CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

ORDER NO. 99-002

ADOPTION OF FINAL SITE CLEANUP REQUIREMENTS AND RESCISSION OF ORDER NO. 95-140 FOR:

AMERICAN MICROSYSTEMS, INC.,
VALLCO PARK, LTD., AND
KAISER FOUNDATION HOSPITALS (A CALIFORNIA NOT-FOR-PROFIT, PUBLIC BENEFIT CORPORATION)

for the property located at

3800 HOMESTEAD ROAD
SANTA CLARA
SANTA CLARA COUNTY

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

1. **Site Location**: The property is located at 3800 Homestead Road in Santa Clara (the site). The site is surrounded by Calabazas Creek and Marchese Orchards No. 1 to the east, a residential neighborhood to the north, Intersil/Siemens Superfund site (Intersil/Siemens) to the west, and Tandem (now Compaq) Corporation to the south (see attached map).

2. **Site History**: American Microsystems, Inc. (AMI) leased the property from Vallco Park, Ltd. (Vallco) in 1966 and occupied it from 1967 to 1988. AMI was formed in 1965 and incorporated in California in 1966. AMI was acquired by Gould, now Gould Electronics, Inc. (Gould), in February of 1982. AMI discontinued all operations at the subject site and transferred all its functions to the AMI facility at Pocatello, Idaho in 1988. AMI also terminated its lease and returned the property to Vallco. In November of 1988, Japan Energy Corporation purchased Gould. Both AMI and Gould are now separate operating divisions of GA Tech, a subsidiary of Japan Energy Corporation. In 1988, Ferma Corporation, retained by Vallco, demolished all structures on the site. Vallco sold the property to Tandem (now Compaq), who in turn sold the property to Kaiser Foundation Hospitals (a California not-for-profit, public benefit corporation) (Kaiser) in 1993. Kaiser plans to develop the property for medical purposes.

   AMI had 5 buildings on the site. Building 10-100 contained a small wafer fabrication area. AMI manufactured transistors by the metal oxide-silicon (MOS) method. The effluent from this process was piped to a sump east of the building designated a "TCE Separator-Neutralization System". The acidic waste was neutralized with ammonia and

released to the sanitary sewer. This sump became inactive between 1969-1970. AMI closed the sump in October of 1982 and removed the sump in 1989. Confirmatory soil samples showed traces of ethylbenzene at a depth of 12 feet.

Building 200-300-400 originally contained four wafer fabrication areas. This structure also contained a photolithographic area where AMI fabricated the masks necessary to manufacture MOS devices. A system of waste collection trenches, approximately 2 feet wide and 2 to 4 feet deep, was built into the slab. These trenches contained a system of piping which collected acidic wastes and transported these wastes to the neutralization system. The original neutralization sump was designed as combination solvent separator and neutralization vessel.

Building 500-600 was an assembly and test facility. There were VOC degreaser facilities in this building. VOCs may have been used at this building as degreasers.

In 1970, a 250-gallon steel tank for containing solvent wastes was buried south of the manufacturing Building 200-300-400. A piping system was installed in the trenches to collect used solvents and transport these wastes to the tank. The tank was removed in 1983.

AMI's chemical use statement indicates that the facility used primarily acids and bases. They also used VOCs such as trichloroethylene (TCE), freons, trichloroethane (TCA), and other hazardous production materials.

3. **Named Dischargers**: AMI is named as a discharger because of substantial evidence that it discharged pollutants to soil and groundwater at the site, including its use of chlorinated solvents in semiconductor fabrication, the presence of these same pollutants in soil in the immediate vicinity of former Building 200-300-400 (wafer fabrication areas), and the presence of these same pollutants in groundwater at and down-gradient of this building.

Vallco is named as a discharger because it owned the property during AMI's occupancy and release of pollutants to soil and groundwater at the site, had knowledge of the discharge, and had the legal ability to prevent the discharge. Kaiser is named as a discharger because it is the current property owner, has knowledge of the discharge, and has the legal ability to prevent the discharge. Vallco and Kaiser will be responsible for compliance only if the Board or Executive Officer finds that other named dischargers have failed to comply with the requirements of this order.

Japan Energy Corporation, Gould and GA Tech, who acquired AMI, are not named as dischargers in this order for the following reasons: i) AMI still exists as an entity, ii) AMI has adequate financial resources to comply with this order, iii) AMI has complied with the prior order, and iv) AMI has requested that the Japan Energy Corporation, Gould

and GA Tech not be named in this order. However, Japan Energy Corporation, Gould and GA Tech may be named if future circumstances change.

If additional information is submitted indicating that other parties caused or permitted any waste to be discharged on the site where it entered or could have entered waters of the state, the Board will consider adding those parties' names to this order.

4. **Regulatory Status**: This site is subject to the following Board order:

o NPDES General Permit (Order No. 94-087) adopted on July 20, 1994

This site was subject to the following Board order:

o Site Cleanup Requirements (Order No. 95-140) adopted June 21, 1995

5. **Site Hydrogeology**: The site is underlain by a sequence of permeable sands and gravels and relatively impermeable clays and silts. The sands and gravels are deposited as fluvial channels interfingering with the silts and clays deposited in overbank and mudflat environments. The individual channel deposits are lenticular and discontinuous and may occur as isolated bodies enclosed in fine grain sediments. Most of these channel deposits are believed to be hydraulically interconnected. These sand and gravel layers in the vadose zone comprise the perched groundwater zone in this area.

Shallow groundwater underneath the site has been subdivided locally into four coarse-grained water-bearing zones, designated as the perched-, A-, B-, and C-zones. The perched zone is a partially saturated and unsaturated shallower zone and is encountered at about 40 to 60 feet below ground surface (bgs). The A-zone is an unconfined aquifer and occurs at approximately 95 to 120 feet bgs. The A-zone stratigraphy is highly variable from mostly clay and silt, with one or two thin, water-bearing sands to mostly coarse-grained sediments. The B-zone is a semi-confined aquifer and occurs at approximately 130 to 150 feet bgs. The B-zone contains thick intervals of sand and gravel that interfinger with predominantly clay and thin beds of sand. The C-zone is a confined aquifer which occurs at about 180-200 feet bgs.

The geologic sections indicate that water-bearing zones and aquitard material are laterally discontinuous. The transition from A- to B-zones is poorly defined and does not appear to be marked by a laterally continuous aquitard. There may be some vertical hydraulic connection where the transition is characterized by thick sections of clayey sand and gravel.

Groundwater flow direction in the perched zone is not established because of the discontinuity of the saturated sediments within this unit. Natural groundwater flow in the A-, B- and C-zones is generally to the north/northeast. However, it is likely that the

direction of groundwater flow in the A- and B-zones at AMI onsite and offsite has been locally impacted due to groundwater extraction at AMI and Intersil/Siemens.

Groundwater in this area moves in a "stair-stepping" manner. The following describes this process. Groundwater recharge in the area is principally the result of irrigation and rainfall on pervious areas and infiltration of surface runoff in Calabazas Creek. This groundwater recharge moves vertically downward in the vadose zone until it is intercepted by either a perched groundwater zone or the A-zone. In a perched zone, groundwater spreads laterally or until it reaches a boundary or until a balance between inflowing and outflowing water is achieved, and the groundwater then resumes its downward vertical transit. To maintain the continuity of groundwater recharge moving through the vadose zone, a saturated (perched) unit will form allowing groundwater to spread over a larger area. The direction of groundwater movement in a particular perched unit is governed by the slope of the free surface of that perched unit, which can also be influenced by the slope of the underlying low hydraulic conductivity interface. Where the perched groundwater spreads laterally to the edge of a low hydraulic conductivity unit, it can drain vertically, and unsaturated conditions will resume. In this manner, a particular parcel of groundwater recharge may be offset laterally from the overlying area where it infiltrated the near-surface deposits. This stair-stepping process is independent of the local A-zone groundwater flow direction.

In the A-zone, most of the groundwater moves laterally in the general direction of the groundwater flow, while some groundwater moves vertically downward through the aquitard separating the A- and B- zones. The absence of this aquitard in some areas facilitates the downward vertical movement of groundwater between A- and B-zones. Groundwater movement within and between B- and C-zones is similar to that in the A-zone.

6. **Remedial Investigation**

a. **Soil:** VOCs were detected in soil borings during sampling events in July 1989, December 1989 and January 1990. Freon 113, cis-1,2-DCE, TCE, PCE, ethylbenzene, and xylenes were detected in soil samples at the site. Specific concentrations of these constituents varied widely. TCE was the most commonly identified VOC, with concentrations ranging from 0.005 mg/kg to 4.3 mg/kg in soil behind Building 300. AMI implemented soil vapor extraction system to remediate the source areas.

In 1995, AMI conducted a thorough additional source investigation at the site. Several VOCs including TCE and TCA were detected in soil samples at concentrations below cleanup goals, 1 mg/kg. Due to the presence of low total VOC concentrations, no additional soil remediation is needed at this time.

b. **Groundwater:** AMI conducted perched-, A-, B- and C-zones groundwater investigation to characterize the site and define the contaminants and their impact to these water-bearing zones underneath the site. Currently, the monitoring well network has about 47 wells including 5 perched zone, 23 A-zone, 18 B-zone, and one C-zone wells. Water samples from the perched zone under Building 300 (the source area) detected up to 1500 µg/l of TCE. Other contaminants such as chloroform, cis-1,2-DCE, 1,4-dichlorobenzene, 1,2-dichlorobenzene, 1,1,1-TCA, Freon 113, and PCE were also detected at concentrations at or below cleanup levels.

In the A-zone, elevated VOC concentrations were detected in some wells along Calabazas Creek, across the northern part of the property and offsite at the corner of London and Vireo Avenues. TCE has been detected in onsite wells at concentrations as high as 120 µg/l, east of Building 100 . In the offsite wells, TCE has been detected in concentrations, initially, up to 300 µg/l east of Calabazas Creek and cross-gradient from the site at Marchese Orchards No. 1. However, subsequent samples have been mostly below 100 µg/l. TCE was detected up to 220 µg/l downgradient of the site (northeast of the site) and east of the creek.

In the B-zone, the highest concentrations of TCE were again detected in samples along or east of Calabazas Creek. In the onsite wells, the highest TCE concentration detected was up to 180 µg/l east of Building 100. TCE was also detected up to 488 µg/l in the northeast downgradient offsite wells.

In the C-zone, AMI installed one monitoring well to investigate the vertical extent of the plume. TCE and Freon 113 have been detected consistently at or below MCLs. Given the limited VOC concentrations in soil and in the saturated zones, proper source control, and ongoing hydraulic containment efforts by AMI in the perched-, A- and B-zones, it is unlikely that VOCs originating at the site will significantly impact the C-zone. AMI continues to monitor the water quality using its C-zone monitoring well. Intersil and Siemens also have an extended C-zone monitoring network downgradient of their site.

The groundwater plume is delineated, and no additional groundwater investigation is needed at this time.

7. **Adjacent Sites**: The Intersil/Siemens Superfund site is adjacent to and west of the AMI facility. The groundwater plume from this site has been defined and site investigation and remediation has been underway since the early 1980's. The Board adopted a final Site Cleanup Requirements for Intersil/Siemens on August 15, 1990. EPA issued a concurring Record of Decision (ROD) at the same time. Intersil and Siemens have operated soil vapor extraction systems (SVE) to control the pollution sources. Intersil

closed its SVE system in 1993 because VOC concentrations in soil reached cleanup goals. Siemens is still operating its SVE system.

Intersil and Siemens also have onsite and offsite groundwater extraction systems in operation. Operation of the groundwater extraction systems at these sites appear to have locally impacted the natural groundwater flow direction. The change in direction of groundwater flow, from a northerly to a northwesterly direction, may have impacted the movement of the plume originating at AMI. Groundwater extraction systems at AMI and Intersil/Siemens facilities should be operated such that any further horizontal and vertical migration of the contaminants is prevented.

Based on our review of the available information, it appears that there is no significant commingling of the groundwater plumes from Intersil/Siemens and AMI.

8. **Interim Remedial Measures**: AMI has implemented soil and groundwater interim remedial measures (IRMs) at this site, and has been conducting groundwater monitoring since 1990.

a. **Interim Soil Remedial Measures**

In July 1990, AMI implemented SVE to remove VOCs, primarily TCE, from the vadose zone south of former Building 300. AMI operated the system for approximately 14 months (from February 1991 to August 1993). The system removed about 160 pounds of total VOCs. In August of 1993, the Board approved AMI's request to close the SVE system with a condition to continue monitoring perched zone groundwater. AMI installed an extraction well in the perched zone (P-5) to minimize impact of chemicals from the vadose zone to groundwater. AMI also installed several perched zone monitoring wells. AMI frequently purges all perched zone wells, especially during wet season. The purged groundwater is treated by the existing onsite treatment system. Currently, AMI monthly purges and monitors all its perched zone wells.

b. **Interim Groundwater Remedial Measures**

AMI initiated IRMs for the onsite groundwater in March 1993 and expanded the system in January 1994 to include the offsite plume. The IRMs consist of one perched zone, two A-zone and two B-zone extraction wells and an air stripper unit. Since 1993, the system has treated about 236 million gallons of groundwater and has removed about 142 pounds of TCE. The treated waste water is discharged to Calabazas Creek under a general NPDES general permit. The system has been effective in reducing TCE concentrations; however, further source control in the perched zone and replacement of an extraction well in the A-zone are needed to effectively contain the plume.

9. **Feasibility Study**: AMI developed and evaluated three possible alternatives for source control in the perched zone and remediating the contaminated A and B water-bearing zones underneath the 3800 Homestead Road site. The screening of technologies was based on their applicability to site characteristics, on the properties of the chemicals, and on reliability and performance of treatment technologies. The remaining three remedial alternatives such as 1) "no further action", 2) source control by using potassium permanganate and hydraulic containment by groundwater extraction and 3) hydraulic containment by groundwater extraction were then further evaluated on the basis of implementability, effectiveness and environmental and public health impacts. AMI selected the second alternative as a final remedy for the site due to reliability, implementability, performance, acceptability, and cost effectiveness.

10. **Cleanup Plan**: AMI submitted a revised draft remedial action plan (RAP) on October 15, 1998 and a December 4, 1998, RAP addendum (risk assessment). The revised draft RAP summarizes the remedial investigation and IRMs, evaluates cleanup alternatives and proposes in-situ source control by injecting potassium permanganate to oxidize TCE in the perched zone and continue operation of the existing IRMs for A- and B-zones including installation of two perched zone and one A-zone extraction wells. The revised draft RAP proposes cleanup standards for groundwater and evaluates risk to human health.

11. **Risk Assessment**: The perched, A and B water-bearing zones underneath the site are not currently used for domestic supply. The risk assessment section of AMI's, revised draft RAP assumed that the VOC impacted water-bearing zones underneath the site would in future be used as domestic water supplies. Several scenarios were evaluated during the risk assessment, but two scenarios are appropriate to the scope of this order. Scenario 1 evaluated current site conditions using most recent maximum groundwater VOC concentrations. Scenario 2 evaluated future conditions assuming attainment of maximum contaminant levels (MCLs). Both scenarios considered groundwater ingestion as a potential exposure pathway. The assessment determined the primary chemicals of interest and their toxicity. Then, the assessment computed risks for carcinogenic and non-carcinogenic chemicals in the groundwater, and compared them to the EPA recommended risk range.

Toxicity Classification for Chemicals of Interest: TCE has been consistently detected above its respective MCL in the perched-, A- and B-zones beneath the site; however, the risk assessment included four additional TCE's potential breakdown products. These compounds are: 1,1-DCE, cis-1,2-DCE, trans-1,2-DCE, and vinyl chloride. The risk assessment excluded TCA and Freon 113 because these compounds have been consistently detected significantly below their respective MCLs.

Three of the five chemicals of concern are classified as carcinogens: vinyl chloride, TCE, and 1,1-DCE. Based on EPA's classification, vinyl chloride is class "A" carcinogen

(sufficient human evidence). TCE is class "B2" carcinogens (inferring probable human carcinogen, with inadequate human evidence and sufficient evidence from animal experiments). 1,1-DCE is class "C" carcinogen (possible human carcinogen, limited evidence of carcinogenicity in animals with inadequate human data). Cis-1,2-DCE and trans-1,2-DCE are non-carcinogens (class "D" or lower).

Exposure Assessment: Under the current use of the site, there appear to be no complete exposure pathways. The TCE concentrations in the perched-, A- and B-zones are greater than drinking water standards; however, these water-bearing zones are currently not being used for drinking water. The deeper aquifer that is used for drinking water has not been impacted by VOCs. However, the assessment assumed more conservative approach. In both scenarios, it assumed ingestion of groundwater from a hypothetical domestic well as exposure route.

Baseline Risk: The site is now vacant, and the shallow groundwater is not used at this time. There is no complete exposure pathway under the current land use scenario. However, the current TCE concentrations at the site may pose threat to human health if the impacted water-bearing zones are used for domestic use pending remediation. The excess cancer risk was estimated at 5.9×10^{-5} the total hazard index (HI) was determined to be about 3.6. For comparison, the Board considers the following risk to be acceptable at remediation sites: a hazard index of 1.0 or less for non-carcinogens, and a cumulative excess cancer risk of 10^{-4} or less for carcinogens.

The baseline risk assessment did not identify soil as an exposure medium because there is no significant TCE concentrations in the top 35 feet of soil. There still exists limited TCE concentrations in the perched zone groundwater, but TCE vapors do not pose a significant health threat. AMI will also implement further source controls in the perched zone groundwater.

The current TCE concentrations may pose non-carcinogenic excessive risk if the upper three water-bearing zones are used for domestic purpose. Therefore, institutional constraints are appropriate to limit the on-site exposure. Institutional constraints include a deed restriction that notifies future owners of sub-surface contamination and prohibits the use of the upper three water-bearing zone beneath the site as a source of drinking water until cleanup standards are met.

Post-Remediation Risk: Attainment of cleanup standards will protect human health in the event that shallow groundwater is used for domestic purposes. For the carcinogenic chemicals, the excess cancer risk predicted by this analysis is about 5.5×10^{-5}, or about 6 excess cancer cases in a population of 100,000. This cancer risk level lies within the Board's acceptable risk range. Likewise, the total HI for non-carcinogenic compounds was found to be about 1.0 for a child and 0.46 for an adult, at or below the acceptable level (i.e. 1.0).

12. **Basis for Cleanup Standards**

a. **General**: State Board Resolution No. 68-16, "Statement of Policy with Respect to Maintaining High Quality of Waters in California," applies to this discharge and requires attainment of background levels of water quality, or the highest level of water quality which is reasonable if background levels of water quality cannot be restored. Cleanup levels other than background must be consistent with the maximum benefit to the people of the State, not unreasonably affect present and anticipated beneficial uses of such water, and not result in exceedance of applicable water quality objectives. The previously-cited cleanup plan provides sufficient rationale that background levels of water quality cannot be restored. This order and its requirements are consistent with Resolution No. 68-16.

State Board Resolution No. 92-49, "Policies and Procedures for Investigation and Cleanup and Abatement of Discharges Under Water Code Section 13304," applies to this discharge. This order and its requirements are consistent with the provisions of Resolution No. 92-49, as amended.

b. **Beneficial Uses**: The Board adopted a revised Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan) on June 21, 1995. This updated and consolidated plan represents the Board's master water quality control planning document. The revised Basin Plan was approved by the State Water Resources Control Board and the Office of Administrative Law on July 20, 1995, and November 13, 1995, respectively. A summary of regulatory provisions is contained in Title 23, California Code of Regulations, Section 3912. The Basin Plan defines beneficial uses and water quality objectives for waters of the State, including surface waters and groundwaters.

Board Resolution No. 89-39, "Sources of Drinking Water," defines potential sources of drinking water to include all groundwater in the region, with limited exceptions for areas of high TDS, low yield, or naturally-high contaminant levels. Groundwater underlying and adjacent to the site qualifies as a potential source of drinking water.

The Basin Plan designates the following potential beneficial uses of groundwater underlying and adjacent to the site:

- o Municipal and domestic water supply
- o Industrial process water supply
- o Industrial service water supply
- o Agricultural water supply

At present, there is no known use of the three upper water-bearing zones underlying the site for the above purposes.

The existing and potential beneficial uses of Calabazas Creek, which is adjacent to the site include:

- o Agricultural supply
- o Groundwater recharge
- o Water contact and non-contact recreation
- o Wildlife habitat
- o Cold freshwater and warm freshwater habitat
- o Navigation

c. **Basis for Groundwater Cleanup Standards**: The groundwater cleanup standards for the site are based on applicable water quality objectives and are the more stringent of EPA and California primary maximum contaminant levels (MCLs). Cleanup to this level will result in acceptable residual risk to humans.

13. **Future Changes to Cleanup Standards**: The goal of this remedial action is to restore the beneficial uses of groundwater underlying and adjacent to the site. Results from other sites suggest that full restoration of beneficial uses to groundwater as a result of active remediation at this site may not be possible. If full restoration of beneficial uses is not technologically nor economically achievable within a reasonable period of time, then the discharger may request modification to the cleanup standards or establishment of a containment zone, a limited groundwater pollution zone where water quality objectives are exceeded. Conversely, if new technical information indicates that cleanup standards can be surpassed, the Board may decide that further cleanup actions should be taken.

14. **Reuse or Disposal of Extracted Groundwater**: Board Resolution No. 88-160 allows discharges of extracted, treated groundwater from site cleanups to surface waters only if it has been demonstrated that neither reclamation nor discharge to the sanitary sewer is technically and economically feasible.

15. **Basis for 13304 Order**: The dischargers have caused or permitted waste to be discharged or deposited where it is or probably will be discharged into waters of the State and creates or threatens to create a condition of pollution or nuisance.

16. **Cost Recovery**: Pursuant to California Water Code Section 13304, the dischargers are hereby notified that the Board is entitled to, and may seek reimbursement for, all reasonable costs actually incurred by the Board to investigate unauthorized discharges of waste and to oversee cleanup of such waste, abatement of the effects thereof, or other remedial action, required by this order.

17. **CEQA**: This action is an order to enforce the laws and regulations administered by the Board. As such, this action is categorically exempt from the provisions of the California Environmental Quality Act (CEQA) pursuant to Section 15321 of the Resources Agency Guidelines.

18. **Notification**: The Board has notified the dischargers and all 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 an opportunity to submit their written comments.

IT IS HEREBY ORDERED, pursuant to Section 13304 of the California Water Code, that the dischargers (or their agents, successors, or assigns) shall cleanup and abate the effects described in the above findings as follows:

A. PROHIBITIONS

1. The discharge of wastes or hazardous substances in a manner which will degrade water quality or adversely affect beneficial uses of waters of the State is prohibited.

2. Further significant migration of wastes or hazardous substances 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 wastes or hazardous substances are prohibited.

B. CLEANUP PLAN AND CLEANUP STANDARDS

1. **Implement Cleanup Plan**: The dischargers shall implement the cleanup plan described in finding 10.

2. **Groundwater Cleanup Standards**: The following groundwater cleanup standards shall be met in all wells identified in the Self-Monitoring Program:

Constituent	Standard (ug/l)	Basis
Cis-1,2-Dichloroethylene	6	California MCL
Trans-1,2-Dichloroethylene	10	California MCL
1,1-Dichloroethylene	6	California MCL
Trichloroethylene	5	EPA/California MCL
Vinyl Chloride	0.5	California MCL

C. **TASKS**

1. **WORKPLAN FOR SOURCE CONTROL PILOT STUDY AND REPLACEMENT OF GROUNDWATER EXTRACTION AND MONITORING WELLS**

COMPLIANCE DATE: February 15, 1999

Submit a workplan acceptable to the Executive Officer for implementation of a source control pilot study using potassium permanganate and installation of additional wells necessary to RAP implementation as provided in the draft RAP (see finding 10). This includes installation of one monitoring and two extraction wells in the perched zone, one extraction and three monitoring wells in the A-zone, and one B-zone monitoring well. The workplan should include measures to monitor the effectiveness of migration control measures during source control implementation. The workplan should describe all significant implementation steps and should include an implementation and reporting schedule.

2. **IMPLEMENTATION OF SOURCE CONTROL PILOT STUDY AND REPLACEMENT OF GROUNDWATER EXTRACTION AND MONITORING WELLS**

COMPLIANCE DATE: July 15, 1999

Submit a technical report acceptable to the Executive Officer documenting completion of necessary tasks identified in the Task 1 workplan. For ongoing actions, such as groundwater extraction, the report should document system start-up (as opposed to completion) and should present initial results on system effectiveness (e.g. capture zone). Proposals for further system expansion or modification may be included in annual reports (see Self-Monitoring Program).

3. **WORKPLAN FOR IMPLEMENTATION OF FULL SCALE SOURCE CONTROL**

COMPLIANCE DATE: July 15, 1999

Submit a workplan acceptable to the Executive Officer proposing implementation of a full scale source control in the perched zone using potassium permanganate. Alternatively, if the source control pilot study fails to significantly reduce VOC concentrations in the perched zone, then the workplan should propose a contingency plan (e.g. groundwater extraction in the perched zone). In either case, the workplan should describe all significant implementation steps and should include an implementation and reporting schedule.

4. **IMPLEMENTATION OF FULL SCALE SOURCE CONTROL**

COMPLIANCE DATE: January 31, 2000

Submit a technical report acceptable to the Executive Officer documenting completion of necessary tasks identified in the Task 3 workplan. The report should document completion of the full scale injection of potassium permanganate to the perched zone and should present initial results on system effectiveness (e.g. capture zone or area of influence). Proposals for further system expansion or modification may be included in annual reports (see Self-Monitoring Program). Alternatively, if full scale source control has met its objectives for perched zone VOC concentrations reduction, then the report should include a proposal for system closure, including injection well(s) closure.

5. **PROPOSED INSTITUTIONAL CONSTRAINTS**

COMPLIANCE DATE: April 30, 1999

Submit a technical report acceptable to the Executive Officer documenting procedures to be used by American Microsystems, Inc. to prevent or minimize human exposure to groundwater contamination prior to meeting cleanup standards. Such procedures shall include a deed restriction (prepared and recorded by Kaiser Foundation Hospitals or subsequent property owners) prohibiting the use of the perched, A and B water-bearing zones as sources of drinking water.

6. **IMPLEMENTATION OF INSTITUTIONAL CONSTRAINTS**

COMPLIANCE DATE: 60 days after Executive Officer approval

Submit a technical report acceptable to the Executive Officer documenting that the proposed institutional constraints have been implemented.

7. **FIVE-YEAR STATUS REPORT**

COMPLIANCE DATE: January 31, 2004

Submit a technical report acceptable to the Executive Officer evaluating the effectiveness of the approved cleanup plan. The report should include:

a. Summary of effectiveness in controlling contaminant migration and protecting human health and the environment
b. Comparison of contaminant concentration trends with cleanup standards
c. Comparison of anticipated versus actual costs of cleanup activities
d. Performance data (e.g. groundwater volume extracted, chemical mass removed, mass removed per million gallons extracted)
e. Cost effectiveness data (e.g. cost per pound of contaminant removed)
f. Summary of additional investigations (including results) and significant modifications to remediation systems
g. Additional remedial actions proposed to meet cleanup standards (if applicable) including time schedule

If cleanup standards have not been met and are not projected to be met within a reasonable time, the report should assess the technical practicability of meeting cleanup standards and may propose an alternative cleanup strategy.

8. **PROPOSED GROUNDWATER EXTRACTION CURTAILMENT**

COMPLIANCE DATE: 60 days prior to proposed curtailment

Submit a technical report acceptable to the executive Officer containing a proposal to curtail groundwater remediation. Curtailment includes system closure (e.g. well abandonment), system suspension (e.g. cease extraction but wells retained), and significant system modification (e.g. major reduction in groundwater extraction rates, closure of individual extraction wells within groundwater extraction network). The report should include the rationale for curtailment. Proposals for final closure should demonstrate that cleanup standards have been, contaminant concentrations are stable, and contaminant migration potential is minimal. The proposal shall include a schedule for implementation.

9. **IMPLEMENTATION OF GROUNDWATER REMEDIATION CURTAILMENT**

COMPLIANCE DATE: 60 days after Executive Officer approval

Submit a technical report acceptable to the Executive Officer documenting completion of the tasks identified in Task 8.

10. **EVALUATION OF NEW HEALTH CRITERIA**

COMPLIANCE DATE: 90 days after requested by Executive Officer

Submit a technical report acceptable to the Executive Officer evaluating the effect on the approved cleanup plan of revising one or more cleanup standards in response to revision of drinking water standards, maximum contaminant levels, or other health-based criteria.

11. **EVALUATION OF NEW TECHNICAL INFORMATION**

COMPLIANCE DATE: 90 days after requested by Executive Officer

Submit a technical report acceptable to the Executive Officer evaluating new technical information which bears on the approved cleanup plan and cleanup standards for this site. In the case of a new cleanup technology, the report should evaluate the technology using the same criteria used in the feasibility study. Such technical reports shall not be requested unless the Executive Officer determines that the new information is reasonably likely to warrant a revision in the approved cleanup plan or cleanup standards.

12. **Delayed Compliance**: If the dischargers are delayed, interrupted, or prevented from meeting one or more of the completion dates specified for the above tasks, the dischargers shall promptly notify the Executive Officer and the Board may consider revision to this Order.

D. PROVISIONS

1. **No Nuisance**: The storage, handling, treatment, or disposal of polluted soil or groundwater shall not create a nuisance as defined in California Water Code Section 13050(m).

2. **Good O&M**: 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.

3. **Cost Recovery**: The dischargers shall be liable, pursuant to California Water Code Section 13304, to the Board for all reasonable costs actually incurred by the Board to investigate unauthorized discharges of waste and to oversee cleanup of such waste, abatement of the effects thereof, or other remedial action, required by this Order. If the site addressed by this Order is enrolled in a State Board-managed reimbursement program, reimbursement shall be made pursuant to this Order and according to the procedures established in that program. Any disputes raised by the dischargers over reimbursement amounts or methods used in that program shall be consistent with the dispute resolution procedures for that program.

4. **Access to Site and Records**: In accordance with California Water Code Section 13267(c), the dischargers shall permit the Board or its authorized representative:

   a. Entry upon premises in which any pollution source exists, 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 requirements of this Order.

   c. Inspection of any monitoring or remediation facilities installed 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 dischargers.

5. **Self-Monitoring Program**: The dischargers shall comply with the Self-Monitoring Program as attached to this Order and as may be amended by the Executive Officer.

6. **Contractor / Consultant Qualifications**: All technical documents shall be signed by and stamped with the seal of a California registered geologist, a California certified engineering geologist, or a California registered civil engineer.

7. **Lab Qualifications**: 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 (QA/QC) records for Board review. This provision does not apply to analyses that can only reasonably be performed on-site (e.g. temperature, dissolved oxygen, redox potential, spectrophotometer readings etc.).

8. **Document Distribution**: Copies of all correspondence, technical reports, and other documents pertaining to compliance with this Order shall be provided to the following agencies:

a. Santa Clara Valley Water District

The dischargers shall provide copies of cover letters, title page, table of contents and the executive summaries of above compliance report to the following agencies:

a. Santa Clara County Department of Environmental Health
b. California EPA/DTSC Site Mitigation Branch
c. City of Santa Clara
d. City of Cupertino
e. City of Sunnyvale

The Executive Officer may require the dischargers to provide copies to other parties, such as the U.S. Environmental Protection Agency, Region IX, and the local repository for public use.

The dischargers are encouraged to provide all technical reports to Intersil and Siemens facilities. These companies operate remedial systems in the area, and work performed at this site may impact their systems.

The Executive Officer may modify this distribution list as needed.

9. **Reporting of Changed Owner or Operator**: The dischargers shall file a technical report on any changes in site occupancy or ownership associated with the property described in this Order.

10. **Reporting of Hazardous Substance Release**: If any hazardous substance is discharged in or on any waters of the State, or discharged or deposited where it is, or probably will be, discharged in or on any waters of the State, the dischargers shall report such discharge to the Regional Board by calling (510) 622-2300 during regular office hours (Monday through Friday, 8:00 to 5:00).

A written report shall be filed with the Board within five working days. The report shall describe: the nature of the hazardous substance, estimated quantity involved, duration of incident, cause of release, estimated size of affected area, nature of effect, corrective actions taken or planned, schedule of corrective actions planned, and persons/agencies notified.

This reporting is in addition to reporting to the Office of Emergency Services required pursuant to the Health and Safety Code.

11. **Secondarily-Responsible Dischargers**: Within 60 days after being notified by the Executive Officer that other named dischargers have failed to comply with this order, Vallco Park, Ltd. and Kaiser Foundation Health Plan, Inc., shall then be responsible for complying with this order. Task deadlines above will be automatically adjusted to add 60 days (e.g. if an RI workplan was due on 1/1/95, an RI report was due on 4/1/95, the RI workplan was never submitted, and the EO notification was sent on 7/1/95, then the secondarily-responsible dischargers must submit an RI workplan by 9/1/95 and an RI report by 12/1/95).

12. **Rescission of Existing Order**: This Order supercedes and rescinds Order No. 95-140.

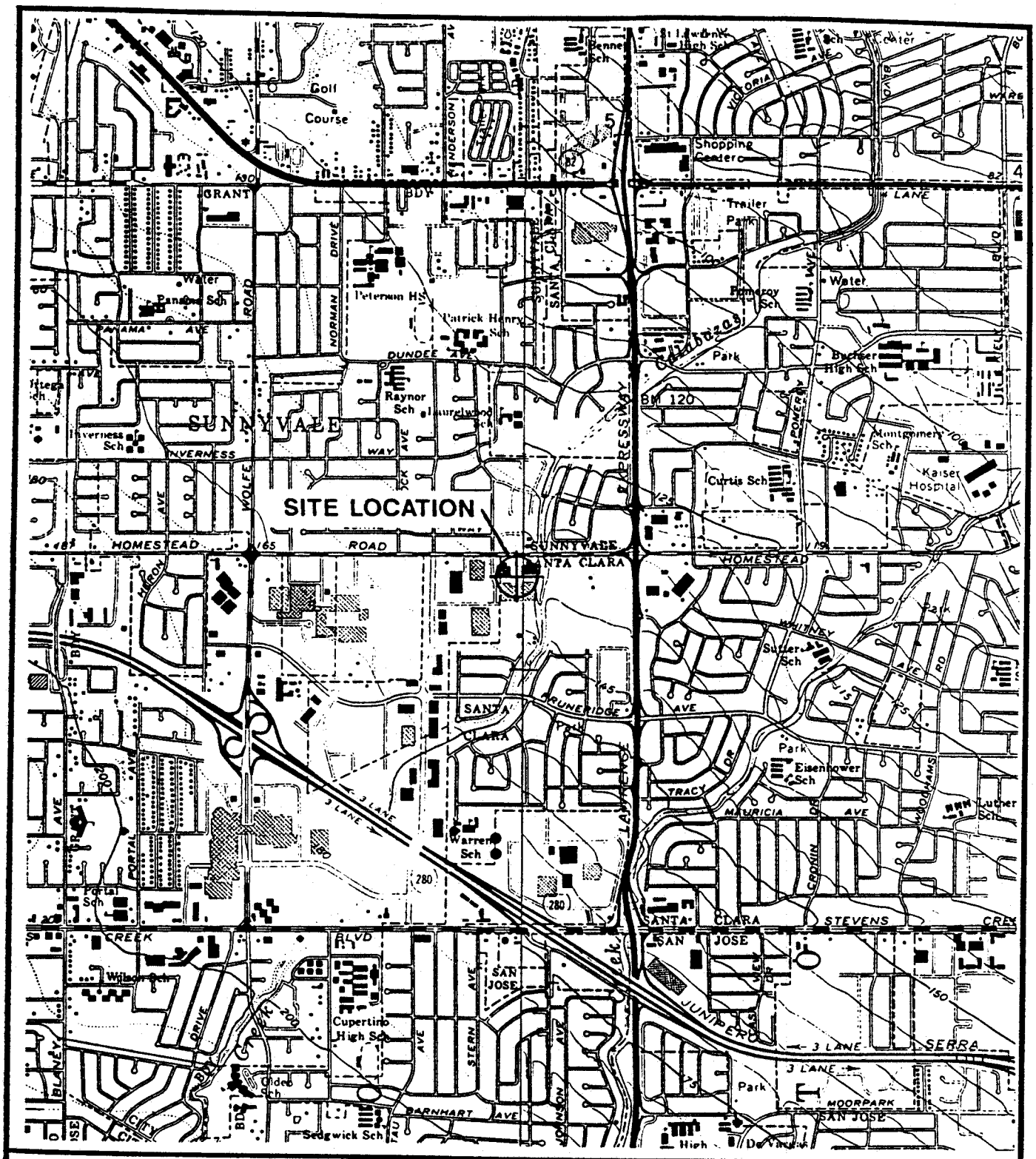
13. **Periodic SCR Review**: The Board will review this Order periodically and may revise it when necessary.

FAILURE TO COMPLY WITH THE REQUIREMENTS OF THIS ORDER MAY SUBJECT YOU TO ENFORCEMENT ACTION, INCLUDING BUT NOT LIMITED TO: IMPOSITION OF ADMINISTRATIVE CIVIL LIABILITY UNDER WATER CODE SECTIONS 13268 OR 13350, OR REFERRAL TO THE ATTORNEY GENERAL FOR INJUNCTIVE RELIEF OR CIVIL OR CRIMINAL LIABILITY

Loretta K. Barsamian
Executive Officer

January 27, 1999
Date

Attachments: Site Map
Self-Monitoring Program



FLUOR DANIEL GTI

SOURCE: U.S.G.S. 7.5' QUAD SHEET
CUPERTINO, CALIFORNIA
PHOTOREVISED 1980

N

SCALE: 0 FEET 2000

SITE LOCATION MAP

CLIENT: AMERICAN MICROSYSTEMS, INC.

DATE: 7/25/97

LOCATION: 3800 HOMESTEAD ROAD
SANTA CLARA, CALIFORNIA

FIGURE: 1

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

SELF-MONITORING PROGRAM FOR:

AMERICAN MICROSYSTEMS, INC.,
VALLCO PARK, LTD., AND
KAISER FOUNDATION HEALTH PLAN, INC.

for the property located at

3800 HOMESTEAD ROAD
SANTA CLARA
SANTA CLARA COUNTY

1. **Authority and Purpose**: The Board requests the technical reports required in this Self-Monitoring Program pursuant to Water Code Sections 13267 and 13304. This Self-Monitoring Program is intended to document compliance with site cleanup requirements Order No. *XX-XXX*.

2. **Monitoring**: The dischargers shall measure groundwater elevations quarterly in all monitoring wells, and shall collect and analyze representative samples of groundwater according to the attached table:

   The dischargers shall sample any new monitoring or extraction wells quarterly and analyze groundwater samples for the same constituents as shown in the attached table. The dischargers may propose changes in the attached table; any proposed changes are subject to Executive Officer approval.

3. **Quarterly Monitoring Reports**: The dischargers shall submit quarterly monitoring reports to the Board no later than 30 days following the end of the quarter (e.g. report for first quarter of the year due April 30). The first quarterly monitoring report shall be due on April 30, 1999. The reports shall include:

   a. Transmittal Letter: The transmittal letter shall discuss any violations during the reporting period and actions taken or planned to correct the problem. The letter shall be signed by the dischargers' principal executive officer or their duly authorized representative, and shall include a statement by the official, under penalty of perjury, that the report is true and correct to the best of the official's knowledge.

b. Groundwater Elevations: Groundwater elevation data shall be presented in tabular form, and a groundwater elevation map should be prepared for each monitored water-bearing zone. Historical groundwater elevations shall be included in the fourth quarterly report each year.

c. Groundwater Analyses: Groundwater sampling data shall be presented in tabular form, and an isoconcentration map should be prepared for one or more key contaminants for each monitored water-bearing zone, as appropriate. The report shall indicate the analytical method used, detection limits obtained for each reported constituent, and a summary of QA/QC data. Historical groundwater sampling results shall be included in the fourth quarterly report each year. The report shall describe any significant increases in contaminant concentrations since the last report, and any measures proposed to address the increases. Supporting data, such as lab data sheets, need not be included (however, see record keeping - below).

d. Groundwater Extraction: If applicable, the report shall include groundwater extraction results in tabular form, for each extraction well and for the site as a whole, expressed in gallons per minute and total groundwater volume for the quarter. The report shall also include contaminant removal results, from groundwater extraction wells and from other remediation systems (e.g. soil vapor extraction), expressed in units of chemical mass per day and mass for the quarter. Historical mass removal results shall be included in the fourth quarterly report each year.

e. Status Report: The quarterly report shall describe relevant work completed during the reporting period (e.g. site investigation, interim remedial measures) and work planned for the following quarter.

5. **Violation Reports**: If the dischargers violate requirements in the Site Cleanup Requirements, then the dischargers shall notify the Board office by telephone as soon as practicable once the dischargers have knowledge of the violation. Board staff may, depending on violation severity, require the dischargers to submit a separate technical report on the violation within five working days of telephone notification.

6. **Other Reports**: The dischargers shall notify the Board in writing prior to any site activities, such as construction or underground tank removal, which have the potential to cause further migration of contaminants or which would provide new opportunities for site investigation.

7. **Record Keeping**: The dischargers or their agent shall retain data generated for the above reports, including lab results and QA/QC data, for a minimum of six years after origination and shall make them available to the Board upon request.

8. **SMP Revisions**: Revisions to the Self-Monitoring Program may be ordered by the Executive Officer, either on his/her own initiative or at the request of the dischargers. Prior to making SMP revisions, the Executive Officer will consider the burden, including costs, of associated self-monitoring reports relative to the benefits to be obtained from these reports.

Loretta K. Barsamian
Executive Officer

1.27.99
Date

Attachment - Table 1

Attachment

Table 1
Monitoring Schedule for
3800 Homestead Road
Santa Clara, Santa Clara County

Well #	Sampling Frequency	Analyses	Well #	Sampling Frequency	Analyses
Perched-zone			E-17A	A	8010
P-1*	Q	8010	E-18A	SA	8010
P-3	Q	8010	E-19A	A	8010
P-5	Q	8010	E-26A	A	8010
P-6	A	8010	E-27A	A	8010
P-7	A	8010	E-28A	SA	8010
P-8	Q	8010	EW-2A	A	8010
AMI-1A	A	8010	EW-4A*	Q	8010
AMI-2A	A	8010			
E-2A	A	8010	E-12A	SA	8010
E-29A*	Q	8010	LF-1B	SA	8010
E-6A	A	8010	LF-3	A	8010
E-30A*	Q	8010	LF-4	SA	8010
E-9A	A	8010	LF-5	A	8010
E-31*	Q	8010	LF-6	A	8010
E-11A	SA	8010	**B-zone**		
E-13A	A	8010	E-25B*	Q	8010
E-16A	A	8010	E-11B	SA	8010

Well #	Sampling Frequency	Analyses	Well #	Sampling Frequency	Analyses
E-12B	SA	8010	EW-1B	SA	8010
E-14B	A	8010	EW-2B	SA	8010
E-15B	A	8010	HS-1B	A	8010
E-20B	A	8010	BM-1B	A	8010
E-21B	A	8010	KB-1B	A	8010
E-22B	SA	8010	VW-1B	SA	8010
E-23B	A	8010	**C-zone**		
E-24B	A	8010	E-11C	SA	8010
Note: * = Replacement wells					

Key: Q = Quarterly 8010 = EPA Method 8010 or equivalent
SA - Semiannually A = Annually

Well #	Sampling Frequency	Analyses	Well #	Sampling Frequency	Analyses
E-12B	SA	8010	EW-1B	SA	8010
E-14B	A	8010	EW-2B	SA	8010
E-15B	A	8010	HS-1B	A	8010
E-20B	A	8010	BM-1B	A	8010
E-21B	A	8010	KB-1B	A	8010
E-22B	SA	8010	VW-1B	SA	8010
E-23B	A	8010	**C-zone**		
E-24B	A	8010	E-11C	SA	8010
Note: * = Replacement wells					

Key: Q = Quarterly 8010 = EPA Method 8010 or equivalent
SA - Semiannually A = Annually