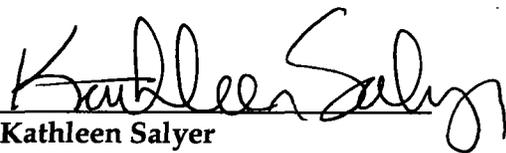


**THIRD FIVE-YEAR REVIEW REPORT**  
**FOR**  
**INTEL MAGNETICS/MICRO STORAGE CORPORATION SUPERFUND SITE**  
**SANTA CLARA, CALIFORNIA**

September 2007

Approved by:

Date:



Kathleen Salyer  
Chief, Site Cleanup Branch  
USEPA, Region 9

9/28/07

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# Acronyms and Abbreviations

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µg/L	micrograms per liter
ARAR	Applicable or Relevant and Appropriate Requirements
bgs	below ground surface
BPHE	Baseline Public Health Evaluation
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
COC	contaminants of concern
DCA	dichloroethane
DCE	dichloroethylene
KCIII	Kim Camp III
MCC	Metropolitan Corporate Center
IM/MSC	Intel Magnetics/Micro Storage Corporation
MTBE	methyl tert-butyl ether
NAA	Non-attainment Area
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
O&M	Operation and Maintenance
PCE	tetrachloroethylene
ROD	Record of Decision
Site	Intel Magnetics/Micro Storage Corporation Superfund Site
TCA	trichloroethane
TCE	trichloroethylene
USEPA	United States Environmental Protection Agency
UST	underground storage tank
VOC	volatile organic compound
Water Board	California Regional Water Quality Control Board, San Francisco Bay Region

# Five-Year Review Summary Form

## SITE IDENTIFICATION

Site name : Intel Magnetics/Micro Storage Corporation (IM/MSC)

EPA ID: CAD092212497 CERCLIS ID : 0987

Region: 9 State: California City/County: Santa Clara, California/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: 8/19/1992

Has site been put into reuse?  YES  NO Note: Property has consistently been in use.

## REVIEW STATUS

Reviewing agency:  EPA  State  Tribe  Other Federal Agency \_\_\_\_\_

Author name: Penelope McDaniel

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

Review period: January-May 2007

Date(s) of Site inspection: May 4, 2007

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 On-site Construction at OU #\_\_
- Actual RA at OU #\_\_
- Previous Five –Year Review Report
- Construction Completion
- Other (specify) \_\_\_\_\_

**Triggering action date:** September 29, 2002

**Due date (five years after triggering action date):** September 29, 2007

**Issues and Recommendations****Issue**

Although regular monitoring of the plume appears to be stable or decreasing, many areas of the site continue to show contaminant levels above cleanup standards, particularly for trichloroethylene and total 1,2-dichloroethylene.

**Recommendation**

Continue biannual groundwater sampling, at a minimum, to monitor the plume stability and attenuation, and to maintain institutional controls to prevent direct exposures.

**Issue**

Although remaining groundwater concentrations are very low, the groundwater cleanup goals have not been met for the Site. The groundwater extraction and treatment system has been very effective in reducing contaminant concentrations in the groundwater to very low levels. However, this system reached asymptotic levels and was no longer recovering significant quantities of contaminants. Therefore, active groundwater extraction ceased. Contaminant concentrations continue to slowly decline, indicating that natural attenuation processes are occurring. With concurrence of the Board, the PRP has implemented a monitored natural attenuation approach to the remaining contamination.

**Recommendation**

A ROD amendment will be necessary to document this modification and any other changes that affect the selected remedy.

**Issue**

A covenant for the MSC property has been recorded. However, there is no evidence that a covenant was ever recorded at the IM Site. The existing covenant was recorded prior to passage of California Civil Code section 1471, which establishes the framework for environmental covenants in California.

**Recommendation**

New restrictive covenants must be recorded for both properties that are consistent with current California law.

**Issue**

Groundwater contamination may be migrating onto the IM/MSC Site from an upgradient, off-site source.

**Recommendation**

An investigation is currently being conducted to identify the off-site source. Pending the results of that investigation, it is recommended that the groundwater extraction and treatment system be assessed for readiness in the event that the system must be restarted. If an off-site source of contaminants is located, hydraulic controls may be used at that site to prevent further migration of contaminants onto the IM/MSC Site, which could affect the stability of the IM/MSC plume. The IM/MSC groundwater extraction and treatment system, or another hydraulic control system may be required to maintain plume stability.

As noted in the 1991 Record of Decision, the regulatory agencies (USEPA and the Regional Water Quality Control Board) have required that the operation of any extraction system on the IM/MSC Site or the neighboring Metropolitan Corporate Center site be coordinated so as to minimize the hydraulic effects on the other site's groundwater plume (USEPA, 1991).

**Protectiveness Statement**

The remedy at the IM/MSC Site is currently protective of human health and the environment because exposure pathways that could result in unacceptable risks are being controlled. However, in order to be protective in the long-term, institutional controls need to be placed on the Intel Magnetics property.

# Executive Summary

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This is the third Five-Year Review of the Intel Magnetics/Micro Storage Corporation (IM/MSC) Superfund Site (the Site), located in Santa Clara, Santa Clara County, California. The purpose of this Five-Year Review (FYR) report is to assess the protectiveness of the remedial action at the Site. This Five-Year Review is required by statute and was 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 third Five-Year Review for the Site. The triggering action for this review is the United States Environmental Protection Agency (USEPA) approval date of the second Five-Year Review report on September 29, 2002.

The IM/MSC Site is currently operating as general office space. The Site consists of two adjacent facilities: the former Intel Magnetics and the former Micro Storage Corporation. The IM/MSC Site is located in an industrial park setting, formerly dominated by the electronics and semiconductor manufacturing industries. Most buildings in the area are low-rise developments containing office space and research and development facilities (USEPA, 1991).

The IM/MSC Site overlies the Santa Clara Valley Groundwater Basin. Groundwater from the basin provides up to 50 percent of the municipal drinking water for the 1.4 million residents of the Santa Clara Valley. Approximately 300,000 people living within a 3-mile radius of the study area depend on local groundwater for drinking purposes. The upper aquifer zone below the IM/MSC Site consists of an A- and a B-zone, with contamination largely confined to the shallower A-zone (USEPA, 1991).

Beginning in 1979, Intel Magnetics produced and tested computer memory products known as magnetic bubbles at the IM Site. The chemicals used for these activities included isopropanol, Freon, chlorinated hydrocarbons (unspecified, but reportedly does not include tetrachloroethylene [PCE] and 1,1,1-trichloroethane [TCA]), n-butyl acetate, Hunt Developer (isodecane C11 and C12), acetone, xylene, dilute acids, and the metals arsenic, chromium, lead, and tin. Among others, trichloroethylene (TCE), TCA, and Freon 113 have been detected in the groundwater (USEPA, 1991).

Micro Storage Corporation conducted research, development and pilot manufacturing of microcomputer disk drives at the MSC Site. The chemicals used for these activities were Freon 113 and other nonflammable/chlorinated solvents, which have been detected in the groundwater (USEPA, 1991).

In 1985, as a result of ongoing soil and groundwater contamination studies, IM removed a 500-gallon underground storage tank that had been used to store chemicals, as well as 35 cubic yards of soil. A 1,000-gallon, double-walled, stainless-steel tank was installed in a new excavation (USEPA, 1991). The IM Site was placed in the National Priorities List in May 1986, and the MSC Site was included with the IM Site as one combined Superfund site in 1988.

The 1991 Record of Decision (ROD) addressed remediation of the contaminated shallow A-zone aquifer and had six components, which are summarized below:

- a) Perform continued groundwater extraction until drinking water standards for TCE, 1,1-dichloroethane (DCA), 1,1-dichloroethylene (DCE), cis 1,2-DCE, trans 1,2-DCE, Freon 113, methylene chloride, PCE, toluene, 1,1,1-TCA, 1,1,2 TCA, and chloroform are achieved in all combined IM/MSD Site monitoring wells.
- b) Achieve hydraulic containment of the entire groundwater plume above cleanup standards, and perform continued groundwater extraction at the four existing wells.
- c) Perform maintenance of hydraulic control to prohibit the further vertical and horizontal migration of the groundwater pollution.
- d) Perform groundwater monitoring at the combined IM/MSD Site during the cleanup period to verify that cleanup is proceeding and that there is no migration of volatile organic compounds (VOCs) above cleanup standard levels beyond current boundaries or into the deeper B-zone.
- e) Perform treatment of extracted groundwater with an existing carbon adsorption system, with treated groundwater discharged to the Calabazas Creek, pursuant to a National Pollutant Discharge Elimination System permit.
- f) File a deed restriction prohibiting use of on-site shallow groundwater for drinking water and controlling other subsurface activities.

In 1996, after approximately 9 years of operating the groundwater pump and treat system, and a significant decline in contaminant removal rates, the Regional Water Quality Control Board (Water Board) determined that the system could be shut down. Continued groundwater monitoring was required to ensure the remaining low levels of groundwater contamination remained stable. At the time the treatment system was shut down, contaminant concentrations at the Site had reached asymptotic or near-asymptotic levels. Additionally, information from the IM/MSD Site and other sites in the South San Francisco Bay Area had shown that groundwater extraction may not be able to restore VOC contaminated aquifers to background or drinking water quality standards (Water Board, 1996) using traditional pump and treat remedies. This decision, in effect, limits the current remedy to components (d) and (f) of the ROD, both of which are still in effect. That is, the deed restriction remains in place, and groundwater sampling has occurred at least biannually for the past decade (with the exception of 2005).

Following the shutdown of the system in 1996, VOC concentrations rose in some areas of the plume but did not reach pre-extraction concentrations and have since stabilized or decreased. Minor exceptions were noted in wells at or near the upgradient edge of the well, suggesting an off-site, upgradient source of contaminants migrating onto the Site (USEPA, 2002). This hypothesis was further supported by the appearance of methyl tert-butyl ether in 2001, which had not been detected previously at the site. An investigation is currently underway to determine the off-site source of contamination.

Based on a review of documents and data related to monitoring activities at the Site, containment of contaminated groundwater at the Site has been functioning as intended, but the remediation goals for the aquifer area have not yet been achieved. Annual groundwater

monitoring reports indicate that levels of VOCs have not yet achieved the remediation goals established in the ROD. While continued monitoring, along with institutional controls remain in effect, additional remediation efforts may be evaluated in the future to determine if further reductions in groundwater contaminant concentrations can be made.

USEPA has reviewed the applicable or relevant and appropriate requirements ("ARARs") and other standards to be considered at the Site. Since the ROD was issued, there have been no changes to existing action-specific, chemical-specific, or location-specific ARARs that might affect the current protectiveness of the selected remedy.

No new human health routes of exposure are identified that would challenge the protectiveness of the remedy. Methyl tert-butyl ether has been detected at the site as recently as August 2006 but has never been detected at levels approaching the California maximum contaminant level of 13 micrograms per liter.

The remedy at the IM/MSC Site is currently protective of human health and the environment because exposure pathways that could result in unacceptable risks are being controlled. However, in order to be protective in the long-term, institutional controls need to be placed on the Intel Magnetics property.

# 1.0 Introduction

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This report summarizes findings of a Five-Year Review of the remedial actions implemented at the Intel Magnetics/Micro Storage Corporation (IM/MSC) Superfund Site (the Site) in Santa Clara, California. The Five-Year Review evaluates whether the remedy at the IM/MSC Site remains protective of human health and the environment.

The United States Environmental Protection Agency (USEPA), Region 9 conducted the Five-Year Review from January to May 2007. This report was prepared in accordance with USEPA's guidance document, *Comprehensive Five-Year Review Guidance* (USEPA, 2001). In addition, this report identifies any deficiencies found during the review and provides recommendations to address these deficiencies.

This Five-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 this Five-Year Review because the implemented remedy at the IM/MSC 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 third Five-Year Review for the IM/MSC Site. The trigger date for this review is September 29, 2002, the USEPA approval date of the second Five-Year Review report (USEPA, 2002). This report evaluates the remedial action objectives of the IM/MSC Site, as stated in the 1991 Record of Decision (ROD).

## 2.0 Site Chronology

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

**TABLE 2-1**  
**Chronology of Site Events**  
*Third Five-Year Review Report for IM/MSC Superfund Site, Santa Clara, California*

Event	Date
IM/MSC Site developed from agricultural land to a business park.	1979
Groundwater contamination discovered at the IM Site.	1982
Intel submits completed California Regional Water Quality Control Board (Water Board) facility questionnaire.	June 16, 1982
IM removes an underground storage tank, which was a source of contamination on the IM Site, along with 35 cubic yards of soil.	July 1, 1985
Water Board adopts National Pollutant Discharge Elimination System Permit No. CA0028941 (Order No. 86-014) for the discharge of treated extracted groundwater at the IM Site. Groundwater extraction and treatment begins.	March 19, 1986
USEPA adds IM Site to the National Priorities List.	May 1, 1986
Kim Camp III, owner of MSC, submits its tenants' Hazardous Chemical Use History Reports.	February 2, 1987
The MSC Site is identified as being a primary source of groundwater contamination.	June 10, 1985
USEPA changes the name of the site from IM to the combined IM/MSC Site.	October 12, 1988
Water Board adopts Order No. 89-017 issuing Site Cleanup Requirements to MSC and Kim Camp III.	February 15, 1989
Water Board adopts Order No. 89-086 approving the Remedial Investigation/Feasibility Study Work Plan.	March 17, 1989
Water Board adopts National Pollutant Discharge Elimination System Permit No. CA0029670 (Order No. 90-040) for the discharge of treated extracted groundwater from the combined IM/MSC Site. Groundwater extraction and treatment from the expanded extraction system begins.	March 21, 1990
Water Board adopts Order No. 91-119, the Final Site Cleanup Requirements for the combined IM/MSC Site.	July 17, 1991
Water Board allows the groundwater extraction system to be shut down in response to a significant decline in contaminant removal rates and continuing equipment problems. Monitored natural attenuation trial begins.	April 1, 1995
First Five-Year Review completed.	October 31, 1996
Second Five-Year Review completed.	September 29, 2002

## 3.0 Site Background

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This section provides IM/MSC Site background including the IM/MSC 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 IM/MSC Site is located in Santa Clara, Santa Clara County, California. The combined IM/MSC Site is bounded to the north by Central Expressway, to the east by Oakmead Village Court, to the south by Kifer Road, and to the west by other properties. The property owner and lead responsible party responsible party is Kimosabe, a successor entity to Kim Camp III. The closest residential areas are approximately 0.5 mile to the south and 1 mile to the northwest. The site is located in an industrial park setting, formerly dominated by the electronics and semiconductor manufacturing industries. Most buildings in the area are low-rise developments containing office space and research and development facilities. The IM/MSC Site is currently in use as general office space (USEPA, 1991).

The IM/MSC Site overlies the Santa Clara Valley Groundwater Basin. Groundwater from the basin provides up to 50 percent of the municipal drinking water for the 1.4 million residents of the Santa Clara Valley. Approximately 300,000 people living within a 3-mile radius of the study area depend on local groundwater for drinking purposes. Surface water is controlled by the storm sewer system that directs runoff to the Calabazas Creek (USEPA, 1991).

The main focus of remedial actions at the IM/MSC Site under USEPA has been the removal of volatile organic compounds (VOCs), specifically trichloroethene (TCE), and cis 1,2-dichloroethylene (DCE) and trans 1,2-DCE (characterized as total 1,2-DCE for the purposes of this report). Other contaminants of concern (COCs) identified in the 1991 (ROD) have been detected at the Site, but since 1996, these other COCs have not been detected above cleanup standards, except in some isolated cases. Starting in 2001, methyl tert-butyl ether (MTBE) has infiltrated the plume from an off-site source and has been detected at levels well below cleanup standards.

Figure 3-1 shows the separate IM and MSC Sites, as well as the combined IM/MSC Site and the Metropolitan Corporate Center (MCC) site to the west.

### 3.2 Physical Setting

The combined IM/MSC Site is located in the city of Santa Clara in a relatively flat portion of the Santa Clara Valley, approximately 50 miles south of San Francisco. Ground surface elevations are generally between 35 feet and 41 feet above mean sea level. The majority of the area is developed, with large paved areas for streets and parking lots. Surface water is controlled by the storm sewer system that directs runoff to Calabazas Creek. The nearest residential areas are located 1,200 feet south of the Site. Other residential areas are located

6,000 feet north-northeast of the Site. None of these areas is within the area impacted by the past chemical releases from the IM/MSC Site (USEPA, 1991).

### 3.2.1 Lithology

The Santa Clara Valley is a large structural depression in the central coastal ranges of California. The valley is bounded by the Diablo Range to the northeast and the Santa Cruz and Gabilan Ranges to the southwest. The valley is filled with alluvial and fluvial deposits from the adjacent mountain ranges. These deposits are up to 1,500 feet thick. At the base of the adjacent mountains, gently-sloping alluvial fans of the basin tributaries laterally merge to form an alluvial apron extending into the interior of the basin (USEPA, 1991).

### 3.2.2 Hydrogeology

The IM/MSC Site is located on the inner portion of the Santa Clara Valley Groundwater Basin, known as the "Confined Area." This area is stratified into individual beds separated by significant aquitards, divided into the upper and lower zones. The division is formed by an extensive regional aquitard that occurs at depths ranging from 100 feet near the area's southern boundary to 150 feet to 250 feet in the center of the Confined Area. Thickness of this aquitard ranges from 20 feet to over 100 feet (USEPA, 1991).

Groundwater contamination at the IM/MSC Site is confined to the shallowest zone within the upper aquifer zone (the lower aquifer zone is separated by a practically impermeable regional aquitard). Municipal water supply wells are generally perforated in the lower aquifer zone. The nearest municipal drinking water supply well downgradient from the IM/MSC Site is the City of Santa Clara's well No. 33, located 1.8 miles north of the Site. No contaminants had been found in this well at the time of the 1991 ROD, and groundwater sampling at the IM/MSC Site since that time has indicated that the contaminant plume is stable and has not migrated downgradient (USEPA, 1991).

The portion of the upper aquifer zone below the IM/MSC Site is divided into two shallow aquifer zones. The A-zone aquifer is the shallowest, with its upper boundary at about 10 feet below ground surface (bgs) and its lower boundary about 20 feet bgs, while the deeper B-zone aquifer has its upper and lower boundaries at 30 and 40 feet bgs, respectively. The two zones are separated by a 2- to 10-foot-thick aquitard composed of clay to silty sand. It is suspected that hydraulic separation between the two zones is imperfect owing to the discontinuous nature of sediment types. Groundwater flow in the A- and B-zones beneath the site is generally to the northeast, which is consistent with the northerly regional flow towards the San Francisco Bay (USEPA, 1991).

## 3.3 History of Contamination

The IM Site is located at 3000 Oakmead Village Drive, Santa Clara, California in the northern section of the IM/MSC Site. The IM Site consists of a single-story structure located on approximately 2 acres of property. About 90 percent of the property is paved, with landscaping around the edges. Intel Magnetics produced and tested computer memory products known as magnetic bubbles at the IM Site. The chemicals used for these activities included isopropanol, Freon, chlorinated hydrocarbons (unspecified, but reportedly does not include tetrachloroethylene [PCE] and 1,1,1-trichloroethane [TCA]), n-butyl acetate,

Hunt Developer (isodecane C11 and C12), acetone, xylene, dilute acids, and the metals arsenic, chromium, lead, and tin. Among others, TCE, TCA, and Freon 113 have been detected in the groundwater. The chemicals were initially stored in 500-gallon underground storage tanks (USTs). In 1985, as a result of ongoing soil and groundwater contamination studies, IM removed the 500-gallon UST and 35 cubic yards of soil and installed, in a new excavation, a 1,000-gallon, double-walled, stainless-steel tank. IM also operated an acid neutralization system on-site in which a dilute acid stream was neutralized in three underground compartments before being discharged to the sanitary sewer. The system reportedly neutralized approximately 2,000 gallons of wastewater a day (USEPA, 1991). USEPA placed the IM Site on the National Priorities List (NPL) in May 1986.

The MSC Site is located at 2986 Oakmead Village Court, Santa Clara, California in the southern section of the IM/MSD Site. The MSC Site consists of a single-story structure located on approximately 1 acre of property. Like the IM Site, approximately 90 percent of the property is paved, with landscaping around the borders of the property. Micro Storage Corporation used the Site for research, development and pilot manufacturing of microcomputer disk drives. In the course of these activities, MSC used Freon 113 and other chlorinated solvents, which have been detected in the groundwater. The chemicals were stored in an external shaded storage area, located on the west side of the building on a concrete platform, typically in 5-gallon and 55-gallon drums (USEPA, 1991). The MSC Site was included with the IM Site as one combined Superfund site in 1988.

A separate groundwater plume has been identified beneath the MCC Site, located at 3165 Kifer Road, west of the MSC Site. TCE has been detected in groundwater monitoring wells on the property, although no source has been located. No USTs are known to have been installed at the MCC property, and the lateral and vertical extent of the MCC plume has not been completely defined. However, data submitted at the time of the ROD by both the property owner, Metropolitan Life Insurance Company, and KCIII indicate that either the MCC and IM/MSD plumes are not commingled, or the plumes are only commingled near the lateral leading edge at levels less than approximately 50 micrograms per liter ( $\mu\text{g}/\text{L}$ ) total VOC (USEPA, 1991). The Water Board issued site cleanup requirements for MCC in June 1991. Because the MCC plume and the IM/MSD plume are in close proximity to each other, USEPA and the Water Board required that operation of any extraction system on either property must be coordinated so as to minimize the hydraulic effects on the other site's groundwater plume.

### 3.4 Basis for Taking Action

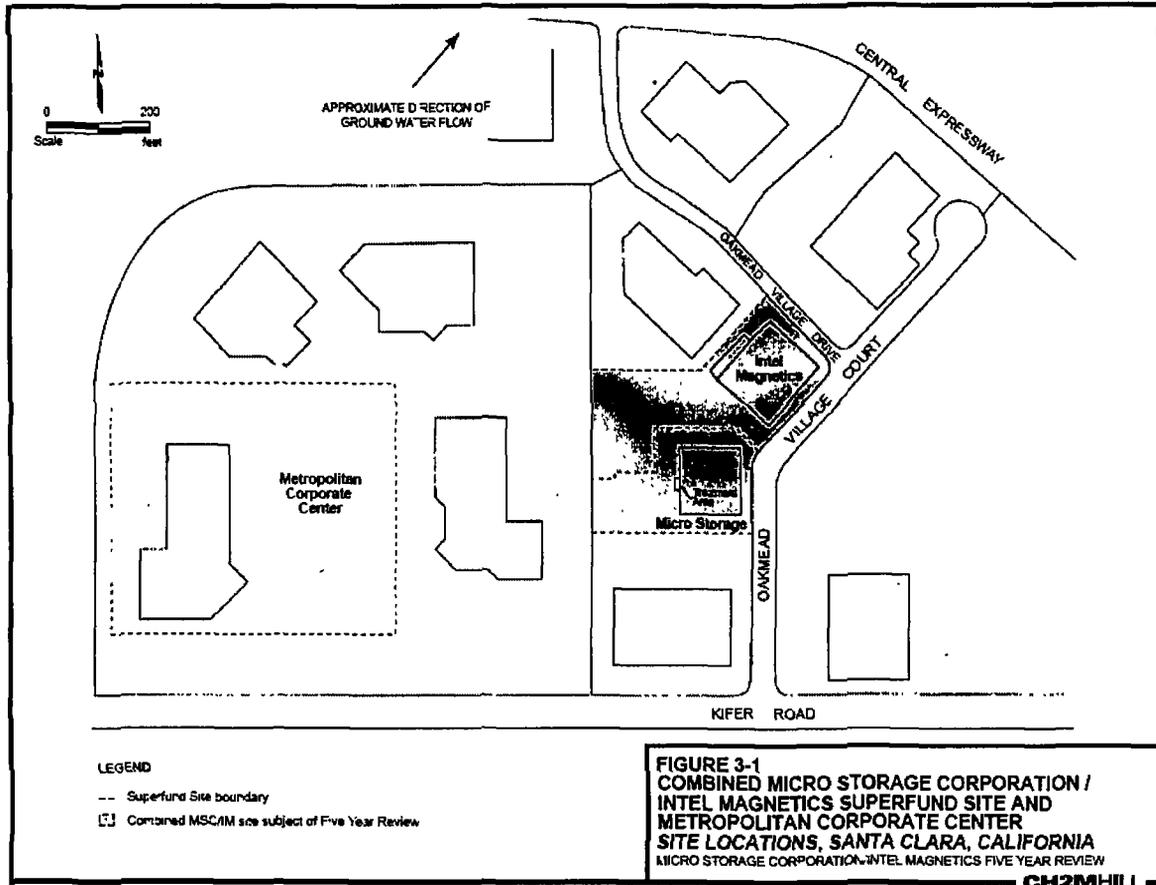
As mentioned above, the IM Site was placed on the NPL in May 1986. The MSC Site was included with the IM Site in 1988 as one combined Superfund site. The following is a chronology of important IM/MSD regulatory activities:

- June 16, 1982: Intel Magnetics submits completed Water Board Facility Questionnaire.
- March 19, 1986: Water Board adopted National Pollutant Discharge Elimination System Permit No. CA0028941 (Order No. 86-014) for the discharge of treated extracted groundwater at the IM Site.
- May 1986: IM Site added to the final NPL.

- February 2, 1987: KCIII submits its tenants' Hazardous Chemical Use History Report.
- October 12, 1988: USEPA modifies the name of site from IM to the combined IM/MSC Site.
- February 15, 1989: Water Board adopted Order No. 89-017 issuing Site Cleanup Requirements to MSC and KCIII.
- March 17, 1989: Water Board adopted Order No. 89-086 amending Site Cleanup Requirements to MSC, KCIII, Intel, and Oakmead Village Drive Limited (approving Remedial Investigation/Feasibility Study Work Plan and rescinding Order No. 89-017).
- March 21, 1990: Water Board adopted NPDES Permit No. CA0029670 (Order No. 90-040) for the discharge of treated extracted groundwater at the combined IM/MSC Site.

In early 1982, as part of a wider Water Board-initiated investigation into the extent of leakage from USTs and pipes in the South Bay Area, TCE, TCA, and Freon 113 were detected in the A-zone aquifer below the IM Site. In the 1991 ROD, USEPA noted a Jacobs Engineering report from 1988 that concluded that the MSC Site was likely the primary source of VOCs, while the IM Site represented a secondary source (USEPA, 1991).

**FIGURE 3-1** Combined Intel Magnetics/Micro Storage Corporation Superfund Site and Metropolitan Corporate Center Site Locations, Santa Clara, California



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## 4.0 Remedial Actions

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This section summarizes the remedial actions selected and implemented at the IM/MSC Site, as well as operations and maintenance (O&M) of the remedy. USEPA issued the ROD for the Site in 1991.

### 4.1 Remedial Actions Selection and Implementation

Sometime between 1988 and 1991, MSC declared bankruptcy and was dissolved as a corporation. Since that time, KCIII has been the primary responsible party for the cleanup. From before the time the IM Site was put on the NPL in 1986 through the issuing of the ROD in 1991, KCIII conducted interim cleanup measures, including installing a groundwater extraction and treatment system (capable of extracting approximately 13,000 gallons/day) and excavating and removing the 500-gallon UST and 35 cubic yards of soil (USEPA, 1991).

The remedial action goals of the site were developed based on ARARs and results from the human health and ecological risk assessments. The major components of the remedy included in the 1991 ROD were:

- a) Perform continued groundwater extraction until drinking water standards for TCE (5 µg/L); 1,1-dichloroethane (DCA) (5 µg/L); 1,1-DCE (4 µg/L); cis 1,2-DCE (6 µg/L); trans 1,2-DCE (10 µg/L); Freon 113 (1,200 µg/L); methylene chloride (40 µg/L); PCE (5 µg/L); toluene (100 µg/L); 1,1,1-TCA (200 µg/L); 1,1,2 TCA (32 µg/L); and chloroform (100 µg/L) are achieved in all combined IM/MSC site monitoring wells.
- b) Achieve hydraulic containment of the entire groundwater plume above cleanup standards and continued groundwater extraction at the four existing wells. Modifications to the system are required in the event that the interim hydraulic control system is no longer effective in containing and removing the groundwater pollutants.
- c) Perform maintenance of hydraulic control to prohibit the further vertical and horizontal migration of the groundwater pollution. This requirement shall remain in effect until cleanup standards are achieved.
- d) Perform continued quarterly groundwater monitoring at the combined IM/MSC Site during the cleanup period. Continue to collect water samples to verify that cleanup is proceeding and that VOCs do not migrate above cleanup standard levels beyond current boundaries or into the deeper B-zone. The frequency of monitoring will be decreased from quarterly to triannually 2 years after approval of a report submitted in compliance with Provision C.4.a (hydraulic control) of the Water Board Order. The frequency of monitoring will further be decreased to biannually once cleanup standards have been achieved and stabilized for 1 year. Detailed sampling and reporting requirements for the combined IM/MSC Site are contained in the Water Board's Self-Monitoring Plan.

- e) Perform treatment of extracted groundwater with an existing carbon adsorption system. The treated groundwater will continue to be discharged to Calabazas Creek, pursuant to a NPDES permit.
- f) File a deed restriction prohibiting use of on-site shallow groundwater for drinking water and for controlling other subsurface activities. The deed restriction shall remain in place until groundwater cleanup standards are achieved.

In 1991, following the issuing of the ROD, groundwater extraction was expanded to include the MSC Site. At this time, there were five extraction wells on the combined IM/MS Site: four on the MSC Site and one on the IM Site. Between 1991 and 1995, the expanded groundwater extraction system pumped approximately 15.6 million gallons of groundwater and removed approximately 12.5 pounds of TCE before discharging to the Calabazas Creek. At that time, TCE concentrations had been reduced from a high of up to 1,400  $\mu\text{g/L}$  to approximately 100  $\mu\text{g/L}$ ; 1,1-DCE and cis 1,2-DCE had been reduced from highs of 28  $\mu\text{g/L}$  and 65  $\mu\text{g/L}$ , to about 5  $\mu\text{g/L}$  and 8  $\mu\text{g/L}$ , respectively. Other COCs were detected below cleanup standards. While the amount of VOCs removed per volume of groundwater extracted steadily declined during this time period, mass removal rates of TCE remained constant by increasing the amount of water being extracted (Water Board, 1996).

In 1995, KCIII requested that it be allowed to shut down the extraction system. Frequent equipment failures were resulting in significant downtime of the extraction system. KCIII claimed that concentrations of VOCs in groundwater had reached asymptotic levels and that further groundwater extraction would not result in any significant further reductions in VOC concentrations, particularly when costs associated with continuing to run the system were considered. Additionally, information from this site and other sites in the South San Francisco Bay indicated that, while groundwater extraction works to remove contaminant mass, reducing VOC concentrations and containing plumes, it may not be able to restore VOC-contaminated aquifers to background or drinking-water quality standards (Water Board, 1996). In April 1995 the Water Board approved this request, and the system has since remained shut down. Groundwater monitoring has occurred at least biannually since then (except in 2005, when groundwater was sampled once).

In November 1993, Kim Camp III, owner of the MSC Site, recorded a covenant for the MSC property at 2986 Oakmead Village Court, Santa Clara, as required by the ROD. USEPA has no evidence that a covenant was ever recorded at the IM Site.

Also in 1995, as part of the 1994 fourth quarter monitoring report and as part of the 5-year status report, KCIII requested a designation of Non-attainment Area (NAA). As part of a NAA designation, KCIII would be required to establish a contingency plan if an established trigger concentration is detected at any of the wells. This contingency plan would require restarting groundwater extraction until concentrations drop back below the trigger concentration for three quarters.

## **5.0 Progress Since Last Five-Year Review**

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USEPA issued the last Five-Year Review report for the IM/MSC Site in September 2002.

### **5.1 Protectiveness Statement from Last Review**

The protectiveness statement from the second Five-Year Review was as follows:

Because the remedial actions at the site are protective, the site is protective of human health and the environment. It is expected that it may require ten years to achieve cleanup goals. In the interim, ingestion of contaminated groundwater is the only exposure pathway that could result in unacceptable risks. This pathway is being controlled through institutional controls prohibiting the use of groundwater.

The risk assessment performed for the site in the BPHE identified inhalation of vapors from underlying groundwater in a residential use scenario as a potential exposure pathway that could result in unacceptable risk. However, groundwater VOC levels have been reduced such that the current levels of TCE and 1,2-DCE in groundwater at the site are below the screening levels for potential indoor air risk for both a commercial/industrial and residential use scenario.

The existing monitoring well network and sampling program is sufficient to track the stability of the plume and the progress of natural attenuation in remediating the groundwater contamination.

### **5.2 Issues and Recommendations from Last Five-Year Review**

The following issue was identified during the second Five-Year Review:

The only issue identified during the review is the potential that off-site contamination is migrating onto the IM/MSC Site. This does not affect current protectiveness but it could lengthen the time to achieve cleanup of groundwater.

The recommendations developed from the last Five-Year Review are as follows:

It is recommended that additional investigation of a potential off-site source of VOC contamination that may be migrating onto the IM/MSC Site be done. A research of the upgradient properties should be conducted to see if there are any sites with known VOC groundwater pollution. A well survey should be performed to determine what existing upgradient wells may be available for sampling. Based on this information a sampling plan can be created and carried out. The Regional Board will be the oversight agency responsible for the investigation. The target date for completion will be January 30, 2003.

## **5.3 Follow-up Actions from Last Five-Year Review**

USEPA and KCIII have taken the following actions to address the issues and recommendations made in the last Five-Year Review.

### **5.3.1 Continued Groundwater Monitoring**

With the exception of 2005, when groundwater was sampled only once, KCIII has sampled the groundwater at least biannually since the previous Five-Year Review.

### **5.3.2 Investigation for Off-site Sources of VOC Migration to the IM/MSD Site**

The previous Five-Year Review report concluded that increases in VOC concentrations on the upgradient edge of the plume, as well as the appearance of MTBE, which had not previously been detected at the site, were likely due to migration from an off-site source. The Water Board, in conjunction with the USEPA is further investigating to identify potential off-site sources of VOCs and MTBE migration onto the IM/MSD Site.

## 6.0 Five-Year Review Process

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### 6.1 Administrative Components

The USEPA conducted this Five-Year Review. The Five-Year Review consisted of a review of relevant documents, a regulatory review, and a site inspection.

### 6.2 Community Involvement

The site repository is located at the Santa Clara Central Park Library, 2635 Homestead Road, in Santa Clara, California. This Five-Year Review Report and other important environmental documents related to the Site are available in the Site repository as well as in the EPA Superfund Records Center, located at 95 Hawthorne Street, San Francisco, California. The community is welcome to view the Five-Year Review at either of these locations.

A public notice will be placed in the *Santa Clara Weekly* when the Five-Year review is finalized. The notice will include the purpose of the Five-Year Review, a summary of recommendations from the second Five-Year Review, a summary of findings from the third Five-Year Review, and information on how to access the third Five-Year Review Report. In addition, the public will be encouraged to contact the Water Board or EPA with any questions or concerns about the remedy being conducted at the IM/MSC Site.

### 6.3 Document Review

As part of the Five-Year Review process, USEPA reviewed relevant documents and information related to Site activities. The documents chosen for review primarily focused on progress since the last Five-Year Review but ranged in publication date from 1991 to present.

### 6.4 Data Review

This section discusses the data and information found in documents relating to the groundwater monitoring activities at the IM/MSC Site from 1996 to 2006. Figure 6-1 presents sampling results for the 15 wells reviewed for this report. Results reflect the maximum concentrations for the specified analytes from 2002 (the year of the previous Five-Year Review) and 2006 (the year of the current Five-Year Review), when those results exceeded cleanup standards.

USEPA reviewed groundwater monitoring data from the years 1996 to 2006 for the 15 monitoring wells as part of this Five-Year Review. These 15 wells were chosen based on their inclusion in the most recent sampling event, which occurred on August 14, 2006. Results for 1996 through 2002 were also covered in the previous Five-Year Review.

For the years that the groundwater extraction system was operating, VOC levels in the plume fell consistently until they reached near-asymptotic or asymptotic levels. In 1995, KCIII shut down the groundwater extraction system and the system remains dormant. The Water Board noted in the first Five-Year Review in 1996 that "Information from this site and other sites in the [South San Francisco Bay] and around the country indicates that while groundwater extraction works to reduce VOC concentrations and contain plumes, it may not be able to restore VOC contaminated aquifers to background or drinking water quality" (Water Board, 1996). Therefore, the main activities conducted at the IM/MSC Site between 1996 and 2006 have consisted of at least biannual groundwater monitoring (except in 2005) to monitor of the plume stability and natural attenuation of the remaining VOCs.

Since the groundwater extraction system was shut down in 1995, PCE, 1,1,1-TCA, 1,1,2-TCA, Freon 113, toluene, chloroform, and methylene chloride have not been detected above their respective cleanup standards at the selected monitoring wells.

The maximum concentrations of 1,1-DCA and 1,1-DCE were detected at monitoring well MW-6 on August 14, 2006, with concentrations of 38.7  $\mu\text{g}/\text{L}$  and 15.4  $\mu\text{g}/\text{L}$ , respectively. This well has shown steady increases for these two contaminants starting in September 2001, when concentrations of 4.8  $\mu\text{g}/\text{L}$  and 1.3  $\mu\text{g}/\text{L}$  were detected, respectively. This increase could possibly be attributed to an upgradient off-site source. The maximum concentration of total 1,2-DCE was detected at monitoring well MW-1 on September 20, 2002, with a concentration of 59.7  $\mu\text{g}/\text{L}$ . The maximum concentration of TCE also was detected at monitoring well MW-1 on September 20, 2002, with a concentration of 480  $\mu\text{g}/\text{L}$ . In general, concentrations of TCE and total 1,2-DCE remain above cleanup standards throughout the IM/MSC Site. However, concentrations continue to slowly decrease or remain stable, and any increases are suspected to be caused by migration from an off-site source.

MTBE, a gasoline additive, was first detected on September 26, 2001 in nine of the 15 monitoring wells examined for this review, including both wells in the B-zone aquifer. It has since been detected in four additional wells covered by this review, for a total of 13 wells. The maximum concentration was detected in September 2001 at monitoring well MW-5, which monitors the B-zone aquifer. The detected concentration of 2.3  $\mu\text{g}/\text{L}$  is well below the California drinking water maximum contaminant level for MTBE of 13  $\mu\text{g}/\text{L}$ , and the majority of detections for MTBE at the 15 selected monitoring wells have been below 1  $\mu\text{g}/\text{L}$ .

## 6.5 Regulatory Review

USEPA reviewed the ARARs and other standards to be considered for the selected remedy at the IM/MSC Site. The goal of the review was to determine if the ARARs and other standards have changed since the ROD was issued in 1991 in ways that might affect the current protectiveness of the selected remedy. USEPA concluded that there are no changes to ARARs that affect protectiveness at the Site.

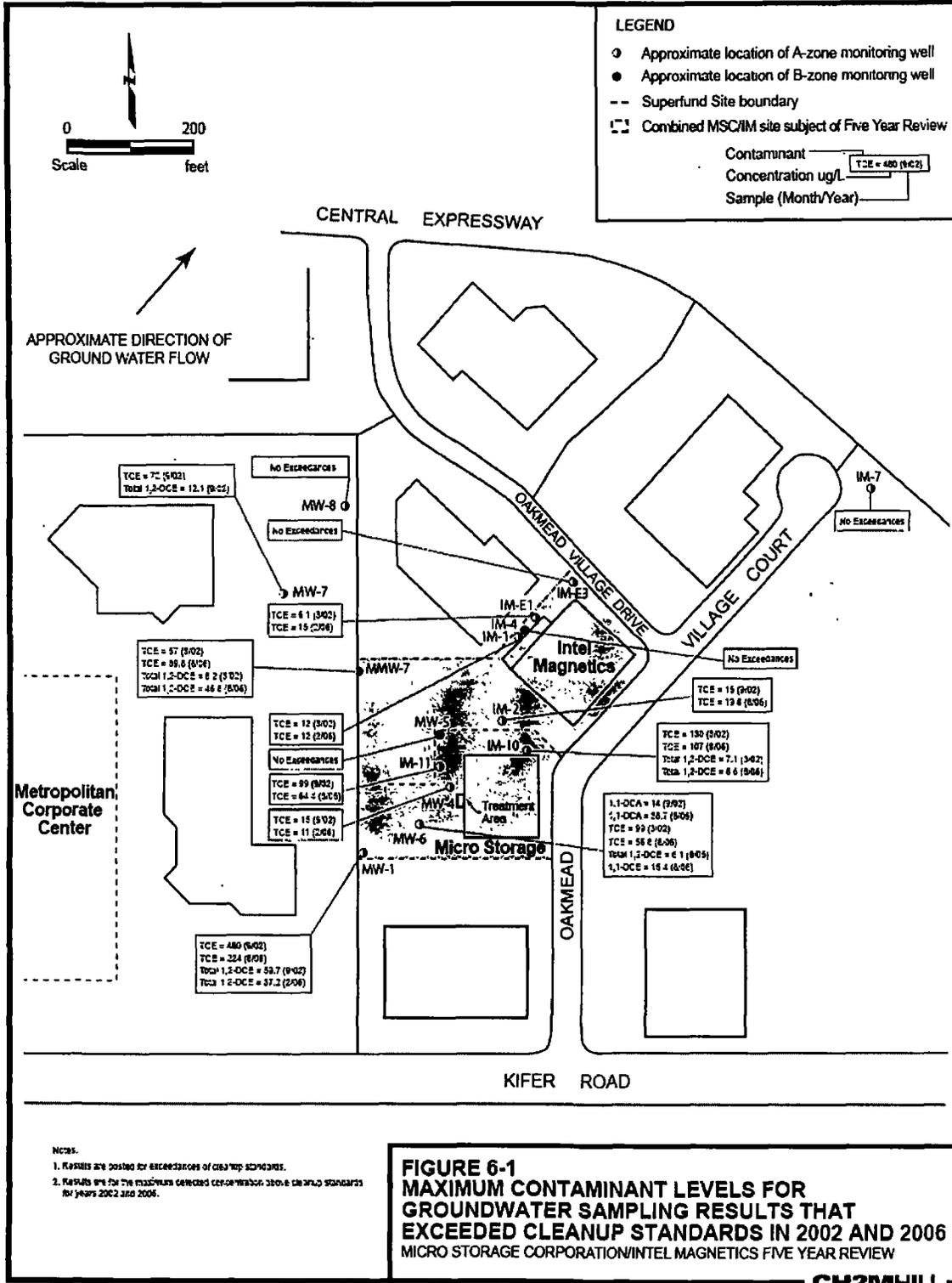
In 1995, California passed California Civil Code Section 1471, which creates a framework for environmental restriction covenants and specifies how they are to be recorded and made applicable to successors. A new covenant or covenants should be recorded to be consistent

with state law. The planned ROD Amendment will address this issue. A ROD Amendment is anticipated within the next two years.

## **6.6 Site Inspection**

Representatives of USEPA conducted a site inspection on May 4, 2007. The purpose of the site inspection was to observe conditions and status of operation at the IM/MSC Site and the surrounding area. Results of the site inspection indicate that the site remediation and monitoring infrastructure is in fairly good condition. Photos from the inspection can be found in Appendix A.

**FIGURE 6-1 Maximum Contaminant Levels for Groundwater Sampling Results that Exceeded Cleanup Standards in 2002 and 2006**



ES042007001SFO\_Fig 6-1 Groundwater Sampling\_04/25/07\_ez

## 7.0 Technical Assessment

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This section evaluates the protectiveness of the implemented remedy at the IM/MSC Site based on data and information presented in the previous section. The technical assessment is based on the responses to three questions set forth in USEPA's Five-Year Review guidance.

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

This subsection discusses how the IM/MSC 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.

USEPA's review of documents, ARARs, risk assumptions, and the site inspection indicates that the remedy is functioning as intended, but cautionary actions may be required.

- The original remedy included four provisions related to groundwater extraction and treatment (components (a), (b), (c), and (e) listed in Section 4.0). Groundwater extraction and treatment reduced VOC concentrations to asymptotic or near-asymptotic levels by the time of the first Five-Year Review in 1996, and the Water Board allowed KCIII to shut down the treatment system. Additionally, the Water Board noted in the first Five-Year Review that, while groundwater extraction may reduce VOC concentrations and contain plumes, it may not be able to restore VOC-contaminated aquifers to background or drinking-water quality (USEPA, 1996). The plume in the A-zone aquifer has remained stable, and only one instance of a cleanup standard exceedance has been observed in the B-zone aquifer since the system was shut down. Monitoring has shown that the plume is either decreasing or remaining stable overall. Natural attenuation may be occurring, and should be evaluated in the future as a method for reducing and maintaining stable VOC concentrations on the site.
- Component (d) from the remedy pertains to conducting periodic groundwater monitoring. Groundwater has been sampled at least biannually (except in 2005) and, overall, has shown stable or decreasing VOC concentrations at the site (TRC Lowney, 2006). Instances of increased VOC concentrations and the appearance of MTBE in some wells are suspected to be attributable to an upgradient off-site source.
- Component (f) from the remedy pertains to implementing institutional controls to prevent ingestion or other direct exposure to the shallow groundwater. A deed prohibiting use of on-site shallow groundwater for drinking water was submitted in 1991 (USEPA, 1992) and is still in effect.

However, the following issues were identified:

- Remediation goals for the aquifer area have not yet been achieved. Groundwater monitoring reports indicate that, in many places throughout the Site, concentrations of TCE and total 1,2-DCE remain above cleanup standards established in the ROD. Additionally, 1,1-DCA and 1,1-DCE have been detected in rising concentrations at well MW-6, and MTBE continues to be detected on-site.
- Efforts to hydraulically contain and stabilize an off-site source of VOCs may affect the stability of the IM/MSD plume.

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

The exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of remedy selection are generally unchanged.

### **7.2.1 Changes in Site Conditions**

No major changes were identified in the Site conditions of the upland area that might affect the exposure pathways.

### **7.2.2 Changes in Exposure Pathways**

The use of the site remains commercial and office space. The exposure assumptions used to develop the Final Baseline Public Health Evaluation (BPHE) were for potential future exposure if untreated groundwater were to be used for drinking water and if residential uses were to occur at the Site. The institutional controls in place include prohibitions on the use of groundwater until cleanup levels are achieved. There have been no revisions to the standardized risk assessment methodology that could affect the protectiveness of the remedy.

In the BPHE, inhalation of vapors from underlying groundwater in a residential use scenario was identified as a potential exposure pathway that could result in unacceptable risk. The Regional Board has developed risk-based screening levels for a variety of exposure routes, including vapor intrusion into buildings from underlying groundwater contamination. Groundwater VOC levels have been reduced such that current levels of TCE and 1,2-DCE in groundwater at the site are below the screening levels for potential indoor air risk for both commercial/industrial and residential use scenario.

### **7.2.3 Changes in Toxicity Values**

There have been a number of changes to the toxicity values for specific COCs in groundwater at the IM/MSD Site since the ROD was signed in 1991. Although these changes do not affect the protectiveness of the remedy, the changes in TCE toxicity values in particular do create some uncertainty at this Site. In August 2001, USEPA's Office of Research and Development (ORD) released the draft "Trichloroethylene Health Risk Assessment: Synthesis and Characterization" ("TCE Health Risk Assessment") for external peer review. The draft TCE Health Risk Assessment takes into account recent scientific studies of the health risks posed by TCE. According to the draft TCE Health Risk Assessment, for those individuals who have increased susceptibility and/or higher

background exposures, TCE could pose a higher risk through inhalation than previously considered. The draft TCE Health Risk Assessment is available on-line at: <http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=23249>.

The Science Advisory Board, a team of outside experts convened by USEPA, reviewed the draft TCE Health Risk Assessment in 2002. The Science Advisory Board's review of the draft TCE Health Risk Assessment is available at: <http://www.epa.gov/sab/pdf/ehc03002.pdf>.

In July 2006, the National Academy of Sciences completed additional peer review of scientific issues that were the basis for the draft TCE Health Risk Assessment. In response to this review, USEPA will revise the draft TCE Health Risk Assessment. Consequently, review of the toxicity value for TCE may continue for a number of years. This issue will need to be updated in subsequent Five-Year Reviews.

### **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 IM/MSD Site.

## 8.0 Issues and Recommendations

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This section describes issues and recommendations identified for the IM/MSC Site during this Five-Year Review.

### Issue

Although the plume appears to be stable or decreasing, many areas of the site continue to show contaminant levels above cleanup standards, particularly for trichloroethylene and total 1,2-dichloroethylene.

### Recommendation

Continue biannual groundwater sampling, at a minimum, to monitor the plume stability and attenuation, and maintain institutional controls to prevent direct exposures.

### Issue

Because asymptotic levels had been reached at the site, active groundwater extraction ceased and the groundwater extraction and treatment remedy was ultimately changed to monitored natural attenuation.

### Recommendation

A ROD amendment will be necessary to document this modification and any other changes that affect the selected remedy.

### Issue

A covenant for the MSC property has been recorded. However, there is no evidence that a covenant was ever recorded at the IM Site. The existing covenant was recorded prior to passage of California Civil Code section 1471, which establishes the framework for environmental covenants in California.

### Recommendation

New restrictive covenants must be recorded for both properties that are consistent with current California law.

### Issue

Groundwater contamination may be migrating onto the IM/MSC Site from an upgradient, off-site source.

### Recommendation

The Water Board in conjunction with USEPA is currently conducting an investigation to identify the off-site source. Pending the results of that investigation, it is recommended that the groundwater extraction and treatment system be assessed for readiness in the event that

the system must be restarted. If the investigation identifies an off-site source of contaminants, hydraulic controls may be used at that site to prevent further migration of contaminants onto the IM/MSC Site, which could affect the stability of the IM/MSC plume. The IM/MSC groundwater extraction and treatment system or another hydraulic control system may be required to maintain plume stability.

As noted in the 1991 Record of Decision, USEPA and the Water Board require that the operation of any extraction system on the IM/MSC Site or the neighboring Metropolitan Corporate Center site be coordinated so as to minimize the hydraulic effects on the other site's groundwater plume (USEPA, 1991).

**Table 8-1**

Issues, Recommendations, and Follow-Up Actions

*Third Five-Year Review Report for IM/MSC Superfund Site, Santa Clara, California*

Issue	Recommendations and Follow-Up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness (Y/N)	
					Current	Future
Contaminant levels in groundwater remain above cleanup standards.	Continue biannual groundwater monitoring to assess plume stability and natural attenuation. Maintain institutional controls.	PRP	USEPA	Ongoing	N	N
Because asymptotic levels had been reached at the site, active groundwater extraction ceased and the GET remedy was ultimately changed to monitored natural attenuation.	A ROD amendment will be necessary to document this modification and any other changes that affect the selected remedy.	PRP	USEPA	12/2010	N	N
Covenants needs to be revised and recorded.	The covenants need recorded to be consistent with current California law.	PRP, USEPA, and Water Board	USEPA	10/2008	N	N
Contaminants may be migrating onto site from off-site source.	Continue current investigation of the potential off-site, upgradient source. Additional remediation measures, including hydraulic controls may be necessary to prevent further contaminant migration.	PRP	USEPA	09/2009	N	Y

## **9.0 Protectiveness Statement**

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The remedy at the IM/MSC Site is currently protective of human health and the environment because exposure pathways that could result in unacceptable risks are being controlled. However, in order to be protective in the long-term, institutional controls need to be placed on the Intel Magnetics property.

## **10.0 Next Five-Year Review**

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The next Five-Year Review for the IM/MSC will be conducted in 2012, five years from the date of this review.

## 11.0 References

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- California Regional Water Quality Control Board, San Francisco Bay Region (Water Board). 1996. *Five-Year Review Intel Magnetics/Micro Storage, Santa Clara, CA*. October.
- TRC Lowney. 2006. *Second Semi-Annual 2006 Ground Water Monitoring Report*. October.
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