 761.60 disposal requirements, through the ESD, USEPA allowed TSCA landfill disposal of the majority of these soils. Thirty-one truckloads (1,378,000 lbs) of waste soil, gravel, and AC pavement were removed to an industrial waste landfill in Utah. Ten gondola boxes containing 339,667 lbs of soil was shipped for disposal to a TSCA hazardous waste landfill. Two truckloads of soil (93,611 lbs) were shipped for incineration.

Machine Shop Sump TCE Soils Remediation

In April 1997, Northrop Grumman made preparations to close a sump outside their Building 44 machine shop. Initial soil sampling beneath the sump indicated the presence of petroleum hydrocarbon and solvent-related compounds. Under geologic oversight by ALTA Geosciences, a soil boring was immediately installed and sampled next to the sump. The analytical testing identified 1,1-dichloroethane, 1,1,1-trichloroethane, ethyl benzene, toluene, and xylene at very low levels (up to 2.3 mg/kg), all well below Preliminary Remediation Goals (PRGs) published by USEPA Region 9.

However, Total Petroleum Hydrocarbons (quantified as diesel) were identified in all samples, at concentrations ranging from 2,600 mg/kg to 29,000 mg/kg. Because of the proximity of the sump to an active plant facility and the lack of other viable remediation alternatives, it was decided that monitoring and natural attenuation were the most suitable alternatives for addressing this problem. Three monitoring wells (W-83, W-84 and W-85) were installed north (downgradient) of the former sump and incorporated into the groundwater monitoring plan.

Building 21 Investigation and Soils Remediation

Pursuant to the ROD, no excavation was required or performed inside Building 21, but the ROD required that USEPA be notified if Building 21 was modified in the future. Accordingly, the excavations conducted for the Phase I and II Remediation programs terminated at Building 21 and did not extend along the pipelines running beneath Building 21. In preparation for building improvements in 1999, Northrop Grumman notified USEPA of intended construction in the building. Under an USEPA-approved Work Plan, ALTA Geosciences installed nine soil borings and 4 monitoring wells inside Building 21, to identify potential PCB impacts. The results of these investigations indicated soil impacts at the east end of the building, adjacent to and beneath the former PCB pipeline and transformer filling station; however, no groundwater impacts from PCBs were identified. Following USEPA approval of the remediation work plan, under oversight by ALTA Geosciences, excavation was started in August 2000. Soils exceeding 500 mg/kg PCBs (17,014 lbs) were sent for incineration to the Safety-Kleen (Aragonite) incinerator in Utah, and soils between 25 and 500 mg/kg PCBs (17,925 lbs) were sent to an industrial landfill operated by Chemical Waste Management in Kettlemen Hills, CA.

According to the *GeoSyntec Consultants / ALTA Geosciences, Inc., Five-Year Groundwater Status Report, Westinghouse Sunnyvale Superfund Site, Sunnyvale, California. May 2006*, confirmation samples were taken on the excavation sides and bottom to assure compliance with removal criteria. The final excavation was approximately 7 feet wide by 15 feet long and up to 5 feet deep. Imported soil was used to backfill the excavation and the area was re-paved.

4.3 Operations and Maintenance

To assess and ensure long-term effectiveness of the remedial actions, two aspects of O&M activities are being implemented at the Site, including (1) groundwater monitoring and (2) cap inspection monitoring.

4.3.1 Groundwater Monitoring

The ROD identifies “permanent and ongoing monitoring of the affected aquifers to verify that the extraction system is effective in capturing and reducing chemical concentrations and the extent of the aqueous phase plume, and in containing aqueous phase contamination in the DNAPL source area”.

4.3.2 Inspection Monitoring

The objective of the cap inspection monitoring program is to identify any potential release of impacted soils by examining the integrity of the system through inspection monitoring. Northrop Grumman is responsible for the long-term management of the cap system, as well as maintaining institutional controls by ensuring no alteration in land use of the property to residential use.

The asphalt cap is in good condition, and effectively prevents exposure to contaminated soils. Portions of the Site where PCB-contaminated soils remain are generally capped with

asphalt pavement. However, a few areas noted in the Site Inspection section of this report are unpaved.

4.3.3 Institutional Controls

Appendix A provides an evaluation of the institutional controls at the Westinghouse Superfund Site. Institutional controls are not yet in place. Access controls are in place and effectively prevent exposures. The entire plant is fenced and the only access to affected areas is via guarded gates. The fence is currently in good condition. Unauthorized persons are not allowed in the plant. The groundwater treatment system fenced off from the rest of the plant and kept locked when not undergoing maintenance inspection.

Northrop Grumman submitted a draft of the restrictive easement to USEPA on April 10, 2003 to satisfy the Administrative Order requirement for institutional controls. The *Report on the Extent of Dissolved PCBs >0.5 μg/L in Groundwater and Residual PCBs >25 mg/kg in Soil* (ALTA, June 2003) was also submitted to provide the technical basis for the restrictive easement. USEPA has indicated that they will be involving the California Department of Toxic Substances Control (DTSC) in the institutional controls process.

Since hazardous materials, hazardous wastes or constituents, or hazardous substances will remain at the property at levels which are not suitable for unrestricted use, land use restrictions are required and will be implemented through a Land Use Covenant/Environmental Restriction. The land use covenant will carry restrictions such as are necessary to ensure the protectiveness of and prevent damage to or interference with the remedial action. Additionally, monitoring, inspections, and reporting will be conducted to ensure compliance with the land use restrictions. The Covenant shall run with the land and bind all successive owners and occupants.

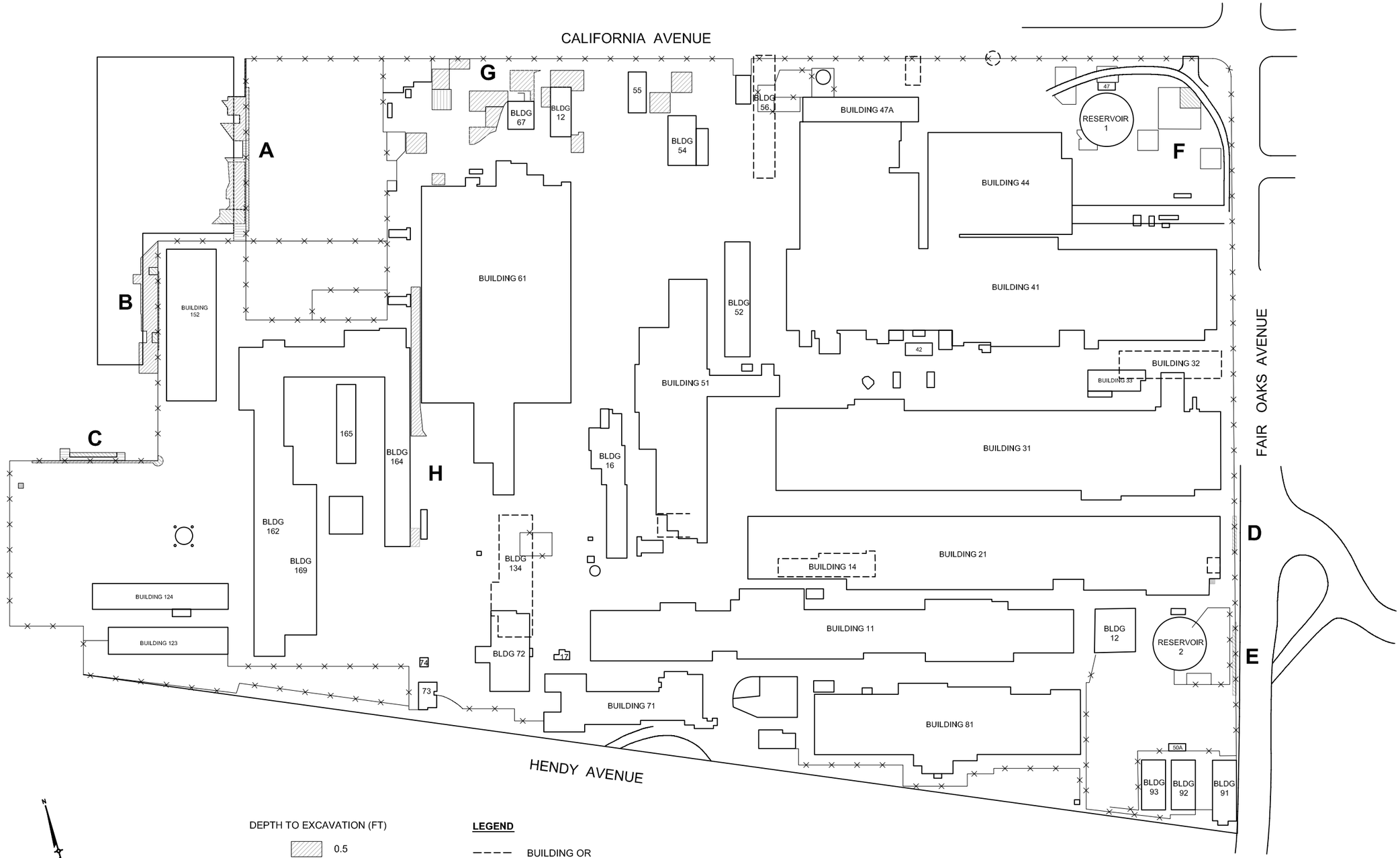
The deed restriction should be completed for the Site. Appropriate institutional control monitoring and reporting requirements will be included in the land use covenant. Areas of the Site where PCBs remain at levels above those suitable for direct contact should be capped with pavement. The cap should be regularly inspected and repaired on an as-needed basis.

4.3.4 Operations and Maintenance Costs

The estimated cost of the remedy in the ROD was $8,300,000. The ROD presents the O&M costs for the groundwater remedy as $60,000 for the first year and $29,000 for each year thereafter.

Operations and maintenance costs for the groundwater treatment system for 2005 totaled about $76,000. This includes on-site plant maintenance staff, parts and supplies, disposal costs, water extraction fees, and utilities. This number does not include groundwater monitoring or legal or consulting fees. For 2005, during which 0.91 pounds of PCBs and 41 pounds of chlorinated benzenes were recovered, this equates to about $84,000 per pound of PCBs recovered and $1,900 per pound of chlorinated benzenes.

Large variances in O&M costs have not occurred since implementation of the upgrades to the extraction and treatment system in 2001. The estimated O&M costs for the groundwater remedy are significantly lower than the actual cost of O&M at the Site.



Source: GeoSyntec Consultants/ALTA Geosciences, Inc., *Five-Year Groundwater Status Report, Appendix A, Historical Data*, May 2006.

FIGURE 4-1
1984-1985 REMEDIAL EXCAVATION AREAS
WESTINGHOUSE FIVE-YEAR REVIEW REPORT
SUNNYVALE, CALIFORNIA

CH2MHILL

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SECTION 5.0

Progress Since the Last 5-year Review

The last five-year review conducted at the Westinghouse Superfund Site was prepared by USEPA Region 9 in September 2001.

5.1 Protectiveness Statement from Last Review

The protectiveness statement from the last five-year review was as follows:

> "I certify that the remedy selected for this site is expected to be protective of human health and the environment. Based on the expected continuing presence of contamination at this site at levels which preclude unlimited use and unrestricted exposure, the next Five-Year Review will be written within five years from the date of signature of this review."

5.2 Issues and Recommendations from Last 5-year Review

No issues were identified from the previous five-year review.

The recommendations developed from the last five-year review are as follows:

> "The new extraction wells need to be installed, the use of existing barrier wells should be discontinued after the new wells are installed, the treatment plant upgrades should be performed and the asphalt cap should be repaired. These modifications and repairs should be completed by October 2001."

5.3 Follow-up Actions from Last 5-year Review

Follow-up actions have been conducted to address the issues and recommendations that were made in the last five-year review.

5.3.1 Source Area Extraction Wells

The previous 5-year report concluded that the current source area extraction wells did not achieve the desired containment effectiveness in the source area due to:

- Inadequate pump capacity.
- Inappropriate screen interval for current conditions.
- Biofouling problems (biological growth that inhibits the efficiency of the wells) and the probability that the air driven pumps increase the active biofouling in the well-pump systems.
- Mechanical unreliability of the air driven pumps.

Consequently, the previous 5-year report recommended that the groundwater extraction and treatment system (GETS) be significantly revised as listed below.

- Separation of the DNAPL recovery and hydraulic containment functions of the extraction wells.
- Installation of new groundwater extraction wells – The new wells should be screened across the entire saturated section. Preliminary evaluations indicate that three new wells would be adequate to achieve full hydraulic containment of the source areas. These wells would function solely for hydraulic containment and extraction of aqueous phase contaminants. Variable speed electric submersible pumps should be used.
- Existing extraction wells E1 through E5 should be rehabilitated through redevelopment and anti-biofouling treatment and used solely for DNAPL recovery. The air driven pumps should be replaced with low flow electric submersible pumps operated cyclically.
- A biofouling monitoring and maintenance program should be implemented for the Source Area wells.

Construction work on the upgrades was performed in 2001. Each of the recommendations was addressed, as described below.

- Extraction wells E1 through E5 were fitted with electric submersible pumps set at the bottom of the well screen. These pumps operate on a periodic basis to remove accumulated DNAPL but are not operated for the purpose of maintaining hydraulic containment, which is addressed by the three new wells discussed below.
- Three new groundwater extraction wells (designated A, B, and C) were installed within the source area (Well C) and the groundwater impact area (Wells A and B) and serve as the main extraction wells for the GETS. The new wells are screened across the entire saturated section. The wells were connected via new PVC double-walled piping to the groundwater treatment plant. The three new wells and existing well E8 were fitted with variable speed submersible pumps. The capacity of the new pumps is up to 10 gpm which is greater than the capacity of the previous pneumatic pumps.
- The existing extraction wells were redeveloped and treated for biofouling problems by treating with palletized acid cleaner and polymeric acid enhancer products designed specifically for well treatment. The existing pumps were removed from extraction wells E1 through E5 and replaced. Wells E1- through E5 received new low flow single speed electric submersible pumps that are operated intermittently on a timer from the main control panel. The wellhead vaults were replaced with new 24” x 36” pre-cast concrete vaults with traffic-rated, hinged steel lids.
- Biofouling in the extraction wells was addressed by redeveloping the wells and treating with a granular acid cleaner and polymeric acid enhancer. Ongoing maintenance has included periodic treatment with the granular acid cleaner and polymeric acid enhancer to reduce microbial re-growth and mineral scaling.

5.3.2 Barrier System Wells

The previous 5-year report recommended that the existing barrier wells should be shut down and retained as a backup system only after installation and verification of the performance of the new extraction wells. If left in service when the new wells are operating, they would interfere with hydraulic containment of the source areas. The 2001 Report also recommended that consideration be given to new requirements for these wells in a revised operations and maintenance (O&M) plan, given their less frequent operations in the future. However, no revised O&M plan for these wells was produced, as the continued effectiveness of the extraction wells has rendered the operation of these wells unnecessary.

5.3.3 Piping and Equipment Systems

The previous 5-year report recommended that the existing piping be replaced by larger diameter piping from the extraction wells to the treatment plant to increase the piping capacity. Two sets of piping from each of the source areas were recommended to enable separate flow monitoring of DNAPL versus groundwater recoveries. Secondary containment was recommended for the new piping. Existing extraction wells E-1 through E-5 were originally installed with single-wall pipe. This pipe was removed and replaced with larger PVC double-walled pipe. The pipe that was removed was vinyl-coated steel, and was consistently found to be in sound condition, without apparent leaks or excessive corrosion. An additional feature of the pipeline was the inclusion of several cleanout ports and a leak detection system. The previous 5-year report also recommended installation of larger in-ground vaults and mounting the equipment around the inside perimeter of the vaults to address the difficulty of working in the existing E1 through E5 well vaults. The well vaults were replaced by new 24” x 36” pre-cast concrete vaults with traffic-rated, hinged steel lids.

5.3.4 Treatment Plant Operations and Equipment

The previous 5-year report recommended that consideration be given to replacing the existing cartridge filters with self-cleaning filters due to the high cost of pre-filter maintenance and cartridge disposal. Self-cleaning filters were pilot tested, but were concluded to be inappropriate due to the volume of waste water generated during their cleaning so use of the existing cartridge filters resumed.

The previous 5-year report also recommended that consideration be given to installing digital flow (or other) meters for system parameters in the treatment plant headworks (where well flows enter) and at other critical locations in the plant to improve responses to system maintenance needs or emergency repairs. These should be connected to a remotely accessible monitoring system. The groundwater treatment plant was automated with new instrumentation and electrical components including programmable logic control (PLC) and human-machine interface (HMI). Areas of automation or instrumentation included well level transmitters, chemical control and monitoring in the plant, feed pumps in the plant, flow meters, and pressure transmitters and filter operation. Fluorescent lighting fixtures were installed in the roof structure over the treatment plant, to improve night working conditions.

Level transmitters to monitor groundwater level, electronic flow meters to record extraction rate, and wiring to connect to the treatment plant controls were installed in the three new extraction wells and five existing source area wells, and extraction well E8. Level

transmitters were also installed in monitoring wells W-34, W-36, W-42, W-46, and W-54. Wiring was connected to route data from the flow meters and level transmitters from the wells to the main control panel and the GETS computer to provide real-time information regarding pumping rate and water level drawdown. Three field control panels (including thermostatically controlled electric fans) for the wells and associated equipment were installed. The existing barrier well system control was incorporated into the PLC and HMI.

5.3.5 Asphalt Cap Repair

The previous 5-year report designated areas of the asphalt cap in the source areas that required repair or resealing. In addition to those areas, some pavement was damaged by excavations or operation of equipment in the work areas of the subsequent construction. The affected areas included eastern portions of the Building 91 Parking Lot, both north and south of the groundwater treatment plant, around the southeast corner of Building 21, and south of the Building 21 Breezeway. The repaved areas totaled approximately 2,160 square feet, the amount of slurry-sealed pavement (less severely damaged than re-pavement areas) totaled approximately 900 square feet, and the length of cracked pavement sealed with tar totaled approximately 200 feet. The repaired areas cannot easily be shown on a map, since the work was addressing discontinuous specific problem areas with irregular shapes.

An inspection of the asphalt capping in the source areas was performed in January 2006. Based on that inspection, additional repairs to the asphalt cap were made in February 2006. These repairs included:

- Complete removal and replacement of the asphalt pavement in several areas where severe alligator cracking had developed. This totaled approximately 2000 square feet.
- Spot excavation and replacement of pavement where the asphalt was degrading.
- Significant cracks were blown and brushed clear of debris, soil, and vegetation and were sealed with hot tar.
- Previously unpaved areas near the treatment system and around Reservoir 2 were paved for the first time to improve the cap effectiveness.

The 2006 repairs were inspected in February 2006, and during the 5-Year Review Inspection May 22, 2006. Pavement in the vicinity of Building 67 overlying prior PCB remediation areas is lacking. This area should be paved to prevent exposure to PCBs.

SECTION 6.0

5-year Review Process

The following sections discuss findings from the 5-year review.

6.1 Administrative Components

Gary Riley, USEPA Remedial Project Manager for the Site, led this second 5-year review. CH2M HILL provided technical support to the USEPA.

Activities to involve the community in the 5-year review included preparation and distribution of a fact sheet. The 5-year review consisted of a review of relevant documents (Appendix B), a regulatory review, and a Site inspection.

6.2 Community Involvement

USEPA distributed a notice in the local newspaper on July 3, 2006 announcing the start of the 5-year review. The notice described the Site background, outlined the process associated with conducting a 5-year review, and invited community involvement. Lauren Berkman is the USEPA Community Involvement Coordinator for the Site. A copy of the newspaper ad is included in Appendix C.

Following the release of this document, a fact sheet will be prepared by USEPA for distribution to the community near the Site. The fact sheet will summarize the findings and announce instructions on how to obtain a copy of this 5-year review report.

EPA received a letter from the Heritage District Neighborhood Association dated July 5, 2006 containing a number of questions and comments regarding the progress of the cleanup. A copy of the correspondence is attached in Appendix X. A number of concerns were raised regarding potential use of PCBs by Westinghouse on railroad right-of-ways outside the Westinghouse property, and whether recent construction on or near these areas could have affected contamination from the Site.

The purpose of the Five Year Review is, in part, to assess whether there have been changes in exposure pathways and assumptions used at the time of remedy selection. The 1991 RI report summarizes the soil cleanup of PCBs outside the Reservoir 2 source area conducted prior to the RI under the oversight of the Regional Water Quality Control Board between 1981 and 1987. This cleanup included areas along fence lines at the perimeter of the Westinghouse plant, and along railroad spurs located on Westinghouse property. EPA did not encounter evidence that Westinghouse used PCBs on rail lines outside their property. Many of the concerns raised in the Neighborhood Association's letter related to railroad lines that were not owned or controlled by Westinghouse.

6.3 Document Review

As part of the 5-year review process, relevant documents and information related to the Site activities were reviewed. The documents chosen for review primarily focused on progress since the last five-year review but ranged in publication date from 1991 to present. A list of the documents reviewed is provided in Appendix B.

6.4 Data Review

This section discusses the data and information found in documents relating to the groundwater monitoring and soil removal activities at the Site. For this 5-year review, annual reports documenting the implementation of the Monitoring Program from July 2000 to December 2005 were reviewed.

Groundwater monitoring data from the years 2001 to 2005 is presented in Table 6-1. A summary of 1998-2005 PCB results is presented in Table 6-2. Positive detections of chlorobenzenes from the years 2004 and 2005 are presented in Table 6-3.

6.4.1 Groundwater

Based on information from the annual groundwater monitoring and Five-Year Groundwater Status Report, the groundwater extraction and treatment system (GETS) has been functioning as intended, while the remediation goals for PCBs and chlorobenzenes have not yet been achieved. The annual groundwater monitoring reports indicate that the GETS is effective in containing the groundwater impact area and preventing off-site migration.

6.4.2 Soil

In response to the recommendations of the previous 5-year report, repairs to the asphalt cap were implemented. Repairs to the asphalt cap adequately prevent exposure to soil in the capped areas. Capped areas should be inspected and maintained in good condition.

As occurred at Building 21 in 1999, Westinghouse should notify the USEPA if buildings will be modified, and/or asphalt caps or soil will be excavated. Confirmation samples should be collected after excavations to ensure exposed soil is below cleanup standards.

6.5 Regulatory Review

A review of ARARs and TBCs was conducted for the selected remedy at the Site, as included in Appendix D. The review was conducted to determine if changes to standards and TBCs have occurred since the ROD was issued in 1995 that might affect current protectiveness of the selected remedy.

The specific documents that were reviewed for any changes, additions, or deletions include the ROD, issued October 16, 1991, and the ESD, issued February 14, 1997.

- Based on the evaluation, there were no changes to existing action-specific, chemical-specific, location-specific ARARs, nor TBCs since the issuance of ROD in 1995 that might affect the current protectiveness of the selected remedy
- **Action-specific ARARs.** There were no changes to existing action-specific ARARs as stated in the ROD.
- **Chemical-specific ARARs.** There was one change to the existing chemical-specific ARARs as stated in the ROD. The proposed MCL for 1,2,4-Trichlorobenzene (0.005 mg/L) was stated in the ROD as TBC criteria. The 0.005 mg/L proposed MCL for 1,2,4-Trichlorobenzene was established as the state MCL for 1,2,4- Trichlorobenzene on June 12, 2003. This change does not affect protectiveness because the ROD cleanup criterion for 1,2,4-Trichlorobenzene is equal to the state MCL.
- **Location-specific ARARs.** There were no changes to the existing location-specific ARARs as stated in the ROD.

6.6 Site Inspection

A Site inspection was conducted by representatives of USEPA and CH2M HILL on May 22, 2006. The purpose of the Site inspection was to observe conditions and status of operation at the Site and its surrounding area. The inspection included a tour of the Site with Northrup Grumman personnel. A summary of the inspection findings is presented below. The Site inspection checklist is provided in Appendix E. Conditions during the inspection were favorable, sunny, with temperatures of 68° to 70°.

The area surrounding the Site is heavily urbanized and is currently zoned and used for commercial, residential and industrial use. Some residential parcels adjoin the facility on the west side. The entire plant is fenced and the only access to affected areas is via guarded gates. The fence is currently in good condition. Unauthorized persons are not allowed in the Site.

Based on observation from the Site inspection, the integrity of the asphalt capping in place is well-maintained, and the cap was in good condition with no erosion. Areas of the Site where PCBs remain at levels above those suitable for direct contact should be capped with pavement. The cap should be regularly inspected and repaired on an as-needed basis.

Based on observation from the Site inspection, the groundwater extraction and treatment system was functioning as intended, and monitoring records were maintained. No significant issues were identified at the time of the Site inspection.

6.7 Interviews

Interviews were conducted with several persons connected to the site. Dave Wurfer, a resident who lives across the street from the site was interviewed on August 2, 2006. Rodger Hartman, Chief Financial Officer and Dale Stempson, Manager of Quality Assurance, of Valin Corporation were also interviewed on the same date. No significant problems regarding the site were identified. Both parties were unaware of any cleanup activities at the site and there was no impact of site activities on either party. Both parties

stated they were uninformed of any site activities yet felt that since no there was no negative impact on them, that they did not feel a need to go out and seek information. Mr. Wufer would like to see the external physical appearance of the site improved and suggested shrubbery to camouflage the fence that surrounds the plant.

TABLE 6-1
SUMMARY OF 1998-2005 PCB RESULTS (ug/L)

WELL	Aquifer	WELL TYPE	PCBs October 1998 (ug/L)	PCBs July 2000 (ug/L)	PCBs January 2003 (ug/L)	PCBs September 2004 (ug/L)	PCBs June 2005 (ug/L)	PCBs December 2005 (ug/L)
E-13	A	perimeter				<0.1		0.14
W-20	A	Source	0.39		<0.1	<0.1	0.13	<0.1
W-24	A	compliance	<0.1			<0.1		0.15
W-26	A	Source	0.23		<0.1	0.9	6.7	5.7
W-34	A	Source	<0.1	0.8	<0.1	2.6	<0.1	<0.1
W-35	A	Source	0.12		<0.1	<0.1	<0.1	<0.1
W-36	A	Source					1.7	2.7
W-39	A	Source	0.23	2.6	0.3	0.37	0.38	2.5
W-40	A	Source			6.8	3	15	3.2
W42	A	source	1.81	2.1	0.6	1.91	0.53	10
W-43	A	perimeter	<0.1	<0.1	<0.1	<0.1	0.23	0.22
W44	A	compliance	<0.1	<0.1		<0.1		<0.1
W-46	A	Source					110	640
W-47	A	Source			0.8	<0.1	0.4	0.12
W-48	A	Source	7.7		11.7	1600	25	9.3
W-52	A	perimeter	<0.1	<0.1		<0.1		0.12
W53	A	compliance	<0.1	<0.1	<0.1	<0.1		<0.1
W-54	A	Source			<0.1	7.1	0.29	9.7
W-55	A	compliance		<0.1				<0.1
W-57	A	compliance	<0.1	<0.1	<0.1	<0.1		<0.1
W-58	A	compliance	<0.1	<0.1	<0.1	<0.1		<0.1
W-60	A	compliance	<0.1	<0.1		<0.1		<0.1
W-63	A	compliance	<0.1	<0.1		<0.1		<0.1
W-66	A	upgradient	<0.1					NA
W-81	A	perimeter			<0.1	<0.1		<0.1
W86	A	perimeter		<0.1	<0.1	<0.1		<0.1
W88	A	perimeter		<0.1	<0.1	<0.1		<0.1
Well A	A	Source			6.0	0.1	<0.1	0.4
Well B	A	Source			0.3	<0.1	0.15	0.42
Well C	A	Source			25.0	2000		7600
W-25	B1	perimeter		<0.1		<0.1		<0.1
W-62	B1	perimeter		<0.1		<0.1		<0.1
W-69	B1	perimeter		<0.1		<0.1		<0.1

Notes: = results greater than 0.5 ug/L

TABLE 6-2
POSITIVE DETECTIONS FOR CHLOROBENZENES

		Well A			Well B			Well C			W-36		
CONSTITUENT	**ROD CLEANUP CRITERIA**	**Sep-04**	**Jun-05**	**Dec-05**	**Sep-04**	**Jun-05**	**Dec-05**	**Sep-04**	**Jun-05**	**Dec-05**	**Sep-04**	**Jun-05**	**Dec-05**
Polychlorinated Biphenyls	0.5	0.1	<0.1	0.4	<0.1	0.15	0.42	2000	NS	7600	NS	1.7	2.7
Chlorobenzene	30	ND	ND	ND	0.56	ND	ND	140	NS	91	NS	ND	ND
1,2-Dichlorobenzene	600	0.65	1.3	0.75	1.5	1.5	1.1	74	NS	67	NS	ND	ND
1,3-Dichlorobenzene	130	0.7	1.2	0.78	0.78	ND	ND	470	NS	350	NS	0.75	ND
1,4-Dichlorobenzene	5	0.81	1.1	0.69	0.94	ND	ND	690	NS	430	NS	ND	ND
1,2,3-Trichlorobenzene	none (1)	11	16	11	5.5	5.6	6.8	280	NS	ND	NS	ND	ND
1,2,4-Trichlorobenzene	5	14	53	32	9	12	14	2800	NS	2400	NS	ND	ND

Notes:
1. There are no groundwater/drinking water quality criteria for 1,2,3-Trichlorobenzene
2. A few other VOC's have been detected, see text for discussion
3. NS=not sampled; ND= compound not detected
4. Shading indicates result exceeds ROD criteria

TABLE 6-2
POSITIVE DETECTIONS FOR CHLOROBENZENES

		W-42			W-43			W-46			W-48		
CONSTITUENT	**ROD CLEANUP CRITERIA**	**Sep-04**	**Jun-05**	**Dec-05**	**Sep-04**	**Jun-05**	**Dec-05**	**Sep-04**	**Jun-05**	**Dec-05**	**Sep-04**	**Jun-05**	**Dec-05**
Polychlorinated Biphenyls	0.5	0.86	0.51	10	<0.1	0.23	0.22	NS	110	640	1600	25	9.3
Chlorobenzene	30	<0.2	<0.5	<0.5	ND	ND	ND	NS	6.8	ND	220	290	300
1,2-Dichlorobenzene	600	<0.2	<0.5	<0.5	0.58	ND	ND	NS	32	30	92	100	160
1,3-Dichlorobenzene	130	<0.2	<0.5	<0.5	ND	ND	ND	NS	85	48	810	820	880
1,4-Dichlorobenzene	5	<0.2	<0.5	<0.5	ND	ND	ND	NS	83	58	310	380	420
1,2,3-Trichlorobenzene	none (1)	<0.2	<5	<5	9	ND	ND	NS	130	220	530	<500	780
1,2,4-Trichlorobenzene	5	0.4J	<5	<5	20	ND	7.3	NS	510	770	4200	3900	5200

TABLE 6-3
SUMMARY OF GROUNDWATER QUALITY DATA YEAR 2001-2005
ANNUAL MONITORING PROGRAM WELLS
Westinghouse Sunnyvale Superfund Site, Sunnyvale, CA

GeoSyntec Consultants
ALTA Geosciences, Inc.

Well No.	E-13	E-13	E-13	W-20	W-20	W-20	W-20	W24	W24	W24	W24	W24	W24	W24	W-26	W-26	W-26	W-26	W-34	W-34	W-34	W-34	W-34	W-35
Aquifer	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Date	11/19/03	9/13/04	12/16/05	1/1/03	9/1/04	6/1/05	12/1/05	4/4/01	10/29/01	4/9/02	10/7/02	11/19/03	9/13/04	12/17/05	1/1/03	9/1/04	6/1/05	12/1/05	7/1/00	1/1/03	9/1/04	6/1/05	12/1/05	1/1/03
CONSTITUENT																								
Field Parameters																								
Temperature (C)	18.5	20.2	18.0					18.6	19.1	17.9	18.5	18.2	23	17.5										
pH	7.2	7.66	7.8					6.98	6.72	6.96	6.97	7.12	7.13	7.5										
Conductivity (uS)	587	110.2	80.9					985	748	819	790	584	31.1	94.8										
Turbidity (NTU)	0.44	1.4	0.97					1.3	0.5	0.4	0.3	0.17	2.2	0.17										
Polychlorinated Biphenyls (ug/l)																								
PCB-1016	<0.1	<0.1	<0.1					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1										
PCB-1221	<0.1	<0.1	<0.1					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1										
PCB-1232	<0.1	<0.1	<0.1					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1										
PCB-1242	<0.1	<0.1	<0.1					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1										
PCB-1248	<0.1	<0.1	<0.1					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1										
PCB-1254	<0.1	<0.1	<0.1					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1										
PCB-1260	<0.1	<0.1	0.14					<0.1	<0.1	<0.1	<0.1	<0.1	0.19	0.15										
Total PCBs	<0.1	<0.1	0.14	<0.1	<0.1	0.13	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.19	0.15	<0.1	0.9	6.7	5.7	0.8	<0.1	2.6	<0.1	<0.1	<0.1
Chlorinated Hydrocarbons (ug/l)																								
Chlorobenzene	<0.2	<0.5	<0.5					nm	<0.5	nm	<0.5	<0.2	<0.5	<0.5										
1,2-Dichlorobenzene	<0.2	<0.5	<0.5					nm	<0.5	nm	<0.5	<0.2	<0.5	<0.5										
1,3-Dichlorobenzene	<0.2	<0.5	<0.5					nm	<0.5	nm	<0.5	<0.2	<0.5	<0.5										
1,4-Dichlorobenzene	<0.2	<0.5	<0.5					nm	<0.5	nm	<0.5	<0.2	<0.5	<0.5										
1,2,3-Trichlorobenzene	<0.3	<5	<5					nm	<0.5	nm	<0.5	<0.3	<5	<5										
1,2,4-Trichlorobenzene	<0.3	<5	<5					nm	<0.5	nm	<0.5	<0.3	<5	<5										
Petroleum Hydrocarbons (ug/l)																								
TPPH as Gas	nm	nm	nm					nm	nm	nm	nm	nm	nm	nm										
TEPH as Diesel	nm	nm	nm					nm	nm	nm	nm	nm	nm	nm										
Extract HC as Diesel	nm	nm	nm					nm	nm	nm	nm	nm	nm	nm										
Extract HC as Hydraulic/Motor Oil	nm	nm	nm					nm	nm	nm	nm	nm	nm	nm										
Extract HC as Jet Fuel	nm	nm	nm					nm	nm	nm	nm	nm	nm	nm										
Extract HC as Kerosene	nm	nm	nm					nm	nm	nm	nm	nm	nm	nm										
Mineral Spirits or Stoddard	nm	nm	nm					nm	nm	nm	nm	nm	nm	nm										
Benzene	nm	nm	<0.5					nm	nm	nm	nm	nm	<0.5	<0.5										
Toluene	nm	nm	<0.5					nm	nm	nm	nm	nm	<0.5	<0.5										
Ethylbenzene	nm	nm	<0.5					nm	nm	nm	nm	nm	<0.5	<0.5										
Total Xylenes	nm	nm	<0.5					nm	nm	nm	nm	nm	<0.5	<0.5										

Note: Shading indicates results exceeding ROD Cleanup Criteria

TABLE 6-3
SUMMARY OF GROUNDWATER QUALITY DATA YEAR 2001-2005
ANNUAL MONITORING PROGRAM WELLS
Westinghouse Sunnyvale Superfund Site, Sunnyvale, CA

Well No.	W-35	W-35	W-35	W-36	W-36	W-39	W-39	W-39	W-39	W-39	W-40	W-40	W-40	W-40	W-42	W42	W42	W42	W42	W42	W42	W42	W42	W42
Aquifer	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Date	9/1/04	6/1/05	12/1/05	6/1/05	12/1/05	7/1/00	1/1/03	9/1/04	6/1/05	12/1/05	1/1/03	9/1/04	6/1/05	12/1/05	7/1/00	4/6/01	11/2/01	4/11/02	10/7/02	1/1/03	11/19/03	9/13/04	6/9/05	12/15/05
CONSTITUENT																								
Field Parameters																								
Temperature (C)																19.5	22.1	19.9	20.1		20.8	21.1	20.5	16.1
pH																7.10	7.30	7.03	7.10		6.87	7.54	6.48	8.2
Conductivity (uS)																1032	762	750	755		598	168.7	74.2	83.5
Turbidity (NTU)																0.2	0.6	0.8	0.5		1.26	0.6	0.2	nm
Polychlorinated Biphenyls (ug/l)																								
PCB-1016																<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1
PCB-1221																<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1
PCB-1232																<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1
PCB-1242																<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1
PCB-1248																<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1
PCB-1254																<0.1	<0.1	1.9	<0.1		<0.1	1.4	<0.1	<0.1
PCB-1260																<0.1	0.36	0.68	0.9		0.86	0.51	0.53	10
Total PCBs	<0.1	<0.1	<0.1	1.7	2.7	2.6	0.3	0.37	0.38	2.5	6.8	3	15	3.2	2.1	<0.1	0.36	2.58	0.9	0.6	0.86	1.91	0.53	10
Chlorinated Hydrocarbons (ug/l)																								
Chlorobenzene					<0.5											nm	<0.5	nm	<0.5		<0.2	<0.5	<0.5	<0.5
1,2-Dichlorobenzene					<0.5											nm	<0.5	nm	<0.5		<0.2	<0.5	<0.5	<0.5
1,3-Dichlorobenzene					<0.5											nm	<0.5	nm	<0.5		<0.2	<0.5	<0.5	<0.5
1,4-Dichlorobenzene					<0.5											nm	<0.5	nm	<0.5		<0.2	<0.5	<0.5	<0.5
1,2,3-Trichlorobenzene					<5											nm	<0.5	nm	<0.5		0.4J	<5	<5	<5
1,2,4-Trichlorobenzene					<5											nm	<0.5	nm	<0.5		<0.2	<5	<5	<5
Petroleum Hydrocarbons (ug/l)																								
TPPH as Gas																nm	nm	nm	nm		nm	nm	nm	nm
TEPH as Diesel																nm	nm	nm	nm		nm	nm	nm	nm
Extract HC as Diesel																nm	nm	nm	nm		nm	nm	nm	nm
Extract HC as Hydraulic/Motor Oil																nm	nm	nm	nm		nm	nm	nm	nm
Extract HC as Jet Fuel																nm	nm	nm	nm		nm	nm	nm	nm
Extract HC as Kerosene																nm	nm	nm	nm		nm	nm	nm	nm
Mineral Spirits or Stoddard																nm	nm	nm	nm		nm	nm	nm	nm
Benzene																nm	nm	nm	nm		nm	<0.5	<0.5	<0.5
Toluene																nm	nm	nm	nm		nm	<0.5	<0.5	<0.5
Ethylbenzene																nm	nm	nm	nm		nm	<0.5	<0.5	<0.5
Total Xylenes																nm	nm	nm	nm		nm	<0.5	<0.5	<0.5

Note: Shading indicates results exceeding ROD Cleanup Criteria

TABLE 6-3
SUMMARY OF GROUNDWATER QUALITY DATA YEAR 2001-2005
ANNUAL MONITORING PROGRAM WELLS
Westinghouse Sunnyvale Superfund Site, Sunnyvale, CA

Well No.	W-43	W43	W43	W43	W43	W43	W43	W43	W43	W43	W-44	W44	W44	W44	W44	W44	W44	W44	W46	W46	W-47	W-47	W-47	W-47
Aquifer	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Date	7/1/00	4/5/01	10/30/01	4/11/02	10/7/02	1/1/03	11/19/03	9/13/04	6/10/05	12/16/05	7/1/00	4/5/01	10/30/01	4/11/02	10/7/02	11/19/03	9/13/04	12/18/05	6/10/05	12/16/05	1/1/03	9/1/04	6/1/05	12/1/05
CONSTITUENT																								
Field Parameters																								
Temperature (C)		18.9	19.4	19.6	19.5		18.5	21.7	20.8	18.0		16.7	19	18.3	18.3	nm	21	15.4						
pH		6.90	6.92	7.11	7.07		7.07	7.59	7.74	7.5		7.20	6.94	7.29	7.12	nm	7.75	8.1						
Conductivity (uS)		1027	793	863	845		612	163.5	92	91.3		987	725	7.41	7.34	nm	129.7	78						
Turbidity (NTU)		0.8	0.7	0.8	0.5		1.57	2	0.4	0.4		1.6	2	1.35	2.1	nm	3.4	0.6						
Polychlorinated Biphenyls (ug/l)																								
PCB-1016		<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1	nm	<0.1	<0.1						
PCB-1221		<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1	nm	<0.1	<0.1						
PCB-1232		<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1	nm	<0.1	<0.1						
PCB-1242		<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1	nm	<0.1	<0.1						
PCB-1248		<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1	nm	<0.1	<0.1						
PCB-1254		<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1	nm	<0.1	<0.1						
PCB-1260		<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	0.23	0.22		<0.1	<0.1	<0.1	<0.1	nm	<0.1	<0.1						
Total PCBs	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.23	0.22	<0.1	<0.1	<0.1	<0.1	<0.1	nm	<0.1	<0.1	110	640	0.8	<0.1	0.4	0.12
Chlorinated Hydrocarbons (ug/l)																								
Chlorobenzene		nm	<0.5	nm	<0.5		<.3	<0.5	<0.5	<0.5		nm	<0.5	nm	<0.5	nm	<0.5	<0.5		<0.5				
1,2-Dichlorobenzene		nm	<0.5	nm	<0.5		1.0J	0.58	<0.5	<0.5		nm	<0.5	nm	<0.5	nm	<0.5	<0.5		30				
1,3-Dichlorobenzene		nm	<0.5	nm	<0.5		<.2	<0.5	<0.5	<0.5		nm	<0.5	nm	<0.5	nm	<0.5	<0.5		48				
1,4-Dichlorobenzene		nm	<0.5	nm	<0.5		0.3J	<0.5	<0.5	<0.5		nm	<0.5	nm	<0.5	nm	<0.5	<0.5		58				
1,2,3-Trichlorobenzene		nm	28	nm	66		18	9	<5	<5		nm	<0.5	nm	<0.5	nm	<5	<5		220				
1,2,4-Trichlorobenzene		nm	74	nm	27		47	20	<5	7.3		nm	<0.5	nm	<0.5	nm	<5	<5		770				
Petroleum Hydrocarbons (ug/l)																								
TPPH as Gas		nm	nm	nm	nm		nm	nm	nm	nm		nm	nm	nm	nm	nm	nm	nm						
TEPH as Diesel		nm	nm	nm	nm		nm	nm	nm	nm		nm	nm	nm	nm	nm	nm	nm						
Extract HC as Diesel		nm	nm	nm	nm		nm	nm	nm	nm		nm	nm	nm	nm	nm	nm	nm						
Extract HC as Hydraulic/Motor Oil		nm	nm	nm	nm		nm	nm	nm	nm		nm	nm	nm	nm	nm	nm	nm						
Extract HC as Jet Fuel		nm	nm	nm	nm		nm	nm	nm	nm		nm	nm	nm	nm	nm	nm	nm						
Extract HC as Kerosene		nm	nm	nm	nm		nm	nm	nm	nm		nm	nm	nm	nm	nm	nm	nm						
Mineral Spirits or Stoddard		nm	nm	nm	nm		nm	nm	nm	nm		nm	nm	nm	nm	nm	nm	nm						
Benzene		nm	nm	nm	nm		nm	<0.5	<0.5	<0.5		nm	nm	nm	nm	nm	<0.5	<0.5						
Toluene		nm	nm	nm	nm		nm	<0.5	1.1	<0.5		nm	nm	nm	nm	nm	<0.5	<0.5						
Ethylbenzene		nm	nm	nm	nm		nm	<0.5	<0.5	<0.5		nm	nm	nm	nm	nm	<0.5	<0.5						
Total Xylenes		nm	nm	nm	nm		nm	<0.5	<0.5	<0.5		nm	nm	nm	nm	nm	<0.5	<0.5						

Note: Shading indicates results exceeding ROD Cleanup Criteria

TABLE 6-3
SUMMARY OF GROUNDWATER QUALITY DATA YEAR 2001-2005
ANNUAL MONITORING PROGRAM WELLS
Westinghouse Sunnyvale Superfund Site, Sunnyvale, CA

Well No.	W-48	W-48	W-48	W-48	W-52	W52	W52	W52	W52	W52	W52	W52	W52	W-53	W53	W53	W53	W53	W53	W53	W53	W-54	W-54	W-54
Aquifer	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Date	1/1/03	9/1/04	6/1/05	12/1/05	7/1/00	4/2/01	11/1/01	10/18/99	4/9/02	10/7/02	11/19/03	9/13/04	12/16/05	7/1/00	4/5/01	10/30/01	4/11/02	10/7/02	11/19/03	9/13/04	12/18/05	1/1/03	9/1/04	6/1/05
CONSTITUENT																								
Field Parameters																								
Temperature (C)						18.8	19.8	19.9	18.3	18.7	17.3	23.3	17.6		22.5	19.1	19.6	19.5	18.8	21.3	17.5			
pH						7.1	7.5	7.0	7.26	7.37	7.31	7.79	7.8		6.91	7.20	7.12	7.17	7.11	7.67	8.3			
Conductivity (uS)						972	876	1088	861	878	594	134.8	81.1		950	791	842	812	588	135.8	71.8			
Turbidity (NTU)						3.01	1.1	0.3	1	1.3	0.82	2.6	0.6		0.5	0.5	0.4	0.5	1.62	1.2	0.75			
Polychlorinated Biphenyls (ug/l)																								
PCB-1016						<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1			
PCB-1221						<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1			
PCB-1232						<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1			
PCB-1242						<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1			
PCB-1248						<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1			
PCB-1254						<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1			
PCB-1260						<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.12		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1			
Total PCBs	11.7	1600	25	9.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.12	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	7.1	0.29
Chlorinated Hydrocarbons (ug/l)																								
Chlorobenzene				300		nm	<0.5	<0.5	nm	<0.5	<0.2	<0.5	<0.5		nm	<0.5	nm	<0.5	<0.2	<0.5	<0.5			
1,2-Dichlorobenzene				160		nm	<0.5	<0.5	nm	<0.5	<0.2	<0.5	<0.5		nm	<0.5	nm	<0.5	<0.2	<0.5	<0.5			
1,3-Dichlorobenzene				880		nm	<0.5	<0.5	nm	<0.5	<0.2	<0.5	<0.5		nm	<0.5	nm	<0.5	<0.2	<0.5	<0.5			
1,4-Dichlorobenzene				420		nm	<0.5	<0.5	nm	<0.5	<0.2	<0.5	<0.5		nm	<0.5	nm	<0.5	<0.2	<0.5	<0.5			
1,2,3-Trichlorobenzene				780		nm	<0.5	nm	nm	<0.5	<0.3	<5	<0.5		nm	<0.5	nm	<0.5	<0.3	<0.5	<5			
1,2,4-Trichlorobenzene				5200		nm	<0.5	<2	nm	<0.5	<0.3	<5	<0.5		nm	<0.5	nm	<0.5	<0.3	<0.5	<5			
Petroleum Hydrocarbons (ug/l)																								
TPPH as Gas						nm	nm	nm	nm	nm	nm	nm	nm		nm	nm	nm	nm	nm	nm	nm			
TEPH as Diesel						nm	nm	nm	nm	nm	nm	nm	nm		nm	nm	nm	nm	nm	nm	nm			
Extract HC as Diesel						nm	nm	nm	nm	nm	nm	nm	nm		nm	nm	nm	nm	nm	nm	nm			
Extract HC as Hydraulic/Motor Oil						nm	nm	nm	nm	nm	nm	nm	nm		nm	nm	nm	nm	nm	nm	nm			
Extract HC as Jet Fuel						nm	nm	nm	nm	nm	nm	nm	nm		nm	nm	nm	nm	nm	nm	nm			
Extract HC as Kerosene						nm	nm	nm	nm	nm	nm	nm	nm		nm	nm	nm	nm	nm	nm	nm			
Mineral Spirits or Stoddard						nm	nm	nm	nm	nm	nm	nm	nm		nm	nm	nm	nm	nm	nm	nm			
Benzene						nm	nm	nm	nm	nm	nm	<0.5	<0.5		nm	nm	nm	nm	nm	nm	<0.5			
Toluene						nm	nm	nm	nm	nm	nm	<0.5	<0.5		nm	nm	nm	nm	nm	nm	<0.5			
Ethylbenzene						nm	nm	nm	nm	nm	nm	<0.5	<0.5		nm	nm	nm	nm	nm	nm	<0.5			
Total Xylenes						nm	nm	nm	nm	nm	nm	<0.5	<0.5		nm	nm	nm	nm	nm	nm	<0.5			

Note: Shading indicates results exceeding ROD Cleanup Criteria

TABLE 6-3
SUMMARY OF GROUNDWATER QUALITY DATA YEAR 2001-2005
ANNUAL MONITORING PROGRAM WELLS
Westinghouse Sunnyvale Superfund Site, Sunnyvale, CA

Well No.	W-54	W-55	W55	W55	W55	W55	W55	W55	W55	W-57	W57	W57	W57	W57	W57	W57	W57	W-58	W58	W58	W58	W58	W58	W58
Aquifer	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Date	12/1/05	7/1/00	4/2/01	11/1/01	4/9/02	10/7/02	11/19/03	9/13/04	12/17/05	7/1/00	4/3/01	10/31/01	4/9/02	10/7/02	11/19/03	9/13/04	12/14/05	7/1/00	4/4/01	10/31/01	4/9/02	10/7/02	11/19/03	9/13/04
CONSTITUENT																								
Field Parameters																								
Temperature (C)			18.3	20.8	17.5	18.5	18.6	21.1	17.2		20.7	21.8	20.1	20.3	19.4	22.3	21.4		21	20.4	20.9	20.8	nm	19.8
pH			6.92	7.64	7.02	7.08	6.61	7.59	8.3		6.98	7.37	7.19	7.27	7.19	7.69	7.6		7.03	7.21	7.11	7.19	nm	7.69
Conductivity (uS)			945	813	876	843	556	48.5	66.6		941	783	820	806	560	96.6	84.3		9.39	798	819	801	nm	83.6
Turbidity (NTU)			0.3	1.7	0.29	0.35	0.31	1.8	0.35		2	0.8	1.2	1.7	0.56	0.6	2.8		0.7	0.6	0.3	0.3	nm	0.7
Polychlorinated Biphenyls (ug/l)																								
PCB-1016			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
PCB-1221			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
PCB-1232			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
PCB-1242			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
PCB-1248			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
PCB-1254			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
PCB-1260			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total PCBs	9.7	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorinated Hydrocarbons (ug/l)																								
Chlorobenzene			nm	<0.5	nm	<0.5	<0.2	<0.5	<0.5		nm	<0.5	nm	<0.5	<0.2	<0.5	<0.5		nm	<0.5	nm	<0.5	<0.2	<0.5
1,2-Dichlorobenzene			nm	<0.5	nm	<0.5	<0.2	<0.5	<0.5		nm	<0.5	nm	<0.5	<0.2	<0.5	<0.5		nm	<0.5	nm	<0.5	<0.2	<0.5
1,3-Dichlorobenzene			nm	<0.5	nm	<0.5	<0.2	<0.5	<0.5		nm	<0.5	nm	<0.5	<0.2	<0.5	<0.5		nm	<0.5	nm	<0.5	<0.2	<0.5
1,4-Dichlorobenzene			nm	<0.5	nm	<0.5	<0.2	<0.5	<0.5		nm	<0.5	nm	<0.5	<0.2	<0.5	<0.5		nm	<0.5	nm	<0.5	<0.2	<0.5
1,2,3-Trichlorobenzene			nm	<0.5	nm	<0.5	<0.3	<5	<5		nm	<0.5	nm	<0.5	<0.3	<5	<5		nm	<0.5	nm	<0.5	<0.3	<5
1,2,4-Trichlorobenzene			nm	<0.5	nm	<0.5	<0.3	<5	<5		nm	<0.5	nm	<0.5	<0.3	<5	<5		nm	<0.5	nm	<0.5	<0.3	<5
Petroleum Hydrocarbons (ug/l)																								
TPPH as Gas			nm	nm	nm	nm	nm	nm	nm		nm	nm	nm	nm	nm	nm	nm		nm	nm	nm	nm	nm	nm
TEPH as Diesel			nm	nm	nm	nm	nm	nm	nm		nm	nm	nm	nm	nm	nm	nm		nm	nm	nm	nm	nm	nm
Extract HC as Diesel			nm	nm	nm	nm	nm	nm	nm		nm	nm	nm	nm	nm	nm	nm		nm	nm	nm	nm	nm	nm
Extract HC as Hydraulic/Motor Oil			nm	nm	nm	nm	nm	nm	nm		nm	nm	nm	nm	nm	nm	nm		nm	nm	nm	nm	nm	nm
Extract HC as Jet Fuel			nm	nm	nm	nm	nm	nm	nm		nm	nm	nm	nm	nm	nm	nm		nm	nm	nm	nm	nm	nm
Extract HC as Kerosene			nm	nm	nm	nm	nm	nm	nm		nm	nm	nm	nm	nm	nm	nm		nm	nm	nm	nm	nm	nm
Mineral Spirits or Stoddard			nm	nm	nm	nm	nm	nm	nm		nm	nm	nm	nm	nm	nm	nm		nm	nm	nm	nm	nm	nm
Benzene			nm	nm	nm	nm	nm	<0.5	<0.5		nm	nm	nm	<5	nm	<0.5	<0.5		nm	nm	nm	nm	nm	<0.5
Toluene			nm	nm	nm	nm	nm	<0.5	<0.5		nm	nm	nm	nm	nm	<0.5	<0.5		nm	nm	nm	nm	nm	<0.5
Ethylbenzene			nm	nm	nm	nm	nm	<0.5	<0.5		nm	nm	nm	nm	nm	<0.5	<0.5		nm	nm	nm	nm	nm	<0.5
Total Xylenes			nm	nm	nm	nm	nm	<0.5	<0.5		nm	nm	nm	nm	nm	<0.5	<0.5		nm	nm	nm	nm	nm	<0.5

Note: Shading indicates results exceeding ROD Cleanup Criteria

TABLE 6-3
SUMMARY OF GROUNDWATER QUALITY DATA YEAR 2001-2005
ANNUAL MONITORING PROGRAM WELLS
Westinghouse Sunnyvale Superfund Site, Sunnyvale, CA

Well No.	W58	W-60	W60	W60	W60	W60	W60	W60	W60	W-63	W63	W63	W63	W63	W63	W63	W63	W67	W67	W67	W67	W67	W67	W81
Aquifer	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Date	12/14/05	7/1/00	4/4/01	11/1/01	4/10/02	10/7/02	11/19/03	9/13/04	12/17/05	7/1/00	4/2/01	11/2/01	4/9/02	10/7/02	11/19/03	9/13/04	12/17/05	4/3/01	11/1/01	4/8/02	10/8/02	11/19/03	9/13/04	11/20/03
CONSTITUENT																								
Field Parameters																								
Temperature (C)	18.2		17.1	20.2	17.3	17.4	17.5	22.1	12.8		18.7	17.8	18.4	18.1	18.7	22	18.4	17.1	20.4	21	20.5	18.5	23.6	18.8
pH	7.3		7.18	7.78	7.58	7.46	7.55	7.57	7.9		6.93	7.71	7.16	7.27	7.24	7.69	7.6	7.20	7.40	6.88	7.10	6.67	7.56	7.13
Conductivity (uS)	82.3		945	760	763	843	571	117	78		971	831	865	888	587	119	99.4	528	794	192	297	538	103.1	551
Turbidity (NTU)	0.7		2.3	0.9	1.7	1.9	0.8	2.7	0.4		1.5	4.2	9.9	6.9	0.9	12.7	0.14	1.5	0.7	0.9	1.1	0.35	0.7	0.37
Polychlorinated Biphenyls (ug/l)																								
PCB-1016	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
PCB-1221	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
PCB-1232	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
PCB-1242	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
PCB-1248	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
PCB-1254	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
PCB-1260	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total PCBs	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorinated Hydrocarbons (ug/l)																								
Chlorobenzene	<0.5		nm	<0.5	nm	<0.5	<0.2	<0.5	<0.5		nm	<0.5	nm	<0.5	<0.2	<0.5	<0.5	nm	<0.5	nm	<0.5	<0.2	<0.5	<0.2
1,2-Dichlorobenzene	<0.5		nm	<0.5	nm	<0.5	<0.2	<0.5	<0.5		nm	<0.5	nm	<0.5	<0.2	<0.5	<0.5	nm	<0.5	nm	<0.5	<0.2	<0.5	<0.2
1,3-Dichlorobenzene	<0.5		nm	<0.5	nm	<0.5	<0.2	<0.5	<0.5		nm	<0.5	nm	<0.5	<0.2	<0.5	<0.5	nm	<0.5	nm	<0.5	<0.2	<0.5	<0.2
1,4-Dichlorobenzene	<0.5		nm	<0.5	nm	<0.5	<0.2	<0.5	<0.5		nm	<0.5	nm	<0.5	<0.2	<0.5	<0.5	nm	<0.5	nm	<0.5	<0.2	<0.5	<0.2
1,2,3-Trichlorobenzene	<5		nm	<0.5	nm	<0.5	<0.3	<5	<5		nm	<0.5	nm	<0.5	<0.3	<5	<5	nm	<0.5	nm	<0.5	<0.3	<5	<0.3
1,2,4-Trichlorobenzene	<5		nm	<0.5	nm	<0.5	<0.3	<5	<5		nm	<0.5	nm	<0.5	<0.3	<5	<5	nm	<0.5	nm	<0.5	<0.3	<5	<0.3
Petroleum Hydrocarbons (ug/l)																								
TPPH as Gas	nm		nm	nm	nm	nm	nm	nm	nm		nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
TEPH as Diesel	nm		nm	nm	nm	nm	nm	nm	nm		nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
Extract HC as Diesel	nm		nm	nm	nm	nm	nm	nm	nm		nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
Extract HC as Hydraulic/Motor Oil	nm		nm	nm	nm	nm	nm	nm	nm		nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
Extract HC as Jet Fuel	nm		nm	nm	nm	nm	nm	nm	nm		nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
Extract HC as Kerosene	nm		nm	nm	nm	nm	nm	nm	nm		nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
Mineral Spirits or Stoddard	nm		nm	nm	nm	nm	nm	nm	nm		nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
Benzene	<0.5		nm	nm	nm	nm	nm	<0.5	<0.5		nm	nm	nm	nm	nm	<0.5	<0.5	nm	nm	nm	nm	nm	<0.5	nm
Toluene	<0.5		nm	nm	nm	nm	nm	<0.5	<0.5		nm	nm	nm	nm	nm	<0.5	<0.5	nm	nm	nm	nm	nm	<0.5	nm
Ethylbenzene	<0.5		nm	nm	nm	nm	nm	<0.5	<0.5		nm	nm	nm	nm	nm	<0.5	<0.5	nm	nm	nm	nm	nm	<0.5	nm
Total Xylenes	<0.5		nm	nm	nm	nm	nm	<0.5	<0.5		nm	nm	nm	nm	nm	<0.5	<0.5	nm	nm	nm	nm	nm	<0.5	nm

Note: Shading indicates results
exceeding ROD Cleanup Criteria

TABLE 6-3
SUMMARY OF GROUNDWATER QUALITY DATA YEAR 2001-2005
ANNUAL MONITORING PROGRAM WELLS
Westinghouse Sunnyvale Superfund Site, Sunnyvale, CA

Well No.	W81	W81	W83	W83	W84	W84	W85	W85	W-86	W86	W86	W86	W86	W86	W86	W86	W-88	W88	W88	W88	W88	W88	W88	W88
Aquifer	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Date	9/13/04	12/16/05	4/3/01	4/8/02	4/3/01	4/8/02	4/3/01	4/8/02	7/1/00	4/5/01	10/30/01	4/11/02	10/7/02	11/19/03	9/13/04	12/18/05	7/1/00	4/5/01	10/30/01	4/1/02	10/7/02	11/19/03	9/13/04	12/18/05
CONSTITUENT																								
Field Parameters																								
Temperature (C)	20.7	17.4	16.4	16.8	20.4	20.2	18	18.6		17.2	18.8	18.8	18.8	18.1	20.3	15.6		18.7	19.1	19.4	19.4	17.9	19.2	17.6
pH	7.66	7.9	7.21	7.36	6.82	6.76	7.21	7.26		7.16	7.03	7.39	7.19	7.29	7.78	8.1		6.94	7.07	7.12	6.98	7.05	7.62	8.0
Conductivity (uS)	105.5	79.9	409	167	990	741	535	415		902	722	797	744	573	167	84.1		1055	798	861	858	596	154.6	66.7
Turbidity (NTU)	0.2	1.15	0.4	1.3	10.7	115	1.8	13		1.8	1.02	0.3	1.3	2.46	3.5	1.37		4.9	1.4	4.3	3.3	1.98	1.1	0.3
Polychlorinated Biphenyls (ug/l)																								
PCB-1016	<0.1	<0.1	nm	<0.1	nm	<0.1	nm	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
PCB-1221	<0.1	<0.1	nm	<0.1	nm	<0.1	nm	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
PCB-1232	<0.1	<0.1	nm	<0.1	nm	<0.1	nm	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
PCB-1242	<0.1	<0.1	nm	<0.1	nm	<0.1	nm	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
PCB-1248	<0.1	<0.1	nm	<0.1	nm	<0.1	nm	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
PCB-1254	<0.1	<0.1	nm	<0.1	nm	<0.1	nm	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
PCB-1260	<0.1	<0.1	nm	<0.1	nm	<0.1	nm	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total PCBs	<0.1	<0.1	nm	<0.1	nm	<0.1	nm	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorinated Hydrocarbons (ug/l)																								
Chlorobenzene	<0.5	<0.5	nm	nm	nm	nm	nm	nm		nm	<0.5	nm	<0.5	<0.2	<0.5	<0.5		nm	<0.5	nm	<0.5	<0.2	<0.5	<0.5
1,2-Dichlorobenzene	<0.5	<0.5	nm	nm	nm	nm	nm	nm		nm	<0.5	nm	<0.5	<0.2	<0.5	<0.5		nm	<0.5	nm	<0.5	<0.2	<0.5	<0.5
1,3-Dichlorobenzene	<0.5	<0.5	nm	nm	nm	nm	nm	nm		nm	<0.5	nm	<0.5	<0.2	<0.5	<0.5		nm	<0.5	nm	<0.5	<0.2	<0.5	<0.5
1,4-Dichlorobenzene	<0.5	<0.5	nm	nm	nm	nm	nm	nm		nm	<0.5	nm	<0.5	<0.2	<0.5	<0.5		nm	<0.5	nm	<0.5	<0.2	<0.5	<0.5
1,2,3-Trichlorobenzene	<5	<5	nm	nm	nm	nm	nm	nm		nm	<0.5	nm	<0.5	<0.3	<5	<5		nm	<0.5	nm	7.7	2.5J	<5	<5
1,2,4-Trichlorobenzene	<5	<5	nm	nm	nm	nm	nm	nm		nm	<0.5	nm	<0.5	<0.3	<5	<5		nm	6.6	nm	<0.5	5.7	<5	<5
Petroleum Hydrocarbons (ug/l)																								
TPPH as Gas	nm	nm	nm	nm	nm	nm	nm	nm		nm	nm	nm	nm	nm	nm	nm		nm	nm	nm	nm	nm	nm	nm
TEPH as Diesel	nm	nm	<50	97	<50	<50	<50	<50		nm	nm	nm	nm	nm	nm	nm		nm	nm	nm	nm	nm	nm	nm
Extract HC as Diesel	nm	nm	nm	<250	nm	<250	nm	<250		nm	nm	nm	nm	nm	nm	nm		nm	nm	nm	nm	nm	nm	nm
Extract HC as Hydraulic/Motor Oil	nm	nm	<250	<250	<250	<250	<250	<250		nm	nm	nm	nm	nm	nm	nm		nm	nm	nm	nm	nm	nm	nm
Extract HC as Jet Fuel	nm	nm	<50	<50	<50	<50	<50	<50		nm	nm	nm	nm	nm	nm	nm		nm	nm	nm	nm	nm	nm	nm
Extract HC as Kerosene	nm	nm	<50	<50	<50	<50	<50	<50		nm	nm	nm	nm	nm	nm	nm		nm	nm	nm	nm	nm	nm	nm
Mineral Spirits or Stoddard	nm	nm	<50	<50	<50	<50	<50	<50		nm	nm	nm	nm	nm	nm	nm		nm	nm	nm	nm	nm	nm	nm
Benzene	<0.5	<0.5	nm	nm	nm	nm	nm	nm		nm	nm	nm	nm	nm	<0.5	<0.5		nm	nm	nm	nm	nm	<0.5	<0.5
Toluene	<0.5	<0.5	nm	nm	nm	nm	nm	nm		nm	nm	nm	nm	nm	<0.5	<0.5		nm	nm	nm	nm	nm	<0.5	<0.5
Ethylbenzene	<0.5	<0.5	nm	nm	nm	nm	nm	nm		nm	nm	nm	nm	nm	<0.5	<0.5		nm	nm	nm	nm	nm	<0.5	<0.5
Total Xylenes	<0.5	<0.5	nm	nm	nm	nm	nm	nm		nm	nm	nm	nm	nm	<0.5	<0.5		nm	nm	nm	nm	nm	<0.5	<0.5

Note: Shading indicates results exceeding ROD Cleanup Criteria

TABLE 6-3
SUMMARY OF GROUNDWATER QUALITY DATA YEAR 2001-2005
ANNUAL MONITORING PROGRAM WELLS
Westinghouse Sunnyvale Superfund Site, Sunnyvale, CA

Well No.	W-25	W25	W25	W25	W25	W25	W25	W25	W61	W61	W61	W61	W61	W-62	W62	W62	W62	W62	W62	W62	W62	W-69	W69	W69
Aquifer	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1
Date	7/1/00	4/4/01	10/29/01	4/9/02	10/7/02	11/19/03	9/13/04	12/17/05	4/4/01	11/1/01	4/10/02	10/7/02	9/13/04	7/1/00	4/5/01	10/30/01	4/11/02	10/7/02	11/19/03	9/13/04	12/17/05	7/1/00	4/4/01	10/31/01
CONSTITUENT																								
Field Parameters																								
Temperature (C)		18.3	19	17.6	18.1	18.7	20.7	17.7	20.8	21.1	20.3	20.3	22.4		21.1	19.4	19.1	19.5	18.3	21.6	16.9		18.5	18.6
pH		6.91	6.85	7.00	6.99	7.39	7.63	7.4	7.73	7.72	7.52	7.74	7.96		7.00	7.04	7.14	7.23	7.05	7.60	7.6		7.33	7.65
Conductivity (uS)		998	749	828	8.56	557	42.1	88.9	965	804	801	867	124.5		920	782	845	790	598	153.1	90.4		676	634
Turbidity (NTU)		0.5	0.6	0.4	0.35	0.17	1.4	0.22	2.4	1.2	0.8	0.9	0.8		0.5	0.8	0.4	0.7	1.52	0.7	0.3		0.6	0.8
Polychlorinated Biphenyls (ug/l)																								
PCB-1016		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	<0.1
PCB-1221		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	<0.1
PCB-1232		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	<0.1
PCB-1242		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	<0.1
PCB-1248		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	<0.1
PCB-1254		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	<0.1
PCB-1260		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	<0.1
Total PCBs	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorinated Hydrocarbons (ug/l)																								
Chlorobenzene		nm	<0.5	nm	<0.5	<0.2	<0.5	<0.5	nm	<0.5	nm	<50	<0.5		nm	<0.5	nm	<0.5	<0.2	<0.5	<0.5		nm	<0.5
1,2-Dichlorobenzene		nm	<0.5	nm	<0.5	<0.2	<0.5	<0.5	nm	<0.5	nm	<50	<0.5		nm	<0.5	nm	<0.5	<0.2	<0.5	<0.5		nm	<0.5
1,3-Dichlorobenzene		nm	<0.5	nm	<0.5	<0.2	<0.5	<0.5	nm	<0.5	nm	<50	<0.5		nm	<0.5	nm	<0.5	<0.2	<0.5	<0.5		nm	<0.5
1,4-Dichlorobenzene		nm	<0.5	nm	<0.5	<0.2	<0.5	<0.5	nm	<0.5	nm	<50	<0.5		nm	<0.5	nm	<0.5	<0.2	<0.5	<0.5		nm	<0.5
1,2,3-Trichlorobenzene		nm	<0.5	nm	<0.5	<0.3	<5	<5	nm	<0.5	nm	<50	<5		nm	<0.5	nm	<0.5	<0.3	<5	<5		nm	<0.5
1,2,4-Trichlorobenzene		nm	<0.5	nm	<0.5	<0.3	<5	<5	nm	<0.5	nm	<50	<5		nm	<0.5	nm	<0.5	<0.3	<5	<5		nm	<0.5
Petroleum Hydrocarbons (ug/l)																								
TPPH as Gas		nm	nm	nm	nm	nm	nm	nm	1700	nm	2100	2200	nm		nm	nm	nm	nm	nm	nm	nm		nm	nm
TEPH as Diesel		nm	nm	nm	nm	nm	nm	nm	<50	430	590	nm	nm		nm	nm	nm	nm	nm	nm	nm		nm	nm
Extract HC as Diesel		nm	nm	nm	nm	nm	nm	nm	nm	nm	<250	nm	nm		nm	nm	nm	nm	nm	nm	nm		nm	nm
Extract HC as Hydraulic/Motor Oil		nm	nm	nm	nm	nm	nm	nm	<250	<250	<250	nm	nm		nm	nm	nm	nm	nm	nm	nm		nm	nm
Extract HC as Jet Fuel		nm	nm	nm	nm	nm	nm	nm	<50	<50	<50	nm	nm		nm	nm	nm	nm	nm	nm	nm		nm	nm
Extract HC as Kerosene		nm	nm	nm	nm	nm	nm	nm	<50	<50	<50	nm	nm		nm	nm	nm	nm	nm	nm	nm		nm	nm
Mineral Spirits or Stoddard		nm	nm	nm	nm	nm	nm	nm	1100	<50	<50	nm	nm		nm	nm	nm	nm	nm	nm	nm		nm	nm
Benzene		nm	nm	nm	nm	nm	<0.5	<0.5	<0.5	<5	<0.5	<12.5	<0.5		nm	nm	nm	nm	nm	<0.5	<0.5		nm	nm
Toluene		nm	nm	nm	nm	nm	<0.5	<0.5	<0.5	<5	1.8	<12.5	<0.5		nm	nm	nm	nm	nm	<0.5	<0.5		nm	nm
Ethylbenzene		nm	nm	nm	nm	nm	<0.5	<0.5	<0.5	<5	1.6	<12.5	<0.5		nm	nm	nm	nm	nm	<0.5	<0.5		nm	nm
Total Xylenes		nm	nm	nm	nm	nm	<0.5	<0.5	<0.5	<5	<1	<25	<0.5		nm	nm	nm	nm	nm	<0.5	<0.5		nm	nm

Note: Shading indicates results exceeding ROD Cleanup Criteria

TABLE 6-3
SUMMARY OF GROUNDWATER QUALITY DATA YEAR 2001-2005
ANNUAL MONITORING PROGRAM WELLS
Westinghouse Sunnyvale Superfund Site, Sunnyvale, CA

Well No.	W69	W69	W69	W69	W69	W70	W70	W70	W70	W70	W71	W71	W71	W71	W71	W72	W72	W72	W72	W72	W73	W73	W73	W73
Aquifer	B1	B1	B2	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B2	B2
Date	4/10/02	10/7/02	11/19/03	9/13/04	12/18/05	4/3/01	10/31/01	4/10/02	10/7/02	9/13/04	4/3/01	10/31/01	4/10/02	10/7/02	9/13/04	4/3/01	10/31/01	4/9/02	4/9/02	9/13/04	4/3/01	10/31/01	4/10/02	10/10/02
CONSTITUENT																								
Field Parameters																								
Temperature (C)	18.8	18.5	18.1	19.8	15.7	17.6	18.7	21.5	19.8	23.5	19	20	19.2	18.9	21.1	17.2	20.6	19.9	nm	20.6	21.3	19.4	20.1	19.5
pH	7.99	7.83	7.44	8.00	8.4	7.40	7.56	7.61	7.47	8.34	7.19	7.38	7.45	7.43	7.82	6.93	7.25	7.17	nm	7.67	7.67	7.42	7.83	7.69
Conductivity (uS)	674	702	473	55.9	100.4	672	612	616	7.01	99.3	851	715	745	8.31	122.1	968	782	830	nm	120.6	754	669	682	708
Turbidity (NTU)	0.55	0.7	0.52	2.1	0.25	0.4	1.8	0.3	0.4	0.4	2.3	3	0.3	0.3	1.1	0.7	1.5	0.5	nm	0.3	0.3	1.1	0.6	0.8
Polychlorinated Biphenyls (ug/l)																								
PCB-1016	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	nm	<0.1	<0.1	<0.1	<0.1	<0.1
PCB-1221	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	nm	<0.1	<0.1	<0.1	<0.1	<0.1
PCB-1232	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	nm	<0.1	<0.1	<0.1	<0.1	<0.1
PCB-1242	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	nm	<0.1	<0.1	<0.1	<0.1	<0.1
PCB-1248	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	nm	<0.1	<0.1	<0.1	<0.1	<0.1
PCB-1254	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	nm	<0.1	<0.1	<0.1	<0.1	<0.1
PCB-1260	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	nm	<0.1	<0.1	<0.1	<0.1	<0.1
Total PCBs	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	nm	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorinated Hydrocarbons (ug/l)																								
Chlorobenzene	nm	<0.5	<0.2	<0.5	<0.5	nm	<0.5	nm	<0.5	<0.5	nm	<0.5	nm	<0.5	<0.5	nm	<0.5	nm	<0.5	<0.5	nm	<0.5	nm	<0.5
1,2-Dichlorobenzene	nm	<0.5	<0.2	<0.5	<0.5	nm	<0.5	nm	<0.5	<0.5	nm	<0.5	nm	<0.5	<0.5	nm	<0.5	nm	<0.5	<0.5	nm	<0.5	nm	<0.5
1,3-Dichlorobenzene	nm	<0.5	<0.2	<0.5	<0.5	nm	<0.5	nm	<0.5	<0.5	nm	<0.5	nm	<0.5	<0.5	nm	<0.5	nm	<0.5	<0.5	nm	<0.5	nm	<0.5
1,4-Dichlorobenzene	nm	<0.5	<0.2	<0.5	<0.5	nm	<0.5	nm	<0.5	<0.5	nm	<0.5	nm	<0.5	<0.5	nm	<0.5	nm	<0.5	<0.5	nm	<0.5	nm	<0.5
1,2,3-Trichlorobenzene	nm	<0.5	<0.3	<5	<5	nm	<0.5	nm	<0.5	<5	nm	<0.5	nm	<0.5	<5	nm	<0.5	nm	<0.5	<5	nm	<0.5	nm	<0.5
1,2,4-Trichlorobenzene	nm	<0.5	<0.3	<5	<5	nm	<0.5	nm	<0.5	<5	nm	<0.5	nm	<0.5	<5	nm	<0.5	nm	<0.5	<5	nm	<0.5	nm	<0.5
Petroleum Hydrocarbons (ug/l)																								
TPPH as Gas	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
TEPH as Diesel	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
Extract HC as Diesel	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
Extract HC as Hydraulic/Motor Oil	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
Extract HC as Jet Fuel	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
Extract HC as Kerosene	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
Mineral Spirits or Stoddard	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
Benzene	nm	nm	nm	<0.5	<0.5	nm	nm	nm	nm	<0.5	nm	nm	nm	nm	<0.5	nm	nm	nm	nm	<0.5	nm	nm	nm	nm
Toluene	nm	nm	nm	<0.5	<0.5	nm	nm	nm	nm	<0.5	nm	nm	nm	nm	<0.5	nm	nm	nm	nm	<0.5	nm	nm	nm	nm
Ethylbenzene	nm	nm	nm	<0.5	<0.5	nm	nm	nm	nm	<0.5	nm	nm	nm	nm	<0.5	nm	nm	nm	nm	<0.5	nm	nm	nm	nm
Total Xylenes	nm	nm	nm	<0.5	<0.5	nm	nm	nm	nm	<0.5	nm	nm	nm	nm	<0.5	nm	nm	nm	nm	<0.5	nm	nm	nm	nm

Note: Shading indicates results exceeding ROD Cleanup Criteria

TABLE 6-3
SUMMARY OF GROUNDWATER QUALITY DATA YEAR 2001-2005
ANNUAL MONITORING PROGRAM WELLS
Westinghouse Sunnyvale Superfund Site, Sunnyvale, CA

Well No.	W73	W74	W74	W74	W74	Well A	Well A	Well A	Well A	Well B	Well B	Well B	Well B	Well C	Well C	Well C
Aquifer	B2	B2	B2	B2	B2	A	A	A	A	A	A	A	A		A	A
Date	9/13/04	4/4/01	10/31/01	4/9/02	10/7/02	1/1/03	9/1/04	6/1/05	12/1/05	1/1/03	9/1/04	6/1/05	12/1/05	1/1/03	9/1/04	12/1/05
CONSTITUENT																
Field Parameters																
Temperature (C)	22.7	18.7	18	19.4	18.9											
pH	9.84	7.20	7.85	7.42	7.42											
Conductivity (uS)	555	778	674	682	74.82											
Turbidity (NTU)	0.5	0.2	0.3	0.35	0.6											
Polychlorinated Biphenyls (ug/l)																
PCB-1016	<0.1	<0.1	<0.1	<0.1	<0.1											
PCB-1221	<0.1	<0.1	<0.1	<0.1	<0.1											
PCB-1232	<0.1	<0.1	<0.1	<0.1	<0.1											
PCB-1242	<0.1	<0.1	<0.1	<0.1	<0.1											
PCB-1248	<0.1	<0.1	<0.1	<0.1	<0.1											
PCB-1254	<0.1	<0.1	<0.1	<0.1	<0.1											
PCB-1260	<0.1	<0.1	<0.1	<0.1	<0.1											
Total PCBs	<0.1	<0.1	<0.1	<0.1	<0.1	6.0	0.1	<0.1	0.4	0.3	<0.1	0.15	0.42	25.0	2000	7600
Chlorinated Hydrocarbons (ug/l)																
Chlorobenzene	<0.5	nm	<0.5	nm	<0.5				<0.5				<0.5			91
1,2-Dichlorobenzene	<0.5	nm	<0.5	nm	<0.5				0.75				1.1			67
1,3-Dichlorobenzene	<0.5	nm	<0.5	nm	<0.5				0.78				<0.5			350
1,4-Dichlorobenzene	<0.5	nm	<0.5	nm	<0.5				0.69				<0.5			430
1,2,3-Trichlorobenzene	<5	nm	<0.5	nm	<0.5				11				6.8			<5
1,2,4-Trichlorobenzene	<5	nm	<0.5	nm	<0.5				32				14			2400
Petroleum Hydrocarbons (ug/l)																
TPPH as Gas	nm	nm	nm	nm	nm											
TEPH as Diesel	nm	nm	nm	nm	nm											
Extract HC as Diesel	nm	nm	nm	nm	nm											
Extract HC as Hydraulic/Motor Oil	nm	nm	nm	nm	nm											
Extract HC as Jet Fuel	nm	nm	nm	nm	nm											
Extract HC as Kerosene	nm	nm	nm	nm	nm											
Mineral Spirits or Stoddard	nm	nm	nm	nm	nm											
Benzene	<0.5	nm	nm	nm	nm											
Toluene	<0.5	nm	nm	nm	nm											
Ethylbenzene	<0.5	nm	nm	nm	nm											
Total Xylenes	<0.5	nm	nm	nm	nm											

Note: Shading indicates results exceeding ROD Cleanup Criteria

SECTION 7.0

Technical Assessment

This section evaluates the protectiveness of the implemented remedy at the Site based on data and information presented in the previous section. The technical assessment was conducted by examining three questions, as listed in the following subsections.

7.1 Question A: Is the Remedy Functioning as Intended by the Decision Documents?

This subsection discusses how the Site is operating and functioning in relation to its intended objectives, O&M implementation, optimization opportunities, any early indicators of potential issues, and institutional control implementation.

The review of documents, ARARs, risk assumptions, and the Site inspection indicates that the remedy is functioning as intended.

- The asphalt capping in place achieves the remedial objectives by eliminating the potential of erosion and exposure of contaminated; however, additional asphalt capping may be necessary.
- The groundwater extraction and treatment system is operating as intended, and is preventing off-site migration of contaminants.

There are opportunities for system optimization observed during this review. Optimization of extraction well locations and pump rates and monitoring well locations have the potential for system optimization. Continual inspection monitoring should be conducted to assess any surface cracks or any potential erosion of the asphalt capping.

7.2 Question B: Are the Assumptions Used at the Time of Remedy Selection Still Valid?

The exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of remedy selection are generally unchanged. A technical memorandum related to risk assessment and toxicology analysis is included in Appendix F and is summarized as follows:

Changes in Site Conditions

No major changes in the Site conditions that might affect the exposure pathways were identified. The property is fenced and access is limited.

Changes in Exposure Pathways

No new human health routes of exposure were identified that would challenge the accuracy of the protectiveness of the remedy. No new contaminants have been identified.

Changes in Toxicity Values

There have been a number of changes to the toxicity values for specific constituents of concern in groundwater at the Site since the ROD was signed in 1991. However, these changes do not affect the protectiveness of the remedy since the RAOs were based on ARARs and not on risk.

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

No other information has surfaced that would call into question the protectiveness of the remedy at the Site.

SECTION 8.0

Issues and Recommendations

This section describes issues and recommendations identified for the Westinghouse Site during this five-year review.

Issue

Surface cracks are visibly evident on the capping system at the Site. Although this is currently not affecting the protectiveness of the remedy, protectiveness of the remedy may be in question in the future.

Recommendation

Continual cap inspections are required on a routine basis to assess any further propagation of surface cracks and any potential erosion from the capping system. Areas that show signs of deterioration and a potential for exposure of the underlying material are to be repaired in a timely manner.

Issue

The site inspection showed areas of the site near Building 67 that were previously subject to PCB removal remain unpaved. This may present a potential exposure pathway to PCBs in shallow soils.

Recommendation

This area should be paved and regularly inspected to ensure the asphalt cap is maintained.

Issue

The 1991 ROD required institutional controls be implemented. Institutional controls, including deed restrictions to prevent well construction and or/excavation in source areas that remain contaminated, are not yet in place.

Recommendation

The deed restriction should be completed for the site. Appropriate institutional control monitoring and reporting requirements will be included in the land use covenant. Areas of the Site where PCBs remain at levels above those suitable for direct contact should be capped with pavement. The cap should be regularly inspected and repaired on an as-needed basis.

TABLE 8-1
Issues, Recommendations, and Follow-Up Actions
Second Five-Year Review Report, Westinghouse Superfund Site, Santa Clara County, California

Issue	Recommendations and Follow-Up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness (Y/N)	
					Current	Future
Visible surface cracks	Continue routine cap inspections to identify further degradation and to allow for implementation of repairs.	PRP	USEPA	Ongoing.	N	Y
Area near building 67 unpaved	This area should be paved and the cap routinely inspected.	PRP	USEPA	March 2007	N	Y
ICs not implemented	Put deed restrictions in place to prevent well construction and or/excavation in source areas that remain contaminated.	PRP/DTSC	USEPA	December 2007	N	Y

SECTION 9.0

Protectiveness Statement

The remedy at the Westinghouse Superfund Site currently protects human health and the environment because routine cap inspections are conducted, groundwater extraction and treatment continues, and access controls are in place. However, in order for the remedy to be protective in the long-term, the area near Building 67 should be paved, and deed restrictions should be completed for the Site.

SECTION 10.0

Next 5-Year Review

The next 5-year review for the Westinghouse Site will be conducted in 2011, 5 years from the date of this review.

SECTION 11.0

References

ALTA Geosciences, Inc., 2004. *Quarterly Groundwater Monitoring Report – November 2003 Data, Westinghouse Sunnyvale Superfund Site, Sunnyvale, California*. January.

ALTA Geosciences, Inc., 2005. *Annual Groundwater Monitoring Report – September 2004 Event, Westinghouse Sunnyvale Superfund Site, Sunnyvale, California*. February.

ALTA Geosciences, Inc., 2005. *Groundwater Sampling Report – Dissolved PCBs >0.5 µg/L Perchlorate and Volatile Organic Compounds, September 2004 Extended Sampling Event, Westinghouse Sunnyvale Superfund Site, Sunnyvale, California*. April.

ALTA Geosciences, Inc., 2006. *Groundwater Monitoring Report – December 2005 Event, Westinghouse Sunnyvale Superfund Site, Sunnyvale, California*. February.

GeoSyntec Consultants / ALTA Geosciences, Inc., 2006. *Five-Year Groundwater Status Report, Westinghouse Sunnyvale Superfund Site, Sunnyvale, California*. May.

USEPA. 1991. *Record of Decision: Westinghouse Superfund Site, Sunnyvale, California, EPA ID CAD981436363*. September.

USEPA. 1997. *Explanation of Significant Differences: Westinghouse Superfund Site, Sunnyvale, California, EPA ID CAD981436363*. February.

USEPA. 2001a. *Five-Year Review Report for Westinghouse Superfund Site, Sunnyvale, Santa Clara County, California*. September.

USEPA. 2001b. *Comprehensive Five-Year Review Guidance*. June.

APPENDIX A

Institutional Controls Review

TECHNICAL MEMORANDUM
SECOND FIVE-YEAR REVIEW FOR THE
WESTINGHOUSE (SUNNYVALE) SUPERFUND SITE

INSTITUTIONAL CONTROLS REVIEW
PREPARED BY: GARY J. RILEY, P.E.
REMEDIAL PROJECT MANAGER, U.S. EPA
July 7, 2006

INTRODUCTION

This memorandum is prepared as a supporting document to the second Five-Year Review for the Westinghouse (Sunnyvale) Site. The Environmental Protection Agency (EPA) is conducting the institutional controls portion of the Five Year Review.

The Westinghouse Superfund Site (site) is located at 401 E. Hendy Avenue in Sunnyvale, California, Santa Clara County. The site is bounded by California Avenue to the north, Hendy Avenue to the south, N. Sunnyvale Avenue to the west, and N. Fair Oaks Avenue to the east. The site includes 75 acres of land, and the entire site is referred to as Operable Unit 01 (OU-01). The site currently manufactures steam generators, marine propulsion systems, and missile-launching systems for the U.S. Government. The area around the site has been developed for light industrial, commercial, and residential uses. A building (Building 21) used for transformer manufacturing exists onsite. In the mid-1950s, Westinghouse Electric (Sunnyvale Plant) manufactured transformers containing both mineral oil and Inerteen as thermal-insulating fluids. Inerteen was the Westinghouse trade name for a dense, non-aqueous phase liquid (DNAPL) consisting of approximately 60 percent polychlorinated biphenyls (PCBs) and 40 percent trichlorobenzene (TCB). The storage and use of Inerteen and mineral oil resulted in contamination of soil and two shallow aquifers beneath the site. In addition, general handling practices and the onsite use of Inerteen as a weed killer resulted in the release of PCBs into soil. In 1981, Westinghouse conducted site investigations. In 1984 and 1985, Westinghouse, under state orders, removed PCB-contaminated soil along fence lines and railroad spurs. During these investigations, evidence of fuel hydrocarbon leakage to soil and ground water was discovered coming from two underground fuel tanks. The 1991 ROD addressed remediation of the contaminated shallow ground water and soil, which pose the primary risks at the site. The primary contaminants of concern affecting the soil and ground water were identified in the ROD as PCBs, solvents, and fuel compounds.

The Westinghouse site is a CERCLA Superfund Site, and was placed on the National Priorities List (NPL) June 10, 1986. The United States Environmental Protection Agency (USEPA) assumed lead agency status December 18, 1987.

The following are the decision documents for the site:

- ROD, issued October 16, 1991.
- ESD, issued February 14, 1997.

ROD REQUIREMENTS FOR INSTITUTIONAL CONTROLS

The remedy selected in the 1991 ROD requires the following institutional controls:

- Institutional controls, such as land use restrictions, to prevent well construction (for water supply purposes) in source areas that remain contaminated. Excavation below the eight feet where soil has been removed will be restricted. Restrictions will also preclude excavation, other than temporary subsurface work in the upper eight feet and will require complete restoration of any disturbed fill or the asphalt cap once any such temporary work was completed.

INSTITUTIONAL CONTROL STATUS

Institutional controls are not yet in place. Access controls are in place and effectively prevent exposures. The entire plant is fenced and the only access to affected areas is via guarded gates. The fence is currently inood condition. Unauthorized persons are not allowed in the plant. The asphalt cap is in good condition effectively prevents exposure to contaminated soils. The groundwater treatment system fenced off from the rest of the plant and kept locked when not undergoing maintenance inspection. Northrop Grumman is working with DTSC to impose institutional controls through appropriate deed restrictions on the Site as required by the ROD.

DEED RESTRICTION SUMMARY

Institutional controls are non-engineered mechanisms used to implement land use restrictions to prevent human exposures to hazardous materials, hazardous wastes or constituents, or hazardous substances remaining on the property; to ensure the integrity of the remedial action; and to allow EPA (the CERCLA lead agency) and DTSC and their authorized agents, employees and contractors access to the property to maintain and ensure the effectiveness of the remedial action, as necessary. Since hazardous materials, hazardous wastes or constituents, or hazardous substances will remain at the property at levels which are not suitable for unrestricted use of the land, land use restrictions are required and will be implemented through a Land Use Covenant/Environmental Restriction pursuant to California Civil Code section 1471 and 22 CCR section 67391.1. It shall be entered into by the owner(s) with DTSC, naming EPA as a third-party beneficiary, and recorded in the County records. The land use covenant will carry restrictions such as are necessary to ensure the protectiveness of and prevent damage to or interference with the remedial action. Additionally, monitoring, inspections, and reporting will be conducted to ensure compliance with the land use restrictions. The Covenant shall run with the land and bind all successive owners and occupants.

EVALUATION OF INSTITUTIONAL CONTROLS

EPA’s site inspection did not show evidence of well construction for water supply purposes in source areas that remain contaminated. The site remains in use for industrial purposes. Portions of the site where PCB-contaminated soils remain are generally capped with asphalt pavement. However, a few areas noted in the Site Inspection section of this report are unpaved.

RECOMMENDATIONS

The deed restriction should be completed for the site. Appropriate institutional control monitoring and reporting requirements will be included in the land use covenant. Areas of the site where PCBs remain at levels above those suitable for direct contact should be capped with pavement. The cap should be regularly inspected and repaired on an as-needed basis.

APPENDIX B

Documents Reviewed

APPENDIX B

Documents Reviewed

ALTA Geosciences, Inc., 2004. *Quarterly Groundwater Monitoring Report – November 2003 Data, Westinghouse Sunnyvale Superfund Site, Sunnyvale, California*. January.

ALTA Geosciences, Inc., 2005. *Annual Groundwater Monitoring Report – September 2004 Event, Westinghouse Sunnyvale Superfund Site, Sunnyvale, California*. February.

ALTA Geosciences, Inc., 2005. *Groundwater Sampling Report – Dissolved PCBs >0.5 ug/L Perchlorate and Volatile Organic Compounds, September 2004 Extended Sampling Event, Westinghouse Sunnyvale Superfund Site, Sunnyvale, California*. April.

ALTA Geosciences, Inc., 2006. *Groundwater Monitoring Report – December 2005 Event, Westinghouse Sunnyvale Superfund Site, Sunnyvale, California*. February.

GeoSyntec Consultants / ALTA Geosciences, Inc., 2006. *Five-Year Groundwater Status Report, Westinghouse Sunnyvale Superfund Site, Sunnyvale, California*. May.

USEPA. 1991. *Record of Decision: Westinghouse Superfund Site, Sunnyvale, California, EPA ID CAD981436363*. September.

USEPA. 1997. *Explanation of Significant Differences: Westinghouse Superfund Site, Sunnyvale, California, EPA ID CAD981436363*. February.

USEPA. 2001a. *Five-Year Review Report for Westinghouse Superfund Site, Sunnyvale, Santa Clara County, California*. September.

USEPA. 2001b. *Comprehensive Five-Year Review Guidance*. June.

APPENDIX C

Community Involvement

Laurin Beckman
(copy)

PROOF OF PUBLICATION

San Jose Mercury News

750 RIDDER PARK DRIVE
SAN JOSE, CALIFORNIA 95190

IN THE
City of San Jose
STATE OF CALIFORNIA
COUNTY OF SANTA CLARA

California Newspaper Service Bureau
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Los Angeles, CA 90060
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STATE OF CALIFORNIA)
) SS.
COUNTY OF SANTA CLARA)

The undersigned, being first duly sworn, deposes and says: That at all times hereinafter mentioned affiant was and still is a citizen of the United States, over the age of eighteen years, and not a party to nor interested in the above entitled proceedings; and was at and during all said times and still is the principal clerk of the printer and publisher of the San Jose Mercury News, a newspaper of general circulation printed and published daily in the city of San Jose in said County of Santa Clara, State of California, that said San Jose Mercury News is and was at all times herein mentioned a newspaper of general circulation as that term is defined by Sections 6000 and following, of the Government Code of the State of California, and, as provided by said sections, is published for the dissemination of local or telegraphic news and intelligence of a general character, having a bona fide subscription list of paying subscribers,and is not devoted to the interests or published for the entertainment or instruction of a particular class, professional, trade, calling, race or denomination, or for the entertainment and instruction of any number of such classes, professionals, trades, callings, races or denominations; that at all times said newspaper has been established, printed and published in the said city of San Jose in said County and State at regular intervals for more than one year preceding the first publication of the notice herein mentioned; that said notice was set in type not smaller than nonpareil and was preceded with words printed in black-face type not smaller than nonpareil, describing and expressing in general terms, the purport and character of the notice intended to be given; that the clipping of which is annexed is a true printed copy, was published and printed in said newspaper on the following dates, to-wit:

July 3,2006

Dated at San Jose, California
this 3rd day of July,2006
I declare under penalty of perjury that the foregoing is true and correct.

Signed.....
Principal clerk of the printer and publisher of the San Jose Mercury News.

PUBLIC NOTICE
THE UNITED STATES ENVIRONMENTAL PROTECTI
AGENCY BEGINS FIVE-YEAR REVIEW OF CLEANUP
THE WESTINGHOUSE SUPERFUND SITE

The United States Environmental Protection Agency (U.S. EPA) is conducting a five-year review former Westinghouse Electric Corporation (Sunnyvale Plant), a Superfund site in Sunnyvale, CA. review will summarize cleanup activities that have taken place over the last five years and will eva whether the selected remedy remains protective of human health and the environment. Accord Superfund law, if a cleanup action takes more than five years to complete, the cleanup will be revi every five years until the cleanup is complete. This is the Sunnyvale Plant's second five-year revie

The 75-acre Sunnyvale Plant was formerly used to manufacture electrical transformers. It is cur owned and operated by Northrop Grumman and is now used to manufacture steam generators, m propulsion systems, and missile launching systems for the Department of Defense. Ground contamination is believed to have resulted from a leaking polychlorinated biphenyls (PCB) storage and from localized spills. Most of the contaminated shallow soil areas on site have been renov have been paved over.

Approximately 710,000 people live within three miles of the site. The nearest residence is lo adjacent to the site. Approximately 300,000 people depend on groundwater within three miles of th for their drinking water supply. There are no private wells within the vicinity of the site; however, municipal wells are located within 1/4 mile of the site.

During the review process, U.S. EPA will study information about the site and conduct a site inspe The methods, findings and conclusions of the review will be documented in the five-year review re statement of protectiveness will be provided to explain whether the cleanup continues to be effective recommend improvements if necessary. Upon completion, a copy of the final report will be placed i information repositories listed below and a notice will be placed in the local newspapers.

The U.S. EPA invites the community to learn more about this review process and get involved. One to get involved is to call Lauren Berkman, Community Involvement Coordinator or Gary Riley, Rem Project Manager toll free at (800) 231-3075 to let us know how you feel about the cleanup condu so far. You can obtain further site information from EPA's website: http://yosemite.epa.gov/r9/sf overview.nsf and click on the link for the Westinghouse Electric Corporation.

INFORMATION REPOSITORY - The U.S. EPA maintains information repositories that contain the Administrative Record, project reports and documents, fact sheets and other reference materials. two locations are:

Sunnyvale Public Library
665 West Olive Avenue
Sunnyvale, CA 94088
(408) 730-7300
Hours:
Monday through Thursday:
10 a.m. to 9 p.m.
Friday and Saturday:
10 a.m. to 6 p.m.
Sunday:
12 noon to 6 p.m.

Superfund Records Center
SFD-7C
95 Hawthorne Street, Room 403
San Francisco, CA 94105
(415) 536-2000
Hours:
Monday to Friday
8 am to 5 pm

APPENDIX D

ARARs Evaluation

Westinghouse Superfund Site 5-Year Review

Applicable or Relevant and Appropriate Requirements (ARARs) Evaluation

PREPARED FOR: Caroline Ziegler, CH2M HILL

PREPARED BY: Andrew Redmond, CH2M HILL

COPIES:

DATE: July 6, 2006

This technical memorandum presents an evaluation of the Applicable or Relevant and Appropriate Requirements (ARARs) at the Westinghouse Superfund Site (site).

Purpose of ARARs Review

The purpose of an ARARs review is to determine whether laws, regulations, or guidance promulgated since approval of site decision documents alter the remedy's protectiveness of human health and the environment.

ARARs are established in the site decision documents: Record of Decisions (RODs). Changes to ARARs, where necessary, can be memorialized in ROD Amendments or Explanation of Significant Differences (ESDs).

The preamble to the National Contingency Plan (NCP) states that remedy selection decisions are not to be reopened unless new or modified requirements call into question the protectiveness of the selected remedy (55 CFR 8757, March 8, 1990). This is interpreted to mean generally that ARARs are frozen at the time of remedy approval, unless updated by additional decision documents.

ARARs Background

Section 121(d) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) requires that remedial actions implemented at CERCLA sites are carried out in compliance with any Federal or more stringent State environmental standards, requirements, criteria, or limitations that are determined to be ARARs.

CERCLA response actions are exempted by law from the requirement to obtain Federal, State or local permits related to any activities conducted completely on-site. However, this does not remove the requirement to meet the substantive provisions of permitting regulations that are ARARs.

Applicable. Applicable requirements are cleanup standards, criteria, or limitations promulgated under federal or state law that specifically address the situation at a CERCLA

site. A requirement is applicable if the jurisdictional prerequisites of the environmental standard show a direct correspondence when objectively compared with the conditions at the site.

Relevant and appropriate. If a requirement is not legally applicable, the requirement is evaluated to determine whether it is relevant and appropriate. Relevant and appropriate requirements are those cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under federal or state law that, while not applicable, address problems or situations sufficiently similar to the circumstances of the proposed response action and are well suited to the conditions of the site. The criteria for determining relevance and appropriateness are listed in 40 CFR 300.400(g) (2).

To be considered (TBC). TBC criteria are requirements that may not meet the definition of an ARAR, but still may be useful in determining whether to take action at a site or to what degree action is necessary. TBC criteria, as defined in 40 CFR 300.400(g) (3), are non-promulgated advisories or guidance issued by federal or state government that are not legally binding but may provide useful information or recommended procedures for remedial action. Although TBC criteria do not have the status of ARARs, they are considered together with ARARs to establish the required level of cleanup for protection of human health and the environment.

Pursuant to USEPA guidance, ARARs generally are classified into three categories: chemical-specific, location-specific, and action-specific requirements. These categories of ARARs are identified below:

- **Action-specific ARARs** are requirements that apply to specific actions that may be associated with site remediation. Action-specific ARARs often define acceptable handling, treatment, and disposal procedures for hazardous substances. These requirements are triggered by the particular remedial activities that are selected to accomplish a remedy. Examples of action-specific ARARs include requirements applicable to landfill closure, wastewater discharge, hazardous waste disposal, and emissions of air pollutants.

- **Chemical-specific ARARs** include those laws and regulations that regulate the release to the environment of materials possessing certain chemical or physical characteristics or containing specified chemical compounds. These requirements generally set health- or risk-based concentration limits or discharge limits for specific hazardous substances.

- **Location-specific ARARs** are those requirements that relate to the geographical or physical location of the site, rather than the nature of the contaminants or the proposed site remedial actions. These requirements may limit the placement of remedial action, and may impose additional constraints on the cleanup action. For example, location-specific ARARs may refer to activities in the vicinity of wetlands, floodplains, endangered species habitat, and areas of historical or cultural significance.

Westinghouse Background

The Westinghouse Superfund Site (site) is located at 401 E. Hendy Avenue in Sunnyvale, California, Santa Clara County (Figure 1, Location). The site is bounded by California Avenue to the north, Hendy Avenue to the south, N. Sunnyvale Avenue to the west, and N. Fair Oaks Avenue to the east. The site includes 75 acres of land, and the entire site is referred to as Operable Unit 01 (OU-01).

The site currently manufactures steam generators, marine propulsion systems, and missile-launching systems for the U.S. Government. The area around the site has been developed for light industrial, commercial, and residential uses. A building (Building 21) used for transformer manufacturing exists onsite. In the mid-1950s, Westinghouse Electric (Sunnyvale Plant) manufactured transformers containing both mineral oil and Intereen as thermal-insulating fluids. Intereen was the Westinghouse trade name for a dense, non-aqueous phase liquid (DNAPL) consisting of approximately 60 percent polychlorinated biphenyls (PCBs) and 40 percent trichlorobenzene (TCB). The storage and use of Inerteen and mineral oil resulted in contamination of soil and two shallow aquifers beneath the site. In addition, general handling practices and the onsite use of Inerteen as a weed killer resulted in the release of PCBs into soil.

In 1981, Westinghouse conducted site investigations. In 1984 and 1985, Westinghouse, under state orders, removed PCB-contaminated soil along fence lines and railroad spurs. During these investigations, evidence of fuel hydrocarbon leakage to soil and ground water was discovered coming from two underground fuel tanks. The 1991 ROD addressed remediation of the contaminated shallow ground water and soil, which pose the primary risks at the site. The primary contaminants of concern affecting the soil and ground water were identified in the ROD as PCBs, solvents, and fuel compounds.

The Westinghouse site is a CERCLA Superfund Site, and was placed on the National Priorities List (NPL) June 10, 1986. The United States Environmental Protection Agency (USEPA) assumed lead agency status December 18, 1987.

The following are the site decision documents for the site:

- ROD, issued October 16, 1991.
- ESD, issued February 14, 1997.

Selected Remedies

The following remedies were selected in the 1991 ROD:

- Permanent containment, by means of groundwater extraction, of contaminated groundwater in the source area where DNAPLs are detected.
- Treatment of the extracted groundwater to meet all applicable or relevant and appropriate requirements ("ARARs") identified in the ROD for this discharge, prior to discharge to the onsite storm sewer, unless an evaluation indicates that an alternative "end-use" for the treated effluent (such as use for facility process water) can be

practicably implemented.

- Removal of contaminated soil containing greater than 25 parts per million PCB to a depth of eight feet.
- Filling the excavated areas with clean soil and installing an asphalt cap.
- Offsite incineration of excavated soils at a federally permitted facility.
- Institutional controls, such as land use restrictions, to prevent well construction (for water supply purposes) in source areas that remain contaminated. Excavation below the eight feet where soil has been removed will be restricted. Restrictions will also preclude excavation, other than temporary subsurface work in the upper eight feet and will require complete restoration of any disturbed fill or the asphalt cap once any such temporary work was completed.
- A requirement that EPA receive notification of any future intention to cease operations in, abandon, demolish, or perform construction in (including partial demolition or construction) Building 21.
- Permanent and ongoing monitoring of the affected aquifers to verify that the extraction system is effective in capturing and reducing the chemical concentrations and extent of the aqueous phase plume, and containing the aqueous phase contamination in the DNAPL source area.

The 1997 ESD established the following remedy change:

- A change in the disposal method for soils contaminated with PCBs at less than 500 parts per million (ppm) was permitted; the change was from incineration to landfill disposal for soils removed from the North Parking Lot area only, where contamination is thought to have been a result of using PCB's as a weed killer. The landfill chosen for disposal was required to meet the requirements for Toxic Substances Control Act (TSCA) Chemical Waste Landfills as described in 40 CFR Section 761.75, and was required to be in compliance with the procedures for planning and implementing off-site response actions described in 40 CFR Section 300.440. All soils found during excavation with PCB concentrations greater than 500 ppm were to be incinerated as required in the 1991 ROD.

Remediation Goals

The 1991 ROD established the remediation goals at the site. The goals are to restore contaminated groundwater, using extraction, to the following standards:

- The proposed Maximum Contaminant Level (proposed MCL) for 1,2,4-Trichlorobenzene (1,2,4-TCB), 0.005 milligrams per liter (mg/L). This concentration was established as the 1,2,4-TCB state Maximum Contaminant Level (MCL) June 12, 2003.
- The California Department of Health Services (CDHS) Notification Level (known as Action Level through 2004) for 1,3-Dichlorobenzene (1,3-DCB), archived advisory level 0.6 mg/L. The status of 1,3-DCB as a CDHS is now “archived.” The archived advisory levels may still be used by water systems. If an archived chemical is detected in

drinking water above its advisory level, the requirements and recommendations are the same as for chemicals with Notification Levels.

- Chemical-specific ground water cleanup goals are based on state or federal MCLs in drinking water, including benzene 0.001 mg/kg (state); TCE 0.005 mg/kg (federal); toluene 0.15 mg/kg (state); and xylenes 1.75 mg/kg (state).
- Federal and state MCLs, are applicable with the exception of the standard for PCB (MCL 0.0005 mg/L) in the onsite source area where DNAPL occurs.
- In the 1991 ROD, the EPA invoked a waiver of the requirement to meet the MCL for PCB-contaminated ground water in the source area where DNAPL is detected, based upon **technical impracticability** of remediation to the MCL for PCB. The EPA determined that it is technically impracticable to meet the federal MCL for PCB in the DNAPL source area, and that this source area must be permanently contained. The ROD established that soil containing greater than 25 parts per million (ppm) PCB would be excavated to a depth of 8 feet, based on EPA guidance for PCB remediation at CERCLA sites with restricted access. The 25 ppm PCB soil cleanup standard was established as TBC criterion.

Westinghouse Site ARARs Review

The following three tables list the ARARs established in the above-referenced decision documents, summarize the requirement for each ARAR, cite the regulatory basis for each ARAR, state the evaluated status of each ARAR, and comment on regulatory changes for each ARAR where applicable.

Table 1 contains action–specific ARARs, Table 2 contains chemical–specific ARARs, and Table 3 contains location-specific ARARs. The tables provide the applicable requirements and citation for each established ARAR; and describe whether any updates have occurred for each ARAR since the previous 5-Year Review. Current versions of the California Code of Regulations (CCR) and the Code of Federal Regulations (CFR) were consulted (via the internet or in hardcopy) to review pertinent updates of laws, regulations, or guidance.

TABLE 1
Action-Specific ARARs

Action	Media	Requirement	Citation	Origin	ARARs Determination	Comments
Groundwater Extraction and Treatment	Groundwater	Groundwater treatment system standards for discharges to storm sewers	CWA, 40 CFR; Porter-Cologne, CWC, Division 7, Section 13000	ROD	Applicable	Substantive requirements of the federal CWA standards are ARARs for discharges of treated groundwater to storm sewers.
Groundwater Extraction and Treatment	Groundwater	Storage and treatment requirements for spent carbon.	TSCA, USC Title 15, Subpart D	ROD	Applicable	Applicable if granular activated carbon is used in groundwater treatment.
Groundwater Extraction and Treatment	Groundwater	Storage and treatment requirements for spent filtration membranes.	TSCA, USC Title 15, Subpart D	ROD	Applicable	Applicable if filtration membranes are used in groundwater treatment.
Groundwater Extraction and Treatment	Groundwater	Control of contaminant air emissions during groundwater extraction and treatment, including air stripper or ultraviolet-chemical oxidation methods.	BAAQMD Regulation 8, Rule 47	ROD	Applicable	Applicable for control of contaminant air emissions during groundwater treatment activities.
Soil Excavation	Soil	Control of contaminant air emissions during excavation.	BAAQMD Regulation 8, Rule 40	ROD	Applicable	Applicable during excavation activities involving contaminated soil.
Soil Treatment, Storage and Disposal	Soil	Treatment, storage and disposal requirements for excavated soil contaminated with PCB.	TSCA, USC Title 15, Subpart D	ROD	Applicable	Applicable during excavation activities involving soil contaminated with PCB.

Notes:

It was noted in the ROD that RCRA is not applicable as an ARAR for treatment, storage, or disposal of Westinghouse soil because PCB is not a RCRA waste, and no RCRA wastes are mixed with PCB-contaminated soil. In addition, the ROD determined that RCRA is not relevant and appropriate as an ARAR.

CCR = California Code of Regulations

CFR = Code of Federal Regulations

COCs = Contaminants of Concern

CWA = Clean Water Act

CWC = California Water Code

DTSC = California Department of Toxic Substances Control

EPA = U. S. Environmental Protection Agency

ppm = parts per million

RCRA = Resource Conservation and Recovery Act

TSCA = Toxic Substances Control Act

USC = United States Code

TABLE 2
Chemical-Specific ARARs

Contaminant	Media	Requirement	Citation	Origin	ARARs Determination	Comments
Contaminants in public drinking water supply systems	Groundwater	MCLs are applicable to drinking water at the tap pursuant to the SDWA.	NCP; SDWA; 40 CFR Section 300.430(e)(2)(i)(B)	ROD	Applicable	MCLs are applicable as aquifer standards for groundwater that is or may be used as drinking water.
Contaminants in public drinking water supply systems	Groundwater	MCLs are applicable to drinking water at the tap pursuant to the SDWA.	SDWA; 40 CFR 141 Subparts B, G & I	ROD	Applicable	The concentration of contaminants in public drinking water supply systems must not exceed national primary drinking water MCLs, applied at the tap.
Contaminants in public drinking water supply systems	Groundwater	Secondary Drinking Water Regulations pursuant to the SDWA.	SDWA; 40 CFR 143	ROD	TBC	Secondary Drinking Water Regulations control contaminants in drinking water that primarily affect the aesthetic qualities relating to the public acceptance of drinking water. The regulations are not federally enforceable but are intended as guidelines for the states.
PCB	Groundwater	The requirement under the CWA for groundwater in the source area where DNAPL is detected to be cleaned to the MCLs was waived for PCBs based on Technical Impracticability.	CERCLA 121(d)(4)(c)	ROD	Applicable	EPA determined that it is technically impracticable to meet the federal MCL for PCB in the DNAPL source area, and that this source area must be permanently contained.
PCB	Soil	Soil containing greater than 25 ppm PCB is required to be excavated to a depth of 8 feet.	*Guidance on Remedial Actions for Superfund Sites With PCB Contamination*, OSWER Directive Number 9355.4-01, August 1990.	ROD	TBC	Soil containing greater than 25 ppm PCB is required to be excavated to a depth of 8 feet, based on EPA guidance for PCB remediation at CERCLA sites with restricted access. The 25 ppm PCB soil cleanup standard was established as TBC criteria in the ROD.
PCB	Soil	Treatment, storage and disposal requirements for excavated soil contaminated with PCB.	TSCA, USC Title 15, Subpart D	ROD	Applicable	Applicable during excavation activities involving soil contaminated with PCB.

TABLE 2
Chemical-Specific ARARs

Contaminant	Media	Requirement	Citation	Origin	ARARs Determination	Comments
PCBs	Soil	Storage requirements for hazardous wastes containing greater than 50 ppm PCB.	CCR Title 26, Sections 2266371 and 2266508	ROD	Applicable	Applicable for storage of hazardous wastes containing greater than 50 ppm PCB.
1,3-Dichlorobenzene	Groundwater	The CDHS Notification Level (known as Action Level through 2004) for 1,3-Dichlorobenzene is 0.6 mg/L. The status of 1,3-Dichlorobenzene as a CDHS Notification Level is now "archived."	CCR, Title 22; H&S Code; *CDHS Notification Levels*	ROD	TBC	The ROD presented the 0.6 mg/L 1,3-Dichlorobenzene CDHS Notification Level (known as Action Level through 2004) as a TBC groundwater cleanup standard. The status of 1,3-Dichlorobenzene as a CDHS is now "archived," and remains TBC criteria.
1,2,4-Trichlorobenzene	Groundwater	The proposed MCL for 1,2,4-Trichlorobenzene, 0.005 mg/L as stated in the ROD, was established as the state MCL for 1,2,4-Trichlorobenzene on June 12, 2003.	NCP; SDWA; 40 CFR Section 300.430(e)(2)(i)(B)	ROD	Applicable (stated as TBC in ROD)	0.005 mg/L 1,2,4-Trichlorobenzene was stated as TBC criteria in the ROD. This is now applicable because 0.005 mg/L concentration was established as the state MCL for 1,2,4- Trichlorobenzene on June 12, 2003.

Notes:

CCR = California Code of Regulations

CDHS = California Department of Health Services

CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act

CFR = Code of Federal Regulations

CWA = Clean Water Act

DNAPL = Dense, non-aqueous phase liquid

EPA = U. S. Environmental Protection Agency

H&S Code = California Health and Safety Code

mg/L = milligrams per liter

NCP = National Contingency Plan

OSWER = EPA Office of Solid Waste and Emergency Response

Porter-Cologne = California Porter Cologne Water Quality Control Act

ppm = parts per million

SDWA = Safe Drinking Water Act

TSCA = Toxic Substances Control Act

USC = United States Code

TABLE 3
Location-Specific ARARs

Location	Requirement	Citation	Origin	ARARs Determination	Comments
Property within SFBRWQCB	Maintain high quality of waters within California according to the SFBRWQCB Basin Plan.	CWA; Porter-Cologne; SFBRWQCB Basin Plan Resolution 6816	ROD	Applicable	Maintenance of the high quality of waters within California is an ARAR established in the ROD.
Critical habitat upon which endangered species or threatened species depend	Action to conserve endangered species or threatened species, including consultation with the Department of the Interior for a determination of endangered species or threatened species.	ESA (16 USC 1531 et seq.); 50 CFR Parts 200 and 402.	ROD	Applicable	No endangered or threatened species have been identified at the site. If such species are identified at the site, this requirement will be applicable.
Property that contains hazardous waste	Regulates placement of deed restrictions on property. Institutional controls, such as land use restrictions, are to be applied to the DNAPL source area to prevent water supply well construction.	H&S Code, Div. 20, Chapter 6.5, Section 25232(a)(1) and (2); and CCR, Title 22, Div. 4, Chapter 30, Section 66001	ROD	Applicable	Substantive restrictions are an ARAR; however, the procedural requirements related to notice, hearing, and mechanisms for implementing deed restrictions do not fall within an ARAR based on CERCLA Section 121, 42 USC 9621.
Property that contains hazardous waste	Requires all land use covenants to be signed by the DTSC and the landowner and be recorded in the county where the land is located.	Title 22, CCR, Chapter 39, Section 67391.1	This is a new regulation	Relevant and appropriate	New regulation effective April 19, 2003.

Notes:

CCR = California Code of Regulations

CDFG = California Department of Fish and Game

CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act

CFR = Code of Federal Regulations

CWA = Clean Water Act

DNAPL = Dense, non-aqueous phase liquid

ESA = Endangered Species Act of 1973

H&S Code = California Health and Safety Code

Porter-Cologne = California Porter Cologne Water Quality Control Act

SFBRWQCB = San Francisco Bay Regional Water Quality Control Board

USC = United States Code

Westinghouse Site ARARs Summary

The basis for ARARs are laws and regulations applicable to the site location, remedy actions, and contaminants of concern.

The site is located is located at 401 E. Hendy Avenue in Sunnyvale, California, Santa Clara County (Figure 1, Location). The site is 75 acres, and the entire site is referred to as Operable

Unit 01 (OU-01).

The Westinghouse site is a CERCLA Superfund Site, and was placed on the NPL in 1986. CERCLA response actions are exempted by law from the requirement to obtain Federal, State or local permits related to any activities conducted completely on-site. However, this does not remove the requirement to meet the substantive provisions of permitting regulations that are ARARs. Westinghouse site ARARs (as established in the ROD and ESD) were evaluated and detailed in Tables 1 through 3.

In the 1991 ROD, the EPA invoked a waiver of the requirement to meet the MCL for PCB-contaminated ground water in the source area where DNAPL is detected, based upon **technical impracticability** of remediation to the MCL for PCB. The EPA determined that it is technically impracticable to meet the federal MCL for PCB in the DNAPL source area, and that this source area must be permanently contained. The ROD established that soil containing greater than 25 parts per million (ppm) PCB would be excavated to a depth of 8 feet, based on EPA guidance for PCB remediation at CERCLA sites with restricted access. The 25 ppm PCB soil cleanup standard was established as TBC criterion.

It was noted in the ROD that the Resource Conservation and Recovery Act (RCRA) is not applicable as an ARAR for treatment, storage, or disposal of Westinghouse soil because PCB is not a RCRA waste, and no RCRA wastes are mixed with PCB-contaminated soil. In addition, the ROD determined that RCRA is not relevant and appropriate as an ARAR.

Action-specific ARARs. There were no changes to existing action-specific ARARs as stated in the ROD.

Chemical-specific ARARs. There was one change to the existing chemical-specific ARARs as stated in the ROD. The proposed MCL for 1,2,4-Trichlorobenzene (0.005 mg/L) was stated in the ROD as TBC criteria. The 0.005 mg/L proposed MCL for 1,2,4-Trichlorobenzene was established as the state MCL for 1,2,4- Trichlorobenzene on June 12, 2003; therefore, 0.005 mg/L 1,2,4-Trichlorobenzene is now an applicable ARAR as a groundwater cleanup standard.

Location-specific ARARs. There was addition to the existing location-specific ARARs as stated in the ROD. A new regulation (Title 22, CCR, Chapter 39, Section 67391.1) effective April 19, 2003 requires all land use covenants to be signed by the DTSC, and the landowner and be recorded in the county where the land is located; therefore this signatory requirement is relevant and appropriate as an ARAR for property that contains hazardous waste.

APPENDIX E

Site Inspection Checklist

APPENDIX E

Five-Year Review Site Inspection Checklist

TABLE E-1
Site Inspection Team Roster
Site Inspection – May 22, 2006
Second Five-Year Review Report for Westinghouse Superfund Site, Sunnyvale, California

Name	Title	Affiliation
Gary Riley, P.E.	Remedial Project Manager	EPA Region 9
Ned Black, Ph.D.	Ecological Risk Assessor	EPA Region 9
Scott Eidem	Environmental Engineer	NGMS
Robert Sebastio	Operator	Westinghouse - Sunnyvale

Five-Year Review Site Inspection Checklist
Westinghouse Superfund Site

I. SITE INFORMATION	
Site name: Westinghouse	**Date of inspection:** May 22, 2006
Location and Region: Sunnyvale, California - Region 9	**EPA ID:** CAD001864081
Agency, office, or company leading the five-year review: EPA Region 9	**Weather/temperature:** Partly cloudy, light winds / Low to mid 60's °F

Remedy Includes: (Check all that apply)

- ☒ Landfill cover / containment
- ☒ Access controls
- ☒ Institutional controls
- ☒ Groundwater pump and treatment
- ☒ Surface water collection and treatment
- ☐ Other (explain): Dredging Operation along Lauritzen Channel and Parr Canal
- ☐ Monitored natural attenuation
- ☒ Groundwater containment
- ☐ Vertical barrier walls

Attachments: ☒ Inspection team roster attached ☒ Site map attached

II. INTERVIEWS ☒ Applicable ☐ N/A

1. **O&M site manager** Scott Eidem, NGMS (Name) Environmental Engineer (Title) 5/22/06 (Date)

   Interviewed: at site Phone No: 408-735-2389

   Problems, suggestions: Biofouling in Well D, with more frequent pump and well maintenance required. When flow drops, well is chemically treated. Now quarterly well maintenance treatment with acid, polymer compounds: Nuwell 110 and 310. No exceedance from IWTP discharge to City POTW. City collects bimonthly samples and NGMS collects splits. No problems reported.

2. **O&M staff** Robert Sebastio (Name) Operator (Title) 5/22/06 (Date)

   Interviewed: at site Phone No: _____

   Problems, suggestions: _____

3. **Local regulatory authorities and responsible 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 _____
Contact _____ _____ _____ _____
Name Title Date Phone No.
Problems, suggestions: _____
_____

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone No.
Problems, suggestions: _____
_____

4. **Other interviews** (optional)

III. ONSITE DOCUMENTS AND RECORDS VERIFIED ☒Applicable ☐N/A

1. **O&M Documents**

O&M manual	☒Readily available	☒Up to date	☐N/A
As-built drawings (in O&M manual)	☒Readily available	☐Up to date	☐N/A
Maintenance logs	☒Readily available	☒Up to date	☐N/A

Remarks: Maint. log current, shows filter changes, well pump status. Reviewed weekly pH calibration log for GETS. Log is up to date.

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: NGC Emergency Response Manual, Section 22. Groundwater Treatment System Alarms, effective 7/26/00.

3. **O&M and OSHA Training Records** ☒Readily available ☒Up to date ☐N/A

Remarks: For operator

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, City of Richmond POTW	☐Readily available	☐Up to date	☒N/A
Other permits: _____	☐Readily available	☐Up to date	☒N/A

Remarks: Weekly Haz Waste storage inspection records reviewed through April 2006. All ok.

5.	**Gas Generation Records** Remarks: _____	☐Readily available	☐Up to date	☒N/A
6.	**Settlement Monument Records** Remarks: _____	☐Readily available	☐Up to date	☒N/A
7.	**Groundwater Monitoring Records** Remarks: In Bldg 62 files	☒Readily available	☒Up to date	☐N/A
8.	**Lechate Extraction Records** Remarks: _____	☐Readily available	☐Up to date	☒N/A
9.	**Discharge Compliance Records**			
	Air	☐Readily available	☐Up to date	☒N/A
	Water (Effluent)	☒Readily available	☒Up to date	☐N/A
	Remarks: Through April 2006			
10.	**Daily Access/Security Logs** Remarks: Kept at 24-hour security desk	☒Readily available	☐Up to date	☐N/A

V. ACCESS AND INSTITUTIONAL CONTROLS		☒Applicable	☐N/A
A. Fencing		☒Applicable	☐N/A
1.	**Fencing**	☐Location shown on site map ☒Gates secured	☐N/A
	Remarks: _____		
B. Other Access Restrictions		☐Applicable	☐N/A
1.	**Signs and other security measures**	☐Location shown on site map	☐N/A
	Remarks: _____		

C. Institutional Controls (ICs) ☒Applicable ☐N/A

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 ☐N/A

_____

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

Remarks: Institutional controls were evaluated and documented separately from the site inspection. The findings of the institutional controls evaluation can be found in a technical memorandum attached to the five-year review report.

D. General ☒Applicable ☐N/A

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

Remarks: _____

2. **Land use changes onsite** ☐Location shown on site map ☒N/A

Remarks: None noted.

3. **Land use changes offsite** ☐Location shown on site map ☐N/A

Remarks: Portion of N Parking Lot sold. Now a commercial 2 story building operated by Valin Corp 555 E. California Ave.

VI. GENERAL SITE CONDITIONS

Other Site Conditions

Remarks:_____

North Parking Lot

Remarks: Portion sold to Valin Corp 555 E. California Ave. Current use is a 2 story commercial building signed "VALIN CORP". No residential/school use noted.

VI. ASPHALT COVERS

A. Westinghouse Property – Reservoir 2 Area

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
   Length < 2 feet Widths approximately 1 inch Depths unknown

   Remarks: Cracks sealed, few cracks observed. One crack near well C., < 1 foot long. Few small cracks with weeds (<5 total cracks)

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) ☐ N/A
   Remarks _____

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 Area / 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 _____

B. Westinghouse Property – Main Site

9. **Settlement** (Low spots) ☐ Location shown on site map ☒ Settlement not evident
Areal extent _____ Depth _____
Remarks _____

10. **Cracks** ☒ Location shown on site map ☐ Cracking not evident
Length varying Widths varies Depths unknown

Remarks: Many areas of degraded asphalt and cracks as noted on attached site map of PCB removal area.

11. **Erosion** ☐ Location shown on site map ☐ Erosion not evident
Areal extent _____ Depth _____
Remarks: _____

12. **Holes** ☐ Location shown on site map ☒ Holes not evident
Areal extent _____ Depth _____
Remarks: Areas along Fair Oaks Fenceline, Reservoir 1 unpaved

13. **Vegetative Cover** ☐ Grass ☐ Cover properly established ☐ No signs of stress
☐ Trees/Shrubs (indicate size and locations on a diagram) ☐ N/A
Remarks _____

14. **Alternative Cover (armored rock, concrete, etc.)** ☒ N/A
Remarks _____

15. **Bulges** ☐ Location shown on site map ☒ Bulges not evident
Areal extent _____ Height _____
Remarks _____

16. **Wet Area / Water Damage** ☐ Wet areas/water damage not evident

Wet areas	☒ Location shown on site map	☐ Areal extent < 5 feet diameter puddles
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 Few puddles near Reservoir 1 due to previous day's rain (0.16" reported)

C. Westinghouse Property – Building 21

17. **Settlement** (Low spots) ☐ Location shown on site map ☒ Settlement not evident
Areal extent _____ Depth _____
Remarks Very thick concrete floor, at least 6" up to 12"

18. **Cracks** ☐ Location shown on site map ☒ Cracking not evident
Length _____ Widths _____ Depths _____

Remarks: _____

19. **Erosion** ☐ Location shown on site map ☐ Erosion not evident
Areal extent _____ Depth _____
Remarks _____

20. **Holes** ☐ Location shown on site map ☒ Holes not evident
Areal extent _____ Depth _____
Remarks _____

21. **Vegetative Cover** ☐ Grass ☐ Cover properly established ☐ No signs of stress
☐ Trees/Shrubs (indicate size and locations on a diagram) ☐ N/A
Remarks _____

22. **Alternative Cover (armored rock, concrete, etc.)** ☒ N/A
Remarks _____

23. **Bulges** ☐ Location shown on site map ☒ Bulges not evident
Areal extent _____ Height _____
Remarks _____

24. **Wet Area / 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 _____

D. Westinghouse Property - Building 67 (nearby)

25. **Settlement** (Low spots) ☐ Location shown on site map ☒ Settlement not evident
Areal extent _____ Depth _____
Remarks Some pot holes in unpaved area but not due to "settlement" per se

26. **Cracks** ☐ Location shown on site map ☐ Cracking not evident
Length < 2 feet Widths approximately 1 inch Depths unknown

Remarks: Area is generally unpaved/gravel, possibly some degraded asphalt

27. **Erosion** ☐ Location shown on site map ☐ Erosion not evident
Areal extent _____ Depth _____
Remarks _____

28. **Holes** ☐ Location shown on site map ☒ Holes not evident
Areal extent _____ Depth _____
Remarks Unpaved area but no holes evident

29. **Vegetative Cover** ☐ Grass ☐ Cover properly established ☐ No signs of stress
☐ Trees/Shrubs (indicate size and locations on a diagram) ☐ N/A
Remarks _____

30. **Alternative Cover (armored rock, concrete, etc.)** ☒ N/A
Remarks Unpaved

31. **Bulges** ☐ Location shown on site map ☒ Bulges not evident
Areal extent _____ Height _____
Remarks Unpaved area

32. **Wet Area / 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: Minor puddles east of Building 62, Storm drain runs from east of 62 toward N. Sediment runoff is possible from unpaved areas.

E. Building 21

Describe ventilation system: Breezeway is open, large roll up doors almost always up. Rooftop vents along length of building.

Remarks: Floor is very thick. Building used for storage of Government Property. Mezzanine office area, own HVAC for this area.
Inspection of some areas difficult due to stored equipment.

F. Treatment System ☒ Applicable ☐ N/A

1. **Treatment Train** (Check components that apply)

☐ Metals removal ☐ Oil/water separation ☐ Bioremediation
☐ Air stripping ☒ Carbon adsorbers
☒ Filters 10µ, 2 in parallel, system controller alternates before GAC, 2 in series after GAC
☐ Additive (e.g., chelation agent, flocculent)_____
☐ Others _____
☒ Good condition ☐ Needs Maintenance
☒ Sampling ports properly marked and functional not labeled
☐ Sampling/maintenance log displayed and up to date in office
☒ Equipment properly identified
☒ Quantity of groundwater treated annually See five year summary report
☐ Quantity of surface water treated annually N/A

Remarks: Waste accumulation properly drummed, labeled, secondary containment. Flow directions labeled on piping.

2. **Electrical Enclosures and Panels** (properly rated and functional)

☐ N/A ☒ Good condition ☐ Needs Maintenance

Remarks: Control system in good repair

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: Piped to POTW outfall by City of Sunnyvale

5. **Treatment Building(s) – support building**

☐N/A ☒Good condition (esp. roof and doorways)
☐Needs repair ☐Chemicals and equipment properly stored

Remarks: Roof-only outdoor enclosure. Chain link fence around GETS.

6. **Monitoring Wells** (pump and treatment remedy)

☒Properly secured/locked ☐Functioning ☒Routinely sampled ☒Good condition
☒All required wells locations ☐Needs Maintenance ☐N/A

Remarks: Hex wrench to open; in secure area of facility. Pump control panels accessible.

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.).

- Groundwater remedy is effective and functioning as designed.
- A few areas where PCB soil excavation was done remain unpaved (see below).

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.

- O&M of Groundwater treatment system and wells is good.
- Some asphalt areas are degraded. Cover is excellent in reservoir areas. Reservoir 1 and Building 67 area are unpaved and only a soil cover is over the PCB remediation areas.
- There is generally a 1-ft width soil strip along fencelines where PCB cleanup occurred.

C. Early Indicators of Potential Remedy Failure

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.

- No major problems observed. Areas that are unpaved over PCB removal areas could become a hazard to human exposure or sediment runoff.
- ICs are not in place. Sold portion of N. Parking lot does not have ICs to prevent residential use.
- Main site ICs are in process; current use remains industrial and access is well controlled.

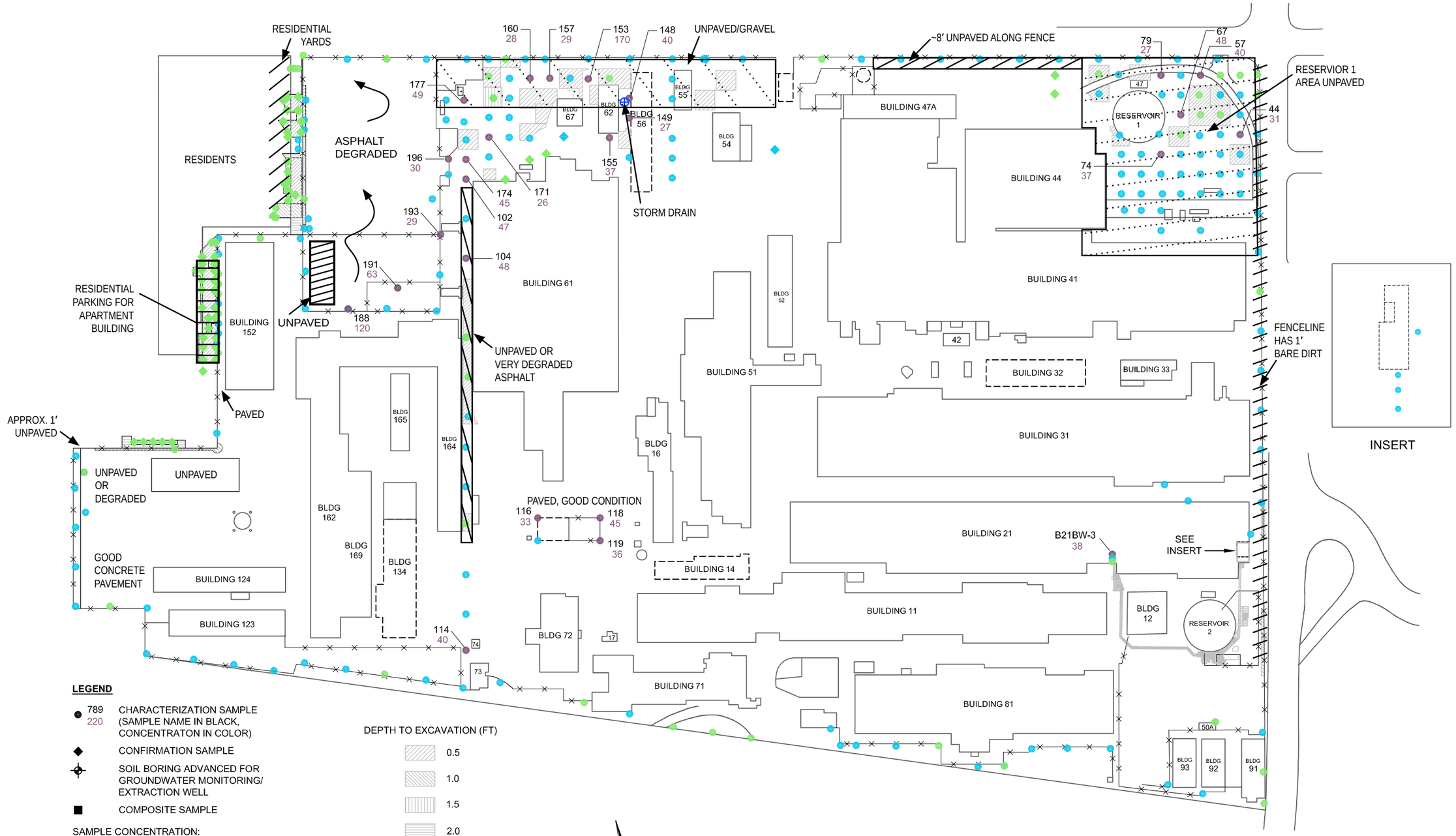
D. Opportunities for Optimization

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

_____

_____

_____



SOURCE: EARTH TECH, FEBRUARY 2006

FIGURE E-1
SITE INSPECTION MAP
WESTINGHOUSE SUPERFUND SITE
SUNNYVALE, CALIFORNIA

CH2MHILL

ES072006017BAO_fig_x-1_site_inspection_map.ai_072406_ll

APPENDIX F

Risk Assessment & Toxicology Review

(Question B for Westinghouse, Sunnyvale Superfund Site)

Memorandum

To: Gary Riley (SFD-7-2)
Remedial Project Manger

Cynthia Wetmore (SFD-8-4)
Five-year Review Coordinator

From: Daniel Stralka Ph.D. (SFD-8-4)
Regional Toxicologist

Subject: Question B for Westinghouse, Sunnyvale Superfund Site

Date: 20 July 2006

This memo is to answer Question B of the statement of service, AAre the exposure assumptions, toxicity data, cleanup levels and remedial action objectives (RAOs) used at the time of remedy selection still valid@.

The ARARs analysis prepared by CH2MHill dated 6 July 2006 gives the site background and history. Whereas there have been minor changes to the toxicity values for some of the COCs, i.e. an updated cancer slope factor for PCB in 1994, the RAOs were based on ARARs and not risk values. There are no new pathways that need to be addressed on the site proper. The change in toxicity values will have no effect on the choice of RAOs. The risks presented by both groundwater and soil contamination are within or above the risk range and still warrant action. Currently, groundwater in being treated and there is no current use of the shallow contaminated groundwater. The surface soils were contaminated with Inerteen, an industrial product containing PCBs and dichlorobenzene and trichlorobenzene. The soil RAOs were based only on PCBs pursuant to TSCA regulations as representative of the mixture. RAOs were to remove PCB contamination above 25 ppm in soil down to 8 feet. Due to the presence of utilities, this depth goal was not achieved. Currently, soil contaminated with PCBs is present below ground surface above levels of concern. Current exposure is limited by pavement and structures over the contaminated area and therefore there are no completed exposure pathways. However, Institutional Controls (ICs) should be put in place to prevent excavation into and exposure of contaminated soil during maintenance procedures, as well as, notification if the land-use changes.

Under the usual site operations there is limited exposure to contaminated soils. However, the release of Inerteen may have crossed the site boundary and into the railroad right-of-way. This are has not been investigated and remains a data gap.

In conclusion, the current land-use is protective but ICs are necessary on the site to notify the presence of PCBs above levels of concern in the subsurface and to prevent excavations in the contaminated areas without proper controls. Also, the possibility of

the PCB fluids exiting the site via surface drainage into the railroad right-of-way is a data gap.