

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

ORDER NO. 91-022

ISSUANCE OF WASTE DISCHARGE REQUIREMENTS FOR:
NPDES PERMIT NO. CA0029807

SILICONIX, INC.
2201 LAURELWOOD ROAD
SANTA CLARA, CA 95054
SANTA CLARA COUNTY

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

1. Siliconix, Inc. has owned and operated a semiconductor wafer manufacturing facility located at 2201 Laurelwood Road, Santa Clara, Santa Clara County, since 1969. Prior to this time the land was used for agricultural purposes. Siliconix, Inc. is hereinafter referred to as the discharger. By application dated July 12, 1990 the discharger has applied for issuance of waste discharge requirements and a permit to discharge waste under the National Pollutant Discharge Elimination System (NPDES).
2. The Siliconix facility is located on about twelve (12) acres of land near the intersection of the Montague Expressway and Bayshore Freeway (Route 101). This is an area of flat to gentle relief in the southern San Francisco Bay region, within the Santa Clara Valley groundwater basin. The site is occupied by several low rise industrial buildings surrounded by paved parking area.
3. The initial Siliconix investigation began in September 1987 and included review of existing data on soil or groundwater pollution, and chemical use and storage data. During this review it was discovered that soils polluted with cis-1,2-dichloroethylene (cis-1,2-DCE) had been detected at Siliconix in 1984. Two of these soil samples were contaminated with 2,500 and 6,700 $\mu\text{g}/\text{kg}$ respectively of cis-1,2-DCE. Additional investigation of soil pollution has been limited by physical constraints at the site.

A preliminary groundwater investigation was carried out at Siliconix in January and February 1988. This investigation included the installation and sampling of three new monitoring wells and the sampling of one existing well. Analyses of groundwater samples from the uppermost aquifer indicated high levels of 1,2-DCE and trichloroethylene (TCE) in the most

downgradient, onsite wells, MW-1 and MW-2. The upgradient well, MW-3 also onsite, shows no evidence of groundwater pollution.

Additional wells were installed in 1989 to investigate contamination in the offsite area and in the second and third water bearing zones. This investigation confirmed the existence of groundwater pollution in the offsite area and in the first two water bearing zones (above 40 feet below ground surface). The current maximum groundwater concentrations occur in the onsite wells with 12,000 $\mu\text{g/l}$ cis-1,2-dichloroethylene and 4,600 $\mu\text{g/l}$ trichloroethylene (TCE) measured in well MW-1 in October 1990. The current maximum groundwater pollution concentration in the second water bearing zone (B aquifer) is 14 $\mu\text{g/l}$ of TCE measured in well MW-9B, October 1990.

4. As required under Board Order No. 89-027 the discharger has proposed to install and operate a system to remediate the groundwater pollution. The system as proposed would include three groundwater extraction wells, two in the A aquifer one in the B aquifer. Two of the proposed extraction well locations are onsite. One of the proposed extraction well locations is on the downgradient, neighboring property. The purpose of this system is to contain and remediate the contaminated groundwater. Groundwater treatment through filtration and carbon adsorption, prior to discharge, has been proposed. Discharge to a storm drain tributary to San Tomas Aquinas Creek, Gaudelupe Slough and South San Francisco Bay is included as part of this proposed remedial effort. The estimated flow from the system, during initial operation, will be up to approximately 14,400 gallons per day (gpd).
5. The discharger, in a report dated 26 January 1990, has evaluated the potential for reuse of the extracted groundwater after treatment. The report evaluated three potential uses for the treated groundwater; 1) irrigation, 2) manufacturing, and 3) use in the facility cooling tower.

No significant amount of landscaping exists nearby the treatment system. Therefore potential for cost effective irrigation use is limited. The discharger has estimated that due to the high mineral content of the water over 95% of the water would be rejected by the reverse osmosis treatment system utilized by the manufacturing process. The cost of treating the water to allow its use in the cooling towers has been estimated by the dischargers to be approximately \$60,000.00 per year for a flow of less than 11,520 gpd. The local sanitary sewer system has denied Siliconix a permit to discharge the treated water to the storm sewer system.

Based on this review the discharger has proposed that the most cost effective solution is to discharge the treated

groundwater to surface waters. In the interest of efficiency and groundwater conservation the initial discharge shall be limited to a maximum of 14,400 gpd. After the extraction and treatment systems have been operated for six months this discharge shall be reduced by 50% to 7,200 gpd. This reduction shall be accomplished either through reuse or reduction in groundwater withdrawal through the optimization of the pumping rate.

6. The Board adopted a revised Water Quality Control Plan for the San Francisco Bay Region (Basin Plan) on December 17, 1986. The Basin Plan contains water quality objectives and beneficial uses for South San Francisco Bay and contiguous surface and groundwaters.
7. The existing and potential beneficial uses of the surface water adjacent to and contiguous with San Thomas Aquinas Creek, Guadalupe Slough and South San Francisco Bay include:
 - a. Contact and non-contact water recreation
 - b. Wildlife habitat
 - c. Preservation of rare and endangered species
 - d. Estuarine habitat
 - e. Fish spawning and migration
 - f. Industrial service supply
 - g. Shellfishing
 - h. Navigation
 - i. Ocean commercial and sport fishing
8. Effluent limitations of this Order (as shown in Table 1 below) are based on the Basin Plan, State and U.S. Environmental Protection Agency (EPA) plans and policies, best available treatment economically available (BATEA), and best technical judgement. Also considered in the determination of effluent limits were the EPA Region IX draft guidance "NPDES Permit Limitations for Discharge of Contaminated Groundwater: Guidance Document", and the San Francisco Bay Regional Water Quality Control Board Internal Memorandum dated February 16, 1990, "Proposed NPDES Permit Limits For Common Organic Pollutants Found at Service Stations and Other Groundwater Cleanup Sites."
9. The Basin Plan prohibits discharge of wastewater which has "particular characteristics of concern to beneficial uses" (a) "at any point in San Francisco Bay south of the Dumbarton Bridge" and (b) "at any point where the wastewater does not receive a minimum initial dilution of at least 10:1 or into any nontidal water, deadend slough, similar confined water, or any immediate tributary thereof."

10. The Basin Plan allows for exceptions to the prohibitions referred to in Finding 9 above when it can be demonstrated that a net environmental benefit can be derived as a result of the discharge.
11. Exceptions to the prohibitions referred to in Finding 9 are warranted for this discharge because the discharge is an integral part of a program to cleanup polluted groundwater and thereby produce an environmental benefit. Discharge of waste is a privilege, not a right. Authorization to discharge is conditional upon the discharge complying with provisions of Division 7 of the California Water Code and any more stringent effluent limitations necessary to implement water quality control plans, to protect beneficial uses, and to prevent nuisance. Compliance with this Order should assure this and limit any potential adverse changes in water quality due to the discharge.
12. The Basin Plan prohibits discharge of "all conservative toxic and deleterious substances, above those levels which can be achieved by a program acceptable to the Board, to waters of the Basin." The discharger's groundwater extraction and treatment system and associated operation, maintenance, and monitoring plan constitutes an acceptable control program for minimizing the discharge of toxicants to San Tomas Aquinas Creek.
13. The issuance of waste discharge requirements for the discharge is exempt from the provisions of Chapter 3 (commencing with Section 21100) of Division 13 of the Public Resources Code (CEQA) pursuant to Section 13389 of the California Water Code.
14. The discharger has permitted, and threatens to cause or permit waste to be discharged or deposited where it is or probably will be discharged to waters of the State and creates or threatens to create a condition of pollution or nuisance.
15. This action is an order to enforce the laws and regulations administered by the Regional Board. This action is categorically exempt from the provisions of the CEQA pursuant to Section 15321 of the Resources Agency Guidelines.
16. The Board has notified the dischargers and interested agencies and persons of its intent under the provisions of Division 7 of the California Water Code Section to prescribe Waste Discharge Requirements for the discharge and has provided them with the opportunity for a public hearing and an opportunity to submit their written views and recommendations.
17. The Board, in a public meeting on February 20, 1991, heard and considered all comments pertaining to the discharge.

IT IS HEREBY ORDERED that the discharger, its agents, successors, and assigns, in order to meet the provisions contained in Division 7 of the California Water Code and regulations adopted thereunder, and the provisions of the Clean Water Act and regulations and guidelines adopted thereunder, shall comply with the following:

A. EFFLUENT LIMITATIONS

1. The initial volume of discharge shall be limited to 14,400 gpd. After the extraction and treatment systems have been operated for six months the volume of discharge shall be reduced by 50% to a maximum of 7,200 gpd unless it is demonstrated by the discharger, in a report acceptable to the Executive Officer that, 1) a reduction in the maximum flow would be detrimental to the effectiveness of the groundwater remediation system in maintaining hydraulic control of the groundwater pollution plume, and 2) that reuse and recharge are still found not to be cost effective. Regardless of volume the discharge of waste containing constituents in excess of the following limits is prohibited:

TABLE 1

Constituent	Instantaneous Maximum Limit (µg/l)
<u>VOC's</u>	
Tetrachloroethylene	5.0
Trichloroethylene	5.0
1,1 Dichloroethylene	5.0
Vinyl Chloride	0.5
cis-1,2-Dichloroethylene	5.0
trans-1,2-Dichloroethylene	5.0
<u>AROMATICS</u>	
Benzene	1.0
Ethylbenzene	5.0
Dichlorobenzene	5.0
Trichlorobenzene	5.0
Xylenes	5.0
Total Petroleum Hydrocarbons	50.0 ¹

¹ As Gasoline & Diesel

INORGANICS

Arsenic	20.0
Cadmium	10.0
Chromium (VI)	11.0
Copper	20.0
Cyanide	25.0
Lead	5.6
Mercury	1.0
Nickel	7.1
Silver	2.3
Zinc	58.0

2. The Ph of the discharge shall not exceed 8.5 nor be less than 6.5.
3. Toxicity: The survival of rainbow trout in 96-hour bioassay of the effluent as discharged shall be a median of 90% survival and a 90 percentile value of not less than 70%

B. RECEIVING WATER LIMITATIONS

1. The discharge of waste shall not cause the following conditions to exist in waters of the State at any place:
 - a. Floating, suspended, or deposited macroscopic particulate matter or foam;
 - b. Bottom deposits or aquatic growths;
 - c. Alteration of temperature, turbidity, or apparent color beyond present natural background levels;
 - d. Visible, floating, suspended, or deposited oil or other products of petroleum origin;
 - e. Toxic or other deleterious substances to be present in concentrations or quantities which will cause deleterious effects on aquatic biota, wildlife, or waterfowl, or which render any of these unfit for human consumption either at levels created in the receiving waters or as a result of biological concentration.
2. The discharge of waste shall not cause the following limits to be exceeded in waters of the State in any place within one foot of the water surface:
 - a. Dissolved oxygen: 5.0 mg/l minimum. The median dissolved oxygen concentration for any three consecutive

months shall not be less than 80% of the dissolved oxygen content at saturation.

- b. pH: The pH shall not be depressed below 6.5 nor raised above 8.5, nor caused to vary from normal ambient pH levels by more than 0.5 units.
- c. Un-ionized ammonia: 0.025 mg/l Annual Median (as N)
0.400 mg/l Maximum

- 3. This discharge shall not cause a violation of any applicable water quality standard for receiving waters adopted by the Board or the State Water Resources Control Board as required by the Federal Water Pollution Control Act and regulations adopted thereunder. If more stringent applicable water quality standards are promulgated or approved pursuant to Section 303 of the Federal Water Pollution Control Act or amendments thereto, the Board will revise and modify this Order in accordance with such more stringent standards.

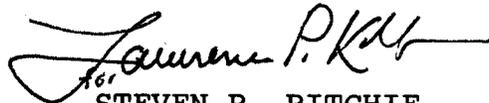
C. PROVISIONS

- 1. The Discharger shall comply with all sections of this order immediately upon adoption.
- 2. The dischargers shall comply with the Self-Monitoring Program as adopted by the Board and as may be amended by the Executive Officer.
- 3. The discharger shall also notify the Regional Board if the self-monitoring program results indicate, or if any discharge activity has occurred or will occur which would result in the discharge, on a routine or frequent basis, of any toxic pollutant which is not limited in the permit.
- 4. This Order includes all items of the attached "Standard Provisions and Reporting Requirements" dated December 1986 except A.10, B.2, B.3, C.8, and C.11.
- 5. Any noncompliance with a requirement of this Order shall be reported as stated in section C.10 of the "Standard Provisions and Reporting Requirements" referred to in C.3. above.
- 6. The discharger shall develop and submit a Best Management Practices (BMP) program to the Board by September 1, 1991. The BMP program shall be consistent with the EPA

regulations 40 CFR 125, Subpart K and the general guidance contained in the " NPDES Best Management Practices Guidance Document", EPA Report No. 600/9-79-045,, December 1979 (revised June 1981). A BMP program acceptable to the Executive Officer shall be implemented by March 1, 1992.

7. This Order expires February 21, 1996 and the discharger must file a report of Waste Discharge in accordance with Title 23, California Administrative Code, not later than 180 days in advance of such expiration date as application for issuance of new waste discharge requirements.
8. This Order shall serve as a National Pollutant Discharge Elimination System permit pursuant to Section 402 of the Federal Water Pollution Control Act, or amendments thereto, and shall become effective at the end of ten days from date of hearing provided the Regional Administrator, U. S. Environmental Protection Agency, has no objection.

I, Steven R. Ritchie, Executive Officer do hereby certify 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 February 20, 1991.



STEVEN R. RITCHIE
Executive Officer

Attachments: Groundwater Extraction System
Standard Provisions and Reporting Requirements -
December 1986
Self-Monitoring Program - December 1986

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

TENTATIVE

SELF-MONITORING PROGRAM

FOR

SILICONIX, INC.
2201 LAURELWOOD ROAD
SANTA CLARA, SANTA CLARA COUNTY

NPDES NO. CA0029807

ORDER NO. 91-022

CONSISTING OF

PART A, dated December 1986 and modified January 1987,
 including Appendices A through E

PART B, Adopted: February 20, 1991

PART B

I. DESCRIPTION OF SAMPLING STATIONS

A. INFLUENT

<u>Stations</u>	<u>Description</u>
I-001	At a point in the extraction system immediately prior to inflow to the treatment unit.

B. EFFLUENT

<u>Stations</u>	<u>Description</u>
<u>E-001</u>	At a point in the discharge line immediately following treatment and prior to the effluent reaching the storm drain tributary of San Tomas Aquinas Creek.
<u>R-001</u>	At a point in the storm drain tributary of San Tomas Aquinas Creek, greater than 35 feet from the discharge point into the storm drain. This location may be temporary and sampling at an alternative point may be required in the future.

II. SCHEDULE OF SAMPLING AND ANALYSIS

A. The schedule of sampling and analysis shall be that given in Table A.

III. MISCELLANEOUS REPORTING

If any chemical additives are proposed to be used in the treatment of extracted groundwater, it shall be reported thirty (30) days prior to their use and

documented in the regular quarterly reports.

IV. MODIFICATION TO PART A

A. Deletions:

Sections D.1.a., D.2.a., D.2.f., D.2.g., D.2.h., D.3., E.1.e., E.3., E.4. , and F.2.b.

B. Modifications:

1. D.2.a. Samples of effluent shall be collected at times coincident (same day) with influent sampling unless otherwise stipulated. The Regional Board or Executive Officer may approve an alternative sampling plan if it is demonstrated that expected operating conditions warrant a deviation from the standard sampling plan.
2. D.2.d If two consecutive samples of any one constituent or parameter monitored on a weekly or monthly basis in a 30 day period exceed the effluent limit or are otherwise out of compliance, or if the required sampling frequency is once per month or less and the sample or parameter exceeds the limit or is otherwise out of compliance, the discharger shall implement correction procedures acceptable to or approved by the Board or Executive Officer, on a case by case basis.
3. D.2.e. During the first six months of system operation, within twenty-four (24) hours of receiving the analytic results indicating a violation of any instantaneous maximum limit, a confirmation sample shall be taken. After resampling, treatment system discharge will be terminated until analysis results are known. However the period of shutdown is not to exceed fourteen days. In the case that the same instantaneous limit is violated in the second sample, the discharge shall be terminated until the cause of the violation is found and corrected.

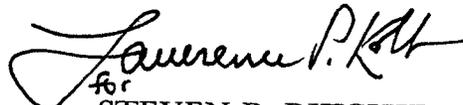
Following the initial six months of system of operation, within twenty-four (24) hours of receiving the analytic results indicating a violation of any instantaneous maximum limit, a confirmation sample shall be taken with analytic results known within twenty-four (24) hours. In the case that the same instantaneous limit is violated in the second sample, the discharge shall be terminated until the cause of the violation is found and corrected. Alternative methods of verifying and correcting violations of instantaneous maximum limits

may be substituted with the approval of the Executive Officer.

4. F.2.a. Total flow shall be recorded continuously.
5. G.4. Written reports as required under G.4. shall be submitted based on a calendar quarter basis, not later than 30 days following the last day of the quarter.
6. G.4.b. The report format shall be in a form acceptable to the Executive Officer of the Regional Board.
7. G.4.e. The report format shall be in a form acceptable to the Executive Officer of the Regional Board. NPDES Discharge Monitoring Report, EPA Form 3320-1, is provided as guidance.
8. G.5. The annual report shall contain all data required for the fourth quarter in addition to summary data required for annual reporting. This report may be submitted in lieu of the report for the fourth quarter of a calendar year.

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

1. Has been developed in accordance with the procedure set forth in the Regional Board's Resolution No. 73-16 in order to obtain data and document compliance with waste discharge requirements established in Regional Board Order No. 91-022.
2. Was adopted by the Board on February 20, 1991.
3. May be reviewed at any time subsequent to the effective date upon written notice from the Executive Officer or request from the discharger and revisions will be ordered by the Executive Officer or Regional Board.


for
STEVEN R. RITCHIE
EXECUTIVE OFFICER

Attachment: Table A

TABLE A
SCHEDULE FOR SAMPLING, MEASUREMENTS, AND ANALYSIS

Sampling Station	I-001	E-001		R-001		
TYPE OF SAMPLE	G	G		G		
Flow Rate (mgd)	cont					
BOD, 5-day 20°, or COD (mg/l & kg/day)						
Chlorine Residual & Dosage (mg/l & kg/day)						
Settleable Matter (ml/1-hr. & ft ³ /day)						
Total Dissolved Solids (mg/l)	Q	Q		2Y		
Oil and Grease (mg/l & kg/day)						
Bio-assay 96-hr % survival (flow- through or static)		Y				
Ammonia Nitrogen (mg/l & kg/day)		V				
Nitrate Nitrogen (mg/l & kg/day)						
Nitrite Nitrogen (mg/l & kg/day)						
Total Organic Nitrogen (mg/l & kg/day)						
Total Phosphate (mg/l & kg/day)						
Turbidity (NTU's)						
pH (units)	W/M	W/M		2Y		
Dissolved Oxygen (mg/l and % saturation)						
Temperature (°C)	W/M	W/M		2Y		
Apparent Color						
Inorganics, Basin Plan, Table IV-1	M/Q/Y	M/Q/Y				
EPA 601 (w/FREON)	W2/M/Q	W2/M/Q		2Y		
EPA 602*	Y	Y		Y		
EPA 624						

Sampling Station	I-001	E-001		R-001		
TYPE OF SAMPLE	G	G		G		
EPA 625						
EPA 8015 (Modified TPH and Diesel)	W2/M/Q	W2/M/Q		2/Y		

LEGEND FOR TABLE A

TYPES OF SAMPLES

G = grab sample
 C-24 = 24 hr. composite
 Cont. = continuous sampling
 DI = depth integrated sample
 BS = bottom sediment sample
 O = observation

TYPES OF STATIONS

I = intake or influent stations
 E = effluent sampling stations
 D = discharge point sampling stations
 R = receiving water sample stations
 L = basin and/or pond levee stations
 B = bottom sediment station
 G = groundwater station

FREQUENCY OF SAMPLING

E = each occurrence
 H = once each hour
 D = once each day
 W = once each week
 M = once each month
 Y = once each year

2/H = twice per hour
 2/W = 2 days per week
 5/W = 5 days per week
 2/M = 2 days per month
 2/Y = once in March and once in September
 Q = quarterly, once in March, June, September, and December

2H = every 2 hours
 2D = every 2 days
 2W = every 2 weeks
 3M = every 3 months

Cont = continuous

V = varies; total ammonia nitrogen shall be analyzed and unionized ammonia calculated whenever fish bioassay test results fail to meet the specified percent survival

W2/M/Q = Biweekly for first month, monthly for 2 months, quarterly thereafter

M/Q/Y = Monthly for first three months, quarterly for remainder of year, yearly thereafter

* Coincident with 601 and to include all tentatively identified compounds