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Superfund Record of Decision:

Solvent Service, CA

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First Remedial Action - Final

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16. Abstract (Limit: 200 words)

The 3-acre Solvent Service (SSI) site is an active treatment, storage and disposal facility in San Jose, California. Land use in the vicinity of the site is industrial and commercial. Since 1983, SSI has been operated as a treatment, storage, and disposal facility. Mixed and segregated solvents have been recycled by a variety of methods including distillation, separation, and blending. Approximately 99% of the recoverable solvents are recycled and then reused and consumed by industry. After VOCs were detected in the ground water, the California Water Quality Control Board adopted Waste Discharge Requirements requiring further site investigations and implementation of interim remedial measures. In 1988 and then again in 1989, the Board adopted Revised Waste Disposal Requirements requiring completion of the pollution investigation, final installation of soil cleanup measures, and submittal of an RI/FS and RAP. Interim remedial actions conducted during the 1980s included the removal of underground storage tanks, paving storage, unloading, and spill containment areas, placing berms in the treatment and storage areas; and changing operational procedures to minimize the risk of additional contamination. SSI is currently operating a containment/extraction system for the ground water plume. The primary contaminants of

(See Attached Page)

17. Document Analysis a. Descriptors
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Contaminated Media: soil, gw
Key Contaminants: VOCs (benzene, PCE, TCE, toluene, xylenes)

b. Identifiers/Open-Ended Terms

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Abstract (Continued)

concern affecting the soil and ground water are VOCs including benzene, PCE, TCE, toluene, and xylenes.

The selected remedial action for this site includes capping the entire site with asphalt; operating a steam injection and vacuum extraction (SIVE) system for the removal of VOCs from soil; extracting ground water via three excavation trenches and five ground water extraction wells, and treating the ground water using bio-treatment, carbon adsorption, and air stripping; soil and ground water monitoring; and implementing deed restrictions. The estimated capital cost for this remedial action is $948,000 with an annual O&M cost of $1,172,000.

PERFORMANCE STANDARDS OR GOALS: A soil remediation goal of 1 ppm total VOCs has been set to protect the ground water from future VOC leaching. Inorganic soil cleanup goals have not been established due to uncertainty surrounding the natural occurrence of metals in soil in the South Bay area. Ground water remediation goals include benzene 1 ug/l (State MCL), PCE 5 ug/l (State MCL), TCE 5 ug/l (State MCL), toluene 1000 ug/l (Federal MCL), and xylenes 1750 ug/l (State MCL).

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 9
1235 MISSION STREET
SAN FRANCISCO, CA 94103

RECORD OF DECISION
DECLARATION STATEMENT

SITE NAME AND LOCATION

Solvent Service Superfund Site
San Jose, California

STATEMENT OF BASIS AND PURPOSE

This declaration document presents the selected remedial action for the Solvent Service Superfund site located in San Jose, California, which was chosen in accordance with the Comprehensive Environmental Response, Compensation and Liability Act of 1980, 42 U.S.C. Section 9601, as amended by the Superfund Amendments and Reauthorization Act of 1986, (CERCLA), and the National Oil and Hazardous Substances Pollution Contingency Plan, 40 C.F.R. Part 300, 55 Fed. Reg. 8666 (NCP). This decision is based on the administrative record for this site.

The State of California concurs with the selected remedy.

ASSESSMENT OF THE SITE

Actual or threatened releases of hazardous substances from this site, if not addressed by implementing the response action selected in this Record of Decision (ROD), may present an imminent and substantial endangerment to public health, welfare, or the environment.

DESCRIPTION OF THE SELECTED REMEDY

The selected remedy for the Solvent Service site addresses the principal threats posed by the site, ground water and soil contamination. The primary chemicals of concern include trichloroethene (TCE); 1,1,1-trichloroethane (1,1,1-TCA); cis-1,2-dichloroethene (cis-1,2-DCE); and acetone. A complete listing of chemicals of concern is found in the California Regional Water Quality Control Board (RWQCB) Site Cleanup Requirements and Staff Report. Several interim response actions were performed at the site by Solvent Service. This action represents the final remedial action to remove contaminants from ground water and soil. The major components of the selected remedy are:

o Capping of the entire site surface with asphalt to limit surface infiltration and to limit air emissions.

o Operation of a steam enhanced vacuum extraction system for removal of volatile organic compounds (VOCs) from the area of highly contaminated soil.

o Operation of three ground water extraction trenches and five ground water extraction wells to remove contaminant mass from the ground water and to contain contaminated ground water at the facility. The extracted ground water will be treated by air stripping, carbon adsorption and biologic treatment systems prior to discharge to the sanitary sewer.

o Continued monitoring of ground water and soil to verify containment of the contaminated ground water and attainment of cleanup levels.

o Deed restrictions to prevent on-site use of ground water and residential development of the property until cleanup standards for soil and ground water are achieved.

STATUTORY DETERMINATIONS

The selected remedy is protective of human health and the environment, complies with federal and State requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost-effective. This remedy utilizes permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable for this site, and satisfies the statutory preference for selecting remedies that employ treatment that reduces the toxicity, mobility, or volume of the hazardous substances.

A review of the remedial action will be conducted every five years after commencement to ensure that the remedy continues to provide protection of human health and the environment.

9.27.90
Date

John Wise
for Daniel W. McGovern
Regional Administrator
EPA Region IX

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 9
1235 MISSION STREET
SAN FRANCISCO, CA 94103

DECISION SUMMARY

The U.S. Environmental Protection Agency ("EPA") and the California Regional Water Quality Control Board, San Francisco Bay Region ("Regional Board"), have worked together to select the remedy for the Solvent Service ("SSI") site. Consequently, portions of the documents by which the Regional Board has embodied its selection of the remedy under State law reflect the efforts of both agencies to investigate the site, to assess the risks which it poses, and to evaluate and compare possible remedial alternatives. Particularly, certain portions of Order No. 90-120, which was adopted by the Regional Board on August 15, 1990, referred to hereafter as the "Order," and the Internal Memo dated August 6, 1990, referred to hereafter as the "Staff Report," accurately set forth the views and rationale of EPA. Consequently, this Decision Summary will refer to portions of those documents (both are attached), and by such reference they are hereby deemed to be incorporated into this Decision Summary.

I. SITE DESCRIPTION

Finding 1 (first paragraph) of the Order and Section 2.0 of the Staff Report describe the Solvent Service site. Regional and site maps are found in Appendix E of this Record of Decision ("ROD"). The estimated residential population within a one-half mile radius is approximately 2000, and increases to approximately 10,000 within a one-mile radius of the site. The SSI site is within one mile of a cluster of five deep aquifer wells that are part of the municipal water supply for the area.

II. SITE HISTORY AND ENFORCEMENT ACTIVITIES

Findings 4, 7 and 8 (first through third paragraphs) of the Order and Sections 3.0, 4.0 (first two paragraphs), and 5.0 of the Staff Report provide a history of site activities and state and federal enforcement activities at the site.

III. COMMUNITY PARTICIPATION ACTIVITIES

Finding 16 of the Order and Section 6 of the Staff Report describe how the public participation requirements of CERCLA were met in the remedy selection process. A response to comments received during the public comment period is included in the Responsiveness Summary, which is part of this Record of Decision.

IV. SCOPE AND ROLE OF RESPONSE ACTION

The selected remedy addresses the principal threats posed by the site, ground water and soil contamination, as described in the Order. Since achieving background concentrations is considered to be infeasible, consideration was given to using the non-carcinogenic hazard index (HI) less-than-one and the 10^{-6} excess cancer risk number (ECRN) concentrations to establish cleanup goals. However, this approach may also not be practical or technically feasible. Less stringent cleanup standards may be appropriate due to the following considerations: 1) the existing practical detection/quantification limits for some chemicals do not presently permit measurement by standard methods of such low concentration (however, technology development may eliminate this factor in the future); 2) there are no water-tap exposures above health-based levels actually occurring in the vicinity of this site at present and it may be possible to guarantee that none will occur in the future; 3) the potential for human exposure from pathways other than future potential drinking water ingestion or inhalation is minimal to none; 4) there are no sensitive populations or special environmental receptors in the immediate vicinity of the site. The standards proposed are health protective, protective of the environment, and will meet or exceed all applicable or relevant and appropriate requirements (ARARs) or other guidance to be considered (TBCs).

While the cleanup objective is to restore ground water quality by removing as much of the chemicals in the ground water as is technically feasible, another objective of major importance is to remove the potential threat to human health or the environment posed by the presence of cancer-causing chemicals at this site. The process of removing carcinogens will result in the removal of non-carcinogens as well and will eliminate the potential exposure to vapors resulting from volatilization from the ground water. Finding 7 of the Order describes interim remedial actions at the SSI site and evaluates their effectiveness in capturing, removing and treating contaminated ground water and in reducing contaminant migration to ground water by means of vapor extraction and treatment of contaminated soils. Contaminants removed from both soil and ground water are captured and permanently destroyed, significantly reducing the toxicity, mobility or volume of the hazardous substances in both media.

V. SUMMARY OF SITE CHARACTERISTICS

Findings 2, 5 and 6 of the Order and Sections 2.0 (second through fifth paragraphs) and 4.0 (second through last paragraphs) of the Staff Report describe site hydrogeological conditions and the nature and extent of contamination. The latter section lists the maximum concentrations of organic chemicals in soil and ground water at the site. In addition, two inorganics, arsenic and nickel, were detected in ground water at the SSI site at

concentrations greater than ARARs. Appendix E of this Record of Decision includes a map showing the areal extent of soil and ground water contamination.

VI. SUMMARY OF SITE RISKS

EPA policy and guidance require that the potential risk to human health and the environment be evaluated under a No-Action scenario. This scenario assumes unrestricted access to site contaminants (including soils and groundwater) and assumes that all on-going treatment and/or mitigation measures are terminated immediately. The information provided by the baseline risk assessment is then used to characterize the current and potential threats posed by the site to human health and the environment.

No exposure pathways with an ECRN greater than the 10^{-4} to 10^{-6} range or a non-carcinogenic HI greater than 1 were identified under current site conditions. Table 1, attached, presents pathway exposures under future use scenarios.

Finding 10 of the Order and Section 8.0 of the Staff Report (excluding the next to the last sentence) summarize the results of the baseline risk assessment. These sections discuss the derivation and use of the cancer potency factors and reference doses. Appendix C, a Board Staff Memo on "Cleanup Standards Solvent Service, Inc." (August 6, 1990) presents the assumptions used in the exposure assessment and uncertainties in the risk characterization for the SSI site.

No critical habitats or endangered species were identified for the site. The potential for migration of contaminants to any bodies of surface water is minimal. The potential for future ecological impacts at this site is determined to be low.

VII. SUMMARY OF ALTERNATIVES

In accordance with CERCLA Section 121, the National Contingency Plan ("NCP"), and the Interim Guidance on Superfund Selection of Remedy, December 24, 1986 (OSWER Directive 9355.0-19), a range of soil and ground water remediation options for the SSI site was developed and initially screened based on the criteria of effectiveness, implementability and relative cost. Next, a detailed analysis of the remaining alternatives in relation to nine evaluation criteria was conducted. Section 10 of the Staff Report identifies the nine evaluation criteria and provides a description of the proposed alternatives.

The remedial alternatives for soil and their associated costs are:

Soil Remediation Alternatives

1. No Action	$231,000
Containment	
2. Asphalt Cap	463,000
3. Concrete Cap	675,000
In-Situ Treatment	
4. Vapor Extraction	706,000
5. SIVE	1,110,000

The remedial alternatives for ground water and their associated costs are:

Ground Water Remediation Alternatives

1. No Action	$ 711,000
Containment	
2. Asphalt Cap/Hydrodynamic Control	2,030,000
3. Concrete Cap/Hydrodynamic Control	2,242,000
Collection, Treatment and Disposal	
4. Pumping/Air Stripping	1,111,000
5. Pumping/Adsorption	1,497,000
6. Pumping/Biological Treatment	1,373,000
7. Pumping/Combination Treatment	1,567,000
In-Situ Treatment	
8. Permeable Treatment Bed	2,049,000

VIII. COMPARISON OF ALTERNATIVES

This portion of the ROD presents a comparison of the alternatives using the nine evaluation criteria.

Protection of Human Health and the Environment

The no action alternative poses the greatest threat to human health and the environment because contaminated ground water could migrate off-site. The alternatives involving pumping and treatment systems provide protection from off-site migration of contaminated ground water but do not address the soil contamination, which provides a continuing source of contamination to ground water if untreated.

Compliance with ARARs

All of the alternatives would eventually achieve cleanup standards. However, the cleanup standards for ground water would eventually be reached under the no action alternative by natural attenuation (estimated at 50 - 100 years), and ground water

degradation would occur to presently uncontaminated areas as the contaminants migrated. Chemical-, location- and action-specific ARARs identified for the SSI site include:

Federal: Safe Drinking Water Act, Clean Water Act, RCRA, Clean Air Act

State: Porter Cologne Water Quality Act, Safe Drinking Water Act, Clean Air Act, California Hazardous Waste Control Law, State Board Resolution 68-16, State Board Resolution 88-63 as incorporated in the Water Quality Control Plan for the San Francisco Basin Plan

Local: Bay Air Air Quality Management District Regulation 8, Rule 47 ("Air Stripper and Soil Vapor Extraction Operations

TBCs for the SSI site include OSWER Directive 9355.0-28 ("Control of Air Emissions from Superfund Air Strippers at Superfund Groundwater Sites").

Finding 11 of the Order discusses ARARs for the SSI site in further detail.

Long-Term Effectiveness and Permanence

The vapor recovery and SIVE alternatives provide a higher degree of residual protection than the other soil alternatives since the contamination is removed from the soil and treated. Residual risk from the permeable treatment bed is uncertain, but may be higher than the pump and treat ground water remediation alternatives. All of the alternatives are reliable, and ground water extraction and treatment and SIVE systems currently exist on-site. The adequacy and reliability of the permeable treatment bed would have to be demonstrated with a pilot scale test.

Reduction of Toxicity, Mobility or Volume Through Treatment

The no action alternative provides no active reduction of toxicity, mobility and volume of the contaminants. Capping with hydrodynamic control will reduce the volume and mobility of ground water contamination. Ground water treatment alternatives will reduce the volume, toxicity and off-site migration of contaminants, although some treatments such as air stripping, carbon adsorption and permeable treatment beds simply transfer contaminants to another media. The SIVE system will reduce the volume and toxicity of soil contaminants by removing and treating the vapors, thereby eliminating soil as the source of continuing ground water contamination. On-site bio-treatment, air stripping and carbon adsorption of condensed vapors and water will reduce toxicity and allow disposal of treated water to the sewer system, which is preferable to off-site disposal options.

Short-Term Effectiveness

The capping alternative could be implemented within six months and would reduce dust and surface erosion as well as minimizing infiltration and recharge. Direct exposure to contaminated soil and vapor would be eliminated. The pumping and treatment alternatives would take considerably less time than the no action alternative, which relies on natural processes to reach cleanup standards. (This assumes that soil and ground water are being remediated simultaneously). The soil vapor recovery system would take an estimated four years to remediate soil VOC concentrations to 1 ppm, while pilot tests indicate the SIVE system would take six months of continuous operation to reach this level. It is estimated that remediation using the permeable treatment bed would take about as long as the pump and treat alternatives.

All of the alternatives have some impact on the community and on-site workers, but can be mitigated in all instances. The no action and soil treatment only alternatives have the potential to pose adverse environmental impacts if the contaminated water migrated off-site. The capping alternative would cover the vegetation on-site, thus reducing the habitat for wildlife. The treatment systems may cause minor air impacts and spent carbon or filter bed material would require disposal.

Implementability

The no action alternative is technically and administratively feasible. The alternatives that are part of the interim remedial program (hydrodynamic control, the combination ground water treatment system, and the SIVE system) have been proven to be technically feasible with services and materials readily available. The administrative requirements have already been met. Installation and operation of a permeable treatment bed is technically feasible provided a pilot scale test determines its effectiveness for site conditions; however, availability of services and materials is dependent upon the selected filter bed material which is probably available locally.

Cost

The cost estimates for the soil and ground water alternatives were presented above in Section VII. The asphalt or concrete capping with hydrodynamic control alternatives are relatively high in cost, but are very effective in controlling and reducing ground water contamination. The pumping and combination treatment alternative provides the greatest adequacy for meeting the different treatability requirements of the contaminant mixture. The cost effectiveness selection process favors interim remedial programs since they already exist; the effectiveness of these measures is known and they appropriately address the remedial objectives.

Support Agency Acceptance

The State of California concurs with EPA's preferred alternative.

Community Acceptance

No objections to the Proposed Plan were received by the Board from the community.

IX. THE SELECTED REMEDY

A combination of soil and ground water treatment is considered the best alternative after considering the nine evaluation criteria. The selected remedy is outlined in Findings 9 and 12 of the Order and Sections 11 and 12 of the Staff Report. The selected remedy consists of:

- Capping of the entire site surface with asphalt
- Operation of the Steam Injection and Vacuum Extraction (SIVE) system for removal of VOCs from soil
- Operation of three ground water extraction trenches and five ground water extraction wells
- Bio-treatment, carbon filtering and air stripping of extracted ground water and soil vapor
- Continued monitoring of ground water and soil

In addition, the selected remedy includes deed restrictions to prevent development of the SSI site that might allow residential development or the use of on-site ground water prior to the attainment of cleanup standards.

With this remedy, the estimated time to achieve ground water cleanup is 30 years; the estimated time to achieve soil cleanup (with continuous SIVE system operation) is 6 months. Although the selected remedy was not specifically designed to remediate metals in ground water, any ground water extraction performed will removed suspended metals as well as VOCs. Also, the SIVE system may mobilize to some extent the metals adsorbed to soil.

The goal of this remedial action is to restore ground water to its beneficial use. Based on the information obtained during the remedial investigation and on a careful analysis of all remedial alternatives, EPA and the State of California believe that the selected remedy will achieve this goal. It may become apparent, during implementation or operation of the ground water extraction system and its modifications, that contaminant levels have ceased to decline and are remaining constant at levels higher than the remediation goal over some portion of the contaminated plume. In such a case, the system performance standards and/or the remedy may be reevaluated.

The performance of the ground water extraction and treatment system will be carefully monitored on a regular basis and adjusted as warranted by the performance data collected during operation. Modifications may include:

a) at individual wells where cleanup standards have been attained, pumping may be discontinued;
b) alternative pumping at wells to eliminate stagnation points;
c) pulse pumping to allow aquifer equilibration and to allow adsorbed contaminants to partition into ground water; and
d) installation of additional extraction wells to facilitate or accelerate cleanup of the contaminant plume.

Cleanup Standards

The final cleanup standards for some chemicals in ground water at the SSI site have been reduced to levels more stringent than ARARs. These modifications were necessary in order to be protective of human health in consideration of exposure to multiple chemicals. A conservative remediation goal of 1 ppm for total VOCs has been set for soil. The Risk Assessment indicated that the risks for direct soil contact for the average case under two future use scenarios was minimal. Therefore, specific remedial actions and cleanup standards for inorganics in soil were not presented.

Finding 11 of the Order and Section 9 of the Staff Report present the final cleanup standards for the site. Promulgated MCLGs serve as the ground water cleanup standards for those chemicals of concern with MCLGs greater than zero. MCLGs are the ground water cleanup standards for three chemicals of concern at Solvent Service: 1,1,1-trichloroethane (1,1,1-TCA); 1,4-dichlorobenzene (1,4-DCB); and 1,1-dichloroethene (1,1-DCE). In these three instances, the California AL or federal or state MCL that has been chosen as the cleanup standard is either equivalent to or more stringent than the federal MCLG.

X. STATUTORY DETERMINATIONS

In accordance with Section 121 of CERCLA, the selected remedial action is protective of human health and the environment, complies with ARARs, is cost effective, and utilizes permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent possible. In addition, the selected remedy satisfies the statutory preference for remedies employing treatment that reduces toxicity, mobility or volume as a principal element.

Under the chosen remedy, future risks at the site fall within the 10^{-4} to 10^{-6} carcinogenic risk range and the less-than-one Hazard Index for non-carcinogens for all exposure pathways. Soil is remediated to a level that will protect ground water from future contamination from untreated soils. The selected remedy complies with federal and state ARARs. Implementation of the remedy will cause no unacceptable short-term risks or cross-media impacts.

The selected remedial action is cost-effective. This remedy is not the most costly of the alternatives that were considered, nor is it the least expensive treatment. The estimated time to reach soil cleanup standards is the shortest period of any of the alternatives. Ground water cleanup times were not a factor for comparison of alternatives since ground water extraction was the only active ground water remedial action considered. The combination treatment system has the advantage that it allows for efficient treatment of a wide variety of pollutants.

Treatment is used as a principal element for the selected remedy. Soil vapor extraction and treatment and ground water extraction and treatment are permanent solutions and significantly reduce contaminant toxicity, mobility and volume at the site.

The proposed ground water extraction system was not designed for the removal of inorganics. However, it is believed that it will, by the removal of ground water contaminated with VOCs, also remove ground water contaminated with inorganic constituents. The concentration of inorganics allowed in the system effluent is regulated under permit from the San Jose Water Pollution Control Plant.

RESPONSIVENESS SUMMARY

for COMMENTS and QUESTIONS RECEIVED FROM

JUNE 20, 1990 to AUGUST 8, 1990

REGARDING THE
THE PROPOSED FINAL REMEDIAL ACTION PLAN
FOR
SOLVENT SERVICE, INC.
2201 BERRYESSA ROAD, SAN JOSE, SANTA CLARA COUNTY

Introduction

This responsiveness summary reviews comments and questions regarding the Remedial Investigation/Feasibility Study (RI/FS) and Proposed Final Cleanup Plan (proposed plan) for the proposed Superfund site, Solvent Service, Inc. (SSI). This summary will include comments received during the period from the opening of public comment at the Board meeting of June 20, 1990 through the close of public comment on July 20, 1990. In addition this summary will address late comments received after the close of the comment period through August 8, 1990. The proposed plan for the SSI facility includes six components:

1. Steam Injection and Vacuum Extraction (SIVE)

2. Bio-treatment, Carbon Filtering, and Air Stripping of Extracted Groundwater, Surface Water, and Vapor

3. Capping of the Site by Paving

4. Groundwater Extraction

5. Continuation of the Groundwater Monitoring Program

6. Deed Restrictions to Control Residential Development of the Property until Cleanup Standards for Soil and Groundwater are Achieved

Verbal comments and questions were received from the public at a community meeting held at the San Jose City Hall on June 27, 1990. The only written comments received during the public comment period were from the discharger and the Santa Clara Valley Water District (SCVWD). Additional written comments were received after the close of comment from the California Department of Health Services, Office of Drinking Water (ODW) and SCVWD. Additional verbal questions were received after the public comment period from the operator of a nearby trailer park, EPA Region IX staff toxicologist and the EPA remedial project manager (RPM). No agency or individual requested an extension of the comment period therefore the official public comment period was closed on July 20, 1990. No comments regarding the components of the proposed plan

were received. Therefore no modifications to the proposed plan are included.

Background

No comments were received during the initial public hearing at the June 20, 1990 Board meeting. A community meeting was held in San Jose on June 27, 1990. This meeting was attended by representatives of the City of San Jose, the Regional Water Quality Control Board, EPA Region IX, SSI, and three individuals representing the interests of a neighboring property owner. The individuals asked many questions regarding the site history and cleanup activities, however comments centered on two concerns: 1) the possibility of contaminated surface water reaching or having reached the neighboring property and 2) the potential impact of the cleanup activities and deed restrictions on the value of the neighboring property.

The comments from the discharger concern corrections, clarifications, proposed language changes and issues related to a groundwater plume of fuel components from an offsite source. The comments from the EPA toxicologists were concerned with the calculation of the hazard index for noncarcinogenic effects of the contaminants at the SSI facility. The significant comments from the EPA RPM are language clarifications, a request for an expanded comparison of alternatives in the staff report, and a request for the inclusion of Bay Area Air Quality Management District (BAAQMD) rules as an ARAR.

The comments from SCVWD express three central concerns:1) the status of the D/E zone which is used as a domestic supply, 2) the methodology for the calculation that the proposed cleanup standards are health protective, and 3) that the goal for cleanup standards for carcinogens should be at the 10^{-6} (1 in 1,000,000) level. The comments from the ODW are similar with the additional concerns that offsite cleanup is included only as a contingency and that new regulations establishing representative public health levels (RPHLs) will differ significantly from the standards proposed by this Order.

The questions from the operator of the trailer park revolved around the possibility that contamination of a drinking water supply well in the trailer park could occur and the replacement of this supply if the well would become contaminated.

A summary of the significant comments or questions and a response is included below. Recent EPA guidance established a two part approach to responsiveness summaries. Under this guidance the first part of the summary would include general response to all significant questions and where warranted a more technical response to specific questions or comments would be included in the second part.

The Administrative Record, containing all the documents that provide the background for the actions proposed for this site, is available at the San Jose Public Library and at the Regional Board offices.

Community Involvement Activities

The major community relations activities are listed below:

August 1988	Fact Sheet No. 1
December 1989	Fact Sheet No. 2
June 1990	Fact Sheet No. 3
June 1990	Community Meeting No. 1

Part 1, General Response to Comments

Local Community Comments

The majority of questions at the community meeting were concerned with site history and actual activity at the site. This questions were answered in the meeting and had also been addressed in the Fact Sheets, particularly Fact Sheet No.3. The major concerns expressed at the community meeting was the possibility of overland flow of contaminated water as a result of the local surface topography and the impact on property values. The other questions from the community came, verbally, from the operator of a nearby trailer park on July 28, 1990. Again the majority of questions concerned the site history and extent of the problem. However, the main concern was potential contamination of a domestic supply well at the trailer park. The questions regarding the site history and activities were covered in Fact Sheets Nos. 1 and 2 and summarized in Fact Sheet No. 3. The individuals asking the questions had received at least Fact Sheet No. 3.

Response

The questions regarding overland flow of contaminated water to the neighboring property was addressed in three phases at the community meeting: 1) future runoff will be captured and contained by the site storm water control plan as detailed in the site RCRA permit, 2) in the recent past, approximately 2 years, a new driveway was installed between the facilities which was elevated and would prevent surface runoff from migrating to the neighboring property, and 3) the possible historical occurrence of runoff of contaminated water from the SSI site onto the neighboring property could not be adequately answered during the community meeting. Therefore staff and representatives of SSI agreed to provide a site tour for the individual that had expressed this concern. In addition, staff has reviewed the files to verify that the storm water control plan would capture storm water runoff on the site and reviewed the location of the driveway. Review of a site investigation completed in 1985 prior to the purchase of another neighboring parcel of land (Jackson-Shaw Properties) included evidence for an absence of contamination on any of the property surrounding SSI. This was based on the results of a shallow soil gas survey and soil samples collected during the installation of monitor wells. The individual that had expressed this concern has been unavailable to complete the site tour. A representative of the City of San Jose indicated that it was probable that the area near SSI would remain zoned for commercial use only. The cleanup activity will not be apparent outside of the site and should not have any impact on local property values.

The well in question, located at the Trailer-Tel trailer park was identified in the potential conduit survey completed by SSI. This well is located approximately 2000 feet downgradient of the SSI site and may be withdrawing groundwater from the D/E zone. Contamination in this zone has only been detected in two wells within the last two years, with the most recent sampling indicating the presence of only two chemicals, 3 ppb Freon 113 and 3 ppb Dichloroethylene. These levels are detected in the center of the site and do not represent a risk to human health or the environment. Monitor wells do exist between the site and the supply well. These wells are currently non-detect and have not, historically, detected any levels of contamination. The B/C zone, which immediately overlies the D/E aquifer, shows higher levels of contamination, however there is no indication of communication between or migration from the B/C zone to the D/E aquifer. Comparison of the results of analysis for inorganic constituents from the D/E aquifer and the B/C zone indicates that the D/E aquifer and the B/C zone are not connected. The maximum lateral migration of contaminated groundwater is in the A aquifer, above the B/C zone. This extends downgradient from the site to the west-northwest for a minimum of 90 feet and up to 150 feet. This is still more than 1800 feet laterally and over 75 feet vertically from the supply well. The groundwater in the area west northwest of the SSI site moves very slowly and it is estimated that groundwater moves less than 53 feet per year in this area. Therefore it is probable that contaminated groundwater, if no groundwater extraction was performed, would take more than twenty years to reach the supply well in question. If the well were to become contaminated an alternative, commercial supply of drinking water is inplace and available. Since the operator of the trailer park provides water to the tenants from the onsite supply well without charge the concern is not with the loss of supply but rather with the financial consequence of being required to purchase water to replace the lost supply. In similar situations in the South Bay the dischargers have paid for the cost of the installation of replacement water supplies without question. This is dependent upon the action of the discharger and might require legal action by the trailer park.

SCVWD and ODW Comments

Verbal comments were received from the California Department of Health Services, Office of Drinking Water (ODW) regarding the proposed cleanup standards and the concerns regarding domestic water supply wells in the area. Written comments from ODW were received on August 1, 1990. Santa Clara Valley Water District (SCVWD) has submitted written comments on the proposed Order twice, first on July 20, 1990 and again on August 3, 1990. All of the comments referenced above are included in Appendix C of the Order. The comments from both sources can be summarized into two categories 1) concern with the manner in which risk due to exposure to carcinogens was evaluated and the resulting proposed cleanup standards, and 2) concerns with the levels of contamination in the units below the A aquifer.

Response

The methodology utilized for the calculation of the potential increased occurrence of cancer after cleanup by the proposed plan is formalized in several EPA guidance documents and is widely accepted in the risk assessment community as being the current "state of the art". The differences in the methodology employed in the review of cleanup standards in this Order and that preferred by ODW and SCVWD was reviewed in a meeting on July 24, 1990 with the representatives of ODW and SCVWD. No consensus was achieved regarding the conflicting methods of calculating the carcinogenic risk related to proposed cleanup standards.

Written comments were received from ODW following this meeting. The methodology proposed by ODW would include the comparison of the proposed cleanup standard to some reference level, probably a maximum contaminant level (MCL) as defined by California or Federal law. These comments still expressed the same concerns. Staff believes that the methodology utilized, which compares a projected intake of a chemical at a specified concentration to a potency factor, is the most scientifically defensible approach available. The methodology proposed by ODW would produce lower cleanup standards, but the actual risk level related to these standards is uncertain due to the inclusion of technical and economic considerations in the assessment of MCLs. Additional written comments received from SCVWD indicate a willingness to accept the methodology, however SCVWD would prefer cleanup goals that would result in a 1 in a 1,000,000 risk level. This would result in cleanup standards that are below detection limits for seven of the 8 carcinogens. This is not a technically achievable or practical goal.

Staff has modified the language that would allow the reassessment of cleanup standards when standards change. The intent of this modification is to clarify that this will occur should RPHLs be codified or MCLs or other standards change. In addition staff has modified the Order to make it more apparent that cleanup of the B/C zone and offsite groundwater contamination is not just a contingency. Cleanup of the offsite B/C zone groundwater contamination will be required, but cleanup will be delayed until remedial actions for the onsite A aquifer has reached lower concentrations. This is to prevent the remedial efforts from increasing the migration of contaminated groundwater both into deeper aquifers and further offsite. A task is included in the Order for the discharger to provide a specific plan and methodology for determination of the startup of the offsite and deeper aquifer remedial actions.

As discussed above the D/E zone contains levels of contaminants that are below current drinking water standards. As suggested in the comments from SCVWD received on July 20 contaminants in the D/E aquifer were remediated as a result of purging the wells during an intensive sampling program in 1988. Therefore the conclusion that the contamination in the D.E aquifer is the result of leaky well bores, not migration through the clay layer separating the D/E aquifer from the B/C zone. The wells suspected of acting as conduits have been destroyed under permit and supervision of the SCVWD. The same general scenario is true of the B/C zone, however the levels of contamination that leaked along the well bores are higher therefore remediation of the B/C zone will be required.

ODW also expressed a concern that water supply utilities will be required to treat water extracted from these aquifers prior to use to meet ODW standards that are calculated by different methodologies or the RPHLs that will promulgated in the future. This ignores the fact that any contaminants remaining in the groundwater would continue to undergo degradation, dispersion, diffusion and attenuation that would greatly reduce the concentration of contaminants present prior to the groundwater reaching any offsite wells. Deed restrictions are included as part of the proposed plan to prevent wells from being installed onsite until cleanup standards have been achieved. In addition, SCVWD regulations currently prohibit the installation of any wells in the A aquifer or B/C zone and there is no evidence of migration of contaminants into the D/E zone. The suggestion that results of analysis acquired under AB 1803 for nearby supply wells will be monitored closely as suggested by the SCVWD.

Further discussions with representatives of ODW on August 6, 1990 indicated that presenting the risk at the proposed cleanup standards does not present an accurate picture of the true risk

expected after cleanup and that ODW feels that expressing the total risk as the sum of the maximum allowable concentration gives the public an inaccurate representation of the true risk that will remain after cleanup of the groundwater contamination. This is a result that, in general, some chemicals are present in the groundwater at much higher concentrations than other contaminants. Therefore, by the time the remedial actions reduce the chemicals that occur at high concentration to the proposed cleanup standards, chemicals that originally occurred at lower concentrations will then occur at concentrations lower than the proposed cleanup standards. While the risk might be presented in a more realistic manner by this description it does not address the difficulties of predicting the manner in which chemicals will move from soil to groundwater. Due to the large number and variety of types of chemicals detected at SSI staff does not believe that a technically accurate prediction that describes this process site can be made for the SSI facility. This approach and other suggestions from ODW will be given careful consideration in the description of risk and the establishment of cleanup standards in future cleanup projects.

EPA Region IX Comments

Comments from EPA Region IX toxicologist indicated that the toxic effects of carcinogens must also be considered in the evaluation of potential health effects from the groundwater after cleanup. The Remedial Project Manager (RPM) indicated that a discussion of BAAQMD regulations for discharge to the air should be included in the Order and staff report. Discussion of the cleanup alternatives considered for site cleanup was considered to be inadequate.

Response

The calculation of the hazard index for the possible toxic health effects due exposure to the groundwater after cleanup was recalculated in the staff report. The proposed cleanup levels in the Revised Tentative Order and attached staff report reflect changes made as a result of considering the toxic effects of additional chemicals. Discussion of the potential risks at the site from air exposure were included in the Remedial Action Plan submitted by the discharger. A discussion of the existence of the BAAQMD regulations and the permits required for air discharge at the site has been added to the Revised Order and Staff Report. An expanded comparison of the remedial alternatives considered has been included in the revised staff report.

Discharger Comments

Written comments from the discharger are included in Appendix C of the Order packet. The majority of these comments concern language changes. The one comment of concern is the change of some guidance standards to more appropriate health based standards as opposed to standards based on human taste and odor thresholds.

Response

Some standards were changed to more appropriate, health based guidance. This change did result in higher concentrations for the proposed cleanup standards for some non-carcinogenic chemicals. As a result, to maintain health protective cleanup standards, proposed cleanup standards for other non-carcinogenic chemicals had to be reduced to lower concentrations for the SSI facility. The discharger requested the deletion of the deed restriction from the proposed plan since SCVWD

regulations prohibit the installation of wells in the B/C zone or A aquifer. Due to the possible length time required to achieve groundwater cleanup and the uncertainty of enforcement of regulations or possible changes in regulations staff did not delete the deed restriction from the proposed plan. The discharger also requested that the requirement for offsite and B/C zone remediation be clarified. Modifications have been made in the Revised Order and staff report to address this concern.

Conclusion

Since no comments or questions were received that suggested changes to the proposed plan or that could not be addressed by the RI/FS or proposed plan no changes to the proposed plan are recommended. Further, since no changes to the proposed plan are recommended Part 2 of the Responsiveness Summary is not considered to be necessary.

APPENDIX A

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

ORDER No: 90-120

SITE CLEANUP REQUIREMENTS FOR:

SOLVENT SERVICE INC.
1021 BERRYESSA ROAD
SAN JOSE
SANTA CLARA COUNTY

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

1. Location and Responsible Party Solvent Service Inc. (SSI), hereinafter called the discharger, owns and operates a treatment, storage, and disposal facility at 1021 Berryessa Road, San Jose, Santa Clara County for the purpose of waste treatment and recycling. The site occupies 3.2 acres and is located approximately 10 miles southeast of San Francisco Bay and approximately 1/3 mile southwest of the confluence of Upper Penitencia Creek and Coyote Creek. The site is near the intersection of Berryessa Road and the Bayshore Freeway (see attached map). This is an area of industrial and commercial developmentand SSI has been in operation at this location since 1973. Prior use of the area was for agriculture.

   Pursuant to Health and Safety Code Sections 25356.1 (c) and (d), the discharger is the only identified responsible party associated with the release of non-petroleum contaminants to the subsurface at this location and has accepted responsibility for the cleanup of the site solely as it relates to non-petroleum related contaminants. The discharger has not assumed responsibility for the petroleum related contaminants that form a plume along the site's southwestern property line. Further the discharger has not assumed responsibility for the VOCs, if any, associated with the groundwater plume in this area.

2. Chemicals Detected Volatile organic chemicals (VOCs) were first detected in groundwater in 1983 in the vicinity of underground solvent storage tanks, the spill control facilities, the barrel storage area and the solvent tank truck unloading zone. The solvents detected included xylene, acetone, 2-butanone, 1,1,1-trichloroethane (1,1,1-TCA), 1,1-dichloroethane (1,1-DCA) and cis-1,2-dichloroethylene (cis-1,2-DCE). Some of the chemicals detected most frequently and in the highest concentrations based on analytical results from the January 1987 - July 1989 period (see attached map) show the presence in onsite groundwater of: acetone at 19,000,000

parts per billion (ppb), trichloroethylene (TCE) at 150,000 ppb, 1,1,1-TCA at 100,000 ppb, and cis-1,2-DCE at 67,000 ppb.

A recent onsite sampling (December 1989) also detected levels of inorganics in groundwater above the maximum contaminant level (MCL). Arsenic was detected at a maximum level of 119 ppb and zinc at a maximum concentration of 25,400 ppb. Other inorganics detected were below the established MCLs. Additional groundwater data was collected February and March 1990 for inorganic analysis. The results of this data, as discussed in the staff report, indicate that most inorganics are not present at concentrations that are of concern.

VOCs and inorganics are identified as either carcinogenic (cancer-causing) or noncarcinogenic (not cancer-causing). The VOCs found in the subsurface at this site include several compounds which have been included by the EPA in one of the categories of human carcinogens as follows: (1) known human carcinogen (Class A) - benzene, vinyl chloride, and arsenic; (2) probable human carcinogen (Class B1 and B2) - chloroform, 1,4-dichlorobenzene (1,4-DCB), TCE, tetrachloroethylene (PCE), 1,1-DCA and methylene chloride; (3) possible human carcinogen (Class C) - 1,1-dichloroethylene (1,1-DCE), and isophorone.

3. Lead Agency Pursuant to the South Bay Multi-Site Cooperative Agreement (MSCA) and the South Bay Ground Water Contamination Enforcement Agreement, entered into on May 2, 1985 (as subsequently amended) by the Regional Board, EPA and DHS, the Regional Board has been acting as the lead regulatory agency. The Regional Board will continue to regulate the discharger's remediation and administer enforcement actions in accordance with CERCLA as amended by SARA.

4. NPL and Orders The site has been proposed for inclusion on the National Priorities List (NPL) and has been regulated by Regional Board Orders, as indicated herein:

a.	March 1986	Regional Board adopted Waste Discharge Requirements.
b.	April 1988	Regional Board adopted revised Site Cleanup Requirements.
c.	June 1988	Site proposed for the NPL.
d.	April 1989	Regional Board adopted Revised Site Cleanup Requirements.

5. Adjacent Site Chevron Inc. (Chevron) owns and operates a fuel distribution terminal at 1020 Berryessa Road, San Jose, Santa Clara County. This facility provides hydrocarbon products for

the South Bay area. Subsurface investigations at this site have revealed the presence of benzene, toluene, xylene, and ethylbenzene (BTX&E) in soil and groundwater beneath the site including separate phase hydrocarbon product (HCs). The occurrence of separate phase hydrocarbon has been documented in the subsurface at the Chevron facility since at least 1984.

Dissolved and separate-phase HCs, which appear to have migrated from Chevron, were detected by SSI during investigations along the southwest SSI site boundary, on the neighboring Jackson-Shaw property, in 1988. In addition, low levels of VOCs have been detected in some wells in this area. Based on current data collected by SSI and Chevron the HC plume apparently continues beyond the SSI site to the northwest.

6. Hydrogeology SSI is in the Santa Clara Valley which is a sedimentary basin filled with unconsolidated heterogeneous alluvial material, interspersed with layers of marine clay. The alluvium is a mixture of permeable, water-bearing sands and gravels, interbedded with less permeable silts and clays. The soils are extremely variable over short distances, both horizontally and vertically.

SSI is underlain by three distinct hydrogeologic units. Aquifer A is an unconfined, low permeability aquifer that occurs from the ground surface to a depth of 20 to 25 feet (50 to 75 feet MSL). The A aquifer is currently locally dewatered. It consists of sandy silts, clay, and a thin, continuous poorly sorted sand layer at its base. Aquifer A is underlain by a clay layer which is typically 6 to 16 feet in thickness. This clay layer may be as thick as 60 feet in some locations on site. The clay layer may impede vertical downward migration of groundwater. Ancestral stream channel deposits have also been identified along the southwestern margin of the site in the A aquifer.

Zone B/C consists of lenses of sands, silts, and clays. It extends to 50 feet below the upper clay layer (0 feet MSL) and appears to be laterally continuous across the site. Water levels in this zone are 1 to 2 feet lower than Aquifer A but little vertical leakage is believed to be occurring. The B/C zone is probably not representative of an aquifer and will be referred to as a zone not an aquifer in this Order. A clay layer, 2 to 10 feet thick, occurs at the base of Zone B/C.

The third zone, Aquifer D/E, consists of an upper member - a thick sequence of silts and sands underlain by a thin clay layer - and a lower member - two sand layers separated by a 2 to 5 feet thick silt layer. A clay layer occurs at the base of this zone, 150 feet below the ground surface (-75 feet MSL). Zone D/E is believed to be very permeable and has been used

historically for domestic water supply.

7. Interim Remedial Actions Three underground storage tanks used for solvent storage, spill control, and waste solvent storage, were removed in or about 1982. Adjacent soil was also removed, however this is not well documented. The highest levels of pollutants in soil remain beneath the existing concrete pad that presently underlies the major treatment and storage area.

The solvent truck unloading area, the barrel storage area, the spill containment facility, and other treatment and storage areas were gradually paved with concrete by 1984. Currently, most of the treatment and storage area is paved. Additional interim remedial measures have included the placement of berms in the treatment and storage area and changing operational procedures to minimize risk of additional contamination.

SSI currently operates a containment/extraction system for the groundwater plume. The system includes 5 recovery wells and 3 extraction trenches. Extracted groundwater is being treated by a biological treatment system, air stripping, and carbon adsorption. Treated water is used in the SSI cooling towers and is subsequently discharged into the sanitary sewer under authorization from the sanitary district. This system appears to be effective in containing migration of pollutants originating onsite and of removing pollutants from the extracted groundwater. However, some pollutants have migrated to and slightly beyond the property boundaries. These pollutants are believed to have migrated beyond the location of the trenches prior to installation of the trenches.

SSI has also been operating a steam injection/vacuum extraction system since December 1989 as an interim remedial action, for onsite in-situ soil remediation, to address the highly contaminated soils that remain inplace beneath the concrete pad.

8. Remedial Investigation/Feasibility Study and Remedial Action Plan The discharger has submitted a Remedial Investigation and Feasibility Study (RI/FS) Report which satisfies the requirements of Regional Board Order No. 89-51, Site Cleanup Requirements, adopted by the Board April 19, 1989. The FS report includes a detailed screening of five alternatives for soil remediation and eight alternative groundwater remedial actions, a baseline risk assessment, and a proposed final remedial action plan (RAP).

The RI/FS Report, originally dated October 17, 1989, was revised and updated and submitted to the Board on January 19, 1990. Additional revisions to RI/FS were required and a the second revised RI/FS was submitted to the Board on May 30, 1990. The final draft RI/FS Report and its revisions have been

available for public review since May 31, 1990.

The proposed final Remedial Action Plan (RAP) was received by Board staff May 31, 1990. A proposed final cleanup plan was presented to the Regional Board for informational purposes at the Board Meeting of June 20, 1990. A Public Meeting to obtain comments on and public input to the proposed final RAP is scheduled for the San Jose City Hall on June 27, 1990.

The RI/FS identifies Applicable or Relevant and Appropriate Requirements (ARARs) and To Be Considereds (TBCs) according to CERCLA guidance documents. Appropriate ARARs/TBCs for this site are listed and discussed in Finding 11, Final Cleanup Standards.

The RI/FS also summarizes the potential human health and environmental effects that may result from the presence of chemicals in the soil and groundwater as presented in the Baseline Public Health Evaluation prepared by ICF/Clement under contract to the Board. The effects of exposure on the environment were determined to be negligible. Impacts upon human health were determined to be unlikely under current use conditions.

The RI/FS has evaluated no-action alternatives for soil and groundwater, four (4) alternative soil cleanup plans, and (7) alternative groundwater cleanup plans. From among these alternatives that were selected for detailed screening the Remedial Action Plan (RAP) submitted by the discharger recommends in-situ steam injection/vacuum extraction (SIVE) for soil remediation and groundwater extraction and treatment as a final remedial action for groundwater. These elements have been combined with eventual "capping" of the site by asphalt and continued groundwater monitoring in the final RAP.

The Board concludes that SIVE for the soil remediation, and extraction and treatment of groundwater can both remove VOCs from the target media. Extraction and treatment of groundwater will take a long period of time to achieve cleanup standards. However, in conjunction with SIVE, for soil remediation, the VOC removal will be accelerated. The Board further concludes that additional investigative work is necessary to appropriately assess the potential effects of inorganic chemical concentrations and to establish naturally occurring concentrations or "background" and to install remedial actions for inorganic chemical concentrations in soil and groundwater to "background", if necessary.

The groundwater extraction/treatment system has been installed at an estimated capitol cost of $399,000. The annual cost of operation and maintenance is estimated to be $884,000. The SIVE system is currently inplace onsite, the estimated capitol

expenditure for this installation is $549,000. The annual operation and maintenance cost for this alternative is estimated to be $288,000. If it is determined that it is necessary to operate the SIVE system in vacuum mode to achieve soil cleanup standards operating and maintenance cost will be reduced to $250,000 annually.

9. Final Cleanup Plan Based primarily on information submitted by the discharger in the RI/FS Report, RAP, and review/comment, this Order provides for a final cleanup plan that includes:

   a. Groundwater Containment/Removal - Continued groundwater extraction from the A aquifer will be required until chemical concentrations are reduced to levels that will meet ARARs and are protective of human health. The rationale for these standards are detailed in Finding 10 and the actual standards are listed in Finding 11. As with any technical project there is uncertainty in the attainment of these standards. However, groundwater extraction is a proven technology for the removal of mass of contaminants from groundwater and it has been demonstrated that the system in place will contain polluted groundwater onsite.

      Contaminated groundwater from the offsite portion of the contaminant plume may be "pulled" back and recovered by the extraction trenches, however this has not been demonstrated by current data. Therefore extraction from A aquifer offsite may be required, however this will be delayed until levels of pollution in onsite soil and groundwater are reduced to specified limits acceptable to the Executive Officer. The purpose of the delay in the startup of off-site extraction is to prevent off-site migration from being accelerated by off-site pumping. Continued monitoring of groundwater in the A aquifer, B/C zone, and D/E aquifer will be required and extraction from the B/C zone may also be required.

      Evaluation of groundwater extraction from the offsite portions of the A aquifer, B/C zone, and D/E aquifer will also be required

   b. Soil Cleanup - SSI will operate a steam injection vacuum extraction system (SIVE) to remediate the onsite soil contamination. Vacuum extraction is a proven technology for soil remediation and is widely used at other South Bay sites. The enhancement of vacuum extraction has been demonstrated in an onsite pilot project that indicated that this technology would reduce the levels of VOCs in soil by up to two orders of

magnitude in coarse grained sediments in a short time period. The advantage that the SIVE system provides over vacuum extraction is reduced time to cleanup, however the system is designed to allow continued operation in the vacuum mode should steam enhancement not provide any advantage.

Cleanup standards for polluted soils are less than one part per million (1 ppm) total VOCs and semi-volatile organic chemicals (SOCs). The system will be operated until these levels of soil pollution are attained. A different soil cleanup level for VOCs may be acceptable if: (1) the Executive Officer determines that higher levels of total VOCs can remain in soils without adversely affecting groundwater resources now or when groundwater extraction is terminated, or (2) the Executive Officer and EPA determines that it is infeasible to achieve the cleanup standard and that public health and the environment will be protected. Information obtained from tests conducted on source area soils will be considered in determining if a different soil cleanup level should be established. Based on current data summarized in the Baseline Public Health Evaluation, inorganics in the shallow soil will not constitute a human health hazard through direct contact with the soil. Since these inorganics are not very mobile, migration into groundwater is considered to be unlikely. Therefore no cleanup standards will be proposed for soil inorganics.

c. Containment - In addition to the above elements the proposed cleanup plan will include the capping of the site with asphalt. This will eliminate potential fugitive dust emissions and will limit infiltration of surface water into the subsurface through any contaminated soil during soil remediation and will limit leaching of any soil contamination that may remain following cleanup. In addition, the capping of the site may improve the efficiency of the SIVE system. This portion of the proposed plan is dependent upon City approval for construction.

d. Water Reuse - It is the goal of this plan to continue the 100% reclamation and/or reuse of the groundwater that is extracted and treated. This standard has been met during the operation of the interim actions and is contained as part of the proposed cleanup plan.

e. Monitoring - Monitoring of groundwater will continue during the operation of the remedial systems. Long-term monitoring beyond projected cleanup times may be required if stability of cleanup levels cannot be demonstrated for

one year after standards are achieved.

f. Institutional Controls - Deed restrictions to prevent the development of the SSI property in a manner that might allow residential development or the use of onsite groundwater prior to the attainment of cleanup standards will be required as a protective measure.

10. Hazard Indices and Cancer Risk Numbers The Hazard Index (HI) is the method used by the Board to assess the public health risk associated with the presence of multiple, non-carcinogenic chemicals. The health risk related to exposure to carcinogens is evaluated through the use of excess cancer risk numbers (ECRN). The use of the HI as a ratio between CDI and RfD for noncarcinogens and estimation of increased population cancer risk for carcinogens is detailed in the EPA Risk Assessment Guidance (July 1989).

The calculation of excess cancer risk numbers (ECRN), the product of a cancer slope or cancer potency factor and the chronic daily intake (q* x CDI), is the method used to evaluate the potential risk of increased cancer incidence due to exposure to carcinogenic chemicals at this site. There is no "zero-risk" level associated with the threat of exposure to carcinogens. The total ECRN for a group of chemicals is calculated by summing each individual chemical's ECRN. A number of assumptions have been made in the derivation of these values, many of which are intentional overestimates of exposure and/or toxicity. The actual incidence of cancer is likely to be lower than these estimates and may even be zero.

These tools were used by Board staff to determine appropriate, health protective, cleanup standards for soil and groundwater. An HI of less than 1 would indicate that no adverse health affects would be expected from exposure to the noncarcinogenic chemicals considered. An ECRN in the 10^{-4} to 10^{-6} range is required for Superfund sites under the National Contingency Plan (NCP) adopted March 9, 1990. These are the minimum goals for cleanup standards at the SSI site. The calculations for this site are detailed in the attached Staff Report.

The HI and total ECRN are much greater than what would be considered an acceptable risk due to the presence of the chemicals identified in useable groundwater and in soil for the no-action alternative. The chemical concentrations in groundwater can be further reduced, and may be reduced to, or below, drinking water applicable, relevant, appropriate requirements and other non-codified regulatory guidelines to be considered (ARARs/TBCs) by remediation. The chemical concentrations in soil can be further reduced by in-situ remediation to achieve background levels and to restore groundwater to its original use-suitability within a

reasonable time frame; and, if required, to provide an extra margin of protection for human health and the environment. Therefore, appropriate cleanup standards must be established.

The exposure point concentration, HI, and total ECRN result from a hypothetical scenario, the possibility that water from this site might be consumed as drinking water. These numbers are intended to be used as tools to evaluate the severity of risk or hazard that a site might represent. While the water is currently not used as drinking water the associated residual chemical concentrations expected to be present in the future and the potential health hazard presented by current concentrations are sufficient cause to pursue a remedial alternative other than no-further-action. It is the intent of the actions planned for this site to preserve the potential beneficial uses of the water, which include use as a source of drinking water, and to eliminate any possible concern of migration of chemicals into drinking water aquifers.

Using the HI-less-than-one and the 10^{-6} ECRN concentrations to establish cleanup standards would attempt to approximate primary cleanup objectives, but may not be practical for all chemicals. Less stringent cleanup standards for some chemicals may be appropriate due to the following considerations: (1) the practical detection/quantification limits for some chemicals do not permit measurement by standard methods of such low concentrations; (2) there are no water-tap exposures above health-based levels actually occurring in the vicinity of this site at present or expected in the future; (3) the potential for human exposure from pathways other than future potential drinking water ingestion or inhalation is minimal to none; (4) there are no sensitive populations or special environmental receptors in the immediate vicinity of the site; (5) the levels of arsenic required to be health protective may be below local background arsenic levels.

11. Final Cleanup Standards The cleanup standards for Aquifer A and the B/C zone are the California DHS Action Level (AL), non-zero Maximum Contaminant Level Goal (MCLG), or Maximum Contaminant Level (MCL), whichever is more stringent, for drinking water, or a standard based on other health-related reference information as described herein.

State Board Resolution 68-16 will also be considered as an ARAR. It is the intent of this Order and the proposed cleanup levels to protect all beneficial uses of the groundwater. Since one identified beneficial use of the groundwater is as a potential source of drinking water, the cleanup objective is to restore groundwater quality by removing the maximum amount of chemicals in the groundwater as is technologically feasible. In adfdition the economic benefit to the people of the State of CAaifornia shall also be considered. Another

objective of major importance is to remove the potential threat posed by the presence of cancer-causing chemicals at this site. The process of removing carcinogens will result in the removal of non-carcinogens as well.

For evaluation of total risk due to the ingestion of groundwater from the site in each of the two categories (carcinogen and non-carcinogen) initial cleanup standards (in µg/l) for the site were established based on:

a. California DHS AL or MCL values for non-carcinogens: 1,2-DCB (5), cis-1,2-DCE (6), trans-1,2-DCE (10), ethylbenzene (1750), 1,1,1-TCA (200), Freon 113 (1200), selenium (10), and xylenes (1750); and for carcinogens: arsenic (50), benzene (0.7), 1,4-DCB (0.5), 1,1-DCA (5), 1,1-DCE (6), methylene chloride (40), PCE (5), TCE (5), and vinyl chloride (0.5).

b. U.S. MCL values for copper (1300) and zinc (5000), and toluene (2000).

c. The Applied Action Level of the DHS Toxic Substances Control Division for chloroform (6).

d. The EPA Integrated Risk Information System (IRIS) oral reference dose for acetone (3500).

e. The EPA National Ambient Water Quality Criteria for Public Health Effects for antimony (14), isophorone (200), nickel (154), phenol (3500), and thallium (1).

f. The EPA Drinking Water Health Advisory for Naphthalene (300).

Some of these standards have been reduced to concentrations lower than ARARs, TBCs or other guidance. These modifications were necessary to be protective of human health in consideration of exposure to multiple chemicals. Setting of standards for some compounds described as chemicals of concern in the BPHE has been deleted following staff review of current groundwater data (see Appendix A). Health protective guidance has not been established for some chemicals. Proposed final cleanup standards based on this review depart from the above standards as follows:

Cleanup Standard Lower than ARARs/TBCs

Acetone - 400 µg/l
Naphthalene - 2000 µ/l
1,1-DCE - 1 µg/l
Ethylbenzene - 400 µg/l

Methylene Chloride - 30 µg/l
Nickel - 80 µg/l
Phenol - 2000 µg/l
Toluene - 1000 µg/l

No Guidance Currently Established

2-Butanone - 20 µg/l
4-Meth.-2-Pent. - 10 µg/l

Deleted

Antimony, Arsenic, Copper, Isophorone, Selenium, Thallium, 1,2,4-Trichlorobenzene, and Zinc

The soil remediation standard is 1 ppm for total VOCs.

An additional concern that is discussed in the FS and the Remedial Action Plan (RAP) is the potential contamination of the air at the Solvent Service site. The appropriate standards for this consideration are the regulations of the Bay Area Air Quality Management District (BAAQMD) Regulation 8, Rule 47 which is an ARAR for the SSI facility. The air stripper system and vapor extraction systems at the SSI site are regulated by the BAAQMD. The air emissions from these units do satisfy the ARAR cited above as regulated by the BAAQMD.

12. Uncertainity in Achieving Cleanup Standards The goal of this remedial action is to restore groundwater to its beneficial uses. Based on information obtained during the RI and on a careful analysis of all remedial alternatives, the Board believes that the selected remedy will achieve this goal. However, studies suggest that groundwater extraction and treatment will not be, in all cases, completely successful in reducing contaminants to health-based levels in the aquifer zones. The Board recognizes that operation of the selected extraction and treatment system may demonstrate the technical impracticability of reaching health-based groundwater quality standards using this approach. If it becomes apparent, during implementation or operation of the system, that contaminant levels have ceased to decline and are remaining constant at levels higher than the remediation goal, that goal and the remedy may be reevaluated.

The selected remedy will include groundwater extraction for a period of up to 30 years, during which the system's performance will be carefully monitored on a regular basis and adjusted as warranted by the performance data collected during operation. Modifications may include:

a) discontinuing operation of extraction wells in areas where cleanup standards have been attained;

b) alternating pumping at wells to eliminate stagnation points; and

c) pulse pumping to allow aquifer equilibration and encourage adsorbed contaminants to partition into groundwater.

13. Future Changes to Cleanup Levels If new information indicates cleanup standards cannot be attained or can reasonably be surpassed, the Regional Board will decide if further final cleanup actions beyond those completed shall be implemented at this site. If changes to the cleanup standards or amended cleanup standards are proposed, due to the claimed technical infeasibility of attaining the standards, adopted by this Order, a new Order will be submitted to the Board for consideration and to EPA Region IX for their concurrence. If changes in health criteria, administrative requirements, site conditions, or remediation efficiency occur, the discharger will submit an evaluation of the effects of these changes on cleanup levels as specified under Provision C.1.i.

The Regional Board will not require the discharger to undertake additional remedial actions with respect to the matters previously described herein unless: (1) conditions on the site, previously unknown to the Regional Board, are discovered after adoption of this Order, or (2) new information is received by the Regional Board, in whole or in part after the date of this Order, and these previously unknown conditions or this new information indicates that the remedial actions required in this Order may not be protective of public health and the environment. The Regional Board will also consider technical practicality, cost effectiveness, State Board Resolution No. 68-16 and other factors evaluated by the Regional Board in issuing this Order in determining whether such additional remedial actions are appropriate and necessary.

14. Groundwater Conservation The Regional Board strongly encourages, and requires to the extent allowed by law, the maximum reclamation or reuse of groundwater feasible either by the discharger or other public or private water users. These measures include reinjection, reuse, or reclamation of extracted groundwater. The discharger's interim groundwater extraction and treatment system includes treatment of extracted groundwater then reuse in the site cooling tower prior to release to the sanitary sewer system under permit from the San Jose Water Pollution Control Plant.

15. Evaluation of Final Plan In accordance with the Health and Safety Code Section 25356.1, Section 121 of CERCLA, the final remedial action plan (including the RI/FS Report submitted by the discharger and this Order) is equivalent to a feasibility

study; satisfies the requirements of the California Water Code Section 13304 and is protective of human health and the environment; attains Applicable or Relevant and Appropriate Requirements (ARARs); utilizes permanent solutions and alternative treatment technologies and resource recovery technologies to the maximum extent possible for short-term effectiveness; is implementable; is cost effective; is acceptable based on State regulations, policies, and guidance; and reduces toxicity, mobility, and volume of pollutants.

16. Community Involvement An aggressive Community Relations program has been ongoing for all Santa Clara Valley Superfund sites, including the SSI site. A notice was published in the San Jose Mercury News on June 14, 1990 announcing the proposed cleanup plan and opportunity for public comment at the Board Meeting of June 20, 1990 in Oakland, and at an evening public meeting to be held at the San Jose City Hall in the City of San Jose on June 27, 1990. Fact Sheets 1 and 2 were mailed to interested residents, local government officials, and media representatives. Fact Sheet 3, dated June 1990 described the proposed final RAP, announced opportunities for public comment at the Board Meeting and the Public Meeting, and the availability of further information at the Information Repository at the San Jose Public Library.

Public concerns expressed at the Regional Board meeting of June 20, 1990 in Oakland and at the public meeting of June 27, 1990 in San Jose, and in comments received by the Regional Board through July 20, 1990, the close of the public comment period, have been considered in this revision of the Tentative Order. Public comment did not generate any significant changes to the proposed plan. Comments received after July 20, 1990 and at the Regional Board meeting of August 15, 1990, will be addressed by review and evaluation, and incorporated by appropriate response in the final Order.

17. Data Quality Development of the Board's final Remedial Action Plan was based on the Regional Board staff evaluation of almost eight years of water and soil quality data. Random samples have been collected and analyzed by the Regional Board to confirm the validity of data generated by the discharger. Data has been validated using EPA validation guidance. The data was judged to be acceptable for qualitative purposes. This judgement, in combination with the internal consistency and size of the data set and comparison to duplicate data collected by Board staff and analyzed by the Board's contract lab, indicates that the data has been used in a manner consistent with its quality.

18. State Board Resolution 68-16 On October 28, 1968 the State Board adopted Resolution No. 68-16, "Statement of Policy with Respect to Maintaining High Quality Waters in California". This policy calls for maintaining existing high quality of State waters unless it is demonstrated that any change would be consistent with the maximum public benefit and not unreasonably affect beneficial uses. The original discharge of waste to the groundwater at this site was in violation of this policy; therefore, the groundwater quality needs to be restored to its original or background quality to the extent reasonable. A return to background quality means achieving a restored groundwater throughout the site that has no detectable concentration of any VOC or SOC and inorganics at the local background level. Even if this condition were achieved for one or more VOCs or SOCs temporarily, it appears unlikely that all VOCs and SOCs can be completely removed permanently without the removal of all existing polluted soil and groundwater on the site. It may not be feasible to remove all the polluted soil and groundwater at this site; therefore it may not be feasible to expect to achieve this water quality objective.

Since it is probable that return of the groundwater quality to background is technically infeasible, cleanup standards have been selected that meet or exceed ARARs and are protective of human health and the environment. In this manner beneficial uses are protected.

19. State Board Resolution 88-63 On March 15, 1989, the Regional Board incorporated the SWRCB Policy of "Sources of Drinking Water" into the Basin Plan. The policy provides for a Municipal and Domestic Supply designation for all waters of the State with some exceptions. Groundwaters of the State are considered to be suitable or potentially suitable for municipal or domestic supply with the exception of: 1) the total dissolved solids in the groundwater exceed 3000 mg/L, and 2) the water source does not provide sufficient water to supply a single well capable of producing an average, sustained yield of 200 gallons per day. Based on data submitted by the discharger, the Regional Board finds that neither of these two exceptions apply to the groundwater at SSI. Thus, the A aquifer at SSI is a potential source of drinking water.

20. The Regional Board adopted a revised Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan) on December 16, 1986. The Basin Plan contains water quality objectives and beneficial uses for South San Francisco Bay and contiguous surface and underground waters.

21. The existing and potential beneficial uses of the groundwater underlying and adjacent to the facility include:

    a. Industrial process water supply
    b. Industrial service water supply
    c. Municipal and domestic water supply
    d. Agricultural water supply

22. The discharger has caused or permitted, and threatens to cause or permit, waste to be discharged or deposited where it is or probably will be discharged to waters of the State and creates or threatens to create a condition of pollution or nuisance. Final containment and remediation measures need to be implemented to alleviate the threat to the environment posed by the plume of pollutants.

23. 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.

24. The Board has notified the discharger and interested agencies and persons of its intent under California Water Code Section 13304 to prescribe Site Cleanup Requirements for the discharge and has provided them with the opportunity for a public hearing and an opportunity to submit their written views and recommendations.

25. The Regional Board, in a public meeting, heard and considered all comments pertaining to the discharge.

IT IS HEREBY ORDERED, pursuant to Section 13304 of the California Water Code, that the discharger shall cleanup abate the effects described in the above findings as follows:

A. PROHIBITIONS

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

2. Further significant migration of chemicals 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 chemicals are prohibited.

B. SPECIFICATIONS

1. The storage, handling, treatment or disposal of soil or groundwater containing chemicals shall not create a nuisance as defined in Section 13050 (m) of the California Water Code.

2. The discharger shall conduct monitoring activities as needed to define the current local hydrogeologic conditions, and the lateral and vertical extent of soil and groundwater containing chemicals. Should monitoring results show evidence of continuing pollutant migration, additional plume characterization may be required.

3. Health protective, final cleanup standards for all groundwater, both onsite and offsite, shall be set as follows:

CHEMICAL	CONCENTRATION (µg/l)
ACETONE	400
2-BUTANONE	20.0
1,2-DCB	5.0
cis-1,2-DCE	6.0
trans-1,2DCE	10.0
ETHYLBENZENE	400
FREON-113	1200
4-METH.-2-PENT.	10.0
NAPHTHALENE	2000
PHENOL	2000
1,1,1 TCA	200
TOLUENE	1000
XYLENES	1750
BENZENE	1.0
CHLOROFORM	6.0
1,4-DCB	0.5
1,1-DCA	5.0
METH. CHLORIDE	30.0
1,1-DCE	1.0
PCE	5.0
TCE	5.0
VINYL CHLORIDE	0.5

4. Groundwater cleanup objectives are: (1) restore the quality of a polluted water source to its potential suitability as a drinking water supply, (2) prevent exposure to polluted water, and (3) prevent migration of polluted groundwater to the deeper aquifers which presently supply water for domestic (drinking) and other beneficial uses.

5. The discharger shall implement the final cleanup plan described in Finding 9.

C. PROVISIONS

1. The discharger shall comply with Prohibitions A.1., A.2., and A.3., and Specifications B.1., B.2., B.3., B.4, and B.5. above, in accordance with the following time schedule and tasks. Any reports, including quarterly reports, due concurrently may be combined in a single submission:

ONSITE TASKS/COMPLETION DATE:

a. GROUNDWATER EXTRACTION AND TREATMENT SYSTEM:

Submit a technical report acceptable to the Executive Officer documenting construction and implementation of groundwater extraction and treatment systems as approved by the Regional Board in the Remedial Action Plan.

COMPLETION DATE: November 31, 1990

b. SOIL REMEDIATION SYSTEM:

Submit a technical report acceptable to the Executive Officer documenting construction and implementation of a soil remediation system as approved by the Regional Board in the Remedial Action Plan.

COMPLETION DATE: November 31, 1990

c. REVISED SAMPLING AND ANALYSIS PLAN

Submit a technical report acceptable to the Executive Officer containing a proposed Sampling and Analysis Plan, as described in CERCLA/SARA guidance. This plan should include a schedule for soil and groundwater sampling during operation of the SIVE system and a description of wells that will be sampled to monitor migration of chemicals in the subsurface during operation of the SIVE system. This plan should also include analysis by appropriate EPA series 8000 analysis techniques.

This report shall also contain a second schedule for sampling and analysis that will following the attainment of soil cleanup standards. This plan should include a schedule for soil and groundwater sampling following cessation of operation of the SIVE system and a description of wells that will be sampled to monitor migration of polluted groundwater in the subsurface and wells that will sampled and analyzed to verify that

cleanup standards for groundwater have been achieved. This plan should also include analysis by appropriate EPA series 8000 analysis techniques.

COMPLETION DATE: DECEMBER 15,1990

d. PROPOSAL TO TERMINATE OPERATION OF THE SOIL CLEANUP SYSTEM.

Submit a technical report acceptable to the Executive Officer and the EPA containing a proposal for terminating operation of the soil remediation system and criteria used to justify this action. This report shall include a proposal indicating the locations of borings and sampling intervals to determine concentrations of VOCs remaining in the soil.

COMPLETION DATE: 30 days prior to expected termination of soil cleanup

e. COMPLETION OF ONSITE SOIL REMEDIATION.

Document in the appropriate quarterly report the completion of the necessary tasks identified in the technical report submitted for Task C.1.d including the results of chemical analyses of samples from the soil borings.

COMPLETION DATE: Due date for quarterly status report for the quarter in which operation of the soil remediation system is terminated.

f. ONSITE WELL PUMPING CURTAILMENT CRITERIA AND PROPOSAL.

Submit a technical report acceptable to the Executive Officer containing a proposal for curtailing pumping from onsite groundwater extraction well(s) and trench(s) and the criteria used to justify such curtailment. This report shall include data to show that cleanup standards for all VOCs have been achieved and have stabilized or are stabilizing, and that the potential for pollutant levels rising above cleanup standards is minimal. This report shall also include an evaluation of the potential for pollutants to migrate downwards to the D/E aquifer at this location. If the discharger claims that it is not technically feasible to achieve cleanup standards, the report shall evaluate the alternate standards that can be achieved. Cessation of pumping will require the concurrence of the Regional Board and EPA, should either

party not concur, continued pumping will be required.

COMPLETION DATE: 90 days prior to proposed implementation of onsite groundwater extraction curtailment

g. IMPLEMENTATION OF ONSITE CURTAILMENT.

Submit a technical report acceptable to the Executive Officer documenting completion of the necessary tasks identified in the technical report submitted for Task C.1.f.

COMPLETION DATE; 30 days after the Regional Board approves onsite curtailment

h. FIVE-YEAR STATUS REPORT AND EFFECTIVENESS EVALUATION.

Submit a technical report acceptable to the Executive Officer containing the results of any additional investigation including the soil remediation study; an evaluation of the effectiveness of installed final cleanup measures and cleanup costs; additional recommended measures to achieve final cleanup objectives and standards, if necessary; a comparison of previous expected costs with the costs incurred and projected costs necessary to achieve cleanup objectives and standards; and the tasks and time schedule necessary to implement any additional final cleanup measures.

This report shall also describe the reuse of extracted groundwater, evaluate and document the cleanup of polluted groundwater, and evaluate and document the removal and/or cleanup of polluted soil. If safe drinking water levels, through the removal of the chemicals for which this Order specifies cleanup standards, have not been achieved onsite and are not expected to be achieved through continued groundwater extraction and/or soil remediation, this report shall also contain an evaluation addressing whether it is technically feasible to achieve drinking-water quality onsite, and if so, a proposal for procedures to do so.

COMPLETION DATE: August 21, 1995

i. EVALUATION OF NEW HEALTH CRITERIA:

Submit a technical report acceptable to the Executive Officer which contains an evaluation of how the final plan and cleanup standards would be affected, if the concentrations as listed in Specification B.4. change as

a result of changes in source-document conclusions or promulgation of drinking water standards, maximum contaminant levels or action levels.

COMPLETION DATE: 60 days after request made by the Executive Officer

OFFSITE TASKS/COMPLETION DATES:

j. SUBMIT A WORKPLAN FOR REMEDIATION OF THE DOWNGRADIENT OFFSITE GROUNDWATER POLLUTION:

Submit a technical report acceptable to the Executive Officer summarizing the extent of offsite groundwater pollution northwest of the site in the vicinity of well 102A where VOCs have been discovered. This report should include an evaluation of the impact of groundwater extraction in the downgradient area on the onsite plume, methods for the determination of when to begin operation of groundwater extraction in this area, and a proposed implementation schedule for the startup of extraction in the downgradient offsite area.

COMPLETION DATE: February 28, 1991

2. The submittal of technical reports evaluating immediate, interim and final remedial measures will include a projection of the cost, effectiveness, benefits, and impact on public health, welfare, and environment of each alternative measure. The remedial investigation and feasibility study shall be consistent with the guidance provided by Subpart E of the National Oil and Hazardous Substances Pollution Contingency Plan (40 CFR Part 300); Section 25356.1 (c) of the California Health and Safety Code; CERCLA guidance documents with reference to Remedial Investigation, Feasibility Studies, and Removal Actions; and the State Water Resources Control Board's Resolution No. 68-16, "Statement of Policy with Respect to Maintaining High Quality of Waters in California".

3. If the discharger is delayed, interrupted or prevented from meeting one or more of the completion dates specified in this Order, the discharger(s) shall promptly notify the Executive Officer and the Board may consider revision to this Order.

4. Technical reports on compliance with the Prohibitions, Specifications, and Provisions of this Order shall be submitted to the Board on a quarterly basis, according to the schedule below, commencing on October 31, 1990 and covering the previous quarter. The quarterly reports shall include, but need not be limited to, the following

information:

a. A summary of work completed since the previous quarterly report,
b. results of water quality sampling analyses.
c. updated water table and piezometric surface maps (second and fourth quarters only) for all affected water bearing zones, and isoconcentration maps for key pollutants in all affected water bearing zones,
d. a cumulative tabulation of all well construction details, groundwater levels, and chemical analyses results,
e. A cumulative tabulation of volume of extracted groundwater, estimates of pounds of pollutants removed in groundwater, and chemical analyses for all site groundwater extraction wells,
f. a cumulative tabulation of volume of liquid and vapor removed by the SIVE system and an estimate of the total pounds of pollutants removed by the SIVE system,
g. geological cross-sections describing the hydrogeological setting of the site,
h. appropriately scaled and detailed base maps showing the location of all monitoring wells and extraction wells, and identifying adjacent facilities and structures,
i. identification of potential problems which will cause or threaten to cause noncompliance with this Order and what actions are being taken or planned to prevent these obstacles from resulting in noncompliance with this Order,
j. in the event of noncompliance with the Provisions and Specifications of this Order, the report shall include written justification for noncompliance and proposed actions to achieve compliance, and
k. the report for the fourth quarter of each calendar year shall contain the data for the quarter and shall serve as a summary report for the calendar year containing a summary tabulation of all data for the preceding year.

SCHEDULE FOR REPORT SUBMITTAL:

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

5. All hydrogeological plans, specifications, reports, and documents shall be signed by or stamped with the seal of a registered geologist, engineering geologist or professional engineer.

6. All samples shall be analyzed by State certified laboratories or laboratories accepted by the Board using approved EPA methods for the type of analysis to be performed. All laboratories shall maintain Quality assurance/quality control records for Board review.

7. The discharger(s) 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.

8. Copies of all correspondence, reports, and documents pertaining to compliance with the Prohibitions, Specifications, and Provisions of this Order, shall be provided to the following agencies:

   a. Santa Clara Valley Water District
   b. Santa Clara County Health Department
   c. City of San Jose
   d. U. S. Environmental Protection Agency, Region IX H-6-3

   The Executive Officer may additionally require copies of correspondence, reports and documents pertaining to compliance with the Prohibitions, Specifications, and Provisions of this Order to be provided to the U.S. Environmental Protection Agency, Region IX, and to a local repository for public use.

9. The discharger(s) shall permit the Board or its authorized representative, in accordance with Section 13267(c) of the California Water Code:

   a. Entry upon premises in which any pollution sources exist, or may potentially exist, or in which any required records are kept, which are relevant to this Order.

   b. Access to copy any records required to be kept under the terms and conditions of this Order.

   c. Inspection of any monitoring equipment or methodology implemented in response to this Order.

   d. Sampling of any groundwater or soil which is accessible, or may become accessible, as part of any investigation or remedial action program undertaken

by the discharger.

10. The discharger(s) shall file a report on any changes in site occupancy and ownership associated with the facility described in this Order.

11. If any hazardous substance is discharged in or on any waters of the state, or discharged and deposited where it is, or probably will be discharged in or on any waters of the state, the discharger shall report such discharge to this Regional Board, at (415) 464-1255 on weekdays during office hours from 8 a.m. to 5 p.m., and to the Office of Emergency Services at (800) 852-7550 during non-business hours. A written report shall be filed with the Regional Board within five (5) working days and shall contain information relative to: the nature of waste or pollutant, quantity involved, duration of incident, cause of spill, Spill Prevention, Control, and Countermeasure Plan (SPCC) in effect, if any, estimated size of affected area, nature of effect, corrective measures that have been taken or planned, and a schedule of these activities, and persons/agencies notified.

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

I, Steven R. Ritchie, Executive Officer, do hereby certify that the foregoing is a full, true and correct copy of an Order adopted by the California Regional Water Quality Control Board, San Francisco Bay Region, on August 15, 1990.

Steven R. Ritchie
Executive Office

APPENDIX B

REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

STAFF REPORT
SOLVENT SERVICE ,INC.
1021 BERRYESSA ROAD,SAN JOSE,
SANTA CLARA COUNTY

To: SRR From: RCG

Date: August 6, 1990

Subject: Staff Report for the Site Cleanup Requirements, Solvent Service Inc., 1021 Berryessa Road, San Jose, Santa Clara County

1.0 PURPOSE AND SCOPE

The purpose of this Order is to introduce the results of the Remedial Investigation, Feasibility Study (RI/FS), and the Remedial Action Plan (RAP) proposed by the discharger. In addition, the staff report and Tentative Order will discuss modifications to the plan that may be proposed by staff and goals for cleanup of the polluted soil and groundwater and soil at the site. The initial presentation of this item at the June Board meeting marked the opening of the public comment period on the above items. The revised Tentative Order and this staff report address comments received from the discharger, other interested agencies, and the public.

2.0 SITE LOCATION AND DESCRIPTION

Solvent Service Inc. (SSI), hereinafter called the discharger, owns and operates a treatment, storage, and disposal facility at 1021 Berryessa Road, San Jose, Santa Clara County for the purpose for the purpose of waste treatment and recycling. The site occupies 3.2 acres and is located approximately 10 miles southeast of San Francisco Bay and approximately 1/3 mile southwest of the confluence of Upper Penitencia Creek and Coyote Creek. It is in an area of industrial and commercial development and has been in operation since 1973. Prior use of the area was for agriculture.

SSI is in the Santa Clara Valley which is a sedimentary basin filled with unconsolidated heterogeneous alluvial material, interspersed with layers of marine clay. The alluvium is a mixture of permeable water-bearing sands and gravels interbedded with less permeable silts and clays. The soils are extremely variable over short distances, both horizontally and vertically.

SSI is underlain by three distinct hydrogeologic units. Aquifer A is an unconfined, low permeability aquifer that occurs from the ground surface to a depth of 20 to 25 feet (50 to 75 feet MSL) and is locally dewatered. It consists of sandy silts, clay, and a thin, continuous poorly sorted sand layer at its base. Aquifer A is underlain by a 6 to 16 foot thick clay layer which may impede vertical downward migration of groundwater. Ancestral stream channel deposits have also been identified along the southwestern margin of the site in the A aquifer.

The Zone B/C consists of lenses of sands, silts, and clays. It extends to 50 feet below the upper clay layer (0 feet MSL). Water levels in this zone are 1 to 2 feet lower than Aquifer A but little vertical leakage is believed to be occurring. A clay layer, 2 to 10 feet thick, occurs at the base of Zone B/C. The sands, silts, and clays in the B/C zone tend to be discontinuous. Consequently this unit locally may function as an aquifer or an aquitard. Therefore this unit will be referred to as a zone, not an aquifer, both in this report and the accompanying Order.

The third zone, Aquifer D/E, consists of an upper member- a thick sequence of silts and sands underlain by a thin clay layer- and a lower member- two sand layers separated by a 2 to 5 feet thick silt layer. A clay layer occurs at the base of the zone, 150 feet below the ground surface (-75 feet MSL). Zone D/E is believed to be very permeable and was used historically for domestic water supply. Currently only one well in the vicinity of the site appears to be producing water from this aquifer. This well is more than 2000 feet from the site.

3.0 SITE HISTORY

Volatile organic chemicals (VOCs) were first detected in groundwater in 1983 in the vicinity of underground solvent storage tanks, the spill control facilities, the barrel storage area and the solvent tank truck unloading zone. In 1983, SSI was permitted by the Department of Health Services as a treatment, storage, and disposal facility. Also in 1983, the Regional Water Quality Control Board (Board) initiated oversight of the soil and groundwater investigation and remediation of pollutants.

Pursuant to the South Bay Multi-Site Cooperative Agreement and the South Bay Ground Water Contamination Enforcement Agreement, entered into on May 2, 1985 (as subsequently amended) by the Board, EPA and DHS, the Board has been acting as the lead regulatory agency. The Board will continue to regulate the discharger's remediation and administer enforcement actions in accordance with CERCLA as amended by SARA.

In March 1986, the Board adopted Waste Discharge Requirements requiring further site investigations and implementation of interim remedial measures. In April 1988, the Board adopted revised Waste Discharge Requirements requiring selection of soil cleanup technologies and an evaluation of groundwater remedial measures. In June 1988, SSI was

proposed for the Federal National Priorities List (NPL). In April 1989, the Board adopted Revised Waste Discharge Requirements requiring completion of the pollution investigation, final installation of soil cleanup measures, and submittal of the Remedial Investigation/Feasibility (RI/FS) Report and the Remedial Action Plan (RAP).

Interim remedial actions implemented at SSI include the following: Three underground storage tanks used for solvent storage, spill control, and waste solvent storage, were removed on or about 1982. These tanks were replaced with new and larger tanks. Subsequently, these larger tanks were removed along with some soil, however, this is not well documented. The actual volume of soil removed is unknown as are the levels of soil pollution remaining inplace following the excavation. Based on more recent investigations, high levels of pollutants in soil remain beneath the presently existing concrete pad that underlies the major treatment and storage area. The solvent truck unloading area, the barrel storage area, the spill containment facility, and other treatment and storage areas were gradually paved with concrete by 1984. Currently, most of the treatment and storage area is paved. Additional interim remedial measures have included placing berms in the treatment and storage area and changing operational procedures to minimize risk of additional contamination. In 1989 and 1990 17 B/C zone wells and 2 D/E aquifer wells were destroyed. These wells were destroyed due to suspected cross-contamination along well seals or conflicts with the installation of the steam injection vapor extraction system.

Groundwater investigations were conducted between 1983 and 1986 by Applied Earth Consultants (AEC). During this time period 56 monitoring wells, an interim extraction trench, and 2 interim recovery wells were installed. In 1986, Groundwater Technology Inc. (GTI) installed a second interim extraction trench, 5 recovery wells, and 10 monitoring wells. In 1987, Todd Engineers Incorporated (Todd Engrs) installed 10 monitoring wells, 2 recovery wells, and another extraction trench. In 1988, Todd Engrs installed 16 more monitoring wells. During 1988, 126 soil samples were collected at SSI by Todd Engrs.

SSI currently operates a containment/extraction system for the groundwater plume. The system includes 5 of the recovery wells and the 3 extraction trenches. Extracted polluted groundwater is being treated by a biological treatment system followed by carbon adsorption and air stripping. Treated water is discharged into the sanitary sewer under permit from the sanitary district. This system appears to be effective in containing migration of pollutants originating onsite and of removing pollutants from the extracted groundwater. However, some pollutants have migrated to and slightly beyond the property boundaries. These pollutants are believed to have migrated beyond the location of the trenches prior to installation of the trenches.

As part of the RI process SSI also performed a pilot study of steam injection/vacuum extraction system for soil remediation in October 1988. The results of the pilot study were encouraging based on an up to two order of magnitude reduction of concentration of VOCs in coarse-grained soils. A full scale system was installed in the Fall of 1989 as an

interim remedial action for in-situ soil remediation. The system was located and designed to address the polluted soils beneath the concrete pad as explained above. The system has been operating as a vacuum extraction system without steam injection since early December 1989 and is removing large volumes of contaminants, though no confirmatory soil sampling has been completed at this time.

SSI followed approved Quality Assurance and Sampling Plans. Data submitted to the agencies was subjected to data validation analysis and determined to be "qualitatively acceptable". The body of data, due its size and consistency of results, is to some degree self-validating. Since the data set has been ascertained to be acceptable for qualitative use and the data set is internally consistent it is judged to be acceptable for use in determining the magnitude of pollution and appropriate cleanup levels.

SSI submitted a Remedial Investigation and Feasibility Study (RI/FS) Report which satisfies the requirements of Board Order No. 89-51, Site Cleanup Requirements. This report includes five alternative soil remedial actions and eight alternative groundwater remedial actions, an evaluation of remediation alternatives, a baseline risk assessment, and a proposed final remedial action plan (RAP).

The RI/FS Report, originally dated October 17, 1989, was revised and updated and submitted to the Board on January 19, 1990. Additional revisions will be required to produce a final report acceptable to the Executive Officer. The revised documents which this Order will approve were received May 30, 1990.

4.0 NATURE AND EXTENT OF CONTAMINATION

SSI is a waste treatment and reduction facility and site operations include handling of a large number of chemicals. Mixed and segregated solvents are recycled by a variety of methods including distillation, separation, and blending. Approximately, 99% of the recoverable solvents are recycled. The resulting products are then reused and consumed by industry. Corrosive liquids are treated by methods including neutralization, precipitation, oxidation, and filtration in order to detoxify the material. Acids and metal sludges meeting certain parameters are recycled for reuse.

During 1988, 126 soil samples were collected at SSI. Half of these soil samples have detected soil pollution greater than 1000 ppb total VOCs. The highest concentrations are located directly beneath a concrete storage pad, referred to as the "hot spot" which extends about one acre. The soil is polluted from the ground surface to depths of about 20 feet. The following chemicals were detected in soil at the maximum concentrations listed below:

CHEMICAL	CONCENTRATION (PPB)
total xylenes	19,000,000
ethylbenzene	3,600,000
1,2-dichlorobenzene	2,900,000
1,1,1-trichloroethane	1,700,000
acetone	1,650,000

Acetone and other ketones may provide a solvent for dispersion of other organic chemicals that are transported more easily in the subsurface when dissolved in a ketone. These results indicate that hazardous wastes have been released at the SSI site.

Since 1983 105 monitoring wells, three extraction trenches, and two recovery wells have been installed. Over 71 tentatively identified chemicals have been identified during the site investigations. At least twenty distinct priority and non-priority pollutants have been identified. Chemical concentration data was reviewed for validity by the California Department of Health Services. The data was considered to be usable for at least qualitative purposes. As was discussed above due to the internal consistency and size of the data base the data was considered to be adequate for the purposes of identifying the scope of the problem and choosing a final remedy. The chemicals detected in groundwater in the highest concentrations and the most frequently are listed below:

CHEMICAL	CONCENTRATION (PPB)
acetone	6,600,000
2-butanone	730,000
cis-1,2-dichloroethane	70,000
cis-1,2-dichloroethylene	67,000
dichloromethane	110,000

FREQUENTLY DETECTED:

1,1-dichloroethane	2,300
cis-1,2-dichloroethane	70,000
xylene	47,000
1,1,1-trichloroethane	58,000

Sampling results from wells screened in Aquifer A and located along the southwest perimeter of the site indicated floating fuel product and dissolved concentrations of benzene, toluene, xylene, and ethylbenzene (BTX&E) over 10,000,000 ppb. This plume of BTX&E probably originates at the adjacent Chevron site. The BTX&E contamination is apparently restricted to a relatively narrow band of sediments that may represent coarser sediments deposited in an ancestral stream channel.

The highest levels of pollution are located in Aquifer A and are confined to the site. A few constituents have been detected in the down-gradient direction and along the southwest margin. The VOC's that are detected in the southwestern portion of the site are detected at low concentrations.

Groundwater pollution in Zone B/C included 21 priority and non-priority pollutants. The total number of pollutants recently detected in this zone is about 13. The maximum concentration of total VOCs ever detected was 300,000 ppb. Recently the concentration has been reduced to 868 ppb. This pollution is reported to be due to cross-contamination during drilling, field sampling and laboratory analyses, and leakage along well casings. Most of the Zone B/C pollution is reported to have been remediated by purging the wells during an intensive sampling program and the majority of wells were this is suspected have been properly destroyed and abandoned.

Ten priority and non-priority pollutants have been detected in Aquifer D/E. The chemicals detected in the highest concentrations include acetone (210 ppb), total xylenes (110 ppb), and ethylbenzene (16 ppb). Currently, only one well has detectable levels of VOCs (6 ppb). The pollution is also reported to be due to cross-contamination and is currently below the proposed cleanup standards.

5.0 ENFORCEMENT

As discussed above investigation of soil and groundwater pollution at the SSI facility has been ongoing since 1983. The site is on the National Priorities List (NPL), however the Regional Board has been acting as the lead agency in directing investigation and remedial actions for SSI. The Board has taken enforcement and regulatory action through Regional Board Orders, as indicated herein:

a.	March 1986	Regional Board adopted Waste Discharge Requirements.
b.	April 1988	Regional Board adopted revised Site Cleanup Requirements.
c.	June 1988	Site proposed for the NPL.
d.	April 1989	Regional Board adopted Revised Site Cleanup Requirements.

A potential responsible party (PRP) search has not been completed for the SSI site, therefore SSI is considered to be the sole responsible party for this site. SSI has accepted the responsibility for site cleanup actions.

6.0 COMMUNITY INVOLVEMENT

An initial "fact sheet" was completed by SSI, in consultation with RWQCB and DHS, and sent to public agencies and community members in August 1988. This initial fact sheet described the site geology, groundwater flow, and current site (August 1988) conditions. A second fact sheet, completed by the Board community relations staff, describing current site conditions and the projected schedule of events for site cleanup was completed and mailed in December 1989. This Board meeting will mark the opening of the public comment period on the completed RI/FS report and the proposed Remedial Action Plan (RAP). An additional fact sheet describing the proposed plan for final site cleanup will be mailed in June 1990. This will be followed by a public meeting at the San Jose City Hall on June 27, 1990. The public response to actions at the SSI site and the proposed plan will be compiled and attached to the Tentative Order adopting a final RAP, scheduled for consideration by the Board at the August 15, 1990 meeting.

7.0 ORDER SCOPE

The Order proposes cleanup standards for soil and groundwater. Since achieving background concentrations is considered to be infeasible consideration was given to using the HI-less-than-one and the 10^{-6} ECRN concentrations to establish cleanup goals. But this approach may also not be practical or technically feasible. Less stringent cleanup goals may be appropriate due to the following considerations: (1) the practical detection/quantification limits for some chemicals do not permit measurement by standard methods of such low concentrations; (2) there are no water-tap exposures above health-based levels actually occurring in the vicinity of this site at present or expected in the future; (3) the potential for human exposure from pathways other than future potential drinking water ingestion or inhalation is minimal to none; (4) there are no sensitive populations or special environmental receptors in the immediate vicinity of the site. The standards proposed are health protective (see Section 11 and attachment), protective of the environment, and will meet or exceed all applicable or relevant and appropriate requirements or other guidance to be considered.

Final Cleanup Levels. The cleanup standards for Aquifer A and the B/C zone are based on the California DHS Action Level (AL) or Maximum Contaminant Level (MCL), whichever is more stringent, for drinking water, other guidance, or are defined by health-related reference information or calculations as described in Section 9.

While the cleanup objective is to restore groundwater quality by removing as much of the chemicals in the groundwater as is technologically and economically feasible, another objective of major importance is to remove the potential threat to human health or the environment posed by the presence of cancer-causing chemicals at this site. The process of removing carcinogens to the extent feasible will result in the removal of non-carcinogens as well and will eliminate the potential exposure to vapors resulting from volatilization from the groundwater.

For evaluation of total risk in each of the two categories (carcinogen and non-carcinogen) cleanup levels (in $\mu g/l$) for the site have been established based on the following standards or ARARs:

a. California DHS AL or MCL values for non-carcinogens: 1,2-DCB (5), cis-1,2-DCE (6), trans-1,2-DCE (10), ethylbenzene (1750), 1,1,1-TCA (200), Freon 113 (1200), selenium (10), and xylenes (1750); and for carcinogens: arsenic (50), benzene (0.7), 1,4-DCB (0.5), 1,1-DCA (5), 1,1-DCE (6), methylene chloride (40), PCE (5), TCE (5), and vinyl chloride (0.5).

b. U.S. MCL values for copper (1300) and zinc (5000), and toluene (2000).

c. The Applied Action Level of the DHS Toxic Substances Control Division for chloroform (6).

d. The EPA Integrated Risk Information System (IRIS) oral reference dose for acetone (3500).

e. The EPA National Ambient Water Quality Criteria for Public Health Effects for antimony (14), isophorone (5200), nickel (154), phenol (3500), and thallium (1).

f. The EPA Drinking Water Health Advisory for Naphthalene (5300).

The proposed final cleanup standards for some chemicals in groundwater at the SSI site have been modified from the above standards. This modification is necessary to be health protective due to the potential exposure to multiple chemicals through multiple exposure pathways. The proposed final cleanup standards are as shown in Table 1 which follows:

	TABLE 1			
NONCARCINOGENIC			CARCINOGENIC	
CHEM	Cw		CHEM	Cw
	µg/l			µg/l
ACETONE	400			
2-BUTANONE	20		BENZENE	1
1,2-DCB	5		CHLOROFORM	6
CIS-1,2-DCE	6		1,1-DCA	5
TRANS-1,2-DCE	10		1,1-DCE	1
ETHYLBENZENE	500		METH. CHLORIDE	30
FREON-113	1200		PCE	5
4-METH.-2-PENT.	10		TCE	5
NICKEL	80		VINYL CL	0.5
PHENOL	2000			
1,1,1-TCA	200			
TOLUENE	1000			
XYLENES	1750			

There are no ARAR's for the removal of VOC's from soil. Therefore, a conservative soil remediation goal of 1 ppm for total VOC's has been set to protect the groundwater from future pollution by leaching of VOC's from polluted soils. Soil cleanup goals for inorganics have not been established due to the uncertainty surrounding the natural occurrence of metals in soils in the South Bay. In addition, the RA indicated that the cancer risk and health hazard from direct soil contact for the average case under two future scenarios was minimal (10^{-6} or less). Therefore remedial actions and cleanup goals for inorganics in soil will not be included in the plan or the Order. The preferred remedial alternative for soil, SIVE, is not designed to remediate metals in soil and will may not reduce the concentrations of inorganics in soil.

An additional concern that is discussed in the FS and the Remedial Action Plan (RAP) is the potential contamination of the air at the Solvent Service site. The appropriate standards for this consideration are the regulations of the Bay Area Air Quality Management District (BAAQMD) Regulation 8, Rule 47 which is an ARAR for the SSI facility. The air stripper system vapor extraction systems at the SSI site is regulated by the BAAQMD. The air emissions from these units do satisfy the ARAR cited above as regulated by the BAAQMD.

In addition, the Tentative Order provides for evaluation of the attainment of cleanup standards, a five year review, and the possibility that technology and experience may allow the discharger to exceed or to be unable to achieve the proposed cleanup standards.

A BTX&E groundwater pollution plume, as described above, was detected near the southwestern site boundary during the Remedial Investigation (RI). SSI and Chevron, in an Order adopted in January 1990, are named as responsible parties for this area. The Order adopted in January contained requirements that the Companies cooperate in the investigation and in remedial actions at the two sites and for the possibly commingled plume area. Remediation of this area is not included in the proposed plan described in this Order. Additional sampling completed at the Chevron site in April, and received by staff after the completion of the Tentative Order presented to the Board in June, indicates the presence of 1,1-DCA in the groundwater beneath the Chevron facility. Staff proposes that any further decisions regarding the possible joint remediation of the groundwater pollution plume along the southwest boundary of the SSI property be delayed until Chevron has completed characterization of the BTX&E groundwater plume. This may require the Order adopted for Chevron in January to be revised.

Staff anticipates that Chevron will contest the SSI Order on the grounds that it does not contain joint tasks for the groundwater contamination along SSI's southwest property boundary. Staff feels that SSI has defined the extent of VOC contamination in this area. However, Chevron has not adequately defined the extent of BTX&E contamination. In addition, it is not clear that the VOC's detected in this area are the result of migration from SSI. Consequently, staff recommends that no further joint tasks be assigned until Chevron has adequately defined the extent of the BTX&E contamination. Under the Order issued to Chevron these tasks are scheduled for completion by April 1991. This should not result in any significant delay in the completion of these tasks or the eventual remediation of the groundwater pollution in this area.

8.0 BASELINE SITE RISKS

A Baseline Public Health Evaluation (BPHE) for the SSI site was completed by ICF/Clement Associates under contract to the Regional Board. The BPHE evaluated exposure through all environmental media and the risk related to any exposure that was considered likely to occur. This evaluation was completed for both current site conditions

and a future use scenario of residential housing occupying the site.

Under current site conditions no exposure pathways that were likely to occur were identified. Under the future use scenario, exposure could occur through ingestion of polluted groundwater, direct contact with soil and through inhalation of vapors resulting from the volatilization, particularly VOC's, from groundwater and polluted soils. The risk related to these exposures is summarized in Table IV.

The greatest risk is related to the ingestion of polluted groundwater from the and inhalation of vapors from the volatilization of chemicals in the A aquifer, with both an increase in the excess cancer risk above the 10^{-4} - 10^{-6} acceptable range for excess cancer risk and possible toxic effects. Risk associated with the groundwater pollution in the A aquifer within the inferred paleochannel at the southwest portion of the site was evaluated separately and will be addressed separately.

Direct ingestion and inhalation exposures to the pollutants contained in the B-C zone related to possible future use may result in an elevated risk of both cancer risk and toxic effects. However, both increased cancer risk and potential toxic exposures are indicted only for the maximum plausible case and not the average case. The exposure through inhalation to vapors from the B-C zone is estimated to result in increased cancer risk for the maximum plausible case and not for the average case. Toxic effects would not be anticipated from inhalation vapors from the B-C zone.

Exposure through ingestion and inhalation related to the pollution of aquifer D-E is not expected to result in either increased cancer risk beyond the acceptable 10^{-4} - 10^{-7} range or adverse noncarcinogenic health effects.

Exposure through direct contact with polluted soil was considered through two future use scenarios 1) children playing in the soil and, 2) adult exposure through gardening. The exposure to children through direct soil contact is within the acceptable 10^{-4} - 10^{-6} range for both average and maximum cases. The exposure for children to the noncarcinogenic compounds is not anticipated to have toxic effects for the average case, however toxics effects related to exposure to thallium would be predicted for the maximum plausible case. The evaluation of the second scenario indicates that exposure through this pathway would not be expected to result in excess cancer risk greater that the acceptable 10^{-4} - 10^{-6} range or adverse noncarcinogenic health effects.

No special environmental habitats or endangered species were identified for the SSI site. The potential for migration to any bodies of surface water is minimal. The potential and real exposure or risk of environmental damage was judged to be nil.

These values are upperbound estimates of excess cancer cases potentially arising from lifetime exposure to the chemicals in question. A number of assumptions have been made in the derivation of these values, many of which are intentional overestimates of exposure

and/or toxicity. The actual incidence of cancer is likely to be lower than these estimates and may even be zero.

9.0 SITE CLEANUP GOALS

To set cleanup goals for groundwater at the Solvent Service (SSI) site staff began with the chemicals identified as chemicals of concern by the risk assessment (RA) prepared by ICF/Clement (ICF) for the Board. The RA defined thirty-one (31) chemicals of concern in groundwater at the Solvent Service, Inc. (SSI) site. These chemicals include nineteen (19) volatile organics (VOCs), five (5) semi-volatile organics (SOCs), and seven (7) inorganics or metals. These chemicals were further classified as either carcinogenic or non-carcinogenic (toxic) substance, with twenty (20) non-carcinogenic chemicals and eleven (11) carcinogenic chemicals.

The primary goal of reducing pollutant concentration to background levels for all chemicals of concern was determined to be technically infeasible due to the mixture, concentrations of pollutants present, and experience on other sites. Therefore, staff developed draft cleanup goals, as described below, utilizing risk-management techniques that would be protective of human health and the environment as well as the existing and potential beneficial uses of the groundwater by utilizing the Hazard Index (HI) for the non-carcinogens and excess cancer risk numbers (ECRN) for carcinogens.

The minimum goal for cleanup standards being an HI less than 1 and an ECRN of 10^{-6} with a maximum of 10^{-4} (EPA policy/regulation). The HI of less than 1 indicates that toxic health effects for a single chemical or the combination of chemicals would not be expected. Excess cancer risk numbers (ECRNs) are evaluated for each individual carcinogenic chemical to indicate the potential effects of carcinogens, and are usually expressed as the number of excess cancers that may develop in a population;i. e., the 10^{-6} or one-in-a-million risk, or the 10^{-5} (one-in-100,000) risk. When cancer-causing substances are present and a threat of exposure to these substances exists, a potential risk is present. There is no "zero-risk" level associated with the threat of exposure to carcinogens. The total ECRN for a group of chemicals is calculated by summing each individual chemical's ECRN. A number of assumptions have been made in the derivation of these values, many of which are intentional overestimates of exposure and/or toxicity. The actual incidence of cancer is likely to be lower than these estimates and may even be zero. The use of the HI for noncarcinogens and estimation of increased population cancer risk for carcinogens is detailed in the EPA Risk Assessment Guidance (December 1989).

The California Department of Health Services (DHS) , Office of Drinking Water has commented on the manner in which the cancer risk was calculated for this site (see Appendix B). The approach recommended by DHS for the calculation of health protective cleanup goals is the DHS carcinogenic hazard index, which is the summation of the proposed cleanup goals divided by the appropriate guidance level, preferably the MCL, for that chemical. This approach would result in proposed cleanup levels for the SSI site

at lower concentrations than those proposed by this Order. Staff feels that the approach presented in this Order is more scientific and representative of the threat to groundwater that the SSI site presents. The approach espoused by DHS does not address the complicated process that goes into the establishment of MCLs, the fact that not all MCLs are health protective, and the lack of MCLs or other standards for comparison for some chemicals. By not describing the MCL process this approach does not make the assumptions that have gone into the calculation of the cleanup goals available for public scrutiny. In the case of SSI establishment of cleanup standards would result in proposed concentrations at or below the detection limit for most or all of the carcinogens. Considering the technical difficulty and length of time estimated to achieve the proposed cleanup standards Staff has reservations about proposing standards that would be even more difficult to realize.

The closest well to the SSI site is approximately 2000 feet downgradient and draws water from the D/E aquifer. Maximum contamination in this aquifer is currently 6 μg/l total VOCs, well below drinking water standards. Due to the absence of contamination this Order does not set cleanup standards for the D/E aquifer. Groundwater monitor wells in this aquifer are and have been inplace between this well and the SSI site. These wells do not currently detect any contaminants. The discharger has presented evidence that contamination in the B?C zone and D/D aquifer is the result of migration along leaky well seals. Cleanup of the D/E aquifer has been accomplished as the result of purging the wells prior to sampling events. The two wells that penetrated the D/E aquifer that were suspected of leaking have been destroyed. Therefore, there is currently no evidence of migration of contaminants through the clay at the base of B/C zone.

Cleanup in the A aquifer and B/C zone is required by this Order. The majority of the groundwater contamination is restricted to the A aquifer. Staff feels that most contamination in the B/C zone is the result of cross-contamination from the A zone. All suspect wells have been properly destroyed and abandoned. New wells have been installed downgradient to replace the destroyed wells and to monitor the migration of any contaminants remaining in the B/C zone.

An explanation of the calculation of hazard indices and excess cancer risk numbers is detailed in the attached memo, Proposed Cleanup Standards for Solvent Service, August 2, 1990. The rationale for the proposed cleanup standards is also included in the attached memo. The proposed cleanup standards are summarized in Section 7.0 of this Staff Report.

10. DESCRIPTION OF ALTERNATIVES

The remedial alternatives encompass a range of appropriate waste management options, as follows:

For soil remediation:

1. No Action

2. Containment
   Capping with clay, asphalt, concrete synthetic or a combination
   Surface controls - Diversion/collection
3. Excavation and Disposal
   Offsite landfill
4. Excavation, Treatment, and Disposal
   Physical treatment - Aeration
   Thermal treatment - Soil cooker
   Biological treatment - Aerobic
5. In-Situ Treatment
   Physical - Vapor recovery
   Thermal - Steam injection

For groundwater remediation:

1. No Action
2. Containment
   Capping plus slurry wall or hydrodynamic control
3. Collection, Treatment, and Disposal
   Pumping - Wells, trenches
   Physical treatment - Air stripping, adsorption
   Chemical treatment - Ozonation/UV
   Biological treatment - Aerobic
4. In-Situ Treatment
   Physical - Permeable treatment bed

Below is a brief description of each alternative that was considered.

Soil Remediation

No Action

This option is required for consideration and involves no further action. Current interim remedial actions would be discontinued. Such institutional actions such as land-use restrictions, fencing, or warning signs can also be considered under the no action alternative. SSI presently is fenced with posted warning signs. No action might result in eventual migration of contaminants into the drinking water aquifers (D/E aquifer and deeper) below the SSI site.

Containment

Capping. The site would be graded and capped with a layer of less permeable material. Capping would reduce dust, surface erosion, and minimize infiltration and recharge by precipitation and surface runoff. Many of the options are

effective, implementable, and low in cost. A large concrete bermed pad currently exists in the center of the site.

Surface controls - Diversion/collection. Physical barriers would be placed around the contaminated area to control and collect surface drainage and reduce surface water infiltration and erosion. These drainage channels or berms would control surface erosion but not stop leaching by direct rainfall or dust generation. Currently, all runoff from the concrete pad is collected.

Excavation and Disposal

Offsite landfill. The contaminated soil could be excavated and disposed of at an approved offsite licensed disposal facility. Bans on land disposal of untreated wastes have been implemented based on waste characteristics. The area would be backfilled with clean soil. This alternative eliminates site soil contamination but creates potential for offsite liability. The contamination would must be moved to another site.

Excavation, Treatment, and Disposal

Physical Treatment - Aeration. The contaminated soil would be excavated and spread on the ground surface to aerate allowing the volatile compounds to escape. Aeration rates would be regulated to limit the organic compound emissions from the soil. The contaminants would just be transferred from one media to another. The excavated areas would be backfilled with the aerated soil or clean fill (with the aerated soil going to a landfill).

Thermal Treatment - Soil cooker. The excavated soil would be treated by a soil cooker to remove contaminants, and then, preferably be disposed of properly onsite. The soil cooker first removes excess water from the soil and then volatilizes organic compounds under high temperatures conditions. A purge gas, typically air, enhances contaminant removal. Subsequently, the removed contaminants can be destroyed by high-temperature incineration in an after-burner or recovered by condensation or adsorption onto activated carbon. The recovered solvents can be disposed of or recycled.

Biological treatment. Excavated soil would be exposed to air or oxygen in order to foster the growth of micro-organisms and subsequent breakdown of organic compounds.

In-Situ Treatment

Physical - Vapor Recovery. Gaseous phase contaminants within the upper unsaturated soil zone would be collected by applying subatmospheric pressure.

to a vapor recovery well. This subatmospheric pressure is maintained by a surface pump or fan which would exhaust the gaseous phase contaminants to recovery equipment.

Thermal - Steam injection. Steam injection would enhance the capture and removal of volatile and semi-volatile compounds through a combination of steam injection wells, and vapor and liquid phase extraction wells. When steam is injected, volatile organic compounds vaporize and are swept ahead of the steam front where they are collected at the extraction wells. process wastes collected through the recovery system would include liquids pumped from the recovery well, liquids collected from the condenser, and the non-condensable gases exiting the vacuum vapor recovery fan. The wastes from this enhanced vapor extraction system would be treated by carbon filtering, distillation, and bio-treatment. A pilot-scale test of steam injection and vacuum extraction performed at SSI reduced the total contaminant concentration in the soil from approximately 1,200,000 μg/kg to less than 22,000 μg/kg in high permeability zones. Additional contaminant recovery is expected for longer steaming periods.

Groundwater Remediation

No Action - This option is required for consideration and involves no further action. Current interim actions such as pumping would be discontinued. Institutional actions such as land use restrictions, fencing, or groundwater monitoring can also be considered under the no action alternative.

Containment

Capping with slurry wall or hydrodynamic control. The site would be capped to reduce surface infiltration and horizontal migration would be controlled through barriers such as extraction wells or slurry walls. The extraction wells would be pumped in an attempt to create a cone of depression beneath the site. Groundwater would flow to the wells to be extracted for disposal. A slurry wall consists of a trench filled with an impermeable material which creates a barrier to horizontal groundwater flow.

Collection, Treatment, and Disposal

Pumping wells, trenches - A plume of contaminated groundwater can be controlled by pumping it out with wells or drainage trenches. Several wells would be used to extract water from Aquifer A. Extraction trenches consist of ditches excavated to a level below the water table and at least partially filled with coarse gravel or a horizontal perforated pipe. One or more extraction wells or sumps in the trench would remove the liquid collected by the drainage action of the trench. Currently, there are three extraction trenches and five operating recovery wells on

site installed as part of the interim remedial measures program.

Physical treatment - Air stripping, adsorption. Air stripping is a groundwater treatment process in which contaminants dissolved in water become dissolved in air. The contaminant transfer from water to air is accomplished by adding air to the water through aeration techniques. Adsorption involves the adherence of contaminated molecules to an adsorbent surface of activated carbon. Contaminated water is passed through a bed of granular activated carbon and the contaminants are adsorbed onto the carbon surface and held there. An air stripper currently exits on site as part of the treatment facility.Carbon tanks also exist on site and will be used to adsorb non-condensable contaminants left in the air from the steam injection - vapor extraction system.

Chemical treatment - Ozonation/UV. Ozone is a powerful oxidizing agent capable of destroying a wide variety of organic compounds. Ozonation consists of the introduction of ozone and contaminated water in a contact chamber. Ultraviolet lamps also may be operated in the chamber.

Biological treatment - An onsite biological degradation system uses bacterial populations to convert soluble organic compounds in waste water into insoluble organic compounds (more bacteria) which can be physically removed from the waste water stream. Contaminated water will flow to an aeration tank where oxygen will be supplied to produce bacterial growth. The water will then be pumped to a bio-reactor where bacterial film will accumulate and slough off. A bio-treatment system currently exists on site.

In-situ treatment

Physical - Permeable treatment bed. Permeable treatment beds utilize an adsorptive process to treat contaminated groundwater in place. A trench would be filled with a permeable treatment medium such as activated carbon to intersect the contaminant plume in Aquifer A.

These remedial alternatives were reduced in number through comparison to the nine criteria, 1) overall protection of human health and the environment, 2) compliance with applicable or relevant and appropriate requirements (ARARs), 3) long term effectiveness and permanence, 4) reduction of toxicity, mobility, or volume through treatment, 5)short term effectiveness, 6) implementability, 7)cost, 8) lead and support agency acceptance, and 9) community acceptance.

These choices were reduced through this screening process to three soil remedial alternatives and four groundwater remedial alternatives. Some technologies are evaluated with multiple treatment options. This results in four soil remedial programs and six combinations of technology and treatment for groundwater. This includes the no action

alternative that was carried forward for comparison.

The soil remedial alternatives that were analyzed in detail include no action, containment, and in-situ treatment, either soil vapor extraction or thermally enhanced soil vapor extraction (SIVE). The groundwater remedial alternatives retained for detailed analysis include: no action, containment, extraction through wells and trenches and treatment either by air stripping in combination with carbon adsorption or biologic treatment, and in-situ treatment through the physical placement of a permeable treatment bed in the saturated zone.

The removal actions for soil were rejected, though they are cost effective and expedient, because removal would require the termination of operations at the SSI facility. However, the estimated cost for this alternative does not consider that removal would result in the probable permanent cessation of operations at the SSI facility. Containment would not actively remediate the soil and the natural degradation of the contaminants is estimated to be between 50 and 100 years. Migration of contaminants from the soil to groundwater could continue while this process was occurring. The in-situ treatment of the soil by enhanced biologic activity was rejected due the uncertainty of this process to work on chlorinated compounds or any compounds in a matrix as complex as that which occurs in the soil at SSI.

Very few alternatives exist for the remediation of groundwater. Containment through the placement of vertical barriers around the site does not prevent continued migration. Therefore this alternative would still require groundwater extraction in some form to control the migration and remove the contaminated groundwater from the subsurface. Two in-situ technologies for groundwater treatment were considered. The first of these, in-situ bioremediation is unproven for chlorinated compounds and the second, the permeable treatment bed is an untested innovative technology. This leaves containment and capture by some type of groundwater extraction as the remaining alternative.

Treatment technologies considered included ozonation-UV, air-stripping, carbon adsorption, and bioremediation. The only one of these that was rejected was the ozone/UV treatment. This was rejected due to the high cost. In addition, though several pilot projects have tested this technology in the South Bay there are no operating installations so the technology must still be considered innovative.

11. PROPOSED PLAN

The proposed plan identifies the following group of actions for cleanup at the SSI site:

1. Steam Injection and Vacuum Extraction (SIVE)

2. Bio-treatment, Carbon Filtering, and Air Stripping of Extracted Groundwater, Surface Water, and Vapor

3. Capping of the Site by Paving

4. Groundwater Extraction

5. Continuation of the Groundwater Monitoring Program

SIVE is identified as the primary technology for remediation of soils polluted with VOC's. Fluid extracted by this process will either be treated in the onsite solvent recovery system, operated under the site RCRA permit, or treated in the groundwater treatment system (see discussion below). If the fluid is treated by the recovery system the majority of the solvent is removed from the vapor or water phase and recycled for offsite use. The waste from this process is sent to the sanitary sewer as process water for waste disposal. If the fluid is treated by the groundwater treatment system more than 98% of the VOC's will be removed from the water. The treated water is then used in the cooling tower portion of the solvent reclamation system. The water from the cooling tower is discharged to the sanitary sewer system as process water and is subject to Pretreatment regulations. Vapor recovered by the SIVE system is treated by carbon adsorption. The carbon is recharged on site as part of the steam injection process and the liquid from the carbon recover is treated either in the solvent recovery system or by the groundwater treatment system, with eventual discharge to the sanitary sewer.

In conjunction with the SIVE system the site will be capped either by asphalt. This will serve both to limit exposure through fugitive dust exposure and exposure to vapors resulting from volatilization of VOC's from groundwater and to limit infiltration of surface water through any contaminated soil remaining inplace which will limit any potential for continued pollution of groundwater. The initiation of this phase of the proposed cleanup plan is dependent upon approval of the City of San Jose for the necessary construction permits.

The groundwater extraction system includes three extraction trenches, and 5 extraction wells. An additional nine large diameter wells previously installed on the site periphery could also potentially be converted to extraction wells. However, the system has been operating as an interim remedial action since 1987 and appears to be adequately controlling pollutant migration and to be effectively capturing the polluted groundwater from the site.

The treatment system for the extracted groundwater, as proposed, would include bio-treatment, carbon adsorption, and air stripping. Each component of the treatment system is designed to remove or convert a different group of potential chemicals of concern.

SIVE is an innovative technology and a pilot scale study has been completed at the SSI site, however since the test was performed in an area surrounded by polluted soil evaluation of the effectiveness of the technology was limited. Therefore excavation of polluted soils should be included in the RAP in case SIVE proves to be ineffective in

achieving soil cleanup goals, particularly in fine-grained soil.

The groundwater extraction system, which has been put in place and operated as an interim remedial action and for containment, is effective for the onsite cleanup of groundwater. However, the system may have to be modified to include polluted groundwater from the offsite areas. The plan proposes to modify some offsite monitor wells for groundwater extraction, but only after onsite groundwater has been remediated. The intent of this is to prevent offsite extraction from accelerating pollutant migration from the onsite area. The plan as proposed is vague and non-specific in this area. A specific task has been included in the Tentative Order to address methods to determine when or if offsite extraction will begin. The monitoring program included as part of the RAP should include specific detail regarding the wells that are inplace verify that downgradient, offsite migration is being controlled or has not migrated beyond the existing wells.

The groundwater extraction system proposed is not designed with the removal of inorganics, however it will, by the removal of groundwater polluted with VOC's also remove groundwater polluted with inorganic constituents. The groundwater treatment is not designed for the removal of the inorganic constituents from the extracted groundwater prior to discharge to the sanitary sewer, however the concentration of inorganics allowed in the system effluent is regulated under permit from the San Jose Water Pollution Control Plant.

Due to the length of time required to achieve groundwater cleanup standards under the proposed plan, as estimated by the discharger, Board staff would propose modification to the plan. This modification would consist of the addition of include institutional controls to limit the possibility of residential use of the property until cleanup standards for soil and water are achieved.

12.0 SELECTED REMEDY

The selected remedy consists of the following components as described above:

1. Steam Injection and Vacuum Extraction (SIVE)
2. Bio-treatment, Carbon Filtering, and Air Stripping of Extracted Groundwater, Surface Water, and Vapor
3. Capping of the Site by Paving
4. Groundwater Extraction
5. Continuation of the Groundwater Monitoring Program

6. Deed Restrictions to Control Residential Development of the Property until Cleanup Standards for Soil and Groundwater are Achieved

This system does not have the highest capital cost of alternatives that were selected for detailed screening nor would this combination of alternatives result in the least expensive treatment of the alternatives considered. The estimated time to cleanup for soil is the shortest period of any of the alternatives that went through detailed screening. Groundwater cleanup times were not a factor for comparison of alternatives since groundwater extraction is the only active remedial action that was considered. The combination treatment system has the advantage that it allows for efficient treatment of a wide variety of pollutants.

The groundwater extraction/treatment system has been installed at an estimated capitol cost of $399,000. The annual cost of operation and maintenance is estimated to be $884,000. The SIVE system is currently inplace onsite, the estimated capitol expenditure for this installation is $549,000. The annual operation and maintenance cost for this alternative is estimated to be $288,000. If it is determined that it is necessary to operate the SIVE system in vacuum mode to achieve soil cleanup standards operating and maintenance cost will be reduced to $250,000 annually.

13. RECOMMENDATIONS

Staff recommends the adoption of the of the six element proposed plan as ,described in Sections 11 and 12 of this staff report and Finding 9.0 of the Revised Tentative Order. The cleanup standards shall be 1 ppm total VOCs and SOCs for soil. The cleanup standards for A aquifer and B/C zone groundwater shall be those detailed in section 9.0 of this staff report and Specification 3 of the Revised Tentative Order. Staff further recommends that the Board require a cooperative remedial effort between Chevron and SSI and participation by SSI in the remediation of soil and groundwater in the area along the southwest property boundary of SSI, where BTX&E contamination and possible VOC contamination is known be reviewed once the extent of the BTX&E contamination has been determined.

Mavis D. Kent

CONCUR

Mavis Kent, Section Leader

South Bay Toxics Division

Steven I. Morse

CONCUR

Steven I. Morse, Division Chief

South Bay Toxics Division

APPENDIX C

REGIONAL WATER QUALITY CONTROL BOARD

SAN FRANCISCO BAY REGION

INTERNAL MEMO

DATE: August 6, 1990

TO: MDK, SIM, File # 2189.8076 FROM: RCG

SUBJECT: CLEANUP STANDARDS SOLVENT SERVICE, INC.

To set cleanup standards for groundwater at the Solvent Service (SSI) site staff began with the chemicals identified as chemicals of concern by the risk assessment (RA) prepared by ICF/Clement (ICF) for the Board. The RA defined thirty-one (31) chemicals of concern in groundwater at the Solvent Service, Inc. (SSI) site. These chemicals include nineteen (19) volatile organics (VOCs), five (5) semi-volatile organics (SOCs), and seven (7) inorganics or metals. These chemicals were further classified as either carcinogenic or non-carcinogenic (toxic) substance, with twenty (20) non-carcinogenic chemicals and eleven (11) carcinogenic chemicals.

The primary goal of reducing pollutant concentration to background levels for all chemicals of concern was determined to be technically infeasible due to the mixture, concentrations of pollutants present, and experience on other sites. Therefore, staff developed draft cleanup standards, as described below, utilizing risk-management techniques that would be protective of human health and the environment as well as the existing and potential beneficial uses of the groundwater by utilizing the Hazard Index (HI) for the non-carcinogens and excess cancer risk numbers (ECRN) for carcinogens. The minimum standard for cleanup being a HI less than 1 and a desired ECRN of 10^{-6} with a maximum of 10^{-4} (EPA policy/regulation). An HI of less than 1 indicates that toxic health effects for a single chemical or the combination of chemicals would not be expected.

This general approach to approximating non-carcinogenic health hazard has been used by Board staff in the past due to ease of calculation and presentation of results. In the past the HI has been calculated as a ratio between the concentration of a chemical and the a reference level, usually state or Federal MCLs for that chemical. This ratio for the individual chemicals is then summed to produce an HI for exposure to all noncarcinogenic chemicals of concern identified for a site. This approach was utilized for this same purpose at both the IBM and Fairchild Superfund sites in Santa Clara County.

For SSI the HI was calculated as the ratio between the chronic daily intake (CDI)

calculated at a given concentration for that chemical and the reference dose (RfD) for a given chemical. The appraoch is similar to that previously used in that intake at a specific concentration is compared to a reference intake, the RfD, at which no health effects shiould be observed. The CDI takes into account the concentration of the chemical, the duration of exposure, average body weight, and daily intake for each chemical. The CDI can be calculated by a standard formula given below. This ratio is then the hazard for the individual chemical at that given concentration. The RfD for each chemical is derived from toxicological data and represents an estimate of the concentration of a chemical that a human can be exposed to with no expected toxic results. The RfD is both chemical and exposure route specific. Compared to the approach that was utilized for the Fairchild and IBM sites, the CDI/RfD approach may be less conservative, but is a more realistic estimate of the hazard posed by the exposure to non-carcinogenic chemicals present at a site. While the approach utilizing the MCL appears to be simple it obscures the complicated process that goes into the development of MCLs.

Current toxicological theory is that there may not be a threshold for exposure to carcinogens. This implies that any single exposure to a carcinogenic chemical, regardless of concentration, can result in an increased incidence of cancer. In addition due to technical and economic reasons not all MCLs are health protective and not all MCLs provide the same level of protection. Therefore, the HI approach is not appropriate tool for evaluating exposure to carcinogenic chemicals. The use of the HI as a ratio between CDI and RfD for noncarcinogens and estimation of increased population cancer risk for carcinogens is detailed in the EPA Risk Assessment Guidance (December 1989).

For this site the risk and hazard estimates are based on conservative exposure estimates as follows:

Adult body weight - 70 kg
Exposure duration - 30 years
Groundwater ingestion - 2 liters/day
Absorption - 100%
Dietary fraction - 100%

An equation was developed for the calculation of the CDI based on the following equations:

$$ITK = (C_w) * (W) * (G) * (D)$$

where,

ITK = chemical intake from groundwater (mg/day),
C_w = chemical concentration in groundwater (mg/L),
W = daily water consumption (L/day),
G = drinking water ingestion absorption factor, and

D = dietary fraction of water ingested at home.

The total intake is then converted to a chronic daily intake (CDI) as follows:

$$CDI = [(ITK)*(D)*(F)]/[(BW)*(E)*(365)]$$

where,

CDI= average daily intake via groundwater (mg/kg/day)
ITK = chemical intake from groundwater (mg/day),
D = duration of exposure (years)
F = frequency of exposure (days/year)
BW = body weight
E = extrapolation factor (years):
for noncarcinogens = exposure period = D = 30 years
for carcinogens = 70 year lifetime, and
365 = conversion factor (days/year)

These risk and hazard estimates are based on conservative exposure estimates as follows:

Average Body Weight - 70 kg = BW
Exposure duration - 30 years = D
Groundwater ingestion - 2 liters/day = W
Absorption - 100% = G
Dietary fraction - 100% = D

The reference dose is estimated from toxicological studies and the values are obtained from one of several data bases maintained by EPA. The integrated risk information system (IRIS) maintained by EPA includes only data that has been extensively validated by peer review. IRIS is the first choice of reference for RfD or other toxicologic data and would be considered the strongest indication that the data is valid and reliable. If an RfD for a chemical is not included in IRIS then other sources are consulted and the resultant data is used, albeit with greater uncertainty.

The thirty year exposure is within the 90% interval for current residence times according to current EPA guidance. The 2 liter/day consumption rate may be a high estimate of average consumption and current EPA guidance indicates that 1.4 liters per day may be a more appropriate assumption, however MCLs are based on the consumption of 2 liters of water per day, consequently it is considered appropriate for this comparison. In addition, since the cancer potency factors (q*) are calculated based on lifetime exposures (70 yrs) the chronic daily intake (CDI) for carcinogens was normalized in the calculations to account for this variation in exposure time (30 years vs. 70 years). Both dietary fraction and absorption are most likely conservative since it is improbable that most residents consume 100% of their daily water intake at home or that all chemicals would be 100%

adsorbed.

The chronic daily intake (CDI) is calculated based on the above equations and assumptions. The CDI is then divided by the reference dose (RfD), as established by toxicological studies, to calculate the individual hazard related to a chemical. The individual HI's are then summed to a total HI for all COC's. This approach represents a more realistic estimate of the hazard posed by the exposure to non-carcinogenic chemicals present at a site than the approach utilizing only the MCL's. In either case the HI approach is a conservative estimate of the hazard posed by a site since summing the exposures assumes that the toxic affect for all chemicals of concern would attack the same system or organ.

The same equations are used for the development of excess cancer risk numbers (ECRN) for carcinogenic chemicals. However, since cancer slope factors or potency are based on lifetime exposures a different extrapolation factor is utilized in the equation to address the less than lifetime exposure assumed for this circumstance. The ECRN is then calculated as the cancer potency factor (q^*), derived from toxicological or epidemiological studies, multiplied by this CDI. The cancer potency factor is an indication of the quantity of a chemical that can be ingested before carcinogenic results are probable. A high number is indicative of a strong relationship between exposure to a chemical and the occurrence of cancer.

Excess cancer risk numbers (ECRNs) are evaluated for each individual chemical to indicate the potential effects of carcinogens, and are usually expressed as the number of excess cancers that may develop in a population; i. e., the 10^{-6} or one-in-a-million risk, or the 10^{-5} (one-in-100,000) risk. When cancer-causing substances are present and a threat of exposure to these substances exists, a potential risk is present. There is no "zero-risk" level associated with the threat of exposure to carcinogens. The total ECRN for a group of chemicals is calculated by summing each individual chemical's ECRN. A number of assumptions have been made in the derivation of these values, many of which are intentional overestimates of exposure and/or toxicity. The actual incidence of cancer is likely to be lower than these estimates and may even be zero. The use of the HI as a ratio between CDI and RfD for noncarcinogens and estimation of increased population cancer risk for carcinogens is detailed in the EPA Risk Assessment Guidance (December 1989).

The first trial cleanup scenario was carried out with ingestion of groundwater, the critical pathway of concern to human health, as identified in the RA. This scenario included all pollutants identified as chemicals of concern in the RA except 1,2,4-Trichlorobenzene, for which no guidance data regarding acceptable levels in water was available, for a total of thirty (30) chemicals of cencern. The potential toxic effects for all chemicals of concern are considered and only the chemicals that are classified by the EPA as a human carcinogen. FOr this trial scenario, the aggregate risk via this pathway was determined by setting cleanup standards to the ARARs identified in the RI/FS. This resulted in a total HI of 10.18 and aggregate ECRN of 10^{-3} (see Table I). These risks did not meet the desired minimum

cleanup standards and included only the groundwater ingestion pathway.

Following further review of the RA and current groundwater data, staff determined that four SOCs and six inorganics could be eliminated from consideration as chemicals of concern. The SOCs that were eliminated are isophorone, naphthalene, 1,4-Dichlorobenzene, and 1,2,4-Trichlorobenzene. Isophorone was eliminated based on its classification as a class C carcinogen. Region IX guidance indicates that class C carcinogens, due to the uncertainty of classification as a carcinogen, may be more appropriately treated as noncarcinogens using a modified RfD approach. Review of the toxicological data in the Public Health Evaluation Risk Database and the RA data also indicated that the evidence for inclusion of isophorone as a carcinogen was based on five studies, only one of which indicated possible carcinogenic affects. The RA also indentified 1,1-DCE as a chemical of concern and it is also a class C carcinogen. The toxicological data for 1,1-DCE is more extensive and is subject to much discussion in the scientific community. The data for 1,1-DCE is more indicative of negative evidence that 1,1-DCE is not a carcinogen than the data for isophorone. However, it was decided to retain 1,1-DCE as a chemical of concern as a carcinogen for setting cleanup standards due to its frequency of occurrence onsite.

Naphthalene, 1,4-Dichlorobenzene, and 1,2,4-Trichlorobenzene were included as chemicals of concern for groundwater based on estimated concentration from their occurrence in soil. Review of groundwater data that was not included in the groundwater database used in the preparation of the RA indicated that these chemicals had been detected either infrequently at low concentrations or never detected. Therefore these SOCs were not considered as chemicals of concern in establishing site cleanup standards.

The inorganics that were initially eliminated from consideration were antimony, copper, lead, selenium, and thallium. The inclusion of these metals as chemicals of concern in the RA was determined from groundwater concentrations estimated by modeling from shallow soil data. Groundwater data collected in December 1989 and March 1990, after the completion of the RA, finds that none of these inorganic chemicals are present in concentrations outside of ranges that might reasonably represent normal background concentrations.

The new data on inorganics does indicate elevated levels of zinc, nickel, cadmium, and possibly chromium in one onsite monitor well. However, since this well is highly contaminated with SOCs and VOCs (3,490,700 μg/l total) the inorganic data may be questionable. High levels of these inorganics are not present in other wells. Therefore these inorganics will also be removed from consideration as chemicals of concern. Comparison of analytical results from filtered and unfiltered groundwater samples from a subsequent round of groundwater data indicated that arsenic present in the samples exists largely in the suspended fraction and is not in solution in the water. The samples with the highest concentrations of aresenic (wells 100A and 101A) are highly turbid and

removal of the sediment from the water prior to analysis reduces the concentrations of arsenic to well below the MCL. Therefore staff recommends that arsenic also be eliminated as a chemical of concenr for the Solvent Service Facility.

A second trial cleanup scenario was carried out for this reduced set of twenty-one (21) chemicals of concern. Again the proposed cleanup standards for all chemicals was set at the MCL (the more stringent of State or Federal MCL levels) or other guidance (ARARs and TBC) such as provided by IRIS, DHS action levels or water quality criteria. This resulted in a total HI of 2.49 and aggregate ECRN of 10^5 (see Table I-A). These risks did not meet the desired minimum cleanup standards and again only addressed exposure through the groundwater ingestion pathway.

As a check an additional scenario was carried out for a set of thirty (30) chemicals of concern to determine what cleanup stadards would be required to achieve an HI of 1.0 or less and an excess cancer risk of 10^{-6}. This indicated that most chemicals would have to be removed to levels at or below the detection limit (see Table II). In particular arsenic and vinyl chloride would have to be reduced to concentrations to approximately a part per trillion. This is based on the scenario that all chemicals identified in the RA are truly present and are of concern.

Further review of the most recent inorganic data indicates that nickel is present above "local" background levels and that elevated levels of zinc are present only in the single well referenced above. Based on this data nickel has been added as a a chemical of concern, although it was not included in the chemicals of concern utilized for the risk assessment. Zinc has been eliminated as a chemical of concern based on its infrequent occurence and low toxicity.

As the next step in development of cleanup standards via risk-management, the HI and aggregate ECRN were calculated. The percentage of the risk and hazard was considered in selecting chemicals that were accounting for the majority of the HI or aggregate ECRN. The cleanup levels for these chemicals were then reduced to achieve the secondary cleanup standards. These reductions were balanced against the ease of attainment of the goal and total concentration of the chemical on the site. This process was repeated on a trial and error basis until both the maximum HI of 1 and a minimum total ECRN (10^{-4}) criteria were met.

These risk management techniques indicate that the major changes necessary for the non-carcinogens were the reduction of the allowable concentration of acetone from the 3.5 mg/l level recommended by IRIS to 1 mg/l. Acetone will be removed from the extracted groundwater as a result of destruction in the bio-treatment system. The cleanup standard for acetone is critical, since acetone is the most widespread pollutant and occurs in the highest concentrations onsite and may account for up to 80% of the volume of groundwater pollutants. To achieve an HI of one or less the proposed concentrations of ethylbenzene, nickel, phenol, and toluene also had to be reduced. The proposed cleanup

standards for acetone was reduced from 3.5 mg/l to 1.0 mg/l, the proposed cleanup standard for ethylbenzene was reduced from .68 mg/l to 0.5 mg/l, the proposed cleanup standard for nickel was reduced from 0.154 mg/l to 0.100 mg/l, the proposed cleanup standard for phenol was reduced from 3.5 mg/l to 3.0 mg/l and the proposed cleanup standard for toluene was reduced from 2.0 mg/l to 1.0 mg/l to establish health protective cleanup standards. The cleanup standards for all other chemicals under this scenario were set at the ARARs or TBCs identified in the RI/FS. This resulted in an HI of 1.0 (see Table III-A), indicative that these cleanup levels would be protective health by exposure through the ingestion of groundwater.

Even at these reduced concentrations, acetone, ethylbenzene, phenol, nickel and toluene will still account for approximately 90% of the HI following cleanup at this site. Further reduction of the non-carcinogenic risk posed by these cleanup standards is probably not warranted, since reduction to background levels (i.e. zero for all compounds except nickel) of all of the compounds would not result in a significant reduction of total vs. incremental risk, and the stringent cleanup required for acetone will also probably drive the remaining VOCs and SOCs to levels below these cleanup standards.

The cleanup standards for the eight remaining carcinogens of concern have all been set at the MCL or other water quality guidance if no MCL has been established (see Table III-A). The excess incremental lifetime cancer risk, above the risk due to the exposure to arsenic, is estimated at 6.5×10^{-5} (see Table III-A) for a person ingesting the groundwater after cleanup. This level of cleanup does fall within the allowable range under the NCP and would be considered to be health protective.

Since ingestion exposure occurs under a hypothetical residential scenario exposure through incidental residential uses (showering, cooking, laundry, etc.) must also be considered. It is logical to assume that the if the ingestion exposure occurs that the incidental exposures will also occur. If this is the case then the risk from each exposure pathway must be summed. As per EPA Region IX guidance, the daily intake through the inhalation pathway related to incidental residential use is equal to the the consumption of two liters of water per day. Therefore the calculation of the CDI is the same for this scenario. The CDI is then divided by the inhalation RfD for volatiles, where available, to estimate the noncarcinogenic health hazard due to exposure to chemicals through incidental residential use. For the carcinogens the same technique was applied, with the CDI calculated for the ingestion scenario multiplied by the inhalation cancer potency factor (q^*), to estimate the increased carcinogenic risk due to exposure to chemicals through incidental residential use. It is then appropriate to sum both risk and hazard from ingestion and inhalation calculations to estimate the total risk under this hypothetical future residential scenario due to the exposure to polluted groundwater through these two pathways. All inorganics were eliminated from the calculation of the incidental residential use exposure since it they are unlikely to volatilize during residential use.

Due to the summation of the ingestion and inhalation pathways the proposed cleanup standards had to be re-calculated. To maintain the goal of an HI of one or less and an ECRN in the desired range some cleanup standards had to be revised. The proposed cleanup standard for acetone was further reduced from 1.0 mg/l to .040 mg/l, the proposed cleanup standard for ethylbenzene was further reduced from 0.50 mg/l to 0.40 mg/l, the proposed cleanup standard for nickel was further reduced from 0.100 mg/l to 0.080 mg/l, and the proposed cleanup standard for phenol was further reduced from 3.0 mg/l to 2.0 mg/l. In addition methylene chloride was reduced from the DHS action level of 0.040 mg/l to 0.030 mg/l. This results in an HI of 1.0 for the summation of both pathways.

The only change in the proposed cleanup standards for carcinogens was the reduction of the proposed cleanup standard for 1,1-DCE to the detection limit of 0.001 mg/l (see Table III-B). This reduction maintains the ECRN in the 10^{-5} range.

This approach produced minimum cleanup standards that are protective of human health and the beneficial uses of the groundwater. The total ECRN is within the acceptable EPA range. Three technical and policy uncertainties remain for management and public consideration:

- Is the deletion of arsenic as a chemical of concern acceptable?,

- Was the method of elimination of some of the chemicals of concern identified in the RA acceptable? *and*

- Is the minimum total ECRN, 10^{-5}, acceptable?

The reduction of the excess cancer risk related to the remaining chemicals of concern would require the reduction of the cleanup standards for 1,1-DCE and vinyl chloride to below detection limits.

Board staff recommends that the cleanup standards as presented in Table III-B be utilized in the Board Order and Record of Decision. The uncertainty surrounding the detection of arsenic, and inorganics in general, and the comparison of filtered and unfiltered samples is sufficient to justify the removal of most inorganics as chemicals of concern. The reduction of the noncarcinogenic risk due to the number of chemicals involved and the potential high levels of hazard, might be more appropriately screened by grouping chemicals by target organ or system. This approach might result in a more realistic appraisal of the noncarcinogenic site hazard, however it would require the expertise of a toxicologist.

SOLVENT SERVICE INC. TABLE I

CLEANUP GOALS SET TO ARARs TO TBCs

DETERMINATION OF EXCESS LIFETIME CANCER RISK FOR CARCINOGENS AND OF HAZARD INDEX FOR NON-CARCINOGENS

CHRONIC DAILY INTAKE (CDI) = Cw * IR * ED * EF/BW * AT (MG/KG/DAY)
Cw = CHEMICAL CONCENTRATION, ARARs/TBCs (MG/L)
IR = INGESTION RATE (Liters/Day)
ED = EXPOSURE DURATION (Years)
EF = Exposure Frequency (Days/Year)
BW = Body Weight (Kg)
AT = Averaging Time (period over which exposure is averaged - days)

Cw	IR	ED	EF	BW	AT (basis)	AT (carcinogen)
chemical specific	2	30	350	70	10950	25550

HAZARD INDEX = CDI/RfD
EXCESS LIFETIME CANCER RISK = CDI x q*
RfD = REFERENCE DOSE (MG/KG/DAY)
q* = CANCER POTENCY FACTOR (MG/KG/DAY)-1

Cw = ARARs or TBCs

CHEMICAL	Cw	WOE	RfD	CDI	HI	% OF TOTAL HAZARD INDEX
ACETONE	0.000	RfD	0.1	1.00E-01	1.00E+00	0.0%
ANTIMONY	0.014	WQC	0.0004	4.00E-04	1.00E+00	0.0%
ARSENIC	0.05	CA MCL/A	0.001	1.40E-03	1.40E+00	14.0%
BENZENE	0.0010	CA MCL/A	0.01	2.80E-05	2.80E-03	0.03%
2-BUTANONE	0.020		0.05	5.71E-04	1.14E-02	0.1%
CHLOROFORM	0.0000	CA AAL/B2	0.01	1.71E-04	1.71E-02	0.17%
COPPER	1.3	US MCL	0.037	3.71E-02	1.00E+00	0.00%
1,1-DCA	0.0002	CA MCL/B2	0.1	1.40E-04	1.40E-03	0.01%
1,2-DCB	0.600	CA MCL	0.09	1.40E-04	1.00E-03	0.0%
1,4-DCB	0.0005	CA AL/B2	0.1	1.40E-05	1.40E-04	0.0%
1,1-DCE	0.0000	CA MCL/C	0.009	1.71E-04	1.00E-02	0.19%
CIS-1,2-DCE	0.030	CA MCL	0.01	1.71E-04	1.71E-02	0.2%
TRANS-1,2-DCE	0.010	CA MCL	0.02	2.00E-04	1.40E-02	0.1%
ETHYLBENZENE	0.000	CA MCL	0.1	1.00E-03	1.00E-01	1.0%
FROM...(1)	1.200	CA AL	03	3.43E-02	1.14E-03	0.0%
ISOPHORONE	0.2	WQC/C	0.15	1.40E-01	0.00E-01	0.7%
LEAD	0.00	CA MCL	0.0000	1.40E-03	0.00E+00	33.4%
METH CHLORIDE	0.0470	CA AL/B2	0.06	1.14E-03	1.00E-02	0.19%
4-METH -2-PENT.	0.010		0.05	2.00E-04	0.71E-03	0.1%
NAPHTHALENE	0.3	DWHA	0.4	1.01E-01	0.70E-01	0.7%
PCE	0.0040	CA AL/B2	0.01	1.14E-04	1.14E-02	0.11%
PHENOL	3.000	WQC	0.6	1.00E-01	1.00E-01	1.0%
SELENIUM	0.01	CA AL	0.005	2.00E-04	0.00E-02	0.0%
1,1,1-TCA	0.200	CA MCL	0.03	5.71E-03	0.00E-02	0.0%
TCE	0.0000	CA MCL/B2	0.0074	1.40E-04	1.00E-02	0.19%
THALLIUM	0.001	WQC	0.00007	2.00E-05	4.00E-01	4.01%
TOLUENE	2.000	US MCL	0.2	5.71E-02	1.00E-01	1.0%
VINYL CL	0.0000	CA MCL/A	0/A	1.40E-05	0/A	0.00%
XYLENES	1.750	CA MCL	2	5.00E-02	0.00E-02	0.5%
ZINC	0.000	2 US MCL	0.2	1.40E-01	7.14E-01	7.0%
			TOTAL HAZARD INDEX =		10.10	100.0%

CHEMICAL	Cw	WOE/CLASS CARCINOGEN	q*	RfD	CDI	RISK	% OF AGGREGATE RISK
ARSENIC	0.05	US MCL/A	2	0.001	0.12E-04	1.00E-03	72.00%
BENZENE	0.001	CA MCL/A	0.029	0.01	0.57E-05	0.40E-07	0.01%
CHLOROFORM	0.000	CA AAL/B2	0.0091	0.01	7.00E-05	4.40E-07	0.03%
1,1-DCA	0.000	CA MCL/B2	0.091	0.1	0.12E-05	0.57E-06	0.08%
1,4-DCB	0.0005	CA AL/B2	0.024	0.1	1.40E-05	1.40E-04	0.4%
1,1-DCE	0.000	CA MCL/C	0.6	0.009	7.00E-05	4.41E-05	2.00%
ISOPHORONE	0.2	WQC/C	0.0011	0.15	0.57E-02	0.01E-04	15.4%
METH. CHLORIDE	0.040	CA AL/B2	0.0075	0.06	4.00E-04	0.07E-06	0.02%
PCE	0.000	CA AL/B2	0.051	0.01	0.12E-05	0.12E-06	0.10%
TCE	0.000	CA MCL/B2	0.011	0.0074	0.12E-05	0.70E-07	0.04%
VINYL CL	0.0005	CA MCL/A	2.3		0.12E-05	1.41E-05	0.00%
			AGGREGATE EXCESS CANCER RISK =			1.70E-03	100%

RfD = IRIS ORAL REFERENCE DOSE
DWHA = DRINKING WATER HEALTH ADVISORY
WQC = NATIONAL AMBIENT WATER QUALITY CRITERIA FOR PUBLIC HEALTH
2 US MCL = SECONDARY FEDERAL MCL
CA AAL = DHS APPLIED ACTION LEVEL
WOE = WEIGHT OF EVIDENCE - SOURCE OF DATA
A = KNOWN HUMAN CARCINOGEN
B1 = PROBABLE HUMAN CARCINOGEN (limited human evidence, adequate evidence from animals)
B2 = PROBABLE HUMAN CARCINOGEN (inadequate human evidence, adequate evidence from animals)
C = POSSIBLE HUMAN CARCINOGEN (limited evidence of carcinogenicity, animal studies only)

SOLVENT SERVICE INC. TABLE I-A

CLEANUP GOALS SET TO ARARs TO TBCs

DETERMINATION OF EXCESS LIFETIME CANCER RISK FOR CARCINOGENS AND
OF HAZARD INDEX FOR NON-CARCINOGENS

CHRONIC DAILY INTAKE (CDI) = Cw * IR * ED * EF/BW * AT (MG/KG/L)
Cw = CHEMICAL CONCENTRATION, ARARs/TBCs (MG/L)
IR = INGESTION RATE (Liters/Day)
ED = EXPOSURE DURATION (Years)
EF = Exposure Frequency (Days/Year)
BW = Body Weight (Kg)
AT = Averaging Time (period over which exposure is averaged - days)

Cw	IR	ED	EF	BW	AT (toxic)	AT carcinogen)
chemical specific	2	30	365	70	10950	25550

HAZARD INDEX = CDI/RfD
EXCESS LIFETIME CANCER RISK = CDI x q*
RfD = REFERENCE DOSE (MG/KG/DAY)
q* = CANCER POTENCY FACTOR (MG/KG/DAY)-1

Cw = ARARs or TBCs

No.	CHEMICAL	Cw	WOE	RfD	CDI	HI	% OF TOTAL HAZARD INDEX
1	ACETONE	3.500	IRIS	0.1	1.00E-01	1.00E+00	40.1%
2	BENZENE	0.0007	CA MCL\A	0.01	2.00E-06	2.00E-03	0.08%
3	2-BUTANONE	0.020		0.05	5.71E-04	1.14E-02	0.5%
4	CHLOROFORM	0.0060	CA AAL\B2	0.01	1.71E-04	1.71E-02	0.69%
5	1,1-DCA	0.0050	CA MCL\B2	0.1	1.43E-04	1.43E-03	0.06%
6	1,2-DCB	0.005	CA MCL	0.09	1.43E-04	1.59E-03	0.1%
7	1,1-DCE	0.0060	CA MCL\C	0.009	1.71E-04	1.90E-02	0.76%
8	CIS-1,2-DCE	0.006	CA MCL	0.01	1.71E-04	1.71E-02	0.7%
9	TRANS-1,2-DCE	0.010	CA MCL	0.02	2.86E-04	1.43E-02	0.6%
10	ETHYLBENZENE	0.680	CA MCL	0.1	1.94E-02	1.94E-01	7.8%
11	FREON-113	1.200	CA AL	30	3.43E-02	1.14E-03	0.0%
12	METH. CHLORIDE	0.0400	CA AL\B2	0.06	1.14E-03	1.90E-02	0.76%
13	4-METH.-2-PENT.	0.010		0.05	2.86E-04	5.71E-03	0.2%
14	PCE	0.0040	CA AL\B2	0.01	1.14E-04	1.14E-02	0.46%
15	PHENOL	3.500	WQC	0.6	1.00E-01	1.67E-01	6.7%
16	1,1,1-TCA	0.200	CA MCL	0.09	5.71E-03	6.35E-02	2.5%
17	TCE	0.0050	CA MCL\B2	0.0074	1.43E-04	1.93E-02	0.77%
18	TOLUENE	2.000	US MCL	0.3	5.71E-02	1.90E-01	7.6%
19	VINYL CL	0.0005	CA MCL\A	NA	1.43E-05	NA	0.00%
20	XYLENES	1.750	CA MCL	2	5.00E-02	2.50E-02	1.0%
21	ZINC	5.000	2 US MCL	0.2	1.43E-01	7.14E-01	28.6%
				TOTAL HAZARD INDEX =		2.48E+00	100.0%

	CHEMICAL	Cw	WOE\CLASS CARCINOGEN	q*	RfD	CDI	RISK	% OF AGGREGATE ECRN
1	BENZENE	0.001	CA MCL\A	0.029	0.01	8.57E-06	2.48E-07	0.35%
2	CHLOROFORM	0.006	CA AAL\B2	0.0061	0.01	7.35E-05	4.48E-07	0.62%
3	1,1-DCA	0.005	CA MCL\B2	0.091	0.1	6.12E-05	5.57E-06	7.75%
4	1,1-DCE	0.006	CA MCL\C	0.6	0.009	7.35E-05	4.41E-05	61.31%
5	METH. CHLORIDE	0.040	CA AL\B2	0.0075	0.06	4.90E-04	3.67E-06	5.11%
6	PCE	0.005	CA AL\B2	0.051	0.01	6.12E-05	3.12E-06	4.34%
7	TCE	0.005	CA MCL\B2	0.011	0.0074	6.12E-05	6.73E-07	0.94%
8	VINYL CL	0.0005	CA MCL\A	2.3		6.12E-06	1.41E-05	19.58%
				AGGREGATE EXCESS CANCER RISK =			7.19E-05	100%

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WOE = WEIGHT OF EVIDENCE = SOURCE OF DATA
A = KNOWN HUMAN CARCINOGENS
B1 = PROBABLE HUMAN CARCINOGEN (limited human evidence, adequate evidence from animals)
B2 = PROBABLE HUMAN CARCINOGEN (inadequate human evidence, adequate evidence from animals)
C = POSSIBLE HUMAN CARCINOGEN (limited evidence of carcinogenity, animal studies only)

SOLVENT SERVICE INC. TABLE II

Cw SET TO ACHIEVE ECRN 10E-6 AND HI LESS THAN 1

DETERMINATION OF EXCESS LIFETIME CANCER RISK FOR CARCINOGENS AND
OF HAZARD INDEX FOR NON-CARCINOGENS

CHRONIC DAILY INTAKE (CDI) = Cw * IR * ED * EF/BW * AT (MG/KG/L)
Cw = CHEMICAL SPECIFIC CONCENTRATION
IR = INGESTION RATE (Liters/Day)
ED = EXPOSURE DURATION (Years)
EF = EXPOSURE FREQUENCY (Days/Year)
BW = BODY WEIGHT (Kg)
AT = AVERAGING TIME (period over which exposure is averaged - days)

Cw	IR	ED	EF	BW	AT (toxic)	AT (carcinogen)
chemical specific	2	30	365	70	10950	25550

q* = CANCER POTENCY FACTOR (MG/KG/DAY)-1
EXCESS LIFETIME CANCER RISK = CDI x q*
HAZARD INDEX = CDI/RfD
RfD = REFERENCE DOSE (MG/KG/DAY)

Cw (MG/L) = CHEMICAL CONCENTRATIONS TO ACHIEVE HI LESS THAN ONE AND 10E-06 RISK

	CHEMICAL	Cw			RfD	CDI	HI	% OF TOTAL HI
1	ACETONE	0.05			0.1	1.43E-03	1.4E-02	1.35%
2	ANTIMONY	0.0014	WQC		0.0004	4.00E-05	1.0E-01	9.69%
3	ARSENIC	0.00001			0.001	2.86E-07	2.9E-04	0.03%
4	BENZENE	0.0005		/A 0.029	0.01	1.43E-05	1.4E-03	0.14%
5	2-BUTANONE	0.002			0.06	5.71E-05	1.1E-03	0.11%
6	CHLOROFORM	0.0005		/B2 0.0061	0.01	1.43E-05	1.4E-03	0.14%
7	1,1-DCA	0.0005		/B2 0.091	0.1	1.43E-05	1.4E-04	0.01%
8	1,2-DCB	0.0005	CA MCL		0.09	1.43E-05	1.6E-04	0.02%
9	1,4-DCB	0.0005		/B2 0.024	0.1	1.43E-05	1.4E-04	0.01%
10	1,1-DCE	0.0001		/C 0.6	0.009	2.86E-06	3.2E-04	0.03%
11	CIS-1,2-DCE	0.0006	CA AL		0.01	1.71E-05	1.7E-03	0.17%
12	TRANS-1,2-DCE	0.001	CA MCL		0.02	2.86E-05	1.4E-03	0.14%
13	COPPER	0.13	US MCL		0.037	3.71E-03	1.0E-01	9.73%
14	ETHYLBENZENE	0.68	CA MCL		0.1	1.94E-02	1.9E-01	18.83%
15	FREON-113	1.2	CA AL		30	3.43E-02	1.1E-03	0.11%
16	ISOPHORONE	0.001		/C 0.0041	0.15	2.86E-05	1.9E-04	0.02%
17	LEAD	0.005	US MCL		0.0008	1.43E-04	2.4E-01	23.07%
18	METH. CHLORIDE	0.0005		/B2 0.0075	0.06	1.43E-05	2.4E-04	0.02%
19	4-METH.-2-PENT.	0.001			0.05	2.86E-05	5.7E-04	0.06%
20	NAPHTHALENE	3			0.4	8.57E-02	2.1E-01	20.70%
21	PCE	0.0005		/B2 0.051	0.01	1.43E-05	1.4E-03	0.14%
22	PHENOL	0.001	CA AL		0.6	2.86E-05	4.8E-05	0.00%
23	SELENIUM	0.001	CA AL		0.003	2.86E-05	9.5E-03	0.92%
24	1,1,1-TCA	0.02	CA MCL		0.09	5.71E-04	6.3E-03	0.62%
25	TCE	0.0005		/B2	0.0074	1.43E-05	1.9E-03	0.19%
26	THALLIUM	0.0001	WQC		0.00007	2.86E-06	4.1E-02	3.99%
27	TOLUENE	0.04	2 US MCL		0.3	1.14E-03	3.8E-03	0.37%
28	VINYL CL	0.00001		/A	---	2.86E-07	NA	NA
29	XYLENES	1.75	CA MCL		2	5.00E-02	2.5E-02	2.42%
30	ZINC	0.5	US MCL		0.2	1.43E-02	7.1E-02	6.92%
					TOTAL HAZARD IND		1.0E+00	100.00%

	CHEMICAL	Cw	WOE/CLASS OF CARCINOGE	q*	RfD	CDI	HI	% OF TOTAL RISK
1	ARSENIC	0.00001	/A	2		1.22E-07	2.43E-07	10.10%
2	BENZENE	0.0005	/A	0.029	0.01	5.00E-06	1.80E-07	0.02%
3	CHLOROFORM	0.0005	/B2	0.0061	0.01	5.00E-06	3.06E-06	1.28%
4	1,4-DCB	0.0005	/B2	0.024	0.1	5.00E-06	1.22E-07	5.48%
5	1,1-DCA	0.0005	/B2	0.091	0.1	5.00E-06	5.01E-07	20.79%
6	1,1-DCE	0.0001	/C	0.6	0.009	1.16E-06	6.60E-07	27.39%
7	ISOPHORONE	0.001	/C	0.0041	0.15	1.16E-05	4.61E-06	1.87%
8	METH. CHLORIDE	0.0005	/B2	0.0075	0.06	5.00E-06	4.13E-06	1.71%
9	PCE	0.0005	/B2	0.051	0.01	5.00E-06	2.81E-07	11.64%
10	TCE	0.0005	/B2	0.011	0.0074	5.00E-06	6.06E-06	2.51%
11	VINYL CL	0.00001	/A	2.3		1.16E-07	2.53E-07	10.49%
			AGGREGATE EXCESS LIFETIME CANCER RISK:				2.41E-06	100.00%

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SOLVENT SERVICE INC. TABLE III-A
PROPOSED FINAL CLEANUP GOALS

DETERMINATION OF EXCESS LIFETIME CANCER RISK FOR CARCINOGENS AND
OF HAZARD INDEX FOR NON-CARCINOGENS

CHRONIC DAILY INTAKE (CDI) = Cw*IR*ED*EF/BW*AT (MG/KG/day)
Cw = CHEMICAL CONCENTRATION, ARARs/TBCs (MG/L)
IR = INGESTION RATE (Liters/Day)
ED = EXPOSURE DURATION (Years)
EF = EXPOSURE FREQUENCY (Days/Year)
BW = BODY WEIGHT (Kg)
AT = AVERAGING TIME (Period over which exposure is averaged - days)

Cw	IR	ED	EF	BW	AT (Toxics)	AT (carcinogens)
Chemical Specific	2	30	365	70	10950	25550

HAZARD INDEX = CDI/RfD
RfD = REFERENCE DOSE (MG/KG/DAY)
EXCESS LIFETIME CANCER RISK = CDI x q*
q* = CANCER POTENCY FACTOR (MG/KG/DAY)-1

Cw = PROPOSED FINAL CLEANUP GOALS

	CHEMICAL	Cw	WOE	RfD	CDI	HAZARD	% OF TOTAL HI
1	ACETONE	1.000		0.1	2.86E-02	2.86E-01	27.57%
2	BENZENE	0.001	CA MCL	—	2.86E-05	NA	0.00%
3	2-BUTANONE	0.020		0.06	5.71E-04	1.14E-02	1.10%
4	CHLOROFORM	0.006	CA AAL	0.01	1.71E-04	1.71E-02	1.65%
5	1,1-DCA	0.005	CA MCL	0.1	1.43E-04	1.43E-03	0.14%
6	1,2-DCB	0.005	CA MCL	0.09	1.43E-04	1.59E-03	0.15%
7	1,1-DCE	0.005	CA MCL	0.009	1.43E-04	1.59E-02	1.53%
8	CIS-1,2-DCE	0.006	CA AL	0.01	1.71E-04	1.71E-02	1.65%
9	TRANS-1,2-DCE	0.010	CA AL	0.02	2.86E-04	1.43E-02	1.38%
10	ETHYLBENZENE	0.500		0.1	1.43E-02	1.43E-01	13.76%
11	FREON-113	1.200	CA AL	30	3.43E-02	1.14E-03	0.11%
12	METH. CHLORIDE	0.040	CA AL	0.06	1.14E-03	1.90E-02	1.84%
13	4-METH.-2-PENT.	0.010		0.05	2.86E-04	5.71E-03	0.55%
14	NICKEL	0.100		0.02	2.86E-03	1.43E-01	13.76%
15	PCE	0.005	CA MCL	0.01	1.43E-04	1.43E-02	1.38%
16	PHENOL	3.000		0.6	8.57E-02	1.43E-01	13.76%
17	1,1,1-TCA	0.200	CA MCL	0.09	5.71E-03	6.35E-02	6.13%
18	TCE	0.005	CA MCL	0.0074	1.43E-04	1.93E-02	1.86%
19	TOLUENE	1.000		0.3	2.86E-02	9.52E-02	9.19%
20	VINYL CL	0.0005	CA MCL/A	—	1.43E-05	0.00E+00	0.00%
21	XYLENES	1.750	CA MCL	2	5.00E-02	2.50E-02	2.41%
				TOTAL HAZARD INDEX:		1.0	100.00%

	CHEMICAL	Cw	WOE/CLASS CARCINOGE	q*	RfD	CDI	RISK	% OF ECRN
1	BENZENE	0.001	CA MCL/A	0.029	—	1.22E-05	3.55E-07	0.55%
2	CHLOROFORM	0.006	CA AAL/B2	0.0061	0.01	7.36E-05	4.48E-07	0.69%
3	1,1-DCA	0.005	CA MCL/B2	0.091	0.1	6.12E-05	5.57E-06	8.62%
4	1,1-DCE	0.005	MCL/C	0.6	0.009	6.12E-05	3.67E-05	56.81%
5	METH. CHLORIDE	0.04	CA AL/B2	0.0075	0.06	4.90E-04	3.67E-06	5.68%
6	PCE	0.005	CA MCL/B2	0.051	0.01	6.12E-05	3.12E-06	4.83%
7	TCE	0.005	CA MCL/B2	0.011	0.0074	6.12E-05	6.73E-07	1.04%
8	VINYL CL	0.0005	CA MCL/A	2.3	—	6.12E-06	1.41E-05	21.76%
				AGGREGATE EXCESS LIFETIME CANCER RISK =			6.47E-05	100.00%

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C = POSSIBLE HUMAN CARCINOGEN (limited evidence of carcinogenity, animal studies only)

LVENT SERVICE INC. TABLE III-B
PROPOSED FINAL CLEANUP GOALS

DETERMINATION OF HAZARD INDEX FOR TOXIC HEALTH EFFECTS AT PROPOSED CLEANUP STANDARDS

CHRONIC DAILY INTAKE (CDI) = Cw * IR * ED * EF / BW * AT (MG/KG/DAY)
Cw = CHEMICAL CONCENTRATION (MG/L)
IR = INGESTION RATE (Liters/Day)
ED = EXPOSURE DURATION (Years)
EF = EXPOSURE FREQUENCY (Days/Year)
BW = BODY WEIGHT (Kg)
AT = AVERAGING TIME (Period over which exposure is averaged - days)

Cw	IR	ED	EF	BW	AT (toxics)	AT (carcinogen)
Chemical Specific	2	30	365	70	10950	25550

HAZARD INDEX = CDI/RfD
RfD = REFERENCE DOSE (MG/KG/DAY)

q* = CANCER POTENCY FACTOR (MG/KG/DAY)-1
EXCESS LIFETIME CANCER RISK = CDI x q*
Cw = PROPOSED FINAL CLEANUP GOALS

	CHEMICAL	Cw	WOE	RfD	CDI	INGESTION HAZARD	% OF INGESTION HI	INHALATION RfD	INHALATION HAZARD	% OF INHALATION HI	INHALATION +INGESTION	% OF TOTAL HI
1	ACETONE	0.400		0.1	1.14E-02	0.11	13.98%	—	NA	0.00%	0.11	11.46%
2	BENZENE	0.001	CA MCL/A	—	2.86E-06	NA	0.00%	—	NA	0.00%	0.00	0.00%
3	2-BUTANONE	0.029		0.06	8.71E-04	0.01	1.40%	0.09	0.01	3.64%	0.02	1.76%
4	CHLOROFORM	0.006	CA AAL/B2	1.0E-02	1.71E-04	0.02	2.10%	—	NA	0.00%	0.02	1.72%
5	1,2-DCB	0.006	CA MCL	0.09	1.43E-04	0.00	0.19%	0.04	0.00	1.89%	0.01	0.62%
6	1,1-DCA	0.005	CA MCL/B2	1.0E-01	1.43E-04	0.00	0.17%	0.1	0.00	0.80%	0.00	0.29%
7	CIS-1,2-DCE	0.006	CA AL	0.01	1.71E-04	0.02	2.10%	—	NA	0.00%	0.02	1.72%
8	TRANS-1,2-DCE	0.010	CA AL	0.02	2.86E-04	0.01	1.75%	—	NA	0.00%	0.01	1.43%
9	1,1-DCE	0.001	DL/C	9.0E-03	2.86E-05	0.00	0.39%	—	NA	0.00%	0.00	0.32%
10	ETHYLBENZENE	0.400		0.1	1.14E-02	0.11	13.98%	—	NA	0.00%	0.11	11.46%
11	FREON-113	1.200	CA AL	30	3.43E-02	0.00	0.14%	—	NA	0.00%	0.00	0.11%
12	METH. CHLORIDE	0.030	CA AL/B2	7.5E-03	8.57E-04	0.11	13.98%	—	NA	0.00%	0.11	11.46%
13	4-METH.-2-PENT.	0.019		0.05	2.86E-04	0.01	0.70%	0.02	0.01	7.97%	0.02	2.01%
14	NICKEL	0.080		0.02	2.29E-03	0.11	13.98%	—	NA	0.00%	0.11	11.46%
15	PCE	0.005	CA MCL/B2	1.0E-02	1.43E-04	0.01	1.75%	—	NA	0.00%	0.01	1.43%
16	PHENOL	2.000	CA AL	0.6	5.71E-02	0.10	11.65%	—	NA	0.00%	0.10	9.55%
17	1,1,1-TCA	0.200	CA MCL	0.09	5.71E-03	0.06	7.76%	—	NA	0.00%	0.06	6.37%
18	TCE	0.005	CA MCL/B2	7.4E-03	1.43E-04	0.02	2.36%	—	NA	0.00%	0.02	1.94%
19	TOLUENE	1.000		0.3	2.86E-02	0.10	11.65%	1.00	0.03	15.94%	0.12	12.42%
20	VINYL CL	0.0005	CA MCL/A	—	1.43E-05	NA	NA	—	NA	0.00%	0.00	0.00%
21	XYLENES	1.75	CA MCL	2	5.00E-02	0.00	0.00%	0.40	0.13	69.75%	0.13	12.54%
				TOTAL HAZARD INDEX:		0.82	100.00%		0.18	100.00%	1.0	100.00%

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2 US MCL = SECONDARY FEDERAL MCL
CA AAL = DHS APPLIED ACTION LEVEL
DL = Detection Limit
WOE = WEIGHT OF EVIDENCE = SOURCE OF DATA
A = KNOWN HUMAN CARCINOGENS
B1 = PROBABLE HUMAN CARCINOGEN (limited human evidence, adequate evidence from animals)
B2 = PROBABLE HUMAN CARCINOGEN (inadequate human evidence, adequate evidence from animals)
C = POSSIBLE HUMAN CARCINOGEN (limited evidence of carcinogenity, animal studies only)

SOLVENT SERVICE INC. TABLE III-B-PART 2
PROPOSED FINAL CLEANUP GOALS

DETERMINATION OF EXCESS CANCER RISK AT PROPOSED CLEANUP STANDARDS

CHRONIC DAILY INTAKE (CDI) = Cw * IR * ED * EF / BW * AT (MG/KG/DAY)
Cw = CHEMICAL CONCENTRATION (MG/L)
IR = INGESTION RATE (Liters/Day)
ED = EXPOSURE DURATION (Years)
EF = EXPOSURE FREQUENCY (Days/Year)
BW = BODY WEIGHT (Kg)
AT = AVERAGING TIME (Period over which exposure is averaged - days)

	Cw	IR	ED	EF	BW	AT (toxics)	AT (carcinogen)
Chemical Specific		2	30	366	70	10950	25550

HAZARD INDEX = CDI/RfD
RfD = REFERENCE DOSE (MG/KG/DAY)

q* = CANCER POTENCY FACTOR (MG/KG/DAY)-1
EXCESS LIFETIME CANCER RISK = CDI x q*

Cw = PROPOSED FINAL CLEANUP STANDARDS

	CHEMICAL	Cw	WOE/CLASS CARCINOGE	q*	RfD	CDI	RISK	% OF INGESTION ECRN	INHALATION q	INHALATION HAZARD	% OF INHALATION ECRN	INHALATION +INGESTION	% OF TOTAL ECRN
1	BENZENE	0.001	CA MCL/A	2.9E-02	---	1.22E-06	3.55E-07	0.66%	0.029	3.55E-07	1.18%	7.10E-07	0.78%
2	CHLOROFORM	0.006	CA AAL/B2	6.1E-03	1.0E-02	7.35E-06	4.48E-07	0.73%	0.061	5.95E-06	19.77%	6.40E-06	7.03%
3	1,1-DCA	0.005	CA MCL/B2	9.1E-02	1.0E-01	6.12E-06	5.57E-06	9.14%		0.00E+00	0.00%	5.57E-06	6.12%
4	1,1-DCE	0.001	DL/C	6.0E-01	9.0E-03	1.22E-06	7.35E-06	12.06%	1.2	1.47E-05	48.82%	2.20E-05	24.20%
5	METH. CHLORIDE	0.04	CA AL/B2	8.0E-02	7.5E-03	4.90E-04	2.94E-05	48.19%	0.014	6.86E-06	22.76%	3.62E-05	39.79%
6	PCE	0.005	CA AL/B2	5.1E-02	1.0E-02	6.12E-06	3.12E-06	5.12%	0.003	1.94E-07	0.61%	3.31E-06	3.63%
7	TCE	0.005	CA MCL/B2	1.1E-02	7.4E-03	6.12E-06	6.73E-07	1.10%	0.0048	2.92E-07	0.94%	9.65E-07	1.06%
8	VINYL CL	0.0005	CA MCL/A	2.3E+00	---	6.12E-06	1.41E-05	23.09%	0.29	1.78E-06	5.90%	1.59E-05	17.41%
			AGGREGATE EXCESS LIFETIME CANCER RISK =				6.10E-05	100.00%		3.01E-05	100.00%	9.11E-05	100.00%

IRIS = IRIS ORAL REFERENCE DOSE
DWHA = DRINKING WATER HEALTH ADVISORY
WQC = NATIONAL AMBIENT WATER QUALITY CRITERIA FOR PUBLIC HEALTH
US MCL = PRIMARY FEDERAL MCL
2 US MCL = SECONDARY FEDERAL MCL
CA AAL = DHS APPLIED ACTION LEVEL
DL = Detection Limit
WOE = WEIGHT OF EVIDENCE = SOURCE OF DATA
A = KNOWN HUMAN CARCINOGENS
B1 = PROBABLE HUMAN CARCINOGEN (limited human evidence, adequate evidence from animals)
B2 = PROBABLE HUMAN CARCINOGEN (inadequate human evidence, adequate evidence from animals)
C = POSSIBLE HUMAN CARCINOGEN (limited evidence of carcinogenity, animal studies only)

APPENDIX D

SOLVENT SERVICE, INC.

1040 COMMERCIAL STREET, SUITE 101, SAN JOSE, CA 95112
PH: (408) 453-6046 FAX: (408) 453-6045

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD

July 16, 1990

JUL 18 1990

QUALITY CONTROL BOARD

Mr. Ron Gervason
Regional Water Quality Control Board
San Francisco Bay Region
1800 Harrison Street
Suite 700
Oakland, California 94612

Re: Tentative Order and Site Cleanup Requirements for Solvent Service Co., Inc., 1021 Berryessa Road, San Jose, Santa Clara County

Dear Mr. Gervason:

Solvent Service ("SSI") wishes to take this opportunity to provide the California Regional Water Quality Control Board, San Francisco Bay Region (the "Board"), with comments regarding the above-captioned order (the "Order"). These comments are intended to supplement our previous letter to you dated June 18, 1990 and not supersede the comments therein. The following comments are presented in the sequence in which they arise in the Order; this organization is not intended to be an indication of the relative significance of the comments.

FINDINGS.

1. Finding 1, Page 1. Sentence one should be amended to more correctly reflect the purpose of the SSI facility. To accomplish this, the phrase "treating and reclaiming industrial solvents and corrosive liquids," should be deleted and replaced with "waste treatment and recycling."

Sentence two should be amended such that it more accurately reflects the location of the site. To accomplish this, the second sentence should be amended to read, "The site occupies 3.2 acres and is located approximately 10 miles southeast of San Francisco Bay and approximately 1/3 mile southwest of the confluence of Upper Penitencia Creek and Coyote Creek. The site is near the intersection of . . . ."

The final sentence indicates that SSI has accepted responsibility for the release of the pollutants into the subsurface and the associated cleanup. This is inaccurate to the extent it applies to the "Commingled Plume." To remedy this, the final sentence should be deleted and replaced with:

> Pursuant to Health and Safety Code Sections 25356.1(c) & (d), the discharger is the only identified responsible party associated with the release of non-petroleum related contaminants to the subsurface at

this location and has accepted responsibility for the cleanup of the site solely as it relates to non-petroleum related contaminants. The discharger has not assumed responsibility for the petroleum related contaminants that form a plume along the site's southwestern property line (the "Petroleum Plume"), which have migrated onto the site from the Chevron property located across Berryessa Road. Further, the discharger has not assumed responsibility for the VOCs, if any, associated with the Petroleum Plume.

2. Finding 2, Page 1. Sentence three is inaccurate in its dates for the analytical results and in the concentration of the CIS-1,2-DCE. To correct these inaccuracies, the third sentence should be amended to read, "Some of the chemicals detected most frequently and in the highest concentrations in the groundwater, based on analytical results from January 1987 through July 1989 (see attached map), are acetone at 19,000,000 parts per billion (ppb), trichloroethylene (TCE) at 150,000 ppb, 1,1,1-TCA at 100,000 ppb, and CIS-1,2-DCE at 67,000 ppb."

3. Finding 2, Page 2. To clarify the type of sampling that was completed in December of 1989, the word "unfiltered" should be inserted between the words "onsite" and "sampling" in the first sentence on page 2.

4. Finding 2, Page 4. The remediation activities are expected to be transferred to regulation under RCRA. To clarify that the Board will remain the lead agency after this transfer has occurred, the phrase "and under RCRA," should be added to the last sentence.

5. Finding 4, Page 2. Since the site has never been placed on the National Priorities List ("NPL"), the beginning of the first sentence should be changed to read, "The site has been proposed for inclusion on the "National Priorities List . . . ," to clarify that the site is not yet on the NPL.

6. Finding 5, Page 2 and 3. As discussed in our June 18, 1990 letter to you and our comment on Provisions 1.j-1.q (excluding 1.k) below, SSI should not be held responsible for the Petroleum Plume. Therefore, this finding should be deleted. If the Board should choose to leave in finding 5, the following changes should be made:

The final sentence on page 2 indicates that hydrocarbon contamination has been known to exist "onsite" since 1984. This is true for the Chevron property, not SSI. To correct this the word "onsite" should be deleted and replaced with, "at the Chevron site."

The final two sentences are inaccurate in that they assume that VOCs are commingled with the Petroleum Plume; this has not been proven. Additionally, the Petroleum Plume extends beyond the Site to the northwest, not the southwest. To make these sentences more accurate, the language should be amended to read, "The HCs may be commingled with low levels of VOCs in this area. Based on current data collected by SSI and Chevron, the HC plume apparently continues beyond the SSI site to the northwest."

7. Finding 6, Page 3. The alluvial material is consistently interspersed with layers of marine clay. Therefore, in sentence one, the word "sometimes" should be deleted.

The second paragraph refers to "A aquifer", the fourth paragraph refers to "Zone D/E", these are inaccurate references to the geological layers. The appropriate reference to the three layers are Aquifer A, Zone B/C, and Aquifer D/E. These terms should be used consistently throughout the Order.

The last sentence of the second paragraph is inaccurate in its description of the width of the clay layer. To correct this, the phrase "6 to 16 foot" should be amended to read "12 to 60 feet."

The fourth paragraph, which describes Aquifer D/E, is misleading in that it does not indicate that Aquifer D/E is not used for the domestic water supply in the vicinity of the site and that it does not indicate that this Aquifer is hydraulically separate from the other layers. To rectify this, the third sentence in the fourth paragraph should be deleted and replaced with, "Aquifer D/E is believed to be very permeable and is hydraulically separate from the other layers. The regional domestic water supply is historically drawn from Aquifer D/E, however, in the immediate vicinity of the site Aquifer D/E is not used for such purposes."

The final sentence of this finding references a channel deposit that is adjacent to Aquifer A yet is in a paragraph that discusses Aquifer D/E. For clarity, this sentence should be moved to the end of the second paragraph, which discusses Aquifer A.

8. Finding 7, Page 3. The information reflected in the first two sentences is not well documented. Therefore, these two sentences should be deleted and replaced with the following language, "Underground storage tanks used for solvent storage spill control and waste solvent storage were removed in or about 1982. Adjacent soil was also excavated, however, this is not well documented."

9. Finding 7, Page 4. The last sentence in the first full paragraph on page 4 should be amended by deleting the phrase, "which has been expanded since 1984."

In discussing the treatment storage and disposal area in the first full paragraph on page 4, the order fails to discuss that the TSD area has been bermed and that operational procedures have been changed to minimize the risk of additional contamination. To correct this, the following language should be added to the end of the first full paragraph on page 4, "Additional interim remedial measures have included berming the treatment and storage area and changing operational procedures to minimize risk of additional contamination."

The third and fourth sentences in the second full paragraph on page 4 do not accurately reflect the process of treating the water or its subsequent use. To rectify this, the sentences should be amended to read, "Extracted groundwater is being treated by a biological treatment system, air stripping, and carbon absorption. Treated water is used in the SSI cooling towers and is subsequently discharged into the sanitary sewer under authorization from the sanitary district."

10. Finding 8, Page 4. The final sentence in the second paragraph refers to the "initial draft RI/FS Report," this should be a reference to the "final draft RI/FS Report."

11. Finding 8, Page 5. The third full paragraph indicates a need for additional investigative work to establish background levels for inorganic compounds. This investigative work is most appropriately undertaken by the Board itself or some other government agency and should not be the responsibility of SSI. The following language should be added to the end of the third paragraph, "Such background levels shall be established by the Board or other appropriate State agency."

12. Finding 9, Page 6. Subparagraph a refers to groundwater extraction from both onsite and offsite aquifers. It should be clarified that this reference is only to Aquifer A. To reflect this, the phrase "onsite aquifers" in the first sentence should be changed to "Aquifer A," and the second sentence in the second paragraph should be amended to read, "Therefore extraction from Aquifer A from offsite wells may be required . . . ."

13. Finding 9, Page 7. In subparagraph c it is unclear as to what the phrase "(less than 1ppm)" refers. Given that this standard is set forth in RI/FS which is to be adopted with this Order, this parenthetical should be deleted.

Subparagraph f adds the requirement of a deed restriction which would prohibit development of the site for residential use until certain cleanup goals are attained. This provision should

be deleted because it is an inappropriate method of ensuring the protection of public health and safety. Public health and safety concerns regarding future land use are already comprehensively dealt with by the California Environmental Quality Act ("CEQA"). CEQA sets forth specified procedures which will have to be followed to obtain approval for any different future site use, especially residential development. In addition, California law provides specific protective mechanisms, such as Proposition 65 and Health and Safety Code Section 25359.7, to ensure that appropriate disclosures are made to future users of the premises. In light of existing regulatory controls, the proposed deed restriction is inappropriate in that it establishes an administrative overlay which will be difficult to administer because of the very vague standards set forth. Further, it is questionable whether the Board has the authority to require that such a deed restriction be recorded.

14. Finding 10, Page 7. The use of the parenthetical "(toxic)" is unclear in that it appears to imply all non-carcinogenic chemicals are toxic. For clarity, this parenthetical should be deleted.

15. Finding 10, Page 9 and Finding 11, Page 9. Both Findings 10 and 11 refer to Aquifer A as a potential source of drinking water. This assumption is unfounded and should be removed from the Order. Aquifer A has not historically been used in the region as a drinking water aquifer due to its proximity to the surface. This makes potential contamination highly probable and for that reason alone Aquifer A is a poor potential drinking water supply. Further, the TDS in Aquifer A is above 1,000 ppm. Since sources for drinking water supplies should have TDS at 500 ppm (U.S. EPA Secondary MCL) or lower, even in the absence of contamination, Aquifer A is not suitable as a drinking water source.

16. Finding 11, Page 9. The second sentence in the second paragraph refers to the maximum amount of chemicals allowed in the groundwater. It should be clarified that the cleanup objective refers to the maximum amount of "organic chemicals" in the groundwater.

Subparagraph a refers to the appropriate cleanup standard for phenol as being one (1) microgram per liter. This is the State Action Level for taste and odor. It is more appropriate to use a health based standard such as the EPA National Ambient Water Quality Criteria for Public Health ("WQC"). As such, the standard for phenol should be 35,000 micrograms per liter. This requirement should be moved to Subparagraph e on page 10 so that it is grouped with the other cleanup standards based on WQC.

17. Finding 11, Page 10. The Secondary U.S. MCL set forth for toluene in Subparagraph b is not a health based standard. A

health based standard is more appropriate for this cleanup. Therefore, the U.S. MCL of 2000 micrograms per liter should be used. Subparagraph b should be amended to read, "U.S. MCL values for copper (1,300) zinc (5,000), and toluene (2,000)."

18. Finding 12, Page 11. To provide a mechanism for changing the standards, the following language should be added to the end of the first paragraph, "The discharger may request the Board amend the standards or amended standards when it determines that the standards or amended standards are not reasonably attainable."

19. Finding 18, Page 13. For reasons discussed above in Paragraph 15, Aquifer A is unlikely to be used for the listed beneficial uses of groundwater. Additionally, Zone B/C does not have sufficient water to be appropriate for such uses and like Aquifer A has TDS over 500 ppm. Therefore, it should be clarified, that such existing and potential uses are only applicable to Aquifer D/E. This can be accomplished by amending the introductory phrase to read, "The existing and potential beneficial uses of the groundwater in Aquifer D/E underlying and adjacent to the facility include:"

SPECIFICATIONS.

1. Specification 3, Page 14. The concentration for phenol should be changed to 3.5 and the concentration for toluene should be changed to 2.0. The explanation for these changes can be found in Paragraphs 16 and 17 in the discussion above addressing the Findings.

PROVISIONS.

1. Provision 1.b, Page 15. The completion date for Provision 1.b. should be changed from October 31, 1990 to November 31, 1990. This will allow SSI to compile additional information prior to submitting the report.

2. Provision 1.e, Page 16. Provision 1.e. refers to Task C.1.c., the reference should be to Task C.1.d.

3. Provision 1.f, Page 16. The first sentence erroneously infers that groundwater is being pumped from pits. To correct this the words "and pit(s)" should be deleted from the first sentence.

4. Provision 1.g, Page 17. Provision 1.g. refers to Task C.1.e., the reference should be to Task C.1.f.

5. Provision 1.h, Page 17. Paragraph 2 discusses what will occur if safe drinking water levels cannot be achieved. Given that it has already been determined that such levels cannot

be achieved for certain chemicals and the natural TDS cannot meet the safe drinking water standard, the final sentence should be deleted.

6. Provision 1.i, Page 17. Provision 1.i. allows the Executive Officer to require an evaluation of how final plan and cleanup standards would be affected as a result of changes in information. The Executive Officer should not be allowed to require such evaluations more than once every five (5) years. The following language should be added to Provision 1.i., "The Executive Officer shall not request such an evaluation more than one (1) time during a five year period."

7. Provision 1.k, Page 18. It is unclear from the organization of the Order that Provision 1.k. refers to the downgradient VOC contamination and not to the Petroleum Plume. To clarify this, this Provision should be moved above Provision 1.j. Additionally, the phrase, "where VOCs have been discovered," should be added to the end of the first sentence.

SSI requests that the completion date for Provision 1.k. be changed to February 30, 1991. SSI will then have an additional round of groundwater sampling results and as such will be able to provide a more effective work plan for remediation of the offsite problem.

8. Provisions 1.j-1.q (excluding Provision 1.k), Pages 18 through 20. As discussed in our June 18, 1990 letter, SSI believes that work to be done on the Petroleum Plume should be carried out by Chevron. SSI's reasons for this position include that SSI has done all work to date to define the extent of the petroleum contamination on its property which has been caused by Chevron, Chevron's lack of initiative in addressing the problem and the fact that Chevron is primarily or solely responsible for the contamination. As such, we believe Provisions 1.j. through 1.q., with the exception of Provision 1.k., should be deleted from this Order. Should they not be deleted from the Order, SSI believes it would be appropriate for the Board to assign primary responsibility to Chevron for the work and assign SSI secondary responsibility in case Chevron fails to meet its obligations.

Additionally, as stated in our June 18 letter, regardless of responsibility, from a technical viewpoint only Provisions 1.j. and 1.l. should be required at this time because of lack of information concerning the nature, extent and origin of the Petroleum Plume. Given the lack of certainty concerning this issue, SSI believes it is not appropriate, at this time, to address the substantive aspects of the Order as it applies to the Petroleum Plume. However, SSI reserves the right to submit such comments at a later date should they become necessary.

As discussed earlier, I believe that it is best for us to arrange a meeting with the Board's legal counsel, yourself, our technical consultants and our legal counsel to discuss the issue of the Petroleum Plume and any additional issues which may have been raised by these comments which you feel are appropriate to discuss with legal counsel. We would appreciate it if you could arrange such a meeting with your counsel later this week, in order to allow maximum time to resolve any outstanding issues.

I look forward to hearing from you.

Very truly yours,

SOLVENT SERVICE CO., INC.

By: _____
Sue Vedantham

SV

cc: David Abbott
Lawrence A. Cogan, Esq.
Mary Haber, Esq.

Santa Clara Valley Water District

5750 ALMADEN EXPRESSWAY
SAN JOSE, CALIFORNIA 95118
TELEPHONE (408) 265-2600
FACSIMILE (408) 266-0271
AN AFFIRMATIVE ACTION EMPLOYER

July 20, 1990

CALIFORNIA REGIONAL WATER
JUL 24 1990
QUALITY CONTROL BOARD

Mr. Ron Gervason
Regional Water Quality Control Board
1800 Harrison Street, Room 700
Oakland, CA 94612

Dear Mr. Gervason:

Subject: Comments on Final Clean Up Plan, Solvent Services, Inc., San Jose, California

This letter presents our comments on Regional Water Quality Control Board's (RWQCB's) proposed final clean up plan and tentative order for soils and groundwater at the Solvent Services, Inc., site in San Jose.

In general, we are in concurrence with the plan using steam injection-vacuum extraction to clean up the surficial soils and A-aquifer; this followed by a pump-and-treat clean up of the B/C zone.

However, we do have concerns regarding proposed clean up goals for existing or potential drinking water aquifers. Consistent with our Board of Director's position on clean up goals for similar sites, we urge you to consider setting goals for carcinogenic contaminants using the Carcinogenic Hazard Index approach. As a clean up goal, this provides a more conservative approach when multiple carcinogenic chemicals are present. We fully understand that further remediation requirements would be evaluated based on feasibility and risk assessment evaluations.

The following specific comments are related to interpretation of B/C zone contamination and potential conduits between the shallow and deep aquifers. In the assessment of the hydrogeologic consultant for Solvent Services, Inc., the contamination of the B/C zone was caused by previous improper monitoring well installation and construction. If this were the case, clean up of this zone through pump-and-treat should be relatively rapid. However, if contamination were caused by chemicals seeping through the intervening aquitard to the B/C zone, clean up may take much longer as chemicals sorbed in the aquitard would slowly continue to be desorbed and leached into the aquifer. Therefore, it is suggested that the discharger evaluate the full range of remediation efforts that might be required.

With regard to potential conduits, Todd Engineers, in their January, 1990, report on Final R1/FS, identified 280 wells within one-half mile radius of the site including 166 active monitoring wells, 2 cathodic protection wells, 45 destroyed or abandoned monitoring wells, 15 production wells, and 38 destroyed production wells. Also included in this total are an estimated 14 historical production wells identified from old maps of the area. Though no contamination have been detected in any of the 15 active production wells, we are concerned about the possible 14 historical production wells, whose dispositions are uncertain, and have the potential for unquantifiable risks. Results of sampling and testing under AB 1803 for nearby production wells should be reviewed on a timely basis to monitor any potential adverse effects by unknown abandoned wells as potential conduits between the shallow aquifer zone and the deep zone.

Please call Tom Iwamura or myself at (408) 927-0710 should you have any questions.

Sincerely,

Thomas D. Iwamura for

David J. Chesterman
Division Engineer
Groundwater Protection Division

...te of California Department of Health Services

Memorandum

To : Steven Ritchie, Executive Officer
Regional Water Quality Control Board
1800 Harrison St., Suite 700
Oakland, CA 94612

Date : July 31, 1990

Subject: Tentative Orders
Site Clean-up
Requirements-
Intersil/ Siemens
& Solvent Services-
Proposed Superfund
Sites-SantaClara Cy

From : Office of Drinking Water
2151 Berkeley Way, Rm 458
Berkeley, CA 94704
8-571-2160

On July 24, 1990 Mr. Steve Morse of your Board requested clarifications and additional comments from the Department of Health Services (DOHS) - Office of Drinking Water (ODW) on the Cleanup Requirements of Superfund sites in Santa Clara County. These comments are supplemental to those previously submitted to the Board in a memo dated July 11, 1990. We have recently completed review for 2 cleanup sites: Intersil/Siemens (I/S) and Solvent Services Inc. (SSI). Inasmuch as our general guidance on cleanup goals for cleanup of contaminated groundwaters involving domestic water issues is the same, we have combined the two sites in our response memos. For case-specific comments on the discussions of cleanup alternatives, Carcinogen Hazard Index (CHI), and risk calculations for the I/S and SSI sites, please refer to Appendices A and B, respectively.

DOHS-ODW - CLEANUP GOALS

As stated in our July 11, 1990 memo, for the purpose of setting cleanup goals for contaminated groundwaters designated as domestic water supply source, the following are the guiding principles used by the Office of Drinking Water:

1. The total cancer risk level does not exceed 10^{-6}, or
2. Carcinogenic Hazard Index does not exceed 1.0, and
3. No contaminants exceed MCL or AL, where applicable.

The above criteria should be followed whenever it is technologically and economically feasible in the remediation of contaminated groundwater aquifers for the protection of their beneficial uses involving domestic consumption.

REGIONAL BOARD (RB) - PROPOSED CLEANUP LEVELS

We acknowledge the method and procedures used by the Board staff for deriving cleanup levels for Superfund sites. The procedures are detailed in the "Guidance Document for the Development of Health-Based Remedial Clean-up Levels for the South Bay Multi-site Cooperative Superfund Program" (RWQCB, June 20, 1990). The basis for this guidance document stems from the EPA's National Oil and Hazardous Substances Pollution Contingency Plan, 1990, and the Risk Assessment Guidance For Superfund, Human Health Risk Assessment; EPA Region IX Recommendations, 1989 (Interim Final).

We also acknowledge that the method used by the Board staff was developed primarily to handle cleanup of Superfund sites. The method does not adequately address specific concerns on the protection of affected groundwaters as domestic water supply sources.

We must also add that in the development of the Board's "Guidance Document", the Department was not informed about it or made part of its peer review prior to finalization.

Consequently, the cleanup levels prescribed for both the I/S and SSI sites proposed in the Tentative Orders involve a much higher total cancer risk than the Department's recommended 10^{-6} level. In addition, using the Carcinogen Hazard Index approach, these contaminated sites after remediation ordered by the Board, will still have hazard indices many times higher than 1.0.

We are opposed to these cleanup levels as they are excessively high and do not adequately protect the groundwater's beneficial uses as domestic supply sources.

CLEANUP FEASIBILITY

On the issue of cleanup feasibility, Board staff indicated during the July 24 meeting that, pursuant to the Board's Resolution No. 68-16, the Non-degradation Policy, the RI/FS conducted by both I/S and SSI included the evaluation of cleanup to "non-detectable" or "background" levels. The Board then made the determination that this alternative would be economically and technically infeasible. We agree that it would be impractical to clean up to non-detectable levels. We also request the Board to re-examine the feasibility of a cleanup alternative and to reconsider the setting of cleanup requirements to a more health protective level from the standpoint of protection of domestic water quality.

CALIFORNIA SAFE DRINKING WATER ACT-RECOMMENDED PUBLIC HEALTH LEVELS (RPHLs)

In addition, we draw your attention to Section 4023 of the California Safe Drinking Water Act on Recommended Public Health Levels (RPHLs). A copy of the Act is enclosed for your reference. The Department is currently in the process of promulgating the RPHLs mandated by our Drinking Water Program. RPHLs are health-based goals set to further reduce contaminants in domestic water supplies to below the MCL. For carcinogenic compounds, the RPHLs will be set at the 10^{-6} cancer risk level. These RPHLs will be applied to all domestic water sources. Water suppliers serving 10,000 service connections or more will be required to submit a Water Quality Improvement Plan (WQIP) to the Department demonstrating the feasibility of providing additional treatment as well as monitoring control in order to meet the RPHLs in both their existing as well as new water sources.

In essence, the WQIP can be viewed as a parallel document as the Remedial Investigation /Feasibility Study (RI/FS) required of the responsible party(ies) by the Board. The water suppliers will be charged with the responsibilities in meeting more conservative and health protective water quality standards than those required of responsible parties in the cleanup of the groundwater. We hereby advise the Board of this serious potential shortcoming in imposing less than acceptable or health protective remediation levels in the affected groundwater aquifers used for domestic supply source.

We would also like to point out that in accordance with the EPA's National Contingency Plan, the RPHLs, when promulgated, will become the ARARs. The RPHLs are currently in development. We will keep the Board informed of all adopted RPHLs in the future.

Thank you for your consideration on this important issue relating water supply quality. We are hopeful that we can work jointly to resolve this problem. We will be available to further discuss this issue at your request or you may have questions we can answer by phone. Please do not hesitate to contact me at (415) 540-2160.

Catherine S. Ling, P.E.
District Engineer
Monterey District

Attachments
cc: See next page

cc: Santa Clara County Health Department
Santa Clara Valley Water District
Santa Clara County Water Retailers
CWS-Los Altos
City of Cupertino
City of Gilroy
City of Milpitas
City of Morgan Hill
City of Mountain View
City of Palo Alto
City of San Jose
City of Santa Clara
City of Sunnyvale
Great Oaks Water Company
San Jose Water Company
Stanford University

APPENDIX A: INTERSIL/SIEMENS SUPERFUND SITE

A. Cleanup levels

The proposed cleanup levels prescribed for the I/S site contained in the Tentative Order are the ARARs(= MCL) for all the chemicals in all of the A- , B- and C- Zone aquifers.

As presented by Mr. Wolfenden using the risk calculations, the cleanup of PCE and TCE to MCL in the A- and B- Zone aquifers would result in a total risk of 3.8×10^{-6}. This is 3.8 times higher than the 10^{-6} level recommended by the Department of Health Services. Using the DOHS CHI approach for 2 carcinogens at MCL, it would have an index of 2.0, twice that recommended by DOHS. However, as stated in our July 11 memo, the A- and B- Zones are considered non-domestic supply zone. Our cleanup goals would not be applicable in this case.

In the C- Zone aquifer, Mr. Wolfenden pointed out that the VOCs currently detected include 19 ppb of TCE and 1 ppb of 1,1-DCE. Since DCE is considered as a non-carcinogen, only TCE is of concern in this particular aquifer. The proposed cleanup to drinking water standard for TCE would be acceptable from a domestic supply standpoint because only a single carcinogenic chemical is involved in this case. Also, as discussed during the July 24, 1990 meeting, the proposed cleanup to MCL for TCE at a much higher concentration than that of DCE would at the same time bring the DCE to very low or non-detectable level, assuming comparable removability of both TCE and DCE in the aquifer. We agree with this. In this case, we suggest that it would be more appropriate for the Board to communicate the "actual" total cancer risk expected from the remediation rather than the risk calculated with the assumption that all of the chemicals are at MCL or ARARs levels.

B. Cleanup alternatives

The feasibility of cleanup to drinking water standards for chemicals in all of the three shallow aquifers A-, B- and C- Zones is based on the proposed remediation plan of extracting contaminated water only from the A- and B- Zone aquifers. No groundwater extraction or remediation is currently proposed for the C- Zone aquifer. The groundwater model used by the Board predicts an upward flow of contaminated water from C- Zone aquifer to the upper A- and B- Zone aquifers. The model for this cleanup alternative also projects to a 45-year period of remediation. This appears to be an extremely long and energy intensive task.

We question the validity of the cleanup plan which does not include a direct remediation plan for C- Zone aquifer, since this is the most vulnerable zone with respect to domestic water supply. As discussed previously, the C- Zone aquifer is an existing domestic water supply source for small system wells, and is also the immediate link to the deeper aquifers, which is the primary source for most of large water systems.

The Board should examine the feasibility of direct extraction from the C aquifer. This could be a more cost-effective and time- efficient alternative for the overall cleanup program at I/S.

APPENDIX B: SOLVENT SERVICES INC. SUPERFUND SITE

A. Background

The SSI site involves multiple chemicals which have contaminated the A, B/C, and D/E aquifers, both on- and off-site. The greatest extent of contamination is in the upper A and B/C aquifers. The D/E aquifer is an existing domestic water supply source. Within one mile radius from the site, there are 2 existing domestic water supply wells drawing from the D/E aquifer.

The carcinogenic chemicals of concern are (8): Arsenic, Benzene, Vinyl Chloride, 1,1-DCA, Methylene Chloride, PCE, TCE, Chloroform.

The non-carcinogenic chemicals of concern are (14): Acetone, 2-Butanone, 1,2-DCB, Cis-1,2-DCE, 1,1-DCE, Trans-1,2-DCE, Ethylbenzene, Freon-113, 4-Meth-2-Pent., Nickel, Phenol, 1,1,1-TCA, Toluene, Xylene.

B. Cleanup levels

NCHI = 0.96 for noncarcinogens.

Total Cancer Risk including Arsenic = 4.98×10^{-4}

As shown, the cleanup levels proposed in the Tentative Order by the Board for the SSI site involve a much higher (498 times) cancer risk than 10^{-6}. In addition, applying the DOHS CHI approach results in a Hazard Index of 7.1.

As stated in our July 11 memo, the interactive effects of the different component toxicants in the mixtures are not well defined and understood. We are greatly concerned about the additional health risks and hazards associated with mixtures of chemicals. We again request the Board to re-examine the feasibility of additional remediation measures and to reconsider lowering the cleanup levels to a more health protective level.

C. Cleanup alternatives

The extent of the contamination and the characterization of the plume off-site were not clear from the Tentative Order. However, it is clear that there will be no direct remediation measure taken. Instead, the remediation of contamination off-site is proposed as a "contingency" plan. It depends solely on the on-site containment process. This process involves the operation of 3 extraction trenches to "pull back" and recover contaminants from the groundwater off-site. The Order, on the other hand, specifically states that the effectiveness of such proposed contingency plan has not been demonstrated by current data. Is there another contingency plan in wait in case the proposed one fails?

Santa Clara Valley Water District
5750 ALMADEN EXPRESSWAY
SAN JOSE, CALIFORNIA 95118
TELEPHONE (408) 265-2600
FACSIMILE (408) 266-0271
AN AFFIRMATIVE ACTION EMPLOYER

August 3, 1990

Mr. Steve Morse
Regional Water Quality Control Board
1800 Harrison Street, Room 700
Oakland, CA 94612

Dear Mr. Morse:

Subject: Comments on Intersil/Siemens and Solvent Services Clean Up Plans

In previous comments transmitted to your staff by letters dated July 13, 1990, and July 20, 1990, for the Intersil/Siemens and Solvent Services sites respectively, we have suggested that the Regional Board apply the Carcinogenic Hazard Index approach for setting clean up level.

In response to discussions with you at a meeting on July 24, 1990, and subsequent discussions with the Department of Health Services, I agree that your methodology for computing clean up levels may be appropriate. The District remains concerned, however, with the recommended goals resulting in 10^{-6} risk levels for carcinogenic compounds. It is my understanding that forthcoming Recommended Public Health Levels (RPHL's) will be based on a 10^{-6} cancer risk. As a result, the recommended goal could adversely impact the future use of that portion of the groundwater basin.

Therefore, we urge you to require a remediation plan which will achieve a total cancer risk level of 10^{-6} in order to assure uninhibited use of the groundwater basin

Sincerely,

David J. Chesterman
Division Engineer
Groundwater Protection Division

SOLVENT SERVICE, INC.
1040 COMMERCIAL STREET, SUITE 101, SAN JOSE, CA 95112
PH: (408) 453-6046 FAX: (408) 453-6045

June 18, 1990

S0748-900900

Mr. Ron Gervason
Regional Water Quality Control Board
San Francisco Bay Region
1800 Harrison Street, Suite 700
Oakland, California 94612

Re: Solvent Service, Inc. – Tentative Order

Dear Mr. Gervason:

This letter is in reference to the "Notice of Transmittal of Site Cleanup Requirements for Solvent Service, Inc., 1021 Berryessa Road, San Jose, California," dated June 4, 1990 (the "Notice"). The Notice contains the tentative order ("Order") of the Regional Water Quality Control Board ("RWQCB") and references the RI/FS and the RAP for the Solvent Service, Inc. ("SSI") facility. The Notice specifies a public comment period from June 20 - July 20, 1990, following adoption of the tentative Order, the RI/FS and the RAP by the RWQCB at its hearing on June 20 for the purpose of initiating the public comment process. Among other things, Provisions C.1.j. through C.1.q. of the Order require that SSI take equal responsibility with Chevron U.S.A. Inc. ("Chevron") for the investigation and cleanup of contaminants in what is referred to in the Order as the "commingled plume area" (in this letter, such plume area is referred to as the "Chevron Plume"). According to Finding 5 of the Order, the Chevron Plume is located along the southwest SSI site boundary and perhaps beyond that boundary to the southwest, and is part of a groundwater plume of dissolved and separate-phase hydrocarbons from Chevron's nearby fuel distribution facility at 1020 Berryessa Road. According to Finding 5, the hydrocarbons in the Chevron Plume are commingled with low levels of VOCs.

Generally stated, SSI objects to being held jointly and equally responsible with Chevron for the Chevron Plume. SSI contends that it should not be classified as a discharger regarding the Chevron Plume, or, alternatively, that at most it should be held secondarily liable for the Chevron Plume. SSI further objects to the extensive scope of the Order as it relates to the Chevron Plume. It is premature to establish a full schedule for the investigation and final cleanup of the Chevron Plume. Substantial further characterization of the extent of the Chevron Plume appears to be required prior to establishing such a schedule.

SSI and its hydrogeological consultant, David Keith Todd Consulting Engineers, Inc. ("Todd Engineers"), believe that it is presently unclear whether the SSI site is a source of the VOCs that are present in the Chevron Plume. Todd Engineers notes that the Chevron Plume may be a completely distinct plume from the solvent plume

("Solvent Plume") which originates from the SSI site and which is dealt with in the RAP. There in fact may be no commingling. If SSI has not caused or contributed to the Chevron Plume, it is not a discharger and should not be required to investigate or remediate such contamination. The Water Code does not provide that an owner or operator of property is a discharger merely because its property overlies contaminated groundwater.

Given that, at present, Chevron is the only conclusively identified contributor to the Chevron Plume, Chevron, not SSI, should more fully characterize the Chevron Plume. Accordingly, at this time, SSI should not be classified as a discharger in regard to the Chevron Plume.

Even assuming for the sake of argument that SSI is responsible for some or all of the VOCs that are present in the Chevron Plume, Chevron should be held primarily liable and at most SSI should be held secondarily liable for the investigation and remediation of the Chevron Plume. As explained more fully below, the reasons for this essentially are three-fold:

(1) under the circumstances, ample precedent exists to assign secondary liability to SSI;

(2) it is uncertain whether, and to what extent, SSI has contributed to the Chevron Plume; and

(3) in the course of its investigation of contamination originating from the SSI site, SSI has already conducted much investigation of the Chevron Plume, whereas Chevron has done little in this regard.

First, SSI is informed by its lawyers that there is ample precedent for assigning secondary liability to SSI under circumstances such as these. A recent RWQCB order, No. 89-086, which sets site cleanup requirements for the Intel Magnetics/Micro Storage federal Superfund site in Santa Clara, provides especially strong precedent for assignment of primary liability to Chevron and secondary liability to SSI. The context of that order is strikingly similar to the context of the proposed Order involving SSI. In the Intel Magnetics/Micro Storage matter, for which the RWQCB serves as lead agency, Intel Magnetics ("Intel") conducted substantial investigation and remediation activities in defining and cleaning up its solvent plume. In the course of its investigation, Intel discovered that the upgradient Micro Storage site appeared to be a source of the contamination, as well. Due apparently to the substantial work already

performed by Intel, the paucity of work performed by Micro Storage and by the owner of the Micro Storage site (KCIII), and the substantial progress that Intel had made in dealing with its contamination, the RWQCB assigned primary responsibility to Micro Storage and KCIII to conduct the next phases of the cleanup, and allowed Intel and its landlord to assume secondary responsibility status.

Further precedent is found in decisions of the State Water Resources Control Board (the "State Board"), which have assigned secondary liability to landlords where tenants who caused the discharge are available and capable of cleaning up the contamination. See, In the Matter of the Petition of San Diego Unified Port District, Order No. WQ 89-12; In the Matter of the Petition of Prudential Insurance Company of America, Order No. WQ 87-6; In the Matter of the Petition of Vallco Park, Order No. WQ 86-18. In each of these decisions the State Board considered the ability of the tenant to clean up the contamination, the ability of the landlord to control the property at the time of discharge (such as to have sufficient control to prevent the discharge), and the landlord's role in the discharge of the waste. In this case, (1) Chevron is available, (2) Chevron has the financial ability and technical expertise to carry out the remediation, (3) thus far Chevron has complied with its own RWQCB order to investigate and remediate the problem, (4) SSI did not have any control over Chevron such that it could have prevented the problem, and (5) SSI did not have a role in the discharge of the petroleum products. As such, fairness and precedent dictate that the RWQCB should assign primary liability to Chevron and at most, secondary liability to SSI for the Chevron Plume.

Second, SSI's contribution, if any, to the Chevron Plume appears to be minor in relation to the contribution of Chevron. In the Chevron Plume, the maximum chemical concentrations found for total volatile organic compounds (VOC's) (606.9 ppm in 1986) and maximum total volatile hydrocarbons (TVH) (12,000,000 ppm in 1988) in monitoring well 38A differ by several orders of magnitude. The VOC's, which also include volatile hydrocarbons, represent less than 0.015% of the contamination by concentration. A cursory review of other monitoring well contamination (including the TIC's) along the southwest perimeter indicate a range of 2% to 5% by concentration of VOC components with respect to gasoline components. The area of the entire Chevron Plume within the 100 ppb total gasoline iso-concentration contour (on/off the Chevron site) is estimated to be 5.4 acres. The Chevron Plume along the southwest perimeter of SSI represents an area of approximately 0.9 acres or 16.6% of the total area of Chevron contamination. Solvent commingling from the SSI site, if it exists, would represent less than 0.9 acres. For comparison, the SSI Solvent Plume is estimated to cover an area of 2.6 acres enclosing the 10 ppb solvent contour interval.

Therefore, Todd Engineers believes that solvents found along the southwest perimeter are insignificant relative to the Chevron Plume and that solvent concentrations will play a minor role in the final cleanup/remediation work. As such, Chevron should assume primary responsibility for the investigation and remediation of the Chevron Plume.

Third, in the course of characterizing its own site and the off-site migration of the Solvent Plume, SSI has done a substantial amount of work in investigating the Chevron Plume. As Finding 5 of the Order notes, it was SSI, not Chevron, that first discovered the Chevron Plume beneath the SSI site. SSI has been actively investigating its contamination problem since about 1983. Chevron's first report regarding the Chevron Plume was not submitted until May 1989, even though subsurface petroleum contamination was known to exist at the Chevron site as early as 1983 (various letters from the RWQCB, 1986). The gross disparity between the work conducted to date by SSI and Chevron is well shown in the attachments entitled "Schedule of Work Performed." Moreover, the geology, stratigraphy, and geohydrology of the Chevron Plume existing along the southwest perimeter of the SSI site have been well defined by SSI within the past several years (Todd Engineers, May 1988). Subsurface dimensions and chemical characterization of the Chevron Plume along the southwest perimeter of the SSI site have also been well defined by the efforts of SSI and its consultant. In addition, valuable site specific geology, geohydrology, and geochemical information collected from and for the SSI site can now been applied to other adjacent sites. Given the amount of work SSI has performed in investigating the Chevron Plume to date, and given the paucity of work performed by Chevron, it is only appropirate that Chevron assume primary responsibility for any additional work regarding the Chevron Plume.

Also, based on SSI's prior experience in attempting to obtain information from Chevron regarding Chevron's investigation activities and data, SSI anticipates that it will be very difficult to gain Chevron's timely cooperation in conducting any required joint activities. As currently drafted, the Order may in fact impede, rather than promote, progress in dealing with the Chevron Plume.

If the RWQCB believes that, contrary to what SSI has urged, some degree of liability should attach to SSI at this time regarding the Chevron Plume, the foregoing factors and precedent provide ample reason to assign, at most, secondary liability to SSI and to assign primary liability to Chevron.

Wholly apart from the issue of responsibility for the Chevron Plume, the Order, as presently drafted, encompasses activities and deadlines regarding the Chevron Plume

from investigation all the way through final cleanup. Given the current lack of complete information concerning the nature, extent and origin(s) of the Chevron Plume, most of the provisions in the Order regarding the Chevron Plume are being imposed prematurely. From a technical viewpoint, Provisions C.1.j. and perhaps C.1.l. should be the only activities specified at this time. After these activities are accomplished and reports have been submitted and evaluated, it would then be appropriate to issue a subsequent order related to the actual remediation of the Chevron Plume.

SSI would like to thank the RWQCB for this opportunity to present some of SSI's comments to the Order regarding the Chevron Plume. We would welcome further discussing these issues with RWQCB staff, as appropriate. Please note that by submitting this letter, SSI does not waive its right to submit further or other comments at a later time. SSI intends to provide the RWQCB with additional comments concerning the Chevron Plume and other issues.

Very truly yours,

Solvent Service Co., Inc.

By _____
Susan Vedantham
Environmental Manager

cc: Lawrence A. Cogan, Esq.
David Abbott
David Keith Todd

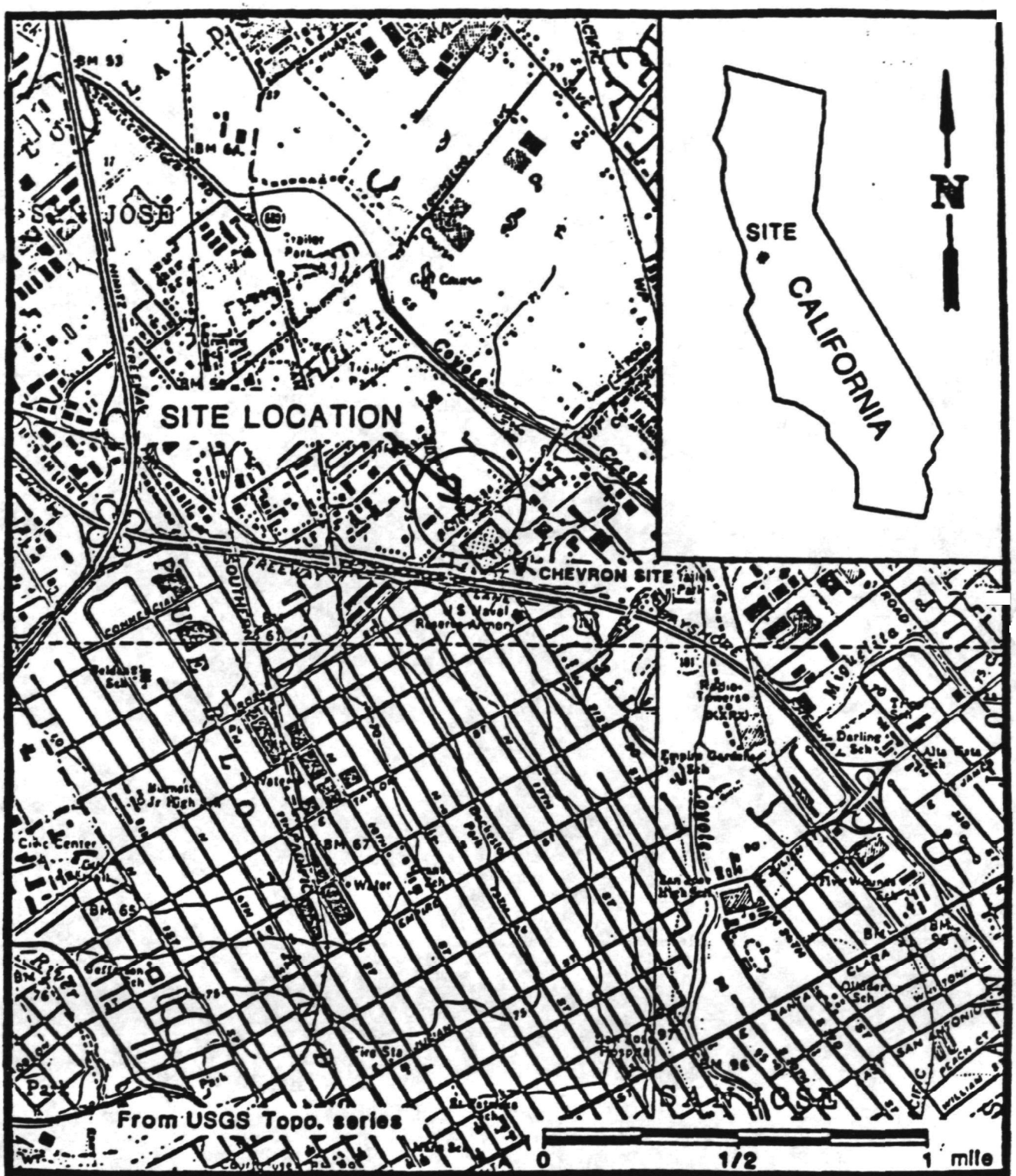
SCHEDULE OF WORK PERFORMED

RELATED TO THE CHEVRON PLUME

Monitoring Wells		
SSI	21 exist,	none proposed
Chevron	8 exist,	4 proposed
Shallow Borings to determine paleochannel geometry		
SSI	13 drilled	none proposed
Chevron	0 drilled	none proposed
Site-Wide Deep Exploration Borings		
SSI	8 drilled	none proposed (3 along SW perimeter)
Chevron	1 drilled	none proposed
Groundwater Sampling		
SSI	55 EPA method 8240 and 5 EPA method 8015	
Chevron	8 documented EPA method 8015 as of Sept. 1989	
	4 documented EPA method 8240 as of Sept. 1989	
	10 estimated samplings early part of 1990	
Soil Sampling and Analysis		
SSI	12 samples (D1 and A5)	
Chevron	0 samples	

SSI fully identified the Chevron Plume in a memorandum previously submitted to the RWQCB. May 22, 1988, Todd Engineers, Memorandum to the RWQCB, Anomalous Concentrations of Benzene, Toluene, Xylene, and Ethylbenzene (BTXE) Along the Southwest Perimeter of the SSI Property.

APPENDIX E

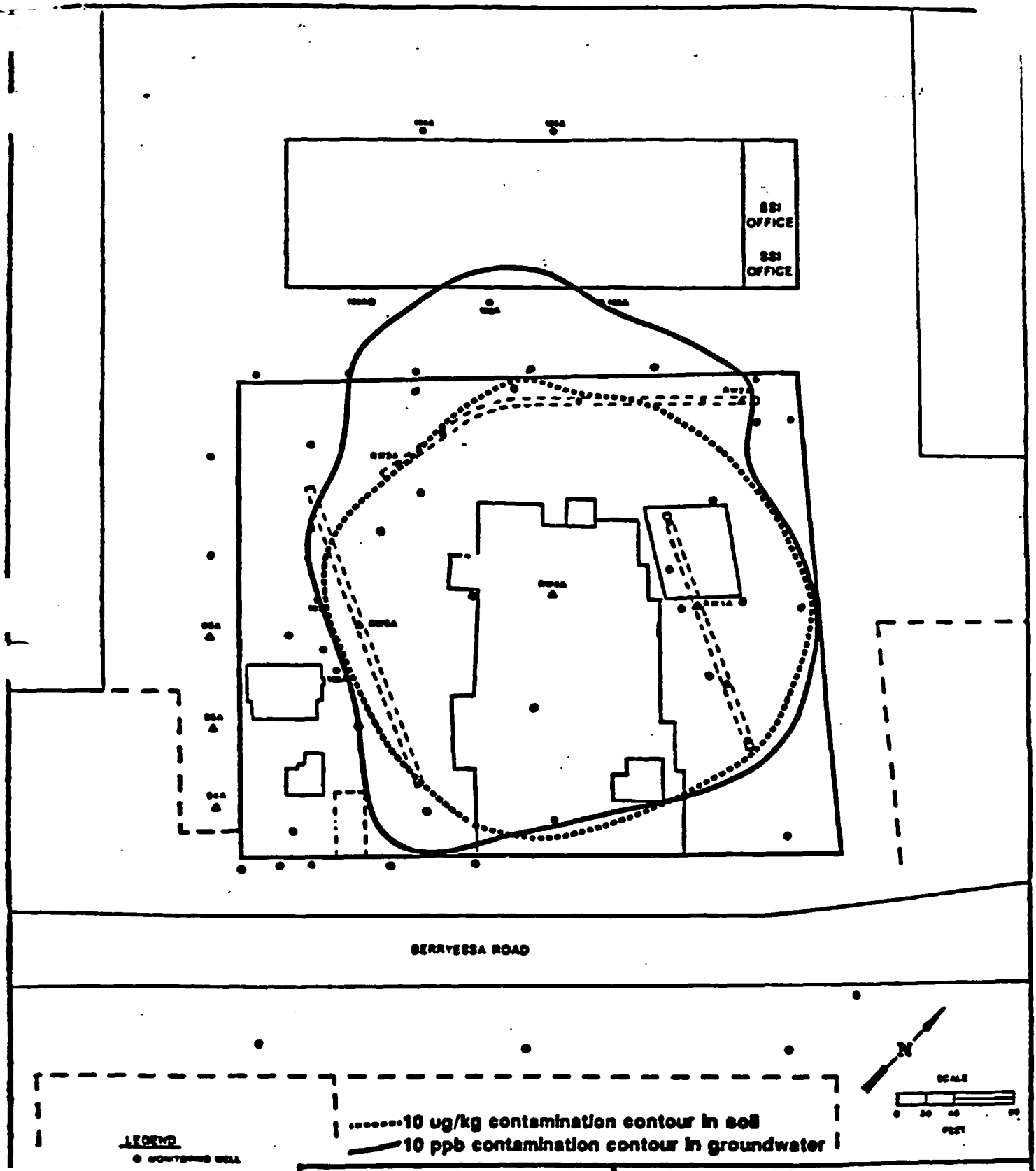


October 1989

Figure 1

DAVID KEITH TODD
Consulting Engineers, Inc.
Berkeley, California

SOLVENT SERVICE
LOCATION MAP



October 1989

DAVID KEITH TODD
Consulting Engineers, Inc.
Berkeley, California

Figure 17

AREAL EXTENT OF SOIL AND GROUNDWATER CONTAMINATION

APPENDIX F

United States Environmental Protection Agency Region 9

Administrative Record - Table of Contents

Solvent Service, Inc.

YEAR - 1982

I. CORRESPONDENCE / MEETINGS

From	To	Desc.	Date
RWQCB	SSI	Subsurface Invest	12/23/82

YEAR - 1983

I. CORRESPONDENCE / MEETINGS

From	To	Desc.	Date
SSI	RWQCB	Subsurface Invest	1/6/83
RWQCB	SSI	Subsurface Invest	1/17/83
SSI	RWQCB	Status Report	1/31/83
SSI	RWQCB	Status Report	2/14/83
RWQCB	SSI	Subsurface Invest	7/12/83
RWQCB	SSI	Request For Proposal	8/1/83
RWQCB	SSI	Review of Proposal	9/2/83
AEC	SSI/RWQCB	Subsurface Geologic Invest	9/22/83
RWQCB	SSI	Approval of Proposal	9/26/89

II. REPORTS

Type	Date
Proposal to Perform Subsurface Investigation and Sampling Groundwater Contamination Study	7/25/83
Proposal to Perform Subsurface Investigation and Sampling Groundwater Contamination Study - Phase II	8/15/83
Proposal to Perform Subsurface Investigation and Sampling Groundwater Contamination Study - Phase II	9/18/83

YEAR - 1984

I. CORRESPONDENCE / MEETINGS

From	To	Desc.	Date

AEC	RWQCB	Boring Logs; Letter dated 7/12/84; Data Sheets / Site Plan	7/18/84
AEC	SSI/RWQCB	Progress of Investigation	8/17/84
AEC	SSI/RWQCB	Study - Update	10/19/84
AEC	SSI/RWQCB	Progress of Investigation	11/5/84
		Meeting - SSI/RWQCB	11/8/84
AEC	SSI/RWQCB	Recommendations For Interim Extraction Trench; Aquifer A	12/5/84

II. REPORTS

Type	Date
Phase II Groundwater Contamination Study Stage I; Investigation of Horizontal Extent on Site. Volume I - Report	1/27/84
Phase II Groundwater Contamination Study Stage I; Investigation of Horizontal Extent on Site. Volume II - Appendices	1/27/84
Proposal to Perform Subsurface Invest. and Sampling; Phase II; Groundwater Contam Study; Aquifer B; Local Groundwater Gradient Study	3/26/84
Groundwater Contamination Study; San Jose Marketing Terminal; San Jose	9/20/84
Phase II Groundwater Contamination Study Aquifer B: Local Groundwater Gradient Study	10/5/84

YEAR - 1985

I. CORRESPONDENCE / MEETINGS

From	To	Desc.	Date
AEC	RWQCB	Results of Sample Analyses	1/11/85
JSC	RWQCB	Report Review / SSI	1/29/85
SSI	RWQCB	Water Treatment Methods	2/1/85
AEC	RWQCB	Boring Logs	2/20/85
AEC	RWQCB	Phase II; GW Contam Study; Stage 3; Progress Report / Draft	4/30/85
AEC	RWQCB	Proposed Phase II Work	5/15/85
AEC	RWQCB	Preliminary Site Assess;	

		Berryessa Properties	5/21/85
AEC	JSC/RWQCB	Permission to Install GW Monitoring Wells and Monitor Existing Wells	5/22/85
AEC	RWQCB	Boring Logs / Chemical Analysis	7/11/85
AEC	JSC/RWQCB	Permission to Continue Work	7/25/85
AEC	RWQCB	Water Sample Results	8/26/85
SSI	RWQCB	GW Mgmt. Practices	9/5/85
RWQCB	RWQCB	Review of SSI Work	9/13/85
CBE	RWQCB	General Comments	10/31/85
CBE	DHS	General Comments	10/31/85
RWQCB	RWQCB	Clarification of 9/13/85 Memo	11/14/85
AEC	RWQCB	Clarification of 9/13/85 Memo	11/14/85
AEC	RWQCB	Site Plan / Boring Logs/ Lab Data Sheets	11/20/85
DHS	RWQCB	Comments From CBE	11/20/85
AEC	SSI/RWQCB	Notes of Meeting 11/19/85	11/25/85
AEC	SSI/DHS/RWQCB	Well Information Letter	12/2/85
CBE	RWQCB	General Comments	12/3/85
CBE	DHS	General Comments	12/4/85
DHS	RWQCB	Additional Comments-SSI	12/20/85

II. REPORTS

Type	Date
Preliminary Site Assessment / Berryessa Properties; for Jackson Shaw	1/14/85
Proposal to Perform Subsurface Investigation and Sampling; Phase II Groundwater Contamination Study; Aquifers B and C: Horizontal Extent of Contamination Down Gradient	2/12/85
Phase II Groundwater Contamination Study Stage 3 Progress Report; Aquifer A: Interim Extraction Trench; Aquifers B and C:Investigation of Extent Down Gradient	4/29/85
Phase II Groundwater Contamination Study Stage 3 Progress Report; Aquifer A: Interim Extraction Trench; Aquifers B and C:Investigation of Extent Down Gradient; Volume I - Report	5/15/85

Phase II Groundwater Contamination Study Stage 3 Progress Report; Volume II - Appendices	5/15/85
Results of Performance Testing; Interim Extraction trench: Aquifer A; Groundwater Contamination Study	7/19/85
Results of Performance Testing; Interim Extraction Well AEC 31B: Aquifer B; Groundwater Contamination Study	7/24/85
Proposal to Perform Subsurface Investigation and Sampling; Phase II Groundwater Contamination Study; Aquifer A; Investigation of Lateral Extent of Contamination; Aquifer C: Groundwater gradient Investigation and Horizontal Extent of Contamination Down Gradient	9/24/85
Proposal to Perform Subsurface Investigation and Sampling; Phase II Groundwater Contamination Study; Aquifer A; Horizontal Extent of Contamination Down Gradient	10/22/85
Proposal to Perform Phase II Groundwater Contamination Study; Stage 5; Aquifers A, B, C, and D	12/10/85

YEAR - 1986

I. CORRESPONDENCE / MEETINGS

From	To	Desc.	Date
RWQCB	SSI	Review of Preliminary Groundwater Sampling Analysis	1/17/86
RWQCB	CBE	SSI Status	1/17/86
SSI	DHS/RWQCB	Comments on 12/20/85 Memo	1/20/86
AEC	RWQCB	Groundwater Extraction Summary Table	1/21/86
AEC	RWQCB	Claim Against RWQCB By AEC	1/22/86
AEC	RWQCB	Soil and Water Sample Results	1/27/86
AEC	JSC	Permission to Continue Work	1/29/86
AEC	DHS/RWQCB	Modifications to 12/10/85 Proposal	1/29/86
AEC	DHS/RWQCB	Notes of Meeting	1/29/86
AEC	DHS/RWQCB	Status of off-site Investigation and Sampling	1/31/86
AEC	DHS/RWQCB	Modification of Project	

		Schedule	2/3/86
AEC	DHS/RWQCB	Status of Investigation	2/3/86
DHS	CBE	Request For Information	2/10/86
AEC	RWQCB	Lab results	2/12/86
RWQCB	SSI	Tentative Order	2/13/86
AEC	DHS/RWQCB	Status Report - Down Gradient Hydraulic Control Measures: Aquifers A and B	2/14/86
AEC	RWQCB	Request For Deadline Extension	2/14/86
DKT	AEC	Analysis on SSI Groundwater Extraction Trench	2/20/86
DKT	AEC	Analysis on SSI Groundwater Extraction Trench; Part III: Preliminary Finite-Element Analysis	3/6/86
		Meeting / Public Forum / SSI	3/19/86
RWQCB	SOC	Notice of Exemption	3/24/86
DKT	AEC	Groundwater Extraction Trench - Analysis of 3/25/85 Pumping	3/26/86
RWQCB	AEC	Order # 86-16	3/28/86
AEC	DHS/RWQCB	Draft Report - On Site Contamination Investigation	3/31/86
		Meeting Summary	4/9/86
AEC	JSC	Update of Work and Permission To Continue Work	4/11/86
AEC	DHS/RWQCB	Confirm Results of 4/9/86 Meeting	4/11/86
DHS	RWQCB	DHS Comments on 4/9/86 Mtg.	4/18/86
AEC	RWQCB	Selection of Wells to be Sampled During 4/86 Quarterly Groundwater Sampling	4/21/86
RWQCB	SSI	Proposal For Additional On-Site Remedial Action Programs	4/24/86
RWQCB	CHV	Groundwater Contamination at Chevron Terminal on 1020 Berryessa Road	4/24/86
AEC	DHS/RWQCB	Shallow Soils Sampling Protocol	4/28/86
DHS	AEC/RWQCB	Response to 4/11/89 Letter	4/29/86
AEC	DHS/RWQCB/JSC	Phone Discussions - 4/18/86 and 4/24/86	5/6/86
AEC	DHS/RWQCB	Work Schedule For Hydraulic Control and On-Site Clean-Up	5/8/86
CHV	RWQCB	Response to Request For Groundwater Investigation	5/9/86
AEC	DHS/RWQCB/JSC	Update of Work and Permission To Continue Work	5/22/86
RWQCB	CHV	Second Request for Investigation	6/2/86
CHV	RWQCB	Groundwater Discussion	6/13/86
CSJ	RWQCB	Notice of Preparation of DEIR	6/18/86

GTI	DHS/RWQCB	Construction Details	7/10/86
SSI	DHS/RWQCB	Amendments To Proposal For Remedial Action	7/21/86
RWQCB	SSI	Comments on Proposal for Zone A Plume Control and Zone BC Plume Control	8/15/86
DHS	SSI	Feasibility Study	8/27/86
SSI	RWQCB	Onsite Treatment Methods	9/20/86
SSI	RWQCB	Time Schedule Restraints	9/20/86
RWQCB	RWQCB	Review of GTI's Proposal	9/29/86
SSI	RWQCB	Monitoring wells Data	9/29/86
CHV	RWQCB	Chevron Fuel Terminal	9/29/86
SSI	RWQCB	List of Wells - Quarterly Monitoring	9/30/86
SSI	RWQCB	Report of Extraction Trench	10/17/86
GTI	RWQCB	Pump Test / Zone B/C	10/30/86
DHS	RWQCB	Biodegradation / Feasibility Study	11/3/86
RWQCB	SSI	Implementation Schedule	12/3/86
SSI	RWQCB	Sampling Schedule	12/5/86
SSI	DHS/RWQCB	Schedule / Work In Progress	12/5/86
RWCQCB	RWQCB	Initial Notification of Spill / Chevron	12/11/86
GTI	SSI	Supplement to Degradation Feasibility Study	12/18/86
SSI	DKT	Authorization to Proceed	12/19/86
SSI	RWQCB	NPDES Application	12/22/86

II. REPORTS

Type	Date
Additional Evaluation of Interim Extraction Trench: Aquifer A	3/26/86
Proposed Measures For Hydraulic Control and On-Site Clean-Up	3/28/86
Proposal To Perform Phase II Off-Site Groundwater Contamination Study - Aquifer A	4/14/86
Results of On-Site Contamination Investigation Groundwater Contamination Study - Volume 1	6/6/86
Results of On-Site Contamination Investigation Groundwater Contamination Study - Volume 2	6/6/86
Results of On-Site Contamination Investigation Groundwater Contamination Study - Volume 3	6/6/86
Results of On-Site Contamination Investigation Groundwater Contamination Study - Volume 4	6/6/86

Results of On-Site Contamination Investigation Groundwater Contamination Study - Volume 5	6/6/86
Proposal For an On-Site Remedial Action Plan	7/20/86
Proposal For A Zone Off Site Plume Control, B/C On site Plume Control	7/3/86
Zone A Extraction Trench Installation and Preliminary Performance Evaluation	7/20/86
Results of the Enhanced Natural Degradation Feasibility Study	10/6/86
Zone A Extraction Trench Installation and Preliminary Performance Evaluation - Revision 1	10/13/86
Zone B and C Recovery Well Installations and Pump Test Analyses	11/19/86

YEAR - 1987

I. CORRESPONDENCE / MEETINGS

From	To	Desc.	Date
DKT	DHS/RWQCB	Proposal For Supplemental Soil Investigation	1/8/87
RWQCB	RWQCB	Comments - GTI Report	1/12/87
DHS	DKT	Comments on Soil Invest. Proposal	1/14/87
		General Status Meeting	1/16/87
SSI	DHS/RWQCB	Status Report	2/2/87
SSI	RWQCB/DHS	Consultant Change / Changes To Order	2/11/87
SSI	RWQCB/DHS	Status Report	2/8/87
DHS	SSI	RAP Guidelines	2/19/87
SSI	RWQCB/DHS	Sampling Results	2/23/87
		General Status Meeting	3/2/87
DHS	SSI	Guidelines / Health and Safety Plan	3/9/87
		General status Meeting	3/23/87
PM	SSI	Biodegradation Feasibility Report	4/7/87
		Meeting Summary	4/17/87
DKT	RWQCB	Groundwater Monitoring and Extraction Facilities	4/27/87
DKT	RWQCB	Monitoring and Extraction Facilities; Proposed Construction Detail	5/11/87
RWQCB	CJS	On-Site Remedial Action Programs	5/14/87

SSI	CJS	General Groundwater Info	5/18/87
RWQCB	Comments -	Soil and Ground-Water Report	5/22/87
SSI	CJS	Info on S.Cooker and Groundwater Treatment Systems	6/4/87
		Meeting	6/12/87
DHS	SSI	Mailing List / Soil Clean-up	6/23/87
DKT	DHS/RWQCB	Progress Report	6/24/87
DKT	DHS/RWQCB	New Monitoring Well Locations and Chemical data From Selected Wells	7/1/87
RWQCB	SSI	Sample and Site Safety Plan	7/3/87
SSI	DHS	Response to 6/23/87 Letter	7/8/87
DKT	DHS/RWQCB	Groundwater Monitoring and Extraction Facilities Construction Details	7/14/87
DKT	DHS/RWQCB	New Chemical Data From Selected Wells; Sampling Quarter 2 Completed	7/14/87
SSI	DHS/RWQCB	Updated Mailing List	7/23/87
RWQCB	SSI	Comments on QAPP	8/20/87
SSI	DHS	Updated Mailing List	8/21/87
SSI	RWQCB	Modified QAAP	9/14/87
DKT	DHS/RWQCB	Corrections to 9/87 Report	10/13/87
RWQCB	SSI	QAPP Approval	10/28/87
		Meeting	11/19/87
		General Status Meeting	12/3/87
DHS	RWQCB	Comments on FS and RAP	12/15/87

II. REPORTS

Type	Date
Soil and Groundwater Investigation For Solvent Service Inc. - Phase I - Volume I	3/87
Soil and Groundwater Investigation For Solvent Service Inc. - Phase I - Volume II	3/87
Site Safety Plan For Groundwater and Soil Investigation and Interim Remedial Action Plan	7/14/87
Quality Assurance Project Plan For Groundwater and Soil Investigation and Interim Remedial Action Plan	7/14/87
Soil and Groundwater Investigation For	

Solvent Service Inc. - Phase II - Volume I	9/87
Soil and Groundwater Investigation For Solvent Service Inc. - Phase II - Volume II	9/87
Soil and Groundwater Investigation For Solvent Service Inc. - Phase II - Volume III	9/87
Sampling Plan For Groundwater and Soil Investigation and Interim Remedial Action Plan	10/1/87
Feasibility Study of Remedial Action Plans For Soil and Groundwater	10/87

YEAR - 1988

I. CORRESPONDENCE / MEETINGS

From	To	Desc.	Date
DKT	DHS/RWQCB	Proposal For Supplemental Soil Investigation	1/8/88
DKT	DHS/RWQCB	Groundwater Monitoring and Extraction Facilities Proposed Construction Details	1/12/88
DHS	DKT	Soil Proposal Comments	1/14/88
DKT	DHS/RWQCB	Sampling Schedule For Monitoring Wells at SSI	1/18/88
DKT	DHS/RWQCB	Monitoring of Zone B/C	1/18/88
DKT	DHS	Proposed Soil and Groundwater Investigation Plans	2/12/88
DKT	DHS/RWQCB	Progress Report-2/88	3/1/88
SSI	DHS/RWQCB	Treatment Systems	3/8/88
RWQCB	DHS	Comments on WDR	3/16/88
SSI	DHS/RWQCB	Mailing List Generation	3/24/88
RWQCB	SSI	Order # 86-16	3/25/88
SSI	DHS/RWQCB	Mailing List Update	3/28/88
DKT	DHS/RWQCB	Progress Report - 3/88	4/1/88
SSI	DHS/RWQCB	Variance Request for Groundwater and Soils Treatment Systems	4/1/88
RWQCB	RWQCB	Comments on Tentative Order	4/4/88
SSI	RWQCB	Comments on Order	4/8/88
SSI	DHS/RWQCB	CRP Development Meeting	4/11/88
SSI	DHS/RWQCB	Revised Variance Request	4/11/88
DHS	DKT	Screening Analysis	4/18/88

		Report	4/20/88
SSI	DKT	Review of Fact Sheet 1	4/21/88
SSI	DHS/RWQCB	First Draft-Fact Sheet 1	4/22/88
DKT	DHS/RWQCB	Screening Analysis Report	4/26/88
SSI	DHS/RWQCB	Variance Request S.Cooker	5/2/88
DHS	SSI	Permit / Variances	5/6/88
DKT	DHS/RWQCB	Progress Report-4/88	5/15/88
RWQCB	SSI	Order No. 88-61	5/16/88
DKT	RWQCB	Anomalous BTXE Conc. Along Southwest Perimeter of SSI Property	5/22/88
SSI	DHS/RWQCB	S. Cooker Proposal and Screening Analysis of Soil Remediation Alternates	5/27/88
DHS	SSI	Comments on Fact Sheet #1	6/2/88
SSI	DHS/RWQCB	SSI - CRP	6/10/88
SSI	DHS/RWQCB	Revised Fact Sheet # 1	6/12/88
DKT	DHS/RWQCB	Progress Report - 5/88	6/15/88
RWQCB	SSI	WorkPlan Request	7/7/88
DKT	DHS/RWQCB	Contamination Status	7/11/88
DKT	DHS/RWQCB	Progress Report	7/15/88
SSI	DHS/RWQCB	Revised Fact Sheet # 1	7/19/88
DHS	SSI	Fact Sheet Comments	8/4/88
		Chevron Plume-Mtg	8/5/88
DKT	DHS/RWQCB	Progress Report	8/15/88
SSI	DHS/RWQCB	Fact Sheet # 1 - Final	8/18/88
SSI	RWQCB/DHS	Amendment / Extension of Order	9/1/88
SSI	DHS/RWQCB	Copies of Fact Sheet # 1	9/14/88
DHS	RWQCB	SSI Cleanup	9/28/88
DKT	DHS/RWQCB	Progress Report	8/15/88
EPA	DHS	Permit Waiver	10/13/88
RWQCB	SSI	QAPP Approval	10/28/88
RWQCB	SSI	Request For Amendment	11/14/88
RWQCB	CHV	Review of Work Plan	11/14/88
		General Status Meeting	11/15/88
		General Status Meeting	11/28/88
DKT	RWQCB/DHS	Proposed schedule	12/1/88
RWQCB	SSI	Workplan Comments	12/1/88
SSI	EPA	Permit Status	12/20/88

II. REPORTS

Type	Date
Soil Investigation For Solvent Service Inc. Volume I - Text	4/88

Soil Investigation For Solvent Service Inc. Volume II - Appendices I to VI	4/88
Soil Investigation For Solvent Service Inc. Volume III - Appendices VII	4/88
Proposal For a Pilot Study of Vacuum Extraction and Steam Injection at SSI	4/88
Proposal For Decontamination of Soils By Low Temperature Thermal Stripping	5/88
Completion of Screening Analysis of Soil Remediation Alternates	5/88
Groundwater and Soils Treatment Systems	5/88
Community Relations Plan	6/88
Groundwater Investigation For Solvent Service Inc. - Volume I - Text	6/88
Groundwater Investigation For Solvent Service Inc. - Volume II - Appendix I to IV	6/88
Groundwater Investigation For Solvent Service Inc. - Volume III - Appendix V to VI	6/88
Groundwater Investigation For Solvent Service Inc. - Volume IV - Appendix VII	6/88
Summary of Plume Stabilization and Off-Site Contamination at SSI	12/88

YEAR - 1989

I. CORRESPONDENCE / MEETINGS

From	To	Desc.	Date
RWQCB	SSI	Compliance Monitoring Report	2/8/89
		SIVE/Work Plan/General Status Meeting	2/24/89
RWQCB	SSI	Comments on RI/FS Workplan	3/23/89
RWQCB	SSI	Tentative Order	3/24/89
		Site Characterization Status - Meeting	3/24/89
DKT	CAI	Transmittal of Preliminary Work Plan	3/29/89
DKT	RWQCB	Transmittal of Well Sampling in Zone B/C Memo	3/29/89
RWQCB	SSI	BPHE Info	3/31/89

SSI	RWQCB	Comments on Order	4/3/89
SSI	RWQCB	Groundwater Sampling	4/5/89
SSI	RWQCB	Work Plan Pages	4/13/89
RWQCB	SSI	BPHE - Data Package Req	4/18/89
DKT	DHS/RWQCB	New Wells and Destruction of Old Wells	4/25/89
RWQCB	DKT	Data Requested by Clements	5/4/89
		Baseline Health Evaluation Meeting	5/8/89
		Baseline Health Evaluation Meeting	5/11/89
DKT	DHS/RWQCB	Monthly Report - May 1989	5/15/89
RWQCB	SSI	Order Number 89-051	5/16/89
DKT	CAI	Response to Request For Info	6/5/89
RWQCB	SSI	Request to add Chevron to Mailing List	6/16/89
DKT	CAI	Info for Baseline Assess	7/11/89
SSI	RWQCB	Proposal for Administrative Draft	7/18/89
SSI	DHS/RWQCB	Monthly Report - June	7/20/89
RWQCB	SSI	Info Request Re. Chevron Access Agreement	7/21/89
SSI	RWQCB	Ad-Draft-Tentative Schedule	7/25/89
SSI	RWQCB	Response to 7/21 letter	7/28/89
RWQCB	SSI	Comments on Conduit Study	7/29/89
RWQCB	SSI	Amendment to 7/29 letter	8/8/89
SSI	RWQCB	Site Safety Plan letter	8/9/89
RWQCB	SSI	Chevron Agreement	8/18/89
SSI	RWQCB	Monthly Report - July/August	8/24/89
SSI	RWQCB	Interim Remedial Actions	9/19/89
RWQCB	SSI	Compliance Monitoring Report	9/20/89
RWQCB	CHV	Compliance Monitoring Report	9/20/89
SSI	DKT	Revised SSI Site Safety Plan	9/21/89
SSI	RWQCB	Revised Site Safety Plan	9/21/89
SSI	EPA/DHS/RWQCB	Draft Table of Contents for SSI's Administrative Draft	10/2/89
DKT	SSI/EPA/DHS	RIFS Transmittal	10/17/89
DKT	SSI/EPA/DHS	RAP Transmittal	10/31/89
DKT	SSI/EPA/DHS	SSI Quarterly	10/89
RWQCB	CHV	Response to Technical Report	11/1/89
RWQCB	SSI	Review of Site Safety Plan	11/3/89
SSI	RWQCB	Well Sampling	11/9/89
RWQCB	General	SSI Fact Sheet # 2	12/89
RWQCB	SSI	Meeting	12/14 89
SSI	RWQCB	Monthly - December	12/15/89
RWQCB	SSI	Comments / RIFS/RAP	12/28/89

II. REPORTS

Type	Date
Groundwater Contamination in Zone B/C and	

Aquifer D/E	2/89
Work Plan	4/89
Environmental Characterization Reporting Requirements For Solvent Service Inc.	5/89
Well Logs and Soil Borings - Book 1	5/89
Well Logs and Soil Borings - Book 2	5/89
Proposal For Interim Soil Remediation Action By Steam Injection and Vacuum Extraction	5/89
Pumping Test Data and Aquifer Characteristics For Aquifer a, and Zone B/C; Methodology, Analysis, and Results	6/89
Conduit Study For SSI	6/89
Quarterly Report For SSI - Volume I	7/89
Quarterly Report For SSI - Volume II	7/89
Groundwater Characterization for SSI - Volume I	9/89
Groundwater Characterization for SSI-Volume II.	9/89
Groundwater Characterization for SSI-Volume III	9/89
Final Baseline Public Health Evaluation	9/89
Site Safety Plan for Soil and Groundwater Investigation	10/89
Remedial Investigation / Feasibility Study	10/89
Remedial Action Plan	10/89
Revised Conduit Study	12/89

YEAR - 1990

I. CORRESPONDENCE / MEETINGS

From	To	Desc.	Date
DKT	RWQCB	Analyses Results	1/10/90
SSI	RWQCB	February Monthly	2/14/90
RWQCB/EPA	SSI	Meeting	2/15/90
SSI	RWQCB	Updated Draft AR	2/21/90

II. REPORTS

Type	Date
Quarterly Report for SSI	1/90
Final RI/FS For SSI	1/90
Remedial Action Plan / SSI	1/90

AEC - Applied Earth Consultants
CAI - Clements Associates Inc.
CBE - Citizens For Better Environment
CJS - City of San Jose
CHV - Chevron Inc.
DHS - Department of Health Services
DKT - David Keith Todd Consultants
JSC - Jackson Shaw Company
GTI - Groundwater Technology Inc.
PM - Perry McCarty
SOC - State of California
RWQCB - Regional Water Quality Control Board

ADMINISTRATIVE RECORD TABLE OF CONTENTS - UPDATE
Solvent Service, Inc.

YEAR - 1990 (January - September)

I. CORRESPONDENCE / MEETINGS

From	To	Description	Date
EPA	RWQCB	Transmittal of Risk Assessment Review for Solvent Service	1/26/90
EPA	RWQCB	Comments on RI/FS Report	2/12/90
SSI	RWQCB	Monthly Report - February	2/14/90
SSI	RWQCB	Monthly Report - March	3/14/90
SSI	RWQCB	Monthly Report - April	4/13/90
EPA	RWQCB	Transmittal of EPA Air Division Comments on RI/FS Report	5/14/90
SSI	RWQCB	Monthly Report - May	5/15/90
SSI	RWQCB	Monthly Report - June	6/15/90
SSI	RWQCB	Comments on Tentative Order for SSI	6/18/90
RWQCB Tentative Order		Site Cleanup Requirements for SSI	6/20/90
DHS	RWQCB	Comments on Tentative Order	7/11/90
SSI	RWQCB	Additional Comments on Tentative Order for SSI	7/16/90
SCVWD	RWQCB	Comments on Tentative Order for SSI	7/20/90
DHS	RWQCB	Comments on Tentative Order for SSI	7/31/90
SCVWD	RWQCB	Additional Comments on Tentative Order for SSI	8/3/90
RWQCB Internal Memo		Revised Cleanup Standards for SSI	8/6/90

RWQCB Order No. 90-120	Site Cleanup Requirements for SSI	8/15/90
EPA Internal Memo	EPA Air Division Comments on ROD	9/12/90
EPA Internal Memo	EPA Water Division Comments on ROD	9/20/90

II. REPORTS

Type	Date
Quarterly Report for SSI	4/90
Inorganic Quality of Groundwater, additional analyses for the Solvent Service site, San Jose, Ca.	4/16/90
Final RAP for SSI	5/90
Fact Sheet No. 3 (Proposed Plan)	6/90
Final RI/FS Report	6/90
Quarterly Report for SSI	6/90
RWQCB Staff Report for SSI (Draft)	6/6/90
RWQCB Staff Report for SSI (Final)	8/6/90
Responsiveness Summary	8/15/90

DHS - California Department of Health Services
EPA - Environmental Protection Agency
RWQCB - Regional Water Quality Control Board
SCVWD - Santa Clara Valley Water District
SSI - Solvent Service, Inc.

ADMINISTRATIVE RECORD
Solvent Service, Inc.

GUIDANCE DOCUMENTS

The following is a list of U.S. EPA Guidance Documents consulted during development and selection of the Response Action for the Solvent Service, Inc. Superfund site in San Jose, California. These documents are included in the Compendium of CERCLA Response Selection Guidance Documents (Volumes 1 - 35), which is available for public review at the Superfund Records Center, EPA Region 9, San Francisco.

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COMPENDIUM OF CERCLA RESPONSE SELECTION GUIDANCE DOCUMENTS

Doc No	Vol	Title	Date	Authors	Status	Pages	Tier	Attachments	OSWER/EPA Number
** RI/FS - GENERAL									
2002	3	GUIDANCE FOR CONDUCTING REMEDIAL INVESTIGATIONS AND FEASIBILITY STUDIES UNDER CERCLA	10/01/88	- OSWER/OERR	FINAL	390	1		OSWER #9355.3-01
2012	5	SUPERFUND STATE-LEAD REMEDIAL PROJECT MANAGEMENT HANDBOOK	12/01/86	- OERR	FINAL	120	1		OSWER #9355.2-1
** RI/FS - RI DATA QUALITY/SITE & WASTE ASSESSMENT									
2100	5	A COMPENDIUM OF SUPERFUND FIELD OPERATIONS METHODS	12/01/87	- OERR	FINAL	550	1		OSWER #9355.0-14
2101	5	6 DATA QUALITY OBJECTIVES FOR REMEDIAL RESPONSE ACTIVITIES: DEVELOPMENT PROCESS	03/01/87	- CDM FEDERAL PROGRAMS CORP.	FINAL	150	1		OSWER #9355.0-7B
2102	6	DATA QUALITY OBJECTIVES FOR REMEDIAL RESPONSE ACTIVITIES: EXAMPLE SCENARIO: RI/FS ACTIVITIES AT A SITE W/CONTAMINATED SOILS AND GROUNDWATER	03/01/87	- CDM FEDERAL PROGRAMS CORP.	FINAL	120	1		OSWER #9355.07B
2112	8	GUIDELINES AND SPECIFICATIONS FOR PREPARING QUALITY ASSURANCE PROGRAM DOCUMENTATION	06/01/87	- ORD/QUALITY ASSURANCE MANAGEMENT STAFF	FINAL	31	2	1) MEMO: GUIDANCE ON PREPARING QAPPs DATED 6/10/87	

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COMPENDIUM OF CERCLA RESPONSE SELECTION GUIDANCE DOCUMENTS

Doc No	Vol	Title	Date	Authors	Status	Pages	Tier	Attachments	OSWER/EPA Number
2113	8	LABORATORY DATA VALIDATION FUNCTIONAL GUIDELINES FOR EVALUATING INORGANICS ANALYSES	07/01/88	- EPA DATA REVIEW WORK GROUP - BLEYLER, R.VIAR AND CO./SAMPLE MGMT. OFFICE	DRAFT	20	2		
2114	8	LABORATORY DATA VALIDATION FUNCTIONAL GUIDELINES FOR EVALUATING ORGANIC ANALYSES	02/01/88	- BLEYLER, R./VIAR AND OC./SAMPLE MGMT. OFFICE - EPA DATA REVIEW ORKGROUP	DRAFT	45	2		
2115	8	PRACTICAL GUIDE FOR GROUND-WATER SAMPLING	09/01/85	- BARCELONIA, M.J., ET. AL./ILLINOIS ST. WATER SURVEY	FINAL	175	1		EPA/600/2-85/104
2116	8	PRACTICAL GUIDE FOR GROUND-WATER SAMPLING	07/01/85	- BARCELONA, M.J., ET. AL./ILLINOIS ST. WATER SURVEY					
** RI/FS - LAND DISPOSAL FACILITY TECHNOLOGY									
2204	13	LAND DISPOSAL RESTRICTIONS	08/11/87	- LONGEST, H.L./OERR	FINAL	23	2	1) SUMMARY OF MAJOR LDR PROVISIONS AND CALIFORNIA LIST PROHIBITIONS 2) OTHER ATTACHS CITED ARE AVAILABLE IN FED. REG.	

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COMPENDIUM OF CERCLA RESPONSE SELECTION GUIDANCE DOCUMENTS

Doc No	Vol	Title	Date	Authors	Status	Pages	Tier	Attachments	OSWER/EPA Number
** RI/FS - OTHER TECHNOLOGIES									
2300	16	A COMPENDIUM OF TECHNOLOGIES USED IN THE TREATMENT OF HAZARDOUS WASTES	09/01/87	- ORD/CERI	FINAL	49	2		EPA/625/8-87/014
** ARARS									
3001	25	CERCLA COMPLIANCE AND OTHER ENVIRONMENTAL STATUTES	10/02/05	- PORTER, J.W./OSWER	FINAL	19	1	1) POTENTIALLY APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS	OSWER #9234.0-2
3002	25	CERCLA COMPLIANCE WITH OTHER LAWS MANUAL	08/08/88	- OERR	DRAFT	245	2		OSWER #9234.1-01
** WATER QUALITY									
4003	26	QUALITY CRITERIA FOR WATER 1986	05/01/87	- OFFICE OF WATER REGULATIONS AND STANDARDS	FINAL	325	2		EPA/440/5-86-001
** RISK ASSESSMENT									
5001	27	CHEMICAL, PHYSICAL & BIOLOGICAL PROPERTIES OF COMPOUNDS PRESENT AT HAZARDOUS WASTE SITES	09/27/85	- CLEMENT ASSOCIATES, INC.	FINAL	320	2		OSWER #9850.3

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COMPENDIUM OF CERCLA RESPONSE SELECTION GUIDANCE DOCUMENTS

Doc No	Vol	Title	Date	Authors	Status	Pages	Tier	Attachments	OSWER/EPA Number
5002	27	FINAL GUIDANCE FOR THE COORDINATION OF ATSDR HEALTH ASSESSMENT ACTIVITIES WITH THE SUPERFUND REMEDIAL PROCESS	05/14/87	- PORTER, J.W./OSWER/OERR	FINAL	22	2	1) SAME TITLE, DATED 4/22/87	OSWER #9285.4-02
5003	27	GUIDELINES FOR CARCINOGEN RISK ASSESSMENT (FEDERAL REGISTER, SEPTEMBER 24, 1986, P.33992)	09/24/86	- EPA	FINAL	13	2		
5004	27	GUIDELINES FOR EXPOSURE ASSESSMENT (FEDERAL REGISTER, SEPTEMBER 24, 1986, P. 34042)	09/24/86	- EPA	FINAL	14	2		
5005	27	GUIDELINES FOR HEALTH ASSESSMENT OF SUSPECT DEVELOPMENTAL TOXICANTS (FEDERAL REGISTER, SEPTEMBER 24, 1986. P. 34028)	09/24/86	- EPA	FINAL	14	2		
5006	27	GUIDELINES FOR MUTAGENECITY RISK ASSESSMENT (FEDERAL REGISTER, SEPTEMBER 24, P. 34006)	09/24/86	- EPA	FINAL	8	2		
5007	27	GUIDELINES FOR THE HEALTH RISK ASSESSMENT OF CHEMICAL MIXTURES (FEDERAL REGISTER, SEPTEMBER 24, 1986, P.34014)	09/24/86	- EPA	FINAL	13	2		

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COMPENDIUM OF CERCLA RESPONSE SELECTION GUIDANCE DOCUMENTS

Doc No	Vol	Title	Date	Authors	Status	Pages	Tier Attachments	OSWER/EPA Number
5008	28+	HEALTH EFFECTS ASSESSMENT DOCUMENTS (58 CHEMICAL PROFILES) VOL. 28: ACETONE, ARSENIC, ASBESTOS, BARIUM, BENZO(A)PYRENE, CADMIUM, ETC.	09/01/84	- ORD/CHEA/ECAO	FINAL	1750	2	EPA/540/1-86/001-058
5009	31	INTEGRATED RISK INFORMATION SYSTEM (IRIS) [A COMPUTER-BASED HEALTH RISK INFORMATION SYSTEM AVAILABLE THROUGH E-MAIL--BROCHURE ON ACCESS IS INCLUDED]	/ /	- CHEA	FINAL	--	2	
5011	31	PUBLIC HEALTH RISK EVALUATION DATABASE (PHRED) [USER'S MANUAL AND TWO DISKETTES CONTAINING THE DBASEIII PLUS SYSTEM ARE INCLUDED]	09/16/88	- OERR/TOXICS INTEGRATION BRANCH	FINAL	--	2	
5013	31	SUPERFUND EXPOSURE ASSESSMENT MANUAL	04/01/88	- OERR	FINAL	160	1	OSWER #9285.5-1
5014	31	SUPERFUND PUBLIC HEALTH EVALUATION MANUAL	10/01/86	- OERR	FINAL	500	1	OSWER #9285.4-1

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Doc No	Vol	Title	Date	Authors	Status	Pages	Tier	Attachments	OSWER/EPA Number
** COMMUNITY RELATIONS									
7000	32	COMMUNITY RELATIONS IN SUPERFUND: A HANDBOOK (INTERIM VERSION)	06/01/88	- OERR	FINAL	188	2	1) CHAP. 6 OF THE COM. REL. HANDBOOK 11/03/88	OSWER #9230.0-03B
** SELECTION OF REMEDY/DECISION DOCUMENTS									
9000	32	INTERIM GUIDANCE ON SUPERFUND SELECTION OF REMEDY	12/24/86	- PORTER, J.W./OSWER	FINAL	10	2		OSWER #9355.0-19
** NEW ADDITIONS									
9002	33	INTERIM FINAL GUIDANCE ON PREPARING SUPERFUND DECISION DOCUMENTS	06/01/89		INTERIM FINAL				OSWER #9355.3-02
9005	33	GROUND WATER ISSUE: PERFORMANCE EVALUATIONS OF PUMP-AND-TREAT REMEDIATIONS	/ /	-KEELEY, J.F.					EPA/540/4-89/005
9009	33	NATIONAL OIL & HAZARDOUS SUBSTANCES POLLUTION CONTINGENCY GUIDANCE, PART 300, 40 CFR CH. 1 (7/1/85 EDITION), pp. 664 - 755	07/01/85			92			
9010	33	SUPERFUND AMENDMENTS & REAUTHORIZATION ACT OF 1986 (SARA)	10/17/86	99TH CONGRESS OF U.S.		130			

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Doc No	Vol	Title	Date	Authors	Status	Pages	Tier Attachments	OSWER/EPA Number
9011	1	RISK ASSESSMENT GUIDANCE FOR SUPERFUND - VOLUME 1, HUMAN HEALTH EVALUATION MANUAL (PART A)	12/01/89		INTERIM FINAL			EPA/540/1-89/002
9012	2	RISK ASSESSMENT GUIDANCE FOR SUPERFUND - VOLUME 2, ENVIRONMENTAL EVALUATION MANUAL	03/01/89		INTERIM FINAL			EPA/540/1-89/001A
9013		INTERIM GUIDANCE ON ADMINISTRATIVE RECORDS FOR SELECTION OF CERCLA RESPONSE ACTIONS	03/01/89		INTERIM	85		OSWER 9833.3A
9014		INTERIM GUIDANCE ON COMPLIANCE WITH APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS	07/09/87		INTERIM	9		OSWER 9324.0-05
9015		CERCLA COMPLIANCE WITH OTHER LAWS MANUAL: PART ii - CLEAN AIR ACT AND OTHER ENVIRONMENTAL STATUTES AND STATE REQUIREMENTS	08/01/89		INTERIM FINAL			OSWER 9234.1-02
9017		REGION 9 ENVIRONMENTAL PROTECTION AGENCY DRINKING WATER STANDARDS AND HEALTH ADVISORY TABLE	06/01/89			28		

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Doc No	Vol	Title	Date	Authors	Status	Pages	Tier	Attachments	OSWER/EPA Number
9018		CONSIDERATIONS IN GROUNDWATER REMEDIATION AT SUPERFUND SITE	10/18/89			8			OSWER 9355.4-03
9019		SUPERFUND LDR GUIDE #7: DETERMINING WHEN LAND DISPOSAL RESTRICTIONS (LDRs) ARE "RELEVANT AND APPROPRIATE" TO CERCLA RESPONSE ACTIONS	12/01/89			2			OSWER 9347.3-08FS
9020		RISK ASSESSMENT GUIDANCE FOR SUPERFUND HUMAN HEALTH RISK ASSESSMENT: U.S. EPA REGION IX RECOMMENDATIONS	12/15/89		INTERIM FINAL				
9021		A GUIDE TO DEVELOPING SUPERFUND RECORDS OF DECISION	05/00/90		FACT SHEET	4			OSWER 9335.3-02FS-1
9022		GUIDANCE ON REMEDIAL INVESTIGATIONS UNDER CERCLA	06/01/85		FINAL				OSWER 9355.0-068
9023		GUIDANCE ON FEASIBILITY STUDIES UNDER CERCLA	06/01/85		FINAL				OSWER 9355.0-05C
9024		CONTROL OF AIR EMISSIONS FROM SUPERFUND AIR STRIPPERS AT SUPERFUND GROUNDWATER SITES	89/06/15		FINAL				OSWER 9355.0-28

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COMPENDIUM OF CERCLA RESPONSE SELECTION GUIDANCE DOCUMENTS

Doc No	Vol	Title	Date	Authors	Status	Pages	Tier	Attachments	OSWER/EPA Number
9025		GROUND WATER POLICY - REGION 9	05/00/89						