

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD  
SAN FRANCISCO BAY REGION

ORDER NO. 99-044

ADOPTION OF FINAL SITE CLEANUP REQUIREMENTS, ESTABLISHMENT OF A  
CONTAINMENT ZONE AND RESCISSION OF ORDER NO. 89-183 FOR

INTEL CORPORATION  
FAB 1 FACILITY

for the property located at

3601 JULIETTE LANE  
SANTA CLARA  
SANTA CLARA COUNTY

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

1. **Site Location:** Intel Corporation, hereinafter called the discharger, owns and operates a semiconductor manufacturing plant on an approximately 20 acre site in the City of Santa Clara, Santa Clara County. This facility, called Fab 1, is located at 3601 Juliette Lane, near the intersection of the Montague Expressway and the 101 Freeway in an industrial area with several neighboring semiconductor and electronics industry plants. There is also a Hyatt Regency Hotel nearby. San Tomas Aquinas Creek, an unlined flood control channel here, is about 800 feet to the west of the site. San Francisco Bay is about six miles to the north.
2. **Site History:** This facility was constructed by Intel in 1979. Semiconductor manufacturing began at Fab1 in 1980 and continued until 1991 when manufacturing was discontinued (The Fab 1 building was renamed Intel Santa Clara 7). Fab1 is part of the larger Intel main campus in Santa Clara and is contiguous with Intel facilities SC-8, SC-9, RNB, SC-11, and SC-12. The discharger has operated solvent storage, distribution, and recovery systems onsite as part of the manufacturing process. In addition, the plant operation included a wastewater treatment system involving the use of acids and bases. A diesel storage tank for the operation of an emergency power generator was also located onsite. In 1985 about 1500 gallons of diesel fuel leaked from the underground piping of the diesel storage tank. Remedial measures were implemented to stop the leak and to cleanup and prevent the spread of diesel fuel in the subsurface. During the remedial investigation for the diesel spill, VOCs, including

1,1,1-TCA, 1,1-DCA, 1,1-DCE, and TCE were discovered in groundwater at the site. No source for the VOCs was identified.

In 1995, a diesel spill occurred from the piping of the replacement diesel underground storage tank.

3. **Named Dischargers:** Intel Corporation is named as the sole and primary discharger for the pollutant releases described in this order because Intel has been the sole owner and operator of the facility.

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 orders:

- o Site Cleanup Requirements (Order No. 89-183) adopted December 13, 1989
- o NPDES General Permit (Order No. 94-087) adopted on July 20, 1994

5. **Site Hydrogeology:** The site is located within the San Jose sub-basin of the Santa Clara Valley groundwater basin. This is an area of alluvial deposition which consists of interbedded sands, silts, clays, and gravels, with widely varying porosities, permeabilities, and transmissivities. Typically, there is a series of disconnected water bearing zones separated by relatively impermeable zones down to about 100-200 feet below the ground surface. This upper zone is then separated by an extensive regional aquitard from a lower regional aquifer. This regional aquifer is tapped for municipal supply. Groundwater at the site flows north-northwest. The VOC contamination at the site occurs in the shallowest groundwater aquifer, called the A aquifer. The A aquifer is found at about fourteen to eighteen feet below the ground surface. The next encountered aquifer is called the B aquifer, the top of which is encountered between about 25 to 35 feet below ground surface. VOC contamination has not been found in the B aquifer.

6. **Remedial Investigation:** Remedial investigation began in 1985 after the discovery that the piping from the underground diesel storage tank had leaked. In addition to diesel, VOCs, including 1,1,1-TCA, 1,1-DCA, 1,1-DCE, and TCE were discovered in groundwater at the site. No definite source for the VOCs was identified, although there was some soil contamination adjacent to an acid waste neutralization system. Twelve monitoring wells were installed during the remedial investigation. The plume measures approximately 250 x 350 x 10 feet. VOC concentrations initially ranged up to 560 ug/l, substantially above drinking water standards.

7. **Adjacent Sites:** The Siliconix site is across Juliette Lane to the south from Intel. Siliconix has a VOC pollutant plume for which remediation is ongoing. There is some indication that VOCs from the Siliconix site may be migrating onto the Intel Site in the area of monitoring well IF1-3. Siliconix has recently had to modify their groundwater extraction system due to construction on the adjacent property. This may have affected the capture zone of the extraction system. Migration of the Siliconix plume onto the Intel Fab 1 site could result in increases in VOC levels in monitoring wells that are part of the containment zone monitoring well network. Under these circumstances, if the increases were significant enough, Siliconix would be responsible for controlling migration of its plume on the Intel site.
  
8. **Remedial Measures:** After discovery of the diesel leak, the diesel underground storage tank was removed along with diesel polluted soil. A groundwater extraction well was installed in the backfill of the underground tank excavation in 1985. The diesel release was remediated relatively quickly, however remediation of the VOCs in groundwater was much slower and groundwater extraction was continuous through 1994. In November 1994 pulsed pumping trials were initiated to see if the efficiency of remediation could be improved. In 1995, in response to the second diesel leak, a second extraction well was added in the location of the second release which is approximately 50 feet from the original extraction well. During 1995 and 1996, groundwater was pumped from both wells. Either well operating alone is capable of containing the groundwater plume. Removal of floating diesel product had taken place by 1987, though low levels of dissolved diesel continued to be detected in groundwater. These levels increased in 1995 due to the second diesel release. The diesel leaks have been effectively remediated. Only low levels of dissolved diesel remain in groundwater in the area of the leak. The extraction system has also been effective in remediating much of the VOC pollution. VOC levels in groundwater have decreased by up to 98%.
  
9. **Feasibility Study and Groundwater Cleanup Standards:** Groundwater cleanup standards are set at California drinking water Maximum Contaminant Levels (MCLs) in accordance with Board policy. It was initially thought that extraction of contaminated groundwater at this and other sites could achieve this goal. Experience at groundwater cleanup sites has shown that groundwater extraction oftentimes cannot achieve low VOC concentration groundwater objectives. The discharger has investigated other technologies and found that they were unlikely to achieve the cleanup goal of drinking water MCLs due to the nature of soil conditions on the site and the small amount of VOC mass present in groundwater. There are no known sources of continuing VOC pollution to groundwater at the site. VOCs found in groundwater at the site represent residual contamination that is present in the saturated zone both dissolved in groundwater and adsorbed to soil. Groundwater extraction is no longer effective at reducing the remaining VOC concentrations in groundwater.

10. **Pulsed Pumping Trials:** Intel began a series of pulsed pumping trials in November 1994. Pulsed pumping is a strategy whereby the groundwater extraction wells are cycled on and off in pumping and nonpumping periods. During the nonpumping period groundwater levels will rebound. In theory, this could provide greater contact time between the shallow soils and groundwater, and potentially allow VOCs adsorbed to soil particles to desorb back into the groundwater, allowing further extraction of VOCs when the extraction wells are turned back on.

During the initial pulsed pumping trial, recovery well R-2 was shut down and groundwater extraction ceased. This pumps off trial was interrupted in February 1995 because of a leak of diesel fuel from the piping of an underground storage tank in the proximity of the VOC source area. A new extraction well, well R-3, was installed in the backfill of the tank excavation. Groundwater was extracted continually from April 1995 until December 1996, and the concentration of diesel in groundwater was reduced to 400 ug/l or less.

In January 1997, a new series of cyclic pumping trials began. A variety of pumping schemes were tried and the effect on concentrations of VOCs in groundwater was analyzed. The results of these pulsed pumping trials showed that four weeks without pumping is enough time for monitoring well VOC concentrations to plateau after showing small initial increases, and two weeks with pumping is enough time for extracted groundwater to return to baseline concentrations. The net result was that pulsed pumping did not result in any significant improvement in VOC removal efficiency.

11. **Containment Zone:** The discharger has submitted a petition to the Board requesting that the Site Cleanup Requirements be modified to allow for a containment zone (CZ) whereby groundwater on the site property can exceed MCLs, in accordance with the State Board's CZ policy. The Board finds that asymptotic levels have been reached in groundwater VOC levels at the site and that groundwater extraction is no longer an effective and economical means of reducing pollutant levels and restoring the polluted aquifer to cleanup levels. The discharger has proposed that the final remedial action plan for the site consist of:
  - a. Termination of groundwater extraction and treatment.
  - b. Maintenance of a deed restriction prohibiting the use of shallow groundwater at the site.
  - c. Monitoring of selected wells for VOCs.

- d. Implementation of contingency procedures if certain criteria are exceeded. These procedures are outlined in a contingency plan submitted by the discharger as part of their petition.

The Board has extensive experience in the cleanup of polluted groundwater sites such as the Intel Fab 1 site. The Board has found that there are limits of existing technology which recent research, much of which is being confirmed at sites within the Region, demonstrates that using pump and treat technology removes and controls pollutant mass migration. However, pump and treat technology is not adequate technology, in most situations, to meet low concentration groundwater objectives because the cost and time frames may be prohibitive and ineffective.

The Board establishes the overall cleanup level for a waterbody based upon the most sensitive beneficial use identified. In all cases, the Board first considers high quality or naturally occurring "background" concentration objectives as the cleanup levels for polluted groundwater with a beneficial use of municipal and domestic supply, such as at this site. If background concentrations cannot be achieved, cleanup levels are normally set no higher than:

- o Maximum Contaminant Levels (MCLs), or where MCLs have not been adopted, other valid technical data supporting maintenance of the beneficial use; or,
- o A more stringent level (i.e. below MCLs) based upon a site specific risk assessment; or,
- o At a level lower than MCLs that is technically and economically feasible.

Groundwater cleanup levels are approved on a case by case basis by the Board. Proposed final cleanup levels are based on a discharger-developed feasibility study of cleanup alternatives that compares effectiveness, cost, time to achieve cleanup standards, and a risk assessment to determine impacts on beneficial uses, human health, and the environment. Cleanup levels must also take into account the mobility, toxicity, and volume of pollutants. Feasibility studies of cleanup alternatives utilize the guidance provided by subpart E of the National Oil and Hazardous Substances Pollution Contingency Plan (40 CFR 300); Section 25356.1(c) of the California Health and Safety Code; U.S. EPA's Comprehensive Environmental Response, Compensation, and Liability Act; the State Water Board's Resolutions Nos. 68-16 and 92-49; and the Regional Board's Resolution 88-160.

State Board Resolution 92-49 was amended in October 1996 to allow for the designation of containment zones. A containment zone is defined as a specific portion of a water bearing unit where the Regional Board finds, pursuant to Section III.H. of Resolution

92-49, it is unreasonable to remediate to the level that achieves water quality objectives. The Regional Board has indicated that it will consider establishment of a containment zone under certain conditions:

- o The groundwater is in low-yielding, fine-grained sediments (silts and clays) and the discharger has demonstrated that no significant pollution migration will occur to underlying or adjacent aquifers; and
- o Adequate source removal and/or isolation is undertaken to limit future migration of chemicals to groundwater; and
- o Alternative or best available technologies are inappropriate or not cost-effective; and
- o An acceptable plan is submitted for containing and managing the remaining risks posed by residual groundwater pollution. This plan could include institutional controls (deed restrictions; site operation, maintenance, health and safety plans; utility workers notice, ect.) and a commitment to mitigating measures such as participation in a regional groundwater monitoring or protection program.

The Board has also indicated it may consider modifying established groundwater cleanup standards based on documentation of the following:

- o An aggressive cleanup program has been fully implemented and operated for a period of time which is adequate to understand both the hydrogeology of the site and pollutant dynamics; and
- o Groundwater pollutant concentrations have reached an asymptotic level using appropriate technology; and
- o Best available technologies are inappropriate or not cost effective to achieve further significant decreases in pollutant concentrations and/or mass; and
- o An acceptable plan is submitted for containing and managing the remaining risks posed by residual groundwater pollution.

The discharger's plan proposes allowing on-site VOC levels higher than California MCLs and utilizes a containment zone concept described above (i.e., meeting low ppb compliance standards at specific locations for VOCs on-site to protect beneficial uses but still allow for limited, controlled areas where beneficial uses cannot be met). Based upon the information submitted by the discharger, the compliance criteria outlined

above, and Board analysis of the site and conditions and the record before the Board, the Board finds that containment zone status is appropriate for this site.

The Board has reviewed all available information and has concluded that:

- a. Groundwater extraction is no longer efficiently removing VOCs from the groundwater at this site.
  - b. The overall efficiency of VOC removal probably cannot be improved.
  - c. Concentrations of VOCs in groundwater on-site may remain above MCLs in the plume area for years to come.
  - d. The remaining risk posed by residual groundwater pollution above the cleanup standards will be managed by a contingency plan, deed restriction, and on-site containment of polluted groundwater.
  - e. The discharger will be able to contain the plume on-site and not allow off-site migration of VOCs above appropriate MCLs in groundwater.
12. The Board concurs with and accepts the dischargers proposal for containment zone status for this site. State Board Resolution 92-49 contains policies and procedures for the investigation and cleanup of discharges. Amendments to the resolution contain requirements that must be met for a site to be designated as a containment zone. The Board has considered all applicable criteria of Section III.H, of amended State Board resolution 92-49. The Board has determined that the Intel Fab 1 site meets all the applicable criteria which are prerequisite for designation of a containment zone. A fact sheet, "Designation of a Portion of Intel Fab 1 as a Containment Zone", describing the applicable criteria and how the Intel Fab 1 site meets these criteria is contained in Appendix 1. The fact sheet is hereby incorporated into and made part of this Order.
13. **Risk Assessment:** The discharger performed a risk assessment for the Site in 1993. Under current conditions there are no completed exposure pathways that could create a human health risk. A risk assessment of the scenario wherein A-zone groundwater from the pollutant plume is used for domestic use (drinking, showering, ect.) shows a potential cancer risk slightly above  $10^{-4}$ , that is, a 1 in 10,000 risk to someone who uses the water for 20 years. The hazard index for non-carcinogenic health risks was below 1, and thus not considered to pose a non-carcinogenic health risk. Since the risk assessment was done, groundwater VOC concentrations at the site have been further reduced. Shallow groundwater at the Site is not used, and is unlikely to be used in the future. Institutional constraints will prohibit the use of shallow groundwater at the site so long as pollutant levels are above the MCLs.

For comparison, the Board considers the following risks to be acceptable at remediation sites: a hazard index of 1 or less for non-carcinogens, and an excess cancer risk of  $10^{-4}$  or less for carcinogens.

Due to excessive risk that will be present at the site pending full remediation, institutional constraints are appropriate to limit on-site exposure to acceptable levels. Institutional constraints include a deed restriction that notifies future owners of sub-surface contamination and prohibits the use of shallow groundwater beneath the site as a source of drinking water until cleanup standards are met.

#### 14. **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 confirms the Board's initial conclusion 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 shallow groundwater underlying the site for the above purposes. Deep groundwater in an underlying regional aquifer is used for municipal supply as described in Finding 5.

The existing and potential beneficial uses of San Tomas Aquinas Creek include:

- o Municipal and domestic supply
- o Agricultural supply
- o Industrial process supply or service supply
- o Groundwater recharge
- o Water contact and non-contact recreation
- o Wildlife habitat
- o Cold freshwater and warm freshwater habitat
- o Fish migration and spawning

- 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. Groundwater leaving the site will be required to meet these standards. Groundwater on-site within the containment zone may exceed these standards without active remediation being required.
- d. **Basis for Soil Cleanup Standards:** The soil cleanup standards for the site are 1 mg/kg total VOCs and 10 mg/kg total SVOCs. Cleanup to this level is intended to prevent leaching of contaminants to groundwater and will result in acceptable residual risk to humans. There are no known areas of soil on-site that exceed this standard.

15. **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. The Board has concluded that groundwater VOC concentrations have been reduced to the extent practicable utilizing currently available technology. Full restoration of beneficial uses is probably not technologically nor economically achievable within a reasonable period of time. Natural attenuation and biodegradation should slowly reduce the VOC concentrations in groundwater over time. Conversely, if new technical information indicates that cleanup standards can be surpassed, the Board may decide that further cleanup actions should be taken.
16. **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. Extraction and treatment of polluted groundwater will not be occurring at this site unless the contingency plan is activated.
17. **Basis for 13304 Order:** The discharger has 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.
18. **Cost Recovery:** Pursuant to California Water Code Section 13304, the discharger is 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.
19. **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.
20. **Notification:** The Board has notified the discharger 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.
21. **Public Hearing:** The Board, at a public meeting, heard and considered all comments pertaining to this discharge.

**IT IS HEREBY ORDERED**, pursuant to Section 13304 of the California Water Code, that the discharger (or its 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. CONTAINMENT ZONE AND CLEANUP STANDARDS**

1. **Implementation of Containment Zone:** The discharger shall implement the containment zone plan described in finding 11 in accordance with the following:

The following wells shall be identified as boundary wells. Final cleanup standards identified in B.2 below shall be met at these wells.

Downgradient Boundary Wells: IF1-4, IF1-5, IF1-11  
B Zone Boundary Well: IF1-14

The following well shall be identified as a guard well.

Guard Well: IF1-16

For the guard well there will be a trigger concentration of 20 ug/l for any isomer of DCA, or DCE, or for TCE or Vinyl Chloride. If a trigger concentration in the guard well is equaled or exceeded, the contingency plan shall be activated. Trigger concentrations are based on historical conditions at the Site and represent significant concentration increases that may lead to non-compliance.

2. **Groundwater Cleanup Standards:** The following groundwater cleanup standards shall be met in the boundary wells identified in B.1 above.

| Constituent                                | Standard (ug/l) | Basis          |
|--|-----------------|----------------|
| 1,1,1-trichloroethane (1,1,1-TCA)          | 200             | California MCL |
| 1,1-dichloroethane (1,1-DCA)               | 5               | California MCL |
| 1,2-dichloroethane (1,2-DCA)               | 0.5             | California MCL |
| 1,1-dichloroethylene (1,1-DCE)             | 6               | California MCL |
| cis 1,2-dichloroethylene (cis 1,2-DCE)     | 6               | California MCL |
| trans 1,2-dichloroethylene (trans 1,2-DCE) | 10              | California MCL |
| Trichlorethylene (TCE)                     | 5               | California MCL |
| Vinyl Chloride                             | 0.5             | California MCL |
| Freon 113                                  | 1,200           | California MCL |

## C. TASKS

### 1. PROPOSED INSTITUTIONAL CONSTRAINTS

COMPLIANCE DATE: August 30, 1999

Submit a technical report acceptable to the Executive Officer documenting procedures to be used by the discharger to prevent or minimize human exposure to soil and groundwater contamination prior to meeting cleanup standards. Such procedures shall include a deed restriction prohibiting the use of shallow groundwater as a source of drinking water.

2. **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.

3. **FIVE-YEAR STATUS REPORT**

COMPLIANCE DATE: April 30, 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) (if applicable)
- 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.

4. **PROPOSED CURTAILMENT**

COMPLIANCE DATE: 60 days prior to proposed curtailment

Submit a technical report acceptable to the Executive Officer containing a proposal to curtail monitoring. Curtailment includes system closure (e.g. well abandonment). The report should include the rationale for curtailment. Proposals for final closure should demonstrate that cleanup standards have been met, contaminant concentrations are stable, and contaminant migration potential is minimal.

5. **IMPLEMENTATION OF 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.

6. **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.

7. **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.

8. **Delayed Compliance:** If the discharger is delayed, interrupted, or prevented from meeting one or more of the completion dates specified for the above tasks, the discharger 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 discharger 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 discharger 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 discharger 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 discharger.
5. **Self-Monitoring Program:** The discharger 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).
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. City of Santa Clara
  - b. County of Santa Clara Department of Environmental Health
  - c. Santa Clara Valley Water District

The Executive Officer may modify this distribution list as needed.

9. **Reporting of Changed Owner or Operator:** The discharger 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 discharger shall report such discharge to the Regional Board by calling (510) 286-1255 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.

12. **Rescission of Existing Order:** This Order supercedes and rescinds Order No. 89-183.
13. **Periodic SCR Review:** The Board will review this Order periodically and may revise it when necessary.

I, Loretta K. Barsamian, 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 June 16, 1999.

  
Loretta K. Barsamian  
Executive Officer

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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  
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Attachments: Self-Monitoring Program  
Designation of a Portion of Intel Fab 1 as a Containment Zone  
Site Maps

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD  
SAN FRANCISCO BAY REGION

SELF-MONITORING PROGRAM FOR:

INTEL CORPORATION  
FAB 1 FACILITY

for the property located at

3601 JULIETTE LANE  
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 Board Order No. 99-044 (site cleanup requirements).
2. **Monitoring:** The discharger shall measure groundwater elevations quarterly in all monitoring wells, and shall collect and analyze representative samples of groundwater according to the following table:

| Well # | Sampling Frequency | Analyses | Well # | Sampling Frequency | Analyses |
|--------|--------------------|----------|--------|--------------------|----------|
| IF1-2  | Q                  | 8010     | IF1-12 | Q                  | 8010     |
| IF1-3  | SA                 | 8010     | IF1-14 | SA                 | 8010     |
| IF1-4  | Q                  | 8010     | IF1-15 | A                  | 8010     |
| IF1-5  | SA                 | 8010     | IF1-16 | Q                  | 8010     |
|        |                    |          | SC11-2 | A                  | 8010     |
| IF1-9  | Q                  | 8010     | SC11-3 | A                  | 8010     |
| IF1-10 | Q                  | 8010     | R-2    | A                  | 8010     |
| IF1-11 | SA                 | 8010     | R-3    | A                  | 8010     |

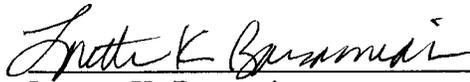
Key: Q = Quarterly                      8010 = EPA Method 8010 or equivalent  
 SA = Semi-Annually                  8020 = EPA Method 8020 or equivalent  
 A = Annually                              8240 = EPA Method 8240 or equivalent  
 8010/8240 = EPA Method 8240 in lieu of 8010 for fourth quarter

The discharger shall propose a sampling schedule for any new monitoring or extraction wells and analyze groundwater samples for the same constituents as shown in the above table. The discharger may propose changes in the above table; any proposed changes are subject to Executive Officer approval.

3. **Monitoring Reports:** The discharger shall submit semi-annual monitoring reports to the Board no later than 30 days following the end of the monitoring period (e.g. report for first half of the year due July 30). The first semi-annual monitoring report shall be due on July 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 discharger's principal executive officer or his/her 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 second semi-annual 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 second semi-annual 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 monitoring period. 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 monitoring period. Historical mass removal results shall be included in the second semi-annual report each year.

- e. **Status Report:** The semi-annual report shall describe relevant work completed during the reporting period (e.g. site investigation, interim remedial measures) and work planned for the following reporting period.
5. **Violation Reports:** If the discharger violates requirements in the Site Cleanup Requirements, then the discharger shall notify the Board office by telephone as soon as practicable once the discharger has knowledge of the violation. Board staff may, depending on violation severity, require the discharger to submit a separate technical report on the violation within five working days of telephone notification.
6. **Other Reports:** The discharger 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 discharger or his/her 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 discharger. 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.

I, Loretta K. Barsamian, Executive Officer, hereby certify that this Self-Monitoring Program was adopted by the Board on June 16, 1999.

  
Loretta K. Barsamian  
Executive Officer

**DESIGNATION OF A PORTION  
OF  
INTEL FAB 1  
AS A CONTAINMENT ZONE**

The following checklist is prepared in response to the requirements specified in the amended SWRCB Resolution No. 92-49.

***Section III.H.1.: attainability of water quality objectives within a reasonable period of time.***

Pump and treat technology has been shown to be incapable of removing chlorinated solvents and petroleum based chemicals at low concentrations from fine-grained type hydrogeologic units which are found below the site. The discharger has also investigated the use of other technologies including soil vapor extraction and/or air sparging, steam flooding, and surfactant injection. The discharger has determined and the Board concurs that due to the fine-grained nature of the soil at this site that none of these technologies are likely to attain cleanup objectives in a reasonable time.

***Section III.H.2.a: discharger's submittal of application for designating a containment zone.***

Intel submitted a petition for a containment zone to the Regional Board on July 29, 1998. The Board finds that the petition complies with the information requirements described in the appendix to Section III.H.

***Section III.H.2.b: removal of pollution sources and free product.***

After extensive investigation and remedial efforts, all known sources of pollution have been removed.

***Section III.H.2.c: degree of groundwater remediation and financial assurances by dischargers.***

Active remediation through groundwater extraction has reduced pollutant concentrations to low levels. However, the persistence of these pollutants stabilizing at low concentrations but above cleanup objectives confirms the belief that further removal by groundwater extraction and treatment would be costly compared to the incremental benefit. In addition there are environmental costs associated with running a groundwater extraction and treatment system. Generation of the energy to run the system generates pollution, as does hauling away the carbon from the treatment system for regeneration. The site is located on Intel's main campus area. Intel has the financial resources to

implement the containment zone management plan. The main campus is their headquarters and they have no plans to leave.

***Section III.H.2.d: submittal of a management plan to access, cleanup, abate, manage, monitor, and mitigate the remaining significant human health, water quality, and environmental impacts.***

The discharger has submitted an acceptable containment zone management plan proposal to the the Board.

***Section III.H.2.e: mitigation measures must be provided by the discharger to control migration of pollution, and if necessary, additional mitigation measures may be proposed by the dischargers.***

The containment zone management plan includes provisions to keep pollutants in groundwater from migrating outside the containment zone. Due to the remedial measures that have been performed to date, including, source removal and groundwater extraction and treatment; the limited extent of the effected area; the fine-grained subsurface conditions limiting pollutant migration; and no adverse risk to human health, the Board concludes that no additional mitigation measures will be required.

***Section III.H.2.f: groundwater monitoring program to demonstrate containment.***

The management plan includes a groundwater monitoring program to monitor the stability of the plume. Downgradient guard wells will be used as compliance points to ensure that groundwater exceeding cleanup standards does not migrate from the containment zone. A trigger well is located where it will intercept pollutants migrating from the source area. If concentrations of pollutants exceed a “trigger” concentration of pollutants, which could indicate the potential for plume migration, response actions will be enacted.

***Section III.H.2.g: data evaluation and contingency plan for containment violation.***

The management plan includes appropriate steps to be taken for contingency actions if there is indication that plume migration which could lead to exceedance of water quality objectives outside the containment area is occurring. Evaluation of monitoring data for the need to implement the contingency plan is based on historical pollutant concentrations at the site.

***Section III.H.3.a: size and effect of the containment zone.***

The containment zone for the Intel Fab 1 site includes that portion of the property extending from the source area downgradient to the boundary wells near the property boundary along Mission College Boulevard and Juliette Lane. Vertically, the containment zone includes only the first encountered aquifer (A zone aquifer).

***Section III.H.3.b: evaluation of potentially significant impacts to water quality, human health, and the environment due to the establishment of the containment zone.***

The Board finds that there will be no significant impacts to water quality, human health, and the environment due to the establishment of the containment zone.

***Section III.H.3.c: no exposure to levels of constituents of concern that could have a significant adverse effect on human health or the environment.***

The discharger conducted a human health risk assessment for the site which concluded that there are no existing exposure pathways. Institutional constraints included in the containment zone requirements will preclude exposure. The containment zone requirements will also ensure that there is no significant adverse effect on the environment.

***Section III.H.3.d: no containment zone is allowed in a critical recharge area.***

The site is not located in or near a critical recharge area.

***Section III.H.5: adoption of containment zone.***

Tentative Site Cleanup Requirements were sent on May 4, 1999 to appropriate agencies and to property owners/tenants of the neighboring properties who may be interested in the proposed designation of a containment zone at the site.

***Section III.H.6: a containment zone shall be implemented only with the written agreement of all fee interest owners of the parcel(s) of property containing the containment zone.***

Intel Corporation is the sole owner and tenant of the property.

***Section III.H.8: public participation requirements.***

The Board provided notice of intent for the proposed designation of the containment zone to the public and neighboring property owners on May 4, 1999.

***Section III.H.9: technical advisory committee (TAC).***

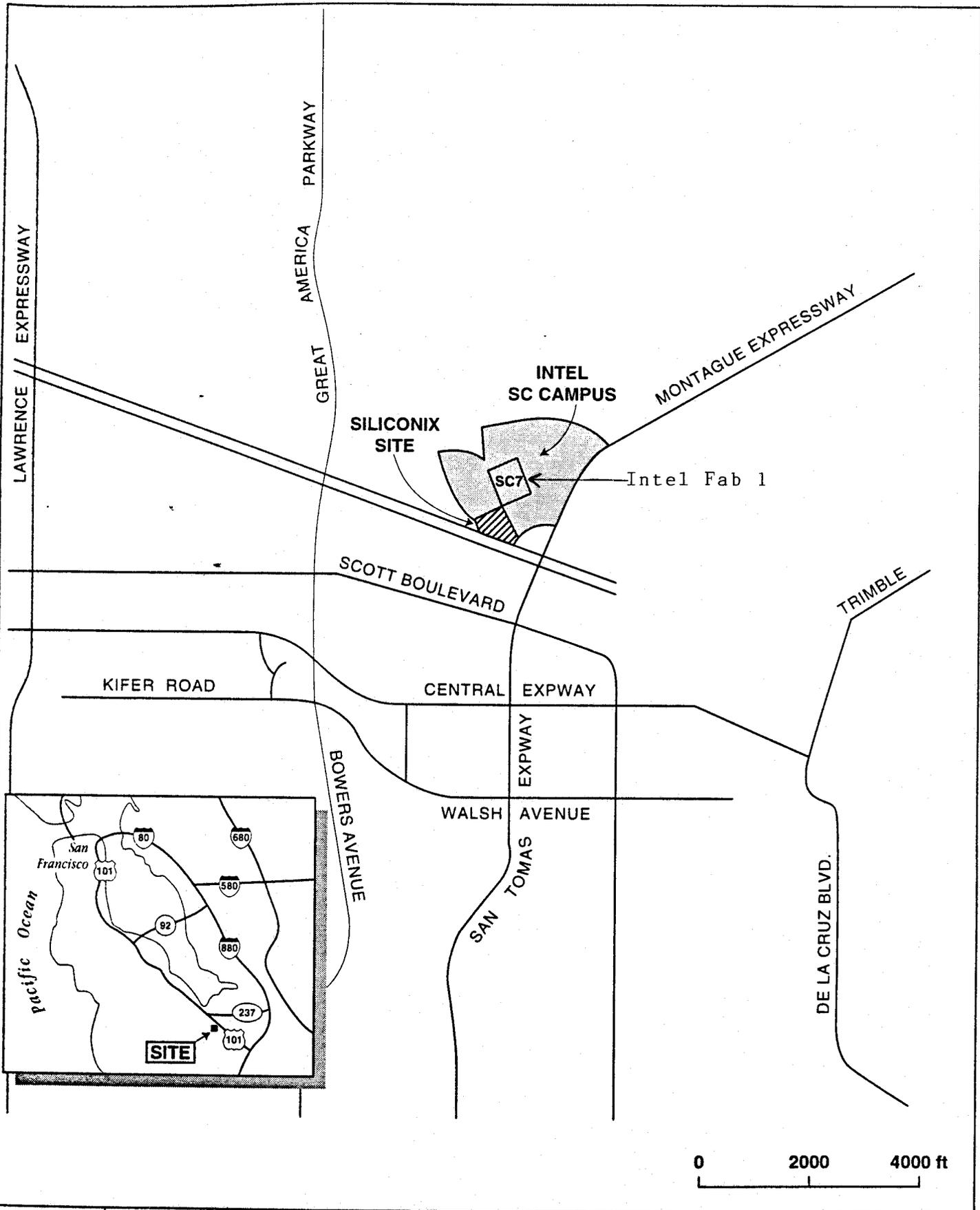
An invitation letter was sent out on May 4, 1999, to the TAC member agencies specified in the section.

***Section III.H.10: master listing of all designated containment zones.***

All containment zones adopted by the Regional Board are recorded on a master list as required by this section.

Remaining sections of amended Resolution No. 92-49 are noted, and require no action by the Regional board at this time. They will be followed by the Regional Board throughout the future management of the containment zone at this site.

***Conclusion: The Intel Corporation Intel Fab 1 site located at 3601 Juliette Lane, Santa Clara, Santa Clara County, is eligible for containment zone designation as the discharger has essentially met the appropriate requirements contained in amended Resolution No. 92-49, which are summarized above.***



98001-12



**PROJECT LOCATION MAP**

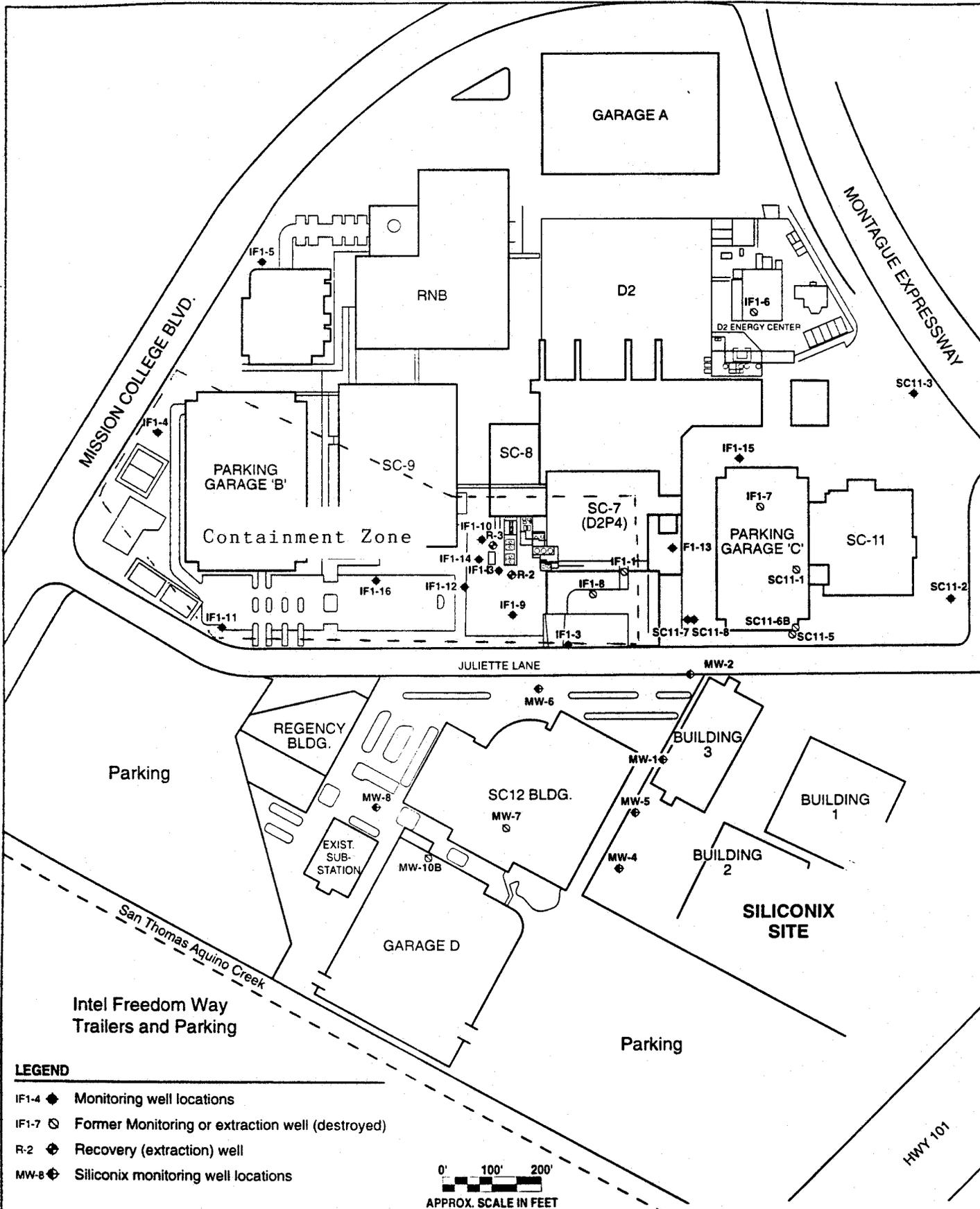
3601 Juliette Lane.  
Santa Clara, CA

By: MJC

JULY 1998

**Figure 1-1**

★ **Stellar Environmental Solutions**  
Geoscience & Engineering Consulting



**LEGEND**

- IF1-4 ◆ Monitoring well locations
- IF1-7 ⊗ Former Monitoring or extraction well (destroyed)
- R-2 ◆ Recovery (extraction) well
- MW-8 ◆ Siliconix monitoring well locations

0' 100' 200'  
APPROX. SCALE IN FEET



**INTEL CAMPUS SITE PLAN**

Intel Corporation  
Santa Clara Campus, CA

By: MJC

JULY 1998

**Figure 1-2**

★ Stellar Environmental Solutions  
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