STATE OF CALIFORNIA PETE WILSON, *Governor*

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION
2101 WEBSTER STREET, SUITE 500
OAKLAND, CA 94612
(510) 286-1255

0304

November 1995
File: 2189.8119 (DIB)

Tom Kremer
Chief, Site Restoration
U.S. EPA
75 Hawthorne St., H-6-4
San Francisco, CA 94105

SUBJECT: FIVE-YEAR REVIEW FOR INTEL SANTA CLARA 3

Dear Mr. Kremer:

Enclosed is the Regional Board staff report regarding Intel Santa Clara 3's Five-Year Status Report and Effectiveness Evaluation. Intel has requested Non-Attainment Area designation for this site in the Report. We have recommended that consideration of Non-Attainment Area status be considered separately from the Five-Year review process. We recommend approval of Intel's Five-Year Status Report and Effectiveness Evaluation without accepting the NAA proposal as part of it.

If you have any questions, please contact David Barr of our Toxics Section at (510) 286-1246.

Sincerely,

Lawrence Kolb
Acting Executive Officer

Stephen Morse
Toxics Division Chief

cc: Bryan Rector, Intel
Terrence McManus, Intel
Mary Stallard, Weiss Associates

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

INTERNAL MEMO

TO: Lawrence Kolb
Acting Executive Officer

Date: November 6, 1995

FROM: David Barr

SUBJECT: Intel Santa Clara 3 Superfund Site, Five-Year Status Report and Effectiveness Evaluation

CONCUR:

Anders Lundgren
Section Leader

Stephen Morse, Chief
Toxics Cleanup Division

Intel has submitted its first Five-Year Status Report and Effectiveness Evaluation for the Intel Santa Clara 3 (SC3) Facility at 2880 Northwestern Parkway in Santa Clara. Remediation began at this site in 1985. A Final Remedial Action Plan was adopted in Site Cleanup Requirements Order No. 90-105. This site had a fairly small groundwater pollutant plume. Groundwater extraction and treatment has reduced the scope of the plume and VOC concentrations have declined since contamination was discovered. Currently, only TCE, present at about 50 ppb, exceeds the cleanup standards. Intel claims that VOC concentrations in groundwater at the site have reached asymptotic levels and that further groundwater extraction will be of limited effectiveness in further reducing VOC concentrations. Intel proposes that the site be designated a Non-Attainment Area (NAA) in accordance with the Board's policy for allowing NAA's under certain conditions. Board Staff have agreed to this proposal and are currently pursuing the matter with U.S. EPA. If U.S. EPA concurs we will recommend that the SCRs be revised to include a NAA.

In accordance with our current policy, I recommend that the NAA proposal be considered separately from the Five-Year Status Report and Effectiveness Evaluation. I recommend that we accept the Five-Year Status Report and Effectiveness Evaluation without accepting the NAA proposal as part of it. The staff report of Intel's Five-Year Status Report and Effectiveness Evaluation is attached.

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

Toxics Cleanup Division

Five-Year Review (Type I)

Intel Santa Clara 3
2880 Northwestern Parkway
Santa Clara, California

I. INTRODUCTION

Authority Statement. Purpose. The California Regional Water Quality Control Board, San Francisco Bay Region, conducted this review pursuant to the Multi-Site Cooperative Agreement (MSCA) between the U. S. EPA Region IX and the Regional Board, and the U. S. EPA Supplemental Five-Year Review Guidance (OSWER Directive 9355.7-02A) of July 26, 1994. It is a policy review. The purpose of a five-year review is to ensure that a remedial action remains protective of public health and the environment and is functioning as designed. This document will become a part of the Site File (No. 2189.8119). This review (Type I) is applicable to a site which response is ongoing.

Site Characteristics:

Location. The Santa Clara 3 (SC3) Facility is located on Northwestern Parkway near where it intersects Central Expressway in the City of Santa Clara. Central Expressway bounds the site on the north. The predominant groundwater flow direction is towards the northeast. The underlying sediments are a heterogeneous alluvial material consisting of sands and gravels interbedded with silts and clays. The soils are extremely variable over short distances, both horizontally and vertically. The interval being remediated consists of the top 30 feet. A shallow groundwater bearing zone called the A zone is found from about 10 to 27 feet. VOC pollution has impacted the A zone. Groundwater in the underlying B zone, reached at a depth below 30 feet and extending down to about 43 feet, has not been impacted by VOC pollution. Below a depth of about 200 feet lies a deep regional confined aquifer.

Source of Contamination. The SC3 Facility was built in 1975. The source of contamination was never positively identified. Three potential sources were proposed, and to the extent practical, evaluated. The potential sources were: 1) leaks from the acid waste neutralization area, 2) spills near the above ground solvent storage facility, and 3) solvent spills associated with cleaning out pipes put in place during construction of the facility. Data collected during the evaluation of these sources indicates that it is unlikely that a source currently exists which could contribute to the existing VOC pollution in groundwater.

Maximum Contamination. The historical maximum VOC concentrations in the A zone were TCE - 490 ug/l, 1,1,1-TCA - 810 ug/l, 1,1-DCE - 84 ug/l, 1,1-DCA - 8.2 ug/l, 1,2 DCA - 16ug/l, Freon 113 - 1300 ug/l. Currently, only TCE is above the cleanup level.

II. DISCUSSION OF REMEDIAL OBJECTIVES

Remedial Actions:

Groundwater. Groundwater extraction began in February 1985 with the installation of two A zone extraction wells. The discharger did a feasibility study evaluating different remedial action alternatives. A complete description of the alternatives is contained in the February 1990 RI/FS report. The Regional Board adopted Site Cleanup Requirements (SCRs), Order No. 90-105, for Intel SC3 in July 1990. The alternative that was selected in the SCRs as the final cleanup plan consisted of: 1) a deed restriction prohibiting the use of shallow groundwater, 2) groundwater monitoring, 3) pumping from the two extraction wells then existing and from one additional well, 4) treatment of extracted groundwater with activated carbon and discharge of the treated groundwater to the storm drain under an NPDES permit, 5) proposal and implementation of a pulsed pumping demonstration project.

The SCRs set cleanup standards at California proposed or adopted Maximum Contaminant Levels (MCLs). These cleanup levels are:

Cleanup Level (ppb)	Carcinogen	Non-carcinogen
5	1,1-DCA	
0.5	1,2-DCA	
6	1,1-DCE	
5	TCE	
6		cis 1,2-DCE
10		trans 1,2-DCE
200		TCA
1,200		Freon 113
150		Freon 11

The pulsed pumping demonstration project began in April 1991. Pulsed pumping is a strategy whereby the extraction wells are cycled on and off in pumping and nonpumping periods. During the nonpumping period groundwater levels will rebound. In theory, this could provide greater contact time between the shallow soils and groundwater, and potentially allow VOCs adsorbed to soil particles to desorb into the groundwater, allowing further extraction of VOCs. A variety of pulsed pumping trials involving varying time periods of pumping and not pumping were tried.

Soils No areas of excess soil contamination were identified, and hence no soil remediation was done.

III. ARARs REVIEW

There have been no changes to the ARARs for the chemicals currently present at the site.

IV. EFFECTIVENESS EVALUATION

Discharger's Evaluation. The 5-year status report is the discharger's evaluation of the selected final cleanup remedy and cleanup costs. This report also contains an evaluation by the discharger, if drinking water standards have not been achieved, addressing whether it is technically feasible to achieve drinking water quality on-site.

Effectiveness of Site Remediation. Since groundwater extraction began in 1985, nearly 45 million gallons of groundwater have been extracted and treated, and approximately 38 pounds of VOCs have been removed (28 pounds of TCE and 10 pounds of Freon 113). About 40 million gallons of groundwater were extracted from February 1985 through April 1991. In April 1991 the pulsed pumping trials began. Approximately 4.6 million gallons of groundwater were extracted during the pulsed pumping trials. VOC removal rates had been declining steadily at the site and there was little difference between the removal rates for pulsed pumping versus continuous extraction. The discharger maintains that the VOC removal rates at the site have reached asymptotic levels. Currently, the only VOC above the cleanup standard is TCE at about 50 ug/l.

The tasks specified in the SCRs for the site have been accomplished. These tasks included: installation of an additional extraction well (well SC3-E3), implementation of a deed restriction prohibiting the use of shallow groundwater, and implementation of a pulsed pumping program.

The cleanup plan has worked in that groundwater extraction has reduced the VOC concentrations in groundwater at the Site and has contained the plume on-site. The extraction wells have

been off since July 1993 in order to see what effect curtailing groundwater extraction would have on the pollutant plume. Since the pumps have been off there has been a gradual decrease in TCE concentrations in most monitoring wells at the Site. There has been a slight increase in the TCE concentration in a well at the leading edge of the plume. This is probably the result of diffusion of product from the center of the plume towards the leading edge. The discharger claims that because VOC concentrations have reached asymptotic levels, that further groundwater extraction will not result in efficient or timely reduction in VOC concentrations to the cleanup levels.

Proposal to establish a Non-Attainment Area (NAA). The discharger claims that VOC concentrations have reached asymptotic levels and has petitioned for a NAA designation for the site. A petition containing a proposal for the NAA designation, including a monitoring and contingency plan, has been submitted by the discharger. The discharger has also included the NAA request as part of the five-year status report.

If a NAA designation is approved by the Board, the extraction system will remain off and a modified monitoring program implemented. A contingency plan will be activated if a concentration at or exceeding an established trigger concentration is detected in any of the monitored wells. If the trigger concentration is confirmed, groundwater extraction and treatment from one or more of the three extraction wells will be initiated, and will continue until all concentrations are below trigger concentrations for three consecutive quarters. The contingency plan is meant to ensure that groundwater containing VOCs in excess of cleanup standards does not leave the site.

The selected remedy consisting of the extraction and treatment of groundwater has worked in that VOC concentrations have declined significantly and the plume has been contained. The goal of the remedy was to restore the groundwater to drinking water quality. Information from this site and other sites in the South 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. 45 million gallons of groundwater have been extracted and treated at this site at a cost of $1,070,000 ($120,000 for remedial investigation) to remove 38 pounds of VOCs. Information submitted by the discharger indicates that VOC concentrations in wells onsite have reached asymptotic levels. It is likely that further groundwater extraction would be less efficient in removing VOCs and considerable resources would be expended in removing enough VOC mass to reach MCLs.

The Regional Board concluded in 1992 that it may not be feasible in all cases to restore VOC polluted groundwater to background or even drinking water quality. In view of this, the Regional Board made it possible for dischargers to propose the application of certain Board-approved criteria to sites being remediated and to request that the sites be categorized as Non-Attainment Areas (NAAs). Such areas are limited areas of groundwater pollution where pollutant concentrations may exceed water quality objectives without active remediation being required. The Intel SC3 Site, where a Board approved cleanup program has not yet resulted in compliance with water quality objectives, is classified as a "Category II" site for NAA consideration. The Board approved criteria and its applicability to the SC3 site are:

a. *An appropriate cleanup program has been fully implemented and reliably operated for an adequate period of time.*

   Groundwater extraction and treatment at this site were continuous from 1985 through 1991 when the cyclic pumping program started. Cyclic pumping lasted from 1991 through 1993. Groundwater extraction has removed 38 pounds of VOCs. Additional extraction would continue to remove VOCs but the removal efficiency, never very high at this site, would be quite low, resulting in a considerable expenditure of resources to remove a rather small amount of VOC mass.

b. *Groundwater pollutant concentrations have reached asymptotic levels using appropriate technology.*

VOC concentrations in monitoring wells on-site appear to have reached asymptotic concentrations (see figure 2). A variety of cyclic pumping schemes were tried to see if the VOC removal efficiency could be improved. Cyclic pumping did not result in any significant improvement in removal efficiency.

c. *Best economically available technologies are not technically or economically feasible to achieve further significant reduction in pollutant concentrations.*

Other technologies for removing VOCs from groundwater do not appear to offer any benefits in increased removal efficiency that would justify the cost to implement them.

d. *An acceptable plan is submitted and implemented for containing and managing the remaining human health, water quality and environmental risks posed by residual soil and groundwater pollution. This includes deed restrictions, a contingency plan, and a monitoring program.*

Intel's plan for managing the remaining risk consists of a deed restriction on the use of shallow groundwater, which is already in place, a monitoring program to track VOC concentrations, and a contingency plan to be implemented in the event that certain criteria are exceeded.

Intel has conducted a risk assessment on the risk to workers in the building on-site which is currently partially underlain by the groundwater pollutant plume. The calculated risk is lower than the acceptable risk range of 10-4 to 10-6.

The Regional Board concurs with Intel's plan with some minor exceptions regarding monitoring.

V. SUMMARY OF SITE VISIT

The most recent site visit occurred in June 1995, when a compliance inspection was conducted by a member of the Board's Staff. The inspection did not reveal any violations, and the site was found to be in full compliance. The groundwater extraction system was shut down during the inspection as it had been for the previous two years in accordance with the agreement between Intel and the Regional Board to leave the extraction system off to see what effect this would have on the plume.

VI. AREAS OF NONCOMPLIANCE

The discharger has fully implemented the approved remedial action, consistent with the remedial objectives, and is in compliance with all current Board Orders as modified by the agreements concerning the cyclic pumping trials and the pumps off trial.

VII. RECOMMENDATIONS

In general Board Staff agrees with the discharger's characterization of the site in the 5-year Review, with the exception of some minor details of the discharger's proposal for an NAA. We recommend that the NAA proposal be considered separately from the 5-year review and that the Board accept the 5-year review without accepting the NAA proposal as part of it (i.e., excluding the NAA proposal).

VIII. STATEMENT OF PROTECTIVENESS

We certify that the remedy selected for this site remains protective of human health and the environment.

IX. NEXT FIVE-YEAR REVIEW

The next 5-year review will be conducted by December 2000.

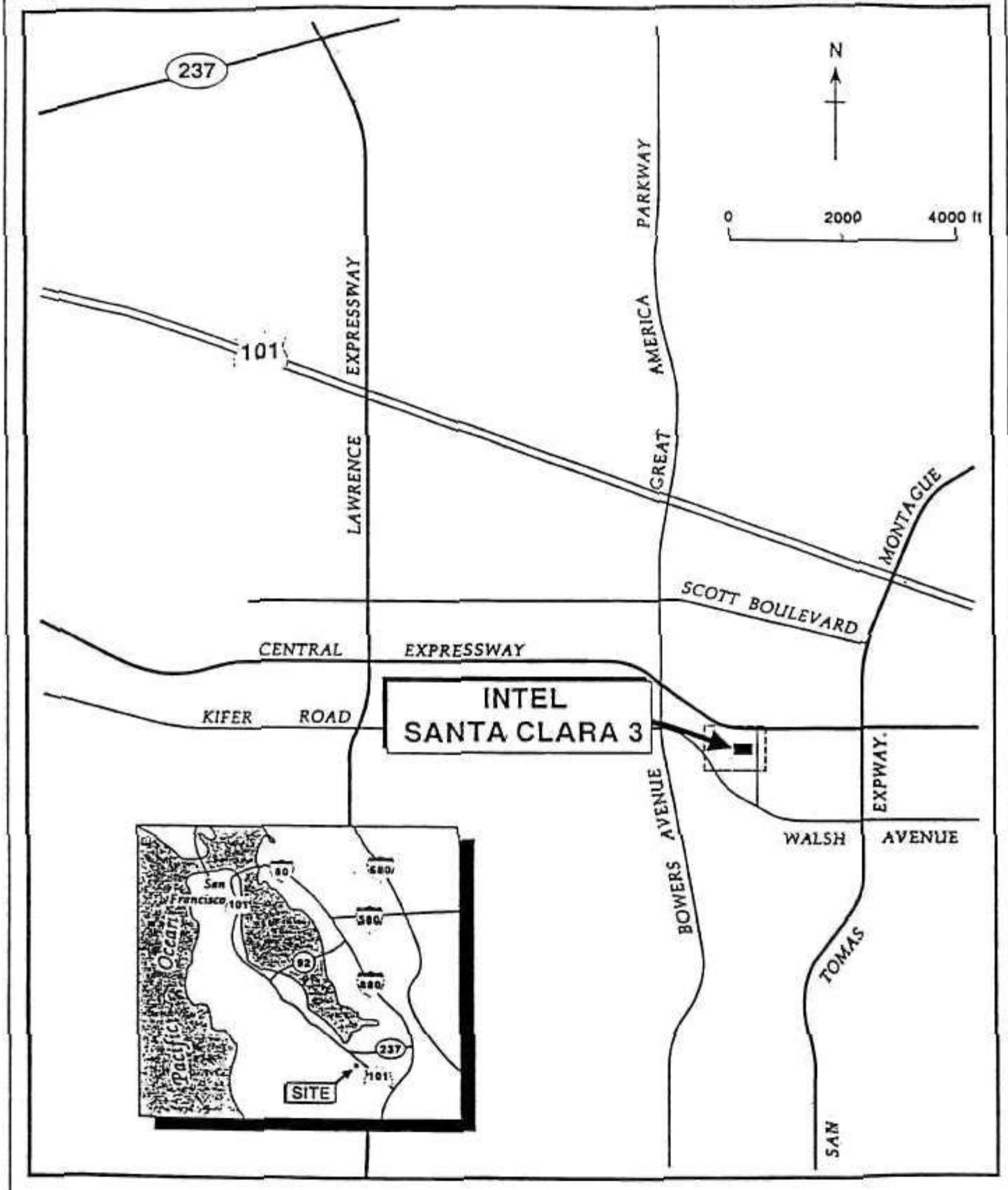


Figure 1. Site Location Map - Intel Santa Clara 3, Santa Clara, California

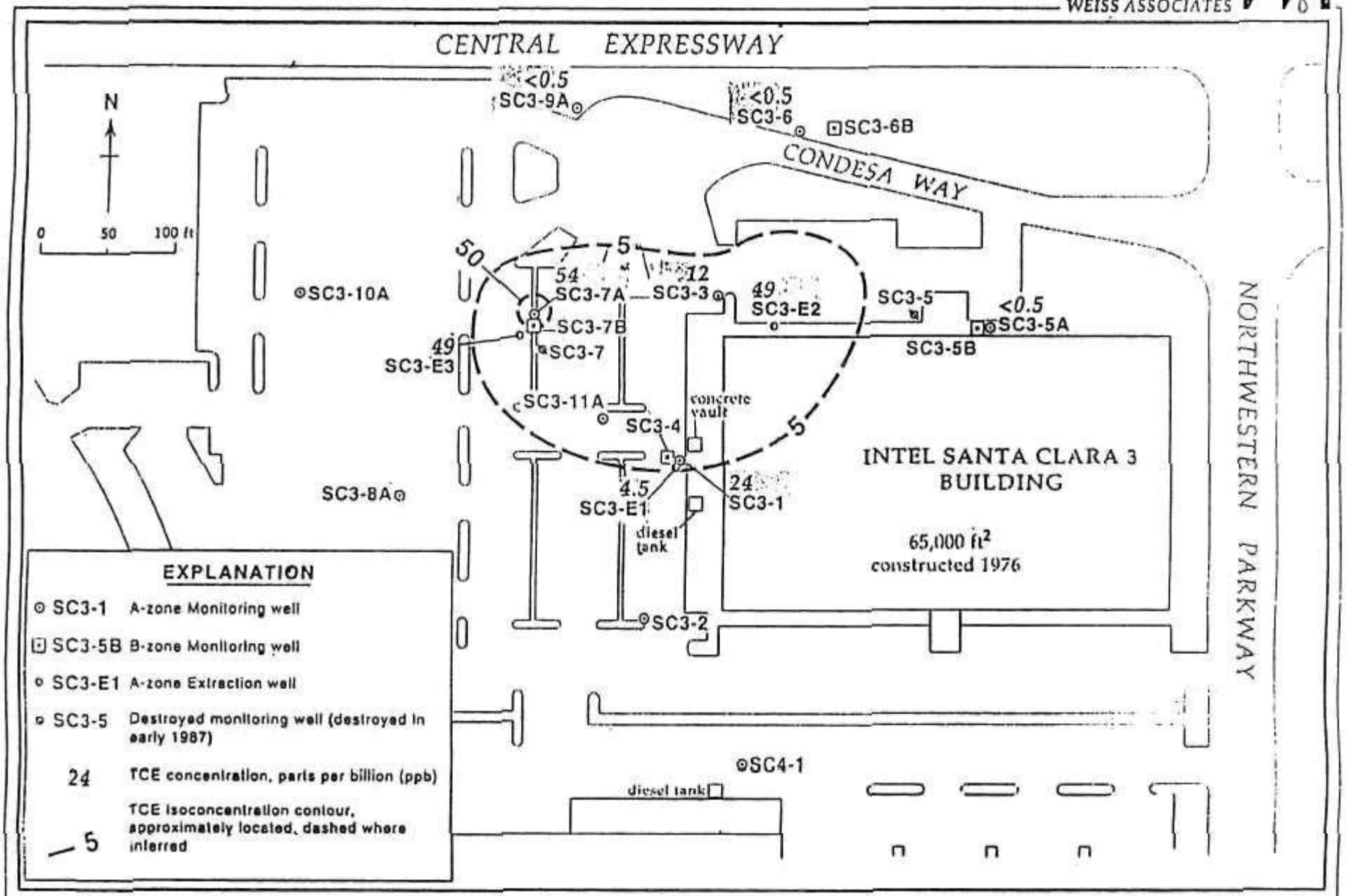
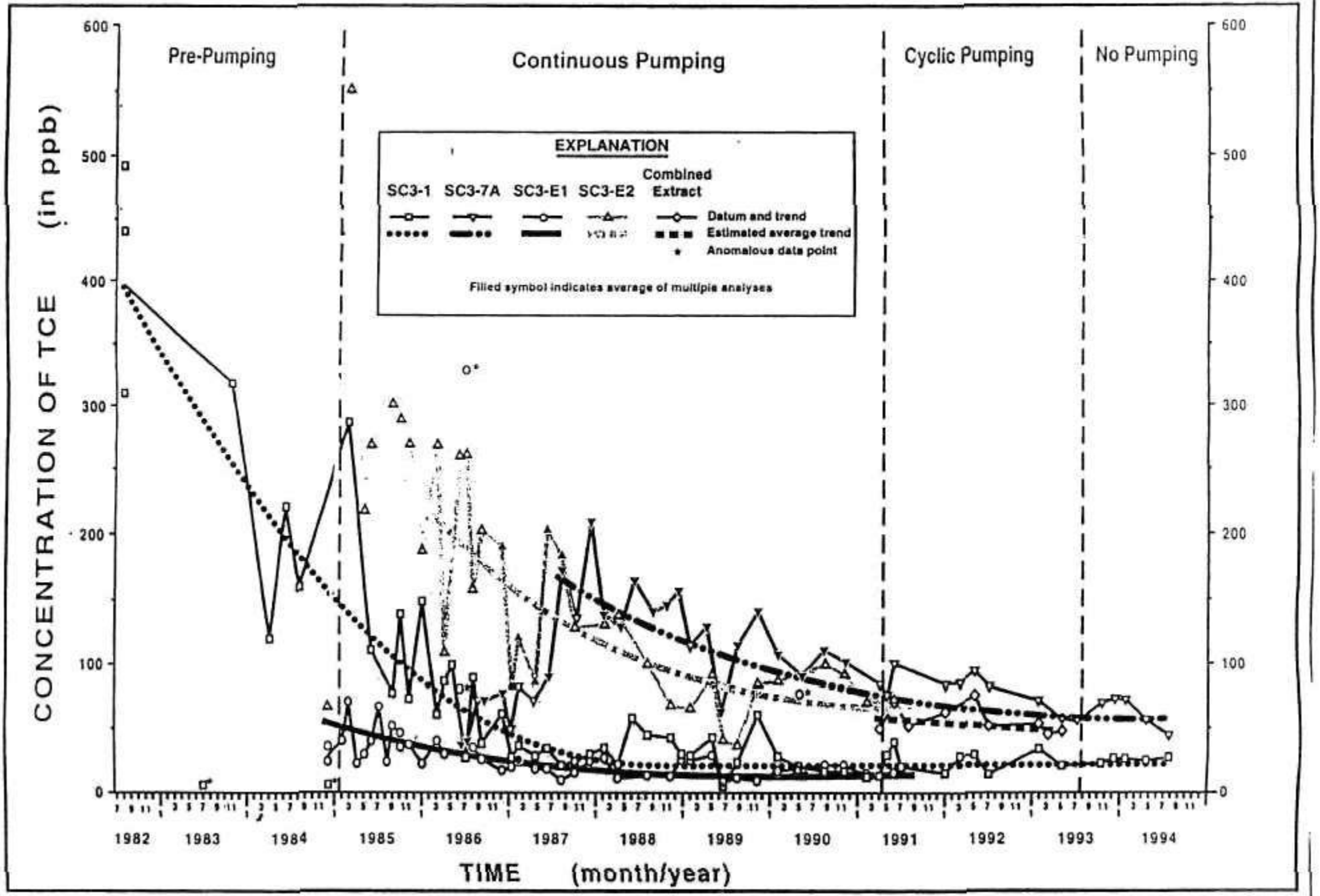


Figure 2 TCE Concentrations in the A Water Bearing Zone - December 14, 1994 - Intel Santa Clara 3, Santa Clara, California



TCE vs. Time - Intel SC3

Figure 3