RO2656
CHROMIUM
VAULT

EXCEL TRANS Phone (707) 745-8907
CAD981982663 Fax (707) 745-8024
2990 Bay Vista Ct., Suite G, Benicia, CA 94510

April 5, 1991

Ms. Susan Hugo
Division of Hazardous Materials
Alameda County Health Agency
80 Swan Way, Room 200
Oakland, CA 94621

Dear Ms. Hugo:

Enclosed please find three copies of the Technical Proposal and Work Plan for the closure of the Chromex plating facility. Chromex is a subsidiary of the Charles Lowe Company. The facility is located at 1400 Park Avenue in Emeryville, and is applying for a closure permit for a facility that used hazardous materials.

As Charles Lowe would like to expedite the closure process, we request that written comments amending the Closure Plan be submitted to ExcelTrans within 15 calendar days of the receipt of this plan. If this is not possible, please advise us of the earliest date which we may receive your comments on the plan.

If you have any questions, please call me at (415)-262-1513. Thank you for your prompt attention to this matter.

Sincerely,

David Nielsen

David Nielsen
Project engineer

Enclosures

cc: Fred Schappert, Charles Lowe Company
Thomas Paulsen, East Bay Municipal Utilities District
Bill Grant, ExcelTrans Inc.

EXCEL TRANS Phone (707) 745-8907
CAD981982663 Fax (707) 745-8024
2990 Bay Vista Ct., Suite G, Benicia, CA 94510

April 5, 1991

Ms. Susan Hugo
Division of Hazardous Materials
Alameda County Health Agency
80 Swan Way, Room 200
Oakland, CA 94621

Dear Ms. Hugo:

Enclosed please find three copies of the Technical Proposal and Work Plan for the closure of the Chromex plating facility. Chromex is a subsidiary of the Charles Lowe Company. The facility is located at 1400 Park Avenue in Emeryville, and is applying for a closure permit for a facility that used hazardous materials.

As Charles Lowe would like to expedite the closure process, we request that written comments amending the Closure Plan be submitted to ExcelTrans within 15 calendar days of the receipt of this plan. If this is not possible, please advise us of the earliest date which we may receive your comments on the plan.

If you have any questions, please call me at (415)-262-1513. Thank you for your prompt attention to this matter.

Sincerely,

David Nielsen
Project engineer

Enclosures

cc: Fred Schappert, Charles Lowe Company
Thomas Paulsen, East Bay Municipal Utilities District
Bill Grant, ExcelTrans Inc.

TECHNICAL PROPOSAL AND WORK PLAN FOR CHROMEX

CLOSURE OF PLATING FACILITY

April 5, 1991

Prepared for:

THE CHARLES LOWE COMPANY
1400 PARK AVENUE
EMERYVILLE, CA 94608

For Submittal To:

Alameda County Health Agency, Division of Hazardous Materials
and
East Bay Municipal Utility District

Prepared By:

David Nielsen
ExcelTrans, Inc.
2990 G Bay Vista Court
Benicia, CA 94510

TABLE OF CONTENTS

SECTION I: INTRODUCTION

SITE HISTORY

Chromex is a division of the Charles Lowe Company located at 1400 Park Avenue in Emeryville, California. The Charles Lowe Company is a manufacturing firm that produces and repairs marine and industrial equipment. Chromex supported the manufacturing operations on-site by providing electroplating, metal spraying, and selective brush plating services. Chromex has ceased these plating and spraying operations, and is closing the room where these activities were conducted.

Chromex occupies a one room addition to the original building on the site. A facility layout diagram is included in Appendix A. The addition was constructed in 1973 by the former building owner, Fred Meyer Company. From 1973 to 1978 the room was occupied by Modern Plating, a subsidiary of the Fred Meyer Company. Modern Plating performed copper and brass plating within the room until 1978 when they ceased operation and vacated. Chromex occupied the room from 1978 until the present, and ceased plating operations on January 31, 1991. The title to the land and building is currently held by Lewerenz Company, Inc. of San Francisco, California.

PURPOSE OF CLOSURE

At this time, ExcelTrans has been contracted to develop and implement a full closure of the Chromex plating room. The goals of the closure are as follows:

- Decontaminate the room and process equipment where residues of hazardous materials may be present.
- Properly dispose of wastes generated during closure.
- Limit Charles Lowe Company's long-term liability associated with Chromex by closing the area in compliance with agency requirements.

Charles Lowe plans to move manufacturing operations currently performed at other areas of the site into the room following closure. After Chromex closes, the room will be divided between hydrostatic valve testing and sand blasting operations.

Charles Lowe is submitting this report to local regulators to establish closure protocols for the Chromex plating facility. The purpose of this report, therefore, is to present a viable approach to confirm that the cleaning performed has adequately removed residual contamination from chrome plating operations.

Subsequent chapters of the report will outline cleaning procedures for plating areas, establish sampling protocols for each task, discuss analytical requirements for each sample, and establish target clean levels to achieve in closure. A final closure report will be submitted after closure is completed to present analytical results and proof of disposal. Analyses will be based on hazardous materials handled or used in the room.

Sub-surface investigation is not included within the scope of this Work Plan. The need for soil sampling will be determined after the closure plan has been executed, and after the final inspection given by the Alameda County Health Agency.

FACILITY CLOSURE GUIDELINES

Federal closure requirements presented in 40 CFR 264 Subpart G specify closure performance standards applicable to RCRA facilities. These standards do not apply to Chromex in a strict sense, because Chromex is not a permitted hazardous waste management facility (TSDF). Applicable sections of 40 CFR Part 264 are useful, however, as a guideline for closure of manufacturing facilities which handle hazardous materials and generate hazardous waste. These guidelines include:

- 40 CFR 264.111: The owner or operator must close the facility in a manner that minimizes the need for further maintenance, and minimizes the potential for post-closure escape of hazardous wastes via runoff, leachate, etc.

- 40 CFR 264.178: Remove all hazardous waste and hazardous waste residues from containment areas.

- 40 CFR 264.197a: Upon closure of a tank system, the owner or operator must remove or decontaminate all waste residues. He must also remove or decontaminate structures and equipment contaminated with waste residues.

The Uniform Fire Code also provides some guidelines on vacating a building that used or stored hazardous materials.

- Section 11.411: Upon vacating or abandoning any premises, the occupant thereof shall remove any and all noxious and hazardous material or waste matter which has been deposited, allowed to come to rest or permitted to accumulate thereon, and such premises shall be left in a clean and neat condition. (1988 UFC)

OUTLINE OF CLOSURE PLAN

Section Two of this closure plan will outline specific steps to be taken in closing the plating area. This section of the plan will identify closure procedures for each task separately. Types and quantities of chemicals handled or stored in the room will also be addressed.

Section Three of this closure plan proposes analytical requirements to assess the achievement of target levels. Target levels for residual contamination after cleaning are presented.

Appendix A contains a layout diagram of the 1400 Park Avenue building, and includes a detail of the Chromex plating room.

Appendix B is the Site Safety Plan. Overall job safety requirements and emergency procedures are outlined, as well as site specific employee training program requirements. Personal protective equipment by job task, and job hazard analyses are also presented. Roles of key site and management personnel are defined in relation to safety.

SECTION II: WORK PLAN

PURPOSE

The purpose of this section of the closure plan is to present a step by step process by which the plating area can be closed, in a manner consistent with both County of Alameda requirements, and Charles Lowe management objectives.

Safety on the job is a top priority with ExcelTrans, and will not be sacrificed under any circumstances. Employees will be required to review the Site Safety Plan (SSP) in Appendix B, which will be available at the job site. Employees will also undergo site specific training as outlined in the SSP.

OUTLINE OF CLOSURE TASKS

For the purposes of closure, the work schedule has been separated into four distinct tasks as presented below.

1) Site preparation,

2) Pumping and removal of plating and etching tanks,

3) Removal of process and abatement equipment,

4) Decontamination of building structure.

Step-by-step closure procedures for each task are presented below. Also discussed is a list of chemicals stored in each area and a summary of the purpose of each item.

Task 1: Site Preparation

Before remediation operations commence, ExcelTrans will secure the work zone to prevent unauthorized entry. Bermed areas will be constructed to facilitate rinsate collection and prevent run-off to areas outside the work zone. Technicians will receive training in accordance with the Site Safety Plan included in Appendix B of this report.

Site preparation will proceed as follows:

A. Establish security area for on-site storage of remediation equipment.

B. Supply emergency and spill clean-up material to the site as specified in the Site Safety Plan.

C. Lock all internal access doors between the work area and the Charles Lowe manufacturing area. Limit access to the work zone with portable fencing, caution tape, or similar barricades.

D. Establish personnel and equipment decontamination station at the entrance to the work zone as specified in the Site Safety Plan.

E. Install a temporary berm around the perimeter of the plating room to facilitate rinsate collection.

F. ExcelTrans Safety Officer will provide site-specific training to technicians as detailed in the Site Safety Plan.

Task 2: Pumping and Removal of Plating and Etching Tanks

Chromex used a 12' deep, below grade vault to secondarily contain process tanks. The vault area contains 8 tanks that held plating, etching, and stripping solutions. The vault walls are constructed of 12" thick steel-reinforced concrete. Materials stored in the vault include four tanks of 26% chromic acid (3600; 3200; 3200; and 2800 gallons); two tanks of 20% hydrochloric acid (120; 60 gallons); one tank of 20% sulfuric acid (100 gallons); and one tank of 20% sodium hydroxide (750 gallons).

In addition to these tanks, the fume scrubber contains 50 gallons of scrubbing solution. Also, one empty 3200 gallon emergency storage tank and one 7000 gallon rinse water storage tank are outside the building and will be handled as specified in this section.

The tanks and associated piping will be cleaned and remarketed, either to a used equipment or scrap metal dealer. If no suitable buyer is found, cleaned tanks will be taken for Class III disposal.

Tank closure will proceed as follows:

A. Visually inspect for significant cracks in floors and sump. (No significant cracks are expected.) If any cracks are discovered, note in the field log for further investigation, photograph, and include in the final closure report. Repair with cement grout for steam cleaning.

B. Pump out liquids remaining in tanks and related piping, segregating each material by chemical compatibility. Dispose of material as hazardous waste.

C. Confirm each tank is empty.

D. Remove piping and any peripheral equipment. Steam clean or manage as hazardous waste.

E. Steam clean interior and exterior of tanks and related piping. Flush until pH of rinsate is neutral.

F. Use field test methods for pH, oxidizer characteristic, and chrome levels in final rinse. If a positive result is observed, continue washing until results indicate that the tank has been cleaned below target levels. (Target levels are discussed in Section Three. Record result for inclusion in final closure report.

Task 3. Removal of Process and Abatement Equipment

Plating operations utilized six rectifiers ranging in size from 2,000 to 10,000 amps supplied by a 220/440 volt 3-phase electrical panel on the west side of the Chromex room.

Two totally enclosed electric boilers and one heat exchanger heated process plating solutions.

A 1,000 cfm venturi-type fume scrubber and polypropylene ball floating covers were used to suppress the airborne concentration of chromic acid.

A two ton overhead crane was used to situate and remove items from the plating baths.

Process equipment will be removed, cleaned, and either remarketed, recycled as scrap, or sent for proper disposal. The electrical panel and overhead crane will be decontaminated and left in place.

Closure of process and abatement equipment will proceed as follows:

A. Lock-out power supply to/from electrical panel by qualified electrician.

B. Empty process piping of free liquids.

C. Disassemble and remove process equipment scheduled for disposal.

D. Steam clean equipment and related piping/ducting. Flush until pH of rinsate is neutral.

E. Use field test methods for pH, oxidizer, and chrome levels in final rinse. If a positive result is observed, continue washing until results indicate that the equipment has been cleaned below target levels. Record result for inclusion in final closure report.

Task 4. Decontamination of Building Structure

The Chromex plating room is a steel frame structure with double wall wood siding. The floor and sump area are 12" thick steel-reinforced concrete. The structure will be decontaminated and left in place.

Closure of the plating room will proceed as follows:

A. After equipment and piping have been removed or cleaned, pressure wash walls and floor with 2000 psi pressure washer. A chemical additive such as EDTA or an oxidizing mineral acid may be added to the wash water at low concentrations. (The chemical additive would aid in solubilizing and removing residual chrome through chelate formation.)

B. Use field test methods for pH, oxidizer, and chrome level in final rinse. If a positive result is observed, continue washing until the result indicates that residual contamination is below target levels.

C. Gather a composite sample of the final rinsate, provide chain-of-custody documentation, and submit to an independent, certified lab for the analysis outlined in Section Three. Record result for inclusion in final closure report.

If pressure washing operations are unable to adequately decontaminate the structure, optional remediation techniques may be employed. A layer of concrete may be removed by scabbling or abrasive media blasting techniques, then pressure washed and sampled as specified above. If contamination still exists, subsequent layers may be removed with a jackhammer, and again rinsed and sampled. If areas of the floor must be removed, concrete will be taken to a concrete recycler for disposal.

In like manner, several remediation options exist if pressure washing techniques are not sufficient to reach target levels for the wood siding. Abrasive media blasting may be used in areas where contamination is found after steam cleaning. Alternatively, structures unable to reach target limits may be encapsulated using a physical barrier such as plaster, epoxy resins,

or paint.[1] This would establish an impermeable barrier to isolate contaminated structures. As a last resort, areas of the wood siding may be removed and disposed as hazardous waste.

MANAGEMENT OF WASTES GENERATED

Several types of waste will be generated in cleaning the plating area. These include plating solutions, rinse water, pipe and duct lines, tanks and removed equipment. Disposition of these wastes is specifically addressed below.

Disposition of Plating Solutions and Rinse Waters

Plating solutions and wash waters generated in cleaning operations will be transported on a Uniform Hazardous Waste Manifest to an approved treatment and recycling facility. The rinse water will be managed according to EPA guidelines. Manifest copies will be included in the final report to document proper disposal.

Recycling and waste minimization are preferred in hazardous waste management. These will minimize Charles Lowe's long-term liability.

Disposition of Duct Lines, Piping, and Debris

All ducting, piping, and debris which previously contained hazardous materials will be removed and pressure washed. These items were exposed almost exclusively to chromic acid, and as such can be managed in like manner.

The disposal of ducting, piping, and debris is limited to three options:

1) Dispose of, uncleaned, at a hazardous waste landfill (Class I disposal).

2) Decontaminate as needed and dispose of at a local (Class III) landfill.

3) Decontaminate and remarket to scrap dealer.

The extent of residual contamination in the equipment, time required to decontaminate, and amount of waste generated in cleaning will determine which disposal option is utilized. Any rinse water from cleaning of piping or ducting will be managed as hazardous waste along with

---

[1]M.P. Esposito et al and R. Clark et al, Decontamination Techniques for Buildings, Structures and Equipment (New Jersey: Noyes Data Corporation, 1987), 42-43, 52-58.

other waste water generated at the site (see Disposition of Rinse Water, above). Manifest copies and non-hazardous disposal receipts will be included in the final report to document proper disposal.

Disposition of Tanks and Equipment

The ten tanks will be rinsed with a 2000 psi pressure washer to remove residual contamination. Tanks range in size from 100 to 3,600 gallons. Equipment scheduled for disposal includes the rectifiers, heat exchanger, boilers, pumps, and other items.

The disposal of tanks and equipment is limited to three options:

1) Dispose of, uncleaned, at a hazardous waste landfill (Class I disposal).

2) Decontaminate as needed and dispose of at a local (Class III) landfill.

3) Decontaminate and remarket to private interest or scrap metal dealer.

The extent of residual contamination, time required to decontaminate, and amount of waste generated in cleaning will determine which disposal option is utilized. Any rinse water from pressure washing operations will be managed as hazardous waste along with other waste water generated at the site (see Disposition of Rinse Water, above). Manifest copies and non-hazardous disposal receipts will be included in the final report to document proper disposal.

SECTION III: EVALUATION OF DECONTAMINATION EFFECTIVENESS

PURPOSE

After cleaning has been completed, the extent of residual contamination must be determined. This will assess the effectiveness of cleaning. A variety of tests will be used in this evaluation. They include laboratory analyses (to be performed by California certified laboratories) and field analysis. Field tests include testing of pH using litmus paper, testing for oxidizer characteristic using potassium iodide paper and testing for chromate ion using chromate test kits.

This section presents specific tests to be performed on rinsate and other samples. Target cleanup levels will also be discussed.

SAMPLES

As part of the closure process in manufacturing areas, cleaning will be performed on all structures and equipment where hazardous materials were used or stored. The last phase of this cleaning will use a high pressure washer to remove contaminants. Final rinsate samples will be gathered from the pressure washing of the building structure.

Composite samples of the wood siding and the concrete floor will also be analyzed to assess the effectiveness of cleaning operations. Areas with heavier visible contamination will be targeted as sample points for final analysis.

Samples will be tracked using Chain of Custody protocol, and analyses will be performed in laboratories certified by the California Department of Health Services. Analysis will be based on hazardous materials previously handled in the room. Since various metals were used in plating operations, the rinsate sample from the plating room will be analyzed for all relevant metals. This will ensure that any significant residue remaining after cleaning will be identified and scheduled for further cleaning.

TARGET LEVELS

The extent of residual contamination following decontamination must be determined so effectiveness of cleanup methods can be assessed. This is done by establishing target "clean" levels for relevant contaminants.

In evaluating effectiveness of cleaning, the designated target level must reflect applicable regulatory constraints. Designated target levels must also be achievable with the remediation technology being employed.

Once a target level is established, it should be used as a guideline. Target levels are not intended as absolute standards, but to evaluate cleaning activities.

EBMUD Sewer Discharge Limits as Target Levels

The levels proposed below are based on the East Bay Municipal Utility District's Ordinance Number 311, "Wastewater Control Ordinance", dated February 1, 1990. These values are provided in Table 5 - 1 below. Soluble Threshold Limit Concentration (STLC) and Total Threshhold Limit Concentration (TTLC) values from Title 22, California Code of Regulations, section 66699 (b) are provided for reference only. (STLC and TTLC values are used in performing a hazardous waste determination.)

TABLE 5 - 1: Target Levels For Rinsate Samples

Parameter	Limit For One Sample	STLC Limit	TTLC Limit
Barium	5 mg/l*	100 mg/l	10,000 mg/kg
Chrome	2 mg/l	5 mg/l	500 mg/kg
Copper	5 mg/l	25 mg/l	2,500 mg/kg
Nickel	5 mg/l	20 mg/l	2,000 mg/kg
Silver	1 mg/l	5 mg/l	100 mg/kg
Zinc	5 mg/l	250 mg/l	5,000 mg/kg
pH	> 5.5	2.0 - 12.0	

* = Not defined by EBMUD Ordinance 311, but set at 5% of STLC value.

As discussed above, rinsate samples will be analyzed for constituents of hazardous materials previously handled in the room in question. Final rinsate samples will be analyzed for the above metals by STLC methods (EPA 3010 or equivalent). Composite or individual samples of concrete and wood siding will be analyzed by TTLC methods (EPA 3050 or equivalent). Final pH measurements will be performed using field test methods.

Analytical and field test results will be included in the final report.

LIST OF APPENDICES

CHROMEX SITE SAFETY PLAN

CLOSURE OF PLATING FACILITY

April 1, 1991

Prepared for:

THE CHARLES LOWE COMPANY
1400 PARK AVENUE
EMERYVILLE, CA 94608

Prepared By:

David Nielsen
ExcelTrans, Inc.
2990 G Bay Vista Court
Benicia, CA 94510

TABLE OF CONTENTS

SITE SAFETY PLAN

CLOSURE OF CHROMEX PLATING FACILITY

1.0 INTRODUCTION

This Plan describes the Health and Safety requirements for ExcelTrans remedial activities that will be performed in connection with closure of the hard chrome plating room at the Chromex site. Chromex is a division of the Charles Lowe Company, and is located at 1400 Park Boulevard in Emeryville, California. This plan is written specifically for ExcelTrans employees and its subcontractors, and is not intended for the protection of non-ExcelTrans personnel.

In accordance with 29 CFR 1910.120.(b)(1)(v), ExcelTrans will provide a copy of this plan to all subcontractors operating in or around the closure area to alert them to the hazards present.

Each subcontractor is responsible for the health and safety of his own personnel, and shall hold ExcelTrans harmless from, and indemnify it against, all liability in the case of an injury. All subcontractors must have their designated safety officer sign the Safety Plan Compliance Agreement at the back of this plan, signifying receipt and understanding of this Site Safety Plan.

The applicability of each section of this Site Safety Plan may vary according to the specific closure operation occurring or unforseen complications at the site. Also, customer requirements may change some of the details of this plan, though safety should never be sacrificed when performing any of the tasks covered herein.

1.1 Key Personnel:

Project personnel who will have the overall responsibility for the safe operation of this project are listed on the following page.

TABLE 1.1: PROJECT PERSONNEL

Name	Title	Phone/Pager
Dan Sedgwick	Operations Manager	(707) 745-8907 (707) 645-6903
Pat Kelly	Senior Field Supervisor/ Site Safety Officer	(707) 745-8907 (707) 645-6995
Dave Nielsen	Project Engineer	(415) 262-1513 (415) 809-1584
Hakeem Al-Raheem	ExcelTrans Safety Officer	(707) 745-8907 (707) 554-7735

1.2 Responsibilities of Key Personnel:

Operations Manager: Will commit equipment and financial resources to emergency situations.

Field Supervisor: Will enforce use of required safety equipment and practices. Will act as on-site emergency coordinator, and fill out incident/accident reports. Will conduct a Tailgate Safety Meeting with all ExcelTrans employees on the site before starting work. Will halt actions of subcontractors performing unsafe acts.

Project Engineer: Will prepare the Site Safety Plan which establishes minimum site requirements for safety equipment per job task. Will brief the site and ExcelTrans safety officer regarding implementation of the Site Safety Plan.

ExcelTrans Safety Officer: Will train field personnel in specifics of Site Safety Plan before Work Plan operations commence. Will review incident report forms, if any, and propose new safety measures as needed.

2.0 HAZARD EVALUATION

This Site Safety Plan addresses specific on-site work activities relevant to intended closure operations. Workers at the site will be experienced in hazardous waste remediation projects. The field supervisor will have received 40 hour SARA training consistent with 29 CFR 1910.120, and been through the additional 8 hour SARA supervisor's training.

Site workers will be informed that the work may involve physical or chemical hazards as outlined in Sections 2.3 and 2.4 below.

Based on the information available, this plan covers anticipated activities and hazards, and makes provision for modification or amendment as hazard-related data are discovered during the course of work. This plan will be amended with a hazard assessment if previously unknown hazards are encountered. Amendments must be in writing, and signed by both the Project Engineer and the Site Safety Officer.

2.1 Hazard Evaluation In The Work Zone:

Inside of the work zone, specific personal protection will be required as a function of job task, as outlined in section 4.0. On-site air monitoring will consist of an initial site survey to establish the airborne concentration of hexavalent chrome. Draeger tube readings will be obtained from the vault area and next to the fume scrubber. Once this test shows that the area is safe for work ($Cr < 0.5$ mg/m^3), employees may begin remediation activities.

2.2 Hazard Evaluation Outside Of The Work Zone:

During the all phases of site work, the site safety officer may perform monitoring of the site with Draeger tubes if work zone readings for airborne chrome exceed 0.5 mg/m^3. Outside of the work zone, respiratory protection will be mandated by Table 2.1 below. If workers complain of persistent eye, throat, and/or lung irritation, respirators should be used regardless of the chrome concentration in air.

TABLE 2.1: RESPIRATORY PROTECTION OUTSIDE OF WORK ZONE

CHROME CONCENTRATION	MINIMUM RESPONSE
< 0.1 mg/m³ Hexavalent Chrome	Limited hazard, no special action. No respirator required.
0.1 - 0.5 mg/m³ Hexavalent Chrome	Monitor for chromic acid vapors at least every 60 minutes.
> 0.5 mg/m³ Hexavalent Chrome	Half-mask acid vapor/dust and mist respirators worn by all in affected area. Monitor area for chromic acid vapors at least every 30 minutes.

2.3 Chemical Hazards:

Closure operations covered under this Site Safety Plan include remediation of tanks that last contained chromic acid plating solution. This material may contain some metals (chrome, copper and nickel, primarily). Also, some dip tanks were present that contained other mineral acids (hydrochloric and sulfuric) and a caustic solution (sodium hydroxide).

Unprotected exposure to these chemical hazards by contact with skin, breathing, or ingestion can result in health effects. Table 2.2 on the following page discusses hazardous materials representative of the chemical hazards which may be present at the site.

Chemical hazards associated with cutting the tanks will be minimal, as the tank will be drained of product, and rinsed until a neutral pH is observed before cutting operations begin.

TABLE 2.2: CHEMICAL HAZARD ASSESSMENT

Hazardous material	Primary hazards
Chromic acid	Causes severe burns through dermal and oral exposure. Potential carcinogen.
Hydrochloric, sulfuric acid	Causes severe burns through dermal and oral exposure.
Sodium Hydroxide	Causes severe burns through dermal and oral exposure.
Metals: Trace Nickel, Copper, Chrome	Toxic if ingested. Potential carcinogen.

2.4 Physical Hazards

Table 2.3 below is an identification of the physical hazards that are anticipated on the job site.

TABLE 2.3: PHYSICAL HAZARD ASSESSMENT

Task	Hazard	Preventive measure
Moving heavy items	Strained back	Use drum dolly to move drums. Employ proper lifting techniques.
Debris	Trip/Fall	Be aware of trip hazards in traffic areas.
General labor	Heat Stress	Monitor workers for signs of heat stress on warm days. Replace lost fluids. See Section 3.2.
General labor	Noise	Use hearing protection as dictated by site safety officer. See Section 3.3.
Confined space entry	Asphyxiation	Not covered under this SSP. Must be added as an addendum before confined space entry may proceed.
Altitude labor	Falls	Use fall protection or safety harness when working three feet or more above ground level.
Torch Cutting	Brightness	Wear appropriate safety shades to reduce visual impact of cutting torch. See Section 4.3.
	Burns	Allow time for cut metal to cool before handling.
	Inhalation	Wear appropriate respiratory protection as outlined in Section 4.3.

3.0 HAZARD MITIGATION AND PERSONNEL PROTECTION

The following section presents procedures on how to mitigate the primary potential hazards encountered in the different tasks of the project.

3.1 Potential Fire Hazard:

Combustible material in the immediate area should be cleared before work begins, to minimize the possibility and impact of a fire. Smoking will not be allowed in the work area.

3.2 Potential Heat Stress Hazards:

When heat stress related conditions are likely, the Site Safety Officer (field supervisor) will monitor employees for symptoms of heat stress. Symptoms include, but are not limited to, clammy skin, confusion, dizziness, fainting, fatigue, heat rash, light-headedness, nausea, profuse sweating, and weak pulse. Serious symptoms include convulsions, hot skin, incoherent speech, unconsciousness, and a ceasing of sweating. (If serious conditions exist, remove exterior clothing, and wrap in a wet blanket. Call for medical assistance.)

The threat of heat stress can be reduced by alternating work and rest periods in high heat conditions, performing heavy work during cooler periods of the day (if feasible), and replacing lost fluids with an electrolyte drink or drinking water.

Employees may be required to wear tyvek protective clothing to prevent chemical exposure, increasing the possibility for heat stress. The field supervisor should be aware of heat stress symptoms, and look for them when the temperature exceeds approximately 75°F.

3.3 Potential Noise Hazards

Where noise exposure is possible, a Simpson model 886 sound level meter or similar will assess the extent of potential exposure. If significant noise sources are present, proper protective equipment (ear plugs or muffs) will be selected in compliance with 29 CFR 1910.95. Noise levels in excess of 80 dBA will require ear plugs or muffs.

3.4 Potential Inhalation Hazard

To limit the level of smoke and dust in the room from torch cutting operations, a blower vented outside the building may be employed. If not able to vent directly outside, collapsible ducting may be used to direct airflow.

4.0 PERSONAL PROTECTIVE EQUIPMENT REQUIREMENTS

Based on evaluation of potential hazards, the following minimum levels of personal protection will be designated for the applicable work area or task.

4.1 Entrance to the Site:

All ExcelTrans personnel and site visitors must wear the following upon entrance to the work area:

- Hard hat.
- Safety glasses.
- Long sleeved clothing.

4.2 PPE During Equipment Removal:

The following minimum requirements apply to personnel involved in removing process machinery, containerizing solid waste, and other tasks that do not include the direct handling of liquids. When performing these tasks, workers will wear, at a minimum, the following:

- Hard hat.
- Sturdy work boots with steel toes.
- Safety glasses (or goggles if handling liquids).
- Half face respirator fitted with suitable cartridges. Suitable cartridges will be NIOSH or MSHA approved to filter acid vapors.
- Paper tyvek or equivalent.
- Chemical resistant gloves.
- NOTE: Full face respirator may be substituted for half mask respirator and safety glasses.

4.3 PPE For Torch Cutting

The following minimum requirements apply to personnel directly involved in cutting metal items with an acetylene torch. When performing these tasks, workers will wear, at a minimum, the following:

- Hard hat.
- Sturdy work boots with steel toes.
- Welding goggles not less than shade 6.
- Half face respirator fitted with suitable cartridges. Suitable cartridges will be NIOSH or MSHA approved to filter acid vapors, dusts, fumes, and mists.
- Paper tyvek or equivalent.
- Leather gloves.

4.4 PPE for Pressure Washing or Liquid Handling

The following minimum requirements apply to personnel involved in pressure washing, liquid collection, or liquid handling operations. When performing these tasks, workers will wear, at a minimum, the following:

- Hard hat.
- Chemical resistant rubber boots with steel toes.
- Goggles.
- Half face respirator fitted with suitable cartridges. Suitable cartridges will be NIOSH or MSHA approved to filter acid gases, dusts, fumes, and mists.
- Poly tyvek.
- Chemical resistant gloves.
- NOTE: Full face respirator may be substituted for half mask respirator and goggles.

5.0 WORK ZONE ACCESS

Only authorized personnel will be permitted to enter the work zone while work is in progress. Authorized personnel will include those who have duties which require their presence in the work zone and have received appropriate health and safety training. Work zone access will be restricted by portable fencing and locks on internal doors leading to the adjoining building.

6.0 GENERAL SAFE WORK PRACTICES

The field supervisor is responsible for ensuring all crews have the proper tools and safety equipment for that day's work. Smoking shall be allowed on breaks and lunch in designated areas only. All employees will wash before beginning breaks and lunch, and upon completion of the work day.

6.1 Tailgate Safety Meetings

To ensure worker safety, employees will attend a tailgate safety meeting before starting work. A copy of the Site Safety Plan will be available for reference on-site. Work will be supervised by the site safety officer at all times.

6.2 Decontamination Procedures:

6.2.1 Level C protection: Level C consists of chemical resistant splash suit (poly coated tyvek), boots, and gloves; full or half face respirator; safety glasses and hard hat. The recommended decontamination procedures for Level C PPE are:

- Outer garment cleanup. For visible contamination, scrub boots, gloves, and tyvek splash suit with decontamination solution to remove liquid contaminants. Rinse thoroughly with water.
- Remove boots and place on plastic sheeting reserved for boot storage.
- Remove gloves and tyvek. Place used items in disposal container.
- Remove mask. Wash mask daily with soap and water solution. Rinse with water and allow to dry in clean area.
- Shower after work.

6.2.2 Level D protection: Level D is essentially a work uniform or long sleeves, along with a hard hat, safety glasses, and work gloves. Decontamination consists of glove and coverall removal, and washing hands. Employees will be instructed to shower after work.

6.2.3 Heavy equipment: Heavy equipment may include the solid tire forklift, reach forklift, scissor lift or pressure washer. The recommended decontamination procedure is as follows:

- Remove gross contamination with hand tools such as a shovel or broom.
- Rinse any remaining contamination with a pressure washer or water hose.
- Collect rinse water and manage as hazardous waste until analysis proves otherwise.

6.3 Respirators

Each employee must be fit-tested by the project safety officer for the specific respirator the employee wears. Employees are responsible for fit-testing the respirator before each use, and for the care and maintenance of the respirator.

6.4 Safety Equipment List

Before work begins each day, the following safety equipment must be available on site:

- Personal protective equipment
- Safety harness / fall protection
- Type ABC fire extinguisher, classification 20 ABC or higher
- First aid kit
- Caution tape, portable fencing, or similar barricade
- Drinking water
- Telephone
- Water supply with hose

7.0 EMERGENCY PROCEDURES

In general, a client's Emergency Procedures / Contingency Plan will apply to work done by the field crew. If for some reason client personnel are not immediately available, then ExcelTrans will be responsible for taking appropriate actions in an emergency. The following are minimum requirements in an emergency.

7.1 Minimum Emergency Response Equipment at the Site:

To ensure prompt response to an emergency at the site, the following emergency equipment will be maintained at the site:

- At least one fire extinguisher, class 20 ABC or higher.
- First aid kit.
- Telephone (if client phone not available, then make certain that a cellular phone is on site).
- Shovels.
- Several bags of sorbent material.
- Empty drums or a roll-off box.

7.2 Emergency Procedures for a Fire:

i. Identify type and approximate quantity of material involved. Call 911 for fire department response.
ii. If the fire is not controllable with a fire extinguisher, initiate evacuation of non-emergency personnel.
iii. To the extent possible, isolate other potential ignition sources (combustible materials, pallets, etc).
iv. Keep roads and evacuation routes clear for emergency personnel and vehicles.
v. Collect all fire fighting liquids and other residues by controlling run-off, and manage as hazardous waste unless certified analysis proves otherwise.

7.3 Emergency Procedures for an Explosion:

i. If a potentially uncontrollable fire results from an explosion, notify supervisor and call 911 immediately. Initiate evacuation of non-emergency personnel.
ii. After an explosion, beware of hazardous vapors which may be present in the vicinity of the incident and downwind. Put on personal protective equipment as directed by site safety officer.
iii. Safely remove any victims from dangerous areas if possible. For any injury requiring emergency medical treatment/transport, call 911. Never attempt to transport a victim with a back or neck injury.
v. Contain all spills which result, following spill response procedures.

7.4 Emergency Procedures for a Spill:

i. Notify supervisor.
ii. If the spill may affect public health or the environment off-site, immediately call 911 for emergency notification.
iii. Put on proper personal protective equipment for spill mitigation as directed by supervisor.
iv. Dike area with sorbent or soil, and apply sorbent to spilled liquids.
v. Remove all residues and manage as hazardous waste.

7.5 Emergency Procedures for an Injury:

i. Assess the nature and severity of the injury. Decontaminate victim with water hose if needed.
ii. If the injury requires emergency medical treatment or transport, call 911 for an ambulance.
iii. If the injury is life threatening, have trained personnel begin CPR if needed and administer first aid.
iv. For cuts and minor injuries, administer first aid.
v. If the victim is burned, apply water to the affected areas. Call 911 for emergency medical assistance.
vi. Fill out an incident/accident report.

7.6 Evacuation Procedure:

i. Never evacuate downwind of an incident.
ii. Do not run. Walk to an upwind location and await further instructions.

7.7 Emergency Phone Numbers:

Fire, Police, or Ambulance Emergency	911
Poison Control Center	(415)-476-6600
State Office of Emergency Services	(800)-852-7550
Chemical Emergency (Chemtrec)	(800)-424-9300
Regional Water Quality Control Board	(415)-464-1287
Bay Area Air Quality Management District	(415)-771-6000

7.8 Shutdown of Operations:

In the event that the contingency plan is implemented, work at the site will not proceed until all emergency response equipment has been recharged or replaced.

8.0 RECORD KEEPING REQUIREMENTS

The following record keeping will be maintained in the job file at the ExcelTrans office.

- Tailgate Safety Meetings.
- SARA Training records.
- Any incident / accident reports.
- Respirator training and fit test documentation.
- Site Safety Plan.
- Confined Space Training documentation.
- CPR / First Aid Training documentation.

Tailgate Safety Meeting

Date: _____

Business Name: Chromex
Location: 1400 Park Avenue
Emeryville, CA 94608

Instructor/Supervisor signature: _____

Job task: _____

Chemical hazards: _____

_____

Physical hazards: _____

_____

Protective clothing: _____

_____

Hospital address: Alta Bates
3001 Colby, Berkeley
(415) 540-0337

Emergency phone no.: **911**

Attendee	Signature
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Safety Plan Compliance Agreement

Client Name: Chromex
A division of the Charles Lowe Company

Site Address: 1400 Park Avenue
Emeryville, CA 94608

Subcontractor: _____

Mailing Address: _____

_____

Safety Officer: _____

I, _____, have received a copy of the Site Safety Plan for this project. I have reviewed the plan, understand it, and agree to comply with all of its provisions. I understand that the firm I represent could be prohibited from working on the project for violating any of the safety requirements specified in the plan.

Signed: _____

Date: _____

STATEMENT OF QUALIFICATIONS

EXCEL TRANS, INC.
290 WEST CHANNEL ROAD
BENICIA, CALIFORNIA 94510

TERRATECH, INC.
1365 VANDER WAY
SAN JOSE, CALIFORNIA 95112

EXCEL TRANS, INC.
STATEMENT OF QUALIFICATIONS

Excel Trans is a woman owned small business that specializes in hazardous waste services. Our regional offices are located in Benicia, California; Sparks, Nevada; and Salt Lake City, Utah. Our range of services includes environmental consulting and remediation, plant closures, PCB services, hazardous waste transportation, and carbon adsorption vessel change-outs.

Together, our experienced and professional managers comprise a team of experts in hazardous waste management services. Our management team is qualified to provide hazardous waste consulting and remediation services based on the following qualifications:

- KNOWLEDGE OF REGULATIONS Excel Trans employs registered engineers, registered environmental assessors, chemists and other experienced professionals who are thoroughly familiar with local, regional, state, and federal agency requirements that pertain to site assessment and remediation.

- CREDIBILITY WITH REGULATORY AGENCIES Excel Trans has worked with many governmental agencies on behalf of clients. We have worked on projects with the Bay Area Air Quality Management District, State Department of Health Services, Regional Water Quality Control Board, and local sewer, fire and health agencies.

- TRANSPORTATION EXPERTISE We are permitted to transport non-hazardous and hazardous waste in Canada and twenty-six states, including California. Our drivers are trained and certified in D.O.T. and OSHA compliance. Our fleet includes vacuum, pneumatic, end dump, roll-off, flat bed, and enclosed van trucks.

- REMEDIATION SERVICES Our field service team consists of highly trained and experienced professionals who specialize in three areas: carbon change-out; PCB remediation and transformer disposal; excavation, plant closure and facility decommissioning.

- INSURANCE COVERAGE Excel Trans is fully insured to perform all proposed work. Our general liability limit is $1M/$5M.

- LICENSES AND PERMITS We hold a general engineering contractor's license and hazardous substance removal certification.

EXCEL TRANS PROFESSIONAL STAFF MEMBERS

Bill Wahbeh - Mr. Wahbeh has an MBA and a B.S. in Chemical Engineering. He is a registered Professional Chemical Engineer in California and Nevada, Registered Environmental Assessor, and licensed contractor. He has extensive experience in permitting for Part B RCRA permits. Currently, he is responsible for regulatory compliance, long range planning, and business development.

David Nielsen - Mr. Nielsen has a B.S. in Chemical Engineering and an Engineer-In-Training certificate from the State of California. His experience includes treatment system designs, regulatory compliance for a TSDF, plant closure and facility decontamination project management, and lab-packing. He has received 40-hour OSHA and 8-hour Supervisor training for hazardous materials workers, and 24-hour D.O.T. compliance training.

Mary Boyd - Ms. Boyd has a B.S. in Chemical Engineering. Her experience includes RCRA and California compliance, plant closure and facility decontamination, OSHA safety compliance, preparation of site safety plans, permitting, sampling, profile and manifest preparation, and classification of unknowns for disposal. She has received 40-hour OSHA and 16-hour D.O.T. compliance training, and 16-hours of HazCat chemical identification training.

Jim Burrough - Mr. Burrough has thirteen years of experience in PCB transformer decommissioning, hazardous waste transportation, and industrial cleaning. He has extensive knowledge of local, state, and federal requirements for the disposal of PCBs and their related equipment. He has experience in the preparation of bids and submittals for county, state, federal, and superfund projects. Mr. Burrough has had 40-hour OSHA and 8-hour Supervisor training for hazardous waste workers, lab pack training at U.C.Davis, and 24-hour D.O.T. compliance training.

Patrick Kelly - Mr. Kelly has ten years of experience supervising crews consisting of heavy equipment operators and laborers. He has six years supervisory experience in facility decontamination and plant closures, in-situ biological treatment of contaminated soil, and asbestos removal. Mr. Kelly has had 40-hour OSHA and 8-hour Supervisor hazardous waste training, 16-hours D.O.T. compliance training, and 16-hours of HazCat chemical identification training.

Jerry Butler - Mr. Butler has worked in transportation for 19 years and in hazardous waste transportation for 5 years as a driver, dispatcher and D.O.T. compliance coordinator. He has experience in D.O.T. BIT inspections, 49CFR HM-181 amendments, D.O.T. random drug testing, and log book compliance. Mr. Butler has 40-hour OSHA, 24-hour D.O.T. compliance, 16-hour BIT, and 8-hour HM-181 training, and is a National Safety Council certified Defensive Driver trainer.

PLANT CLOSURE, FACILITY DECOMMISSIONING AND EXCAVATION

Our engineers provide work and safety plans, final closure reports, regulatory expertise, and project management. They have expertise in cyanide destruction and chromium, electroless nickel, copper and zinc decontamination procedures. Our staff has developed excavation plans for removal of contaminated soil, concrete, and underground storage tanks. Specific projects include:

- Sumitomo Metal Mining, Fremont, CA - Plant Closure
  In 1990, Excel Trans completed a full closure of the facility. We decontaminated and removed plating lines, coating machines, ovens, and cutting and stripping units. A waste water treatment system consisting of 45 tanks was also decontaminated and removed. A final report was submitted to the lead agency after completion of closure.

- Sumitomo Metal Mining, Fremont, CA - Excavation and Backfill
  In 1991, Sumitomo contracted Excel Trans to excavate and back fill areas where releases of hazardous materials had occurred. We excavated, transported, and disposed of 1,000 cubic yards of cyanide contaminated soil. The excavation site was backfilled, compacted and returned to grade. A site safety plan and work plan were prepared and submitted to the lead agency.

- Chromex, Division of Charles Lowe Co., Emeryville, CA - Plant Closure
  Excel Trans completed a full plant closure and demolition of a 3,000 square foot chrome plating facility. Closure activities included removal of storage and plating tanks, demolition of the structure, removal of a concrete floor and vault, and excavation and transport of 300 cubic yards of contaminated debris. A site safety plan, work plan, and final report were submitted to the lead agency.

- Shinko Electric America, Inc., Manteca, CA - Partial Closure
  Our firm decontaminated process equipment and piping, the interior of the facility, and the 34-tank waste water treatment system. A partial closure report was submitted to the lead agency.

- JAM Plating, Santa Clara, CA - Plant Closure
  We performed a full closure of a zinc plating facility. We removed a 5-bath, 7-vault, 9-tank plating system, performed building decontamination, and investigated sub-surface soil. A final closure report was submitted to the local agency.

- Micro Magnetics Industries, Inc., Palo Alto, CA - Plant Closure
  Excel Trans completed a full closure of a zinc plating facility. A work plan was submitted to and approved by the local agency. A final closure report was submitted to the local agency.

PCB SERVICES

Excel Trans provides a complete range of PCB services. Our firm has the background and experience to drain, flush, decontaminate, dismantle, rig, load, and transport all sizes of PCB related materials and equipment. Excel Trans has particular expertise in PCB facility decontamination which includes chemical cleaning, removing transformers, excavating soil and concrete, sampling, backfilling, and pouring concrete pads.

PCB services have been conducted throughout the United States. Specific projects include:

- Clyde G. Steagall, Inc., California - Transformer Management Project
  Steagall, Inc. subcontracted Excel Trans to drain, flush, load and transport PCB transformers from twenty different locations throughout California. Locations included California State Universities, University of California, and California medical and correctional facilities.

- Environmental Management Services, South Carolina - Removal & Demolition of Tank
  Excel Trans was contracted by Environmental Management Services to complete the decontamination of an EPA-TSCA Superfund site consisting of a 15,000 bbl PCB contaminated tank at Hunters Point Naval Shipyard. Our firm is currently dewatering 30,000 gallons of PCB contaminated sludge, chemically cleaning the tank and related equipment, demolishing the tank, excavating contaminated soil, backfilling, and placing a cap over the site.

- Continental Transformer, Inc., California - Transformer Management Project
  Continental Transformer has subcontracted Excel Trans to drain, flush, load and transport PCB transformers from forty-five different locations throughout California. Locations include California State Universities, University of California, and California medical and correctional facilities.

- S. D. Meyers, Inc., Ohio - Transformer Management Project
  We are currently under contract to drain, flush and transport transformers to S.D. Meyers disposal facility for destruction, landfill, recycle, detoxification or incineration of PCB oils and related equipment.

- Aptus Westinghouse, Inc., California - PCB Consultation Services
  Excel Trans has been a PCB transportation and disposal consultant to Aptus since 1987.

- Concord Naval Weapons Station, Concord, California - Transformer Room Closure
  Excel Trans performed closure of a transformer room consistent with a client approved work plan. We decontaminated the PCB transformer room, drained and flushed the transformers, excavated and transported contaminated concrete and soil for disposal, and poured a concrete floor.

CARBON CHANGE-OUT SERVICES

Excel Trans provides full service carbon adsorption vessel change-outs. The firm offers vacuum extraction of vapor and liquid phase carbon. In addition, complete units of spent carbon and vessel can be exchanged for fresh carbon and vessel. Size of the complete unit change out varies from 100 to 40,000 pounds of carbon.

The following is a partial list of our carbon service projects:

- Pacific Coast Chemical, Berkeley, California - Transportation of Waste Activated Carbon
  Excel Trans has loaded and transported bulk, fresh, and spent activated carbon for Pacific Coast since 1988. An Excel Trans pneumatic tanker transports bulk, spent carbon to a regeneration facility. Tanker loads vary in size from 10,000 to 20,000 pounds of carbon. Generator sites include Shell Oil, Tosco Refinery, Chevron U.S.A., and Exxon.

- West General Associates, San Jose, California - Carbon Change-Out
  We have serviced West General Associates since 1989. Our firm routinely performs vacuum extraction of 10,000 pounds of spent carbon from vessels, transports spent carbon to a regeneration facility, and loads fresh carbon into adsorption vessels.

- Groundwater Technology, Sacramento & Concord, California - Carbon Change-Outs
  We have serviced over 30 Groundwater Technology sites for 2 years. We have performed vacuum extraction of spent carbon from 55-gallon soil-vapor extraction units, loaded and transported spent carbon to regeneration facilities, and filled emptied vessels with fresh activated carbon.

- Levine Ficke, Emeryville, California - Carbon Change-Outs
  We have serviced 5 locations for Levine Ficke. At these locations, we extract 10,000 pounds of spent activated carbon from vessels, load the spent carbon into a pneumatic trailer, reload the vessel with fresh carbon, and transport spent carbon to a regeneration facility.

- Cameron-Yakima, Yakima, Washington - Carbon Transportation
  Since 1989, Cameron-Yakima has contracted us to transport annually over 80,000 pounds of fresh and spent carbon throughout California, Oregon, and Washington to the Cameron-Yakima regeneration facility.

- ICI Americas, Inc., Richmond, California - Carbon Change-Out
  Excel Trans has a three year contract with ICI to perform an annual carbon change out at their Richmond facility. When breakthrough occurs, we remove 12,000 pounds of spent carbon, dewater the carbon, and recharge the vessel. We transport spent carbon in a pneumatic trailer to a regeneration facility.

HAZARDOUS WASTE TRANSPORTATION

Excel Trans has provided hazardous waste transportation since 1987 and PUC transportation since 1991. Our firm is permitted to transport hazardous waste throughout the United States and Canada. We have extensive knowledge of D.O.T. and state transportation regulations. Our trailers are equipped with secondary containment and spill kits. In addition, containment pans are available at all terminals for large transformers and other pieces of contaminated equipment.

Specific examples of notable Excel Trans transportation experience include the following:

- Komag, Inc.,Milpitas, California - Hazardous Waste Transportation
  Excel Trans has provided a extensive hazardous waste transportation services to Komag since 1988. Services include the following: rental of roll-off boxes and vans; load and transport waste liquids by vacuum truck for treatment; transport bins of sludge and filter cake for disposal; transport vans containing fiber sacks of sludge and filter cake for disposal; and transport drums of various wastes for recycle and landfill.

- Seagate Magnetics, Fremont, California - Hazardous Waste Transportation
  Excel Trans has provided transportation services to Seagate since 1988. Services provided include the following: monthly rental of roll-off boxes; load and transport waste liquids by vacuum truck for disposal; transport roll-off bins of waste solid for disposal; load and transport drums of waste liquid and solid to disposal facilities.

- International Technology, San Jose, California - Transportation of Hazardous Waste
  Our firm has supplied transportation for over 30 loads of waste as a subcontractor to International Technology. We have supplied vacuum trucks, roll-off bins, vans, and trailers for route and dedicated transport of hazardous waste from Lawrence Livermore Laboratory to disposal facilities throughout the United States.

- Omega Environmental, Tucker Georgia - Hazardous Waste Transportation
  Excel Trans scheduled, dispatched and transported 123 flat bed loads of contaminated bomb and munitions crates from the Sierra Army Depot in Herlong, California to Class I landfill in Utah. We scheduled and dispatched loads and coordinated unloading times for nine trucks a day.

- RESNA, Bakersfield, California - Tank Transport
  Our Nevada office loaded and transported a 56,000 pound above ground storage tank located on a mountainside at 8,000 feet elevation. A low-boy and pole trailer were used to transport the tank to the disposal facility.

- Continental Transformer, Anaheim Hills, California - Transformer Transportation
  Excel Trans transports all sizes of transformers and associated materials throughout the United States for Continental Transformer. For of 1992, we have transported over 20 loads of transformers and PCB oils.

PARTIAL CLIENT LIST

ACME Steel	American Environmental	Amoco Oil Co.
APTUS	Ashland Chemical Co.	Bally's Casino Hotel
Bay Decking Co.	Bechtel	Bentley Nevada Corp.
Burlington Northern Railroad	Caesar's Tahoe	California Correctional Center
Cameron-Yakima	Chevron Chemical	Chempro
CH2M Hill	City of Concord	Criterion Catalyst Co.
Decon Environmental	Delta Environmental	Envrirosafe Services of Idaho
Erickson Enterprises	ETICAM	EXXON
Forbes Manufacturing	Genentech	General Chemical Corp.
Georgia Pacific Corp.	Great Western Chemical	Groundwater Technology
GSX Government Services	Harding Construction	Harrah's Tahoe
HazControl	H B Fuller Co.	Hercules Aerospace
Hewlett-Packard	HMT Technology Corp.	Horizon Hotel/Casino
Hydro Chem	ICI America	International Paper
I.T. Corporation	Kaiser Aluminum & Chemical	Key Environmental
KOMAG, Inc	Laidlaw Environmental	Lassen Municipal Utility
Levine Fricke	LMC Metals	Lucas Aerospace
Manville Sales Corp.	McLarren & Hart Engineering	Mervyns
Metal Graphics	Modesto Energy Ltd.	Morrison-Knudsen Services
Napa Valley Unified Schools	National Smelting & Refinery	Fallon Naval Air Station
Nevada Air National Guard	Nevada Cement Co.	Nevada Metallurgical, Inc.
Nevada Wood Preserving	Omega Environmental	Pacific Coast Chemical
Phillips 66 Co.	Pinole Point Steel	Pure Gro
Quick Stop Markets	Ray Chem	Reidel Environmental
RESNA	Romic Chemical Corp.	Safety Specialists, Inc.
Schlage Lock Co.	S.D. Meyers	Seagate Magnetics
Sierra Pacific Power Co.	Southern Pacific	Spectra Physics
Spreckles Sugar	Thiokol Corp.	Time Oil
Travis AFB	Unison Corp.	Unisys Corporation
UNOCAL Companies	U.S. Bureau of Reclamation	U.S. Bureau of Mines
U.S. Coast Guard	U.S. Ecology	USPCI
Utah Power & Light	Westinghouse Electric	West General Associates

TERRATECH, INC.

ENVIRONMENTAL SERVICES DIVISION

STATEMENT OF QUALIFICATIONS

TERRATECH, INC. is a consulting civil engineering firm specializing in geotechnical engineering, engineering geology, environmental services, materials testing and construction inspection and testing. Since its incorporation in 1968, in San Jose, California, TERRATECH has developed a reputation for **high quality work, for attention to detail, and for innovation in problem solving** during design and construction. The company has offices in San Jose, Gilroy, Monterey and San Luis Obispo.

Our professional staff includes Registered Geologists and Certified Engineering Geologists, Registered Civil Engineers and Geotechnical Engineers, and Registered Environmental Assessors. TERRATECH's staff is experienced in coordinating and responding to the requirements and concerns of the regulatory agencies including the local Fire Departments, Health Departments, and Water Districts; the California Regional Water Quality Control Board; the California Department of Toxic Substances Control; and the California Department of Fish and Game.

Our full-service ground water sampling truck carries an assortment of bailers and pneumatic pumps; a steam-cleaner; tanks of deionized water; a flow-through cell to continuously record pH, temperature and conductivity; and a full complement of instruments and sampling gear.

Our soils laboratory has the capability of performing all of the standard index and classification tests. With 15 cells, we have one of the largest capacities for permeability testing in the Bay Area. Other consultants often take advantage of this service. The National Bureau of Standards and the Army Corps of Engineers have inspected and certified our laboratory, and all testing apparatus is calibrated regularly by Pacific Calibration Services.

TERRATECH can provide guidance in compliance with Federal, State and local environmental regulations. Our environmental services are a natural outgrowth of the geologic and geotechnical services we have always offered. We have established procedures for compliance with EPA quality assurance and quality control requirements. Our employees are monitored by a medical surveillance program. All members of TERRATECH's environmental staff have completed at least 40 hours of OSHA/SARA safety training under the requirements of 29 Code of Federal Regulations 1910.120 and California Title 8, General Industrial Safety Orders, Section 5192. The training program includes accident prevention theory, principles of toxicology, chemical education, hazards recognition, decontamination procedures, and personal protective equipment.

Typical projects include "Phase I" site assessments for real estate transactions; remedial investigations/feasibility studies; remedial action plans; design of soil and groundwater remediation systems including bioremediation, vapor extraction, and carbon adsorption; observation and testing during work by remediation contractors; installation and monitoring of soil and ground water treatment systems; and sampling, testing, and reporting for periodic ground water monitoring after remediation is complete or to document that remediation is not necessary. In addition, we perform third-party reviews for public agencies, potentially responsible parties, property owners, and tenants. We also provide expert witness services in soil and ground water contamination lawsuits.

TERRATECH has a good working relationship with local, county and state governments and agencies. This relationship has been primarily developed through our excellent performance record on numerous projects.

TERRATECH ENVIRONMENTAL DIVISION

LIST OF SERVICES OFFERED

UNDERGROUND STORAGE TANKS

- Assisting with regulatory compliance
- Siting, installation and sampling of monitoring wells (vapor, ground water or soil pore water)
- User training in monitoring procedures and record keeping
- Third party monitoring
- Soil sampling during tank removal activities
- Providing full scope project management for tank closures

SUBSURFACE CONTAMINATION

- Verifying presence and severity of contamination
- Determining the lateral and vertical extent of contamination
- Aquifer characterizing and modeling (hydrogeologic services)
- Designing and implementing remediation systems
- Managing cleanup operations
- Monitoring in-lieu of remediation, or after remediation
- Coordinating with and reporting to regulatory agencies

ENVIRONMENTAL ASSESSMENTS OF REAL PROPERTY

- Researching site history through aerial photos and public records
- Inspecting site and neighborhood conditions
- Retaining qualified specialists to evaluate asbestos hazards
- Researching pertinent information at regulatory agencies
- Formulating cost effective sampling and testing programs
- Interpreting analytical laboratory results
- Providing recommendations and cost estimates for remedial measures
- Preparing Preliminary Endangerment Assessments

WASTE MANAGEMENT

- Solid Waste Assessment Testing (SWAT)
- Siting, installation and sampling of ground water monitoring wells
- Siting, installation and sampling of methane gas probes
- Investigating site conditions for new landfills
- Preparing closure plans with field verification of work
- Evaluating the stability of excavation and fill slopes
- Field and laboratory testing of liner and cover permeabilities
- Designing collection and containment systems

OTHER

- Preparing Hazardous Materials Management Plans (HMMP's)
- Reviewing technical reports prepared by others
- Sampling and testing harbor sediments prior to dredging

TERRATECH, INC

PEER RECOGNITION

In recent years TERRATECH, INC. has been repeatedly recognized as a leader in the profession. Demonstrating this recognition is the following partial list of honors:

CALIFORNIA COUNCIL OF CIVIL ENGINEERS AND LAND SURVEYORS

"Project of the year Award, Public Works Category", 1988
Guadalupe River Box Culvert adjacent to Route 87
Awarded for TERRATECH's innovation and design of a large box culvert constructed using precast panels installed in slurry walls.

CALIFORNIA COUNCIL OF CIVIL ENGINEERS AND LAND SURVEYORS

"Project of the Year, Grand Award of Excellence", 1991
Route 101 Widening Project
Awarded to design engineers in association with TERRATECH.
TERRATECH's work included geotechnical investigation for highway and bridge widening, and preparation of Materials Reports (these were the first prepared by a private consultant).

CALIFORNIA GEOTECHNICAL ENGINEERS ASSOCIATION

"Outstanding Project Award", 1991
Monterey Sports Center Site Improvement
Awarded for TERRATECH's geotechnical investigations of a complex site, engineering and economic evaluation of alternatives, preparation of plans and specifications for innovative solutions to site and subsurface constraints, and construction observation and testing.

CONSULTING ENGINEERS ASSOCIATION OF CALIFORNIA

"Engineering Excellence Award", 1992
Monterey Sports Center Site Improvement
Awarded for TERRATECH's environmental and geotechnical investigations and design, innovation in solving complex site issues, and contribution to the engineering profession. This project was selected as one of the top six projects in the state, among all engineering disciplines, and was a finalist in the national competition.

SHIELA M. CHRISLEY

EDUCATION:

B.S., Geology (with Distinction), California State University, San Jose
B.A., Geography/Environmental Studies (Honors), California State University, San Francisco

PROFESSIONAL AFFILIATIONS:

Association of Engineering Geologists
Association of Ground Water Scientists and Engineers (National Well Water Association)
Association for Women Geoscientists

CERTIFICATION:

OSHA-SARA 29 CFR 1910.120 Hazardous Waste Operations and Emergency Response

AWARDS:

San Jose State University Alumni Scholarship Recipient, School of Science
President, San Jose State University Geology Club
Golden Key National Honor Society, Member
Cousteau Society Field Work
Who's Who Among American College Students, Member

PROFESSIONAL EXPERIENCE:

1989 - Present	PROJECT GEOLOGIST, TERRATECH, INC. Responsible for proposal and report composition, and management of various environmental projects. Performs Phase I and Phase II site assessments, and field investigations for characterizing sites with soil and ground water contamination. Also responsible for designing and implementing soil and ground water sampling and remediation programs, and acting as liaison between clients and regulatory agencies.
1988 - 1989	LABORATORY ASSISTANT, TERRATECH, INC. Responsibilities included performing various soil classification tests including Atterberg Limits, sieve analysis, and hydrometer tests. Also responsible for performing compaction, unconfined compression, sand equivalent, expansion index and permeability tests.
1985 - 1988	OFFICE AND SHIPPING DEPARTMENT MANAGER, Art Classics International, Hollister, California. Was responsible for all office operation and shipping/receiving management.

SHIELA M. CHRISLEY

SELECTED PROJECT EXPERIENCE:

- Monitoring well design, siting and installation at several dry cleaning sites for regional PCE study and aquifer characterization, Gilroy, California
- Site characterization, monitoring well design and installation for fuel leak and PCE study at large cannery, Gilroy, California
- Ground water sampling program and pump and treat clean-up system implementation, waste water treatment plant, Redwood City, California
- Monitoring well siting, design and installation, and multi-level aquifer characterization utilizing seven monitoring wells, industrial site, Morgan Hill, California
- Soil and aquifer characterization utilizing eight monitoring wells, co-manage ground water clean-up system design and installation for TCA and Freon contamination, former furniture manufacturer and dry cleaning facility, Hayward, California
- Permitting, monitoring well installation, sampling program management and reporting, and regulatory liaison for numerous fuel-leak cases, Santa Clara Valley, California
- Site characterization and soil sampling program design for pesticides study, 100-acre agricultural site, Hollister, California
- Phase I and Phase II site characterizations for real estate transactions, San Benito and Santa Clara counties, California
- Hydrology and nitrate balance studies for two small subdivisions, Northern Monterey County, California

ERIC R. LAUTENBACH

EDUCATION:

Postgraduate, Environmental - U.C. Berkeley Extension, U.C. Santa Cruz Extension, U.C. Davis Extension, and American Society of Civil Engineers
M.S., Civil Engineering (Water Resources/Geotechnical), San Diego State University
B.S., Civil Engineering (Top Honors, CE Class of 1981), Drexel University

PROFESSIONAL AFFILIATIONS:

American Society of Civil Engineers

REGISTRATION:

California, Civil Engineer, CE 42437

CERTIFICATION:

OSHA-SARA 29 CFR 1910.120 Hazardous Waste Operations and Emergency Response

PROFESSIONAL EXPERIENCE:

1987 - Present	SENIOR ENGINEER, TERRATECH, INC. Manager, Environmental Department, San Jose office. Responsible for supervising and reviewing the environmental project work of engineers and geologists in main office. Continuing to manage projects and prepare proposals and reports.
1983 - 1987	STAFF ENGINEER, TERRATECH, INC. Managed a wide range of environmental projects at agricultural, commercial and industrial sites. Responsible for conducting site audits, developing soil and ground water sampling programs, assessing contamination severity and risks, evaluating remediation alternatives, and designing monitoring cleanup systems. Projects involved regular interaction with regulatory officials and laboratory chemists. Gained working knowledge of guidelines, statutes and analytical procedures. Also performed a variety of geotechnical investigations.
1982 - 1983	SEA GRANT TRAINEE, San Diego State Foundation. Responsible for measuring engineering properties of deep sea sediment and determining dynamic characteristics of hydraulic sand fills reinforced with geotextiles.
1981 - 1982	STAFF ENGINEER, Ertec Western, Long Beach, California. Responsible for field supervising soil testing crew, writing technical reports, analyzing soil profile data, and preparing proposals and budgets for large Federal projects.
1977 - 1980	CO-OP WORK EXPERIENCE, Various. Inspected and tested earthwork, installed and monitored inclinometers and piezometers, assisted in the design of airport renovation construction projects, and surveyed.

ERIC R. LAUTENBACH

SELECTED PROJECT EXPERIENCE:

- Technical oversight and review of approximately a dozen water supply and nitrate balance projects for proposed residential subdivisions; primarily in Monterey County, but also one each in San Benito and Santa Clara Counties. Water supply portion of work involved defining sub-basins, reviewing available information on hydrogeology and well performance, estimating current and future water use (domestic/municipal, agricultural and commercial/industrial) and recharge, and calculating water balances. Nitrate balance portion involved research on existing ground water concentrations, calculations on present and future loadings to the subsurface environment, estimation of the nitrate content of deep percolation water and comparisons to regulatory criteria.

- Technical oversight and review of water supply assessment project for expanding industrial facility in Monterey County (Quantic Industries). Involved defining the local sub-basins, reviewing available information on hydrogeology and well performance (including technical documents regarding the investigation of contaminants in the shallow aquifer), estimating current and future water use (process, sanitary, fire protection and irrigation) and recharge, and calculating water balances.

- Project engineer for wastewater management project at a mushroom growing facility in Morgan Hill (Steakmate). Involved identification of volume and quality of various waste streams, measurement of effluent volume and quality to an unlined evaporation/infiltration pond, installation and sampling/testing of eight ground water monitoring wells, statistical assessment of ground water quality degradation (general mineral testing plus nitrate, nitrite and Kjeldahl forms of nitrogen), performed field nitrate tests on numerous wastewater and ground water samples, and assisted in design of new wastewater disposal system (double-lined evaporation ponds (membrane over clay), including a leachate collection and recovery system (LCRS), and a network of sprayers to assist evaporation).

- Project manager/engineer for Solid Waste Assessment Test (SWAT) projects at two inactive landfills currently owned by the City of San Jose (Roberts Avenue and Martin Park). Involved installation of five ground water monitoring wells at each site (one upgradient, one interior and three downgradient), preparation of cross-sections, full scan water quality testing (inorganics, metals and organics) over five monitoring events, statistical assessment of ground water quality data with respect to impact from landfill leachate, evaluation of aquifer properties through injection and slug testing, ground water gradient determinations.

- Project engineer for over 30 sites needing definition of the extent of ground water contamination from petroleum fuels and oils, chlorinated solvents, pesticides, heavy metals (chromium and zinc) and polynuclear aromatics. Supervision of project geologists in well siting decisions, performance of slug testing, contouring of ground water gradients and contaminant concentrations. Estimate contaminant migration rates based on contaminants' physical/chemical properties, retardation coefficients from the literature and site aquifer characteristics.

- Project engineer for three sites designing ground water cleanup systems (Boggiatto, Martella and George H. Wilson). Three additional project sites are currently close to initiation of pump and treat clean-ups (Blacow, Tn'T and Merry Oldsmobile). In addition to the contaminant definition projects discussed above, responsibilities included siting and construction detailing of extraction wells and injection wells/trenches, calculating expected capture zones, modelling of pumping influences, and evaluation of operational results with recommendations on modifications.

- Third-party technical reviewer for landowner where large contaminant investigations and clean-ups are being performed by responsible parties (Technical Coatings and Monsanto).