Cost Guidelines

UNDERGROUND STORAGE TANK CLEANUP FUND

STATE WATER RESOURCES CONTROL BOARD
UNDERGROUND STORAGE TANK CLEANUP FUND
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Abbreviations and Acronyms

The following is a list of common abbreviations and acronyms that are commonly used in the UST environment and industry today.

§	section
'	feet (length)
"	inches (length)
APCD	Air Pollution Control District
AQMD	Air Quality Management District
APN	Assessor's Parcel Number
BOD	Biological Oxygen Demand
BTEX	Benzene, Toluene, Ethylbenzene, Xylenes
CADD	Computer Aided Drafting/Design
CAG	Corrective Action Guidelines
Cal-EPA	California Environmental Protection Agency
Cal-OSHA	California Occupational Safety and Health Administration
CAG	Corrective Action Guidelines
CAP	Corrective Action Plan
CCR	California Code of Regulations
CEG	Certified Engineering Geologist
CHG	Certified Hydrogeologist
COD	Chemical Oxygen Demand
CPT	Cone Penetrometer Test
cy	cubic yard
cfm	cubic feet per minute
DEH	Department of Environmental Health
DHS	Department of Health Services
DNAPL	Dense Non-Aqueous Phase Liquid
DO	Dissolved Oxygen
EDF	Electronic Deliverable Format
EHS	Environmental Health Services
EPA	Environmental Protection Agency
FID	Flame Ionization Detector
ft	feet
GAC	Granular Activated Carbon
GC	Gas Chromatograph
gpm	gallons per minute
HAZWOPER	Hazardous Waste Operations and Emergency Response
hp	horse power
hr	hour
ICU	Internal Combustion Unit
IRA	Interim Remedial Activities
lbs.	pounds
LEL	Lower Explosive Limit

LNAPL	Light Non-Aqueous Phase Liquid
LUST	Leaking Underground Storage Tank
MTBE	Methyl Tertiary Butyl Ether
NAPL	Non-Aqueous Phase Liquid
NPDES	National Pollutant Discharge Elimination System
O&M	Operation and Maintenance
OSHA	Occupational Safety and Health Administration
OVM	Organic Vapor Monitor (see PID, FID)
PE	Professional Engineer
PID	Photo-Ionization Detector
ppb	parts per billion
ppm	parts per million
PVC	Polyvinyl Chloride
QA/QC	Quality Assurance/Quality Control
RAP	Remedial Action Plan
RBCA	Risk-Based Corrective Action
RCRA	Resource Conservation and Recovery Act
REA	Registered Environmental Assessor
RG	Registered Geologist
RP	Responsible Party
RWQCB	Regional Water Quality Control Board
sec.	section
SWRCB	State Water Resources Control Board
SVE	Soil Vapor Extraction
TAT	Turn-Around-Time
TDS	Total Dissolved Solids
TOC	Total Organic Carbon
TPH	Total Petroleum Hydrocarbons
TSS	Total Suspended Solids
UST	Underground Storage Tank
USTCF	Underground Storage Tank Cleanup Fund
VES	Vapor Extraction System
VOC	Volatile Organic Compound
Yd^3	cubic yard

Introduction

These guidelines have been developed pursuant to Section 25299.57 (h) of the California Health and Safety Code, which states, in part, that "The State Water Resources Control Board shall develop a summary of expected costs for common remedial actions. This summary of expected costs may be used by claimants as a guide in the selection and supervision of consultants or contractors."

This document is a product of the State Water Resources Control Board Underground Storage Tank Cleanup Fund Program (Fund). The primary purpose of this document is to provide guidance to claimants for evaluating proposed and incurred corrective action costs at sites eligible for participation in the Fund. Specifically, these guidelines are intended to help claimants identify reimbursable goods and services and understand how the Fund evaluates activities and costs. Claimants will also be able to judge whether additional justification will likely be required to support a given cost, or whether a call for assistance from the Fund is in order.

This is a guideline only, it does not establish reimbursement limits for the listed items and activities. It is not intended to remove the element of competition or freedom of choice from the industry. The intention of these guidelines is not to replace the three-bid requirement (see Three-Bid Requirement, page 75).

Standard supporting documents, as described in the Reimbursement Request Instructions (not included in this document), are required for all costs submitted for reimbursement.

A secondary purpose of these guidelines is included in section 25299.57(g)(2) of the California Health and Safety Code which states that for professional engineering and geologic work claimant's shall submit multiple proposals and fee estimates and the "claimant's selection of the provider of these services is not required to be based on the lowest estimated fee, if the fee estimate conforms with the range of acceptable costs established by the board." Multiple proposals and fee estimates are inclusive of this document's unit and project costs.

Consultants and contractors contract directly with the claimant, not the Fund. The choice in selecting a consultant or contractor is the responsibility of the claimant, as is the ultimate responsibility for paying for costs incurred. The fact that the cost is within the guidelines does not mean that the work was necessary or contributed to the advancement of the cleanup of a particular site or that it is eligible for Fund reimbursement (see Work Approval and Direction, page 67). All costs submitted for reimbursement will be evaluated based upon the information available at the time of review. For professional engineering and geologic work where the low estimate is not selected, the Fund strongly recommends that claimants request pre-approval of all project costs (see Pre-Approval, page 77).

Professional engineering work must be conducted under the responsible charge of a California registered Geologist or Engineer. This does not mean that the registered professional must be involved in all activities and it does not mean that the professional must do all the work. It means

that the registered professional is in responsible charge of the activities and ensures that the activities are conducted in a thorough and professional manner.

Some firms do not have registered professionals on staff. This may be a violation of the Geologist and Geophysicist Act (see Personnel Qualifications and Work Descriptions, page 64). Work that is conducted in violation of the laws of the State of California may not be eligible for reimbursement. Work, conducted without properly qualified professionals overseeing the activities, has encountered difficulties that resulted in reduced reimbursements. It is the responsibility of the claimant to comply with all State and Federal Laws when hiring professional services.

Any mention of brand names or specific technologies is not an endorsement of that brand or technology by the State of California, the Fund, or any of the staff. The mention of brands and names is purely for illustrative purposes.

How to use this guide:
The Cost Guidelines consist of three main sections; 1) Unit Costs, 2) Project Costs, and 3) General Guidelines These sections are described below. The appendix contains a few example projects and a list of common acronyms and abbreviations. It also contains common terms that are used in this document and that may be encountered during the investigation and remediation of a contaminated site.

1) Unit costs: A unit of service, activity, or product is delivered for a set cost. Examples include an analytical test from a laboratory or an hourly rate for a consultant's staff person. Where applicable, these costs must be accompanied by an invoice from a subcontractor (analytical, drilling, rental shop, etc.).

Costs are listed for common goods and services used in corrective actions. Listed costs do not include any markups that may be added by a primary (prime) contractor. Use these costs as a comparative guide when evaluating costs presented in bids or estimates received from consultants or contractors.

Please exercise caution when applying unit costs. Just because a unit cost is listed does not mean it is reasonable to extend that cost over the entire range of activities. Such things as "economy-of-scale" must be considered. If extensive work is required, a lower rate can often be negotiated. It may also be more cost effective to purchase equipment for a specific claim rather than charge unit rates if the equipment will be used repeatedly at a site (see Rental/Purchase of Equipment, page 70).

2) Project costs: A project cost is typically an aggregate of unit costs such as: consultant billing hours, equipment rental, and subcontractors, or it may be simply consultant labor. Listed project costs generally describe a level of effort required to perform certain tasks. More than one project cost may need to be referenced to account for all work in a given bid. For example, a single bid for a "Groundwater Monitoring" may include a Groundwater Monitoring Event (see page 35), Free

Product Removal (see page 34), and Report Preparation (see page 37). Tasks and conditions will differ from site to site and the Fund staff will review each case individually.

3) General guidelines: A description of various Fund guidelines, standard practices, and statements on how the Fund addresses issues concerning reimbursement. General information intended to be helpful, but not necessarily directly tied to certain costs, is included in this section.

Variations by region:
Specific areas within California have regional variations, regulatory variations, and resource variations that have more impact on local costs than the generic cost of living for that particular region. It is because of this variation that each area in the state has been assigned to a specific reviewer at the Fund. This allows us to become familiar with specific regional variations and account for them. To account for all regional variations would be beyond the scope and intent of this document. The costs presented in these guidelines are not intended to supercede the actual regional variation in costs.

Revision of this guide:
The Fund has made a concerted effort to prepare a document that will meet the needs of all of our claimants. We will be making a continuous effort to keep the guideline current and responsive to changes in the industry and regulatory aspects, as well as cost changes in California. As specific issues or changes come up, periodic additions or supplements may be prepared and incorporated. Major revisions will not occur more often than every two years.

Contact the Fund:
The Fund's policy is to be very responsive to requests for assistance from claimants. If you have any questions, need additional assistance, are unsure of an item reimbursement status, need some assistance finding consultants, getting bids or understanding regulatory directives, please contact the Fund. We will try to assist you; if we cannot help, we will try to direct you to someone who can. For assistance call your specific contact person at the Fund or telephone 1-800-813-3863.

For the most complete and up-to-date information on the Fund, and copies of public documents (including this one), visit our World Wide Web site at:

http://www.swrcb.ca.gov/cwphome/ustcf/fundhome.htm

Unit Costs

Unit Costs

Personnel Labor Rates

Shown below are typical professional labor rates for consultant personnel. Individual companies may use different titles and descriptions for employees. The Personnel Qualifications and Task Descriptions (see page 64) show typical definitions and tasks for these personnel.

There are two major contributors to excessive personnel costs. One is the use of high billing rate personnel (e.g., Senior Engineer/Geologist) to perform tasks that require a lower level of expertise. It is very important to use only the appropriate staff level for the tasks performed. Some consultants, either through staffing difficulties, scheduling problems, or a lack of staff may use a higher billing staff to perform tasks commonly performed by a lower billing staff person. This is acceptable if the billing rate is adjusted downward to correspond to the task performed. The other contributor to excessive costs is the level of effort required to perform common tasks. The level of effort for common tasks is described in the Project Costs section.

Reimbursement will be limited to the actual value and level of the work performed, irrespective of the title of the employee. Fund staff will make the final determination of eligibility for all costs submitted for reimbursement.

The following typical billable rates include: labor, benefits, taxes, overhead/general &administrative (G&A), profit, and ancillary charges such as copies, faxes, telephones, postage, paper clips, binders, cellular phone charges, computer charges (CADD, word-processing, mapping), etc.

Typical Personnel Labor Rates	
Professional Staff Title/Classification	**Billable Rate ($/hr)**
Principal Engineer/Geologist	125
Project Manager	105
Senior Engineer/Geologist	105
Project/Associate Engineer/Geologist	90
Staff Engineer/Geologist	75
Senior Technician	70
Technician	60
Drafts Person	55
Clerical	45

Unit Costs

Analytical

The following is a list of common analytical tests performed on soil, water and air samples to test for the presence and concentration of contaminants. In most cases, a subcontractor will perform the analytical tests. **The direct invoice from the California Certified laboratory detailing what samples were analyzed, the date analyzed, and actual cost is required with payment requests**. The typical laboratory costs presented below are inclusive of all supplies, sample handling, disposal fees and reporting of laboratory data in electronic deliverable format (EDF).

Lab Analysis (Soil & Water)		
EPA Method[1]	**Component**	**Cost**
8015	Total Petroleum Hydrocarbons (TPH)-gasoline	55
8015	Total Petroleum Hydrocarbons (TPH)-diesel/motor oil	65
8020	BTEX/MTBE	55
8015/8020	TPH/BTEX/MTBE (gasoline only)	65
8260 (incl. Oxygenates)	Volatile Organic Compounds	150
8270	Semi-Volatile Organic Compounds	275
6010/7421	Total Lead[2]	40
	Waste Characterization (Reactivity/Corrosivity/Ignitability)	180
	5 LUFT Metals[3]	80
	CAM 17 Metals[3]	175

[1]These EPA Methods are common terminology in practice used by the industry today. Some substitutions, modifications, and alternatives to the precise EPA Method are common. Verify lab certification.

[2]Lead analysis may be required when leaded gasoline was stored in the UST. Usually a limited number of these tests are run. If this test is performed regularly, justification will be required.

[3]Metal contamination is not typically an eligible substance, one screening sample is normally allowed if specifically required, or as needed for landfill disposal. Justification for additional sampling will be required.

Methyl Tertiary Butyl Ether (MTBE) is a gasoline additive of increasing concern in California. MTBE can be easily and inexpensively quantified using the existing EPA 8020 or EPA 8260 test by simply reporting the information that is already available from the gas chromatograph resulting from the analysis. Most laboratories do not charge extra for MTBE analysis.

Standard turn around time (TAT) is normally between 5 and 14 days depending upon the laboratory and their current workload. Rush charges may be incurred when analytical results are requested within 24 hours. Rush charges usually range from 50% to 100% surcharge on the standard price. Rush charges must be justified to show that they are necessary.

Various landfills and regulatory agencies may require tests, such as: PCB's, ignitability, corrosivity, reactivity, bioassay, and others. These tests will be considered when soils from an eligible source are destined for disposal at a permitted facility. Any additional costs incurred due to the presence of ineligible substances detected as a result of these tests are not eligible for reimbursement. Reimbursement for unusual tests that may be required by a landfill will be evaluated based upon the contaminating substance, requirements of the landfill, and requirements of the regulating agency. Copies of landfill requirements must be included with the reimbursement request.

Use of on-site labs is increasingly common. The use of an on-site lab can save sample transportation and rush charges and give immediate results, reducing the time expensive equipment must be kept in the field. On-site labs are primarily used for excavations, step-out borings, and accelerated site assessments. To decide if an on-site lab should be used, the following considerations should be addressed: 1) Will it provide a lower overall cost? 2) Will enough samples be analyzed to warrant it? 3) Will it provide necessary information to prevent unnecessary costs?

Individual laboratories bill their on-site laboratories differently. Many have a flat daily fee while others use a daily rate and a per sample charge. Whichever method is used, the total cost should be approximately the same. The following are common rates for an on-site laboratory:

On-Site Laboratories		
Flat Fee		**Cost**
Daily Rental Fee	EPA Method 8015/8020 EPA Method 8015/8260	1,500/day 2,000/day
Variable Fee		
Mobilization/Daily Fee	Includes daily mobilization, chemist, and all equipment, supplies and disposal	400/day
Analysis Charges	EPA Method 8015/8020 EPA Method 8015/8260	50/ea 115/ea

Under some conditions sampling of air for contaminant constituents may be required. A copy of the Air Pollution Control District (APCD) permit or a description of the analytical requirements from the appropriate authorizing agency will be required before reimbursement can be made for air samples.

Lab Analysis (Air)	
Component	**Cost**
TPH	60
BTEX/MTBE	115
EPA Method 8260	200

Unit Costs

Supplies (Field, Wells, Miscellaneous)

The following are typical rates for supplies used in the performance of corrective action work. These costs are for generic equipment and supplies.

Supplies (Field, Wells, Miscellaneous)		Size/Unit	Cost
Field Supplies			
	Soil Sampling Liners (Brass)	2" x 6"	6.00
	Soil Sampling Liners (Stainless Steel)	2" x 6"	10.00
	Bailers (disposable) polypropylene	1.5" O.D.	8.00
	Tedlar Bags (1 liter)	Each	10.00
	Film/Development	Roll	At Cost
Well Supplies			
2" PVC, Schedule 40			
	PVC Well Casing (10' lengths)	Per Foot	3.50
	PVC Well Screen 0.010" & 0.020" (Up to 5' Lengths)	Per Foot	4.50
	PVC Well Screen 0.010" & 0.020" (Up to 10' Lengths)	Per Foot	3.50
	Threaded Cap (Top or Bottom)	Each	7.50
	Slip Cap	Each	4.00
	Locking Cap	Each	20.00
4" PVC, Schedule 40			
	PVC Well Casing (10' lengths)	Per Foot	6.00
	PVC Well Screen 0.010" & 0.020" (Up to 5' Lengths)	Per Foot	9.00
	PVC Well Screen 0.010" & 0.020" (Up to 10' Lengths)	Per Foot	7.50
	Threaded Cap (Top or Bottom)	Each	14.00
	Slip Cap	Each	8.00
	Locking Cap	Each	22.00
Concrete			
	Ready Mix	90 lb. Bag	5.00
	Portland Cement Concrete	90 lb. Bag	8.00
	Sand Cement slurry Backfill w/ Delivery	Cubic Yard	60.00
Grout			
	Bentonite Grout	50 lb. Bag	10.00
	Bentonite Chips	50 lb. Bag	10.00
	Bentonite Granular	50 lb. Bag	10.00
	Bentonite Tablets	50 lb. Bag	40.00

Supplies (Field, Wells, Miscellaneous)		Size/Unit	Cost
Sand			
	Monterey Sand	100 lb. Bag	8.50
	Silica Sand	100 lb. Bag	8.00
Well Covers			
	Manholes(locking/tight/Traffic Rated)	8 inch	50.00
	Manholes(locking/tight/Traffic Rated)	12 inch	75.00
	Standpipe, steel, locking	8"dia.x 3'	100.00
	Christy Box	8 inch	75.00
	Christy Box	12 inch	100.00
Miscellaneous			
	Padlocks	Each	10.00
	Asphalt Patch (Cold-Mix)	50 lb. Bag	10.00
	55 gallon drum	Each	40.00
	Visqueen 6 mil, 20'x100'	Roll	75.00
	Tyvek Suits	Each	6.00

There are quite a few small items that may be used during site investigation and cleanup. It is very difficult to account for some of these minor items that range in cost from $0.05 to $5.00 each. The following is a common cost to account for various small consumable items used during extensive field activities.

Small Items	**$/day**
For example: gloves, water, ropes, tape, soap, twine, pens, bottles, paint, warning tape, distilled water etc.	25.00

Protective equipment may be required to adequately protect the health and safety of the workers attempting to remediate the site. Level D is adequate for almost all activities at petroleum UST sites in California. Levels A, B, and C are almost never used at petroleum UST sites in California. The Fund does not reimburse for itemized Level D equipment. This normally includes coveralls, safety boots, safety glasses, and hard-hats. These items are considered part of necessary equipment to do the work. The cost for these items considered part of the overhead that is already built into the billing rate of the staff.

Unit Costs

Equipment (Small)

The costs below are for equipment in good mechanical condition, complete as required. These costs also include maintenance, batteries, fuel, cleaning, repairs, insurance, shelter, security, depreciation, purchase price, overhead, and general and administrative costs. Unless otherwise noted, costs do not include the labor, overhead, and profit for the operator.

The Fund will only reimburse for the most cost-effective method of obtaining the equipment (see Rental/Purchase of Equipment, page 70). The claimant is ultimately responsible for determining which method is most cost effective for their site. Equipment purchase will be reimbursed over the length of time needed on the project. Contact Fund staff for any questions regarding rental or purchase.

Equipment (Small)		**Daily**	**Weekly**	**Monthly**
Air Compressor		85.00	315.00	
Concrete Coring/Cutting Equipment				
	Coring Machine - 8" diameter (including bit)	75.00	250.00	
	Concrete Saw	75.00	250.00	
Fence				
	Chain link $/100 ft		100.00	400.00
Field Instruments				
	Datalogger (2 channel)	65.00	325.00	
	Datalogger (8 channel)	115.00	575.00	
	Pressure Transducer	40.00	175.00	
	Photo-ionization Detector (PID)	100.00	350.00	
	Flame Ionization Detector (FID)	150.00	500.00	
	Water Level Indicator	25.00	85.00	
	Oil/Water Interface Probe	40.00	125.00	
	pH/Conductivity/Temperature Meter	40.00	125.00	
	Dissolved Oxygen Meter	40.00	125.00	
	Combustible Gas Meter (LEL/O_2)	50.00	175.00	
	Turbidity Meter	20.00	70.00	
Field Sampling Equipment				
	Bailer (reusable teflon)	20.00		
	Hand Auger	25.00	85.00	
	Core Sampler & Hammer	5.00	20.00	

Equipment (Small)		Daily	Weekly	Monthly
Generators, gasoline/diesel powered				
	Generator, 1-3 kW	40.00	150.00	
	Generator, 5-6 kW	55.00	200.00	
Steam Cleaner		75.00	250.00	
Pumps				
	Gasoline Powered Pump 2" dia., 150 gpm	55.00	200.00	
	Pump, Submersible, 10 gpm	45.00	150.00	
	D.C. Purging Pump 3 gpm	15.00	50.00	
Skimmers/Separators/Hydrocarbon Recovery				
	Passive Skimmer (1 liter)			15.00
	Electric Skimmer			125.00
	Filter Separator			100.00
Storage Tanks				
	Storage Tanks, 1,000 gallon	12.50	85.00	325.00
	Storage Tanks, 5,000 gallon	18.50	125.00	500.00
	Storage Tanks, 21,000 gallon	30.00	210.00	840.00
	Rolloff Bin	19.00	95.00	350.00
Survey Equipment				
	Level/transit, tripod, rod/prism, tape/chain	35.00	140.00	
Traffic Control Components				
	Barricades		5.00	20.00
	Cones/Delineators (25 each)	8.00	35.00	

There are many small items that should not be charged at individual rates. These items are considered part of necessary equipment to do the jobs performed. These costs are often called ancillary charges and are considered to be included in the billing rate of the staff or Small Items (see previous section). These costs include, but are not limited to:

telephones	copies	cellular phones	field phones
faxes	postage	portable computers	tool kits
computers	paper clips	cameras	drum dolly
CADD computers	office electrical	fire extinguishers	dolly
word-processing	binders	first aid kits	flares

Unit Costs

Equipment (Heavy)

The costs below are for equipment in good mechanical condition, complete as required with attachments, tools, hoses, oilers, cables, bits, blades, buckets, skips, hooks, fuel, tires, lubricants, etc. This also includes maintenance, cleaning, repairs, OSHA equipment, insurance, shelter, security, depreciation, and overhead, general and administrative costs. Equipment rates include all costs for equipment, operation, and operator. Detailed subcontractor invoices for large pieces of equipment are standard supporting documentation that is required before reimbursement can be made.

Equipment (Heavy)		**Hourly**	**Daily**	**Weekly**
	Backhoe (operated)	90.00	720.00	3,600.00
	Compactor (compaction wheel or vibraplate)		125.00	650.00
	Excavator (operated)	140.00	1,100	5,500.00
Loaders (operated)				
	Bob cat	75.00	600.00	3,000.00
	Loader	120.00	960.00	4,800.00
Trucks				
	Truck /Automobile	Lesser of $60.00/day or $0.50/mile		
	Specialized Equipment Truck (4WD)	Lesser of $75.00/day or $0.60/mile		
	Truck - 10 cubic yard (operated)	65.00	520.00	2,600.00
	Truck - 20 cubic yard (operated)	75.00	600.00	3,000.00
	Vacuum Truck (operated)	75.00	600.00	3,000.00

Note: Damage resulting from the use of improper equipment, or the improper use of equipment, is not eligible for reimbursement.

Unit Costs

Drilling (Borings and Wells), Direct Push Technologies

Drilling (Borings and Wells):
The following typical costs are presented as both time and material costs and per foot costs. If the time and material cost guidelines are used, the necessary supplies to complete wells are found in Supplies (Field, Wells, Miscellaneous), page 13. The costs based upon a time and materials rate should be commensurate with the per foot rate described below.

Geological and drilling conditions vary greatly throughout the state. Extra costs, due to difficult drilling conditions and/or limited site access, will be considered on a case-by-case basis. These extra costs may include additional time or more expensive drilling methods required due to geological conditions.

The rates below are for drilling equipment used to install monitoring wells and borings. The rates are for equipment in good mechanical condition with all necessary attachments, tools, hoses, oilers, cables, bits, fuel, tires, and lubricants. The rates also include regular maintenance, cleaning, repairs, OSHA equipment, insurance, shelter, security, depreciation, overhead, general and administrative costs and profit. Drilling rig rates normally include at least two operators. Larger, more expensive drill rigs, such as air or mud rotary, may be needed on occasion because of peculiar geologic conditions. Request pre-approval for unusual costs prior to incurring them. Detailed subcontractor invoices for drilling costs are standard supporting documentation needed for reimbursement.

Equipment (Drilling)	**Hourly**	**Daily**
Mobilization/Demobilization (4 hour maximum)	100.00	
Hollow Stem Auger Drill Rig	130.00	
Rotary Drill Rig	160.00	
Direct Push Technology Rig	130.00	
Steam Cleaner		75.00
Cement Pump		60.00
Support Truck/Van		85.00
Compressor with Paving Breaker		85.00
Concrete Coring Machine		75.00
Generator (3500 watt)		55.00

The following costs are based upon a "per foot" cost for installing borings and wells. They are based upon 2 persons, service truck, drilling and sampling every 5 feet, backfilling borings and well materials. These tables should be used for general evaluation of drilling only. Actual costs may vary.

Drilling (Soil Borings, Monitoring Wells)		
Description	**Depth**	**$/ft**
Borings: backfill with cement/bentonite slurry mixture	0 to 50 feet	18.00
Borings: backfill with cement/bentonite slurry mixture	50 to100 feet	18.00
Borings: backfill with cement/bentonite slurry mixture	>100 feet	18.00
Wells: includes borehole drilling, PVC screen and blank schedule 40, end plug, locking cap, sand, bucket of bentonite pellets for seal, concrete grout, and well box; also includes 15 minutes surging time to set sand pack. This rate would be less if no sampling is needed during drilling.		
2" PVC	0 to 50 feet	34.00
2" PVC	50 to100 feet	33.00
2" PVC	>100 feet	32.00
4" PVC	0 to 50 feet	40.00
4" PVC	50 to100 feet	39.00
4" PVC	>100 feet	38.00
Well Demolition: drilling rig costs, includes backfill		
2" PVC		16.00
4" PVC		20.00

Additional drilling costs may be incurred if the regulator requires continuous core sampling, if angle boring is needed to sample below an obstruction, or if a Cone Penetrometer Test (CPT) is performed. The following costs cover some of the miscellaneous charges that may be incurred. Other costs will be considered on a case by case basis.

Miscellaneous Drilling Costs		
Description	**Unit**	**$/Unit**
Additional Well Development	Hourly	110.00
Continuous Core Sampling	Additional $/ft	5.00
Angle Drilling	Additional $/ft	5.00

Direct Push Technologies:
The cone penetrometer is capable of rapidly providing valuable subsurface information. In its basic form, truck or van mounted hydraulic rams force a cone shaped point containing instruments that measure tip resistance, sliding friction and inclination. They can be used to take discrete samples of soil or water. The depths that can be reached depend upon subsurface conditions but are often limited to less than 100 feet. Some of the benefits of this technology are that it does not generate drilling waste, it is relatively quick and less labor intensive, and it allows for continuous evaluation of subsurface conditions. Disadvantages include possible subsurface obstructions, and potential of smearing contamination. Traditional monitoring wells and borings must often follow up this technology.

Cone Penetrometer/Geoprobe/Hydropunch	
Description	**$/ft**
Includes: CPT Equipment, vehicle, labor, professional oversight, all necessary supplies, replacement tips, grout, sample rings and all other necessities to perform field work.	25.00

Project Costs

Project Costs

Workplans

Section 25299.37(c)(1) of the Health and Safety Code specifies that when a responsible party undertakes corrective action, including preliminary site assessments and investigations, they "shall prepare a workplan that details the actions to be taken by the . . . responsible party to achieve the required corrective action." Section 2722 of Article 11 of the California Code of Regulations (CCR) specifies that "the responsible party shall submit a workplan to the regulatory agency responsible for overseeing corrective action at the underground storage site." Section 2811 of the Fund Regulations specifies that claimants shall be entitled to reimbursement for costs only if they are in compliance with corrective action requirements including the implementing regulations in Article 11. The workplan must be signed by a properly licensed engineer/geologist.

Section 2722 of Article 11 (CCR) requires submittal of a workplan for proposed activities under the Preliminary Site Assessment Phase, the Soil and Water Investigation Phase, and the Verification Monitoring Phase. The workplan must be approved by the regulatory agency, or modified until it is acceptable to the agency. **This process should, at most, require one or two revisions.**

The majority of the workplans prepared for a site will be for Preliminary Site Assessment Phase and Soil and Water Investigation Phase activities. **These workplans should include a Site Conceptual Model that presents a summary of the current understanding of geologic and hydrogeologic conditions, suspected contaminant sources, potential migration pathways, receptors and sampling constraints. This understanding forms the basis for the development and rationale for the proposed investigation activities. The workplan should also include a narrative of the goals of the investigation activities and how the work will accomplish those goals.** The workplan will include a description of the proposed work including methods, locations, sampling protocols, laboratory analysis, etc. They may, as necessary, include management of contaminated soil and water generated by the activities, contact persons, schedules of the work, interim remedial actions, and health and safety plans. The actual detail of the workplan will depend upon the scope and type of activity to be conducted. Site Characterization activities such as pump tests, air sparging tests, slug and bail tests, and vapor extraction tests are commonly performed during Phase II activities.

Most workplans contain detailed descriptions of the site and the activities that are to take place. If more than one workplan is prepared, (this happens when two separate and distinct investigative activities take place) much of the detail in the report is duplicated. Word processors allow this information to be duplicated without repeating the initial effort in preparing the report. Once a workplan is prepared for a site, the subsequent plans should take less time, effort, and cost to prepare.

The following is an example of what the Fund expects to see in a typical workplan:

Section	**Content**
Introduction/Purpose	Narrative: with brief site identification, Regulatory case #, current understanding of site conditions (**Site Conceptual Model**), brief descriptions of the goals of the proposed work and how the proposed activities will accomplish these goals. Illustrations: clear illustrations to document the location of the site, current conditions and proposed work. Locations of existing features (utilities, wells, excavations, UST's, adjacent property uses), locations of proposed work, known extent of existing contamination from previous site activities (if any).
Scope of Work	A description of the proposed work to be performed including (as appropriate): drilling method, soil sampling intervals, and anticipated total depth of soil borings, anticipated screened interval of monitoring wells, estimated extent of proposed excavations and/or exploratory trenches, estimated amount of soil to be excavated. A description of the sampling strategy and protocol to be followed in the field. Indicate lab analysis to be performed on samples. A description of the protocol to be followed for preservation and transportation of samples and procedures for decontamination of sampling equipment.
Waste Management	A description of how containerized soil and/or groundwater will be managed at the site. If storage is to take place, location must be noted on the plot plan along with a description of how they will be labeled and safely managed. Name, address, phone # and contact name of site where contaminated soils will be transported for treatment/disposal. Time schedule for removal of wastes and media to be properly disposed of at off-site facilities. Descriptions of the protocol used to sample and characterize soil stockpiles for disposal at class III facilities. Alternative on-site uses of contaminated soils that do not impact public health may also be proposed.
Schedule	Schedule of completion of proposed work.

The following chapters may be added as necessary.

Interim Actions	Appropriate interim remedial actions as may be necessary and required by the regulatory agency.
Health and Safety	A Community Health & Safety Plan may be required for some workplans. Refer to the regulatory agency, regulations and guidelines for a description of the community health and safety issues that are appropriate.

The following costs are what the Fund would expect to see for the preparation of a Preliminary Site Assessment Phase Workplan. These costs include regulatory liaisons, project management and development of the Initial Site Conceptual Model.

Preliminary Site Assessment Phase Workplan				
Personnel	**Description of work**	**Units**	**Rate**	**Cost**
Principal Engineer/Geologist	Review and signature	1	125.00	125.00
Project/Associate Engineer/Geologist	Regulatory liaison, project management and plan preparation	8	90.00	720.00
Staff Engineer/Geologist	Initial Site Concept. Model/plan prep.	8	75.00	600.00
Drafts Person	Prepare site & sampling location maps	3	55.00	165.00
Clerical	Typing/reproduction/mailing	3	45.00	135.00
Total Cost				**1,745.00**

The following costs are what the Fund would expect to see for the preparation of a Soil and Water Investigation Phase Workplan. These costs include regulatory liaisons, project management and revisions to the Site Conceptual Model.

Soil and Water Investigation Phase Workplan				
Personnel	**Description of work**	**Units**	**Rate**	**Cost**
Principal Engineer/Geologist	Review and signature	1	125.00	125.00
Project/Associate Engineer/Geologist	Regulatory liaison, project management and plan preparation	10	90.00	900.00
Staff Engineer/Geologist	Revise Site Concept. Model/Plan prep.	12	75.00	900.00
Drafts Person	Prepare site & sampling location maps	4	55.00	220.00
Clerical	Typing/reproduction/mailing	4	45.00	180.00
Total Cost				**2,325.00**

Interim Remedial Actions:
Regulating agencies may require interim remedial actions to abate or correct actual or potential effects of an unauthorized release prior to complete delineation. These are usually actions such as free product removal or excavation and removal of severely impacted soils or groundwater to remedy an emergency health and safety situation. Due to the immediacy of the need for interim remedial actions, a workplan may or may not be required by the regulatory agency. In either case, a copy of the regulatory agency directive and approval is part of the required supporting documentation. **The interim remedial actions are not intended to replace corrective action or to eliminate the need for the Corrective Action Plan. Excessive soil excavation as part of interim remedial action can lead to unnecessary and unreasonable costs if it is used to bypass investigation and CAP implementation.** For example, excessive interim remedial actions may occur immediately after the underground storage tank removal. Normal interim excavation involves the removal of obviously contaminated soil. However, the Fund has seen over excavation involve thousands of cubic yards of soil. Without proper sampling, characterization, regulatory directives, workplans, and consideration for cost effectiveness, this may result in unreasonable costs. A clear delineation needs to be made between interim remedial action and the full-scale remedial action. The Fund will only reimburse for the amount of the most cost-effective remedial action. **No more than 500 cubic yards of contaminated soil should be removed during an interim remedial action without contacting and receiving approval from the Fund.**

The following costs are what the Fund would expect to see for the preparation of an Interim Remedial Action Workplan:

Interim Remedial Action Workplan				
Personnel	**Description of work**	**Units**	**Rate**	**Cost**
Principal Engineer/Geologist	Review and signature	1	125.00	125.00
Project/Associate Engineer/Geologist	Regulatory liaison, project management and plan preparation	6	90.00	540.00
Staff Engineer/Geologist	Workplan preparation	4	75.00	300.00
Drafts Person	Prepare site & sampling location maps	4	55.00	220.00
Clerical	Typing/reproduction/mailing	3	45.00	135.00
Total Cost				**1,320.00**

Community Health and Safety Plan:
Depending upon the site activities and the requirements of the regulating agency, a Community Health and Safety Plan may be required. The majority of the information in these plans does not change from site to site. A company will have standard methods to deal with certain concerns and hazards. These methods are available from previous health and safety plans. They need to be updated to include the correct contact persons, site addresses, dates, hospital locations, etc. The following is an example of what the Fund would expect to see in a Community Health and Safety Plan:

The Community Health and Safety Plan should include the following topics: (If any of the following requirements are not relevant, please state so clearly in the plan).

1. Site identification and location (case #, site name, address, Assessor's Parcel Number [APN])
2. Plot plan identifying all on-site and surrounding structure, topography, prevailing wind directions, all surrounding land uses, nearby populations, and environments and/or receptors of special concerns
3. Evaluation of potential public exposure to hazards (vapors, dust, noise, fires, explosions, physical hazards, both immediate and long term)
4. Monitoring equipment and protocols to be used
5. Control methods
   a) Site Security
   b) Vapors
   c) Dust
   d) Noise
   e) Open Excavation
   f) Stockpiled Soil
6. Site Safety Manager
7. Emergency Planning
8. Public notification at a minimum should include:
   a) Name and 24-hr phone number for the site safety supervisor
   b) Brief description of the activities
   c) Dates and time of work to be performed and completed
   d) Any requisite Proposition 65 warnings (chemicals known to cause cancer)

The following costs are what the Fund would expect to see for the preparation of a Community Heath and Safety Plan:

Community Health and Safety Plan				
Personnel	**Description of work**	**Units**	**Rate**	**Cost**
Principal Engineer/Geologist	Review and signature	0.5	125.00	62.50
Project/Associate Engineer/Geologist	Regulatory liaison and plan preparation	6	90.00	540.00
Drafts Person	Site, vicinity, hospital location maps	4	55.00	220.00
Clerical	Typing/reproduction/mailing	3	45.00	135.00
Total Cost				**957.50**

Project Costs

Site Investigation

A site investigation involves a comprehensive environmental investigation of a contamination release and typically includes: contaminant characterization, sampling of soil and groundwater, investigation of the site's geologic and groundwater conditions, identification of artificial subsurface and surface structures and an identification of sensitive environmental receptors.

Site investigations can involve numerous methods of investigation using such equipment as: hand augers, backhoes, drill rigs, cone penetrometers, and/or other geophysical investigation equipment. Each site is unique, with different techniques or combinations of techniques required. Other sections of this guideline contain some of the hourly or weekly rates for common investigative equipment. The costs below are the expected labor expended by the consultants and the normal equipment and supplies needed to perform certain tasks.

Permits:
Before some activities can begin, proper permits must be obtained from the permitting agencies. The costs of obtaining the permits vary, but are usually about **$75.00** each for borings and wells (these may be significantly higher depending upon local requirements). Copies of the actual receipt for the permit must be included when submitting for these costs.

Soil Gas Survey:
Soil Gas Surveys are sometimes performed to obtain an idea of the lateral extent of the contamination and to locate and place borings and monitoring wells efficiently. The total costs for a survey is approximately **$150.00** per probe. This includes all equipment and hourly costs to place, retrieve, test, and prepare a report covering the results. This will vary depending upon the number of sample points placed.

Site Sensitive Receptor Surveys:
Regulating agencies may require that a Site Sensitive Receptor Survey be conducted to identify sensitive receptors within the vicinity of the site. Typical costs for this activity range from **$1,000.00 to $3,000.00** depending on the size and location of the site, and the land use and population density in the vicinity of the site.

Cone Penetrometer Test (CPT):
Cone Penetration involves hydraulically pushing a cone shaped instrument into the soil and measuring its resistance to penetration. Special samplers can be used to retrieve grab samples of the soil, soil vapor, or groundwater.

Some regulatory agencies may or may not approve the use of a CPT for site investigation. The Fund cannot reimburse costs for work that is not directed and approved by the regulatory agency. Contact your regulator prior to performing a CPT to determine if it is acceptable.

Cone Penetrometer Test: Installation of eight (8) CPT probes to thirty (30) feet.				
Personnel	**Description of work**	**Units**	**Rate**	**Cost**
Project Manager	Scheduling/Coordination	6	105.00	630.00
Staff Engineer/Geologist	Field Prep./Permit/Fieldwork	12	75.00	900.00
Total Labor				1,530.00
Equipment Rental/Supplies	**Units**			
Gas Monitor (PID)	day	1	100.00	100.00
Truck	day	1	60.00	60.00
Misc. Field Items	day	1	25.00	25.00
Total Equipment				185.00
Subcontractor	**Units**			
Driller	feet	240	25.00	6,000.00
Analytical (EPA 8015)	each	8	65.00	520.00
Analytical (EPA 8260 w/oxygenates)	each	8	150.00	1,200.00
Markup		7,720	0.15	1,158.00
Total Subcontractor				8,878.00
Total Cost				**10,593.00**

Hand Augering:
Many different types of hand augers are used on sites. Hand augers are generally inexpensive, can be operated by one person, and are readily available. The depth is usually limited to less than 20 feet.

Hand Augering: Installation of five (5) hand augers borings to ten (10) feet.				
Personnel	**Description of work**	**Units**	**Rate**	**Cost**
Project Manager	Scheduling/Coordination	2	105.00	210.00
Staff Engineer/Geologist	Field work/QA	10	75.00	750.00
Technician	Field work	10	60.00	600.00
Total Labor				1,560.00
Equipment Rental/Supplies	**Units**			
Gas Monitor (PID)	day	1	100.00	100.00
Truck	day	1	60.00	60.00
Hand Auger	each	1	30.00	30.00
Coring Machine	day	1	75.00	75.00
Misc. Field Items	day	1	25.00	25.00
Total Equipment				290.00
Subcontractor	**Units**			
Analytical (EPA 8015)	each	6	65.00	390.00
Analytical (EPA 8260 w/oxygenates)	each	6	150.00	900.00
Markup		1,290	0.15	193.50
Total Subcontractor				1,483.50
Total Cost				**3,333.50**

Boring Installation:
A common method of site characterization is the installation of borings. This provides information pertaining to the contaminant plume, the site lithology and potential contaminant pathways.

Soil Boring Installation: Installation of three (3) borings to thirty (30) feet.				
Personnel	**Description of work**	**Units**	**Rate**	**Cost**
Project Manager	Scheduling/Coordination	6	105.00	630.00
Staff Engineer/Geologist	Field prep./Permit/Fieldwork	12	75.00	900.00
Total Labor				1,530.00
Equipment Rental/Supplies	**Units**			
Gas Monitor (PID)	day	1	100.00	100.00
Truck	day	1	60.00	60.00
Drums	each	6	40.00	240.00
Soil Sampling Liners	each	15	6.00	90.00
Misc. Field Items	day	1	25.00	25.00
Total Equipment				515.00
Subcontractor	**Units**			
Driller Mobilization	hour	4	100.00	400.00
Driller	feet	90	18.00	1,620.00
Analytical (EPA 8015)	each	15	65.00	975.00
Analytical (EPA 8260 w/oxygenates)	each	15	150.00	2,250.00
Markup		5,245	0.15	786.75
Total Subcontractor				6,031.75
Total Cost				**8,076.75**

Soil Boring Installation: Installation of six (6) borings to fifty (50) feet.				
Personnel	**Description of work**	**Units**	**Rate**	**Cost**
Project Manager	Scheduling/Coordination	10	105.00	1050.00
Staff Engineer/Geologist	Field prep./Permit/Fieldwork	30	75.00	2,250.00
Total Labor				3,300.00
Equipment Rental/Supplies	**Units**			
Gas Monitor (PID)	day	3	100.00	300.00
Truck	day	3	60.00	180.00
Visqueen	roll	1	75.00	75.00
Soil Sampling Liners	each	48	6.00	288.00
Misc. Field Items	day	3	25.00	75.00
Total Equipment				918.00
Subcontractor	**Units**			
Driller Mobilization	hour	4	100.00	400.00
Driller	feet	300	18.00	5,400.00
Analytical (EPA 8015)	each	48	65	3,120.00
Analytical (EPA 8260 w/oxygenates)	each	48	150.00	7,200.00
Markup		16,120	0.15	2,418.00
Total Subcontractor				18,538.00
Total Cost				**22,756.00**

Trenching/Test Pits:
Another method commonly used to investigate a site is the excavation of trenches or test pits to examine the site lithology and contaminant locations. The costs for excavating a trench or test pit should follow the soil excavation cost outlined in the Soil Excavation, page 52.

Trench/Test Pit Excavation: Excavation of thirty (30) feet of trench to 15 feet.				
Personnel	**Description of work**	**Units**	**Rate**	**Cost**
Project Manager	Scheduling/Coordination	6	105.00	630.00
Staff Engineer/Geologist	Field preparation/Fieldwork	10	75.00	750.00
Total Labor				1,380.00
Equipment Rental/Supplies	**Units**			
Gas Monitor (PID)	day	1	100.00	100.00
Truck	day	1	60.00	60.00
Visqueen	roll	1	75.00	75.00
Misc. Field Items	day	1	25.00	25.00
Total Equipment				260.00
Subcontractor	**Units**			
Backhoe (w/operator)	hour	8	90.00	720.00
Backfill	Yd^3	35	15.00	525.00
Analytical (EPA 8015)	each	6	65.00	390.00
Analytical (EPA 8260 w/oxygenates)	each	6	150.00	900.00
Markup		2,535	0.15	380.25
Total Subcontractor				2,915.25
Total Cost				**4,555.25**

Groundwater Investigation:
The investigation of potential or existing groundwater contamination is usually performed by the installation of wells or obtaining grab samples of the groundwater under the site. Grab samples can be obtained using many methods; an example is given below. The costs for the various methods should be similar.

Hydropunch®[1]: Installation of six (6) sample probes to thirty (30) feet to sample groundwater				
Personnel	**Description of work**	**Units**	**Rate**	**Cost**
Project Manager	Scheduling/Coordination	6.	105.00	630.00
Staff Engineer/Geologist	Field preparation/Fieldwork	12	75.00	900.00
Total Labor				1,530.00
Equipment Rental/Supplies	**Units**			
Gas Monitor (PID)	day	1	100.00	100.00
Truck	day	1	60.00	60.00
Misc. Field Items	day	1	25.00	25.00
Total Equipment				185.00

Subcontractor	**Units**			
Driller Mobilization	hour	4	100.00	400.00
Driller	feet	180	25.00	4,500.00
Analytical (EPA 8015)	each	9	65.00	585.00
Analytical (EPA 8260 w/oxygenates	each	9	150.00	1,350.00
Markup		6,835	0.15	1,025.25
Total Subcontractor				7,860.25
Total Cost				**9,575.25**

[1]Any mention of brand names or specific technologies is not an endorsement of that brand or technology by the State, the Fund, or any of the staff. The mention of brands and names are purely for illustrative purposes.

Groundwater wells are the most common method used to determine aquifer characteristics and contamination. Normally, if contamination is discovered, at least three wells will be required to establish the groundwater gradient. Additional wells may be required to adequately delineate the extent of the contamination.

Groundwater Well Installation: Installation of three (3) borings to thirty (30) feet, converted to two inch monitoring wells.				
Personnel	**Description of work**	**Units**	**Rate**	**Cost**
Project Manager	Scheduling/Coordination	6	105.00	630.00
Staff Engineer/Geologist	Field prep./Permit/Fieldwork	16	75.00	1,200.00
Total Labor				1,830.00
Equipment Rental/Supplies	**Units**			
Gas Monitor (PID)	day	1	100.00	100.00
Truck	day	1	60.00	60.00
Drums	each	6	40.00	240.00
Misc. Field Items	day	1	25.00	25.00
Total Equipment				425.00
Subcontractor	**Units**			
Driller Mobilization	hour	4	100.00	400.00
Driller	feet	90	34.00	3,060.00
Analytical (EPA 8015)	each	15	65.00	975.00
Analytical (EPA 8260 w/oxygenates)	each	15	150.00	2,250.00
Markup		6,685	0.15	1,002.75
Total Subcontractor				7,687.75
Total Cost				**9,942.75**

Groundwater Well Installation: Installation of six (6) borings to fifty (50) feet, converted to two inch monitoring wells.				
Personnel	**Description of work**	**Units**	**Rate**	**Cost**
Project Manager	Scheduling/Coordination	12	105.00	1,260.00
Staff Engineer/Geologist	Field prep./Permit/ Fieldwork	40	75.00	3,000.00
Total Labor				4,260 .00

Equipment Rental/Supplies	**Units**			
Gas Monitor (PID)	day	4	100.00	400.00
Truck	day	4	60.00	240.00
Visqueen	roll	1	75.00	75.00
Misc. Field Items	day	4	25.00	100.00
Total Equipment				815.00
Subcontractor	**Units**			
Driller Mobilization	hour	4	100.00	400.00
Driller	feet	300	34.00	10,200.00
Analytical (EPA 8015)	each	36	65.00	2,340.00
Analytical (EPA 8260 w/oxygenates)	each	36	150.00	5,400.00
Markup		18,340	0.15	2,751.00
Total Subcontractor				21,091.00
Total Cost				**26,166.00**

Well Development:
After the installation of groundwater wells, they may need additional development. The following costs are what might be encountered for this activity.

Well Development				
Personnel	**Description of work**	**Units**	**Rate**	**Cost**
Project Manager	Scheduling/Coordination	1	105.00	105.00
Technician	Develop 3 wells at 30 feet	3	60.00	180.00
Technician	Develop 6 wells at 50 feet	6	60.00	360.00
Equipment Rental/Supplies	**Units**			
Water Level Indicator	day	1	25.00	25.00
Truck	day	1	60.00	60.00
drums	each	3/6	40.00	120/240
Misc. Field Items	day	1	25.00	25.00
Total Equipment				230/350
Subcontractor	**Units**			
Driller	hour	3/6	110.00	330/660
Markup		330/660	0.15	49.50/99
Total Subcontractor				379.50/759
Total Cost/3 wells at 30 feet				**894.50**
Total Cost/6 wells at 50 feet				**1,574.00**

Pilot Tests:
Various pilot tests may be needed to investigate and characterize the site or to plan remedial alternatives. The following tests are commonly performed:

Vapor Test (8 hour)				
Personnel	**Description of work**	**Units**	**Rate**	**Cost**
Project Manager	Scheduling/Coordination	2	105.00	210.00
Staff Engineer/Geologist	Perform test/data analysis	12	75.00	900.00
Technician	Set-up & operation/vapor sampling	16	60.00	960.00
Total Labor				2,070.00
Equipment Rental/Supplies	**Units**			
Gas Monitor (PID)	day	1	100.00	100.00
Truck	day	2	60.00	120.00
VES Trailer (fully equipped)	each	1	500.00	500.00
Misc. Field Items	day	2	25.00	50.00
Total Equipment				770.00
Subcontractor	**Units**			
Analytical (BTEX/MTBE)	each	4	115.00	460.00
Markup		460	0.15	69.00
Total Subcontractor				529.00
Total Cost				**3,369.00**

Pump Test (48 hour)				
Personnel	**Description of work**	**Units**	**Rate**	**Cost**
Project Manager	Scheduling/Coordination	8	105.00	840.00
Project/Associate Engineer/Geologist	Test coordination/Data Analysis	24	90.00	2,160.00
Technician	Set-up and run test/wastewater mgmt.	60	60.00	3,600.00
Total Labor				6,600.00
Equipment Rental/Supplies	**Units**			
Pump (submersible)	week	1	175.00	175.00
Generator	week	1	150.00	150.00
Truck	day	4	60.00	240.00
Storage Tank (21,000 gal)	month	1	840.00	840.00
Datalogger /transducers (8)	each	1	1975.00	1975.00
Misc. Field Items	day	4	25.00	100.00
Total Equipment				3,480.00
Total Cost				**10,080.00**

Project Costs

Free Product Removal

Free product is often found in wells on significantly contaminated sites. The removal of free product may be conducted by several methods. A dedicated free product removal device may be installed in the wells to continuously remove free product (see Equipment (Small), page 16, for skimmers / separators). Most of these types of systems require very little maintenance, but do require periodic emptying. The amount of time and frequency of site visits is based upon the severity of the free product problem and the capabilities of the device used.

A technician is normally used to empty and record free product levels or amounts. A technician may also perform manual free product removal from a well utilizing a bailer. The amount of time this takes will be dependent upon the number of wells and the amount of the free product.

Caution must be used when considering extensive and regular manual free product removal episodes. The cost of removing free product manually can quickly exceed the purchase, operation, and maintenance costs of a dedicated free product removal system. The Fund expects the most cost-effective alternative to be followed.

Free Product Removal: up to six (6) wells				
Activity	**Description of work**	**Units**	**Rate**	**Cost**
Empty and record level in skimmer	Technician (hour)	4	60.00	240.00
	Oil/Water Interface Probe (day)	1	40.00	40.00
	Truck (day)	1	60.00	60.00
	Misc. Field Supplies	1	25.00	25.00
	Total (event)			**365.00**
Manual removal of free product	Technician (hour)	6	60.00	360.00
	Oil/Water Interface Probe (day)	1	40.00	40.00
	Bailer	1	20.00	20.00
	Misc. Field Supplies	1	25.00	25.00
	Truck (day)	1	60.00	60.00
	Total (event)			**505.00**

Project Costs

Groundwater Monitoring Events

The costs the Fund would typically expect to see for a quarterly or bi-annual groundwater monitoring event are shown below.

Groundwater Monitoring Event: three (3) wells at thirty (30) feet.				
Personnel	**Description of work**	**Units**	**Rate**	**Cost**
Project Manager	Scheduling/Coordination	1	105.00	105.00
Technician	Field prep./Fieldwork	8	60.00	480.00
Total Labor				585.00
Equipment Rental/Supplies	**Units**			
Pump	day	1	15.00	15.00
Truck	day	1	60.00	60.00
Drums	each	3	40.00	120.00
PH/Conductivity/Temperature Meter	day	1	40.00	40.00
Water Level Indicator	day	1	25.00	25.00
Bailers	each	3	8.00	24.00
Misc. Field Items	day	1	25.00	25.00
Total Equipment				309.00
Subcontractor	**Units**			
Analytical (EPA 8015)	each	4	65.00	260.00
Analytical (EPA 8260 w/oxygenates)	each	4	150.00	600.00
Markup		860	0.15	129.00
Total Subcontractor				989.00
Total Cost				**1,883.00**

Groundwater Monitoring Event: six (6) wells at fifty (50) feet.				
Personnel	**Description of work**	**Units**	**Rate**	**Cost**
Project Manager	Scheduling/Coordination	2	105.00	210.00
Staff Engineer/Geologist	Field prep./Fieldwork	10	75.00	750.00
Technician	Field prep./Fieldwork	10	60.00	600.00
Total Labor				1560.00
Equipment Rental/Supplies	**Units**			
Pump	day	1	15.00	15.00
Truck	day	1	60.00	60.00
Drums	each	6	40.00	240.00
PH/Conductivity/Temperature Meter	day	1	40.00	40.00
Water Level Indicator	day	1	25.00	25.00
Bailers	each	6	8.00	48.00
Misc. Field Items	day	1	25.00	25.00
Total Equipment				453.00

Subcontractor	**Units**			
Analytical (EPA 8015)	each	7	65.00	455.00
Analytical (EPA 8260 w/oxygenates)	each	7	150.00	1,050.00
Markup		1,505	0.15	225.75
Total Subcontractor				1,730.75
Total Cost				**3,743.75**

Project Costs

Report Preparation

Throughout the process of investigation and remediation of a release from an underground storage tank, many reports will be prepared and submitted to the different regulating agencies. Basic reports that will be required on most sites include Site Investigation Reports and Periodic/Quarterly Activity Reports. **The signature and seal of a registered engineer/geologist is required on all reports.**

Certain sections of some reports may be excerpted from other reports with little or no modification (e.g., sampling protocol followed for drilling or groundwater sampling, health and safety protocols followed, QA/QC procedures, etc.).

Periodic Groundwater Monitoring Report:
The most common report that is required on sites where groundwater has been impacted is the Quarterly Groundwater Monitoring Report. A Quarterly Monitoring Report is normally submitted each quarter (every three months) to the regulating agency and/or the Regional Water Quality Control Board (RWQCB). Other reporting schedules include semi-annual (twice a year) or annual (once a year) and are similar to the quarterly reports.

Most regulatory agencies require a certain amount of detail in these reports. A large amount of this detail is duplicated from report to report. The location, geology, hydrogeology, sampling protocols should not change significantly. The tables and maps need to be updated if they include new data, but no major changes are normally needed. The appendices of the document may be from other sources (e.g., sample results from the laboratory) or duplicates (e.g., standard sampling protocol followed).

The following is an example of what the Fund expects to see in a typical quarterly monitoring report:

Graphic Presentation

Include site maps (plot plans) that are drawn to a scale that remains consistent from one reporting period to the next. The maps shall include:

a) Potential contaminant sources
b) Well locations
c) Groundwater elevation contours
d) Groundwater flow direction(s)
e) Extent of phase separated product
f) Extent of dissolved chemical constituents
g) A North arrow

Selected analytical results should be included on the plot plan. The use of line or bar graphs

are helpful to illustrate variations in groundwater elevations, product thickness, and dissolved chemical concentrations with time. New cross sections are recommended if the previous interpretation of subsurface conditions have changed.

Tabular Presentation

All the following data should be presented in table(s) to show a chronological history and allow quick and easy reference.

a) Well designations
b) Well construction, including: well casing elevation, total casing and screen depth, and depth to top of screen
c) Groundwater depth
d) Groundwater elevation
e) Phase separated product elevation
f) Phase separated product thickness
g) Purge volumes
h) Analytical results
i) Measurement dates

Discussion

Present a discussion of the field and laboratory results including:

a) Conclusions
b) Data anomalies
c) Variations from protocols
d) Conditions of wells including vaults and seals
e) Management of drill cuttings and purge water
f) Data interpretations
g) Recommendations

Appendices

The following should be included as appendices:

a) Complete analytical laboratory reports
b) Well purging and sampling documentation, including: equipment used, date and time, and on-site water quality measurements
c) Decontamination procedures
d) Field quality assurance/quality control methods
e) Sample preservation
f) Documentation of: product volume recovered/disposed, disposal of well development purge water, disposal of drill cuttings (documentation should include either a copy of the hazardous waste manifest and/or bill of lading)

The following are costs the Fund would typically expect to see associated with preparation of a Quarterly Groundwater Monitoring Report:

Periodic Groundwater Monitoring Report: Three (3) wells, no other activity conducted.				
Personnel	**Description of work**	**Units**	**Rate**	**Cost**
Principal Engineer/Geologist	Review and signature	2	125.00	250.00
Project/Associate Engineer/Geologist	Project management, report preparation and review	6	90.00	540.00
Staff Engineer/Geologist	Report preparation	8	75.00	600.00
Drafts Person	Prepare report figures	4	55.00	220.00
Clerical	Typing/reproduction/mailing	4	45.00	180.00
Total Cost				**1,790.00**
Once an initial report is prepared for a site, the subsequent reports should take less effort to prepare.				

Periodic Groundwater Monitoring Report: Six (6) wells, no other activity conducted.				
Personnel	**Description of work**	**Units**	**Rate**	**Cost**
Principal Engineer/Geologist	Review and signature	2	125.00	250.00
Project/Associate Engineer/Geologist	Project management, report preparation and review	8	90.00	720.00
Staff Engineer/Geologist	Report preparation	12	75.00	900.00
Drafts Person	Prepare report figures	4	55.00	220.00
Clerical	Typing/reproduction/mailing	4	45.00	180.00
Total Cost				**2,270.00**
Once an initial report is prepared for a site, the subsequent reports should take less effort to prepare.				

Periodic Update Report:
A Periodic Update Report is often supplied to the regulatory agency to report regular monitoring, remediation equipment operation and efficiency evaluation, recommendations for further assessment, recommendations for closure, and other information of interest to the regulatory agency. The periodic report should cover all activities and occurrences at the site since the last reporting episode.

The following are typical costs the Fund would expect to see associated with preparation of Periodic Update Reports.

Periodic Update Report: Significant activities conducted.				
Personnel	**Description of work**	**Units**	**Rate**	**Cost**
Principal Engineer/Geologist	Review and signature	1	125.00	125.00
Project/Associate Engineer/Geologist	Project management, report preparation and review	4	90.00	360.00
Drafts Person	Prepare report figures	1	55.00	55.00
Clerical	Typing/reproduction/mailing	1	45.00	45.00
Total Cost				**585.00**

Although no activity may have taken place, a Periodic Update Report may still be required. If this is the case, a one-page letter to the regulatory agency will normally suffice. The costs below are the maximum the Fund would expect to see for this type of activity.

Periodic Update Report: No activities conducted during reporting period.				
Personnel	**Description of work**	**Units**	**Rate**	**Cost**
Project/Associate Engineer/Geologist	Project management, report preparation and review	1	90.00	90.00
Clerical	Typing/reproduction/mailing	1	45.00	45.00
Total Cost				**135.00**

Site Investigation Reports:
Most site investigation reports are detailed regarding the site and the activities that took place. If more than one investigation report is prepared, (this happens often when two separate and distinct investigative activities take place) much of the detail in the report can be duplicated.

The following is an example of what the Fund expects to see in a typical site investigation report:

Section	**Content**
Site Identification	address, name, business, regulatory agency identification number, owner, operator, responsible party, contact person and location
Site History	historical and current site and adjacent property use
Release Description	substance, characteristics, quantity, location(s), and how and when occurred and abated
Site Plot Plan	drawn to scale, north arrow, streets, structures, utilities, excavation and stockpile locations, tank and piping (past, existing, proposed), well, boring and samples, legend and abbreviations.
Geology	Regional, site, topography
Hydrogeology	surface drainage, adjacent and water bodies, basin plan, hydrographic unit and sub-unit, groundwater elevations and gradient, migration patterns, sources of information
Contamination Delineation	summary of analytical data with locations, analysis, and results, maps and cross sections showing extent of contamination, potential sources, pathways, boring locations, lithology, water table, groundwater contours, environmental parameters, man-made features, and estimated volume and mass of contaminated media.
Exposure Concerns	migration and natural pathways (air, soil, surface water, bedrock fractures, groundwater, etc.), man-made pathways (conduits, utilities, vaults, piping, storm drains, etc.), impacts on biological receptors (people, plants, animals), potential nuisance and water wells
Sampling	protocol, methods, preservation and transport, analysis, chain-of-custody, matrix, lab reports and quality assurance/quality control
Waste Management	volume, location, methods to prevent run-off or public access, disposal methods, copies of manifests

Site Safety	safety and security description, community health and safety, monitoring equipment, protective equipment, public agency notification and utility notifications
Summary	conclusions and recommendations, horizontal and vertical extent of contamination, additional assessment recommendations and mitigation alternatives.
Appendix	well boring logs, manifests, permits, lab data sheets, chain-of-custody forms
Signature and Registration Seal	signatures of preparers, signatures and seal of registered professionals in responsible charge of site activities, and authorized signature of company preparing report

As can be seen above, certain standard items vary little from report to report. Reports from different sites may also have similarities. The Fund expects to reimburse for new and original work, not repeated information.

The amount of effort by various staff may vary slightly for different types of activities, but the end cost should be roughly the same. The typical cost the Fund would expect to see for a normal report regarding site assessment activities is shown below.

Site Assessment Report: six(6) borings to thirty (30) feet, three (3) converted to monitoring wells				
Personnel	**Description of work**	**Units**	**Rate**	**Cost**
Principal Engineer/Geologist	Review and signature	4	125.00	500.00
Senior Engineer/Geologist	Data evaluation/conclusions & recommendations/review	8	105.00	840.00
Project/Associate Engineer/Geologist	Regulatory liaison and report preparation	16	90.00	1,440.00
Staff Engineer/Geologist	Revise Site Conceptual Model/report preparation	16	75.00	1,200.00
Drafts Person	Prepare site & sampling location maps	8	55.00	440.00
Clerical	Typing/reproduction/mailing	8	45.00	360.00
Total Cost				**4,780.00**

Project Costs

Corrective Action Plan Preparation

Section 2811(a)(5) of the Fund Regulations specifies that corrective action costs incurred after December 2, 1991 are reimbursable only if the work was done in compliance with applicable corrective action requirements "including the implementing regulations in Article 11, Chapter 16, Division 3, Title 23, California Code of Regulations". The requirement for preparation of a Corrective Action Plan (CAP) before initiating corrective action is a part of the Article 11.

The preparation of a CAP that adequately evaluates the appropriate remediation technology alternatives is a critical step in the corrective action process. The CAP is conducted after the implementation of the preliminary site assessment and soil and water investigation phases and after the regulatory agency has concurred that the lateral and vertical extent of contamination have been adequately assessed. The CAP, if developed properly, can effectively incorporate all past regional and site-specific data and identify the most feasible and cost-effective remediation method.

The level of effort and detail necessary for each CAP will vary depending upon the site conditions, the contamination, and the requirements of the regulatory agencies. For example: a site with minimal contamination that is well defined and does not extend far below the surface may be remediated with a minimal CAP, while a site with extensive groundwater contamination from multiple sources to a greater depth may need a more extensive CAP. It is important to be sure that your proposals and the level of detail that will be required in the CAP are in accordance with the requirements of the regulator.

The regulations in Article 11 are explicit about what the minimum requirements are for a CAP. Different regulatory agencies may have additional requirements, or clarifications on what they expect a CAP to include. The following is an example what the Fund expects to see in a typical CAP that meets the requirements from Article 11 of the Underground Storage Tank Regulations:

Assessment of the impacts: A CAP is based upon an adequate assessment of the impacts. If a CAP is requested before assessment is completed, then the completion of the site assessment will be part of the CAP. At a minimum it includes:

a) Hydrogeologic characteristics of the site
   1) Indicate current and potential beneficial uses of the ground and surface waters
   2) Tabulate existing groundwater data, including existing well gauging data and construction details
   3) A narrative description of the topographic characteristics in the vicinity of the site
   4) A map illustrating #3) above and location of groundwater supply wells in vicinity
   5) Narrative description of the lithology of the site
   6) Cross section of the lithologies present at the site
   7) Map(s) illustrating groundwater flow direction and gradient

8) Discussion of the groundwater data in regional context, considering regional climatic cycles

b) Contaminant characteristics
   1) Identify the contaminants of concern at the site, tabulate existing contamination data, and provide analysis of trends in contaminant concentrations
   2) Narrative description of the chemical and physical characteristics of the contaminants, discuss toxicity, persistence, and potential migration
   3) Impacts of the contaminant at the site to the soil, groundwater, surface water and air. Impacts to utilities. Provide maps and cross sections of contaminant plumes.
   4) Description of the potential impacts of the contamination at the site. Prior to initiating a Fate and Transport study, contact the regulator.

Determination of applicable cleanup levels: Cleanup levels for groundwater surface water, and soil are performance standards to be considered when completing a feasibility study. Strategies considered must be technically capable of reaching the established level. Regulatory agency approval must be obtained for any target level prior to implementing corrective action.

Feasibility Study and Workplan: In areas designated as beneficial use, or where the waters are being used, the feasibility study must evaluate the appropriateness and cost-effectiveness of at least two alternatives. Where no designated or current or potential beneficial uses have been designated, at least one alternative must be considered. **The Feasibility Study should only consider alternatives capable of achieving the target cleanup levels established and must include evaluation of the most cost effective alternatives available based on existing technology**. At a minimum, the feasibility study should include:

a) A description of each proposed corrective action strategy.
b) A justification for the selection of each corrective action strategy as an appropriate method to restore or protect existing or potential beneficial uses and to protect human health.
c) An estimate of the time required to complete remediation for each corrective action strategy.
d) A comparative analysis of the total costs of each corrective action strategy, presented in terms of starting and operating costs.
e) A selection of the most cost-effective strategy and the preparation of a detailed workplan describing the specific tasks to be performed during implementation of the selected remediation alternative.

Monitoring and Reporting of CAP Effectiveness: The responsible party must propose a strategy for monitoring and evaluating the effectiveness of the corrective action. The strategy should describe the key indicators and the monitoring methods to be used in evaluating the effectiveness of the work. and describe the criteria to be used in determining when site cleanup is complete, or when the corrective action has become ineffective. The responsible party should propose a schedule for reporting, in writing, the monitoring data and an evaluation of the results of such monitoring. Regulatory agency approval must be obtained prior to implementing corrective action. The monitoring requirements may be modified with the concurrence of the regulatory agency.

The following common costs are for a complete CAP covering soil and groundwater contamination. These costs include regulatory liaisons, project management and revisions to the Site Conceptual Model.

Corrective Action Plan Preparation: Basic site with moderate groundwater and soil contamination.				
Personnel	**Description of work**	**Units**	**Rate**	**Cost**
Principal Engineer/Geologist	Review and signature	4	125.00	500.00
Senior Engineer/Geologist	Review and signature	12	105.00	1,260.00
Project/Associate Engineer/Geologist	Regulatory liaison, project management and plan preparation	20	90.00	1,800.00
Staff Engineer/Geologist	Revise Site Concept. Model/Plan prep.	20	75.00	1,500.00
Drafts Person	Prepare site & sampling location maps	12	55.00	660.00
Clerical	Typing/reproduction/mailing	8	45.00	360.00
Total Cost				**6,080.00**

Corrective Action Plan Preparation: Complicated site with extensive groundwater and soil contamination, difficult hydrogeology and multiple contaminants.				
Personnel	**Description of work**	**Units**	**Rate**	**Cost**
Principal Engineer/Geologist	Review and signature	6	125.00	750.00
Senior Engineer/Geologist	Review and signature	12	105.00	1,260.00
Project/Associate Engineer/Geologist	Regulatory liaison, project management and plan preparation	32	90.00	2,880.00
Staff Engineer/Geologist	Revise Site Concept. Model/Plan prep.	32	75.00	2,400.00
Drafts Person	Prepare site & sampling location maps	16	55.00	880.00
Clerical	Typing/reproduction/mailing	12	45.00	540.00
Total Cost				**8,710.00**

The actual costs will vary significantly depending upon site conditions and regulatory agency requirements.

The completed and approved CAP should be used as a basis for obtaining three bids for the remediation phase of the site cleanup (see Three-Bid Requirement, page 75).

Project Costs

Remedial Action Plan Preparation

A Remedial Action Plan (RAP) is developed if the workplan included in the CAP requires additional design specification to allow the regulators to fully approve the chosen remedial alternative. A RAP completes the design of the chosen remedial alternative for approval by the regulatory agency. In some cases the "Remediation Workplan" or RAP may be part of the Corrective Action Plan. Most agencies do not require a RAP in addition to the CAP.

The following is an example of what the Fund expects to see in a typical RAP.

a) Site Identification
   1) Complete site address and phone number
   2) Name and type of business or description of current site use
   3) Assessor's Parcel Number (APN)
   4) Property owner's name, mailing address, and phone number
   5) Responsible Parties name, mailing address, and phone number
   6) Consultant's name, address, and phone number
   7) Contact person's name, mailing address and phone number (if different from above)
   8) Regulatory agency case number
   9) EPA identification/generator number

b) Summary of Site Assessment
   1) A brief description of the site assessment including: type of contamination matrix (e.g., soil, sludge, groundwater), table of laboratory data, cross sections (showing: vertical extent of contamination, sample locations, contaminant concentrations, water table elevation, lithology, location of tanks, piping, dispensers, and other possible sources), map (showing: the horizontal extent of contamination, sample locations, contaminant concentrations, gradient, location of tanks and dispensers, etc.), maximum and average concentration of contaminants, estimated volume of contamination to be treated, estimated volume of matrix to be treated.
   2) Description of past, present, and future property uses
   3) Map showing adjacent land use(s) (e.g., residential, commercial, etc.) drawn to scale
   4) Vicinity map showing schools, hospitals, and any other sensitive locations within a one-mile radius of the site
   5) Location and use of all known water wells on the site and within a 1,000 foot radius of the site

c) Treatment System
   1) Statement of qualifications of treatment system designed including past experience(s) using the proposed system on similar contaminants and matrices
   2) Treatment system design, type of equipment and operation specifications

3) Treatment system flow chart and logic control flow diagram
4) Plot plan showing location and arrangement of treatment system on the site
5) Proposed treatment project schedule (time-line)
6) Description of monitoring method to be used to measure treatment system effectiveness during operation, and frequency of system checks
7) Hours of operation
8) Sound and noise attenuation, if necessary
9) Plot plan showing the contamination distribution prior to initiation of the treatment system process

d) Community Health and Safety Plan

e) List of Agencies Which May Require Permits or Notifications
1) Local Department of Environmental Health (DEH)
2) Regional Water Quality Control Board (RWQCB)
3) Local Air Pollution Control District (APCD)
4) California Environmental Protection Agency (Cal-EPA)
5) California Occupational Safety and Health Administration (Cal-OSHA)
6) Fire Department
7) Sanitary District
8) Building/Planning Departments

f) Verification Sampling Plan

Many of the items listed above were prepared for the CAP. The only difference is the completion of the system design. The costs shown below are what the Fund would expect to see for a RAP, if the regulatory agency requires it.

Remedial Action Plan Preparation: Basic site with moderate groundwater and soil contamination.				
Personnel	**Description of work**	**Units**	**Rate**	**Cost**
Principal Engineer/Geologist	Review and signature	4	125.00	500.00
Senior Engineer/Geologist	Remedial design, review and signature	8	105.00	840.00
Project/Associate Engineer/Geologist	Regulatory liaison, project management and plan preparation	12	90.00	1,080.00
Staff Engineer/Geologist	Plan preparation	12	75.00	900.00
Drafts Person	Prepare figures and design drawings	8	55.00	440.00
Clerical	Typing/reproduction/mailing	8	45.00	360.00
Total Cost				**4,120.00**

Remedial Action Plan Preparation: Complicated site with extensive groundwater and soil contamination, difficult hydrogeology and multiple contaminants.				
Personnel	**Description of work**	**Units**	**Rate**	**Cost**
Principal Engineer/Geologist	Review and signature	4	125.00	500.00
Senior Engineer/Geologist	Remedial design, review and signature	16	105.00	1,680.00
Project/Associate Engineer/Geologist	Regulatory liaison, project management and plan preparation	24	90.00	2,160.00
Staff Engineer/Geologist	Plan preparation	16	75.00	1,200.00
Drafts Person	Prepare figures and design drawings	12	55.00	660.00
Clerical	Typing/reproduction/mailing	8	45.00	360.00
Total Cost				**6,560.00**

The Fund recommends that claimants seek pre-approval before preparing a RAP. This can take place as part of the pre-approval of general corrective action costs.

Project Costs

Passive Bioremediation

Utilization of passive bioremediation, also called natural attenuation or intrinsic bioremediation, is often a viable remediation alternative where the risk of exposure to contaminants is within acceptable limits. This method of remediation takes advantage of naturally occurring, subsurface microorganisms that use the petroleum hydrocarbons as a food source to metabolize and degrade it into carbon dioxide and water. This effectively neutralizes any health, safety, or environmental threat of the contamination.

Since this is a naturally occurring phenomenon, it requires little active or costly remedial actions other than monitoring the natural processes. It is important to show that bioremediation is actually occurring. There are three primary methods to quantify the extent of passive bioremediation: compound disappearance, reduction of oxygen, nitrate, and sulfate concentrations relative to background concentrations, and degradation byproducts such as increases carbon dioxide. A risk assessment may be needed to show that the plume will not create a hazard to human health, safety, or the environment during passive bioremediation.

At this point the actual costs of monitoring passive bioremediation are highly variable. In many cases periodic groundwater monitoring will be required (see Groundwater Monitoring Events, page 35). Monitoring is relatively simple and can be achieved using conventional and cost effective methods. Depending upon the monitoring and verification requirements of the regulatory agency, costs will vary significantly.

Contact Fund staff for pre-approval of costs and eligibility consideration before initiating passive bioremediation.

Project Costs

Groundwater Treatment System

Some of the more common methods of groundwater remediation for petroleum underground storage tank releases are shown below. An approved CAP must be prepared describing the chosen method. The CAP is used as the basis to solicit multiple bids from consultants and contractors.

Specific pieces of equipment used in these methodologies are often expensive and the purchase of this equipment is covered under the Rental/Purchase of Equipment, page 70. The costs of the design for the systems may be found in the preparation of the CAP or the RAP depending upon agency requirements. Installation costs of the equipment will depend upon the site, the equipment being installed, and the requirement of the regulating agencies. **Because costs vary widely depending upon specific site conditions, please contact the Fund for pre-approval of these costs before incurring them.**

In Situ Air Sparging with Soil Vapor Extraction	Air is injected into the saturated zone. The air forms bubbles that rise into the unsaturated zone, carrying trapped and dissolved contaminants. Extraction wells in the unsaturated zone capture the sparged air. If necessary, the air can be treated using a variety of vapor treatment options.
In Situ Bioremediation:	Removes biodegradable contaminants from groundwater. Relies upon microorganisms and supplemental oxygen and nutrients to break down petroleum products in the groundwater.
In Situ Bioventing with Low Flow Air Sparging	Also known as biosparging. Stimulates the aerobic biodegradation of organic contaminants in groundwater by delivering oxygen to the saturated and unsaturated zones. The oxygen is delivered at a slow rate to encourage biodegradation rather than volatilization. Reduces air emissions and remediates the volatile organic compounds in place.
Vacuum Enhanced Pump and Treat:	Uses a surface-mounted vacuum pump to remove contaminated soil vapors and groundwater at the same time. Increases the rate of pumping, reducing the remediation time. The pumped water and soil vapors can be treated with various techniques.
Pump and Treat:	Brings contaminated groundwater above the ground though the use of extraction wells. The water is then treated, normally using one of three processes: Granular activated carbon, air stripping, or bioremediation. May be used in conjunction with soil vapor extraction to enhance the removal of volatile organic compounds from the zone of water table fluctuation. **Costs:** Vary widely depending upon site specifics, contact Fund staff for pre-approval.
Other Technologies:	These will be dealt with on a case-by-case basis. Costs vary widely depending upon site specifics, contact Fund staff for pre-approval

Project Costs

Operation and Maintenance of Remedial Systems

Costs of operation and maintenance (O&M) of groundwater and soil remediation equipment will vary depending upon the local permit requirements, the type of equipment being used, and the local conditions. The costs shown below are for typical systems. An actual description of the number of hours and the costs incurred in O&M is required. This means a log of the hours spent by technicians working on the system, a description of the parts used, and an explanation of any unusual charges is required.

The cost of operation depends upon the type of fuel being used. A catalytic oxidizer may use electricity. An internal combustion unit (ICU) may run off gasoline, natural gas or propane. The choice of fuel should be based upon availability and cost effectiveness. The cost of O&M is part of the necessary considerations when choosing a cost effective remediation alternative. It is not unusual for a system and the type of fuel it uses, to change during the operation (e.g., exchanging the ICU for a catalytic oxidizer when the contaminant level drops). The utility charges for the operation of the system must be readily identifiable if they are to be reimbursed. A dedicated line, storage, and/or meter may be needed. The fuel should be billed directly to the claimant to avoid unnecessary markup, billing, and confusion.

Different systems will require different types of sampling from the Air Pollution Control District (APCD), Regional Water Quality Control Board (RWQCB), or City or County Environmental Health Services (EHS). Copies of the regulatory agency's requirements are part of the necessary supporting information. Normally, the sampling will be daily or weekly during a startup period, decreasing to, at most, monthly sampling when the system is in operation. For a system that is in operation over a long period of time, quarterly sampling may be appropriate. Annual review of sampling periods and constituents is recommended.

System efficiency evaluations are performed at regular intervals to ensure the system is operating efficiently and effectively. These are used to determine if the system should continue operation, needs to be modified, or terminated.

The examples of labor, supplies, and analytical costs that follow are for systems with one (1) extraction well and three (3) observation wells. Site visits are weekly with reporting quarterly (during the normal quarterly monitoring events). The systems are in full operation with a once per month sampling cycle.

The following is an example of costs for monthly operation of a soil vapor and groundwater extraction system.

System Operation and Maintenance:				
Consulting Costs				
Labor	**Description of work**	**Units**	**Rate**	**Cost**
Technician (1/04/01)	Regular field maintenance/log	4	60.00	240.00
Technician (1/11/01)	Regular field maintenance/log	4	60.00	240.00
Technician (1/18/01)	Regular field maintenance/log	4	60.00	240.00
Technician 1/25/01)	Replace vacuum gauge/oil change/ Regular field maintenance/log	4	60.00	240.00
Equipment	**Description**			
Truck (1/04/01)	Office to site/back	60	0.50	30.00
Truck (1/11/01)	Office to site/back	60	0.50	30.00
Truck (1/18/01)	Office to site/back	60	0.50	30.00
Truck 1/25/01)	Office to site/back	60	0.50	30.00
Total Consulting Costs				**1,080.00**
Supplies				
Vacuum gauge, replace		1	21.55	21.55
Markup		21.55	0.15	3.23
Oil & filter (4 qt. 10-40)		1	25.00	25.00
Total Supplies Cost				**49.78**
Analytical				
EPA 8015/8020 (air)		3	115	345.00
EPA 8260 w/oxygenates (water)		3	150	450.00
Markup		795	0.15	119.25
Total Analytical Cost				**914.25**
Total Cost/Month				**2,044.03**

The costs of replacement parts and supplies should be billed as they are needed and used. Below are the costs for some common remedial supplies that are needed to continue system operation.

Operations and Maintenance Supplies	
Replacement Granular Activated Carbon (GAC) (Liquid Phase) per pound	1.50
Replacement Granular Activated Carbon (GAC) (Vapor Phase) per pound	1.50
Miscellaneous Repair Parts	At Cost

Project Costs

Soil Excavation

Many excavation contractors bill on a time and materials basis because site conditions change the actual costs. These tables should be used for general evaluation of excavation costs only. Site conditions change the actual costs; complete and full justification and hourly breakdown are needed for all sites. Rates for some of the basic equipment used in this type of activity can be found in Equipment (Heavy), page 17.

Excessive soil excavation as part of interim remedial action can lead to unnecessary and unreasonable costs if it is used to bypass investigation and CAP implementation. For example, excessive interim remedial actions may occur immediately after the underground storage tank removal. Normal interim excavation involves the removal of obviously contaminated soil. However, the Fund has seen over excavation involve thousands of cubic yards of soil. Without proper sampling, characterization, regulatory directives, workplans, and consideration for cost effectiveness this may result in unreasonable costs. A clear delineation needs to be made between interim remedial action and the full-scale remedial action. The Fund will only reimburse for the most cost-effective remedial action. **No more than 500 cubic yards of contaminated soil should be removed during an interim remedial action without contacting and receiving approval from the Fund.**

Segregation of clean and contaminated soil, and stockpile characterization are very important. The Fund will not reimburse costs for remediation of non-contaminated soil.

Site Preparation/Replacement			
Activity	**Unit**	**2" Asphalt**	**6" Concrete**
Remove pavement	Ft^2	1.50	2.50
Replace pavement	Ft^2	2.50	3.00

Excavate and segregate overburden and contaminated soil	
Activity	**Cost/unit**
Excavate	8.00/ton (12.00 yd^3)
Replacement Material (including compaction)	12.00/ton (18.00 yd^3)

Stockpiles are typically characterized using EPA methods 8015/8020. The costs for these types of tests can be found in Analytical, page 11. The example shown below is one agency's requirements for stockpile characterization.

Stockpile Characterization: Different regulatory agencies have different requirements regarding the adequate characterization of stockpiles. The Fund recommends that you check with your regulatory agency for their stockpile requirements.	
Stockpile Size	**Minimum Number of Samples**
Less than 10 Yd^3	2
10 to 20 Yd^3	3
20 to 100 Yd^3	4
100 to 500 Yd^3	1 sample for each 25 Yd^3
Over 500 Yd^3	may vary depending upon requirements
Containerized Soil	similar to above, may vary due to agency requirements and site specifics

Shoring costs may be incurred during the excavation of contaminated soil. As a part of an eligible excavation, shoring costs may be reimbursable. Shoring costs vary widely depending upon site conditions. The cost of the shoring must have been considered in the CAP, as part of the selection of excavation as the most cost effective remediation method. Shoring costs will be considered on a case by case basis.

An example of excavation costs is shown below. The following assumes an excavation volume of 500 cubic yards.

Consulting Excavation Cost:			
Labor	**Units**	**Rate**	**Cost**
Staff Engineer/Geologist	20	75.00	1,500.00
Total Labor Cost			1,500.00
Equipment Rental/Supplies			
Gas Monitor (PID)	2	100.00	200.00
Truck	120	.50	60.00
Misc. Field Items	2	25.00	50.00
Total Equipment Cost			310.00
Analytical			
EPA 8015/8020	20	65.00	1,300.00
Markup	1,300	0.15	195.00
Total Analytical			1,495.00
Total Consultant Cost			**3,305.00**

The excavating contractor should bill the claimant directly to avoid unnecessary markup. Actual invoices detailing activities will be required as part of the basic supporting documentation

Excavation Contractor Cost:			
Activity	**Units**	**Rate**	**Cost**
Excavation	500	12.00	6,000.00
Backfill and Compaction	500	18.00	9,000.00
Total Contractor Cost			**15,000.00**

Project Costs

Waste Transportation and Disposal

The guidelines below are for loading and hauling various contaminated wastes. The costs do not include disposal unless otherwise noted. Contact the Fund staff for pre-approval of these costs before incurring them.

Contaminated Soil:
Loading and hauling costs may be billed based upon cubic yards, tonnage, or hourly breakdown of costs. The end result should be approximately the same. The distance traveled is normally the biggest factor in the cost of transportation. Many disposal facilities will provide/arrange trucking at a cost-effective rate for transporting the soil to their facility. This may produce a lower overall cost for transportation and disposal. Rates vary depending upon the amount of material being moved.

Contaminated Soil:	Units	Rate
Load		5.00/ton (7.50 yd^3)
Load	hourly	see equipment (heavy), page 17
Transportation	hourly	see equipment (heavy), page 17
Disposal	Ton	see soil remediation, page 57

Contaminated Liquid:
Loading and transportation costs are normally billed by gallons or by the hour. The end result should be approximately the same. Many disposal facilities will provide trucking at a cost-effective rate for transporting the liquid to their facility. This may produce a lower overall cost for transportation and disposal. Rates vary depending upon the amount of material being moved. If a large amount is to be moved, other methods of disposal may be more cost effective. The Fund reimburses for the most cost-effective alternative. Many alternatives exist in performing these types of activities.

Contaminated Liquid:	Units	Rate
Load and Transport	gallon	0.75
Load and Transport	hourly	see equipment (heavy), page 17
Disposal	gallon	1.00

Containerized Waste:
Containerized wastes, usually stored in 55-gallon drums, are most often generated during drilling activities (for soil) and well sampling (purge water). Depending upon site conditions and contaminant level, disposal options may vary. If the soil contaminant level is negligible, it may be disposed of on-site, or aerated until it may be disposed of on-site. Depending upon the amount of contaminated material, it may be more cost effective to use the disposal methods described above (such as adding them to existing stockpiles). Many alternatives exist in performing these types of activities.

Containerized Waste:	**Units**	**Rate**
Load/Transport/Dispose - Soil	55 gallon drum	100.00
Load/Transport/Dispose - Water	55 gallon drum	100.00

Project Costs

Soil Remediation

Some of the more common methods of soil remediation for underground storage tank releases are shown below. The costs listed below are a general overall project cost (design, installation, operation, and destruction) and are shown for informational purposes only. **A CAP must be prepared including the evaluation of various remedial alternatives so that the most cost-effective alternative is selected**. The approved plan is used as the basis to solicit multiple bids from consultants and contractors. The Fund will only reimburse the costs of actual work conducted and will require the standard breakdown of all charges submitted for reimbursement.

Soil remediation can be broken down into on-site and off-site options. On-site refers to remediating the soil without removing it from the property where it originates. This should not be confused with in-situ that refers to remediating the soil without excavating. Off-site refers to removing the soil from the site and treating or disposing of it elsewhere at a treatment or disposal facility.

The Fund encourages the use of recycling technologies in remediating contaminated soils. Hydrocarbon contamination can be safely and effectively remediated and the soil reused without significant restrictions or hazards. **However, the reimbursement for remediation will be based upon the most cost-effective available option.**

The costs below are for guidance purposes only. The costs will change as regulations, business conditions, competition, availability, and negotiability change. Costs should be negotiated with each specific site, since great variability exists in this industry at this time. The actual invoices from the facilities must be supplied for reimbursement purposes. Units should be maintained in tons since cubic yards are subject to uncertain "fluff" factors, and bulk densities of the soils around the state vary significantly.

It is advisable to contact Fund staff for pre-approval of all soil remediation costs before they are incurred.

The costs associated with off-site remediation and disposal are the costs of treatment at the facility only and do not include the excavation, loading, and transportation costs required to move the contaminated soil from the site to the treatment facility (see Soil Excavation, page 52 and Waste Transportation, page 55). The costs include all "tipping" fees, weighing fees, manifest fees, etc.

On-Site Remediation:
Soil is treated in-situ (in place, without excavating) or ex-situ (with excavating) without leaving the site. This can often be a very cost effective alternative if enough contaminated material is present to warrant it, if space is available, and if trucking and disposal options are restrictive. In-situ treatment has encountered some difficulties in the past and it is recommended that the Fund be contacted before implementation of an in-situ remediation alternative.

Aeration, Land Farming	Contamination in the soil is allowed to naturally convert to a vapor state and disperse to the environment or a vapor treatment system. Permits may be required from the local Air Pollution Control District (APCD). May be used to reduce contaminant level to become acceptable to certain disposal facilities.
Bioremediation	Soil is bioremediated on-site and used as backfill on-site or disposed as clean fill. **Ex-situ:** Many companies have successfully remediated soil where the soil is excavated and the treatment is conducted above ground using bioremediation. **In-situ:** This is still considered an experimental and must be considered carefully for effectiveness and costs.
Thermal Desorption	Contaminants are thermally desorbed from soil in mobile rotary kiln and the vapors are burned in a flame burner or catalytic oxidizer.
Vapor Extraction	Contaminants are "vacuumed" from subsurface soils and vapors are treated using thermal oxidation, catalytic oxidation, internal combustion engine, or vapor-phase activated carbon.
Others	These will be evaluated on a case-by-case basis.

Off-site Remediation:
Soil is excavated and removed from the site and remediated at a facility, such as those described below

Off-site Remediation:		
Method	**Description**	**Cost/Unit**
Asphalt Recycling	Contaminated soil used as a substitute for sand aggregate in asphalt production	$55.00/ton
Thermal Desorption	Contamination is thermally desorbed from soil in a fixed facility rotary kiln and the vapors are burned in a flame burner	$55.00/ton
Bioremediation	Soil is bioremediated at a dedicated facility. Costs will vary depending upon the level of contamination found in the soil.	$45.00/ton

Off-site Disposal:
The excavated soil is trucked to a dedicated commercial facility for disposal. Different areas of the state have different facilities available. Check with your regulator to find what facilities are available in a given area. Be sure that facilities have current licenses and permits to accept the material being sent to them.

Off-site Disposal:		
Facility	**Description**	**Cost/Unit**
Class I Landfill (Hazardous)	Accepts 'hazardous' wastes, uncommon for Petroleum UST contamination	$150.00/ton
Class II Landfill (Designated)	Accepts designated wastes	$40 to $65/ton
Class III Landfill (Non-hazardous)	Municipal facilities can sometimes accept varying levels depending upon their specific design and permits. May use remediated soil as "cover" material at no cost.	$10 to $30/ton

Reimbursement for disposal costs will be made based upon the most cost-effective method available. If the disposal method chosen is not the most cost effective (disposal and transportation), the claimant will be responsible for the balance.

Project Costs

Cleanup Progress Reports

Most regulatory agencies require detailed corrective action reports about the site and the activities that take place. If more than one assessment report is prepared, such as when two separate and distinct cleanup activities take place, much of the detail in the report is duplicated. Certain sections of some reports may be excerpted from other reports with little to no modification (e.g., prior activities, sampling protocol followed for drilling or groundwater sampling, health and safety protocols followed, etc.). The location, geology, hydrogeology, and sampling protocols should not change significantly. The tables and maps need to be updated to include new data, but no major changes should be needed. The appendices of the document may be from other sources (e.g., sample results from the laboratory) or duplicates (e.g., standard sampling protocol followed). Although the amount of effort by various staff may vary slightly for different types of activities, the end cost should be roughly the same.

Remediation Systems:
The regulatory agency must be kept informed about the continued operation of any remediation system. Usually this will take the form of a standard quarterly report. The level of detail and update for the report will be dependent upon the activities and changes to the system during that period. The analytical and sampling costs are covered in operation and maintenance. The operation and maintenance data, along with the analytical information, are included in the report.

Soil Remediation:
The costs of a remediation report for off-site remediation or disposal, and on-site remediation will vary greatly depending upon the method used. Off-site remediation or disposal is a common and proven technique. Quite often less detail will be required in the reports than with other methods.

Cleanup Progress Report				
Personnel	**Description of work**	**Units**	**Rate**	**Cost**
Principal Engineer/Geologist	Review and signature	1	125.00	125.00
Project/Associate Engineer/Geologist	Regulatory liaison, project management and report preparation	8	90.00	720.00
Staff Engineer/Geologist	Report preparation.	8	75.00	600.00
Drafts Person	Prepare report figures	4	55.00	220.00
Clerical	Typing/reproduction/mailing	4	45.00	180.00
Total Cost				**1,845.00**

Project Costs

Miscellaneous

Site Survey:
A site survey is normally conducted to determine the well location (latitude and longitude) and wellhead elevations relative to mean sea level so that groundwater gradient may be determined. Site survey information is also necessary for the electronic submission of laboratory data that is required by Title 23, Division 3, Chapter 16, Article 12, Sections 2729 and 2729.1 (CCR)

A survey is normally required after new wells have been installed, or if significant modification has been made to existing wells. The survey may be conducted by the consulting firm's in-house surveyors or by a subcontracted survey company. The costs below are inclusive of all staff, equipment, data reduction, and mapping costs needed to perform and describe a site survey.

Site Survey:	**Cost/Event**
Site Survey (3 wells)	450.00
Site Survey (6 wells)	700.00

Underground Utility Check:
An underground utility check is normally conducted before drilling or other subsurface excavation activities take place to ensure that the activities do not encounter buried utilities such as water, sewer, electrical, and telephone services. The check may vary from the simple expedient of notifying Underground Services Alert (USA) and marking locations of proposed activity to a full electromagnetic scan of the intended excavation area. The degree of care needed is based upon the potential for damages and likelihood of encountering unknown utilities. The costs vary accordingly. Shown below are two examples.

Underground Utility Check:	**Cost/Event**
USA Notification for three drilling points	75.00
Electromagnetic scan for underground structures	600.00

Traffic Control:
Traffic control may be needed when activities (most often drilling) are conducted in streets, roads, and highways. The need for the traffic control must be justified. It is important to consider the costs of traffic control not just in the placement of wells, but in the sampling as well. The amount of traffic control needed will depend upon the location of the activities, street traffic levels, local regulations, and permit requirements.

Traffic Control:	**Cost/Day**
Basic Traffic Control for closing one lane	350.00
Extensive traffic control requiring multiple flagpersons and closure of lanes	950.00

Utility Costs:
Most remedial systems will be attached to an existing utility service. The Fund will reimburse for the reasonable direct costs of utilities. It is very important to consider the most cost-effective method of providing power and service to a remedial system. For some systems the utility costs can exceed the purchase price of the equipment itself. This must be considered (and reconsidered periodically, usually as part of the system efficiency evaluation under Operation and Maintenance) when determining what system is to be used on a site. **Utilities should be in the claimant's name and separated from their regular utility service (usually by a separate meter). Utility costs should be paid by the claimant and not marked up by the consultant.**

Mobilization:
Normal and reasonable mobilization and de-mobilization charges necessary to provide equipment for remediation are reimbursable. Actual invoices and costs must be supplied as part of the reimbursement request.

Monitoring Well Maintenance:
Costs associated with monitoring well maintenance, such as replacement of rusty locks or pieces of the well that may wear out due to the use of the monitoring well, are eligible for funding. Costs associated with damage to the monitoring well caused by negligence, property redevelopment or activities other than corrective action are not eligible for funding.

Bonds:
Some agencies and municipalities may require security bonds for work done within their right-of-way. Commonly referred to as "Performance Bonds," these are refundable once the work has been performed, or once the corrective action has been completed and the facilities removed or replaced to the agency's satisfaction. Since these bonds are refundable, the Fund does not reimburse the bonded amount. The cost associated with preparing the bonding application is typically reimbursable.

General Guidelines

General Guidelines

Personnel Qualifications & Task Descriptions

Listed below are common titles and qualifications of persons performing common tasks associated with corrective action. The Fund staff may, if necessary, ask for verification of consultant staff, registrations, and experience before reimbursement can be made at certain rates.

Common Definitions of Personnel and Qualifications	Description of Common Tasks
Principal The Principal has a valid professional registration (i.e. PE, CE, RG, CEG, CHG), an engineering or geologic science degree and at least 10 years experience in conducting corrective actions for UST's. Administrative and/or professional head of the organization. The principal is responsible for the oversight of all staff in his specific regional office. Charges limited number of hours. Principal should almost never bill fieldwork.	Expert testimony Legal strategies Depositions Review of most complex sites New technology innovations
Project Manager Possesses a degree in engineering/geology or a directly related field. Serves as manager for entire projects and has at least 3 years experience in corrective action field. Prepares programs and plan specifications for remediation. Responsible for the gathering of field data and data analysis. Periodic site inspection.	Project oversight/management Workplan preparation/review Field work planning/coordination Report review Prepares bids and proposals Site inspection (periodic)
Senior Engineer/Geologist/Hydrogeologist The Senior has a valid professional registration with an engineering/geology degree and at least 7-9 years experience in conducting corrective action. Serves as senior technical leader for remediation projects and has developed substantial expertise in the field of design, economic analysis, cost estimating and comparison of remedial strategies. Responsible for approving designs, reports, plans and specifications before submittal to clients or regulatory agencies. Charges limited number of hours.	Project oversight/management Aquifer characterization Review of technical reports Review of corrective action plans Prepares bids and proposals Engineering/remedial design

Common Definitions of Personnel and Qualifications	Description of Common Tasks
Project/Associate Engineer/Geologist The Associate has an engineering/geology degree and at least 3-5 years experience in conducting corrective action. Must be able to conduct assessment and remedial activities, oversee drilling and monitoring well installation, soil borings, sampling, compile data, have knowledge of QA/QC procedures and protocol, perform aquifer testing and prepare permit applications.	Project Management Engineering/remedial design Aquifer characterization Prepare/review technical reports Prepare/review corrective action plans Data review/analysis Site inspection
Staff Engineer/Geologist/Hydrogeologist Possesses an engineering/geology degree and at least 1-3 years experience in conducting corrective action. Must be able to conduct assessment and remedial activities, oversee drilling and monitoring well installation, soil borings, sampling, compile data, have knowledge of QA/QC procedures and protocol, perform aquifer testing under supervision of the Project/Associate.	Report preparation Field work planning/preparation Site reconnaissance and mapping Site assessment execution Supervise excavation activities Remedial system installation Permitting and monitoring
Technician Typically requires a high school diploma, associate degree, technical coursework, and specialized trades training. Requires 2-6 years directly related experience. Responsible for on-site installation, maintenance, and repair of machinery and equipment, and sampling. Collects samples and maintain documentation of operating logs and maintains equipment.	Remedial system installation and operation & maintenance Well development and sampling Waste handling Decontamination Groundwater monitoring Free product removal
Drafts Person Typically requires a high school diploma and specialized training in technical drawing and use of CAD systems. Prepares site maps and details as needed	Drafting CAD work GIS Cartography
Clerical/Word Processor General office work, typing, and filing. Operates computer for word processing spreadsheets, statistical typing, correspondence and report generation.	Typing and filing Spreadsheets and tables Report generation Document reproduction

Professional Registration

Section 2812.1 of the Fund regulations requires claimants to follow applicable state laws and regulations in procuring consultant and contractor services and to obtain these services from qualified firms. Generally, the services of a geologist or an engineer will be necessary during the course of corrective action. The practice of geology must be performed by professional geologists within the meaning of the Business and Professions Code, division 3, chapter 12.5 (commencing with section 7800). The practice of engineering must be conducted by professional engineers within the meaning of the Business and Professions Code, division 3, chapter 7 (commencing with section 6700). The Business and Professions Code requires all geologic plans and reports and all engineering plans and reports to be prepared by or under the direction of a registered geologist or engineer, respectively, and these plans and reports must be signed by the registered professional in responsible charge.

The Geologist and Geophysicist Act requires firms that advertise geologic services to the public to have a registered geologist as a partner or officer of the firm. The Professional Engineers Act permits group practice of engineering if a registered engineer is an "owner, part owner, or officer in charge of the engineering practice of the business." The Fund encourages claimants to carefully select remediation firms. The addresses below can be used to contact these agencies for license or registration verification:

Board of Registration for Professional Engineers and Land Surveyors
2535 Capitol Oaks Drive, Suite 300
Sacramento, CA 95833-2926
(916) 263-2230
http://www.dca.ca.gov/pels/

Board of Geologist and Geophysicists
2535 Capitol Oaks Drive, Suite 300A
Sacramento, CA 85814
(916) 445-2113
http://www.dca.ca.gov/geology/

Contractors State License Board
9821 Business Park Drive
Sacramento, CA 95827
(800) 321-2752
(916) 255-3900
http://www.cslb.ca.gov/

The Fund will only reimburse for the activities of firms that are properly licensed and maintain necessary registrations for legal operations in the State of California. It is the claimant's responsibility to hire qualified consultants and to follow applicable state laws in hiring professional services. Therefore, it is prudent to ask who will be in responsible charge for the work to be performed at your site. Contact Fund technical staff or one of the licensing/registration agencies listed above for assistance with complying with this requirement.

General Guidelines

Work Approval and Direction

Fund regulations require that any work that is to be reimbursed MUST be approved and directed by the regulatory agency (Section 2812(a)(5). The Fund requires that copies of all written regulatory agency orders, directives, and approvals be provided as a basic part of reimbursement.

Just because it is directed does not mean it will be reimbursed:
The regulatory agency is responsible for many tasks, including protecting human health and safety, the environment, and the current and potential beneficial uses of the waters of the State. The Fund is only able to pay for reasonable and necessary costs directly related to corrective action associated with an eligible petroleum release. This may result in claimants being directed to perform work that is not reimbursable. This does not mean the work does not need to be done. Part of staying in compliance with regulatory agency includes complying with all their directives and requirements. Compliance is a prerequisite for reimbursement.

The following four examples help explain the relationship between work direction, approval and reimbursement. Each claim is evaluated on an individual basis and specific case factors may influence findings. All potential applications of these principles and cases cannot be explored here. These are merely examples.

Case A:
Work is directed but not approved. Regulatory agency directs installation of wells as proposed in the workplan. The wells are placed in another location that does not provide the required information for the regulatory agency and new wells are required. The cost of installing wells in the wrong place is not reimbursable.

Case B:
Work is directed and approved but not reimbursable. A source of contamination other than the eligible Underground Storage Tank (for example: a farm tank, a hydraulic lift tank, a sump, an above ground tank, or a surface spill) is identified and the regulatory agency requires that it be cleaned up. Spills from ineligible sources are just as much a threat to human health, safety, and the environment, but an underground storage tank as defined in section 2804 of the Fund regulations does not include any structures specifically exempted in title 23, section 2621 CCR. Therefore, the Fund regulations preclude reimbursement for contamination originating from these types of sources. This can often occur in conjunction with an eligible release from an underground petroleum tank, in these cases some cost apportionment is usually made.

Case C:
Work is directed and approved and reimbursable. An unauthorized release from an eligible underground storage tank is discovered and regulators are informed and they direct investigation. A workplan is prepared, proposing installation of borings and wells, which is approved by the

regulator. The work is completed and an acceptable final report is given to the regulator. These costs are generally reimbursable.

Case D:
Work is approved but not directed. The regulatory agency requires a cleanup level of 100 ppm TPH. The claimant cleans up the site to non-detect in order to sell the property immediately. The regulatory agency approves of cleaning to a greater level than is required but does not direct this additional work. The Fund will only reimburse costs of remediation to the level that is necessary to protect human health, safety and the environment and was directed by the regulator. If you have questions about whether your proposed course of action will be reimbursable or not, be sure to contact the Fund technical staff prior to implementation.

General Guidelines

Premiums and Extra Costs

During investigation and remediation activities, certain situations may arise where work may be performed on your site that may cause costs to be charged at a premium rate. Premium charges include overtime, night differentials, double time, and expedited turn-around times. Premium costs are site specific and will be evaluated on a site-specific basis. The following provides some guidance about how the Fund would evaluate premiums on costs and extra costs.

Typically, if a person works more than eight (8) hours on a site, the resulting overtime compensation is no more than one and one-half times the normal hourly rate. This, however, does not apply to staff professionals and their managers (exempt employees). If an employee works for less than eight hours on a specific site, no overtime is reimbursable for activities on that site.

In the event that night differentials are necessary and reasonable, increased hourly rates will be considered. These cases will be evaluated on a case by case basis and claimants will be expected to justify increased hourly rates. Contact Fund technical staff for pre-approval of this type of activity to verify that the premium costs are warranted and reimbursable.

Premium costs due to a claimant's desire to not interrupt on-site operations are a business decision. The claimant is free to place restrictions upon when and how the work is performed due to business reasons. The extra costs associated with these restrictions are considered by the Fund to be unreasonable and are the responsibility of the claimant and the Fund does will not reimburse for unreasonable costs. A reasonable effort to work around current business operations is allowable.

Extra insurance may be required in some instances by permitting agencies. The extra cost for this insurance may be reimbursable if the extra cost is demonstrated to be above and beyond the normal insurance coverage that most firms carry and is required to carry out the corrective action. Any extra insurance or bonding requirements must be shown to be reasonable and necessary. Contact the Fund for prior approval of these types of costs.

General Guidelines

Rental/Purchase of Equipment

Equipment Rental versus Equipment Purchase:
The decision to rent or purchase equipment should be based on the option that gives the lowest overall cost. Section 2812.2(e)(14) of the Fund regulations specifies that the Fund does not reimburse costs associated with the "purchase of equipment, unless the claimant can demonstrate that the purchase "…is more cost effective than leasing or renting".

If equipment is needed extensively over a long time, it may be more cost effective to purchase the equipment. It is important to consider this because the Fund will not typically reimburse rental costs exceeding the purchase price of equipment.

Claimants should contact Fund technical staff to help evaluate whether the purchase or rental of equipment is the most cost-effective option.

Equipment Purchase:
Depending on the available rental rates for certain pieces of equipment, or if the equipment is needed for a large percentage of its expected useful life, it may be more cost effective to purchase the equipment. Specific emphasis will be placed on soil vapor extraction units, pumps, treatment systems, generators, blowers and support equipment. When dealing with multiple sites, the purchase of equipment may be the most cost-effective alternative.

Deciding whether to purchase or rent a piece of equipment is not an exact science: there is an element of judgment involved in making this decision. The decision to rent or purchase equipment should be based on the option that gives the lowest overall cost. All costs, purchase price, rental rate and operation and maintenance costs for the expected duration of the necessary cleanup must be considered before deciding whether to purchase equipment and selecting a particular piece of equipment. **Claimants are encouraged to contact the Fund's technical staff for help in evaluating whether purchasing equipment is more cost effective.**

If it appears that an equipment purchase is appropriate, the claimant should request pre-approval of the equipment purchase (see Pre-Approval, page 77).

Equipment Rental:
The Fund will require documentation supporting equipment rental rates. Specific emphasis will be placed on soil vapor extraction systems, pump and treat systems, generators/blowers/pumps, and support equipment.

When considering the reasonableness a rental rate, the Fund typically considers the following factors:

- Capital Cost of Equipment (purchase price)

- Salvage Value of Equipment
- Expected Economic Life of Equipment
- Cost of Capital (interest)

One method of calculating a monthly cost of the equipment is the "capital recovery" factor. This allows the cost of the equipment to be carried over a period of time with uniform payments. It includes, purchase price, salvage value, life of the equipment and an interest rate. This is shown by the equation:

$$RR = \left(P - \frac{S}{(1+i)^n} \right) x \frac{i(1+i)^n}{(1+i)^n - 1}$$

Where:

RR = Monthly rental rate
P = Purchase price of the equipment
S = Salvage value of the equipment
n = Economic life of the equipment (in months)
i = Interest rate (Annual rate divided by 12)

Three examples of how this equation might be utilized are shown below:

Example 1:	Example 2:	Example 3:
P = $60,000	P = $60,000	P = $30,000
S = $0.00	S = $6,000	S = $3,000
n = 60 (5 years)	n = 36 (3 years)	n = 30 (2.5years)
i = 0.0083 (10%/12)	i = 0.0083 (10%/12)	i = 0.0083 (10%/12)
RR = $1,275	RR = $1,729	RR = $1,050

For some equipment there can be little certainty regarding the salvage value and economic life of the equipment. Manufacturers are a good source for information regarding the particular piece of equipment being purchased. Obviously, some equipment will last longer than others will and equipment life is extended by proper maintenance and shortened by improper maintenance and care. These factors should be evaluated assuming normal maintenance for the equipment. Maintenance costs are billed separately from the rental rate (see section on Operation and Maintenance of Remedial Systems). **All** costs (including purchase price, rental rate, and operation and maintenance costs) should be considered when deciding to choose a particular device or piece of equipment.

Claimants should submit detailed supporting documentation to justify rental rates. Claimants should contact Fund technical staff if they have any specific questions regarding this policy.

Appropriate Rental Time Base:
When evaluating rental rates, the Fund will reimburse rental costs based on the appropriate rental time base. If the equipment is needed for one day, or for a short time, then a daily or weekly rental rate should be used instead of a monthly rate. Conversely, if the equipment is needed for several months (e.g., daily monitoring of vapor extraction system influent and effluent for 3 months) then the monthly rental rate should be used instead of the daily rental rate.

Appropriate Level of Equipment Utilization:
The Fund will only reimburse for the actual value associated with the equipment utilization. For example, if an oil water interface probe is used to measure the water level in a monitoring well, then the Fund will only reimburse for the costs associated with the water level meter, which is less than the oil water interface probe. Similarly, if an equipment truck is used to visit the site, when an automobile was sufficient, then the Fund will reimburse based on the rental of the automobile and not the equipment truck.

General Guidelines

Expense Markup

Contractors and consultants typically add a markup to their subcontractor invoices and major equipment purchases to cover overhead and profit. Overhead is the indirect cost associated with items, such as insurance, administration, and carrying costs. The intent of the Fund reimbursing a markup is to allow the primary contractor or consultant who coordinates the project to cover the additional indirect costs associated with the subcontractor work.

The Fund encourages claimants to arrange payment to subcontractors and for major equipment purchases directly to avoid markup charges altogether. This is done by the simple expedient of having the "sub" contractor or equipment supplier send their bill directly to the claimant, instead of to the "prime" contractor. This is commonly called "direct billing." Direct billing does not mean the claimant will have to supervise and instruct the sub, the prime still engages with this activity and bills their normal project management charges. The sub sends their bill for payment to the claimant instead of to the prime.

The Fund also encourages the claimant to arrange direct payments to the subcontractors and equipment supplier since problems have occurred with non-payment by the prime contractor. Specifically, some claimants have received reimbursement from the Fund and have turned over those costs to the prime contractor, who then failed to pay the subcontractors. As a result, the subcontractors filed a mechanic's lien against the property owner for the costs that were not paid by the prime contractor (one of the few recourses the subcontractor has to get paid is to file a mechanic's lien against the property owner). The Fund will only reimburse for costs once, and any difficulty arising from this situation is entirely the responsibility of the claimants. If the claimant contracts directly for costs, the Fund will be able to ensure that all parties receive the amounts reimbursed and avoid most problems of this nature.

Direct billing is especially important where large subcontracted costs are expected, such as the case for a large remedial excavation. In these cases, direct billing should be utilized if at all possible for soil treatment, excavation, and transportation costs.

Markup can become excessive when one or more of the following occur(s):

- The percentage of the markup is high.
- The amount of work performed by subcontractors constitutes a majority of the total project cost.
- Markups are applied inappropriately.

The following are the markups the Fund considers reasonable for specific types of activity and services:

Total Subcontract or Equipment Amount	**Maximum Markup**
Less than $50,000	15%
Greater than 50,000	10%

The following principles should be applied to keep markups at reasonable levels:

- Primary contractor should perform the corrective action work; e.g., primary contractor should not simply serve as a "broker" and subcontract out all work.
- Markups should only be applied to the actual subcontractor or equipment costs paid by the primary corrective action contractor (e.g., not "list" or other artificial price).
- Markups should not be applied to direct charges by the primary contractor
- Markups should not be applied to charges from an affiliate or subsidiary company of the primary contractor.
- Subcontractor costs should be reasonable and necessary for corrective action.
- **Claimants must provide a copy of the actual subcontractor invoice (with detail) or equipment purchase receipt with the reimbursement request.**

Many claimants wait for reimbursement before paying their consultants. This may result in an increase in costs to the consultant. The Fund is a reimbursement program and does not reimburse for interest or other costs incurred because of lack of prompt payment. Any cost accrued due to waiting for Fund reimbursement is not eligible and does not constitute a reason to charge an additional markup.

General Guidelines

Three Bid Requirement

The law that established the Underground Storage Tank Cleanup Fund requires that claimants who contract for corrective action work must receive multiple bids (at least three) for work if they file a claim against the Fund. Claimants must follow applicable State laws and regulations in procuring qualified consultants/ contractor services, and must ensure that such services are obtained from qualified firms at a reasonable price.

Where multiple bids/proposals are required but are not obtained by the claimant, the Fund may waive the 3-bid/proposal requirement if the Fund finds that the requirement is unnecessary, unreasonable, or impossible to comply with under the circumstances pertaining to a particular claim.

Where three bids/proposals have been obtained, the Fund will generally reimburse eligible costs limited to the lowest submittal unless:

1. The Fund determines justification exists for rejection of the lowest bid/proposal; or
2. The costs of the work involved are reasonable and necessary, and the work involved was performed by or under the direction of professional engineers/geologists within the meaning of Business and Professional Code, division 3, chapter 12.5.

Where a claimant incurs increased costs or changes the scope of work covered by the awarded bid/proposal, the claimant must justify to the Fund's satisfaction any costs in excess of the awarded bid/proposal

When the corrective action work is complete, all work must be acceptable to the appropriate regulatory agency in order to be determined eligible for Fund reimbursement.

IMPORTANT POINTS TO REMEMBER IN OBTAINING BIDS:

- Although corrective action is defined in four distinct phases (Article 11 in Chapter 16 of the Underground Storage Tank Regulations), the Fund recognizes that for practical purposes there are two distinct efforts; namely, contamination delineation (investigation) and contamination cleanup. In other words, as a minimum, the claimant must receive three bids/proposals on the site investigation effort and three bids/proposals on the actual cleanup effort. However, the Fund reserves the right to request three bids whenever it determines that it is appropriate and necessary to ensure reasonable costs.
  Note: If claimant wishes to change consultants after the initial three bid/proposal requirement has been met, three bids/proposals must be obtained for the next phase of work.
- After the claimant receives an order to conduct cleanup work, a workplan must be submitted to the regulatory agency. This workplan must be reviewed and approved by the regulatory agency and should be the basis of the bid/proposal document. It is highly

recommended that the bid/proposal document contain unit/cost requirements to ensure comparable responses.

- After the consultant/contractor completes the site investigation effort, they are required to submit to the regulatory agency, a Corrective Action Plan (CAP). The CAP includes among other things, (1) the results of the investigation effort (vertical and horizontal delineation of contamination); (2) recommended cleanup method; and (3) cost estimate of cleanup. This document (the CAP) then becomes the basis for the bids/proposals for the cleanup effort.
- All subcontractor costs that are outside the typical costs presented in the Fund Cost Guidelines and any subcontractor costs for services not addressed in the Fund Cost Guidelines should be supported by three bids. In addition, the Fund reserves the right to request three bids for any subcontractor costs.

CLAIMANT'S DIRECT RESPONSIBILITY: Soliciting bids/proposals for corrective action work is similar to obtaining estimates to conduct work on your house or automobile. It is recognized, however, that while work on your house or automobile can be defined in definitive terms, the same cannot be said for corrective action work and in particular, the investigation effort since the work cannot be precisely defined. However, the claimant can take the following steps and do their homework in ensuring that they have made their best faith effort in obtaining services from qualified contractor/consultants and at reasonable prices:

1. Meet with the regulatory agency directing the cleanup to gather input regarding scope of work and a list of potential consultants/contractors.
2. After selecting several potential contractors, thoroughly investigate their performance record.
3. Use common sense and don't be afraid to ask questions.

Contact the Fund technical staff for assistance in reviewing bids or the need for obtaining bids.

General Guidelines

Pre-Approval

What pre-approval is:
Pre-approval is a method by which the claimant can come to an understanding with the Fund as to the reasonableness of costs for specific corrective actions prior to starting a corrective action project. If the proposed project activities are completed as presented in the pre-approved package, then reimbursement is virtually assured.

What pre-approval is not:
Pre-approval is not a requirement. Pre-approval is not pre-payment. Pre-approval is not an exemption from the documenting or three-bid requirements (although pre-approval may serve as the basis for waiving the three-bid requirement).

How pre-approval works:
After the claimant receives directives to begin corrective action from their regulatory agency, they choose a consultant to prepare a workplan. The workplan is submitted to the regulator for approval. After the regulator approves the workplan, the claimant obtains three bids based upon the workplan The claimant then contacts the Fund representative for their site and is provided, by Fund staff, with a form that includes a list of the required documents to be submitted for pre-approval. Reasonable costs associated with the preparation of the pre-approval package are eligible for reimbursement as corrective action costs and are not applied against the $3,000.00 limit for Regulatory Technical Assistance (RTA). **Copies of bids/cost estimates for all subcontractor work should be included with the pre-approval request.**

When the Fund receives and reviews the pre-approval request and supporting documentation, the claimant will be informed of the pre-approved amount that was determined to be reasonable based on the proposed work that is to be conducted. If the pre-approved amount is less than the amount requested, it does not mean that the remaining costs will not be reimbursed. Pre-approval will be limited to those reasonable costs associated with specific corrective action work for which the Fund has sufficient supporting documentation.

The claimant monitors the work that is conducted to ensure compliance with the proposal and submits the required detailed invoices (with supporting documents) for reimbursement. If the costs requested for reimbursement exceed the pre-approved amount, justification for the excesses must be provided with the request.

The Fund will review the Reimbursement Request to ensure compliance with proposed corrective action activities and pre-approval, and will reimburse those costs determined reasonable and necessary.

Only the claimant or a representative duly authorized by the claimant through a notarized Power of Attorney Form filed with the Fund may request pre-approval. Consultants, legal counsel, or parties not duly authorized may not request pre-approval on behalf of the claimant.

General Guidelines

Non-reimbursable Costs

In accordance with Section 2812.2 (a) of the Fund Regulations, the Board may only reimburse from the Fund reasonable and necessary corrective action, regulatory technical assistance and third party compensation costs that are incurred by or on behalf of the claimant. **Corrective action as defined in Section 2804 of the Fund Regulations does not include cost associated with the detection, confirmation, or reporting of the unauthorized release**. Section 2812.2 (b) of the Fund regulations also requires that in order to be reimbursable from the Fund, the corrective action work undertaken must be acceptable to the appropriate regulatory agency.

As listed in Section 2812.2 (e) of the Fund regulations, the following are ineligible corrective action and regulatory technical assistance costs:

1. Attorney fees or other legal costs; except those to provide regulatory technical assistance;
2. Interest or any finance charges;
3. Any cost associated with removal, repair, retrofit, or installation of an underground storage tank, residential tank or the associated equipment;
4. Any cost associated with supervision of corrective action by a claimant,
5. The cost of soil density tests that are not directly related to the corrective action which is the subject of the claim;
6. The cost of environmental audits or pre-purchase agreements unless performed as part of corrective action;
7. The cost of testing non-hydrocarbon contamination that is not associated with corrective action for the specific claim involved;
8. Cost of abandonment of wells not directly impacted by the release and not installed or used for corrective action purposes;
9. The cost of blacktop or concrete replacement or repair not directly associated with corrective action;
10. Cost of demolition of buildings, except when it can be demonstrated to the Fund's satisfaction to be necessary to implement the most cost effective corrective action alternative;
11. The cost of repairs, remodels, or reconstruction of buildings or other improvements;
12. The cost of monitoring devices to detect hydrocarbon contamination in soil, the vadose zone or water to the extent that they are not used for corrective action;
13. The cost of small tools except as required for corrective action;
14. The cost of purchase of equipment, unless the claimant can demonstrate that the purchase of the equipment is more cost effective than leasing or renting;
15. Any consequential cost incurred as a result of corrective action such as, but not limited to, loss of rents or business;

16. The added costs of implementing a corrective action alternative that is not the most cost-effective alternative to achieve cleanup levels identified as necessary by the regulatory agency.
17. The cost of corrective actions incurred to clean up the property beyond the cleanup levels identified as necessary by the regulatory agency;
18. Corrective action costs incurred by the claimant before January 1, 1988;
19. Regulatory technical assistance costs incurred before January 1, 1997;
20. Regulatory technical assistance costs in excess of $3,000 per occurrence submitted with a reimbursement request received by the fund on or after January 1, 2000;
21. Costs associated with resubmitting an application or reimbursement request to the extent that the costs are incurred in response to a finding of noncompliance with the application or reimbursement requirements of the Fund;
22. Any cost not directly related to corrective action; including but not limited to costs associated with filing appeals and petitions;

General Guidelines

Important Dates and Deadlines

Various regulations have cutoff, requirement and eligibility dates. Some of the important dates for UST owner/operators and the Fund are listed below. The following dates may be used as a reference for Fund regulations and policy uses:

Date	Significance	Source
01/01/84	Tank permit requirements went into effect	H&SC[4] §25284
01/01/88	**Oldest incurred corrective action costs that are eligible**	**USTCF[1] §2810**
01/24/89	Financial Responsibility required for petroleum marketing firms (over 1,000 tanks)	USTCF §2806.1[2]
10/26/89	Financial Responsibility required petroleum marketing firms (from 100-999 tanks)	USTCF §2806.1[2]
12/02/91	**Three bids required for reimbursement of corrective action work**	**USTCF §2812.2**
12/02/91	Corrective Action Plan (CAP) Preparation required for reimbursement of remediation costs	CCR[3] §2725 & USTCF §2811.b
04/26/91	Financial Responsibility required for petroleum marketing firms (from 13-99 tanks)	USTCF §2806.1[2]
12/31/93	Financial Responsibility required for other UST owner's or operators	USTCF §2806.1[2]
01/01/94	Claims filed after this date, may request a statutory waiver of the permit requirement	USTCF §2811
02/18/94	Financial Responsibility required for local governmental entities	USTCF §2806.1[2]
01/01/97	**Oldest incurred regulatory technical assistance costs that are eligible**	**USTCF §2810**
12/22/98	All UST's must be retrofitted or upgraded to current standards	CCR §2662
12/31/98	Financial Responsibility required federally recognized Indian tribes	USTCF §2806.1[2]
01/01/00	**Regulatory technical assistance costs limited to $3,000 per occurrence for reimbursement requests filed on or after this date.**	**H&SC §25299.57**
01/01/11	Sunset provision for the Fund takes effect, termination of program unless extended	H&SC §25299.81

[1]USTCF = California Code of Regulations, Title 23, Division 3, Chapter 18, Petroleum Underground Storage Tank Cleanup Fund Regulations
[2]Per the 40 Code of Federal Regulations (CFR) Section 280.91
[3]CCR = California Code of Regulations, Title 23, Division 3, Chapter 16, Underground Storage Tank Regulations
[4]H&SC = California Health & Safety Code Chapter 6.75, Petroleum Underground Storage Tank Cleanup Fund

In addition to significant dates, there are constraints and deadlines placed upon certain items. The deadlines below should be used in dealing with Fund claims:

Earliest submittal of another reimbursement request (of $10,000 or more) after previous request	30 days
To submit a Reimbursement Request from the date of receipt of an LOC	90 days
Claimants shall repay Fund in the case of any overpayment	20 days
All information must be kept beyond the date of last reimbursement by the Fund for potential audit	3 years

General Guidelines

Miscellaneous

Regulatory Agency Oversight Costs:
Normal and customary oversight costs from the regulatory agencies to review and approve corrective actions are reimbursable from the Fund. Exceptions to this may include enforcement actions or oversight of non-eligible cleanup. Complete copies of all oversight agency invoices are required before reimbursement can be made.

Regulatory Technical Assistance
Regulatory technical assistance by a person other than the claimant in the preparation and submission of a claim to the Fund is reimbursable up to **$3,000.00** per occurrence. Regulatory technical assistance includes assistance with completing and submitting the claim application, reimbursement requests, assembling supporting documentation and complying with procurement requirements. **Due to the $3,000.00 limit of Regulatory Technical Assistance, the Fund recommends that appropriate level junior and mid level technical/clerical staff be used to provide this assistance to avoid exceeding the limit.**

Claimants Performing Corrective Action:
In cases where the claimant is licensed and/or capable of performing work on their own sites, the Fund will consider reimbursing for their activities as they relate directly to corrective action. Many claimants have performed interim actions such as free product removal at their own sites. Other examples of claimants who have performed their own work are construction firms, large petroleum companies with in-house professionals, and registered engineers. The Fund can reimburse the claimant for the direct cost of the employee or equipment performing the work. This would include the base salary of the employee, the cost of insurance and benefits package, etc. **For this type of cost to be reimbursed, it should be approved in advance by the Fund staff.** Before using claimant staff, the Fund requests that claimants contact the Fund for eligibility considerations and pre-approval.

Travel and per diem:
Travel long distances to and from sites should be minimized. If the costs of travel are to be a regular feature of the job, this should be reflected in the bid pricing (bids must include travel/per diem costs). If possible, firms located in, or with a local office in, the same geographical region should be retained to reduce the amount of travel and expenses associated with site activities. Only actual costs for travel will be reimbursed. This requires submittal of invoices for travel costs. Actual invoice/receipts must be submitted, not credit card receipts. Choosing a consultant outside of a geographical region when competent consultants are available locally will result in the claimant being responsible for any travel and per diem costs. **For travel expenses to be reimbursed they should be approved in advance by the Fund.** Before incurring travel expense costs, the Fund requests that claimants contact the Fund staff for eligibility considerations and pre-approval.

New and innovative technologies:
The Fund supports innovation and the use of new technologies that have promise in cleaning up sites. In all cases it must be demonstrated to be the most cost effective alternative and have a reasonable chance of success. Any new and innovative methods to be used should be approved in advance by the Fund staff to be considered for reimbursement. Before using a new or innovative technology, the Fund requests that claimants contact the Fund staff for eligibility considerations and pre-approval.

Costs due to waiting for reimbursement:
Many claimants wait for reimbursement before paying their consultants. This may result in an increase in costs to the consultant. The Fund is a reimbursement program and does not reimburse for interest or other costs incurred because of lack of prompt payment. Any cost accrued due to waiting for Fund reimbursement is not eligible.

Interim Remedial Actions:
Regulating agencies may require interim remedial actions to abate or correct actual or potential effects of an unauthorized release prior to complete delineation. A variety of activities can be undertaken as part of interim remedial actions. The most common remedial action undertaken is free product removal. Interim remedial actions are undertaken when required because there is an immediate and necessary action that must be taken to prevent harm to human health and safety or damage to the environment or the waters of the state. **Interim remedial actions are not intended to take the place of, or obviate the need for, a feasibility study and corrective action plan.**

Interim remedial action typically consists of free product removal and/or limited excavation of the contaminated source area to prevent significant migration of free product**. Some excessive interim remedial action has led to unnecessary and unreasonable costs because it was used to bypass investigation and CAP implementation.** For example, excessive interim remedial actions may occur immediately after the underground storage tank removal. Normal interim excavation involves the removal of obviously contaminated soil. However, the Fund has seen over excavation involve thousands of cubic yards of soil. Without proper sampling, characterization, regulatory directives, workplans, and consideration for cost effectiveness this may result in unreasonable costs. A clear delineation needs to be made between interim remedial action and the full-scale remedial action. The Fund will only reimburse for the amount of the most cost-effective method. **No more than 500 cubic yards of contaminated soil should be removed during an interim remedial action without contacting and receiving approval from the Fund.**

Where feasible, request pre-approval of on-going interim actions to ensure that the costs are reasonable and reimbursable. Obviously, this does not include cases where immediate threats of explosion or other catastrophic hazards to human health, safety, or the environment, exist that can only be ameliorated by immediate action. Any on-going activity, once an immediate threat has been dealt with, should be pre-approved.

Appendix

Appendix

Example Projects

This section gives examples of two common excavation projects. Many variables may be involved in completing UST corrective action. It is impossible to include every conceivable cost that could occur at every site or predict one cost for completing corrective action at thousands of sites throughout the State.

Each example tries to illustrate the total cost for a common corrective action scenario at a typical site, and shows how the unit costs ultimately add up to the total project cost. It will still be necessary to conduct bidding and use judgment when selecting someone to perform a scope of work at a site similar to one of these examples. The Fund's staff can provide assistance in evaluating and comparing estimates, and pre-approval of costs before costs are incurred is highly recommended. ***NOTE -- These are examples and are provided for illustrative purposes only.***

EXAMPLE 1

Overexcavation After Tank Removal and Disposal of 150 Cubic Yards of Petroleum Contaminated Soil:

The estimate is based on the following assumptions:

- Over excavation has been directed and approved by the lead regulatory agency.
- Tank removal recently completed. The tank pit is open and equipment on-site.
- All excavation will be done on-site. No off-site access is necessary.
- Adequate space and access is available for excavation/stockpiling.
- No shoring or repairs to underground utilities are necessary.
- Excavated soil will be disposed at a Class 2 landfill.
- Travel Distance from site to disposal facility is approximately 150 miles.
- Travel Distance from office to site to laboratory to office: is approximately. 100 miles.

Task 1(Overexcavate/Stockpile Soil and Sample Excavation Sidewalls) Includes:

- All coordination of staff and subcontractors,
- arranging for any additional equipment/supplies,
- removal and disposal of approximately 150 square feet of 3 inch thick asphalt,
- overexcavation of soil and stockpiling of soil on visqueen,
- collection/storing/transportation of soil samples from the excavation to a certified lab,
- laboratory costs for 6 TPH as gasoline/BTEX and 6 TPH as diesel soil samples,
- covering stockpile and surrounding work area with 6 feet high chain link fence,

Task 2 (Sample Stockpiled Soil and Arrange Proper Disposal) Includes:

- Travel to and from site to collect soil samples from the stockpile,
- Proper handling/logging/transporting of soil samples to a certified lab,
- Laboratory costs for 6 TPH as gasoline/BTEX and 6 TPH as diesel soil samples, 1 Reactivity, Corrosivity & Ignitability test, 1 Total Lead test and 1 CAM 17 Metals test,

- Evaluating stockpile samples and arranging proper disposal.

Task 3 (Load, Transport and Dispose of Soil) Includes:

- Travel to and from site,
- Traffic control,
- Loading and transporting soil to Class 2 disposal facility.

Task 4 (Backfill, Compact & Repave) Includes:

- Import and compact clean material to replace volume of excavated soil,
- Spread and grade 4 inches of Class II base rock and repave with 3 inches of asphalt,
- Cleanup of site and equipment.

After Tank Removal, Overexcavate and Dispose of 150 Yd^3 of Petroleum Contaminated Soil										
Consulting Costs			**Task 1**		**Task 2**		**Task 3**		**Task 4**	
	unit	rate	#units	Cost	#units	Cost	#units	Cost	#units	Cost
Project Manager	hr	105	4	420	2	210			1	105
Staff	hr	75	12	900	8	600				
Technician	hr	60	10	600			10	600	12	720
Equipment Rental/Supplies										
PID	day	100	1	100						
Fence w/Gate	Mo.	400	1	400						
Visqueen	roll	75	2	150						
Truck	mi.	0.50	100	50	100	50	100	50	200	100
Misc. Supplies	day	25	1	25	1	25	1	25	2	50
Subcontractor										
Backhoe	day	720	1	720					2	1,400
Loader	day	960					1	960		
18 yd^3 Truck.	hr	75					40	3,000		
Class 2 LF Fees	ton	65					225	14,625		
Soil Backfill	ton	12					200	2,400		
Gravel Backfill	ton	12					5	60		
Asphalt Saw.	hr	50					4	200	4	200
Asphalt Disp.	ft^2	1.50							150	225
Asphalt Repave	ft^2	2.50							150	375
TPH- gas	Ea.	65	6	390	6	390				
TPH - Diesel	Ea.	65	6	390	6	390				
Total Lead	Ea.	40			1	40				
CAM 17	Ea.	200			1	200				
RCI	Ea.	180			1	180				
Markup	Ea.			225		180		3,187		330
Task Subtotals				4,370		2,265		25,107		3,985
Total Cost										**35,727**

EXAMPLE 2

Excavation and Disposal of 1,500 Cubic Yards of Petroleum Contaminated Soil:

This estimate is based on the following assumptions:

- The Corrective Action Plan has been submitted and approved by the lead agency.
- All excavation will be done on-site; no off-site access is necessary.
- Adequate space and access is available for equipment.
- No shoring, demolition or repairs to underground utilities are necessary.
- Soil has been accepted at a Class 3 landfill and will be loaded directly into trucks for transportation and disposal.
- Total Travel Distance -- Site-Disposal Facility-Quarry-Site: approximately 150 miles.
- Total Travel Distance -- Office-Site-Lab-Office: approximately 100 miles.

Task 1 (Planning, Permits and Mobilization) Includes:

- All coordination of staff and subcontractors,
- Obtaining all construction and traffic control permits,
- Mobilization/demobilization of all equipment.

Task 2 (Excavate, Load, Transport and Dispose of Soil) Includes:

- Sawcutting, removing and disposing of 3 inch asphalt over 2,025 sq. ft. area,
- Directing and coordinating excavation, loading and manifesting, of soil
- Transporting soil and disposal of soil at Class 3 disposal facility,
- Surrounding the work area with a temporary, 6 feet high chain link fence for one month and traffic control.

Task 3 (Sample Excavation Sidewalls and Laboratory Analysis) Includes:

- Collecting soil samples from the excavation bottom and sidewalls,
- Proper handling/logging of soil samples and transporting soil samples to laboratory,
- Laboratory costs for the following tests:
  a) 12 TPH as gasoline/BTEX soil samples,
  b) 12 TPH as diesel soil samples.

Task 4 (Backfill, Compact & Repave) Includes:

- Import sufficient volume of clean material to replace volume of excavated soil,
- Compact imported clean material,
- Spread and grade excavation area with 6 inches of Class II base rock and repave with 3 inches of hot rolled asphalt,

Task 5 (Prepare Report) Includes:

- Tables and text summarizing the results of the excavation, sampling and disposal,
- Conclusions and recommendations regarding the significance of the data collected,
- A site plan showing the locations of all soil samples,
- Laboratory data sheets and chain of custody forms for samples collected and,
- QA/QC by an experienced staff member and five (5) copies of the report.

After Tank Removal, Overexcavate and Dispose of 1500 Yd^3 of Petroleum Contaminated Soil												
Consulting Costs			**Task 1**		**Task 2**		**Task 3**		**Task 4**		**Task 5**	
	unit	rate	#units	Cost	#units	Cost	#units	Cost	#units	Cost	#units	Cost
Principal	hr	125									3	375
Proj. Mgr.	hr	105	8	840	6	630	1	105	3	315	4	420
Senior	hr	105									4	420
Staff	hr	75	12	900	32	2,400	8	600			16	1,200
Drafter	hr	55									4	220
Clerical	hr	45									4	180
Tech.	hr	60			32	1,920			30	1,800		
Equipment Rental/Supplies												
PID	day	100			4	400						
Fence	mo	400	1	400								
Truck	mi.	0.50			4	200	1	50	3	150		
Supplies	day	25			4	100	1	25	3	75		
Subcontractor												
Excavator	day	1,100			4	4,400						
Loader	day	960			4	3,840						
18yd^3Truck	hr	75			420	31,500						
Disp. Fees	ton	25			2,250	56,250						
Clean Soil	ton	12							2,200	26,400		
Gravel	ton	12							50	600		
Asph. Saw	hr	50							8	400		
Asph. Disp.	ft^2	1.50			2,025	3,038						
Asph. Pave	ft^2	2.50							2,025	5,062		
TPH-gas	Ea.	65					12	780				
TPH-Diesel	Ea.	65					12	780				
Markup						9,903		156		3,246		
Task Subtotals				2,140		108,931		2,496		38,048		2,440
Total Cost												**154,055**

Appendix

Definitions

The following are some of the common terms and definitions that are used in the UST and environmental industries.

AERATION: For soils, a method of remediating contaminated soil by supplying or exposing the contaminated soil to air. The contaminants volatilize to the atmosphere. For water, the process of bubbling air through water or spraying water into the air to removed dissolved contaminants.

ABSORPTION: The penetration of atoms, ions, or molecules into the bulk mass of a substance.

ADSORPTION: The retention of atoms, ions, or molecules onto the surface of another substance.

AIR POLLUTION CONTROL DISTRICT (APCD): Regulatory Agency charged with maintaining quality of air. Most air discharges from contaminated sites will require clearance of APCD.

AIR SPARGING: Method of removing VOC's (Volatile organic compounds) from ground water. Compressed air is forced through a well screen placed in the aquifer causing a bubbling effect in the groundwater. Contaminants in the groundwater are transferred to the air. These contaminants can then be removed by soil vapor extraction. Air Sparging can also enhance bioremediation.

AIR STRIPPERS: Equipment used in the process of mixing groundwater contaminated by petroleum with air. The mixing process removes the dissolved petroleum from the water by transferring it into the air. Local air pollution rules may prohibit or require permits for this method.

ANGLE DRILLING: Drilling at an angle or a slant instead of drilling vertically. Used to investigate under buildings or other obstructions.

AQUIFER: An underground geological formation that contains water and is capable of yielding water to a well or spring.

ATTENUATION: The reduction or lessening in amount (e.g., a reduction in the amount of contaminants in a plume as it migrates away from the source).

AUGER: a tool used for drilling into unconsolidated earth materials (soil) consisting of a spiral blade wound around a central stem that is commonly hollow (hollow stem auger).

BACKHOES: A power driven excavating vehicle with a hinged bucket at the end of a long jointed arm.

BACTERIA: Unicellular microorganisms that exist either as free-living organisms or as parasites and have a broad range of biochemical, and often pathogenic properties.

BAILERS: A tube, often constructed of plastic or metal, used for removing water from wells, and for collecting samples of well water.

BENTONITE: clay with expansive properties used to provide a tight seal around well casings to prevent contaminants from using the wellbore as a pathway for migration.

BID: A detailed and itemized description of proposed costs prepared by a consultant or contractor that is specific to, and consistent with, a regulatory agency approved workplan and/or directive. See Three Bid Policy.

BILLABLE RATE: Hourly rate charged for consultant. It is often determined by multiplying the employee's payroll times the billing factor, includes, salaries, overhead, and profit.

BIOASSAY: a method used to determine toxicity of specific chemical contaminants. A number of individuals of a sensitive species are placed in water containing specific concentrations of the contaminant for a specified period of time.

BIODEGREDATION: A process by which microbial organisms transform or alter (through enzymatic or metabolic action) the structure of the chemical contaminant.

BIOREMEDIATION: The process in which microorganisms (bacteria) breakdown petroleum products in the soil. Enhanced bioremediation refers to the addition of microorganisms or chemicals to speed up the natural rate of breakdown of petroleum products in the soil.

BIOVENTING: Uses vapor wells to induce airflow in the subsurface increasing the amount of oxygen available for microbial degradation. Nutrient solutions might also be injected.

BLANK SCHEDULE: Pipe, usually PVC, used in construction of wells that does not have any slots or holes along its length. A number after the name designates specific construction details (e.g., schedule 40).

BLOWERS: Mechanical device used for a wide variety of applications in soil and groundwater remediation. Blowers can provide positive airflow as well as a vacuum force.

BORING (SOIL): A hole in the ground created by a drilling device. Usually as part of assessing the lateral and vertical extent of contamination.

BTEX: Abbreviation for Benzene, Toluene, Ethylbenzene, and Xylene, which are all chemical compounds in gasoline. Site investigations often measure the amount of these compounds in soil and groundwater as such, they are often called indicator chemicals.

CADD COMPUTER: Computer specifically designed to run computer aided drafting and design software.

CALIFORNIA CODE OF REGULATIONS (CCR) Regulations established by the state to regulate many issues within the state including, but not limited to, contaminant levels in the soil and water released from various forms including Underground Storage Tanks.

CARBON ADSORBERS: The use of activated carbon to adsorb organic compounds out of an air stream or from a liquid stream.

CATALYTIC OXIDIZERS: An off-gas post-treatment unit for control of contaminant compounds in the air stream. The catalyst allows contaminant removal at a lower temperature due to the catalytic chemical reaction, thus uses less energy, costs less, and can target specific contaminants.

CLAIMANT: A person applying to the Fund for reimbursement of corrective action costs from a leaking underground petroleum storage tank

CLEANUP FUND: State of California funding for the cleanup of soil contamination from Underground Storage Tanks. Also known as SB2004, the Fund, and the Fund Moneys are derived from a fee on each gallon of gas sold in the state.

COMPACTORS: Usually motorized equipment used to compact fill material placed in an excavation.

COMPONENT: An identifiable piece of a larger complex unit.

COMPRESSORS: Usually an air compressor that compresses air for a variety of uses.

CONE PENETROMETER TEST (CPT): A truck mounted rig that pushes tubing into the ground taking measurements or samples as it goes.

CONSULTANT: Any firm that is involved in the assessment of cleanup of an underground tank leak. The Responsible Party hires the consultant.

CONTAMINANTS: Any petroleum constituents introduced into soil or groundwater that will adversely affect its quality.

CONTRACTOR: A firm that provides equipment and labor to perform remedial actions.

CORING EQUIPMENT: Equipment needed to remove concrete or asphalt before borings can be installed.

CORRECTIVE ACTION: Activity necessary to investigate and analyze the effects of an unauthorized release; propose a cost-effective plan to adequately protect human health, safety, and the environment and to restore or protect current and potential beneficial uses of water; and implement and evaluate the effectiveness of the activity.

CORRECTIVE ACTION REPORTS: Report prepared for regulatory agencies documenting steps taken to remediate a site.

COST PROPOSAL: See PROPOSAL.

DATALOGGER: Recording device that automatically records data from equipment at a site (i.e. pressure transducer).

DECONTAMINATION UNIT (STEAM CLEANER): Device that sprays high-pressure water to wash soil and contamination off equipment. Required to prevent cross contamination.

DECONTAMINATION TRAILER: Trailer mounted unit to provide decontamination on site as needed.

DEMOBILIZATION: Move equipment off location.

DEPRECIATION: Loss of value due to usage and passage of time.

DISPERSION: The process by which a substance or chemical spreads and dilutes in flowing groundwater or soil gas.

DISSOLVED OXYGEN METER: Device that measures the amounts of dissolved oxygen in water. Used as an indicator of biological activity.

DOUBLE BILLING: Requesting payment for something that has already been paid or invoiced.

DOWNGRADIENT: In the direction of decreasing static head (potential). The direction water and contaminants will most likely travel without other influences.

DOZERS: Earth moving construction equipment.

DRAWDOWN: Lowering the water table due to withdrawal of groundwater.

DRILLING RIG: Equipment used for drilling borings and monitor wells.

ELECTRO-MAGNETIC SCAN: Device used to detect subsurface metallic objects such as tanks and product lines.

EFFLUENT: Something that flows out, especially a liquid or gaseous waste stream.

END PLUG: Bottom of well casing or any other type of pipe.

ENVIRONMENTAL HEALTH SERVICES (EHS): Usually a county organization charged with protecting the health of the people; may act as a regulatory agency.

ENZYME: Any of numerous proteins or conjugated proteins produced by living organisms and functioning as biochemical catalysts.

EX-SITU: Moved from its original place; excavated; removed or recovered from the subsurface.

FATE AND TRANSPORT STUDY: Model based method to objectively estimate the effects of natural processes on the stability and distribution of contaminants in the environment.

FEASIBILITY STUDY: Study performed to evaluate whether certain actions taken to clean up contamination will work, how well they will work, and what is the most cost effective option to use.

FILTER SEPARATOR: Device that separates non-dissolved contamination (NAPL) from water.

FLAME-IONIZATION DETECTOR (FID): Equipment used to either detect gross VOC contamination, or through use of capillary chromatograph columns, to identify and quantify concentrations of selected volatile compounds.

FREE PRODUCT: The petroleum product that resides in the spaces between the soil particles or floats on top of the groundwater and is generally more accessible for removal or treatment.

FUEL FINGERPRINT ANALYSIS: An attempt to determine identifying characteristics of a particular type of fuel.

FUND: The Underground Storage Tank Cleanup Fund. See CLEANUP FUND.

GENERATOR: (1) Any person whose process produces a hazardous waste in excess of 100 kg/month or acutely hazardous waste in excess of 1 Kg/month, or whose actions first cause a hazardous waste to become subject to regulation. (2) A device that produces electricity for remote sites that are not accessible to standard electrical sources, usually petroleum fuel driven.

GEOLOGIST AND GEOPHYSICIST ACT: California law requiring that any firm advertising geological services must have a registered professional as an officer of the corporation. Section 7838 of the Business and Professional Code.

GROUNDWATER: The water contained in the pore spaces of saturated geologic media.

GROUT: A watery mixture of cement (and commonly bentonite) without aggregate that is used to seal the annular space around well casings to prevent infiltration of water or short circuiting of vapor flow.

HAND AUGER: Hand held earth boring tool (see AUGER).

HYDROGEOLOGY: Scientific consideration relating to geological formations, soil, surface water, and groundwater.

HYDROCARBON: Chemical compounds composed of carbon and hydrogen.

IN-SITU: In its original place; unmoved; unexcavated; remaining in the subsurface.

INJECTION WELL: Well used to inject a fluid (liquid or gas) into the subsurface.

INTERFACE PROBE: Device that measures the depth to the top of non-dissolved contaminants and the depth of the liquid-water interface.

INTERIM REMEDIAL ACTIONS: Actions taken, as required, to prevent further spread or damage to the environment from the contaminants; usually takes the form of free product removal.

INTERNAL COMBUSTION UNIT (ICU): Similar to an automobile engine (often created using an auto engine) used to combust petroleum vapors.

LAND FARMING: Method of removing petroleum compounds from soils. Contaminated soils are removed from the ground, spread out, and periodically, tilled to speed up the release of VOC's and breakdown of the contaminants. See AERATION.

LANDFILL: Landfills are principally disposal sites for municipal refuse and some industrial wastes. Some landfill may accept petroleum contaminated wastes depending upon their permits.

LITHOLOGY: Gross physical character of a rock or rock types in a stratigraphic section.

LOCAL OVERSIGHT AGENCY: The department, office, or other county or city agency designated to have oversight authority for directing the remediation of an unauthorized release.

LOWER EXPLOSIVE LIMIT (LEL): The concentration of a gas below which the concentration of vapors is insufficient to support an explosion.

LUFT MANUAL: A field manual to provide practical guidance to regulatory agencies, consultants, and RP's in investigating and remediating their sites.

MARKUP: The costs the corrective action firms tack on to the subcontractor’s bills to cover insurance and processing costs.

MOBILIZATION: Move equipment onto location.

NEW AND INNOVATIVE TECHNOLOGIES: Technologies that do not have a definite proven track record and may encounter regulatory and technological difficulties.

NON-AQUEOUS PHASE LIQUID (NAPL): Contaminants that remain as the original bulk liquid in the subsurface. See FREE PRODUCT.

O & M SUPPLIES: Operation and maintenance supplies such as oil, filters etc.

ON-SITE LABS: Laboratories capable of running analytical tests on-site as work is being performed.

OPERATOR: Any person in control of, or having responsibility for the daily operation of a UST containing petroleum.

OSHA EQUIPMENT: Equipment required by the Occupational Safety and Health Administration to protect worker health and safety.

OWNER: The owner of an underground storage tank containing petroleum. Includes any person who has legal title to a UST and any owner of real property who is a de facto owner of a UST located on such property.

OVERHAULS: To disassemble, repair, or replace parts and reassemble a given piece of equipment after a period of usage.

OVERHEAD: Indirect costs of doing business such as, building rent, telephone connection, power, etc.

PCB's, IGNITABILITY, CORROSIVITY, REACTIVITY, BIOASSAY: An array of analytical tests that may be required to dispose of soil.

PETROLEUM: Crude oil, or any fraction thereof, which is liquid at standard conditions of temperature of pressure, which means at 60 degrees Fahrenheit and 14.7 pounds per square inch absolute pressure.

PHOTO-IONIZATION DETECTOR (PID): Instrument to detect either gross total contamination or through use of capillary chromatography column, to identify and quantify concentrations of selected volatile compounds.

PILOT TESTS: Operation of a small-scale version of a larger system to gain information relating to the anticipated performance of the larger system. Pilot test results are typically used to design and optimize the larger system.

PRESSURE WASHER (COLD WATER): Steam cleaner without steam (decontamination unit).

PROPOSAL: A detailed and itemized description of proposed costs prepared by a consultant of contractor that is specific to, and consistent with, a regulatory agency approved workplan and/or directive. See Three Bid Policy.

PUMP AND TREAT: A technique that brings contaminated groundwater above the ground through the use of extraction wells. The water is then treated; normally using granulated activated carbon, air stripping, or bioremediation.

PUMPS: A variety of devices used to move water to another location usually from a well.

PVC SCREEN: PVC Pipe with holes or slots along its length that allow fluid to enter.

QUARTERLY MONITORING REPORT: Report of activity at a site, usually to determine the effectiveness of remedial activities.

REGULATORY AGENCY: The State Board, a Regional Board, or any local, state, or federal agency which has responsibility or authority for regulating UST's or which has responsibility for cleanup and overseeing the cleanup from unauthorized releases from UST's.

RELEASE: Any spilling, leaking, emitting, discharging, escaping, leaching, or disposing from a UST into or on the waters of the state, the land, or the subsurface soils.

REMEDIAL ACTION PLAN: A detailed system design document prepared to remediate fuel contamination of soil or groundwater. Only prepared after the completion of a Corrective Action Plan has determined what is the most cost effective method to remediate the site. Not necessary in many cases.

RESPONSIBLE CHARGE: The independent control and direction, by the use of initiative, skill, and independent judgment, of the investigation or design of professional engineering work or the direct engineering control of such projects. Section 6703, Chapter 229 of the Business and Professional Codes.

RESPONSIBLE PARTY: Owner or operator of an underground storage tank ultimately responsible for the underground tank release.

RISK ASSESSMENTS: The quantitative evaluation of hazards posed by exposure to toxicants. Risk deduction through management of the contaminant source and/or the exposure conditions can serve as equally viable options to achieve the goal of public health and environmental protection. Thus risk assessment not only frames the regulatory problem, but also provides a process for choosing the potential solutions.

RISK-BASED CORRECTIVE ACTION (RBCA): Methodology used to evaluate the potential and existing risks of a contamination to determine if or how much, remediation is required.

RWQCB: Regional Water Quality Control Boards located in nine locations in California which have the authority for setting cleanup levels, and regulate waste discharges from point and non-point sources. May act as local oversight agencies.

SHORING: Devices used to keep sides of an excavation from caving in.

SITE INVESTIGATION/ASSESSMENT: Procedure conducted at a site to investigate and confirm suspected releases; determine the extent of contamination; and to assess the effects on human health and the environment. This information is used to evaluate whether cleanup is needed, and, if necessary, the implementation of cleanup.

SKIMMERS/SEPARATORS: Devices used to remove free product from water surface.

SLUG/BAIL TEST: Field test performed to measure aquifer parameters.

SLURRY: Weak concrete mixture used as backfill. See GROUT.

SOIL EXCAVATION: Removing soil from its original location.

SOIL GAS SURVEY: Collection of soil gas samples to test for the presence and lateral extent of contamination.

SOIL REMEDIATION: Any of a variety of techniques used to render soil non-contaminated.

SOIL VAPOR EXTRACTION: Remediation method that draws fresh air into the ground and brings contaminants up to the surface where they can be treated and safely discharged.

SOIL VAPOR TEST/SURVEY: Method used to collect and analyze volatile petroleum hydrocarbons from subsurface soils, vapor samples are collected from a borehole using a hand or vacuum pump and analyzed in the field.

STEP OUT BORINGS: Borings installed further out from sources of contamination to determine extent of contamination.

STOCKPILE CHARACTERIZATION: Analytical sampling of stockpiles to verify need for remediating on if clean.

STODDARD SOLVENTS: A widely used dry-cleaning solvent for spot and stain removal.

STORAGE TANKS: Any of a number of devices used to store material such as water, gasoline, diesel, etc.

SUBCONTRACTOR: If you choose a firm (i.e. consulting firm) to perform the corrective action, it is likely that they will subcontract various aspects of the work such as drilling, sample analysis, excavation activities, etc. to a subcontractor.

SURVEY EQUIPMENT: Equipment used to determine location and elevation of physical objects.

TEST PITS: Pits dug into ground in an attempt to define geological characteristics and contaminated locations

THERMAL DESORPTION: Soil treatment system designed to desorb volatile organic compounds from contaminated soil.

THERMAL OXIDIZERS: High temperature burners used for destroying volatile organic compounds in the vapor phase.

THREE BID REQUIREMENT: Three bids required by the Fund from contractors.

TOTAL PETROLEUM HYDROCARBONS (TPH): A measure of the concentration of mass of petroleum hydrocarbon constituents present in a given sample of air, water, or soil. The level of TPH can be used to determine the amount of contamination at a site.

TOXICITY: The property of a substance or mixture of substances to cause any adverse effects.

TRAFFIC CONTROL: People and, or equipment used to control flow of automobile traffic around site activities.

TRENCHING: Trenches dug in ground to install piping or to examine subsurface conditions.

TURBIDITY: Cloudiness in water due to suspended and colloidal organic and inorganic material.

UNAUTHORIZED RELEASE: Any reportable unauthorized release of petroleum from a UST.

UNDERGROUND UTILITY CHECK: A check for buried utilities such as power, gas, and telephone to prevent accidents during site work.

UNDERGROUND STORAGE TANK (UST): A tank and any underground piping connected to the tank that has 10 percent or more of its volume (including pipe volume) beneath the surface of the ground.

UPGRADIENT: In the direction of increasing potentiometric (piezometric) head. The direction water and contaminant would normally flow from without any other influences.

VADOSE ZONE: The zone in between land surface and the water table within which the moisture content is less than saturation (except capillary fringe).

VAPOR EXTRACTION TEST: Field test to measure the efficacy of using vapor extraction as a potential remedial option.

WATER LEVEL INDICATOR: Device to measure the depth to water in a well.

WATER TABLE: The water surface in an unconfined aquifer at which the fluid pressure in the pore spaces is at atmospheric pressure.

WELL COVERS: Cover over wells which provide well protection to prevent entry of surface waters, accidental damage, unauthorized access, and vandalism.

WELLHEAD: The area immediately surrounding the top of a well, or the top of a well casing.

WORKPLANS: Description of work to be performed that is submitted to regulatory agency for approval

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