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Option ①	Est Cap Costs ② For Pumping	Est. Site ③ Prep Costs	Est. Annual ④ Operating Costs	Consultant ⑤ Fees	Est Method Cap. Cost	Est. Method Outlay	Est. Method Operating Costs	Disposal Costs	Option Total	10% Contingency	Grand Total
1A	17,000	22,000	7,040	68,300	8,000	9,500	55,000	4,200	191,040	19,104	210,144
1B	17,000	22,000	7,040	68,300	8,000	9,500	55,000	15,000	201,840	20,184	222,024
1C	17,000	22,000	7,040	68,300	8,000	9,500	55,000	10,000	196,840	19,684	216,524
2A	17,000	22,000	7,040	68,300	0	8,500	60,400	4,200	187,440	18,744	206,184
2B	17,000	22,000	7,040	68,300	0	8,500	60,400	15,000	198,240	19,824	218,064
2C	17,000	22,000	7,040	68,300	0	8,500	60,400	10,000	193,240	19,324	212,564
3A	17,000	22,000	7,040	68,300	70,000	10,000	88,000	4,200	286,540	28,634	315,194
3B	17,000	22,000	7,040	68,300	70,000	10,000	88,000	15,000	297,340	29,734	327,074
3C	17,000	22,000	7,040	68,300	70,000	10,000	88,000	10,000	292,340	29,234	321,574
4	0	0	0	0	0	12,000	0	49,000	61,000	6,100	67,100
5	0	0	0	0	0	21,000	0	55,000	76,000	7,600	83,600
6	0	0	0	0	0	19,000	0	82,500	101,500	10,150	111,650
7	0	0	0	0	1,500	13,350	11,150	10,000	36,000	3,600	39,600
8	0	0	0	0	0	58,000	0	0	66,500	6,650	73,150

Numbers in O refer to Appendix

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COST ANALYSIS
REMEDIATION ALTERNATIVES

19984 MEEKLAND AVENUE
HAYWARD, CALIFORNIA

Presented To:
Durham Transportation
9171 Capitol of Texas Highway
Travis Building, Suite 200
Austin, Texas 78759

Prepared By:
CTTS, Inc.
Toxic Technology Services
P.O. Box 515
Rodeo, California 94572

September 20, 1993

CTTS, Inc.
toxic technology services

September 20, 1993

Mr. David Delamotte
Durham Transportation
9171 Capitol of Texas Highway North
Travis Bldg., Suite 200
Austin, Texas 78759

Subject: Request For Bid Proposal
19984 Meekland Ave., Hayward, CA

Dear Mr. Delamotte:

CTTS, Inc. (Toxic Technology Services) is pleased to present a cost proposal and estimate for the execution of soil and groundwater remediation services at the above referenced subject site. Our package includes several technological alternatives that were evaluated for the site and our recommendations based on the best available technology for the size of the site, type of contamination and economic feasibility.

The project will be billed on a time and materials basis. The enclosed cost proposal is a realistic estimate given the information that is currently known. However, this project will take some time to complete and the unexpected often happens.

The following are responses directly correlated with the items in the "Request For Bid Proposal" dated August 20 1993.

I PURPOSE

The letter from the LRA dated June 11, 1993 states that the clean-up goal for soil remediation is 10 ppm Total Petroleum Hydrocarbons. To the best our knowledge, no clean-up level for groundwater has been established specifically for the site. CTTS, Inc. will remediate to whatever levels are negotiated by the LRA and CTTS, Inc.

II SITE HISTORY

No additional comment.

III PROPOSED SCOPE OF WORK

A. Soil Remediation

No additional comment

B. Groundwater Remediation

This proposal is for the remediation of the on site groundwater contamination plume. Off site investigation would be proposed under separate cover.

As part of this proposal is a remediation methods evaluation with associated costs. Both on site soil and groundwater remediation is addressed. Remediation methods have been recommended based on the evaluation.

IV PROJECT COST ANALYSIS FOR EACH PROPOSED METHOD

A cost summary is included with the remediation methods evaluation. The cost analysis includes:

1. Preparation of amendments to the November 1, 1992 workplan. This workplan is what was requested by the LRA to commence remediation of the site. The LRA has accepted this plan with the subsequent amendments prepared by CTTS, Inc.. Additional correspondence with the LRA will be needed to confirm the methodology and clean-up levels, but a re-write of the workplan is unnecessary.

2. This cost analysis includes obtaining the proper permits to complete the workplan as approved by the LRA.

3. This cost analysis includes any pilot studies that may be required by the LRA to complete the approved workplan, although none are anticipated or required by the LRA at this time.

4. This cost analysis includes the acquisition of all required equipment, structures and materials to complete the workplan as approved by the LRA.

5. This cost analysis includes equipment operation and maintenance.

6. This cost analysis includes monitoring reports as required by the LRA.

7. It is not known how long groundwater treatment will take and therefore closure costs can not be determined at this time. However, in this proposal and cost analysis makes the assumption that groundwater pumping and treatment will take place for one year. After the period of one year, then verification sampling of the groundwater would take place quarterly for one year. Given that the groundwater was verified "clean", a request for closure would be prepared.

V BIDDING REQUIREMENTS

1. Personnel from CTTS, Inc. have at least three years of experience conducting site remediation work in the State of California. Experience also includes substantial work at the subject site, from tank removals to the preparation of the November 1, 1992 workplan. A Statement of Qualifications is attached as Appendix A.

2. Resumes of key personnel are presented with the Statement of Qualifications in Appendix A.

3. CTTS, Inc. will carry out the approved workplan in a timely, professional, safe and legal manner while maintaining all necessary records and other safeguards to ensure that all items reported to the LRA are true and accurate. All work will be conducted in a manner approved by the LRA.

4. Appendix B presents five references of previous clients for whom similar work has been completed in the last three years.

5. Appendix C presents proof of insurance in the amount of one million dollars for general liability insurance and professional errors and omissions. This will be maintained for the life of the contract. A certificate of insurance is already on file with Durham Transportation.

6. CTTS, Inc. will respond to any reasonable inquiry regarding any claim submitted by Durham Transportation, Inc. in conjunction with this site.

7. No additional comment.

8. No additional comment.

VI INVOICES AND PAYMENTS

CTTS, Inc. agrees to the conditions described in this section.

Thank you for this opportunity to provide Durham Transportation with these environmental services. If you have any questions, please call at (510) 799-1140.

Sincerely,

Lisa A. Polos, REA, CHMM
Senior Scientist
Toxic Technology Services
CTTS, Inc.

INTRODUCTION

In August of 1989, Toxic Technology Services was contracted by Mr. Jack Worthington to remove four underground tanks from 19984 Meekland Avenue in the unincorporated area of Alameda County, near Hayward.

Soil samples collected from the tank excavations at the time of removal, indicated significant contamination from gasoline and its constituents of Benzene, Toluene, Ethylbenzene and Xylenes.

This data prompted the installation of groundwater monitoring wells. The groundwater proved to be contaminated.

During 1990, an investigation was conducted to determine the extent of the contamination and investigate possible shallow sources of contamination. This investigation has prompted the preparation of the November 1, 1992 workplan and now this analysis of remediation methods.

Alameda County has requested additional site investigation, but has agreed to proceed on the remediation concurrently.

The subject site warrants both soil and groundwater remediation. Levels of soil contamination were as high as follows:

TPH as Gasoline - 6200 ug/Gm (ppm)
Benzene - 1900 ug/Kg (ppb)
Toluene - 17000 ug/Kg (ppb)
Ethylbenzene - 36000 ug/Kg (ppb)
Xylenes - 220000 ug/Kg (ppb)

Groundwater has been monitored quarterly since 1990. All wells except the upgradient well, MW-8, have shown varying levels of contamination. The two bad actors have consistently been Benzene and Gasoline. Other constituents in the groundwater are volatile chlorinated organics, Toluene, Ethylbenzene and Xylenes.

The cost analysis presented below contains a main spreadsheet with a series of appendices that explain the individual columns.
The first four columns of the spread sheet represent items that must occur regardless of which soil and groundwater remediation methods are chosen. These are:

- Estimated Capital Cost For Groundwater Pumping
- Estimated Site Preparation Costs
- Annual Operational Costs (separate from method operational costs)
- Consultant Fees

Breakdowns of each of these categories are presented in Appendices 2-5.

The remainder of the columns are method specific and are broken down in Appendix 1.

APPENDIX 1

LIST OF ALTERNATIVES

GROUNDWATER TREATMENT AND DISPOSAL

1A - Air Stripping and Liquid Phase Carbon With Sewer Disposal

This involves installing a stripping tower that will purge air through the contaminated water and strip out the majority of the contaminants. The contaminated air is passed through a carbon canister and then to the open environment. The "stripped" water is passed through a series of carbon canisters to give is a final cleaning. Final disposition is into the sanitary sewer.

This is not a recommended method because another layer of bureaucracy, namely the air board, is added to the situation. For the levels of contamination that we are dealing with, it would not be advisable to complicate the treatment by contaminating an air phase that will have to be treated as well the water phase.

	CAPITAL COSTS ($)	INITIAL OUTLAY ($)	OPERATING $/YEAR
Stripping Tower	8,000		
Air Permits		1,000	
Carbon		8,500	15,000
Disposal Costs*			4,200
Estimated Capital Costs for Pumping	17,000		
Estimated Site Prep.		22,000	
Estimated Annual Op. Costs			7,040
Consultant Fees			68,300
Laboratory Fees			40,000
TOTAL	25,000	31,500	134,540

Method Option plus 10% Contingency: $210,144

*= Sewer Fees

1B - Air Stripping and Liquid Phase Carbon With Re-Injection

This method is primarily the same as 1A except that final disposition would be back into the groundwater aquifer so that it can replenish and recycle through the system.

To make this method work, additional wells must be installed. The wells would be constructed of steel casing instead of the less expensive PVC, and units would be installed to pressurize each well.

The cost versus the benefits of this method make it unattractive. Additionally, the Water Quality Control Board has historically not allowed re-injection in the East Bay Area. The permit process could therefore be quite lengthy with a high probability of rejection.

	CAPITAL COSTS ($)	INITIAL OUTLAY ($)	OPERATING $/YEAR
Stripping Tower	8,000		
Air Permits		1,000	
Carbon		8,500	15,000
Disposal Costs*		15,000	
Estimated Capital Costs for Pumping	17,000		
Estimated Site Prep.		22,000	
Estimated Annual Op. Costs			7,040
Consultant Fees			68,300
Laboratory Fees			40,000
TOTAL	25,000	46,500	130,340

Method Total plus 10% contingency: $222,024

* = This includes two stainless steel cased wells, pumps, etc.

1C - Air Stripping and Liquid Phase Carbon With Disposal Into A Storm Drain

This method is primarily the same as 1A except that final disposition would be into a storm drain. This requires a Federal NPDES Permit for disposal into open surface waters, in this case, San Francisco Bay. This process takes a year, can be quite labor intensive and sometimes results in the preparation of an Environmental Impact Report (EIR). A line would also have to be installed from the site to the nearest storm drain.

This method is not recommended because of the time and expense involved in obtaining the permit, especially given that the local sanitary district is willing to sewer our treated water.

	CAPITAL COSTS ($)	INITIAL OUTLAY ($)	OPERATING $/YEAR
Stripping Tower	8,000		
Air Permits		1,000	
Carbon		8,500	15,000
Disposal Costs*		10,000	
Estimated Capital Costs for Pumping	17,000		
Estimated Site Prep.		22,000	
Estimated Annual Op. Costs			7,040
Consultant Fees			68,300
Laboratory Fees			40,000
TOTAL	25,000	41,500	130,340

Method Total plus 10% contingency: $216,524

*= This includes a line to the storm drain and other labor involved in the permitting process.

2-A - Water Phase Carbon With Sewer Disposal

This method consists of pumping groundwater through a series of carbon canisters. The carbon removes the contaminants and the treated water is pumped into a holding tank. After analysis, the water is disposed into the sanitary sewer, or if the discharge requirements of the sanitary district have not been met, the water is recycled through the canisters again. The carbon must be transported as a hazardous waste and either regenerated or disposed.

This alternative is recommended by Toxic Technology Services as the most cost-effective and practical, given the levels of contamination and the size of the subject site.

Carbon treatment is a proven technology that is much easier to fine-tune when in operation. The initial costs are comparatively low and the operational costs are reasonable. This method also offers the most flexibility should it seem necessary to supplement the system with air sparging, air stripping or some other technology.

The Oro Loma Sanitary District currently accepts treated groundwater provided that their treatment standards are maintained.

	CAPITAL COSTS ($)	INITIAL OUTLAY ($)	OPERATING $/YEAR
Carbon Canisters		8,500	20,400
Disposal Costs*			4,200
Estimated Capital Costs for Pumping	17,000		
Estimated Site Prep.		22,000	
Estimated Annual Op. Costs			7,040
Consultant Fees			68,300
Laboratory Fees			40,000
TOTAL	17,000	30,500	139,940

Method Total plus 10% contingency: $206,184

* = Sewer Fees

2B - Water Phase Carbon With Re-Injection

As with Alternative 1B, the disadvantage to this method is the additional cost and labor in well installations and the hassle in getting a permit for re-injecting the treated groundwater.

	CAPITAL COSTS ($)	INITIAL OUTLAY ($)	OPERATING $/YEAR
Carbon Canisters		8,500	20,400
Disposal Costs*		15,000	
Estimated Capital Costs for Pumping	17,000		
Estimated Site Prep.		22,000	
Estimated Annual Op. Costs			7,040
Consultant Fees			68,300
Laboratory Fees			40,000
TOTAL	17,000	45,500	135,740

Method Total plus 10% contingency: 218,064

*: This includes two stainless steel cased wells, pumps, etc.

2C - Water Phase Carbon With Disposal Into A Storm Drain

As with Alternative 1C, the disadvantage to this method is the time involved in obtaining a NPDES Permit.

	CAPITAL COSTS ($)	INITIAL OUTLAY ($)	OPERATING $/YEAR
Carbon Canisters		8,500	20,400
Disposal Costs*		10,000	
Estimated Capital Costs for Pumping	17,000		
Estimated Site Prep.		22,000	
Estimated Annual Op. Costs			7,040
Consultant Fees			68,300
Laboratory Fees			40,000
TOTAL	17,000	40,500	135,740

Method Total plus 10% contingency: 212,564

*= This includes a line to the storm drain and other labor involved in the permitting process.

3A - Chemical Oxidation With Sewer Disposal

This treatment involves pumping the water through a unit that adds hydrogen peroxide to the water and then exposes it to ultra-violet light. The chemical reaction results in converting the hydrocarbons to harmless residual compounds, namely carbon dioxide and water. As with the other "A" alternatives, disposal would be to the sewer.

This alternative was given heavy consideration. In speaking to individuals using this type of system, it was determined that the unit was extremely difficult to fine tune, had a very poor efficiency rate and was extremely expensive. The power consumption for units like this are extremely high and drive up operation costs tremendously. For these reasons, this alternative is not recommended.

	CAPITAL COSTS ($)	INITIAL OUTLAY ($)	OPERATING $/YEAR
UV/Redox Unit	70,000		
Electrical Set-up		10,000	
Electricity			24,000
Lamps			24,000
Disposal Costs*			4,200
Estimated Capital Costs for Pumping	17,000		
Estimated Site Prep.		22,000	
Estimated Annual Op. Costs			7,040
Consultant Fees			68,300
Laboratory Fees			40,000
TOTAL	87,000	32,000	167,540

Method Total plus 10% contingency: 315,194

* = Sewer Fees

3B - Chemical Oxidation With Re-Injection

This alternative is not recommended for the same reasons as 3A and 1B.

	CAPITAL COSTS ($)	INITIAL OUTLAY ($)	OPERATING $/YEAR
UV/Redox Unit	70,000		
Electrical Set-up		10,000	
Electricity			24,000
Lamps			24,000
Disposal Costs*		15,000	
Estimated Capital Costs for Pumping	17,000		
Estimated Site Prep.		22,000	
Estimated Annual Op. Costs			7,040
Consultant Fees			68,300
Laboratory Fees			40,000
TOTAL	87,000	47,000	163,340

Method Total plus 10% contingency: $327,074

*: This includes two stainless steel cased wells, pumps, etc.

3C - Chemical Oxidation With Disposal Into A Storm Drain

This alternative is not recommended for the same reasons as 3A and 1C.

	CAPITAL COSTS ($)	INITIAL OUTLAY ($)	OPERATING $/YEAR
UV/Redox Unit	70,000		
Electrical Set-up		10,000	
Electricity			24,000
Lamps			24,000
Disposal Costs*		10,000	
Estimated Capital Costs for Pumping	17,000		
Estimated Site Prep.		22,000	
Estimated Annual Op. Costs			7,040
Consultant Fees			68,300
Laboratory Fees			40,000
TOTAL	87,000	42,000	163,340

Method Total plus 10% contingency: $321,574

*= This includes a line to the storm drain and other labor involved in the permitting process.

SOIL TREATMENT AND DISPOSAL (estimate 450 cu.yds.)

4 - Off Site Recycling

This consists of excavating the contaminated soil and hauling it away to a facility permitted to accept hydrocarbon contaminated waste and process it. Forward Landfill in Stockton, California is a Class II landfill which accepts gasoline contaminated soil. The soil will be aerated on site and when proved clean by laboratory analysis, is disposed of in a line waste disposal unit. A certificate of recycling is issued after the soil has been remediated and tested. This facility has a tracking and labeling system such that the facility processes the generator's soil through their system to completion.

Durham's liability is greatly reduced because the soil is profiled as a non-hazardous waste and accepted by Forward. It is then treated on site and disposed of after chemical analysis had proven it clean. However, Durham must remember that the generator of a waste material has ultimate and long term liability.

This method is the recommended soil remediation method. It is not necessarily the least expensive, but is certainly the most cost effective when compared to the time that on site methods would take. Soils were profiled in February 1993 and the data indicated that Forward Landfill could accept the waste. Provided that Forward would still accept the February 1993 data, estimated disposal costs would be as described below.

	CAPITAL COSTS ($)	INITIAL OUTLAY ($)	OPERATING $/YEAR
Soil Excavation (estimate 3 days with a backhoe)		4,000	
Clean Fill		7,000	
Laboratory Fees		1,000	
Disposal Costs		49,000	
TOTAL		61,000	

Method Total plus 10% contingency: $ 67,100

5 - Off Site Treatment Via Thermal Destruction

This consists of excavating the contaminated soil and hauling it to a facility where it will be thermally destroyed. Port Costa Materials in Port Costa, California operates a rotary kiln. The unit is designed to thermally process shale from the adjacent quarry mixed with hydrocarbon contaminated soil. Soils are crushed, processed through the kiln, then screened for the specifications that it meets and stored to await blending to meet a clients's construction needs. during the thermal process, a soil sample is collected every hour. The samples are composited into one and sent to a state certified hazardous waste laboratory for analysis. Analytical results and a certificate of destruction are issued to the generator.

This method would be quite effective and would all but eliminate the long term liability. However, soil samples collected and analyzed in February, 1993, indicate that the petroleum hydrocarbon as gasoline concentration is higher than what can be accepted at Port Costa Materials. It is possible that the LRA would allow us to re-sample since many months have passed since that last analytical data was obtained, but it would put Durham Transportation in the position of "proving innocence".

There are other thermal destruction plants in the Bay Area, but the soil would probably have to be profiled again to comply with that specific facilities requirements.

There are other treatment technologies that would be quite effective and for this reason, this method is not recommended by CTTS, Inc.

For thermal destruction, an estimate of costs is as follows:

	CAPITAL COSTS ($)	INITIAL OUTLAY ($)	OPERATING $/YEAR
Soil Excavation (estimate 3 days with a backhoe)		4,000	
Clean Fill		7,000	
Laboratory Fees		10,000	
Disposal Costs		55,000	
TOTAL		76,000	

Method Total plus 10% contingency: $ 83,600

6 - Chemical Fixation

This consists of excavating the contaminated soil and mixing it with a polymer that will "fix" or encapsulate the contamination and then put the treated soil back in the excavation. This method is costly, especially considering that we are looking at only 500 cubic yards of soil. Another disadvantage is that the polymer probably has a lifetime of twenty years or so. This presents the possibility of having to perform some other treatment, somewhere down the road. Durham would be responsible for this because the liability would not end with remediation, closure and sale of the property. For these reasons, this method is not recommended.

	CAPITAL COSTS ($)	INITIAL OUTLAY ($)	OPERATING $/YEAR
Soil Excavation (estimate 3 days with a backhoe)		4,000	
Clean Fill		5,000	
Laboratory Fees		10,000	
Disposal Costs		82,500	
TOTAL		101,500	

Method Total plus 10% contingency: $111,650

7 - Aeration

This consists of excavating the contaminated soil and piling it on thick plastic. Layers of slotted PVC pipe would be placed in the soil. The pile would be enveloped in plastic and a blower would be hooked-up to the manifolded PVC pipe. Exhausted air would go through a carbon canister and then to the atmosphere.

The air board would be notified of these activities, however, we don't think that the levels of soil contamination are high enough to require a permit. Baseline soil samples would have to be collected and analyzed to verify this.

When it has been determined through progressive sampling and analysis that the level of contamination is less that 10 ppm, the soil is can be transported to a Class III (solid waste) Landfill and used as cover.

This method is far more economical that the other alternatives and reduces liability because there would be chemical analysis to prove that the soil was below 10 ppm. However, Durham must remember that the generator of a waste material has ultimate and long term liability.

This is not the recommended method because it will take a number of months to complete and will possibly get in the way of conducting the groundwater remediation. We have also presented other options in which a number of facilities will take responsibility for the contaminated soil and thus share the long term liability.

	CAPITAL COSTS ($)	INITIAL OUTLAY ($)	OPERATING $/YEAR
Blower	1,000		
Extra Electricity			300
Small Blower	500		
Carbon		850	850
Misc. Pipe		1,500	
Soil Excavation (estimate 3 days with a backhoe)		4,000	
Clean Fill		7,000	
Laboratory Fees			10,000
Disposal Costs		10,000	
TOTAL	1,500	23,350	11,150

Method Total plus 10% contingency: $39,600

8 - On Site Soil Burning Utilizing A Portable Soil Remediation Unit

A number of companies in California operate a permitted transportable soil burning unit for hydrocarbon contaminated soils. The units are designed to remediate soil contaminated with light distillate petroleum hydrocarbons which include gasoline, diesel and a variety of other fuels. The systems operate by rapidly volatilizing petroleum hydrocarbons from the soil and then thermally destroying them in the discharge air stream. The units generally consist of a rotary dryer with feed system, discharge and combustion control systems, a dust collector, a modular thermal oxidizer and associated fuel and delivery systems.

The treated soil is put back into the excavations, so there are no transportation and disposal costs. Additionally, less clean fill would have to be brought in to bring the excavations to grade.

Distinct advantages to this method include the significant reduction of long term liability of the treated soil, particularly being that the soil is rendered inert and will be disposed of on site. Additionally, the soil remediation will only take seven to ten days to complete.

Disadvantages include the cost and the possible resistance by the locals in the neighborhood. Traditionally, any technology resembling incineration is unpopular. When investigating this method, one company decided against using their unit on the Meekland site because of the fire hazard involved with using large quantities of propane on a small site in a residential area. However, there is at least one other firm with a similar, but smaller unit. This firm is not local and transportation costs could be quite costly.

For the above disadvantages and the fact that there are other effective methods to dispose of the soil, this method is not recommended.

	CAPITAL COSTS ($)	INITIAL OUTLAY ($)	OPERATING $/YEAR
Soil Excavation (estimate 3 days with a backhoe)		4,000	
Clean Fill		2,500	
Laboratory Fees		10,000	
Soil Burning		50,000	
TOTAL		66,500	

Method Total plus 10% contingency: $73,150

APPENDIX 2

ESTIMATED CAPITAL COSTS FOR GROUNDWATER EXTRACTION

The following items are required for extracting the groundwater from the existing wells no matter which groundwater treatment technology is chosen. The recapture costs are marginal, given the life of the equipment and the length of time of service at this site. However, this equipment could be used at other Durham locations, if needed, and that could save from purchasing new equipment.

Item	Estimated Cost
Well Pumps and Plumbing	$ 10,000
Surface Pump	$ 2,000
Safety Equipment	$ 1,500
Miscellaneous Equipment	$ 3,000
TOTAL	$ 17,000

APPENDIX 3

ESTIMATED SITE PREPARATION COSTS

The following items are required to prepare the site for remediation regardless of groundwater and soil treatment options chosen.

Item	Estimated Cost
Tool Sheds	$ 500
Well Abandonment	$ 2,500
Well Installation	$ 2,500
Electrical	$ 5,000
Plumbing	$ 5,000
Well Surging	$ 3,500
Permit Application Fees	$ 2,000
Miscellaneous	$ 1,000
TOTAL	$ 22,000

APPENDIX 4

ESTIMATED OPERATING COSTS

The following are routine operating items required to remediate the site regardless of groundwater and soil remediation options chosen. If a particular technology requires additional outlay over and above what the estimate is here, it is accounted for in the line items for each technology.

Item	Annual Cost
Municipal Water	$ 300
Electricity (PG&E)	$ 2,400
Chemical Toilet	$ 840
Holding Tanks	$ 2,500
Miscellaneous Supplies	$ 1,000
TOTAL	$ 7,040

APPENDIX 5

ESTIMATED LABOR COSTS

The following is an estimated labor cost breakdown based on the recommended options. These estimates include project and site maintenance costs that must occur independently of the remediation. Such items include but are not limited to:

Remediation Coordination
Quarterly Well Sampling
Reports
Miscellaneous Maintenance Activities

We would like to investigate ways of keeping labor costs down. Perhaps utilizing Durham personnel for technician tasks is an option. For purposes of liability, it is strongly recommended that any Durham personnel who will be working on site especially with the contaminated groundwater, complete the OSHA 40-hr. training course and have a complete physical before on site work commences and annually until remediation and closure is completed.

We will be happy to furnish additional information on this if you wish.

As in the past, labor will be billed on a time and materials basis. Estimated costs are broken down as follows:

Senior Scientist @ $60/hr.	$ 31,000
Consulting Geologist @ $90/hr.	$ 23,800
Consulting Engineer @ $90/hr.	$ 11,000
Technician @ $35/hr.	$ 2,500
TOTAL	$ 68,300

RECOMMENDATIONS

It is our recommendation to Durham Transportation to:

> **Treat contaminated groundwater with liquid phase carbon and dispose of the treated water into the sanitary sewer (Option 2A). Excavate contaminated soil and transport to Forward Landfill (Option 4).**

We believe these technologies to be the most cost-effective and practical given the levels of contamination and the size of the subject site.

Carbon treatment is a proven technology that is much easier to fine-tune when in operation. The initial costs are comparatively low and the operational costs are reasonable. There is the flexibility in this method to add on additional remediation techniques if it seems necessary.

The Oro Loma Sanitary District is amenable to taking the treated water provided that their treatment standards are maintained.

Off site soil treatment requires the least time and allows the groundwater remediation to commence without interference. Soil has already be profiled for acceptance at Forward Landfill and hopefully no additional laboratory analysis will be required. Durham Transportation will be issued a certificate of recycling thus reducing liability and bringing Forward Landfill into the responsibility loop.

The cost for the recommended treatments is: $ 273,284.

CLOSURE ACTIVITIES

In keeping with the assumption that groundwater pumping would proceed for one year, closure activities would consist of an additional year of quarterly groundwater monitoring to show that groundwater has been treated and will stay at the clean-up levels required by the LRA.

The costs for this include lab analysis and labor for four quarters of well monitoring for the ten wells. The estimate for this is $ 30,000.

The grand total for the recommended remediation and the closure activities is: $ 303,284.

APPENDIX A

CTTS , Inc.
toxic technology services

STATEMENT OF QUALIFICATIONS

P. O. Box 515 • Rodeo, California 94572 • (510) 799-1140

STATEMENT OF QUALIFICATIONS

Toxic Technology Services (CTTS, Inc.) is a woman-owned corporation specializing in hazardous waste management and environmental compliance. Our staff and associates include Registered Environmental Assessors, Environmental Managers (Nevada Registration), Certified Engineering Geologists, Scientists and Environmental Attorneys.

SERVICES INCLUDE:

Hazardous Waste Planning

Hazardous Materials Management and Business Plans, waste audits, chemical and waste inventories, permitting, hazardous waste management plans, hazardous waste minimization plans, waste reports, small quantity generator and household hazardous waste programs.

Underground Tank Consultation

Oversight and arrangement of tank permitting, testing, removal, installation and agency liaison.

Site Assessments

Evaluations for property transactions to fulfill the requirements of lending institutions and establishing an environmental baseline of a property.

Site Characterizations

Soil and water evaluations, groundwater well installations, agency liaison and other necessary tasks to properly characterize the severity and extent of contamination

Site Remediations

Turnkey operation for the permitting, agency liaison, subsurface geology and hydrology reporting, remediation techniques, site clean-up and closure of a property.

Environmental Impact Reports and Statements

Research and development of information and preparation of documents to fulfill the requirements of the California Environmental Quality Act (CEQA) and the National Environmental Protection Act (NEPA).

SELECTED PROJECT PROFILES

- Prepared a hazardous waste handling plan, hazardous waste minimization statement and Standard Operating Procedures for waste streams generated by a materials testing laboratory in Carson City, Nevada. The project also included a chemical clean-out and disposal. Toxic Technology Services was responsible for preparing the disposal scenarios from which the client chose. Training was also given to personnel in the Carson City and Las Vegas laboratories to inform them on the proper handling and disposal of chemicals and wastes.

- Prepared the Hazardous Waste Source Reduction and Management Plan and Report, required pursuant to California SB 14, for the research center of a major agrichemical laboratory. The documents also servedto fulfill a need for a hazardous waste minimization plan for a local citizens group. This project was particularly challenging with regards to diagraming the process flow of a research facility, when information is the output and not a particular chemical or commodity.

- Prepared the Hazardous Waste Source Reduction and Management Plan and Report, required pursuant to California SB 14, for an agrichemical production plant.

- Toxic Technology Services is currently working on the site investigation of a underground tank release. Service began in 1989 when the firm was contracted to manage the removal of four underground fuel tanks. Toxic Technology Services has since provided turnkey management of on site and off site drilling and well installations, soil gas testing, soil excavation, disposal, agency liaison site plan and health and safety plan development. A draft remediation plan and budget has also been prepared and steps have been taken to have Toxic Technology Services manage and engineer the soil and groundwater remediation.

- Toxic Technology Services has assisted in finalizing the County Hazardous Waste Management Plans for two California counties. This included updating information and writing it into the plans as well as going through the processes needed to have the documents incorporated in the county and city general plans.

- Toxic Technology Services has been contracted to prepare segments of an Environmental Impact Report (EIR) for future activities at a county landfill. Segments include Public Health and Safety and Visual Aesthetics. The project also includes providing liaison services by attending and assisting in the public hearings.

- Toxic Technology Services managed the removal of an underground fuel tank from under a city sidewalk. The project involved more than the routine permitting and inspections. The situation was not routine as the tank was located adjacent to a building and excavation activities could have lead to the undermining of the building foundation. Contaminated soil was removed and aerated on site.

PARTIAL CLIENT LIST

- Durham Transportation - Rosemead, California
- ICI Americas Inc., Western Research Center - Richmond, California
- ICI Americas Inc., Agricultural Products Plant - Richmond, California
- SCS Engineers - Long Beach, California
- Normandeau Associates - Richmond, California
- Yolo County Public Works - Woodland, California
- Stanislaus County Department of Environmental Resources - Modesto, California
- Guarantee Forklift - Oakland, California

LISA A. POLOS, REA, CHMM
Senior Scientist

Education

B.S. Biology, University of San Francisco

Registrations and Certifications

Certified Hazardous Materials Manager (CHMM)
California Registered Environmental Assessor (REA-00749)

Professional Experience

Ms. Polos is Principal and Senior Scientist of CTTS, Inc.

Over twelve years of experience including all aspects of project management, quality control, client contact and dealing with regulatory agencies. Ms. Polos brings a broad knowledge and understanding of Inorganic and Organic Chemical Analyses to CTTS. She is very familiar with local, state and federal hazardous waste regulations.

Key project experience:

- Principal author of a Hazardous Waste Handling Plan, Hazardous Waste Minimization Statement and Standard Operating Procedures for waste streams generated by a materials testing laboratory in Carson City, Nevada.
- Principal author of a Hazardous Waste Source Reduction and Management Plan and Report required pursuant to California SB 14 for a major agrichemical research laboratory in Richmond, California.
- Principal author of a Hazardous Waste Source Reduction and Management Plan and Report required pursuant to California SB 14 for a major agrichemical production facility in Richmond, California.
- Project Manager for a Phase II subsurface investigation at a former gasoline station in Hayward, California
- Project Manager for the update of the Yolo County Hazardous Waste Management Plan
- Assistant Project Manager for the initial preparation of the Yolo County Hazardous Waste Management Plan

- Assistant Project Manager for the preparation of the Environmental Impact Report for the Yolo County Hazardous Waste Management Plan
- Project Manager for the Environmental Impact Report for the Stanislaus County Hazardous Waste Management Plan
- Project Manager for the Stanislaus County Hazardous Waste Management Plan up-date
- Prepared elements of EIR for continuation of activities at Yolo County central landfill. Conducted community involvement, outreach and public information activities.
- Project Consultant for the removal of an underground fuel tank and the remediation of contaminated soil at a forklift company in Oakland, California
- Project Manager of the monitoring program for treatment of contaminated run-off at a freight terminal in Nashville, Tennessee
- Conducted several chemical inventories and responded to local agencies permitting procedures for hazardous materials storage
- Coordinated sampling, analytical activities and Quality Control Program for the Del Norte Superfund site
- Instructor for course on Real Estate Site Assessments through UC Davis University Extension
- Proposal writing and budget management for projects valued at several hundred thousand dollars
- Project Consultant for underground storage tank removals and repairs
- Conducted numerous Phase I Site Assessments for real estate transactions
- Developed marketing plans, responsible for new client base and maintenance of current client base, quotations, coordinate incoming work, track projects, maintain current regulatory file in the environmental field
- As a Program Manager, was responsible for implementing and overseeing projects that involved multidisciplinary lab work, extensive client contact, report writing and project follow-up

JOHN N. ALT CEG, RG
Consulting Geologist

Education

Graduate Studies	Geology, San Jose State University
B.A.	Geology, San Jose State University, San Jose
A.A.S.	Forestry, Paul Smith College, New York

Affiliations

American Geophysical Union Association of Engineering Geologists
Earthquake Engineering Research Institute
International Association of Engineering Geologists
Geological Society of America

Registrations and Certifications

Registered Geologist: California (#3446)
Certified Engineering Geologist: California (#1136)

Professional Experience

Mr. Alt is Consulting Geologist for CTTS, Inc. and brings over twenty years of experience in hydro-geology and engineering geology investigations. Over the past five years, many of these investigations have been directed toward the assessment and mitigation of soil and groundwater contamination.

Key Project Experience

- Project Manager for Preliminary Assessment and Site Characterization Investigations of a State Superfund site located in Mountain View, California. The project involved defining the lateral and vertical extent of several plumes of industrial solvents and required the installation of monitoring, test, and extraction wells screened in various aquifers underlying the site. Soil gas surveys were used to help define the extent of off-site migration of the shallow plume. A part of the project involved evaluating the contribution of up-gradient sources, to the groundwater contamination below the site. Preliminary Feasibility Studies were also carried out to assess cleanup alternatives for both contaminated soil and groundwater.

- Involved in a Feasibility Study of a site in Sunnyvale, California that contained shallow groundwater contaminated with various solvents. The project involved the layout of extraction wells and the technical and economic review of various cleanup technologies. Two were selected for pilot testing.

- Involved in a project to review the use of oils and solvents and help design procedures for recycling at the Subic Bay Naval Base in the Philippines.

- Served as engineering geologist for the preparation of groundwater SWAT and closure reports for landfill sites in Monterey, Calaveras, and Placer Counties.

- Directed the installation of numerous vadose and groundwater monitoring wells. Collected soil and groundwater samples following quality control protocol in the collection and handling of the samples.

- Carried out numerous environmental site assessments related to the conversion of agricultural or industrial property to residential and/or commercial use. Assessments included review of historical records, interpretation of aerial photographs, interview, field reconnaissance, and sampling.

- Managed a number of underground storage tank removals and conducted sampling according to state and local regulations.

- Investigation and inventory of landslide damage in Northern California resulting from intense rain storms during winter of 1986 for Allstate Insurance.

- Member of a team to investigate seismic hazards for High Aswan Dam in Egypt. Worked on coastal deformation along Red Sea Coast. Project funded by U.S. AID.

- Investigations of regional geology and soils for the proposed Calima III dam and reservoir near Cali, Colombia.

- Mapping of faults and landslides and investigation of soils within the reservoir area of the La Honda Dam, Venezuela.

- Project Manager for the investigation of seismic and volcanic hazards for Agoyan water diversion project, Eastern Andes, Ecuador.

- Review of volcanic risk along the coast on the west flank of Mt. Cameroons, Cameroon, for a proposed LNG site.

- Project Manager for investigation of seismic hazards at proposed Salado dam and reservoir on east flank of Andes, Ecuador.

- Investigation of coastal deformation and active fault studies for the proposed Boruca dam and reservoir on the southwest coast of Costa Rica.

LESLIE C. GOLDSMITH
Senior Scientist

Education

B.S. Agriculture, University of Wisconsin, River Falls, Wisconsin

Professional Experience

Ten years of experience in regulatory, academic and private sector environmental programs. Hands-on and teaching experience in emergency response and hazardous waste site health & safety. Extensive work in development and implementation of state environmental protection programs.

Key project experience:

- Member of State of Minnesota Hazardous Materials Response Team. Responded to hazardous chemical incidents at fixed facilities and during transportation. Directed investigation and cleanup of numerous chemical spills.
- Served on the State of Minnesota Emergency Response Commission for the implementation of the Emergency Planning and Community Right-to-Know Act of 1986 (SARA Title III).
- Prepared reports to the Governor's Commission on Pipeline Safety and the National Transportation Safety Board in response to a gasoline pipeline explosion in Moundsview, Minnesota.
- Presented the Advanced Site Monitoring Course for Federal Emergency Management Agency (FEMA) Region V Hazardous Materials Specialist annual refresher course.
- Provided customized hazardous materials specialist training for the cities of Minneapolis, St. Paul and other Minnesota Fire Department Hazardous Materials Emergency Response Teams.
- Selected by the Minnesota Department of Emergency Management to teach Hazardous Materials Emergency Planning courses offered to Minnesota Communities and Local Emergency Planning Committees under the Federal SARA Title III training grant program.
- Contributor to a Hazardous Waste Source Reduction and Management Plans and Reports required pursuant to California SB 14.
- Implemented a two year effort to expand Minnesota's Statewide Household Hazardous Waste Management Program from 14 counties to 80 counties, effectively providing a coordinated statewide Household Hazardous Waste Management program. Managed biennial budget for the program in excess of two million dollars.

- Worked with state legislators to develop laws for the management of hazardous problem wastes, such as batteries and fluorescent lamps.

- Led a multi-disciplinary technical work group that developed functional and program design specifications for the Minnesota Integrated Ground Water Information System, a database to manage and integrate ground water data collections among state agencies, contractors and responsible parties. Researched and analyzed computer and and data systems.

- Participated in the EPA Office of Information Resources Management (OIRM) work group that developed the current standards for the accuracy and representation of locational data.

- Worked on inter-agency team that developed and tracked the Minnesota Comprehensive Ground Water Protection Act of 1989.

- Worked with numerous Minnesota communities of all sizes to achieve compliance with the requirements of the Clean Water Act and Minnesota Water Quality protection laws. Negotiated returns to compliance, facilitated public meetings and conducted hearings on controversial NPDES permit issuances.

APPENDIX B

APPENDIX B

CLIENT REFERENCES

1. Esan Fanjung
   Zeneca Ag Products
   1415 S. 47th Street
   Richmond, Ca 94804
   (510) 231-1371

2. Mark Borsuk
   Attorney At Law
   1626 Vallejo Street
   San Francisco, Ca 94123-5116
   (415) 922-4740

3. Robert Rosen
   Guarantee Forklift
   699-4th Street
   Oakland, Ca 94607
   (510) 834-2490

4. Jack Worthington
   Durham Transportation
   2713 North River Avenue
   Rosemead, Ca 91770

5. John Cummings (This is a reference for John Alt, CEG)
   John Cummings and Assoc.
   P.O. Box 2847
   Fremont, Ca 94536
   (510) 505-0722

APPENDIX C

ACORD. CERTIFICATE OF INSURANCE

ISSUE DATE (MM/DD/YY)
04-27-93

PRODUCER

ENVIRONMENTAL PROFESSIONAL
RISK PURCHASING GROUP
15851 DALLAS PKY #865
DALLAS, TX 75248

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW.

COMPANIES AFFORDING COVERAGE

COMPANY LETTER A — CREDIT GENERAL INSURANCE COMPANY
COMPANY LETTER B
COMPANY LETTER C
COMPANY LETTER D
COMPANY LETTER E

INSURED

CTTS, INC. DBA
TOXIC TECHNOLOGY SERVICES
PO BOX 515
RODEO, CA 94572

COVERAGES

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED, NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

CO LTR	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFFECTIVE DATE (MM/DD/YY)	POLICY EXPIRATION DATE (MM/DD/YY)	LIMITS	
	GENERAL LIABILITY				GENERAL AGGREGATE	$ 1,000,000
A	X COMMERCIAL GENERAL LIABILITY				PRODUCTS-COMP/OP AGG.	$ 1,000,000
	X CLAIMS MADE OCCUR.	EOC800-183-00	01-10-93	01-10-94	PERSONAL & ADV. INJURY	$ 1,000,000
	OWNER'S & CONTRACTOR'S PROT.				EACH OCCURRENCE	$ 1,000,000
	X PROFESSIONAL LIABILITY				FIRE DAMAGE (Any one fire)	$ 50,000
	X POLLUTION LIABILITY				MED. EXPENSE (Any one person)	$ 5,000
	AUTOMOBILE LIABILITY				COMBINED SINGLE LIMIT	$
	ANY AUTO					
	ALL OWNED AUTOS				BODILY INJURY (Per person)	$
	SCHEDULED AUTOS					
	HIRED AUTOS				BODILY INJURY (Per accident)	$
	NON-OWNED AUTOS					
	GARAGE LIABILITY				PROPERTY DAMAGE	$
	EXCESS LIABILITY				EACH OCCURRENCE	$
	UMBRELLA FORM				AGGREGATE	$
	OTHER THAN UMBRELLA FORM					
	WORKER'S COMPENSATION				STATUTORY LIMITS	
	AND				EACH ACCIDENT	$
	EMPLOYERS' LIABILITY				DISEASE—POLICY LIMIT	$
					DISEASE—EACH EMPLOYEE	$
	OTHER					

DESCRIPTION OF OPERATIONS/LOCATIONS/VEHICLES/SPECIAL ITEMS

CERTIFICATE HOLDER
THIS IS A SAMPLE CERTIFICATE FOR BIDDING & INFORMATION PURPOSES.

CANCELLATION
SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, THE ISSUING COMPANY WILL ENDEAVOR TO MAIL XXXX DAYS WRITTEN NOTICE TO THE CERTIFICATE HOLDER NAMED TO THE LEFT, BUT FAILURE TO MAIL SUCH NOTICE SHALL IMPOSE NO OBLIGATION OR LIABILITY OF ANY KIND UPON THE COMPANY, ITS AGENTS OR REPRESENTATIVES.

AUTHORIZED REPRESENTATIVE
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX