

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

ORDER NO. 89-062

SITE CLEANUP REQUIREMENTS FOR:

NATIONAL SEMICONDUCTOR CORPORATION
2900 SEMICONDUCTOR DRIVE
SANTA CLARA, SANTA CLARA COUNTY

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

1. Site Location and Description National Semiconductor Corporation (NSC) owns and operates a semiconductor manufacturing facility at 2900 Semiconductor Drive, Santa Clara, Santa Clara County. The NSC site is bounded by Central Expressway on the north, Lawrence Expressway on the east, Kifer Road on the south, and a line about 1000 feet east of Commercial on the west. The site comprises over 20 buildings containing administrative offices, laboratories and production facilities over an area of approximately 60 acres. NSC has been manufacturing semiconductors at the site since 1967.
2. Regulatory Status NSC is hereinafter referred to as a discharger because of the releases of hazardous wastes that have occurred at its site. NSC is also a Responsible Party under Federal Superfund regulations (CERCLA/SARA), and is a Superfund site on the National Priorities List (NPL). This Order is intended to outline the tasks required for completion of the Remedial Investigation/Feasibility Study (RI/FS) as required by CERCLA/SARA.
3. Site History Virgin solvents and acids used in the semiconductor manufacturing processes were and are stored in aboveground tanks and storage drums while waste solvents have been stored in underground tanks and acid wastes have been neutralized in acid neutralization sumps. Subsurface investigations initiated in early 1982 revealed significant levels of organic chemical pollution in soils and ground water beneath and downgradient of the site. The pollution was caused primarily by leakage from underground tanks, sumps and pipes.

In 1986, following initial investigations and actions at the site, the Board issued waste discharge requirements which established tasks and a time schedule to complete definition of the extent of offsite pollution and to implement plume stabilization measures.

In 1988, the Board issued site cleanup requirements which modified the waste discharge requirements to address onsite soil pollution and to update the schedule to complete further plume investigation and stabilization measures and the final remedial action program.

4. Hydrogeology The NSC site is underlain by a thick sequence of unconsolidated sediments that were deposited primarily by northward flowing streams draining the Coast Range Mountains. The shallow aquifers encountered beneath and downgradient of the NSC site vary in thickness and consist of moderate to high permeability sands and gravels. The aquifers are separated by low-permeability clay and silt aquitards. To characterize the complex aquifer/aquitard system, the sands and gravels have been grouped into various water-bearing zones designated as the A and B aquifers, with the B subdivided into the B1, B2, and B3 aquifers.

The A aquifer occurs at depths between 5 and 25 feet and is, in general, separated from the underlying B1 aquifer by a low-permeability clay aquitard. In some areas, the A/B1 aquitard is not present which results in a combined A/B1 aquifer system. The B1, B2, and B3 aquifers occur between 30 and 45 feet, 50 and 65 feet, and 70 and 90 feet below ground surface, respectively. These shallow aquifers are separated from each other by clay or silt aquitards and from the deeper aquifers that supply water for public consumption by a thick (>100 feet) low-permeability clay.

Ground water gradients have been determined to be to the north by northeast in the vicinity of the site in the A, B1, and B2 aquifers. The vertical gradients have historically been upward.

5. Soil Pollution Soil samples have been collected at the site in conjunction with drilling of well borings, underground tank vault and acid sump removals, investigations of solvent and acid pipeline trench leaks and an extensive investigation of remaining onsite soil contamination. These samples have been analyzed for organic compounds and metals. Maximum pollutant levels of volatile organic compounds (VOCs) found were 18,000, 3000, 1200, 900, 150, and 3.3 parts per million (ppm) of xylenes and ethyl benzene, trichlorobenzene, benzene, tetrachloroethene (PCE), 1,1,1-trichloroethane (1,1,1-TCA), and trichloroethene (TCE), respectively.
6. Groundwater Pollution VOCs were detected at concentrations as high as 33,000 parts per billion (ppb) in ground water samples from the initial wells installed near existing underground tanks or sumps suspected of leaking. Results of the initial onsite and subsequent onsite and offsite ground water investigations at the site indicate that 1,1,1-TCA, TCE,

1,1-dichloroethene (1,1-DCE), 1,2-DCE, and Freon 113 were consistently detected in all impacted wells. Volatile aromatic compounds (xylenes and ethyl benzene) were also detected in certain onsite wells. To date, NSC has installed 51 and 41 ground monitoring wells onsite and offsite, respectively. Studies have delineated a plume of VOCs in the A and B1 aquifers extending approximately 5000 feet downgradient (north) of the NSC site, ending in the vicinity of U. S. Highway 101, in the City of Sunnyvale.

7. Interim Soil Remedial Actions Contaminated soil onsite has been removed offsite in conjunction with underground waste solvent tank and waste oil storage pad excavations in 1982 and 1984. Based on the investigation of remaining onsite soil contamination, interim remedial actions being reviewed and considered for the site are further soil excavation and soil venting.
8. Interim Ground Water Remedial Actions NSC began onsite ground water remediation in 1985 by installing an extraction and treatment system onsite. This system presently consists of 25 wells and two air stripping towers and acid fume scrubbers. The stripping tower effluent is discharged to surface waters under an NPDES permit issued by the Board and the scrubber effluent is discharged to the sanitary sewer.

NSC also operates an offsite extraction and treatment system located along Miraloma Way and East Arques Avenue in the City of Sunnyvale. This system consists of 15 extraction wells and an air stripper. The system was installed in May 1987 and the number of extraction wells expanded in the summer of 1988.

Currently, NSC is extracting and treating approximately 1.25 million gallons of water per week with its onsite and offsite remediation systems.

9. Workplan Because the NSC site is listed on the EPA's NPL, NSC was requested to submit a workplan for a Remedial Investigation/Feasibility Study. NSC submitted a workplan on May 31, 1988, and revisions of that workplan on March 13, 1989, and March 29, 1989.
10. Scope of this Order On February 17, 1988, the Board adopted Order No. 88-22 which prescribed Waste Discharge Requirements to the discharger and established tasks and time schedules to define the extent of the contaminants and implement interim remedial actions. The intent of this Order is to supersede the requirements of Order No. 88-22 by updating the status of the site and prescribing a time schedule to complete final investigations and evaluate final remedial action alternatives, and in so doing, approve the workplan referenced in Finding 9 above. This Order rescinds Order No. 88-22.

11. 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.
12. The existing and potential beneficial uses of the ground water underlying the NSC and adjacent sites include:
 - a. Municipal and domestic water supply
 - b. Industrial process and service water supply
 - c. Agricultural water supply
13. 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.
14. 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.
15. 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.
16. 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.
17. 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 outlined in an Amended Sampling and Analysis Plan, approved by the Executive Officer, 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 comply with Prohibitions A.1., A.2., and A.3., and Specifications B.1. and B.2. immediately except as modified in accordance with the following tasks and time schedule:

COMPLETION DATE/TASK

a) COMPLETION DATE: August 1, 1989

TASK: AMEND SAMPLING AND ANALYSIS PLAN Submit an amended Sampling and Analysis Plan (SAP), consisting of the Quality Assurance Project Plan and Field Sampling Plan, which is consistent with the latest EPA RI/FS Guidance Document and appropriate referenced documents therein. Data Quality Objectives for all media for all data used shall be established in the SAP in a manner consistent with EPA's "Data Quality Objectives for Remedial Response Action" Document (March 1987).

b) COMPLETION DATE: November 1, 1989

TASK: INVESTIGATION OF VERTICAL CONDUITS Submit a technical report acceptable to the Executive Officer, based on the Weiss Associates December 27, 1986 report entitled "Possible Well Locations - Selected Parts of Santa Clara Valley, California", that 1) evaluates the potential for wells within the plume boundaries, described in Finding 6, to act as vertical conduits for interaquifer cross-contamination, and 2) recommends, if necessary, further investigations and monitoring of such wells.

c) 1) COMPLETION DATE: December 29, 1989

TASK: SUBMIT DRAFT REMEDIAL INVESTIGATION REPORT Submit a technical report acceptable to the Executive Officer, pursuant to the workplan described in Finding 9, containing the results of the remedial investigation.

2) COMPLETION DATE: June 1, 1990

TASK: SUBMIT DRAFT FEASIBILITY STUDY REPORT Submit a technical report acceptable to the Executive Officer, pursuant to the workplan described in Finding 9 and the technical report submitted for Task 1.c)1), containing an evaluation of the installed interim remedial measures, a feasibility study evaluating alternative final remedial measures, the recommended measures necessary to achieve final cleanup objectives, and the time schedule necessary to implement the recommended final remedial measures.

d) COMPLETION DATE: September 28, 1990

TASK: SUBMIT FINAL REMEDIAL INVESTIGATION AND FEASIBILITY STUDY REPORT AND PROPOSED REMEDIAL ACTION PLAN Submit a technical report acceptable to the Executive Officer based on the technical reports submitted for Task 1.c) and agency comments on the technical reports submitted for Task 1.c).

2. This Order approves the workplan described in Finding 9 above.

3. All technical reports submitted must be acceptable to the Executive Officer. The submittal of technical reports evaluating interim and final remedial measures shall include a projection of the cost, effectiveness, benefits, and impact on public health and the environment of each alternative measure.
4. Any proposal for the discharge of extracted ground water must initially consider the feasibility of reclamation, reuse, or discharge to a publicly owned treatment works (POTW), as specified in Board Resolution No. 88-160. If it can be demonstrated that reclamation, reuse, or discharge to a POTW is technically and economically unfeasible, a proposal for discharge to surface water shall be considered. Such proposal for discharge to surface water shall include the above demonstration and a completed application for an NPDES permit.
5. 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 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".
6. 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 prior to the required completion date.
7. The discharger shall submit to the Board acceptable self-monitoring program reports containing results of work performed according to a program as described in the Amended SAP, approved by the Executive Officer.
8. The self-monitoring program reports shall also summarize the status of compliance with the Prohibitions, Specifications, and Provisions of this Order and shall be submitted on a quarterly basis, according to the schedule below, commencing with the report for the second quarter 1989, due July 31, 1989.

Quarter	1st quarter	2nd Quarter	3rd Quarter	4th Quarter
Period	Jan-March	April-June	July-Sept	Oct-Dec
Due Date	April 30	July 31	October 31	January 31

The quarterly reports shall include;

- a. a summary of work completed since the previous quarterly report,
 - b. appropriately scaled and labeled maps showing the location of all monitoring wells, extraction wells, and existing structures,
 - c. updated water table and piezometric surface maps for all affected water bearing zones, or alternatively, isoconcentration maps for key contaminants in all affected water bearing zones,
 - d. a cumulative tabulation of all well construction data, groundwater levels and chemical analysis results for site monitoring wells as specified in the amended SAP,
 - e. a cumulative tabulation of volume of extracted groundwater and chemical analysis for all site groundwater extraction wells,
 - f. identification of potential problems which will cause or threaten to cause noncompliance with this Order and what actions are being taken or planned to prevent these obstacles from resulting in noncompliance with this Order, and
 - g. in the event of noncompliance with the Provisions and Specifications of this Order, the report shall include written justification for noncompliance and proposed actions to achieve compliance.
9. 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.
 10. All samples shall be analyzed by State certified laboratories or laboratories accepted by the Board using approved EPA methods for the types of analyses to be performed. All laboratories shall maintain Quality Assurance/Quality Control records for Board review.
 11. 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.
 12. Three copies of all correspondence, reports, and documents pertaining to compliance with the Prohibitions, Specifications, and Provisions of this Order, shall be provided to the Board.
 13. Copies of all correspondence, reports, and documents 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 Santa Clara
- d. State Department of Health Services/TSCD
- e. U. S. EPA Region IX

The Executive Officer may additionally require copies to be provided to a local repository for public use.

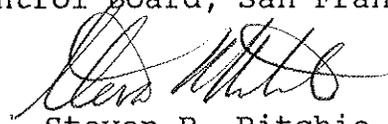
14. The discharger shall permit the Board or its authorized representative, in accordance with Section 13267(c) of the California Water Code:
 - a. Entry upon premises in which any pollution sources exist, or may potentially exist, or in which any required records are kept, which are relevant to this 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.
15. The discharger shall file a report on any changes in site occupancy and ownership associated with the facility described in this Order.
16. If any hazardous substance, as defined pursuant to Section 25140 of the Health and Safety Code, is discharged to any waters of the state, or discharged and deposited where it is, or probably will be discharged to 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.

17. Order No. 88-22 is hereby rescinded.

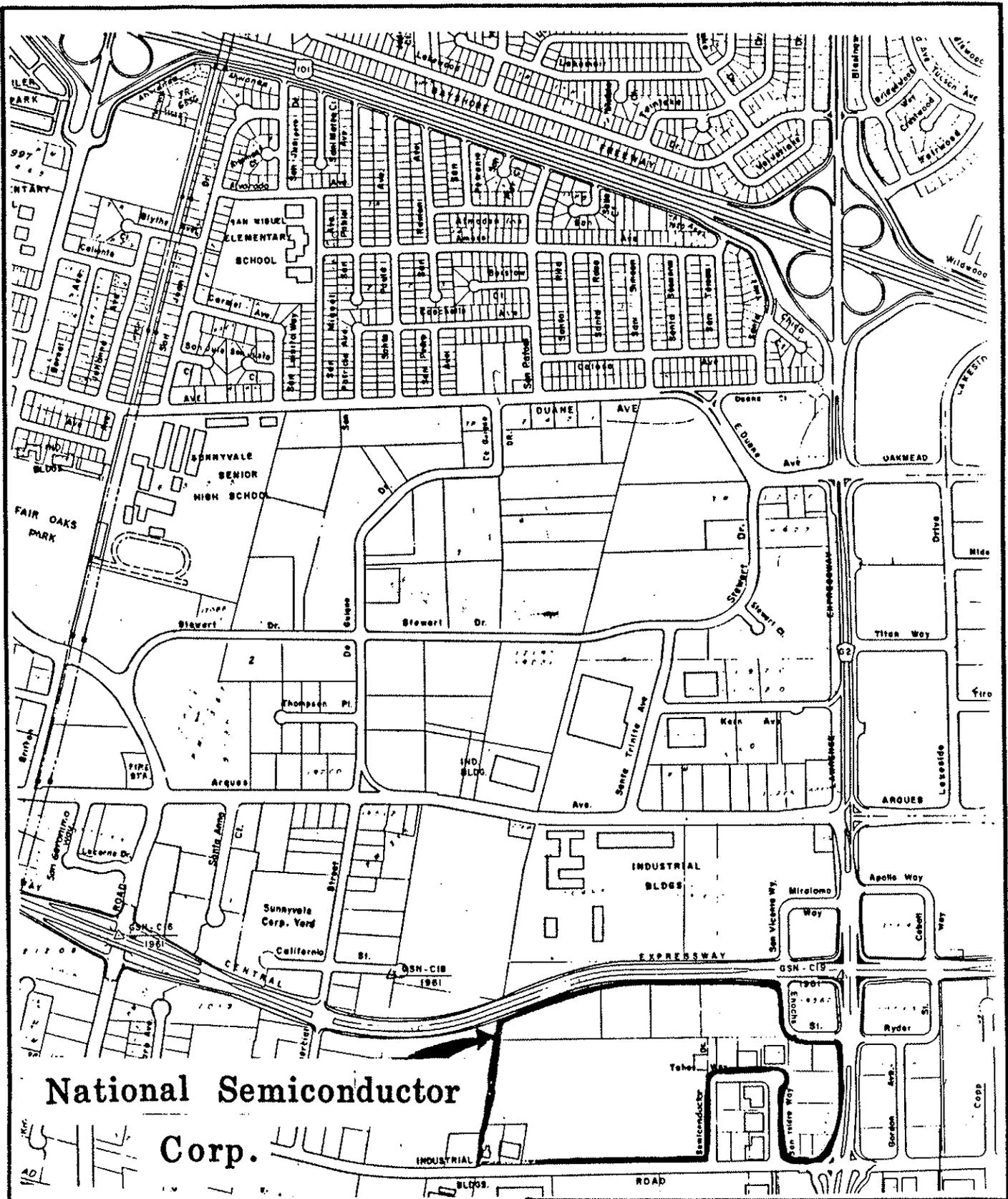
19. The Board will review this Order periodically and may revise the requirements when necessary.

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 April 19, 1989.



Steven R. Ritchie
Executive Officer

Attachments: Location Map



National Semiconductor Corp.

LOCATION MAP

**STATE OF CALIFORNIA
REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION**

National Semiconductor Corporation
2900 Semiconductor Drive
Santa Clara, Santa Clara County

DRAWN BY:	DATE:	DRWG. NO.
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