

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

ORDER NO. 89 - 019

SITE CLEANUP REQUIREMENTS FOR:

TELEDYNE SEMICONDUCTOR
1300 TERRA BELLA AVENUE
MOUNTAIN VIEW
SANTA CLARA COUNTY

The California Regional Water Quality Control Board, San Francisco Bay Region (hereinafter called the Board) finds that:

1. Site Description Teledyne Semiconductor (Teledyne) manufactures semiconductors at a site located at 1300 Terra Bella Avenue, Mountain View, Santa Clara County (Figure 1). The Teledyne facility has been in operation since 1962.
2. Site History Two 1400 gallon below-grade sumps were installed at the site in 1962 and 1966, respectively (Figure 2). Prior to 1980, the sumps were used for acid neutralization and waste trichloroethylene (TCE) collection. Neither sump has contained TCE since 1980 and the two sumps are no longer in service. A 2,000 gallon underground waste flammable solvent tank (Tank A) was installed in 1975 and removed in 1982. It was used to store waste isopropyl alcohol, xylene and acetone. Teledyne also used trichloroethane (TCA) and other volatile organic compounds (VOCs) at the facility. All underground solvent handling activities were discontinued in 1980 and all chemicals are currently stored above-ground.
3. Hydrogeology The two major water-yielding zones beneath the site consist of an upper aquifer of about 70 feet of predominantly clays and silts interbedded with occasional saturated sands and gravels and the Deep Aquifer. The upper and deeper aquifers are separated by about 80 feet of finer-grained marine clays and fine silts with smaller amount of sand and possibly some gravels. There are two smaller sub-units within the upper aquifer, called the shallow zone and the intermediate zone. The shallow zone is about 10 feet thick, and generally occurs between the depths of 10 to about 30 feet. The intermediate zone is about 10 to 15 feet thick, and generally occurs between depths of 35 to 70 feet. Ground water in both the shallow and intermediate zones flows generally to the north. The deep aquifer begins at about 150 feet below the land surface and extends to a depth of approximately 700 feet.

4. Adjacent Facility Spectra-Physics, Inc. (Spectra-Physics) manufactures lasers at a site located at 1250 West Middlefield Road, Mountain View, Santa Clara County (Figure 1). The site is bounded by Terra Bella Avenue and West Middlefield Road and includes nine buildings. The Spectra-Physics site is directly south of the Teledyne site, in the upgradient ground water direction, on the opposite side of Terra Bella Avenue. Soil sampling results from the Spectra-Physics site indicate that a release of hazardous waste has occurred at the Spectra-Physics site. Ground water sampling results indicate ground water pollution from the Spectra-Physics site has migrated northward beneath the Teledyne site.
5. Soil Investigation Eight soil samples collected at the Teledyne site in 1982 from beneath the former tank A and adjacent to the two sumps and associated piping detected up to 258 parts per billion (ppb) TCE, 88 ppb trans-1,2-dichloroethylene (1,2-DCE), 42 ppb tetrachloroethylene (PCE), 663 ppb xylene and 158 ppb ethyl benzene. The soil sampling results indicate that a release of hazardous waste has occurred at the Teledyne site. Additional soil samples were collected directly beneath the former tank A location and the two sumps during December, 1988, to further identify and define the vertical extent of soil pollution.
6. Ground Water Investigation Ground water investigations have been ongoing at the Teledyne facility since 1982 and at the Spectra-Physics facility since 1984. Teledyne has installed 21 shallow zone monitoring wells and 10 intermediate zone monitoring wells on its on-site area. Spectra-Physics has installed 17 shallow zone monitoring wells and three intermediate zone monitoring wells on its on-site area. Over 30 shallow and intermediate zone monitoring wells and two deep aquifer monitoring wells have been installed by Teledyne and Spectra-Physics in the off-site area. One on-site and three off-site vertical extent wells have been installed by Teledyne and Spectra-Physics.

The on-site and off-site horizontal and vertical extent of groundwater pollution has been defined except for the Spring Street and Morgan Street (Spring Street) area and the northern most down gradient area north of Charleston Road where the investigation is ongoing. The off-site horizontal extent of ground water pollution extends at least northward to the City of Mountain View landfill dewatering trench. The vertical extent of ground water pollution extends to the bottom of vertical extent well VW-1 at a depth of 103 feet.

TCE and 1,2-DCE were detected at concentrations of up to 1.7 parts per million (ppm) and 4.9 ppm, respectively, in the shallow zone and TCE was detected at concentrations of up to 2.3 ppm in the intermediate zone beneath the Teledyne site

during the March, 1988, sampling event. In the off-site area, TCE was detected up to 1.8 ppm and 4.6 ppm in the shallow and intermediate zones, respectively, during the July, 1988 sampling event. TCE was detected in vertical extent monitoring well VW-1 at 9 ppb in June, 1988. VOCs are not currently being detected in the deep aquifer monitoring wells.

7. **Potential Conduit Study** In 1982, Santa Clara Valley Water District data documented approximately 120 active private domestic wells within a one mile radius of the Teledyne site. Many of these wells were perforated in the upper aquifer. Teledyne, in conjunction with the Santa Clara County Health Department, tested 47 active private wells in the area north of the Bayshore Freeway, between Permanente Creek to the west and Stierlin Road to the east. Sampling results confirmed the presence of TCE and 1,2-DCE in the shallow ground water. Teledyne advanced the costs to connect residents in the area to the municipal water system. Teledyne and Spectra-Physics have each submitted potential conduit studies and have made recommendations to destroy certain wells.
8. **Interim Remedial Actions** Teledyne has been extracting shallow zone ground water from one on-site shallow zone extraction well since October, 1986 and intermediate zone ground water from one on-site intermediate zone extraction well since March, 1988. Pumped ground water is discharged to the City of Mountain View sanitary sewer. Teledyne and Spectra-Physics are jointly installing ground water extraction systems in the Spring Street area consisting of several shallow and intermediate extraction wells and in the North Bayshore area (off-site area north of Highway 101) consisting of eleven shallow and six intermediate extraction wells. Teledyne and Spectra-Physics plan to start up the North Bayshore system in June, 1989, and are required to submit a report on the startup of the Spring Street system by June 30, 1989.
9. **Work Plan** Teledyne submitted a work plan for the completion of a remedial investigation, feasibility study (RI/FS) and a proposed final plan on August 26, 1988, and a revised work plan on November 17, 1988.
10. **Scope Of This Order** This Order contains a task for Teledyne to complete the installation and sampling of soil borings beneath Teledyne's on-site underground sumps and tank and to complete a RI/FS and a proposed plan for the Teledyne on-site area and for the off-site area down gradient of Teledyne. Ground water pollution from the Spectra-Physics site has migrated northward down gradient beneath the Teledyne site and commingled with the Teledyne ground water pollution. Board staff intend to recommend that the Board adopt a Site Cleanup Order for Spectra-Physics in early 1989 which contains tasks for Spectra-Physics to complete a RI/FS and a proposed plan

for the Spectra-Physics on-site area and for the off-site area down gradient of Spectra-Physics.

11. Teledyne is hereinafter referred to as a discharger because of the releases of hazardous wastes that have occurred at its site. Teledyne is also a Responsible Party under the Federal Superfund (CERCLA/SARA). Teledyne is a Superfund site on the National Priorities List (NPL).
12. The Board adopted a revised Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan) on December 17, 1986. The Basin Plan contains water quality objectives and beneficial uses for South San Francisco Bay and contiguous surface and ground waters.
13. The existing and potential beneficial uses of the groundwater underlying and adjacent to the facility include:
 - a. Industrial process water supply
 - b. Industrial service water supply
 - c. Municipal and Domestic water supply
 - d. Agricultural water supply
14. The discharger has caused or permitted, and threatens to cause or permit waste to be discharged or deposited where it is or probably will be discharged to waters of the State and creates or threatens to create a condition of pollution or nuisance.
15. This action is an order to enforce the laws and regulations administered by the Board. This action is categorically exempt from the provisions of the CEQA pursuant to Section 15321 of the Resources Agency Guidelines.
16. Onsite and offsite interim containment and cleanup measures need to be implemented to alleviate the threat to the environment posed by the continued migration of pollutants and to provide a substantive technical basis for designing and evaluating the effectiveness of final cleanup alternatives.
17. The Board has notified the discharger and interested agencies and persons of its intent under California Water Code Section 13304 to prescribe Site Cleanup Requirements for the discharge and has provided them with the opportunity for a public hearing and an opportunity to submit their written views and recommendations.
18. The Board, in a public meeting, heard and considered all comments pertaining to the discharge.

IT IS HEREBY ORDERED, pursuant to Section 13304 of the California Water Code, that the discharger shall cleanup and abate the effects described in the above findings as follows:

A. PROHIBITIONS

1. The discharge of wastes or hazardous materials in a manner which will degrade water quality or adversely affect the beneficial uses of the waters of the State is prohibited.
2. Further significant migration of pollutants through subsurface transport to waters of the State is prohibited.
3. Activities associated with the subsurface investigation and cleanup which will cause significant adverse migration of pollutants are prohibited.

B. SPECIFICATIONS

1. The storage, handling, treatment or disposal of soil or groundwater containing pollutants shall not create a nuisance as defined in Section 13050(m) of the California Water Code.
2. The discharger shall conduct monitoring activities as needed to define the current local hydrogeologic conditions, and the lateral and vertical extent of soil and groundwater pollution. Should monitoring results show evidence of pollutant migration, additional characterization of pollutant extent may be required.

C. PROVISIONS

1. The discharger shall submit to the Board acceptable monitoring program reports containing results of work performed according to a program as attached.
2. The discharger shall comply with Prohibitions A.1., A.2., and A.3., and Specifications B.1. and B.2. above, in accordance with the following time schedule and tasks:

COMPLETION DATE/TASK

ON-SITE

- a. 1) COMPLETION DATE: January 20, 1989

TASK: CHARACTERIZE SOIL POLLUTION: Submit a technical report acceptable to the Executive Officer documenting completion of the installation and sampling of on-site soil borings, an evaluation of the need for additional soil borings to define the nature and extent of soil pollution, and a proposal for additional soil borings, if necessary.

OFF-SITE DOWN GRADIENT

- b. 1) COMPLETION DATE: FEBRUARY 10, 1989

TASK: CHARACTERIZE DOWN GRADIENT EXTENT OF GROUNDWATER POLLUTION, EVALUATE NORTH OF CHARLESTON PIEZOMETER NETWORK AND PROPOSE REVISED SELF-MONITORING PLAN: Submit a technical report acceptable to the Executive Officer containing (1) a proposal to define the down gradient extent of groundwater pollution, (2) an evaluation of and proposal for additional piezometers north of Charleston Road to define the extraction system capture area, and (3) a revised self-monitoring plan.

- 2) COMPLETION DATE: February 17, 1989

TASK: CHARACTERIZE GROUND WATER POLLUTION: Submit a technical report acceptable to the Executive Officer documenting completion of the installation and sampling of monitoring wells in the Spring Street area and a proposal for additional monitoring wells to define the extent of ground water pollution in the Spring Street area, if necessary.

ON-SITE AND OFF-SITE DOWN GRADIENT

- c. 1) COMPLETION DATE: January 29, 1989

TASK: CATEGORIZE POTENTIAL CONDUITS: Submit a technical report acceptable to the Executive Order categorizing the potential conduits according to the categories listed in the November 16, 1988 Levine-Fricke report, "Update

Status Report, Potential Conduit Study." The categories shall include wells greater than 65 feet deep also. The report shall also include an evaluation of whether any additional measures are needed to prevent the migration of pollutants to the Deep Aquifer, such as sealing additional wells.

- d. 1) COMPLETION DATE: June 30, 1989

TASK: START UP OF SPRING STREET GROUND WATER EXTRACTION SYSTEM: Submit a technical report acceptable to the Executive Officer documenting the start up of the Spring Street ground water extraction system.

- e. 1) COMPLETION DATE: February 3, 1989

TASK: BASELINE PUBLIC HEALTH EVALUATION WORKPLAN: Submit a technical report acceptable to the Executive Officer containing a work plan for the completion of a baseline public health evaluation prepared in accordance with the Superfund Baseline Public Health Evaluation Manual (EPA 540/1-86/060, October 1986).

- 2) COMPLETION DATE: June 2, 1989

TASK: BASELINE PUBLIC HEALTH EVALUATION: Submit a technical report acceptable to the Executive Officer containing a baseline public health evaluation prepared in accordance with the Superfund Baseline Public Health Evaluation Manual (EPA 540/1-86/060, October 1986).

- f. 1) COMPLETION DATE: November 30, 1989

TASK: PROPOSED FINAL CLEANUP OBJECTIVES AND ACTIONS: Submit a technical report acceptable to the Executive Officer pursuant to the work plan described in Finding 9 as revised, and approved by the Executive Officer, containing the results of the remedial investigation; an evaluation of the installed interim remedial measures; a feasibility study evaluating alternative final remedial measures; and a separate technical report acceptable to the Executive Officer containing the recommended measures necessary to achieve final cleanup objectives; and the tasks and time schedule necessary to implement the recommended final remedial measures.

3. The submittal of technical reports evaluating immediate, interim and final remedial measures will include a projection of the cost, effectiveness, benefits, and impact on public health, welfare, and environment of each alternative measure. The remedial investigation and feasibility study shall be consistent with the guidance provided by Subpart F of the National Oil and Hazardous Substances Pollution Contingency Plan (40 CFR Part 300); Section 25356.1 (c) of the California Health and Safety Code; CERCLA guidance documents issued by April 1, 1989 with reference to Remedial Investigation, Feasibility Studies, and Removal Actions; and the State Water Resources Control Board's Resolution No. 68-16, "Statement of Policy with Respect to Maintaining High Quality of Waters in California".
4. If the discharger is delayed, interrupted or prevented from meeting one or more of the completion dates specified in this Order, the discharger shall promptly notify the Executive Officer and the Board may consider revision to this Order.
5. Technical reports on compliance with the Prohibitions, Specifications, and Provisions of this Order shall be submitted quarterly to the Board commencing on February 15, 1989, and covering the previous quarter. On a quarterly basis thereafter, these reports shall consist of a letter report that, (1) summarizes work completed since submittal of the previous report, and work projected to be completed by the time of the next report, (2) identifies any obstacles which may threaten compliance with the schedule of this Order and what actions are being taken to overcome these obstacles, and (3) includes, in the event of non-compliance with Provision C.2. or any other Specification or Provision of this Order, written notification which clarifies the reasons for non-compliance and which proposes specific measures and a schedule to achieve compliance. This written notification shall identify work not completed that was projected for completion, and shall identify the impact of non-compliance on achieving compliance with the remaining requirements of this Order.

On a quarterly basis, commencing with the October - December, 1988 quarterly report due February 15, 1989, the quarterly reports shall include, but need not be limited to, updated water table and piezometric surface maps for all affected water bearing zones, and appropriately scaled and detailed base maps showing the location of all monitoring wells and extraction wells, and identifying adjacent facilities and structures. When appropriate due to new data, and upon request by the

Executive Officer, new geological data shall be incorporated into cross-sectional geological maps describing the hydrogeological setting of the site.

7. All hydrogeological plans, specifications, reports, and documents shall be signed by or stamped with the seal of a registered geologist, engineering geologist or professional engineer.
8. All samples shall be analyzed by State certified laboratories or laboratories accepted by the Board using approved EPA methods for the type of analysis to be performed. All laboratories shall maintain Quality assurance/quality control records for Board review.
9. The discharger shall maintain in good working order, and operate, as efficiently as possible, any facility or control system installed to achieve compliance with the requirements of this Order.
10. Copies of all reports pertaining to compliance with the Prohibitions, Specifications, and Provisions of this Order, shall be provided to the following agencies:
 - a. Santa Clara Valley Water District
 - b. Santa Clara County Health Department
 - c. City of Mountain View
 - d. State Department of Health Services/TSCD
 - e. State Water Resources Control Board
 - f. U. S. Environmental Protection Agency, Region IX

The Executive Officer may additionally require copies of correspondence, reports and documents pertaining to compliance with the Prohibitions, Specifications, and Provisions of this Order to a local repository for public use.

11. The discharger shall permit the Board or its authorized representative, in accordance with Section 13267(c) of the California Water Code:
 - a. Entry upon premises in which any pollution sources exist, or may potentially exist, or in which any required records are kept, which are relevant to this Order.
 - b. Access to copy any records required to be kept under the terms and conditions of this Order.
 - c. Inspection of any monitoring equipment or methodology implemented in response to this Order.

- d. Sampling of any groundwater or soil which is accessible, or may become accessible, as part of any investigation or remedial action program undertaken by the discharger.
12. The discharger shall file a report on any changes in site occupancy and ownership associated with the facility described in this Order.
13. If any hazardous substance, as defined pursuant to Section 25140 of the Health and Safety Code, is discharged in or on any waters of the state, or discharged and deposited where it is, or probably will be discharged in or on any waters of the state, the discharger shall report such discharge to this Regional Board, at (415) 464-1255 on weekdays during office hours from 8 a.m. to 5 p.m., and to the Office of Emergency Services at (800) 852-7550 during non-business hours. A written report shall be filed with the Regional Board within five (5) working days and shall contain information relative to: the nature of waste or pollutant, quantity involved, duration of incident, cause of spill, Spill Prevention, Control, and Countermeasure Plan (SPCC) in effect, if any, estimated size of affected area, nature of effect, corrective measures that have been taken or planned, and a schedule of these activities, and persons/agencies notified.
14. The Board will review this Order periodically and may revise the requirements when necessary.

I, Steven R. Ritchie, Executive Officer, do hereby certify that the foregoing is a full, true and correct copy of an Order adopted by the California Regional Water Quality Control Board, San Francisco Bay Region, on January 18, 1989.


Steven R. Ritchie
Executive Officer

Attachments
Self-Monitoring Program
Figure 1
Figure 2

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

SELF-MONITORING PROGRAM

FOR

Teledyne Semiconductor

1300 Terra Bella Avenue
Mountain View
Santa Clara County

Order No. 89 - 019

CONSISTS OF

PART A, Dec. 1986
As Modified by SBTD, 1/23/87
With Appendices A-E

and

PART B, January 18, 1989

PART B

Teledyne Semiconductor
1300 Terra Bella Avenue
Mountain View
Santa Clara County

I. DESCRIPTION OF SAMPLING STATIONS

All existing and future shallow, intermediate and deep aquifer monitoring and extraction wells as appropriate. See Table 1 and 2 (attached) for list of monitoring wells.

II. MISCELLANEOUS REPORTING. None.

III. SCHEDULE OF SAMPLING AND ANALYSIS

The schedule of sampling and analysis shall be that given in Table 1 (attached).

IV. MODIFICATIONS TO PART A.

A. Delete Sections B, D, E, F.2, F.3, G.1, G.2, G.4.b, and G.4.e., G.4.g.

B. The first paragraph of Section G.4 shall be changed to read as follows:

Written reports shall be filed with the Regional Board regularly for each calendar quarter (unless otherwise specified) and filed no later 45 days after each quarter. The reports shall be compromised of the following:

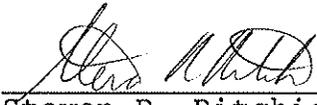
C. Insert G.4.d.5) to read as follows:

The EPA Method 8240 analyses shall include tentative identification and semi-quantified concentrations of non-priority pollutant substances of greatest apparent concentration, to be followed by identification and confirmation of peaks of greatest concentration.

I, Steven R. Ritchie, Executive Officer, hereby certify that the foregoing Self-Monitoring Program:

1. Has been developed in accordance with the procedure set forth in this Regional Board's Resolution No. 73-16 in order to obtain data and document compliance with site cleanup requirements established in Regional Board Order No. 89 - 019.
2. May be reviewed at any time subsequent to the effective date upon written notice from the Executive Officer or request from the discharger, and revisions will be ordered by the Executive Officer or Regional Board.
3. Was adopted by the Board on January 18, 1989.

1/20/89
DATE



Steven R. Ritchie
Executive Officer

Attachments: Table 1
Table 2

TABLE 1
SCHEDULE FOR SAMPLING, MEASUREMENTS, AND ANALYSIS

SAMPLING --> STATION -->	As listed in Table 2	RA-1, T-32I, E1S through E9S, E10I through E15I, E16S, E17S Spring St. Extraction Wells
TYPE OF SAMPLE	G	
<u>ANALYSES</u> EPA Method 8010	Q	
EPA Method 8240 w/Open Scan	1/Y*	
Mass Quantity of Pollutants Removed		Q

LEGEND FOR TABLE 1

G = grab sample

Q = quarterly, once in March, June, September and December

1/Y = once per year

* EPA 8010 not required for months when EPA 8240 is performed.

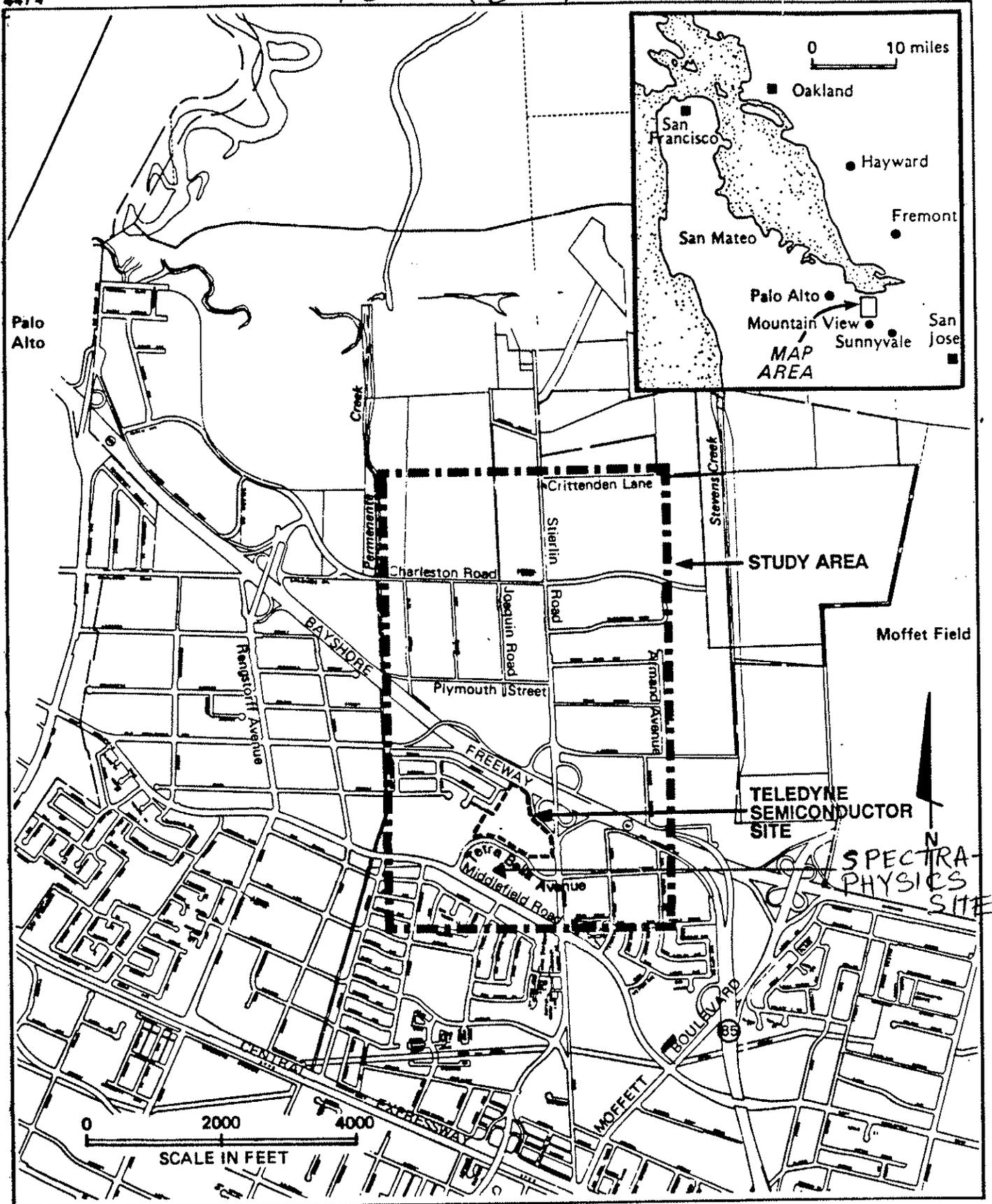
TABLE 2
WELL SAMPLING FREQUENCY SUMMARY

Quarterly Wells			Semi-Annual Wells			Annual Wells
E1*	W-1*	T6	S-1	T1	24S	S-4
E2*	W-2	T8*	S-2	T2	24I	S-5
E3*	W-2A	T32I	S-3	T3	25I	S-6
E4*	W-3	RA1	S-8*	T4	26S	S-7
E5*	W-5*	VW1	S-9	T5	26I	S-10
E6*	W-6		S-11	T7	30S	S-12
E7*	W-6A		S-13	T9	30I	
E8	W-7*		S-14	T10		T33I
E9	W-7A*		S-15I	T11*	W2	
E10*			S-16I	T12	W2A	6S2W09Q1
E11*	SP-10I*		S-17	T13	W4	6S2W16G7
E12*			S-18	T14	W4A	
E13	T21*		S-18A	T15		
E14*	T22*		S-19	T16	VW2	
E15*	T23*			T19	VW3	
E16	27I			T20	VW4	
E17	28S		R-1	T31S		
E18S	28I		R-2	T34S	NB13I	
E19I	29S			P21	NB14	
E20S	29I			P22		
				P23		
W9I	C1			P24		
W10I	C2			P25		
W11S				P26		
W12S				P211		
MW13S						
MW14I						
MW15S						
W16I						

+ Approximate Sampling Date

* To be analyzed once a year for EPA Method 8240

FIGURE 1



Harding Lawson Associates
Engineers and Geoscientists

Location of Study Area
RI/FS/RA Work Plan
Teledyne Semiconductor And Spectra Physics, Inc. 1
Mountain View, California

PLATE

DRAWN
ML

JOB NUMBER
17452,074.02

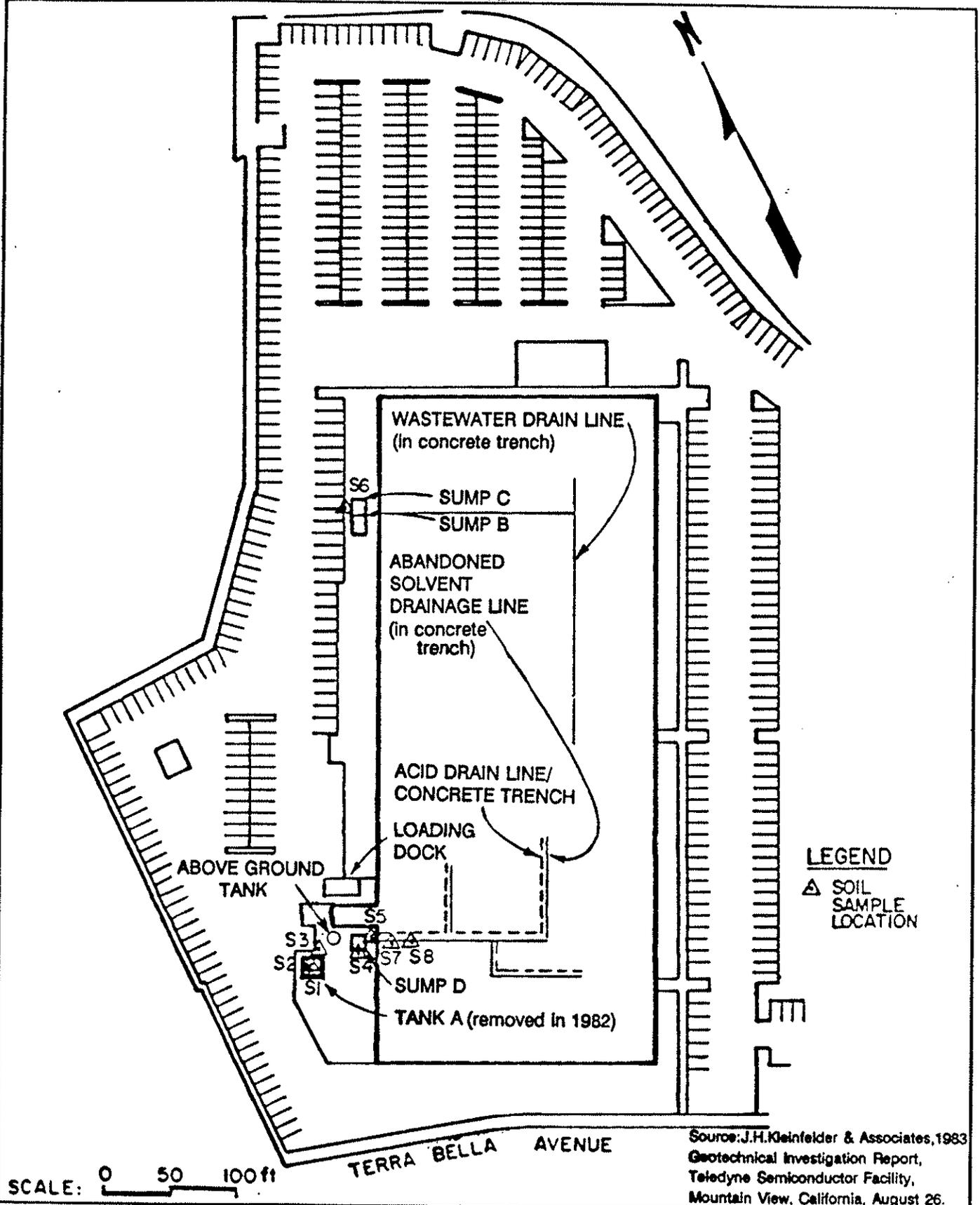
APPROVED
R. Hanfer

DATE
6/88

REVISED

DATE

FIGURE 2



Harding Lawson Associates
Engineers and Geoscientists

Locations of Sumps, Drain Lines, and Soil Samples
RI/FS/RA Work Plan
Teledyne Semiconductor
Mountain View, California

DRAWN
AK

JOB NUMBER
17452,074.02

APPROVED
R. Hanfer

DATE
6/88

REVISED

DATE