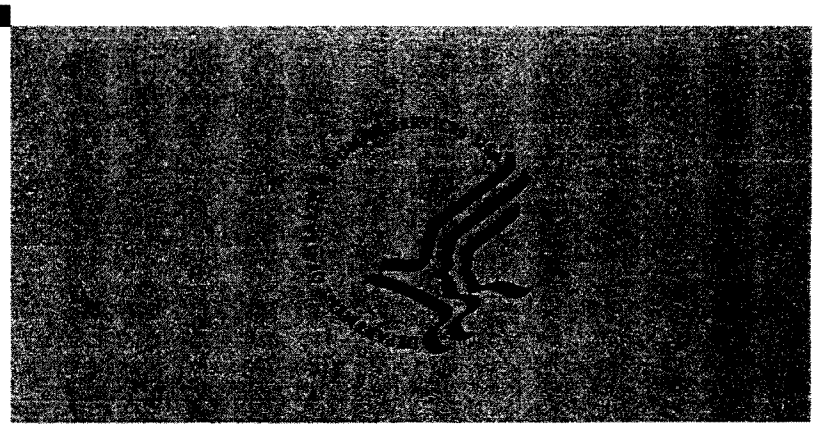
Public Health Assessment for

MICRO STORAGE/INTEL MAGNETICS
SANTA CLARA, SANTA CLARA COUNTY, CALIFORNIA
CERCLIS NO. CAD092212497
OCTOBER 5, 1992

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
PUBLIC HEALTH SERVICE
Agency for Toxic Substances and Disease Registry



PUBLIC HEALTH ASSESSMENT

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SANTA CLARA, SANTA CLARA COUNTY, CALIFORNIA

CERCLIS NO. CAD092212497

Prepared by:

California Department of Health Services
Under Cooperative Agreement with the
Agency for Toxic Substances and Disease Registry

THE ATSDR PUBLIC HEALTH ASSESSMENT: A NOTE OF EXPLANATION

This Public Health Assessment was prepared by ATSDR pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund) section 104 (i)(6) (42 U.S.C. 9604 (i)(6), and in accordance with our implementing regulations 42 C.F.R. Part 90). In preparing this document ATSDR has collected relevant health data, environmental data, and community health concerns from the Environmental Protection Agency (EPA), state and local health and environmental agencies, the community, and potentially responsible parties, where appropriate.

In addition, this document has previously been provided to EPA and the affected states in an initial release, as required by CERCLA section 104 (i)(6)(H) for their information and review. The revised document was released for a 30 day public comment period. Subsequent to the public comment period, ATSDR addressed all public comments and revised or appended the document as appropriate. The public health assessment has now been reissued. This concludes the public health assessment process for this site, unless additional information is obtained by ATSDR which, in the Agency's opinion, indicates a need to revise or append the conclusions previously issued.

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SUMMARY

The California Department of Health Services (CDHS) has prepared this public health assessment under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). The ATSDR/CDHS public health assessment is a mechanism to provide the community with information on the public health implications of specific hazardous waste sites and identify those populations for which further health actions or studies are indicated. This public health assessment serves to update the preliminary public health assessment for Intel Magnetics, completed by ATSDR in October 1988. The public health assessment is based on a recent review of environmental monitoring data, a site visit, and consultation with involved agencies and the public.

The former Micro Storage and Intel Magnetics facilities are located in the City of Santa Clara, California, approximately 50 miles south of San Francisco. The combined facilities were included on the National Priorities List (NPL) by the U.S. Environmental Protection Agency in October 1988. The California Regional Water Quality Control Board is the lead agency for overseeing investigation and remediation at the site. The source of contamination is primarily spillage during routine activities when the facilities were operating. Intel Magnetics operated an underground solvent storage tank. The tank appeared to be in good condition at the time of excavation, although soil over the tank was found to be contaminated, indicating that spillage had occurred. Spills may also have occurred at the former Micro Storage facility during its operations. The solvent storage tank and surrounding contaminated soils have been removed. A system of ground-water extraction and liquid phase carbon absorption treatment is currently operating at the site to restore ground water to acceptable drinking water standards.

Based on information reviewed, ATSDR and CDHS conclude that the Micro Storage/Intel Magnetics site represents no apparent public health hazard. The available evidence indicates that humans have not been exposed to contaminants related to the site at levels of concern. Significant future exposure to site-related contaminants is unlikely if: 1) the ground water extraction and treatment system reduces concentrations of site-related contaminants to below levels of health concern; 2) no future drinking water wells are placed in areas of known contamination until remediation has reduced contaminant concentrations below levels of health concern; 3) any future excavation/construction projects at the site take the necessary precautions to insure that workers are not exposed to contaminants above levels of health concern; and 4) the site is not redeveloped for residential use unless subsurface soil contamination is remediated. No community health concerns have been identified with respect to the site. An evaluation of existing health related data is not warranted due to the absence of exposure to contaminants at levels of concern and the absence of community concern regarding the site.

BACKGROUND

The California Department of Health Services (CDHS) has prepared this public health assessment under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). ATSDR, located in Atlanta, Georgia, is a federal agency within the United States Department of Health and Human Services. Staff from ATSDR prepared a preliminary public health assessment for the Intel Magnetics site in October 1988 (1). The preliminary public health assessment concluded that the site was not a public health concern based on available information, however, insufficient information was available to complete a full public health assessment. The present public health assessment serves to update the preliminary public health assessment, and is based on a recent review of environmental monitoring data and information, a site visit, and consultation with involved agencies and the public. The environmental data and information reviewed are from the final baseline public health evaluation (2) and final remedial investigation reports (3-5) for the site required under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980.

Although public health assessments evaluate past, current, and future chemical exposures related to a particular site, the focus of the assessment is the evaluation of past and current exposures (i.e., exposures up until the time the public health assessment is completed) and the resulting current public health risk and impact on the community. The public health assessment has four primary objectives: 1) determine if there have been exposures to hazardous substances from a particular hazardous waste site at levels that could pose a health threat; 2) determine if it is possible to better define what impact the site may have had on the community by using health related data; 3) determine whether all relevant current and future exposure pathways are being addressed or sufficiently addressed by the responsible parties and the regulatory agencies involved; and 4) provide the community with this information and address specific community health concerns.

A. Site Description and History

The former Micro Storage and Intel Magnetics facilities are located in the City of Santa Clara, approximately 50 miles south of San Francisco. The facilities that formerly housed the operations of Micro Storage and Intel Magnetics are located next to each other in an industrial park. A map of the vicinity around the site is shown in Figure 1. Both facilities are currently occupied by different tenants.

Micro Storage leased the facility at 2986 Oakmead Village Court from January 1985 to December 1986. Micro Storage operations at the facility included the manufacture of disk drives and research

and development. The site consists of a single story structure on approximately one acre of property. The building is surrounded with pavement. Less than 10% of the property is unpaved, consisting of landscaped areas on the borders of the property (2).

Chemicals reported to have been used at the former Micro Storage facility were stored in an outside storage area on the west side of the building on a concrete slab. Large quantities were contained in 55-gallon drums on wood pallets inside the storage area. Other chemicals were stored in smaller containers inside a metal cabinet within the storage area. Freon was stored in a 55-gallon drum which was brought into the building where it was pumped into a degreaser. Used chemicals were pumped into a 55-gallon drum and moved to the outside storage area for collection. Micro Storage did not indicate that any spills or leaks occurred at the facility, although about 10 gallons of Freon was reported missing and may have leaked or evaporated from a 55-gallon drum between December 1986 and April 1987 (2).

Intel Magnetics, a wholly owned subsidiary of the Intel Corporation (Intel), leased the facility located at 3000 Oakmead Village Drive from 1978 to 1987, where it produced devices for the electronics industry. The facility consists of a single story structure on approximately two acres of property. As with 2986 Oakmead Village Court, the majority of the property is paved, the only unpaved areas consisting of landscape on the borders of the property. Intel Magnetics operated a 500-gallon underground waste solvent tank at the facility. The waste solvent storage tank was installed in 1978 and held a mixture reportedly consisting of 70% water, 25% isopropanol, and small amounts of Freon, N-butyl acetate, Hunt Developer, acetone, xylene, and polymer solids (2, 3). The tank consisted of a single wall of steel (as compared to two separate walls), and was buried directly underground (as apposed to being placed inside a concrete vault).

In April 1982, the California Regional Water Quality Control Board (RWQCB) issued a questionnaire to all facilities in the San Francisco Bay Area known to store and handle chemicals. As a result of this questionnaire, Intel Magnetics initiated a ground-water investigation in July 1982 with the installation of a ground-water monitoring well next to the underground solvent tank. This well was screened in (i.e., open to) the uppermost water-bearing zone (labeled the A-zone). Three ground-water samples from the well were found to contain volatile organic compounds (VOCs), including 1,1,1-trichloroethane (up to 170 parts per billion parts ground water [ppb]), Freon 113 (up to 58 ppb), and trichloroethene (up to 12 ppb) (2, 3). An additional eight monitoring wells were installed in 1982 and 1983. Based on the absence of VOCs in an upgradient well, it was thought by EPA that the ground-water plume originated at Intel Magnetics. EPA

placed Intel Magnetics on the NPL in June 1986.

In August 1986, two more monitoring wells were installed upgradient at 2986 Oakmead Village Court to investigate a possible upgradient source. Ground-water samples from these wells contained higher concentrations of contaminants than downgradient wells, indicating that some of the contamination may have originated from the 2986 Oakmead Village property. As a result, the EPA redefined the NPL site as Micro Storage/Intel Magnetics in October 1988 (2).

The California Regional Water Quality Control Board (RWQCB), San Francisco Bay Region (Region 2), is the lead agency regulating the Micro Storage/Intel Magnetics cleanup under a formal agreement with the EPA. As an NPL site, Micro Storage/Intel Magnetics is required under the Comprehensive Environmental Response, Compensation and Liability Act of 1980 to complete a remedial investigation, a feasibility study, and a baseline public health evaluation. Kim Camp Properties (the owner of the property at 2986 Oakmead Village Court Drive where Micro Storage was a tenant) retained J.V. Lowney & Associates in 1986 to conduct the remedial investigation (3-5) and feasibility study (6). The baseline public health evaluation (2) for the Micro Storage/Intel Magnetics site was conducted by Clement Associates, Incorporated.

The remedial investigation has identified a plume of VOCs in the A-zone extending approximately 1,200 feet by 500 feet (2). Twenty VOCs have been detected in on-site ground water. Chemicals detected at highest concentrations in the ground-water contaminant plume are trichloroethene, 1,1,1-trichloroethane, and Freon 113. (2). With the exception of one sample detecting methylene chloride, VOCs have not been detected in the two monitoring wells screened in the deeper, B-zone.

An interim remedial ground-water extraction and treatment program was approved by the RWQCB in 1984. An extraction well was installed near the former location of Intel Magnetics's underground solvent tank at 3000 Oakmead Village Drive and began operating in February 1985 (3). The treated water is discharged to a storm drain that empties into the Calabazas Creek under a National Pollutant Discharge Elimination System (NPDES) permit.

The Intel Magnetics underground solvent tank was excavated and removed in July 1985. The tank was tested for leaks both prior to and after excavation and none were found. However, soil samples collected from the excavation contained 1,1-dichloroethane (4 ppb), 1,1,1-trichloroethane (29 ppb), and tetrachloroethene (3 ppb) (2). Based on these results, an additional 34 cubic yards of soil were removed from the excavation.

Two additional A-zone extraction wells began operation in December 1985. One well extracts ground water from a water collecting system installed in the area of the former waste solvent tank. The other well was installed downgradient from the former location of the waste solvent tank. In February 1985, the treatment system was moved to the parking lot in the rear of the building at 2986 Oakmead Village Court. The locations of the former chemical storage areas, the groundwater monitoring and extraction wells, and the groundwater treatment facility are shown in figure 2.

B. Site Visit

On the afternoon of May 22, 1991, David Borgeson, Diana Lee, and Jane Riggan from the ATSDR/CDHS cooperative agreement project visited the site under the guidance of a representative for the current tenant at 2986 Oakmead Village Court (i.e., the former Micro Storage facility) and the Project Manager for J.V. Lowney & Associates, the contractor preparing the remedial investigation for the site. Each of the properties which make up the site consist of one large single story structure on a lot which is almost completely paved. No apparent physical hazards were observed that would be expected to present a particular health threat. The water treatment system is located on site and surrounded by a 12-foot cyclone/wood slat fence with a locked gate.

We toured the inside of the building at 2986 Oakmead Village Court (former Micro Storage facility). The current tenant, a systems programming company, uses approximately two thirds of the one-story building for offices and about one third for its computer systems. The computer room is separated from office area; the office area and particularly the computer room appeared to be well ventilated. The building is built upon a concrete slab.

C. Demographics, Land Use, and Natural Resources

DEMOGRAPHICS

Census information was only gathered for potentially exposed populations north-northeast of the site because that is the direction of groundwater flow. According to the 1990 Census information, there are no residents living near the site, including an area extending approximately one mile north of the site potentially impacted by contaminated groundwater. The Director of Planning and Inspection for the City of Santa Clara estimated that as of May 1991 there were approximately 8,000 employees working in buildings in the area extending about one mile north of the site.

LAND USE

The Micro Storage/Intel Magnetics site is located in an industrial park where many of the businesses and industry are related to semiconductor and electronics manufacturing. Most of the site and areas surrounding the site consist of paved surfaces or industrial buildings. According to the City of Santa Clara Zoning Map, the area around Micro Storage/Intel Magnetics is zoned primarily light industrial with some commercial park and general office use mixed in the area closer to U.S. Highway 101 to the north.

The closest residence to the site is approximately one mile to the northwest. This residential area predominantly contains single family homes built on concrete slabs. Several elementary schools exist in the residential area. The campus of Mission College is located about one mile north of the site. There are no day care centers or convalescent homes located in the immediate vicinity of the site (2). Very little, if any, agricultural activity occurs within a one mile radius of the site. The area around the site does not support abundant wildlife nor is it used for hunting.

NATURAL RESOURCES

Surface Water

The closest natural surface water bodies to the site are the Calabazas Creek approximately 1,000 feet to the east and Saratoga Creek about 1,500 feet west of Micro Storage/Intel Magnetics. The Santa Clara Valley Water District maintains a concrete-lined drainage channel (the Sunnyvale East Drainage Channel) which discharges storm water into the Calabazas Creek and ultimately into the San Francisco Bay.(2). The Micro Storage/Intel Magnetics site is nearly level, and is covered to a large extent by pavement. Less than 10% of the property is unpaved and consists of landscaped areas on the borders of the property. Runoff from rainfall flows from the site into city storm drains which empty into Calabazas Creek. The average annual rainfall in the Santa Clara Valley is about 14 inches, of which 75% occurs during the winter months of November through March (2).

Ground Water

In the area of Micro Storage/Intel Magnetics, subsurface soils consist of sand and gravel beds separated by silts and clays. The sand and gravel beds can hold large quantities of water and are therefore potential water-bearing zones (i.e., aquifers). Silt and clay layers are relatively impermeable and act as barriers to the flow of water. These relatively impermeable layers are called aquitards.

Two water bearing zones defined as the A- and B-zones exist below the Micro Storage/Intel Magnetics site. The most shallow zone, known as the A-zone, extends from about 6 feet below ground surface to a depth of about 19 feet. The deeper B-zone lies between 22 and 43 feet below ground surface. The A and B water-bearing zones are separated by an aquitard 3 to 12 feet thick. The subsurface soils are heterogeneous and water-bearing zones or aquitards may or may not be continuous from well to well, even within distances on the order of 10 to 100 feet (3). The ground water within the A- and B-zones underlying the Micro Storage/Intel Magnetics site has not been used in the past and is not currently used for drinking water, but it could be used for drinking water in the future.

Below the B-zone lies an extensive silt and clay aquitard from about 100 feet to 150 feet below ground surfaces, which retards the movement of water and contamination from the B-zone to lower water-bearing zones. Most of the water supply for the vicinity comes from water-bearing zones below this aquitard. The closest water supply wells downgradient of Micro Storage/Intel Magnetics are the City of Santa Clara Municipal Wells No. 19 and 33 located about 2.5 miles northwest (2). Regional ground-water flows north, towards San Francisco Bay. Ground-water in the A and B-zones beneath Micro Storage/Intel Magnetics flows to the northeast. An average ground-water velocity of roughly 100 to 250 feet per year has been estimated for the A-zone (3).

Information obtained from well surveys conducted in the area indicate that no private or municipal drinking water supplies are affected by the site-related contamination. The surveys did, however, recommend that proper decommission of four of Micro Storage/Intel Magnetics's monitoring wells and a nearby abandoned well be carried out as these wells could act as vertical conduits by which contamination could migrate between the A- and B-zones (2).

D. Health Outcome Data

Sources of existing health related data in California that may be useful in evaluating hazards from environmental exposures include the California Birth Defects Monitoring Program, the California Cancer Surveillance Program, birth certificates, death certificates, and medical records as exist in employment records and local hospitals and clinics. On January 1, 1988, the Tumor Registry began collecting data for the region that includes the Micro Storage/Intel Magnetics site and surrounding areas. The state released the data for 1988 on February 18, 1991 (7). The California Birth Defects Monitoring Program began collecting data for Santa Clara County in 1983. The pertinence of these data bases to the Micro Storage/Intel Magnetics site will be discussed in the Public Health Implications section of the public health assessment.

COMMUNITY HEALTH CONCERNS

As described earlier, the Micro Storage/Intel Magnetics site is located in an industrial park consisting primarily of light industry and commercial businesses. The nearest residences downgradient of the site are approximately one mile to the north/northwest. Consequently, this site has not evoked as much community concern as some of the sites with residential areas nearby.

The community relations staff from the CDHS/ATSDR cooperative agreement project contacted city officials from Santa Clara, officials from the Santa Clara County Health Department, offices of two members of the Santa Clara County Board of Supervisors, and community relations staff from the U.S. Environmental Protection Agency and the State Department of Toxic Substances Control. None of the individuals contacted was aware of any recent community health concerns related to the site.

Historically, community health concerns in Santa Clara County have centered on groundwater and soil contamination. Following the discovery of the contamination at the Fairchild and IBM facilities in South San Jose in the early 1980s, the community became concerned about ground-water contamination in Santa Clara County. In November, 1982, a group of environmental, labor and other organizations concerned about groundwater contamination formed the Silicon Valley Toxics Coalition. The Coalition informed residents about the potential for extensive groundwater contamination in Santa Clara Valley. As the residents became more knowledgeable about groundwater issues, they became more effective in expressing their health concerns.

In January 1990, the RWQCB, as the lead agency at many of the South Bay Superfund sites, released their Community Relations Plan for the City of Santa Clara which incorporated the plans for five Superfund sites, including Micro Storage/Intel Magnetics, into a single plan (8). This plan identified the primary historical concerns in Santa Clara area as being: concern about the quality of drinking water; whether the extent of the problem had been discovered; what would happen if the contamination spread; what was being done to cleanup the soil and groundwater; what happened to contaminated groundwater that was pumped out; what the schedule for clean-up is; and how the property values would be effected.

In January 1990, RWQCB also released Fact Sheet #1 describing cleanup of soil and groundwater contamination at three sites in Santa Clara including Micro Storage/Intel Magnetics (9). The fact sheet included a summary of the contamination problem, the investigation and the cleanup of the site to date. It also gave a projected schedule of activities for final cleanup of the site. The second RWQCB fact sheet on Micro Storage/Intel Magnetics

became available in April 1991 (10). The purpose of this fact sheet was to present the proposed plan for soil and groundwater cleanup. The 10 to 12 years to achieve cleanup standards was much shorter than cleanup time estimates for other South Bay sites. The fact sheet also announced the public comment period and the community meeting on April 24, 1991.

Notice regarding the public comment period and the community meeting appeared in the Santa Clara Weekly for two consecutive weeks and Fact Sheet 2 had been mailed to approximately 450 persons or organizations. In spite of the effort, no members of the general public attended the community meeting. In attendance at the meeting were five RWQCB staff, three local government representatives, a representative from the U.S. Environmental Protection Agency, and one member of the press from the Electronic Buyers News. None of those in attendance wanted to make a comment for the record.

The public health assessment for Micro Storage/Intel Magnetics was released for public comment from July 2 until July 31, 1992. Requests for public comment were published in the Santa Clara Valley Weekly and the San Jose Mercury News and the public health assessment was made available for review at the Santa Clara public library. No comments were received. In summary, there do not appear to be any community health concerns in connection with the Micro Storage/Intel Magnetics site.

ENVIRONMENTAL CONTAMINATION AND OTHER HAZARDS

This section presents the contaminants of concern in each environmental medium. The environmental sampling investigation conducted at Micro Storage/Intel Magnetics has resulted in a large quantity of analytical data. Analyses have detected multiple contaminants. Subsets of contaminants of concern in each medium were selected from all contaminants detected at the site in order to focus the public health assessment on those contaminants that are most likely to pose a health risk. Their selection does not necessarily mean that they pose a health threat but only that they will be evaluated further in the public health assessment. Subsequent sections will evaluate whether individuals have been or could be exposed to the contaminants of concern and will determine whether such exposures have public health significance.

The following criteria were used to select or eliminate contaminants of concern: 1) the quality and adequacy of the environmental sampling and analysis, 2) the frequency of detection, 3) a comparison with background concentrations, 4) a comparison with field and laboratory blanks (some chemicals detected in samples may not be site-related but rather the result of field or laboratory contamination), and 5) a comparison with health guidance values. If a contaminant is found in one medium

at a level of concern, it is evaluated in all media potentially impacted. Guidance values used to select contaminants of concern include the following:

EMEG	ATSDR Environmental Media Evaluation Guide
CREG	Cancer Risk Evaluation Guide
HA	EPA Health Advisory for drinking water
EPA MCLG	EPA Maximum Contaminant Level Goal
EPA MCL	EPA Maximum Contaminant Level
CA MCL	California Maximum Contaminant Level

EMEGs are media specific values developed by ATSDR to serve as an aid in selecting environmental contaminants of concern that need to be further evaluated for potential health impacts. EMEGs are based on noncarcinogenic end-points and do not consider carcinogenic effects. EMEGs are calculated from either an ATSDR Minimal Risk Level (MRL) or an EPA Reference Dose (RfD). Both the MRL and the RfD are estimates of daily exposure to a chemical that is unlikely to cause adverse, noncarcinogenic, health effects. CREGs are media specific values developed by ATSDR to serve as an aid in selecting contaminants of concern that are potential carcinogens. CREGs are based on EPA cancer slope factors which give an indication of the relative carcinogenic potency of a particular chemical.

EPA has developed health based, non-regulatory Health Advisories (HAs) for some chemicals in drinking water. HAs represent a concentration below which noncancer adverse health effects are expected to occur. As with EMEGs and NREGs, HAs are based on noncarcinogenic end-points and do not consider carcinogenic effects. A margin of safety is included to protect sensitive members of the population. Separate HA values exist for noncarcinogenic and carcinogenic health effects.

MCLGs and MCLs are developed by EPA under the authority of the Safe Drinking Water Act. MCLGs are non-enforceable goals, set at levels which would result in no known, or anticipated, adverse health effects with an adequate margin of safety. In setting MCLGs for known or probable human carcinogens, EPA makes the assumption that there is no absolutely "safe" level of exposure (i.e., known as the non-threshold assumption) and sets the MCLG at zero. MCLs are enforceable standards set as close to MCLGs as possible, but in addition to health factors, MCLs are required by law to consider the technological and economic feasibility of removing the contaminant from the water supply. The limit that is set must be feasible given the best available technology and

treatment techniques. For some chemicals, California has established its own MCL values, which are equal to or stricter than Federal EPA values.

A. Toxic Chemical Release Inventory (TRI) Search

We searched the Toxic Release Inventory (TRI) for the years 1987, 1988 and 1989 (the years for which TRI data were available on-line at the time this public health assessment was written). The TRI contains information on estimated annual releases of toxic chemicals releases from active industrial facilities from 1987 to present. TRI data can be used to get a general idea of the current environmental emissions occurring at a site and in the area surrounding a site, and whether they may be causing an additional environmental burden to the community. However, since Micro Storage and Intel Magnetics no longer reside at the site and are not releasing new sources of contaminants at the site, no information on these companies at this location exists in the TRI files. The current tenants at 2986 Oakmead Village Court and 3000 Oakmead Village Drive did not report any releases to the environment to TRI.

B. On-Site Contamination

CONTAMINANTS IN ON-SITE SOIL

Soil data from the area of the former underground waste solvent tank at 3000 Oakmead Village Drive (Intel Magnetics facility) were collected in 1982. Additional soil data were collected in 1985, 1986, 1988, 1989, and 1990. Approximately 45 on-site soil samples were collected and analyzed for VOCs. No surface soil samples were collected, although most of the site and the areas near potential release sources are covered by pavement. Subsurface soil samples were collected between 0.5 and 7.5 feet below the ground surface. Most samples were collected above the water table level of approximately 6.5 feet beneath the ground surface. Several VOCs were detected in on-site soils.

Chemicals found in highest concentrations in soil were 1,2,3-trichlorobenzene, 1,2,4-trichlorobenzene, and Freon 113. A soil sample collected in 1982 at a depth of 1.5 feet below ground surface and above the former Intel Magnetics solvent tank showed 1,2,3-trichlorobenzene (33,000 ppb) and 1,2,4-trichlorobenzene (89,000 ppb). In July 1985, the underground tank and 34 cubic yards of soil were excavated and removed. This source area has been remediated and trichlorobenzenes are not considered contaminants of concern in soil at Micro Storage/Intel Magnetics. These trichlorobenzenes have a relatively low toxicity rating. The maximum concentration of Freon 113 (180,000 ppb) was measured in subsurface soil on the western portion of 2986 Oakmead Village Court (former Micro Storage facility) beneath a parking lot. Freon 113 was the contaminant most frequently detected in soil

samples. Freons were used at the former Micro Storage facility, and contamination apparently occurred as a result of spillage. Several Freons are of concern in ground water. In soil, however, Freons were not found at levels of health concern.

Only one contaminant, tetrachloroethene, was considered to be present at levels of health concern in on-site soil at Micro Storage/Intel Magnetics. This contaminant was found at levels of concern in subsurface soil at 2986 Oakmead Village Court (the former Micro Storage facility). The maximum concentration detected was 47 ppb. The ATSDR Cancer Risk Evaluation Guide (CREG) value for tetrachloroethene in soil is 14 ppb.

CONTAMINANTS IN ON-SITE GROUND WATER

One sample of A-zone ground water was analyzed for priority pollutant metals. Metals detected were within reasonable background range. Semi-volatile organic compounds were analyzed for in 10 ground-water samples of ground water, and none were found at detection limits ranging from 10 to 100 ppb (2). About 275 ground-water samples were analyzed for VOCs.

The contaminants of concern in on-site ground water are listed in Table 1, along with the maximum concentration detected on-site and comparison values for each contaminant. Contaminants of concern include bromodichloromethane, 1,1-dichloroethane, 1,2-dichloroethane, 1,1-dichloroethene, dichlorotrifluoroethane, Freon 13, Freon 113, Freon 123, methylene chloride, tetrachloroethene, 1,1,1-trichloroethane, and trichloroethene. Table 1 presents historical maximum values. More recent data indicate that remedial efforts have reduced the concentrations of chemicals in the ground water. For instance, the most recent sampling event (August 1, 1991) sampled three on-site wells in the A-zone and analyzed samples for VOCs. A total of five VOCs were detected in on-site ground water, of which only two were detected at levels of concern (1,1-dichloroethene at 9.4 ppb and trichloroethene at 470 ppb).

TABLE 1
MAXIMUM CONCENTRATIONS AND COMPARISON VALUES FOR CONTAMINANTS OF CONCERN IN A-ZONE, ON-SITE GROUND WATER*

Chemical	Maximum Concentration (ppb)	Comparison Value (ppb)	Comparison Value Source
Bromodichloromethane	2.2	0.3	CREG
1,1-Dichloroethane	22	5	CA MCL
1,2-Dichloroethane	18	0.4	CREG
1,1-Dichloroethene	46	0.06	CREG
Freon 13	3,400	NA	NA
Freon 113	3,500	1,200	CA MCL
Freon 123	50	NA	NA
Methylene Chloride	90	4.7	CREG
Tetrachloroethene	28	0.7	CREG
1,1,1-Trichloroethane	570	200	HA
Trichloroethene	1,400	3.2	CREG

* Data from 1982 through 1990.

NA = Not Available.

CONTAMINANTS IN ON-SITE SOIL GAS

Contaminants in soil gas are generally evaluated in order to assist in choosing the placement of ground water monitoring or extraction wells. Contaminated soil gas is only of concern if contaminants are released to the air to a degree that results in a significant exposure. A total of 70 soil gas samples were collected on-site at 2986 Oakmead Village Court (the former Micro Storage facility) in October 1987, June 1988, and April 1989 and analyzed for VOCs. Five VOCs were detected in soil gas. Two of these, tetrachloroethane and trichloroethane, are of concern because they are potential carcinogens. The other VOCs detected, 1,1-dichloroethane, freon 113 and 1,1,1-trichloroethane, are not carcinogens, but were selected as contaminants of concern in soil gas due to their concentrations. These VOCs and the maximum concentrations detected on-site are presented in Table 2.

TABLE 2
MAXIMUM CONCENTRATIONS OF CONTAMINANTS OF CONCERN
IN ON-SITE SOIL GAS

Chemical	Maximum Concentration (mg/m^3)
1,1-Dichloroethane	35
Freon 113	19,000
Tetrachloroethene	100
1,1,1-Trichloroethane	794
Trichloroethene	320

CONTAMINANTS IN ON-SITE AIR

The ground water treatment system does not include an air stripper, therefore air stripper emissions are not of concern at the Micro Storage/Intel Magnetics site. Ambient or indoor air samples were not taken at the Micro Storage/Intel Magnetics site, however, organic chemicals transported in soil gas may be released to the surface and lead to exposure to VOCs in air. Therefore, all contaminants that were found in soil gas and have the potential to volatilize to air are considered contaminants of concern for air. Contaminants of concern for each medium on-site, including air, are summarized in Table 3.

TABLE 3
SUMMARY OF CONTAMINANTS OF CONCERN FOR EACH MEDIUM ON-SITE

Chemical	Ground Water	Soil	Soil Gas	Air
Bromodichloromethane	X			
1,1-Dichloroethane	X		X	X
1,2-Dichloroethane	X			
1,1-Dichloroethene	X			
Freon 13	X			
Freon 113	X		X	X
Freon 123	X			
Methylene Chloride	X			
Tetrachloroethane	X	X	X	X
1,1,1-Trichloroethane	X			
Trichloroethene	X			

X = contaminant of concern.

C. Off-Site Contamination

The Pathways Analyses section below discusses the potential for each environmental medium to be impacted by site-related contaminants. The only off-site medium significantly impacted by site-related contaminants is shallow ground water. Although several VOCs related to the Micro Storage/Intel Magnetics site have been detected in off-site ground water, only tetrachloroethene and trichloroethene were detected at levels exceeding comparison values. The maximum concentration of tetrachloroethene in off-site ground water during the period 1982 through 1990 was 0.8 ppb, compared to a water CREG value of 0.7 ppb. The maximum concentration of trichloroethene in off-site ground water during this period was 39 ppb, compared to its water CREG value of 3.2 ppb.

As with on-site ground water, the concentrations of contaminants in off-site ground water have decreased with time as a result of remediation. The most recent sampling event (August 1, 1991) sampled three off-site wells in the A-zone and analyzed the samples for VOCs. Three VOCs (1,1-dichloroethane, cis-1,2-dichloroethene, and trichloroethene) were detected in this most recent sampling, although the concentrations found were below levels of health concern.

D. Quality Assurance and Quality Control

In preparing this public health assessment, ATSDR and CDHS rely on the information provided in the referenced documents and assumes that adequate quality assurance and quality control measures were followed with regard to chain-of-custody, laboratory procedures, and data reporting. The accuracy of the conclusions contained in this public health assessment is determined by the completeness and reliability of the referenced information. Environmental sampling and analysis error can result from the error inherent in the analysis procedures, from a failure to take an adequate number of samples to characterize a medium, from mistakes on the part of the sampler, or from the heterogeneity of the medium being sampled. Procedural or systematic error can be minimized through the use of quality control procedures such as duplicate samples and blanks (2). Quality control measures reported by Intel do not indicate any major problems with the field or laboratory procedures (2).

E. Physical and Other Hazards

Observations made at the time of the site visit did not detect any physical or other hazards that would be expected to present a particular threat to public health. The water treatment system located on site is surrounded by a 12-foot cyclone/wood slat fence with a locked gate.

PATHWAYS ANALYSES

This section addresses the potential pathways by which human populations could be exposed to contaminants at, or migrating from, the Micro Storage/Intel Magnetics site. In order for a chemical to pose a human health risk, a complete exposure pathway must exist. A complete exposure pathway consists of five elements: 1) a source and a mechanism of chemical release to the environment; 2) a contaminated environmental medium (e.g., air, soil); 3) a point of human contact with the contaminated medium (known as the exposure point); 4) an exposure route (e.g., inhalation) at the exposure point; and 5) a potentially exposed human population at the exposure point (11).

Exposure pathways are classified as either complete or potential. Complete pathways require that all five elements listed above exist. A time frame given for each pathway indicates whether the exposure occurred in the past, is currently occurring, or will occur in the future. For example, a complete pathway with only a past time frame indicates that exposure did occur in the past, but has been eliminated and therefore does not currently exist and will not exist in the future. Potential pathways occur when at least one of the five elements is currently missing (i.e., it is incomplete), but could exist in the future and therefore become complete. A pathway is also classified as potential if there is reason to believe that it is complete, but insufficient information is available to determine whether it is in fact complete. Time frames are also provided for potential pathways.

Human exposure pathways are evaluated for each environmental medium possibly impacted by site-related contaminants. For each pathway identified, the likelihood of occurrence (i.e., the likelihood that humans are in fact exposed via the pathway) is considered. Pathways may be eliminated from further assessment if they are determined to be unlikely to exist. The toxicological implications of complete exposure pathways will be evaluated in the Public Health Implications section.

A. Complete Exposure Pathways

No complete exposure pathways were identified as being likely to have existed or to exist at Micro Storage/Intel Magnetics.

B. Potential Exposure Pathways

Five potential exposure pathways are identified and are summarized in Table 4. Four of the five pathways do not currently exist, but could potentially exist in the future. One pathway, indoor air, may or may not currently exist, although significant exposure via this pathway is considered unlikely. All but one pathway are considered to have a low likelihood of occurrence, given remediation. The one potential exposure

pathway with moderate likelihood of occurrence is the future redevelopment of the site into residences, resulting in exposure to unremediated contaminated soils.

SOIL PATHWAYS

The sources of soil contamination at Micro Storage/Intel Magnetics are not fully understood. No leakage was reported in the waste solvent tank at the former Intel Magnetics facility, nor have chemical spills been reported by either Micro Storage o Intel Magnetics. However, spillage of solvents may have occurre during periodic removal of the storage tank at Intel Magnetics (3). Most of the chemicals of potential concern at Micro Storage/Intel Magnetics are volatile. As a result, they would volatilize to the air and therefore not persist in surface soil. Some contaminants in subsurface soil at Micro Storage/Intel Magnetics may bind tightly to soil particles and become relatively immobile, but most of the site-related contaminants can be leached through the soil column to underlying ground water.

Direct contact with contaminated soil can result in exposure via inadvertent or intentional soil ingestion and/or via dermal absorption. However, frequent direct contact with soil was and is currently unlikely as about 90% of on-site soil is covered by pavement or buildings, the rest has been landscaped. Migration of contaminants to off-site soils via fugitive dust emissions is therefore also unlikely. Populations potentially exposed were the former Micro Storage and Intel Magnetics workers, and now th current tenants at 2986 Oakmead Village Court (former Micro Storage facility) and 3000 Oakmead Village Drive (former Intel Magnetics facility). Fences enclosed the process and hazardous waste storage areas at the facilities, reducing the possibility of exposure to area residents trespassing on the site.

Former Micro Storage and Intel Magnetics workers working directl with chemicals used in site processes may have had exposure from direct contact, but information was not available in the site literature by which to evaluate the magnitude of such exposure. Landscape workers are not expected to have had significant exposure to site-related chemicals. The hot spots of soil contamination were or are in subsurface soil and are mostly covered by pavement. The concentrations of contaminants measure in on-site soil gas were generally low and would be rapidly dispersed once reaching the surface.

Some soil contamination still exists at Micro Storage/Intel Magnetics. Although currently covered by pavement or landscaping, future excavation or construction on site at Micro Storage/Intel Magnetics could result in exposure to workers, and others, if runoff and tracking of contaminated soil occurs. Thi was presented as a possible complete future exposure pathway in

the Baseline Public Health Evaluation and is not likely to be a pathway of concern as long as actions such as the use of protective clothing are taken to minimize exposure during any future construction or excavation. If the Micro Storage/Intel Magnetics site is developed in the future for residential purposes, on-site residents could come in direct contact with contamination.

GROUND WATER PATHWAYS

Contamination of the ground water beneath the Micro Storage/Intel Magnetics site has been primarily restricted to the A-zone beneath and downgradient of the site. One chemical, methylene chloride, was detected in a B-zone on-site well. Contaminants found at Micro Storage/Intel Magnetics are expected to be mobile in the subsurface. Chemicals may potentially migrate vertically from the A-zone to lower zones by percolation through intervening aquitards, through local discontinuities in aquitards, or via man-made conduits (e.g., improperly installed monitoring wells or gravel packed agricultural wells). However, an upward vertical hydraulic gradient (i.e., an upward pressure or force) has been measured between the A- and B-zones (2, 3), making it less likely for contamination to migrate down to the B-zone due. There have been no identified past or current users of A- or B-zone ground water. Therefore, no complete past or current exposure pathways involving ground water are identified.

Exposure to ground water contaminants could result if domestic, agricultural or industrial use of the contaminated ground water occurs in the future prior to complete remediation. The likelihood of a well being placed within the confines of Micro Storage/Intel Magnetics's contaminant plume is low. At this time, sufficient water for municipal use is available from other aquifers having higher quality water and water yield. In addition, regulatory barriers prohibiting installation of shallow private wells do exist. Appreciable exposure to ground-water contaminants in the future is unlikely if the ground-water extraction and treatment system reduces concentrations of contaminants to below levels of health concern, and no future drinking water wells are placed in areas of known contamination until remediation has reduced contaminant concentrations below levels of health concern.

SURFACE WATER PATHWAYS

Contaminants originating from Micro Storage/Intel Magnetics could be transported to surface water by overland runoff of rainwater or by discharge of contaminated ground water. The identified ground-water plume in the A-zone does not currently extend beneath any surface water bodies, so no contamination of surface water by ground-water seepage is expected. Storm water runoff and treated ground water from the ground water extraction system

is discharged via the city storm drains into Calabazas Creek, approximately 1,000 feet east of the site. Storm runoff is not expected to have significantly spread contamination because the majority of the site is covered with pavement. Discharge of effluent from the liquid phase carbon adsorption treatment syste is permitted under NPDES and is not expected to have released significant levels of contaminants to Calabazas Creek. The RWQC requires reducing total VOCs present in ground water effluent to less than 100 ppb prior to discharge to Calabazas Creek. Concentrations of several VOCs, including Trichloroethene and Freon 113, cannot exceed 5 ppb (6). If releases to Calabazas creek were to occur, potentially exposed populations are unlikel as Calabazas Creek is not used for recreational purposes. Therefore, no complete exposure pathways involving surface water have occurred in the past, are occurring now, or are expected to occur in the future.

AIR PATHWAYS

The soils in which elevated levels of chemicals have been detected either have been removed during the removal of the wast solvent tank or are paved or covered by vegetation. Therefore, very little fugitive dust emissions of contaminated particulates is considered to have occurred or be occurring now. Ground wate is sufficiently treated using liquid phase carbon adsorption technology only, eliminating the need for an air stripper and associated air emissions.

VOCs could volatilize from subsurface soil or the shallow contaminated ground water, which lies approximately six feet below the ground surface at Micro Storage/Intel Magnetics (2). Organic chemical vapors could then migrate upward to the surface and either be released to the ambient (i.e., outdoor) air, or enter and possibly collect in buildings. The asphalt covering the parking area acts as a significant barrier to this soil gas transport pathway, although features such as the pavement, buildings, buried utility lines, and sewers can provide conduits for the lateral transport of chemical vapors. On-site soil gas data indicate that migration of VOCs from either ground water or contaminated soil within the unsaturated subsurface soil is occurring at the Micro Storage/Intel Magnetics site, although th concentrations are low.

Once released to the surface, vapors would be rapidly diluted by mixing in the ambient air. The nearest residences are located approximately one-half mile south of the site, and one mile nort of the site and do not represent a potentially exposed population. VOCs transported via soil-gas could enter buildings over the plume. This would be an exposure pathway of concern if 1) contaminated soil-gas migrates through openings in the structure; 2) accumulation of contaminants occurs in enclosed spaces; and 3) workers are located in these locations for

significant periods of time. No indoor air sampling has been done, therefore, concentrations must be estimated by modeling the transport of the contaminants through the soil and into the buildings. Clement modeled the transport of site contaminants into hypothetical residential homes built on-site in the future. Using conservative parameter values, and including chemicals which were detected in ground water but not in soil gas, the modeled concentrations were low (2). Given the design of the buildings over the contamination (e.g., concrete slab foundation and industrial ventilation), the contaminant concentrations to which workers may be exposed would be very low and may not be present at all.

This indoor air pathway is the only pathway with a past and current time frame. It may or may not be complete. However, it is not expected that volatile chemicals have been or are being transported into and accumulating within buildings to a significant degree. Therefore, this pathway will not be evaluated further.

BIOTA PATHWAYS

There are no past, current, or future pathways by which consumable biota would be impacted by site-related contaminants. Most of the site-related contaminants are not appreciably concentrated in plant or animal tissues. An exception are the trichlorobenzenes, which are moderately bioconcentrated. However, trichlorobenzene contamination has been remediated. Residual contamination, if any, would not be in an area where it could directly or indirectly impact consumable biota.

TABLE 4
POTENTIAL EXPOSURE PATHWAYS

Contaminated Environmental Medium	Time Frame	Exposure Point (i.e., Point of Human Contact)	Exposure Route at Exposure Point	Potentially Exposed Populations at Exposure Point	Likelihood of Occurrence
Surface and subsurface Soil	Future	On-site	Direct Contact, incidental ingestion, inhalation	Hypothetical future on-site excavation or construction workers	Low. Significant exposure is not expected as long as actions are taken to minimize exposure during any future construction or excavation.
Surface Soil	Future	On-site	Direct Contact, incidental ingestion, inhalation	Hypothetical future on-site residents	Moderate. Soil contamination exists.
Ground Water	Future	On-site	Ingestion and inhalation of volatile chemicals released from ground water during use	Hypothetical future shallow well users	Low. Exposure is not expected as long as future drinking water wells are not placed in the area of known contamination until remediation has reduced contaminant concentrations below levels of health concern.
Indoor Air	Future	On-site	Inhalation of volatile chemicals released from subsurface soil and shallow ground water	Hypothetical future on-site residents	Low. VOCs released to ambient air are rapidly diluted. It is not expected that volatile chemicals would be transported into and accumulate within homes to a significant degree, particularly given that remediation will be reducing the levels of contamination in the aquifer over time.
Indoor Air	Past, current, future	Buildings over soil or ground-water contamination	Inhalation of volatile chemicals released from subsurface soil and shallow ground water	Workers in buildings over soil or ground-water contamination	Low. This pathway may or may not be complete. Indoor air monitoring has not been done but transport modeling indicates that there is a potential for low levels of volatile chemicals to enter buildings over contamination.

PUBLIC HEALTH IMPLICATIONS

A. Toxicological Evaluation

As discussed in the Pathways Analyses section, no complete exposure pathways are identified at the Micro Storage/Intel Magnetics site. Indoor air is the only potential pathway where past exposures or current exposures could occur. However, this indoor air pathway was found to have a low likelihood of occurrence. Even if the pathway is complete, it is unlikely to result in exposure to contaminants at levels of public health concern.

B. Health Outcome Data Evaluation

No complete past or current exposure pathways of concern were identified at the Micro Storage/Intel Magnetics site nor has there been any community concerns raised about the site. Therefore, an evaluation of health related data is not warranted.

C. Community Health Concerns Evaluation

There were no community health concerns identified concerning the Micro Storage/Intel Magnetics site.

CONCLUSIONS

The available evidence does not indicate that humans are or have been exposed to contaminants related to the Micro Storage/Intel Magnetics site at levels of public health concern. Therefore, ATSDR and CDHS conclude that the Micro Storage/Intel Magnetics site represents no apparent public health hazard. An evaluation of existing health related data is not warranted due to the absence of exposure to contaminants at levels of concern and lac of community health concerns. Significant future exposure to site-related contaminants is unlikely if: 1) the ground water extraction and treatment system reduces concentrations of site-related contaminants to below levels of health concern; 2) no future drinking water wells are placed in areas of known contamination until remediation has reduced contaminant concentrations below levels of health concern; 3) any future excavation/construction projects at the site take the necessary precautions to insure that workers are not exposed to contaminants above levels of health concern; and 4) the site is not redeveloped for residential use unless subsurface soil contamination is remediated.

RECOMMENDATIONS

A. Cease/Reduce Exposure Recommendations

1) In the areas of known ground water contamination, institutional controls should be implemented to prevent future use of contaminated aquifers for drinking water supplies until remediation has reduced contaminant concentrations to below levels of health concern.

2) To minimize exposures during any future excavation or construction on the former Micro Storage/Intel Magnetics property, the work site should be limited to authorized personnel using appropriate personal protective clothing and equipment; applicable OSHA regulations and NIOSH guidelines should be followed.

3) Deed restrictions should be drafted to restrict redevelopment of site into residential use unless soil contamination is remediated.

B. Follow-up Health Recommendations

1) The data and information presented in this public health assessment for the Micro Storage/Intel Magnetics site have been evaluated by the ATSDR Health Activities Recommendation Panel for follow-up health activities. The available evidence does not indicate that humans are or have been exposed to site related contaminants at levels which could cause illness or disease. Therefore, follow-up health actions are not indicated at this time. However, if additional data become available, ATSDR and the California Department of Health Services will reevaluate this site for any indicated follow-up health actions.

PUBLIC HEALTH ACTION

1) Based on the recommendation of the ATSDR Health Activities Recommendation Panel, this site is not being considered for follow-up health actions at this time.

2) The Record of Decision (ROD) for MS/IM was completed and signed by EPA on August 19, 1991. The ROD presents the selected clean-up plan for the site. The clean-up actions chosen include: 1) pumping and treating shallow groundwater by carbon absorption until it reaches drinking water quality; 2) continued groundwater monitoring; 3) verification that the plume of contaminated groundwater is not spreading; and 4) implementation of a deed restriction governing future use of groundwater under the site until cleanup standards are achieved. Although the deed restriction is not intended to regulate site construction activities, it is intended to serve as a reminder and as a warning to any future site owners or developers of the existence of site contamination.

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CERTIFICATION

This public health assessment was prepared by the California Department of Health Services under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). It is in accordance with approved methodology and procedures existing at the time the health assessment was initiated.

Technical Project Officer, SPS, RPB, DHAC

The Division of Health Assessment and Consultation, ATSDR, has reviewed this health assessment and concurs with its findings.

Director, DHAC, ATSDR

REFERENCES

(1) Agency for Toxic Substances and Disease Registry. Preliminary Public health assessment for Intel Magnetics, Santa Clara, California, October 1, 1988.

(2) Clement Associates, Incorporated. Final Baseline Public Health Evaluation For The Micro Storage/Intel Magnetics Site, Santa Clara, California, May 1, 1990.

(3) J. V. Lowney & Associates. Final Remedial Investigation For Micro Storage/Intel Magnetics, Santa Clara, California, January 9, 1991.

(4) J. V. Lowney & Associates. Final Remedial Investigation For Micro Storage/Intel Magnetics, Santa Clara, California, January 9, 1991. Appendix A & B.

(5) J. V. Lowney & Associates. Final Remedial Investigation For Micro Storage/Intel Magnetics, Santa Clara, California, January 9, 1991. Appendix C - F.

(6) J. V. Lowney & Associates. Final Feasibility Study For 2986 and 3000 Oakmead Village Court, Santa Clara, California, January 9, 1991.

(7) Department of Health Services. Cancer Incidence and Mortality in California, 1988.

(8) California Water Quality Control Board, San Francisco Bay Region. Community Relations Plan for Superfund Sites in the City of Santa Clara, January, 1990.

(9) California Regional Water Quality Control Board, San Francisco Bay Region, Fact Sheet #1, Intel-Santa Clara 3, Micro Storage/Intel Magnetics, and Synertek Building #1: Santa Clara Superfund Sites. January 1990.

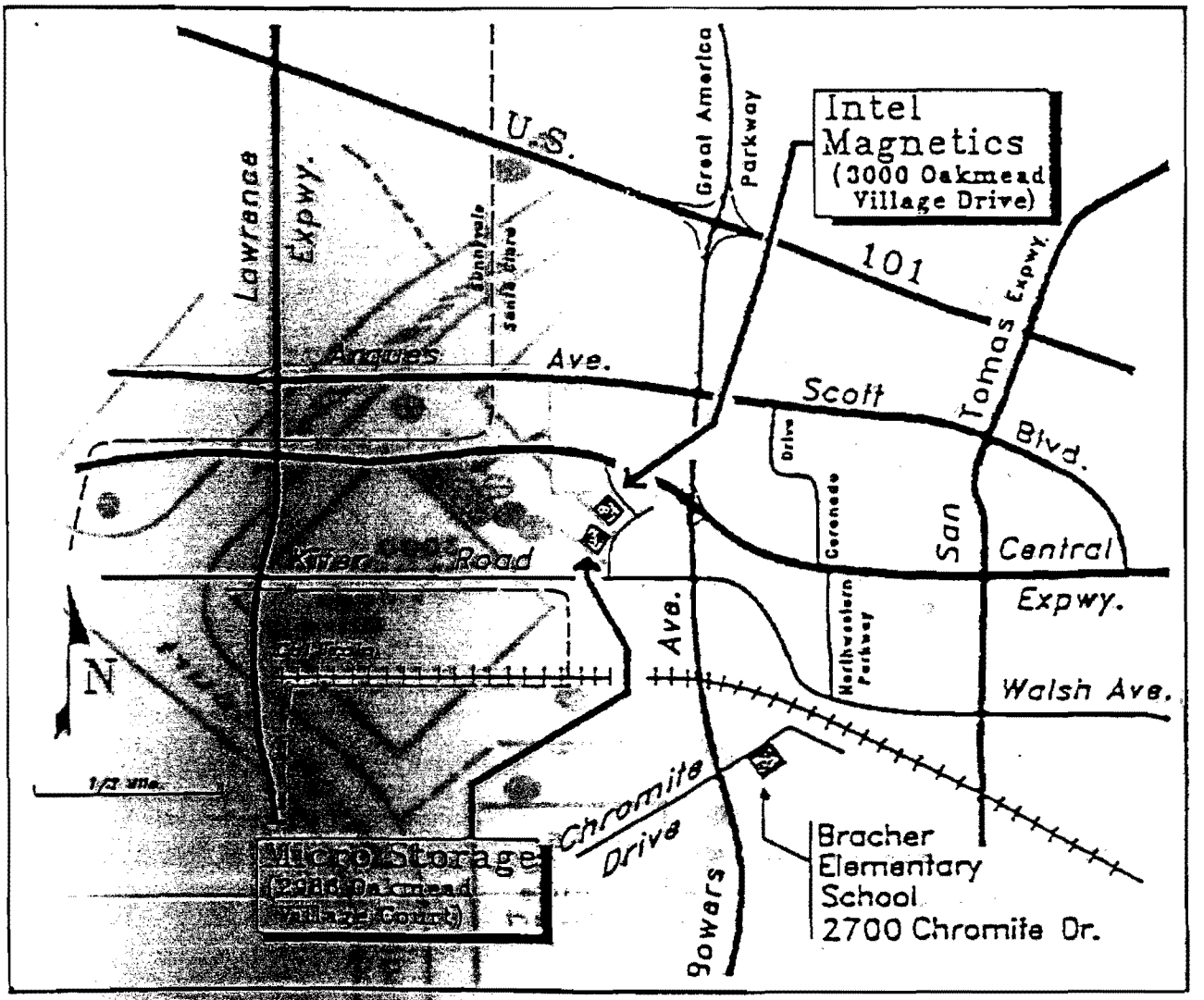
(10) California Regional Water Quality Control Board, San Francisco Bay Region, Micro Storage/Intel Magnetics, Combined Superfund Site, Santa Clara, California. April 1991.

(11) Agency for Toxic Substances and Disease Registry. Draft Public Health Assessment Guidance Manual. Atlanta, Georgia: Agency for Toxic Substances and Disease Registry, February 1991; DHHS, Public Health Service.

(12) U.S. Environmental Protection Agency, Region IX. Record of Decision for Micro Storage/Intel Magnetics Superfund Site, Santa Clara, California, August 19, 1991.

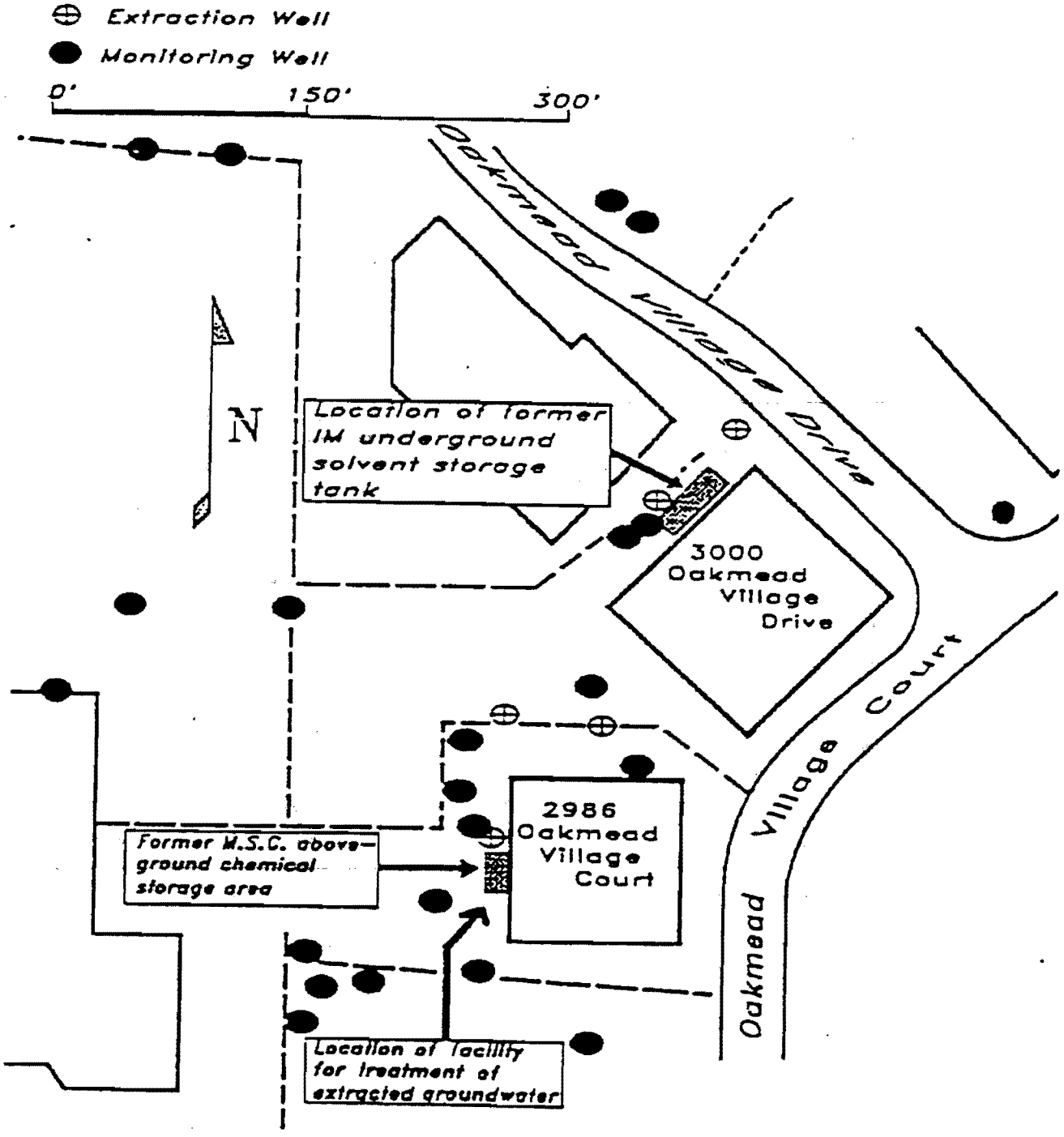
APPENDIX A
Figures

FIGURE 1
SITE VICINITY MAP*



* From RWQCB (10)

FIGURE 2
LOCATION OF FORMER CHEMICAL STORAGE FACILITIES,
GROUNDWATER MONITORING AND EXTRACTING WELLS,
AND GROUNDWATER TREATMENT SYSTEM*



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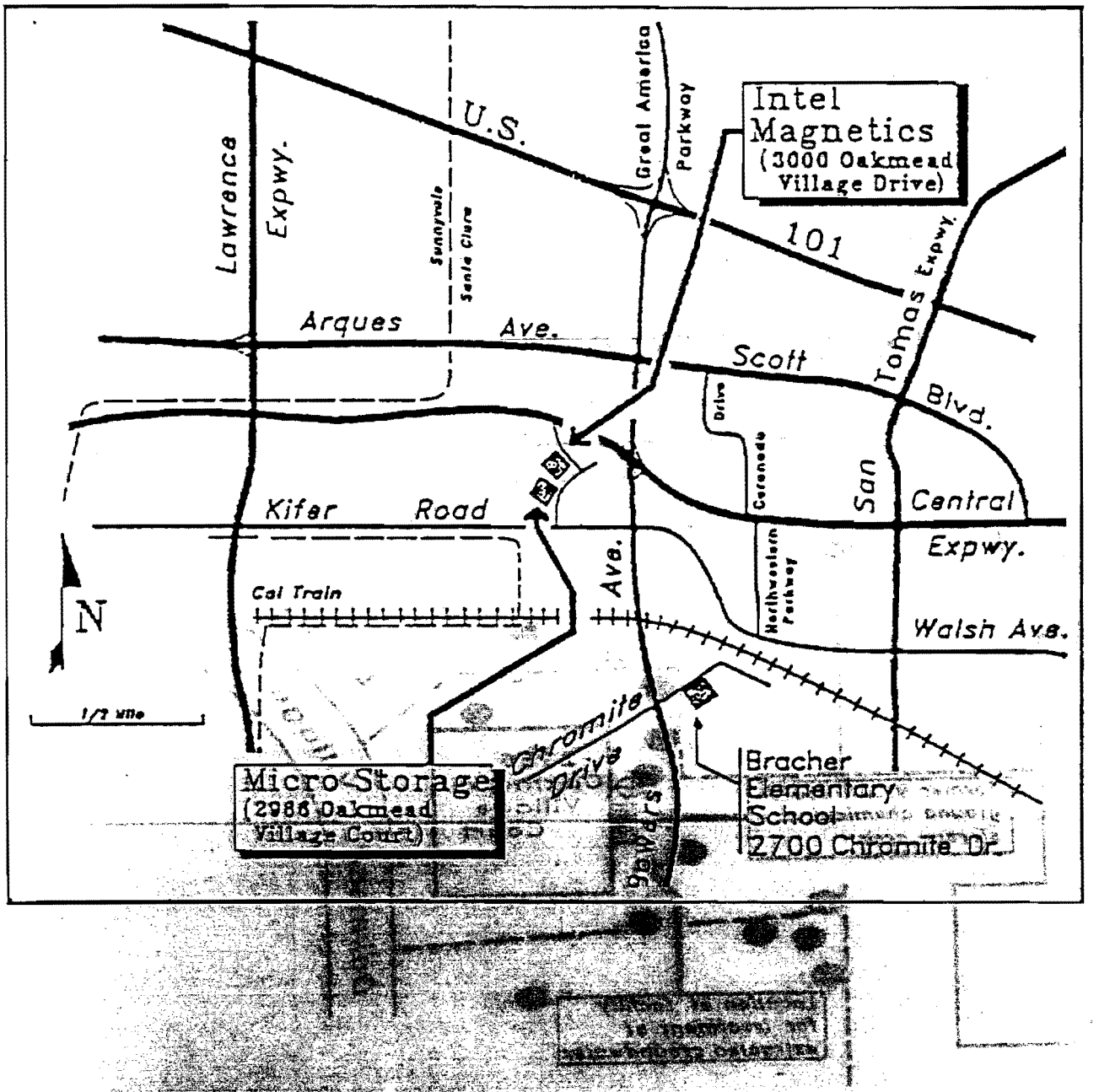

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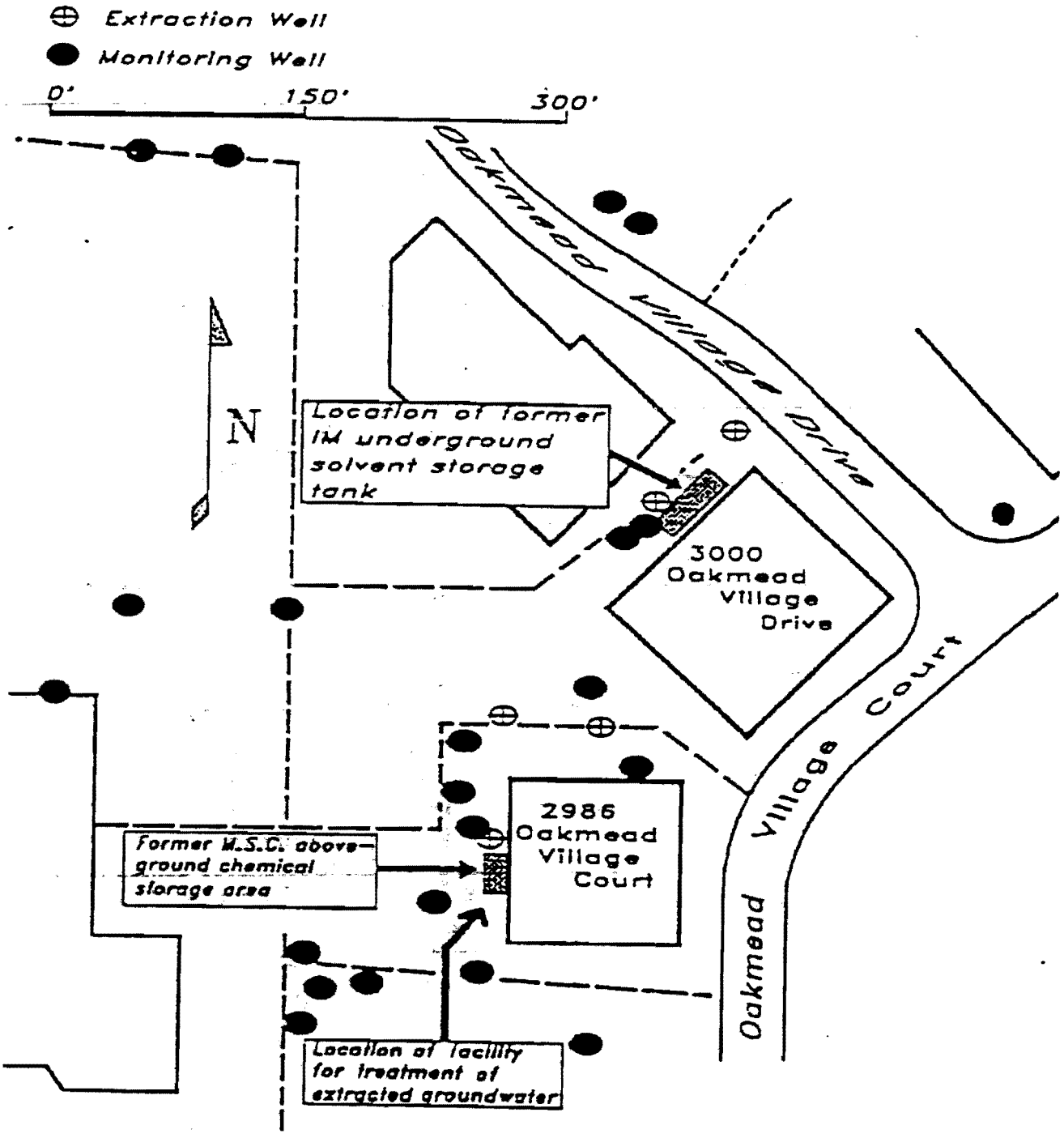

* From RWQCB (10)