

**California Regional Water Quality Control Board
San Francisco Bay Region**

Fourth Five-Year Review

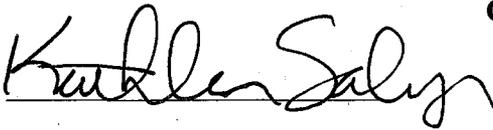
**Fairchild Semiconductor - San Jose Site
101 Bernal Road
San Jose, Santa Clara County, California**

September 2009

Approved By:

**Stephen A. Hill
Chief, Toxics Cleanup Division**

Concurred By:



**Kathleen Salyer
Assistant Director
Superfund Division
U.S. EPA Region IX**

9/30/09

Date

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List of Acronyms

ARAR	Applicable or Relevant and Appropriate Requirements
bgs	Below Ground Surface
COC	Chemical of Concern
BPHE	Baseline Public Health Evaluation
1,1-DCE	1,1-dichloroethene
ESL	Environmental Screening Levels
FRAP	Final Remedial Action Plan
GWET	Groundwater extraction and treatment
MCL	Maximum Contaminant Level
ug/L	Micrograms per liter
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
PCE	Tetrachloroethene
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
Regional Water Board	Regional Water Quality Control Board
SCR	Site Cleanup Requirements
STC	Schlumberger Technology Corporation
SVET	Soil Vapor Extraction and Treatment
TCA	1,1,1-trichloroethane
TCE	Trichloroethene
USEPA	United States Environmental Protection Agency
VC	Vinyl Chloride
VOC	Volatile Organic Compound

Executive Summary

The remedy for groundwater contamination at the Fairchild-San Jose Superfund Site at 101 Bernal Road in San Jose, California, has included soil excavation, construction of a slurry cut-off wall encompassing the Site, groundwater extraction and treatment (GWET), soil vapor extraction and treatment (SVET), groundwater monitoring, and institutional controls. This is the fourth five-year review for the Fairchild-San Jose Site, and it covers remedial activities conducted between September 2004 and September 2009.

Between 1982 and 1998, Fairchild removed approximately 147,000 pounds of volatile organic compounds (VOCs) by soil excavation, and soil vapor and groundwater extraction. Groundwater extraction was suspended in 1998, and no remediation has been performed at the Site since that time. A slurry cut-off wall was constructed around the Site in 1986 to contain the contaminants within the Site boundaries. VOC concentrations inside the slurry cut-off wall have been gradually reduced during the review period, but Site cleanup standards have not been achieved for all contaminants within the Site boundaries and in off-property areas. Current maximum groundwater concentrations of 1,1-dichloroethene (1,1-DCE) within the slurry wall is 690 ug/L which exceeds the remedial action objectives for on-site wells set at 6 ug/L. Current maximum groundwater concentrations of 1,1-DCE in down-gradient off-property areas are 11 ug/L which exceeds the off-site remedial action objectives of 1.5 ug/L. All other chemicals of concern are below their respective remedial action objective. Fairchild conducted groundwater monitoring on a semi-annual basis until March 2007 and on an annual basis thereafter. Monitored natural attenuation (MNA) is very slowly reducing groundwater VOC concentrations at the Site.

The remedy at the Fairchild-San Jose Superfund Site at 101 Bernal Road in San Jose, California is currently protective of human health and the environment. The groundwater plume has been reduced and contained. In the meantime, institutional controls are in place to prevent exposure. There is no exposure risk from vapor intrusion. To be protective in the long term, however, the feasibility of alternative remedies or improvements to the existing system need to be evaluated to insure that the remedial objectives are achieved. The ROD will need to be amended to reflect the change in remedy and to identify 1,4-dioxane as a chemical of concern. Also, a new environmental restriction covenant consistent with current California law should be recorded to ensure long-term protectiveness.

Five-Year Review Summary Form		
SITE IDENTIFICATION		
Site Name (from WasteLAN): Fairchild Semiconductor Corp., South San Jose		
EPA ID (from WasteLAN): CAD097012298		
Region: 9	State: CA	City/County: San Jose/Santa Clara
SITE STATUS		
NPL status: Final		
Remediation Status: GWET system is not operating, slurry cut-off wall in place		
Multiple OUs? No	Construction completion date: 1987	
Has Site been put into reuse? The Site was redeveloped into a shopping center during 1998 - 2000.		
REVIEW STATUS		
Lead agency: State of California		
Author Name: Max Shahbazian		
Author title: Engineering Geologist	Author affiliation: CA Regional Water Quality Control Board (Lead Agency)	
Review period: January through September 2009		
Date(s) of Site inspection: 3/24/2009		
Type of Review: (in bold) <input type="checkbox"/> Post-Sara <input type="checkbox"/> Pre-Sara <input type="checkbox"/> NPL-Removal only <input type="checkbox"/> Non-NPL Remedial Action Site <input checked="" type="checkbox"/> NPL State/Tribe-lead <input type="checkbox"/> Regional Discretion		
Review number: (in bold) <input type="checkbox"/> 1 (first) <input type="checkbox"/> 2 (second) <input type="checkbox"/> 3 (third) <input checked="" type="checkbox"/> 4 (fourth) Other (specify)		
Triggering action: (in bold) <input type="checkbox"/> Actual RA Onsite Construction at OU#__ <input type="checkbox"/> Actual RA Start at OU#__ <input type="checkbox"/> Construction Completion <input checked="" type="checkbox"/> Previous Five-Year Review Report <input type="checkbox"/> Other (specify)		
Triggering action date (from WasteLAN): 9/30/2004		
Due Date: 9/30/2009		

Five-Year Review Summary Form (Continued)

Issues:

The following three issues were identified during the review:

- 1) 1,4-dioxane is present in the contaminated groundwater plume, but is not identified in the ROD and does not have a clean-up level.
- 2) The slurry cut-off wall around the Site is preventing off-property migration of contaminated groundwater but it may not be capable of achieving groundwater cleanup standards within the slurry wall for many years. The GWET system was shut off in 1998. The ROD will need to be amended to reflect the change in remedy.
- 3) The existing restrictive covenant was recorded prior to the passage of California Civil Code section 1471, which establishes the framework for environmental covenants in California.

Recommendations and Follow-up Actions:

- 1) The ROD will need to be amended to reflect the change in remedy and the new contaminant of concern.
- 2) Fairchild should continue to assess the long-term success of the slurry cut-off wall in preventing off-property migration of contaminated groundwater and evaluate other remedies such as in-situ bioremediation in terms of accelerating groundwater cleanup.
- 3) A new restrictive covenant should be recorded for the Site that is consistent with current California law.

Protectiveness Statement:

The remedy at the Fairchild-San Jose Superfund Site at 101 Bernal Road in San Jose, California is currently protective of human health and the environment. The groundwater plume has been reduced and contained. In the meantime, institutional controls are in place to prevent exposure. There is no exposure risk from vapor intrusion. To be protective in the long term, the feasibility of alternative remedies or improvements to the existing system need to be evaluated to insure the long term remedial objectives are achieved. The ROD will need to be amended to reflect the change in remedy and to identify 1,4-dioxane as a chemical of concern. Also, a new environmental restriction covenant consistent with current California law should be recorded to ensure long-term protectiveness.

I. Introduction

The purpose of the five-year review is to determine whether the remedy at a Site is protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in Five-Year Review reports. In addition, Five-Year Review reports identify issues found during the review, if any, and identify recommendations to address them.

The Agency is preparing this Five-Year Review report pursuant to CERCLA §121 and the National Contingency Plan (NCP). CERCLA §121 states:

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

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

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

The California Regional Water Quality Control Board, San Francisco Bay Region, conducted the five-year review of the remedy implemented at the Fairchild-San Jose 101 Bernal Road Superfund Site (Site) in San Jose, Santa Clara County, California. This is the fourth five-year review for the Site. The triggering action for this policy review is the completion of the third five-year review on September 30, 2004. The five-year review is required due to the fact that because hazardous substances, pollutants, or contaminants remain at the Site above levels that allow for unlimited use and unrestricted exposure.

II. Site Chronology

Event	Date
Fairchild begins electronics manufacturing at the Site	1977
Initial investigations identify leaking underground waste solvent storage tank and associated soil and groundwater contamination	Nov – Dec 1981
Great Oaks Water Company public supply well GO-13 found to contain 1,1,1-TCA and taken out of service	Dec 1981
Fairchild removes the leaking tank and associated piping. Fairchild also excavates a 50 feet (ft) by 65 ft area to a depth of 50 ft around the tank.	1982
Fairchild begins groundwater extraction	1982
Fairchild stops industrial operations at the Site	1983
Slurry cut-off wall constructed to contain on-property contamination	May 1986
Regional Water Board issues initial Site Cleanup Requirements Order 86-62	Aug 1986
Public Health Assessment completed for Site	1988
Fairchild San Jose Site added to the National Priorities List	1989
Fairchild conducts on-property soil vapor extraction in A/B aquitard between January 1989 and April 1990	Jan 1989
Regional Water Board adopted Final Site Cleanup Requirements Order 89-16	Jan 1989
USEPA issued Record of Decision (ROD)	Mar 1989
Fairchild terminated groundwater extraction from “C” aquifer	1989
Fairchild-Schlumberger sold Site property to SRDC, Inc.	1990
Fairchild terminated off-property pumping	Dec 1991
Fairchild submitted first Five-Year Review Report to Regional Water Board	Feb 1994
A Supplemental Health Risk Assessment was conducted to address vapor intrusion	Nov 1995
Fairchild terminated on-property groundwater extraction and treatment	July 1998
Fairchild submitted second Five-Year Review Report to Regional Water Board	Feb 1999
RWQCB and EPA complete First Five Year Review	July 1999
SRDC and APSI developed the property into a retail shopping center	1998 - 2000
RWQCB and EPA complete Second Five Year Review	September 2004
1,1-dichloroethene (1,1-DCE) was detected above the maximum contaminant level (MCL) of 6 micrograms per liter (µg/L) in well RW-25B located outside the slurry wall.	October 2005
Fairchild initiated quarterly sampling of on-property wells RW-25B and 127B to evaluate concentration changes. No chemicals were ever detected in well 127B, so quarterly sampling in this well reverted back to annual in January 2008.	January 2007
Revised Self Monitoring Program issued and monitoring and reporting requirements changed from semi-annual to annual.	July 2007
Groundwater sampling and analysis for 1,4-dioxane in wells WCC-6(C), WCC-41(A), 127(B) and 128(B) indicate maximum of 79 µg/L detected in one well.	September 2008

III. Background

Physical Characteristics

The Fairchild San Jose Site is located west of Highway 101 about nine miles southeast of downtown San Jose near the intersection of Monterey Highway and Highway 85 (see attached map). The Site is located in a light industrial and commercial area. Most buildings in the vicinity are low-rise developments containing offices, warehouses, and research and development facilities. The portion of the area that is contained within the slurry wall is referred to as the “on-property area” (currently containing retail shops, restaurants and parking), and the portion outside of this area is referred to as the “off-property area.” Both areas, however, are within the Superfund Site.

One large industrial building formerly occupied the 22-acre Site property. The property was redeveloped during 1998 to 2000 into a retail shopping center. Groundwater contamination at this Site consists primarily of 1,1,1-trichloroethane (1,1,1-TCA) and its breakdown product 1,1-dichloroethene (1,1-DCE), along with other chlorinated and non-chlorinated compounds such as acetone and xylenes. Groundwater contamination from the Site formed a plume that migrated about one mile northwestward toward the San Francisco Bay. Downgradient contamination was limited to 1,1,1-TCA and 1,1-DCE.

Site Operational History

The Fairchild San Jose facility was constructed between 1975 and 1977. The facility was used for electronics and semiconductor fabrication facility from 1977 to 1983. Organic solvents (primarily 1,1,1-TCA) were used for cleaning and degreasing at the facility. Other chemicals were also used and stored at the facility. The Site was vacant from 1983 until it was redeveloped and reoccupied in 2000. Fairchild’s parent company, Schlumberger Technology Corporation (STC), sold Fairchild to National Semiconductor Corporation in 1987, and sold the Site property in 1990 to SRDC. STC has remained responsible for Site cleanup.

Hydrogeology

The Site is located in the Santa Teresa Basin, a higher elevation, southern extension of the Santa Clara Valley. The Santa Clara Valley is a fault-bounded structural basin filled with marine and alluvial sediments. Alternating layers of coarse and fine deposits result in a heterogeneous sequence of interbedded sands, gravels, silts, and clays. The natural groundwater flow direction beneath the Site is to the northwest towards San Francisco Bay. The Santa Teresa Basin is bounded by the bedrock outcrops of Coyote Narrows and Tulare Hill on the southeast, Santa Teresa Hills on the southwest, Edenvale Ridge and Oak Hill on the northwest, and the Diablo Range on the northeast.

The thickness of alluvium in the Santa Teresa Basin ranges from zero at bedrock outcrops to about 400 feet in the basin center. Four distinct water-bearing zones, designated as the “A,” “B,” “C,” and “D” aquifers, have been identified within the alluvium in the vicinity of the Site. These transmissive, coarse-grained units are generally composed of sand or sandy gravel. The shallowest water-bearing zone, designated the A aquifer, is from 10 to 40 feet thick and is first encountered at depths of 10 to 20 feet below ground surface (bgs). The A aquifer is laterally discontinuous in the off-property area. The B aquifer is generally located between depths of 60

to 120 feet bgs. The C aquifer occurs between 150 and 190 feet bgs at the Site, and the D aquifer occurs at depths greater than 300 feet bgs. There is some degree of hydraulic connection between the zones. The B, C, and D aquifers are laterally continuous, are generally prolific water producers, have very high ambient water quality, and are actively used in the basin as a source of drinking water. Groundwater contamination from the Fairchild Site impacted the A, B, and C aquifers. On-property, contamination was generally restricted to the A and B aquifers, with only trace concentrations of solvents ever discovered in the C aquifer. Off-property, contamination was most pronounced and extensive in the B aquifer and, to a lesser extent, the C aquifer.

History of Contamination

Initial investigations were conducted between November and December 1981, and determined that there was a single source, a 5,940 gallon organic solvent waste storage tank that released chemicals to soil and groundwater. The manufacturing operations at the Site involved using various industrial solvents that included 1,1,2-trichloro-1,2,2-trifluoroethane (Freon 113), 1,1,1-TCA, acetone, isopropyl alcohol, tetrachloroethylene (PCE), and xylenes. The main chemicals of concern (COCs) at the Site are 1,1,1-TCA and its breakdown product 1,1-DCE. Due to the tank failure, chemicals migrated down-gradient from the Site and into the A and B aquifers. Inactive agricultural wells in the area provided direct conduits for further migration of chemicals to the C aquifer.

Contamination in the drinking water aquifer was detected in 1981 when samples were collected from Great Oaks Water Company drinking water supply well GO-13, located down-gradient of the Fairchild facility and they contained detected chemicals due to the failed tank. Well GO-13 was taken out of service in December 1981 and sealed in October 1986.

Initial Response

Remedial action at the Site began in 1982 with the removal of the 5,940 gallon organic leaking solvent waste tank and associated piping. About 3,400 cubic yards of contaminated soil were excavated from the Site. The soil removal area was approximately 50 feet by 65 feet in plan view and 52 feet deep. Additional facilities that were removed included an acid waste tank, concrete holding vault, concrete slab beneath the former waste solvent tank, and a temporary waste solvent tank. Groundwater extraction was also initiated in 1982 to control contaminant migration.

In 1986, Fairchild constructed a slurry cut-off wall around the Site to create a physical barrier to prevent off-property migration and to facilitate remediation of VOC "hot spots" within the Site boundaries. The approximate rectangular shaped soil-bentonite slurry wall at the Site is about 1,260 feet long by 1,125 feet wide (covers approximately 32.5 acres). It is approximately 3 feet thick and varies in depth from 55 to 148 ft bgs. The depth of the wall varies because it is keyed a minimum of two feet into the B - C clay aquitard that is continuous beneath the Site. GWET continued both inside and down-gradient from the slurry wall enclosure for several years as described above.

Summary of Basis for Taking Action

The Site overlies the Santa Teresa groundwater basin. Groundwater from this basin is of very high ambient quality, and is actively used as a source of drinking water. The Fairchild Site was made a Superfund Site primarily because past chemical releases at the Site impacted this valuable resource and caused supply wells to be taken out of service.

IV. Remedial Actions

Remedy Selection

A Baseline Public Health Evaluation (BPHE) for the Site was completed in 1988. The Regional Water Board adopted Final Site Cleanup Requirements (SCR) Order No. 89-016 for the Site in January 1989. The Final SCR Order contains the approved remedy for cleanup at the Site. A Record of Decision (ROD) was issued by USEPA in March 1989. The remedy selected in the SCR and the ROD consisted of the following elements:

- 1) soil excavation
- 2) soil vapor extraction and treatment (SVET)
- 3) groundwater extraction and treatment
- 4) discharge of treated water under NPDES permit
- 5) institutional controls prohibiting the use of shallow groundwater for drinking water.

The 1989 Final SCR set groundwater cleanup standards at California proposed or adopted Maximum Contaminant Levels (MCLs), USEPA MCLs, California Action Levels, or levels based on a risk assessment. The 1989 Final SCR also indicates that Site groundwater cleanup standards will change according to changes in DHS drinking water action levels or MCLs (if the MCL becomes more stringent). The cleanup standards for the on-property and off-property areas are listed in Table 1 below.

Table 1 - Site Groundwater Cleanup Standards

Chemical	Cleanup Standard (ug/L)	
	On-property	Off-property
1,1-dichloroethene (1,1-DCE)	6	1.5
Freon 113	1,200	-
tetrachloroethene (PCE)	5	-
1,1,1-trichloroethane (1,1,1-TCA)	200	50
xylenes *	1,750	-
Acetone	3,500	-
IPA	2,250	-

Table Notes:

For the off-property area, groundwater cleanup standards were set at a 0.25 hazard index for 1,1,1-TCA and 1,1-DCE, the only chemicals that have been detected in off-property groundwater. The hazard index was calculated by summing the hazard associated with each VOC of concern, which is approximately 25% of the MCL.

* MCL is for either a single isomer or the sum of isomers.

Remedy Implementation

Soil excavation and construction of the slurry wall were complete and the groundwater extraction and treatment (GWET) system and groundwater monitoring program fully implemented, at the time the Final SCR was adopted in 1989.

Groundwater remediation began at the Site in 1982, and extraction rates increased rapidly, reaching a peak of 3.36 million gallons of water per year in 1984. Fairchild identified and closed all supply wells in the area that were impacted by the pollution plume. GWET from the C aquifer was terminated in 1989, and all off-property pumping ended in 1991. With concurrence from the Regional Water Board, Fairchild suspended on-property groundwater extraction and treatment in July 1998 after demonstrating that asymptotic VOC concentrations and other conditions had been reached. During operation of the GWET system between 1982 and 1998, a total of 93,285 pounds of VOCs were removed from groundwater.

A soil vapor extraction and treatment (SVET) system was operated at the Site between 1987 and 1990 to treat vadose-zone soil contamination. The system was permanently shut down and removed in 1995 when Fairchild demonstrated that soil cleanup standards established in the SCR had been achieved. A total of 15,906 pounds of VOCs were removed by SVET.

In total, 146,191 pounds of VOCs were removed from the Site through soil excavation, groundwater extraction, and soil vapor extraction.

No active remediation has been performed at the Site since 1998. Fairchild is currently conducting monitored natural attenuation at the Site.

A restrictive covenant was prepared for the property and recorded with the Santa Clara County Records Office on May 17, 1989. The covenant prohibits the use of groundwater from the Site for drinking water and restricts excavation below a depth of 20 feet (the approximate depth to the water table). A title search report was prepared for the site property on December 26, 2002. The report reflects the existence of the covenant in the title record.

Systems Operation and Maintenance

Groundwater extraction was terminated at the Site in July 1998. No water was extracted during the 1999-2004 and 2004-2009 review periods. Fairchild-Schlumberger continues to submit groundwater monitoring reports on an annual schedule. The cost associated with groundwater sampling, analysis and reporting during 2004-2009 review period was approximately \$300,000.

V. Progress Since the Last Review

The Third Five-Year Review, completed in September 2004, concluded that:

Remedial actions conducted at the site have greatly reduced contaminant mass and groundwater concentrations. There is no longer an offsite groundwater plume, as contaminant concentrations at all monitoring points outside the site boundary have been below drinking water standards for ten years. Site cleanup goals have not been achieved for all chemicals of concern within the site boundaries, but concentrations inside the slurry cut-off wall at the site have been reduced to levels that no longer pose any human health risk. Groundwater extraction was suspended in 1998, and no remediation has been performed at the site since that time. The remedy is currently protective of human health and the environment in terms of limiting ingestion of contaminated water through the use of institutional controls prohibiting the use of shallow groundwater.

Indoor air has not been sampled at the site. Although risks associated with vapor intrusion are expected to be minimal, Regional Water Board and USEPA are deferring making a protectiveness statement until an analysis of the risks at this site from the vapor intrusion pathway have been considered further.

The issues identified and actions taken since the last five-year review are summarized in Table 2 below.

Table 2 - Actions Taken Since the Previous Five-Year Review

Issues from Previous Review	Recommendations and Follow-up Actions	Actions Taken and Outcome
Indoor air VOC concentrations have not been monitored at the Site. While the potential for human health risk associated with vapor intrusion appears to be minimal, assessment of the vapor intrusion threat is not complete	Regional Water Board and USEPA need to further evaluate the vapor intrusion pathway and determine if additional Site investigation and risk assessment is necessary	Fairchild evaluated vapor intrusion potential into indoor air based on Regional Water Board Tier 1 Environmental Screening Levels. Results indicate that there are no potential vapor intrusion risks to indoor air at this Site from the VOC concentrations in on-property and off-property groundwater.

In the second five year review, one, new, potentially toxic chemical 1,4-dioxane, was identified as a potential contaminant of concern. In September 2001, 1,4-dioxane was detected inside the slurry wall from two on-property wells within the slurry wall at concentrations as high as 890 µg/L. 1,4-dioxane was not detected in wells outside the slurry wall.

In September 2008, follow-up samples of 1,4-dioxane were collected from wells with highest detected 1,4-dioxane based on 2001 sampling. One well inside the slurry wall contained 1,4-dioxane at 79 µg/L and one well outside the slurry wall contained 1,4-dioxane at 7 µg/L .

VI. Five-Year Review Process

Community Notification

The Regional Water Board published a public notice in the local newspaper regarding this fourth five-year review of cleanup actions undertaken at the Site. A copy of the public notice was published on August 16, 2009, in the San Jose Mercury News.

Document Review

This five-year review consisted of a review of relevant documents including Fairchild's Twenty-year status report, submitted to the Regional Water Board on December 30, 2008, and annual and semiannual groundwater monitoring reports.

Data Review

Groundwater Data

Groundwater monitoring data collected from 2004 to 2009 were reviewed to evaluate groundwater conditions. There is no evidence that groundwater contamination has migrated vertically inside or outside the slurry wall since groundwater extraction was terminated.

The current (September 2008) maximum concentration of 1,1-DCE within the slurry wall enclosure is 690 µg/L, which is substantially less than pre-remediation maximum concentrations of 1,900,000 µg/L in June 1982. The current maximum concentration of 1,1,1-TCA is 120 µg/L. Eight of the thirteen wells within the slurry wall enclosure have achieved cleanup standards for the five Site contaminants. The remaining five wells exceed the cleanup standards for 1,1-DCE, with one well also exceeding for PCE. Concentrations of 1,1,1-TCA and 1,1-DCE inside the slurry wall are declining very slowly over time but remain above cleanup standards.

Contaminant concentrations in the off-property area remain below drinking water standards and below the 0.25 hazard index except for 1,1-DCE. Since October 2005, 1,1-DCE concentrations in RW-25(B) have exceeded the MCL (6 µg/L) and chemical-specific hazard index, which is roughly 25% of MCL.

1,4-dioxane was evaluated in 2008, and a maximum concentration of 79 µg/L was detected within the slurry wall enclosure in Well WCC-41(A), and a maximum of 7 µg/L was detected outside the slurry wall enclosure in Well 128(B). The U.S.EPA risk-based screening level (RSL) for this chemical is 6.1µg/L. 1,4-dioxane was not identified as a contaminant of concern at the time of the ROD, and therefore did not have cleanup standards specified in the SCR.

1,1,1-TCA and 1,1-DCE concentrations in groundwater from 2004 to 2009 are summarized in Appendix A.

VOC Mass Removal Data

During operation of the GWET system between 1982 and 1998 a total of 93,285 pounds of VOCs were removed from groundwater. In addition, a total of 15,906 pounds of VOCs were removed by SVET system between 1987 and 1990, of which 12,410 pounds were 1,1-DCE and 1,1,1-TCA.

Site Inspection

Regional Water Board and USEPA staff conducted a Site inspection on March 24, 2009. The Site was redeveloped into a shopping center in 1998 to 2000, and no remedial activities have been conducted during the past five years. The GWET system was in place. The restrictive covenant recorded in 1989 includes prohibitions on the use of groundwater and excavation below a depth of 20 feet until cleanup levels are achieved. No activities were observed that would have violated the institutional controls.

VII. Technical Assessment

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

No. Several elements of the remedy selected in the SCR Order and the ROD are no longer in operation at the Site. For example the GWET system was shut off in 1998. The current groundwater monitoring program is sufficient to detect any contaminant migration beyond the slurry cut-off wall. The remedy selected in the Final Remedial Action Plan and ROD (slurry cut-off wall, GWET, SVET, and institutional controls) was implemented as planned and was successful in removing almost 147,000 pounds of VOC mass from groundwater, reducing VOC concentrations in groundwater outside the slurry cut-off wall, and confining contamination to the area inside the cut-off wall. Concentrations of 1,1,1-TCA and 1,1-DCE inside the slurry wall are declining very slowly over time but remain above cleanup standards.

The restrictive covenant recorded in 1989 includes a prohibition on the use of groundwater until cleanup levels are achieved. No activities were observed that would have violated the institutional controls. The existing restrictive covenant was, however, recorded prior to the passage of California Civil Code section 1471, which establishes the framework for environmental covenants in California. Therefore a new environmental covenants and deed restriction should be recorded consistent with state law.

Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy selection still valid?

Changes in Site Conditions

During the review period, there have been no changes to the physical conditions of the Site that would affect the protectiveness of the remedy. The Site was redeveloped and occupied by a commercial shopping complex beginning in 2000. Institutional controls prohibit the use of groundwater, and groundwater is not currently used at the Site.

Changes in Cleanup Levels

There have been no changes to Applicable, Relevant, and Appropriate Requirements (ARARs) for the Site and no new standards that would affect the protectiveness of the remedy. 1,1,1-TCA and 1,1-DCE are the primary chemicals whose concentrations still routinely exceed the cleanup standards. Groundwater cleanup standards for these chemicals have not changed since the ROD was issued.

Changes in Toxicity

There have been a number of changes to the toxicity values for specific constituents of concern since the Public Health Assessment was completed in 1998 and the Supplemental Health Risk Assessment that was completed in 1995.

The majority of the chemical contaminants currently have toxicity values that are higher than in 1990 and, therefore, the original risk assessment for those are more conservative than originally calculated. PCE has had its toxicity values lowered since the 1998 PHA. The Record of Decision chose the California MCL of 5 ug/L as the PCE clean-up level. Based on the new toxicity number, this would result in a 4.5×10^{-5} risk, which is still within EPA's risk range. The two non-cancer risk chemicals of concern: 1,1,1-TCA and Acetone have had their toxicity values reassessed higher and therefore the recalculated hazard index is still less than 1.

Chemical	Cleanup Standard (ug/L)	2009 ESL corresponding to 10⁻⁶ risk	New risk for clean-up level	Hazard Index
1,1-dichloroethene (1,1-DCE)	6	24000	2.50E-10	N/A
Freon 113	1,200	59000	2.03E-08	N/A
tetrachloroethene (PCE)	5	0.11	4.55E-05	N/A
1,1,1-trichloroethane (1,1,1-TCA)	200	9100	N/A	0.02
Acetone	3500	22000	N/A	0.16

Although there have been changes to the toxicity values, these changes do not increase the Site risk to unacceptable levels.

Changes in Exposure Assumptions

A BPHE was conducted for the Site in 1988, and updated in 1995 to address potential risks from vapor intrusion. This risk assessment was used in evaluating and selecting remedial options for the Site. The BPHE concluded that on-property groundwater was the most likely potential human exposure pathway. Drinking water wells located down-gradient of the Site were identified in the BPHE as the exposure pathway of greatest concern. The 1995 Supplemental Health Risk Assessment evaluated potential vapor intrusion risks for current commercial and potential future on-property residents. The assessment concluded that contaminant concentrations posed no significant threat based on calculated cancer and non-cancer risks.

The primary exposure pathway of potential concern related to recent Site redevelopment is inhalation of organic vapors migrating into structures built over the former Site. Two exposure scenarios were evaluated for this pathway in a supplemental health risk assessment report submitted to the Regional Water Board in 1995. Occupational exposure was assessed for workers in future offices or retail stores. Residential exposure, although an unlikely scenario,

was assessed for potential homes built on-property. Risks associated with these exposure scenarios were found to be within acceptable levels.

The 2004 FYR recommended that the potential for vapor intrusion be assessed in light of the current understanding of the pathway. Fairchild evaluated the indoor air pathway consistent with the Regional Water Board's tiered approach environmental screening levels (ESLs). The results indicate VOC (1,1,1-TCA and 1,1-DCE) concentrations in groundwater are well below the ESLs and do not indicate potential vapor intrusion risk to indoor air at Site buildings. These chemicals are primarily found in the B aquifer at depths of 60 feet or more, and therefore are not expected to pose a significant human health risk through the vapor intrusion pathway.

EPA has also developed screening levels in various media to address the potential for vapor intrusion. Both agencies use similar conceptual models that incorporate important variables such as depth to the source and the physical properties of the chemicals of concern. The Regional Water Board's ESLs are derived using generalized soil physical properties that may be applicable for the San Francisco Bay Area. EPA's screening values are derived from empirical data collected in the process of numerous, national vapor intrusion investigations. EPA's groundwater screening values for groundwater are 31,400 ug/l for 1,1,1 TCA and 800 ug/l for 1,1, DCE and thereby indicate that there is not a potential for vapor intrusion from groundwater.

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

1,4-dioxane was identified in 2004 as a contaminant in groundwater beneath the Site. A maximum contaminant level (MCL) has not been established for 1,4-dioxane, but the concentration in groundwater in off-property well 128(B) is 7 ug/L and in on-property well WCC-41(A) is 79 ug/L, which exceed the USEPA RSL of 6.1 ug/L. Fairchild will continue conducting routine monitoring for 1,4-dioxane to evaluate its concentration trends. There is no other information that calls into question the protectiveness of the remedy.

Technical Assessment Summary

According to the data reviewed and the site inspection, the remedy is continuing to control the contamination. There are indications that the remedy may not achieve restoration of groundwater within the slurry wall enclosure to its beneficial use as a potential drinking water supply source in a reasonable timeframe. There have no been changes in the physical condition or land use of the Site that would reduce the protectiveness of the remedy. Reductions in groundwater contaminant concentrations achieved through Site remediation have increased the protectiveness of the remedy by reducing the potential for human exposure to groundwater contamination. A chemical, 1,4-dioxane, was found in the previous Five Year Review and has been monitored during this review period; however, no standard has yet been selected in a decision document. The vapor intrusion pathway has been evaluated at the Site, and there is not a potential for vapor intrusion from groundwater.

There is no other information that calls into question the protectiveness of the remedy.

VIII. Issues

The following three issues were identified during the review:

1. 1,4-dioxane is present in the contaminated groundwater plume, but is not identified in the ROD and does not have a clean-up level.
2. The slurry cut-off wall around the Site is preventing off-property migration of contaminated groundwater but it may not be capable of achieving groundwater cleanup standards within the slurry wall for many years. The GWET system was shut off in 1998.
3. The existing restrictive covenant was recorded prior to the passage of California Civil Code section 1471, which establishes the framework for environmental covenants in California.

IX. Recommendations and Follow-up Actions

1. The ROD will need to be amended to reflect the change in remedy and the new contaminant of concern, 1,4, dioxane
2. Fairchild should continue to assess the long-term success of the slurry cut-off wall in preventing on-property migration of contaminated groundwater and evaluate other remedies such as in-situ bioremediation for accelerating groundwater cleanup.
3. A new restrictive covenant should be recorded for the Site that is consistent with current California law.

Issues, recommendations, follow-up actions and milestone dates are summarized in Table 3 below.

X. Protectiveness Statement

The remedy at the Fairchild-San Jose Superfund Site at 101 Bernal Road in San Jose, California is currently protective of human health and the environment. The groundwater plume has been reduced and contained. In the meantime, institutional controls are in place to prevent exposure. There is no exposure risk from vapor intrusion. To be protective in the long term, the feasibility of alternative remedies or improvements to the existing system need to be evaluated to insure that the remedial objectives are achieved. The ROD will need to be amended to reflect the change in remedy and to identify 1,4-dioxane as a chemical of concern. Also, a new environmental restriction covenant consistent with current California law should be recorded to ensure long-term protectiveness.

XI. Next Review

The next five-year review for the Fairchild-San Jose Superfund Site is required by September 30, 2014. In order to synchronize the five-year reporting schedule between Regional Water Board and USEPA, Fairchild should submit its next Five-Year Summary Report to the Regional Water Board by December 31, 2013.

Table 3 - Issues, Recommendations, Follow-up Actions and Milestones

Issue	Recommendation and Follow-up Action	Responsible Party	Oversight Agency	Milestone Date	Affects Protectiveness (Yes/No)
1,4-dioxane is present in the contaminated groundwater plume, but is not identified in the ROD and does not have a clean-up level.	The ROD will need to be amended to reflect the change in remedy and the new contaminant of concern.	Regional Water Board	USEPA	2012	Short term: No Long term: Yes
The slurry cut-off wall around the Site is preventing off-property migration of contaminated groundwater but it may not be capable of achieving groundwater cleanup standards within the slurry wall for many years. The GWET system was shut off in 1998.	Fairchild should continue to assess the long-term success of the slurry cut-off wall in preventing off-property migration of contaminated groundwater and evaluate other remedies such as in-situ bioremediation in terms of accelerating groundwater cleanup.	Fairchild	Regional Water Board	2013	Short term: No Long term: Yes
The existing restrictive covenant was recorded prior to the passage of California Civil Code section 1471, which establishes the framework for environmental covenants in California.	A new restrictive covenant should be recorded for the Site that is consistent with current California law.	Current Site owner	Regional Water Board	2011	Short term: No Long term: Yes

Appendix A
Groundwater Analytical Data

Well ID	Well Location	Sample Date	1,1,1-TCA	1,1-DCE
Groundwater Cleanup Standard (On-property/Off-property)			200/50	6/1.5
105(B)	Off-property	10/6/2005	<0.5	<0.5
105(B)		9/20/2007	<0.5	<0.5
105(B)		9/8/2008	<0.5	<0.5
106(B)	Off-property	9/8/2004	3.7	<0.5
106(B)		10/5/2005	3.7	<0.5
106(B)		9/28/2006	1/3/1900	<0.5
106(B)		9/20/2007	4.9	<0.5
106(B)		9/9/2008	4.2	<0.5
116(B)	On-property	9/8/2004	20	2.1
116(B)		10/6/2005	9.4	1
116(B)		9/28/2006	4.7	1.8
116(B)		9/19/2007	17	2
116(B)		9/9/2008	28	2.9
119(B)	On-property	9/8/2004	<0.5	<0.5
119(B)		10/5/2005	<0.5	<0.5
119(B)		9/28/2006	<0.5	<0.5
119(B)		9/20/2007	<0.5	<0.5
119(B)		9/9/2008	<0.5	<0.5
120(B)	Off-property	10/6/2005	<0.5	<0.5
120(B)		9/20/2007	<0.5	<0.5
120(B)		9/9/2008	<0.5	<0.5
122(B)	On-property	9/8/2004	<0.5	<0.5
122(B)		10/6/2005	<0.5	<0.5
122(B)		9/28/2006	<0.5	<0.5
122(B)		9/21/2007	<0.5	<0.5
122(B)		9/8/2008	<0.5	<0.5
126(B)	Off-property	3/23/2004	<0.5	<0.5
126(B)		3/23/2004-DUP	<0.5	<0.5
126(B)		9/8/2004	<0.5	<0.5
126(B)		9/8/2004-DUP	<0.5	<0.5
126(B)		3/31/2005	<0.5	<0.5
126(B)		10/5/2005	<0.5	<0.5
126(B)		3/15/2006	<0.5	<0.5
126(B)		3/5/2007	<0.5	<0.5
126(B)		9/19/2007	<0.5	<0.5

Well ID	Well Location	Sample Date	1,1,1-TCA	1,1-DCE
126(B)		9/8/2008	<0.5	<0.5
127(B)	Off-property	3/23/2004	<0.5	<0.5
127(B)		9/8/2004	<0.5	<0.5
127(B)		3/31/2005	0.7	<0.5
127(B)		10/5/2005	<0.5	<0.5
127(B)		3/15/2006	0.7	<0.5
127(B)		9/28/2006	0.7	<0.5
127(B)		1/30/2007	<0.5	<0.5
127(B)		3/6/2007	<0.5	<0.5
127(B)		6/8/2007	<0.5	<0.5
127(B)		9/20/2007	<0.5	<0.5
127(B)		9/9/2008	<0.5	<0.5
128(B)	Off-property	3/23/2004	1.4	<0.5
128(B)		9/9/2004	1.1	<0.5
128(B)		3/30/2005	2.5	0.5
128(B)		10/5/2005	<0.5	<0.5
128(B)		3/15/2006	2.6	0.6
128(B)		9/28/2006	1.6	<0.5
128(B)		3/6/2007	2.2	0.6
128(B)		9/20/2007	1.7	<0.5
128(B)		9/10/2008	2	<0.5
129(B)	Off-property	9/9/2004	<0.5	<0.5
129(B)		10/5/2005	<0.5	<0.5
129(B)		10/5/2005-DUP	<0.5	<0.5
129(B)		9/27/2006	<0.5	<0.5
129(B)		9/20/2007	<0.5	<0.5
129(B)		9/9/2008	<0.5	<0.5
131(B)	On-property	9/8/2004	12	2.4
131(B)		10/6/2005	12	1.7
131(B)		9/28/2006	9.8	8.1
131(B)		9/21/2007	17	21
131(B)		9/9/2008	6.5	8
135(B)	Off-property	9/8/2004	3.8	<0.5
135(B)		10/6/2005	3.9	<0.5
135(B)		9/27/2006	3.7	<0.5
135(B)		9/20/2007	3.7	<0.5
135(B)		9/9/2008	3.1	<0.5
145(B)	On-property	9/8/2004	23	12
145(B)		10/6/2005	8.4	1
145(B)		3/16/2006	60	36

Well ID	Well Location	Sample Date	1,1,1-TCA	1,1-DCE
145(B)		3/16/2006-DUP	55	33
145(B)		9/28/2006	22	4.8
145(B)		3/6/2007	88	140
145(B)		3/6/2007-DUP	67	110
145(B)		9/20/2007	19	2.9
145(B)		9/8/2008	18	3.5
146(B)		10/5/2005	<0.5	<0.5
146(B)		3/15/2006	18	5.1
146(B)	On-property	9/27/2006	7.2	1.9
146(B)		3/6/2007	10	2.5
146(B)		9/20/2007	6.6	1.5
146(B)		9/9/2008	12	2.6
74(B)		9/8/2004	0.7	<0.5
74(B)	Off-property	10/5/2005	0.7	<0.5
74(B)		9/28/2006	2.2	<0.5
75(B)		3/23/2004	<0.5	<0.5
75(B)		9/9/2004	2.1	0.6
75(B)		3/30/2005	1.5	0.6
75(B)		10/5/2005	1.2	0.5
75(B)	Off-property	3/15/2006	4.6	1.1
75(B)		9/28/2006	1.8	0.7
75(B)		3/6/2007	3.8	1.2
75(B)		9/19/2007	1.7	<0.5
75(B)		9/10/2008	0.6	<0.5
83(B)		9/9/2004	<0.5	<0.5
83(B)	Off-property	10/5/2005	<0.5	<0.5
83(B)		9/28/2009	<0.5	<0.5
AE-1(B)		9/9/2004	320	1,400
AE-1(B)		3/30/2005	260	650
AE-1(B)		10/6/2005	540	2,500
AE-1(B)	On-property	3/16/2006	280	860
AE-1(B)		9/28/2006	230	1,100
AE-1(B)		9/20/2007	260	3,000
AE-1(B)		9/8/2008	76	690
AE-1(B)		9/8/2008 DUP	72	620
AE-2(B)		9/9/2004	440	820
AE-2(B)	On-property	3/30/2005	650	1,100
AE-2(B)		10/6/2005	390	830
AE-2(B)		3/16/2006	560	1,400

Well ID	Well Location	Sample Date	1,1,1-TCA	1,1-DCE
AE-2(B)		9/28/2006	510	1,700
AE-2(B)		9/28/2006-DUP	570	1,500
AE-2(B)		9/20/2007	260	610
AE-2(B)		9/20/2007-DUP	240	630
AE-2(B)		9/8/2008	120	380
GO-04(M)	Off-property	10/6/2005	<0.5	<0.5
GO-04(M)		2/27/2007	<0.5	<0.5
GO-04(M)		9/19/2007	<0.5	<0.5
GO-04(M)		9/2/2008	<0.5	<0.5
RW-13(B)	Off-property	9/9/2004	<0.5	<0.5
RW-13(B)		10/5/2005	<0.5	<0.5
RW-13(B)		9/27/2006	<0.5	<0.5
RW-13(B)		9/20/2007	<0.5	<0.5
RW-13(B)		9/9/2008	<0.5	<0.5
RW-19(B)	Off-property	3/24/2004	5	1.6
RW-19(B)		9/8/2004	3.9	1.2
RW-19(B)		3/30/2005	6	1.9
RW-19(B)		10/6/2005	3.3	1.1
RW-19(B)		3/16/2006	5.2	1.1
RW-19(B)		9/28/2006	4.8	1.7
RW-19(B)		3/6/2007	<0.5	0.9
RW-19(B)		9/20/2007	6.7	1.9
RW-19(B)		9/8/2008	6.7	1.7
RW-20(B)	Off-property	3/24/2004	2.1	<0.5
RW-20(B)		9/8/2004	0.5	<0.5
RW-20(B)		3/31/2005	<0.5	<0.5
RW-20(B)		3/31/2005-DUP	<0.5	<0.5
RW-20(B)		10/6/2005	2.9	<0.5
RW-20(B)		3/15/2006	4.6	<0.5
RW-20(B)		9/28/2006	2.6	<0.5
RW-20(B)		3/6/2007	2.9	<0.5
RW-20(B)		9/20/2007	3.4	<0.5
RW-20(B)		9/9/2008	3.5	<0.5
RW-23(A)	On-property	9/28/2006	10	3.6
RW-23(A)		9/20/2007	11	11
RW-23(A)		9/9/2008	6.6	4.7
RW-25(B)	Off-property	3/24/2004	5.8	4.2
RW-25(B)		3/31/2005	<0.5	<0.5
RW-25(B)		10/6/2005	15	9.1
RW-25(B)		3/17/2006	13	9.3

Well ID	Well Location	Sample Date	1,1,1-TCA	1,1-DCE
RW-25(B)		9/28/2006	13	11
RW-25(B)		1/30/2007	19	15
RW-25(B)		3/6/2007	14	13
RW-25(B)		6/8/2007	15	12
RW-25(B)		9/19/2007	16	12
RW-25(B)		2/8/2008	16	13
RW-25(B)		3/25/2008	<0.5	4.8
RW-25(B)		6/25/2008	<0.5	0.6
RW-25(B)		9/8/2008	18	12
RW-25(B)		3/9/2009	<0.5	<0.5
RW-25(B)		6/9/2009	16	11
RW-27(B)		3/24/2004	2	<0.5
RW-27(B)		9/8/2004	0.9	<0.5
RW-27(B)		3/30/2005	<0.5	<0.5
RW-27(B)		10/5/2005	<0.5	<0.5
RW-27(B)	Off-property	3/15/2006	<0.5	<0.5
RW-27(B)		9/28/2006	<0.5	<0.5
RW-27(B)		3/6/2007	5.2	0.9
RW-27(B)		9/20/2007	6.7	0.6
RW-27(B)		9/8/2008	7	0.6
WCC-01(B)		9/9/2004	38	9.5
WCC-01(B)		10/6/2005	42	9.9
WCC-01(B)	On-property	9/29/2006	31	8.6
WCC-01(B)		9/20/2007	39	10
WCC-01(B)		9/10/2008	43	10
WCC-02(B)		9/9/2004	30	1.9
WCC-02(B)		9/9/2004-DUP	31	2
WCC-02(B)	On-property	10/6/2005	8.5	1
WCC-02(B)		9/29/2006	25	1.5
WCC-02(B)		9/20/2007	32	1.7
WCC-02(B)		9/9/2008	34	1.6
WCC-06(C)		9/9/2004	<0.5	<0.5
WCC-06(C)		10/5/2005	<0.5	<0.5
WCC-06(C)	On-property	9/29/2006	<0.5	<0.5
WCC-06(C)		9/20/2007	<0.5	<0.5
WCC-06(C)		9/9/2008	<0.5	<0.5
WCC-13(B)		9/8/2004	<0.5	<0.5
WCC-13(B)	Off-property	10/5/2005	<0.5	<0.5
WCC-13(B)		9/28/2006	<0.5	<0.5
WCC-26(B)	Off-property	3/24/2004	<0.5	<0.5

Well ID	Well Location	Sample Date	1,1,1-TCA	1,1-DCE
WCC-26(B)		9/8/2004	<0.5	<0.5
WCC-26(B)		3/31/2005	<0.5	<0.5
WCC-26(B)		10/5/2005	<0.5	<0.5
WCC-26(B)		3/15/2006	<0.5	<0.5
WCC-26(B)		9/28/2006	<0.5	<0.5
WCC-26(B)		3/6/2007	<0.5	<0.5
WCC-26(B)		9/20/2007	<0.5	<0.5
WCC-26(B)		9/9/2008	<0.5	<0.5
WCC-27(B)		3/24/2004	2.5	<0.5
WCC-27(B)		9/8/2004	3.5	0.6
WCC-27(B)	Off-property	3/30/2005	4.8	0.8
WCC-27(B)		10/6/2005	3.8	<0.5
WCC-27(B)		9/28/2006	3.6	0.6
WCC-41(A)		9/28/2006	66	140
WCC-41(A)	On-property	9/21/2007	110	150
WCC-41(A)		9/8/2008	110	150
WCC-42(B)		10/6/2005	<0.5	<0.5
WCC-42(B)	Off-property	9/21/2007	<0.5	<0.5
WCC-42(B)		9/8/2008	<0.5	<0.5

Table Notes:

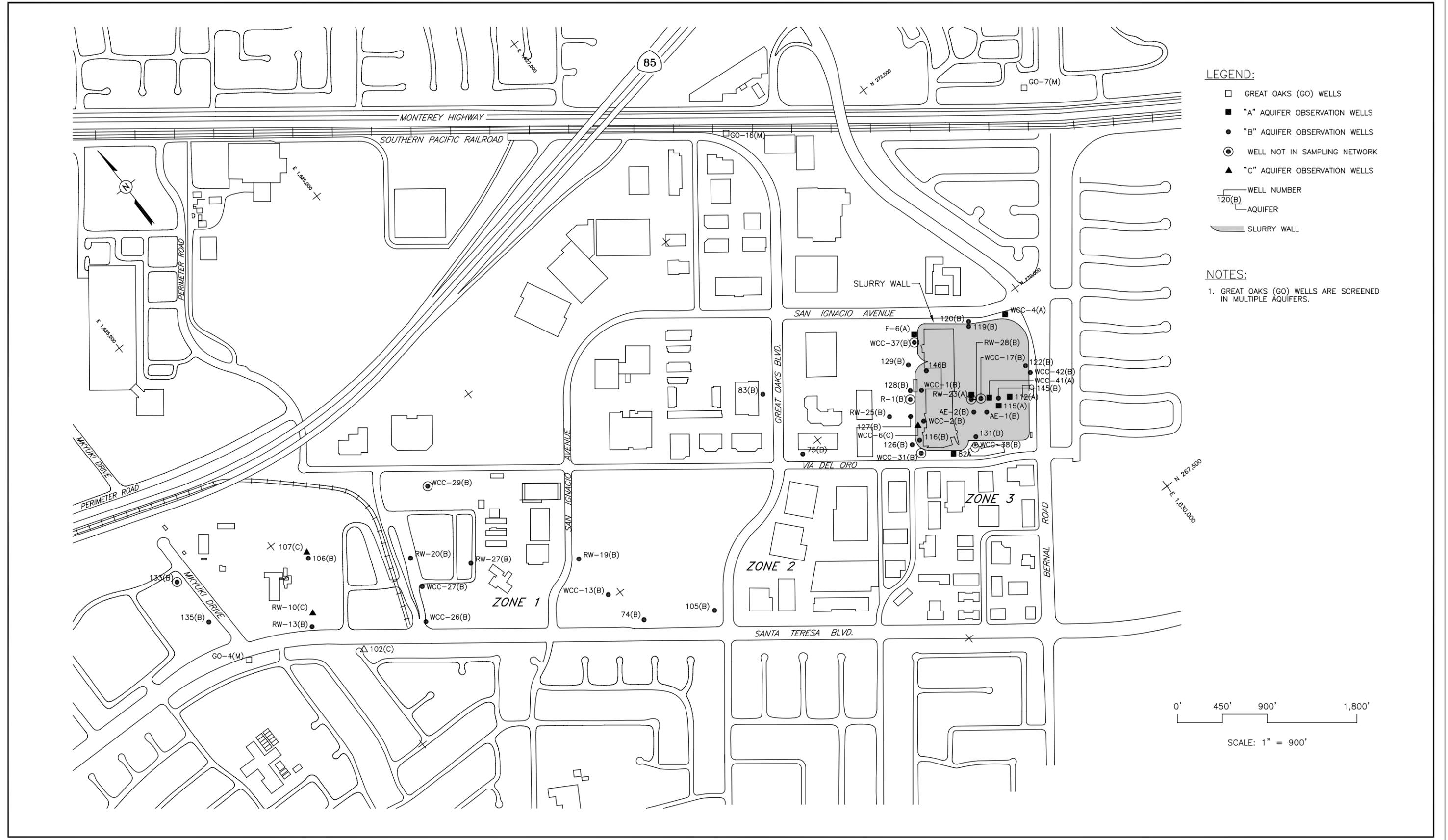
All wells inside the slurry wall are considered on-property and wells outside the slurry wall are off-property. Concentrations are in micrograms per liter (ug/L).

BOLD indicates exceedences.

DUP = duplicate sample.

< = less than.

Appendix B – Site Map



- LEGEND:**
- GREAT OAKS (GO) WELLS
 - "A" AQUIFER OBSERVATION WELLS
 - "B" AQUIFER OBSERVATION WELLS
 - ⊙ WELL NOT IN SAMPLING NETWORK
 - ▲ "C" AQUIFER OBSERVATION WELLS
 - WELL NUMBER
 - 120(B) AQUIFER
 - SLURRY WALL

- NOTES:**
1. GREAT OAKS (GO) WELLS ARE SCREENED IN MULTIPLE AQUIFERS.

Figure 2. Site and Monitoring Well Location Map, 101 Bernal Road, San Jose, California

APPENDIX C – SITE DOCUMENTS – STATE CLEARINGHOUSE LINK

http://geotracker.waterboards.ca.gov/profile_report.asp?global_id=SL720361208

The State Water Resources Control Board maintains the Geotracker website as a repository of environmental data for regulated facilities in California. You can use the following link(s) to find the covenant(s) that have been recorded for the Site property or properties. In addition, the environmental title search reports will shortly be available at the same link.