

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

ORDER NO. 89-56

SITE CLEANUP REQUIREMENTS AND RECISION OF ORDER NO. 87-162 FOR:

ADVANCED MICRO DEVICES
901/902 THOMPSON PLACE
SUNNYVALE
SANTA CLARA COUNTY

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

1. Location and Facility Description Advanced Micro Devices (AMD) owns and operates a printed circuit manufacturing plant in two buildings at 901 and 902 Thompson Place (AMD 901;AMD 902), Sunnyvale, Santa Clara County in an area bounded by the Bayshore, Central, and Lawrence Expressways and Fair Oaks. AMD 901 was used as a semiconductor manufacturing facility from 1969 to 1983. Manufacturing operations at AMD 902 began in 1972 and are still active. The manufacturing process at these two facilities involved the use of solvents for cleaning and degreasing, acids for etching, caustics for acid neutralization and some arsine and chromium in the manufacturing process.
2. Regulatory Status AMD is hereinafter referred to as a discharger because of the releases of hazardous wastes that have occurred at its site. AMD 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 Underground acid neutralization systems were in place at each facility. The acid neutralization at AMD 901 operated from 1969 to when it was removed in December 1983. The acid neutralization sump at AMD 902 was operated from approximately 1972 to its removal in September 1984.

Initial investigation at AMD 901/902 site began in 1982 with the investigation of leakage from an acid neutralization system near AMD 901. This leakage was investigated and the acid neutralization system was removed during 1983. In 1984 the investigation spread to include the acid neutralization system at AMD 902. Polluted soils were found near both acid neutralization systems.

The polluted soils were identified as point sources that had resulted in groundwater pollution with volatile organic chemicals (VOC's). Investigation and interim remedial actions followed the soils investigation.

Following initial investigations and actions at this site the initial Board Order, including Waste Discharge Requirements, was adopted in 1985. That Order was rescinded and replaced by a new Order in 1987.

4. Hydrogeology Stratigraphy in the area surrounding the AMD site is characterized by interbedded and interfingering sands, silts and clays. These soils were deposited in complex patterns as part of fluvial systems draining the uplands to the south and deposited as the streams flowed north toward the Bay.

The groundwater gradient in all identified aquifers, in static conditions, is to the north toward San Francisco Bay. Local reversal of gradient is observed in the vicinity of groundwater extraction systems.

Four identifiable, local aquifers have been identified through the investigation at AMD 901/902. The shallowest of these aquifers has been designated the A aquifer and extends from 7 to 20 feet below the ground surface. The next shallowest unit has been designated as the B1 aquifer and generally occurs from 22 to 40 feet below the ground surface. The next unit has been designated as the B2 aquifer and generally occurs between 45 and 65 feet below ground surface. The deepest aquifer identified at AMD 901/902, the B3, is characterized by a single well.

5. Soil Pollution Soil pollution was the highest near the AMD 901 acid neutralization system. During removal of the system, soils with up to 186,000 $\mu\text{g}/\text{kg}$ of TCE was excavated. Due to proximity of the building not all of the polluted soils could be removed from the southern portion of the excavation. Therefore soils near AMD 901 may contain up to 95,600 $\mu\text{g}/\text{kg}$ of TCE.

An acid neutralization system was also removed from the vicinity of AMD 902 in 1984. The maximum concentration of soils pollution detected during the investigation of the neutralization system was 1200 $\mu\text{g}/\text{kg}$ of TCE, directly beneath the former tank location. No other soil pollution above 100 $\mu\text{g}/\text{kg}$ was detected during this removal action.

6. Groundwater Quality TCE is the most common pollutant and has been used as an indicator for groundwater pollution at AMD 901/902. Initial levels of groundwater pollution at this site were as high as 100 ppm of TCE with total VOC's as high as 1000 ppm prior to the point source removal in 1983. The highest current levels of groundwater pollution are about 1 ppm TCE for the onsite area. Currently the onsite pollution extends to a depth of up to 65 feet.

Offsite the pollution extends to a depth of up to 100 feet and extends laterally downgradient for approximately 4000 feet. The offsite downgradient plume has commingled with pollutants derived from point sources at TRW (FEI) Microwave, 825 Stewart, and Signetics 811 Arques facilities. Deeper aquifers have been identified offsite and the pollution does potentially threaten these deeper aquifers.

7. Relationship To Other Sites Offsite interim remediation efforts are conducted in conjunction with Signetics and TRW Microwave. The workplan for additional work required for the completion of a Remedial Investigation and Feasibility Study (RI/FS), and the RI/FS, are being completed as a joint project by AMD, Signetics, and TRW Microwave (hereinafter the Companies).

A proposed final workplan, which includes separate onsite tasks for each company and joint offsite tasks, was submitted on behalf of the Companies in July 1988 and a revised workplan was submitted February 6, 1989. Adoption of this Order approves this workplan, as revised, and the tasks outlined for completion of a joint RI/FS. It is anticipated that final remedial actions will also be proposed as a joint effort of the Companies.

8. Chemicals Of Concern Chemicals detected in water and soil include dichloroethylene (DCE), trichloroethane (TCA), tetrachloroethylene (PCE), dichlorobenzene (DCB) and Freon 113. TCE is the chemical most commonly present and serves as an indicator chemical for this site and the adjacent TRW and Signetics sites.

9. Interim Remedial Actions, Soils Onsite interim remedial actions began in 1983 with the removal of the acid neutralization sump and about 103 cubic yards of soil, at AMD 901. Not all of the polluted soils were removed due to possible structural damage to AMD 901. In 1984, the acid waste neutralization sump and about 114 cubic yards of soil was removed from the vicinity of Building 902.

10. Interim Remedial Actions, Onsite Groundwater Remediation of the groundwater began in 1984 with the installation of two dewatering sumps and one extraction well to contain the onsite pollution. One sump extracts water from the shallow (A) aquifer; the other two systems extract water from the B1 aquifer. Three additional extraction wells were installed in 1988 to enhance the containment of the onsite groundwater pollution plume and to begin containment of the groundwater pollution in the B2 aquifer. The extracted groundwater is treated and reused as process water at the AMD 901/902 facility.
11. Interim Remedial Actions, Offsite Groundwater Two offsite groundwater containment extraction systems have been installed. The Duane Avenue Extraction system, consisting of nine extraction wells, is located just south of Duane Avenue, approximately 1200 to 2100 feet downgradient (north) of the AMD, Signetics, and TRW operable units. This extraction system was installed and began operation in 1986. The Duane Avenue system extracts water from the A, B1, B2, B3 and B4 aquifers.

A second extraction system consisting of fourteen wells, along Alvarado Avenue, approximately 2700 to 4300 feet downgradient (north) of the AMD, Signetics And TRW operable units, was completed in 1988. Operation of the Alvarado Avenue system began in October 1988. This system extracts water from the A, B1, and B2 aquifers. Data has been collected for the evaluation of both extraction systems and a report evaluating the effectiveness of the systems was submitted on March 10, 1989.

All extracted groundwater is transferred by a piping system to the AMD 915 DeGuigne facility where the water is treated. About 80 % of the treated water is utilized as process make-up water by the AMD 915 facility and the remainder is released to surface water under NPDES Permit Number CA0028797.

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 continued 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 on April 19, 1989, 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 the amended sampling 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 submit to the Board acceptable monitoring program reports containing results of work performed according to a program as described in the sampling plan, as amended, and approved by the Executive Officer.
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) COMPLETION DATE: June 15, 1989

TASK: SOILS REMEDIATION: Submit a technical report proposing soil remediation alternatives and any pilot or treatability studies proposed for the polluted soils remaining in the area near AMD Building 901.

b) COMPLETION DATE: June 15, 1989

TASK: AMENDED SAMPLING PLAN: Submit an addendum to the Sampling Plan to include initial sampling of selected wells to analyze for EPA priority pollutant metals, an initial sampling of selected wells for analysis by EPA method 8240 (open scan) and inclusion of future groundwater sampling events with analysis by appropriate EPA 8000 series methods.

OFFSITE

c) COMPLETION DATE: June 1, 1989

TASK: ADMINISTRATIVE RECORD: Submit a proposal acceptable to the Executive Officer to compile and index an Administrative Record as outlined in EPA Interim Draft Guidance on Administrative Records for Selection Of CERCLA Response Actions.

d) COMPLETION DATE: February 17, 1990

TASK: REMEDIAL INVESTIGATION Submit a technical report acceptable to the Executive Officer pursuant to the work plan described in Finding 7 as revised, and approved by the Executive Officer, containing the results of the remedial investigation including complete site characterization (both onsite and offsite), and an evaluation of the installed interim remedial measures.

e) COMPLETION DATE: April 17, 1990

TASK: FEASIBILITY STUDY AND REMEDIAL ACTION PLAN: Submit a technical report acceptable to the Executive Officer pursuant to the work plan described in Finding 7 as revised, and approved by the Executive Officer, containing the results of the a feasibility study evaluating alternative final remedial measures. In addition, submit a Remedial Action Plan, as a separate technical report containing 1) recommended measures necessary to achieve final cleanup objectives; and 2) the time schedule necessary to implement the recommended final remedial measures.

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.
4. The remedial investigation and feasibility study shall consider 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".

5. If the discharger is delayed, interrupted or prevented from meeting one or more of the completion dates specified in this Order, the discharger shall notify the Executive Officer prior to the deadline for the completion date.
6. Technical reports summarizing the status of compliance with the Prohibitions, Specifications, and Provisions of this Order and progress toward completion of tasks as identified in the workplan as revised, 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, and isoconcentration maps for key pollutants in all affected water bearing zones, shall be included at a minimum in the reports for the second and fourth quarters, or in the event of significant changes,
- d. a summary tabulation of all well construction data, groundwater levels and chemical analysis results for site monitor wells as specified in the revised sampling plan,
- e. a summary 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.

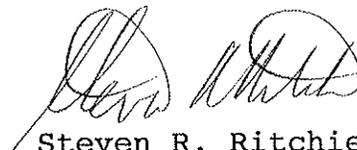
7. All hydrogeological plans, specifications, reports, and documents shall be signed by or stamped with the seal of a registered geologist, engineering geologist or professional engineer.
8. All samples shall be analyzed by State certified laboratories or laboratories accepted by the Board using approved 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 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 Sunnyvale
 - d. State Department of Health Services/TSCD
 - e. U. S. EPA Region IX
 - f. U. S. EPA Region IX Contractor, as identified by Region IX personnel

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 be provided 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.

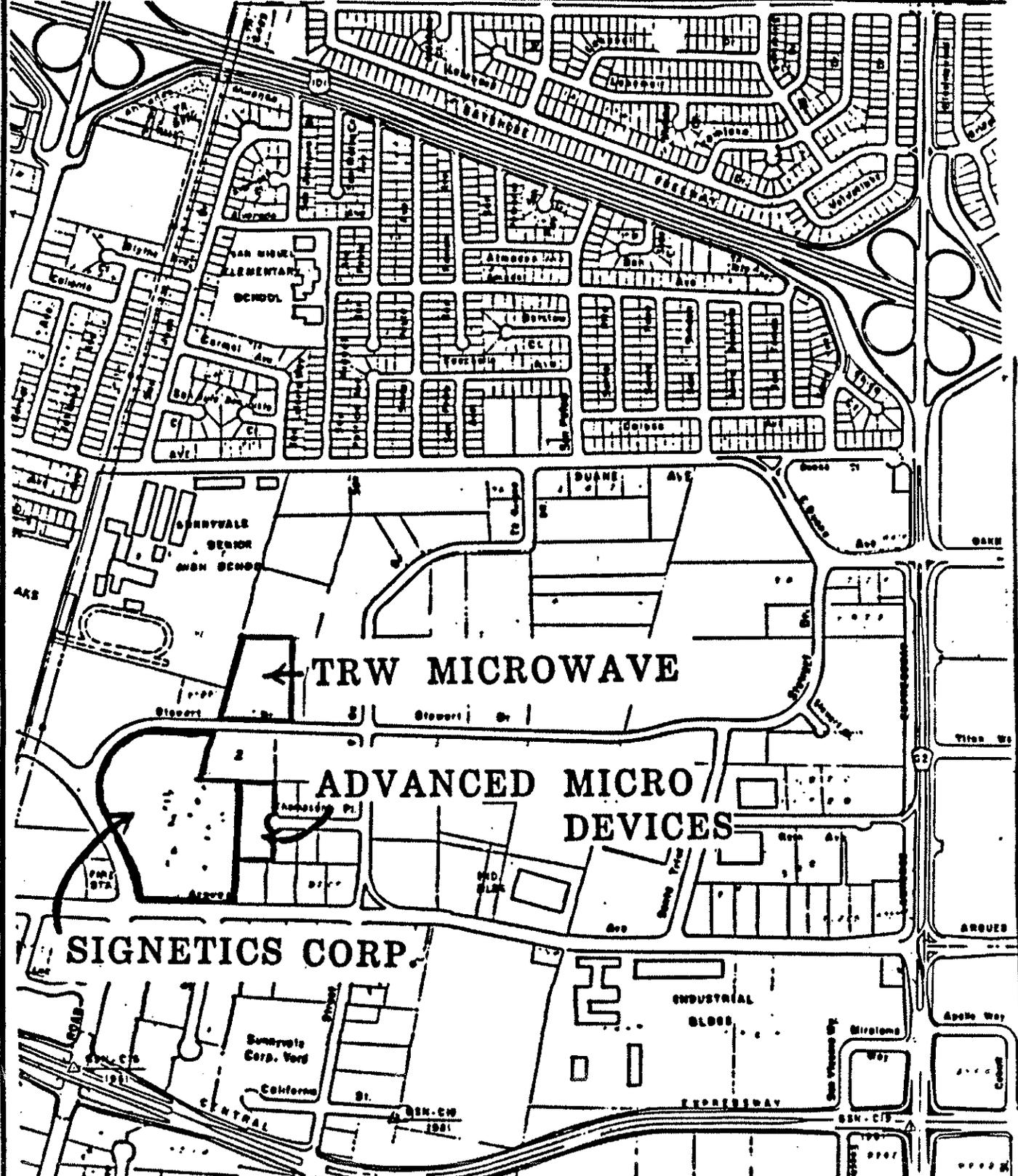
- d. Sampling of any groundwater or soil which is accessible, or may become accessible, as part of any investigation or remedial action program undertaken by the discharger.
12. The discharger shall file a report on any changes in site occupancy and ownership associated with the facility described in this Order.
13. If any hazardous substance 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.
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 April 19, 1989.



Steven R. Ritchie
Executive Officer

Attachments: Site location map



← TRW MICROWAVE

ADVANCED MICRO DEVICES

SIGNETICS CORP.

ADDRESSES:

- TRW Microwave Inc.,
825 Stewart Drive, Sunnyvale
- Advanced Micro Devices Inc.,
901 Thompson Place, Sunnyvale
- Signetics Corporation
811 E. Arques Avenue, Sunnyvale

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

LOCATION MAP:

Advanced Micro Devices Inc., Sunnyvale
Signetics Corporation, Sunnyvale
TRW Microwave Inc., Sunnyvale

DRAWN BY: **DATE:** 2/2/87 **DRWG. NO.**