REVISED AND MODIFIED WORK PLAN FOR THE REMOVAL OF UNDERGROUND STORAGE TANKS AND INSTALLATION OF GROUNDWATER MONITORING WELLS

Aug 19, 1991

PHASE I SITE CHARACTERIZATION PROGRAM

HARRISON STREET GARAGE 1432 HARRISON STREET OAKLAND, CALIFORNIA 94612

Prepared by:

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August 19, 1991

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SCS ENGINEERS

August 19, 1991 File No. 0390044.02

Mr. Paul Smith Alameda County Health Care Services Division of Hazardous Materials Department of Environmental Health 80 Swan Way, Room 200 Oakland, California 94621

Subject: Modified Work Plan for

Removal of Underground Storage Tanks

and Preliminary Site Investigation

Harrison Street Garage 1432 Harrison Street

Oakland, California 94612

Dear Mr. Smith:

Pursuant Alameda County Health Care Services' (ACHCS) letter dated July 12, 1991, SCS Engineers (SCS) is submitting this revised and modified work plan, including the appended Underground Tank Closure Plan, Health and Safety Plan, and other supporting documentation, for the 1) proposed removal of four abandoned underground storage tanks (USTs), three hydraulic lifts and associated facilities, and 2) initial installation of groundwater monitoring wells at the Harrison Street Garage, 1432 Harrison Street, Oakland California. The supporting documentation includes: copies of tank removal contractors' insurance certificates, plot plan, and a deposit check for \$1000 (as per 1991 Alameda County deposit fee schedule) to cover the cost of County review and administration.

Mr. Paul Smith August 19, 1991 Page Two

In this revised work plan SCS has made an attempt to address all issues outlined in ACHCS' letter, by incorporating the required changes in the work plan. The investigation and subsequent analysis outlined in this work plan will be conducted in accordance with the guidelines of Tri-Regional Board Staff Recommendations for Preliminary Evaluation and Investigation of Underground Tank Sites dated August 10, 1991 (Tri-Regional Recommendations).

Following ACHCS' concern regarding the concentration of benzene in the gasoline tanks on the Harrison Street, SCS collected liquid samples from the tanks in your presence and analyzed for benzene by EPA Protocol 8240. The results of the analysis indicated a benzene concentration of 1.8 percent which is a normal percentage for gasoline. Based on these results, it is SCS' opinion that our existing safety procedures are adequate for the underground storage tanks removal and preliminary site investigation. SCS proposes no revision to the Health and Safety plan outlined in our work plan dated June 6, 1991.

The tasks to be completed as part of this work plan constitute Phase I of the site characterization and assessment program for this site. After completing all the tasks outlined in this phase a detailed report describing SCS' findings, evaluation, and recommendation will be submitted along with a work plan for Phase II of site characterization/remediation program.

Mr. Paul Smith August 19, 1991 Page Three

This work plan will be implemented immediately following the County's approval. If there are any questions, please contact any of the undersigned at (415) 829-0661.

Sincerely,

Nels R. Johnson, P.E.

Senjor Project Engineer

SC\$ Engineers

Thomas D. Gilmore

Staff Geologist

SCS Engineers

NRJ/JPC/TDG/PNR:egh

John P. Cummings, Ph.D., R.F.A., R.E.P.

Office Director SCS Engineers

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Staff Engineer

SCS Engineers

CONTENTS

<u>Section</u>		<u>Page</u>
1	Project Description	1
2	Site Description and History	2
	Results of Previous Investigations	
	Waste Oil Tanks	
	Gasoline Tanks	
	Hydraulic Lift Area	
3	Project Organization and Functional Responsibilities	10
	List of Project Personnel	
	SCS Engineers	
	Subcontractors	
	Contract Analytical Laboratory	10
	SCS Engineers Organizational Structure	
	Functional Responsibilities	
	Project Director/Health and Safety Officer	
	Technical Advisor/Quality Assurance Officer	
	Project Manager	
	Field Manager	
	Field Geologists/Engineers	
4	Field Activities	14
	Introduction	14
	Location of Underground Utilities	
	Collection of Samples from Wash Rack Sump	
	and Collection Drain Areas	
	Tank and Lift Removals	
	Collection of Soil Samples	
	Installation of Groundwater Monitoring Wells	21
	Placement Rationale	
	Drilling and Installation of Wells	
	Well Construction	
	Well Development	
	Water-Level Measurement	27
	Collection of Groundwater Samples	28
	Sample Handling	30
5	Documentation of Chain of Custody	32

Contents (Continued)

6	Analytical Services and Quality Assurance Procedures 34
	Analytical Services
	Quality Assurance Procedures
	Field Quality Assurance
	Laboratory Quality Assurance
pendic	ces

<u>App</u>

- Alameda County Underground Tank Closure Plan Α
- В Health and Safety Plan
- Tank Removal Contractor's Workman's Compensation Insurance Certificates \mathbf{C}
- **SCS** Forms D
- Statement of Qualifications, SCS Analytical Laboratory E

LIST OF FIGURES AND TABLES

Figures		Page
1.	Site vicinity map	3
2.	Site plan, showing locations of groundwater monitoring wells	4
3.	Detailed site plan of Alice Street basement, showing locations of waste oil tanks and associated facilities	7
4.	Detailed site plan showing locations of hydraulic lifts and suspected underground fluid reservoir	9
5.	Unified Soil Classification System chart showing soil types and categories	23
6.	Typical well construction details for the installation of groundwater monitoring wells	25
<u>Tables</u>		
1.	Previous analytical test result, based on soil and groundwater samples collected and analyzed by Subsurface Consultants in October 1990	5
2.	Summary of Laboratory Analyses to be performed on samples collected as part of this investigation,	17

SECTION 1 PROJECT DESCRIPTION

This modified work plan, including the appended Underground Tank Closure Plan and supporting documentation (Appendices A, B, C, D, and E), outlines the proposed field operations and associated analytical test services to be provided by SCS Engineers (SCS) for the proposed removal of abandoned underground storage tanks (USTs) and associated facilities, including hydraulic lifts, at the Harrison Street Garage, 1432 Harrison Street, Oakland, California. Alameda County issued the original Cleanup Order to the property owners on September 24, 1990. This modified work plan is being submitted pursuant to a recent agreement between Alameda County, SCS Engineers, and attorneys representing the property owners and District Attorney's office, dated April 26, 1991, to excavate and remove the existing tanks and associated facilities prior to the implementation of a more detailed site characterization and assessment program involving the drilling and installation of soil borings and monitoring wells and collection of representative soil and groundwater samples. The tasks to be completed as part of this work plan constitute Phase I of the site characterization and assessment program for this site. Following is a brief background and description of the site, including tank locations and conditions, investigative and remedial actions which have been performed to date, and current plans to remove the tanks, including sample collection procedures and proposed analytical tests to be conducted.

SECTION 2 SITE DESCRIPTION AND HISTORY

The subject site is located in downtown Oakland and is bordered by Harrison Street on the west and Alice Street on the east, between 14th and 15th Streets (Figure 1). Lake Merritt is located approximately one-quarter mile east of the subject site. Figure 2 presents a site plan that outlines the building perimeter, adjacent streets, and suspected locations of both on-site and off-site USTs.

A garage facility utilized for parking automobiles and light trucks currently exists on the site, and essentially consists of two directly adjoining buildings. The first is the principal entrance to the parking garage at 1432 Harrison Street. This single-story building contains a partial mezzanine and is constructed of timber and masonry. The second is a multi-story garage that is on the Alice Street portion of the property and is constructed of reinforced concrete. Historical aerial photographs date construction of the buildings back some forty to fifty years.

Results of Previous Investigations

Previous investigations by others indicate that the soil is contaminated beneath the site and that such contamination includes measurable quantities of gasoline and diesel fuels, benzene, toluene, ethylbenzene, and xylenes (BTEX) aromatic constituents, and PCBs. The reported analytical results (Table 1) are based on analyses of selected soil samples collected during the drilling of 6 exploratory borings by Subsurface Consultants in October 1990. The Subsurface Consultants' report also indicates that subsurface materials consist primarily of dense, fine-grained sands containing varying amounts of clay and silt. Published geologic maps indicate that these sediments are part of the Merritt Sand Formation. Groundwater was encountered by Subsurface Consultants during the drilling at depths ranging from 23 to 25 feet below the Harrison Street grade. Information regarding groundwater flow direction is not available; however, it is presumed to flow eastward toward Lake Merritt.

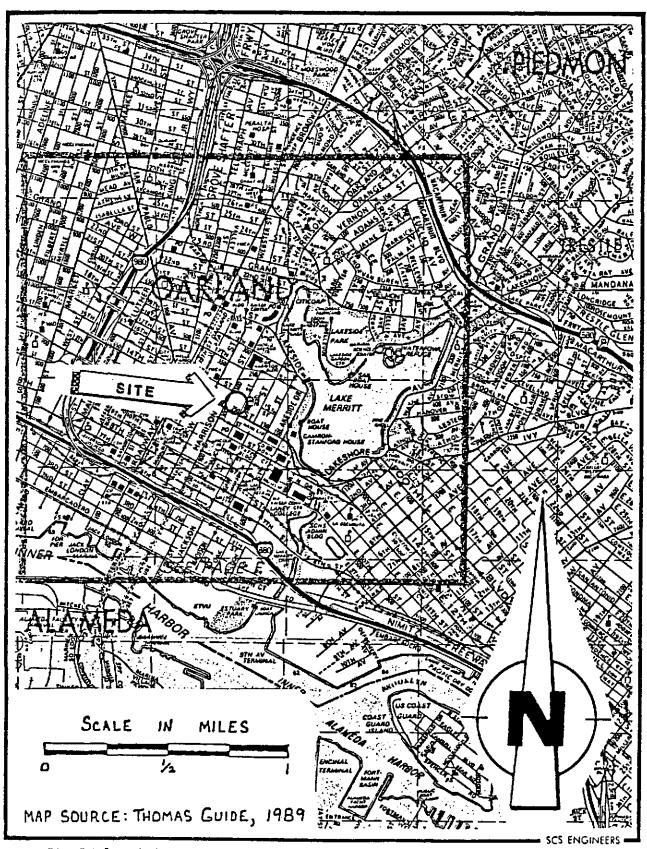


FIGURE 1: Vicinity Map Showing the Location of Subject Site

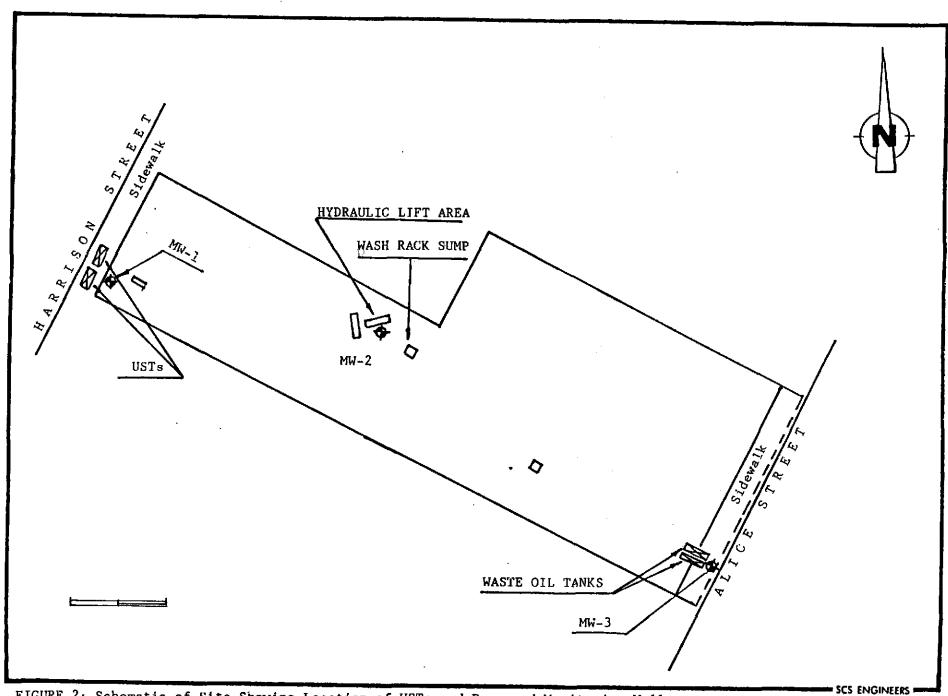


FIGURE 2: Schematic of Site Showing Location of USTs and Proposed Monitoring Wells

TABLE 1. CONTAMINANT CONCENTRATIONS IN SOIL

(Results of Subsurface Consultants October 1990 Investigation)

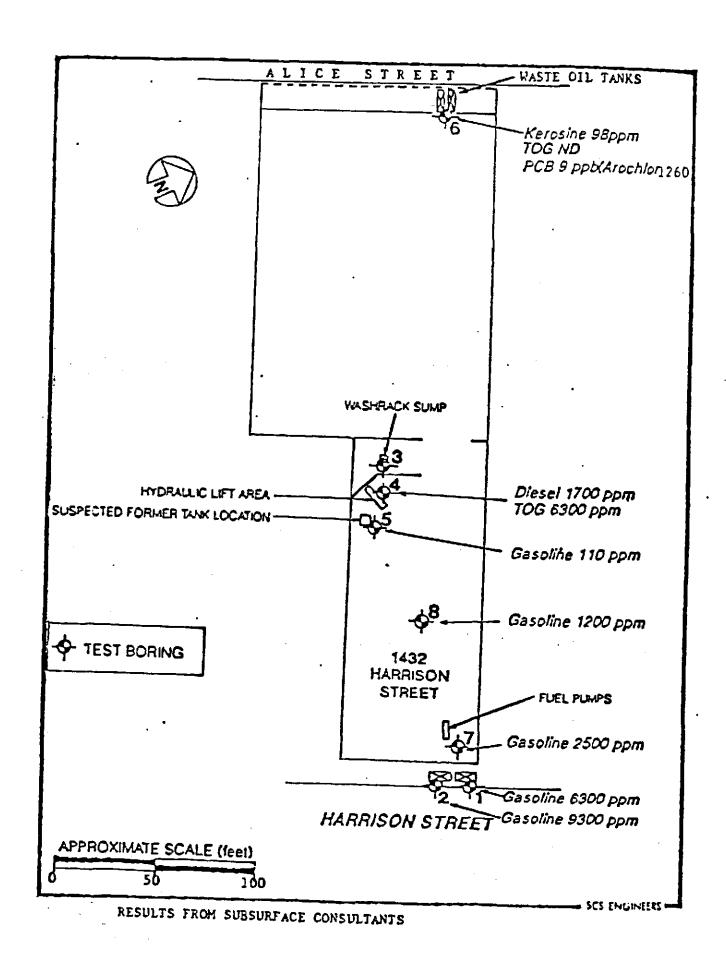
Boring No. & Depth (ft)	TVH ¹ (ppm)	B ² (ppb)	T ³ (ppb)	X ⁴ (ppb)	X ⁵ (ppb)	TOG ⁶ (ppm)	TKH ⁷ (ppm) <u>Keros./Diesel</u>	OTHER 8010/Sol Pb/PCBs /(ppm)/(ppb)
B1 @ 20	6,300	99,000	490,000	610,000	110,000	8	/	/
B2 @ 18.5	9,300	98,000	900,000	1,100,000	190,000		/	/0.21/
B3 (in sump)			***				/	/
B4 @ 10						6,300	ND ⁹ /1,700	//
B5 @ 22.5	110	24	210	1,300	69		/	/ -
B6 @ 9		ND	ND	ND	ND	ND	98/ND	ND/0.06/9
B6 @ 9.5						ND	140/ND	(Arochlor 1260)

- 1 Total Volatile Hydrocarbons, mg/kg = ppm
- 2 Benzene, ug/kg = ppb
- 3 Toluene
- 4 Xylene
- 5 Ethylbenzene
- 6 Total Oil & Grease
- 7 Total Extractable Hydrocarbons (as kerosene and diesel)
- 8 --- = Not tested for
- $9 ext{ ND} = ext{Not detected}$

TABLE 1. CONTAMINANT CONCENTRATIONS IN SOIL (CONT'D) (Results of Subsurface Consultants October 1990 Investigation)

Boring No. & Depth (ft)		B ² (ppb)	T ³ (ppb)	x ⁴ (ppb)	X ⁵ (ppb)	TOG ⁶ (ppm)	TKH ⁷ (ppm) Keros./Diesel	OTHER 8010/Sol Pb/PCBs /(ppm)/(ppb)
B7 @ 13	ND	ND	ND	ND	ND			
B7 @ 20	2,500	3,500	34,000	130,000	33,000	***	/	/0.07/
B8 @ 22.5	1,200	2,300	38,000	89,000	18,000		/	/-

- Total Volatile Hydrocarbons, mg/kg = ppm
- Benzene, ug/kg = ppb
- Toluene
- Xylene
- 5 Ethylbenzene
- Total Oil & Grease
- Total Extractable Hydrocarbons (as kerosene and diesel)
 --- = Not tested for
- ND = Not detected



Suspected sources of contamination may include either on-site and/or off-site USTs. The lateral and vertical extent of contamination has not yet been defined. A previous geophysical investigation by J. R. Associates completed in August 1990 disclosed the presence of several USTs and associated facilities within the boundaries of the subject site. A description of these tanks and a summary of investigative and remedial actions which have been performed to date are presented below.

Waste Oil Tanks

Two waste oil tanks are located beneath the basement floor of the multi-story parking structure along Alice Street. Figure 3 shows the tanks and associated piping and vent lines in the area. The date of installation of these tanks is unknown. No records have been located which have documented the capacity or composition of these tanks. However, it is believed that each tank has an approximately 1000-gallon capacity and is of steel construction. On October 27, 1990, Falcon Energy drained the contents of both tanks by removing a combined total of 1300-gallons of waste oil from them.

Gasoline Tanks

Two gasoline tanks are located near the western property boundary beneath the Harrison Street sidewalk in front of the entrance to the garage. Permits issued to a former long-term tenant of the garage, Douglas Motor Services, show that these tanks each have 1000-gallon capacities, are of steel construction, and were installed in 1975 and 1982, respectively. On October 27, 1990, Falcon Energy removed most gasoline (total less than 200 gallons) from the tanks. The condition of these two tanks is unknown, although a sample collected from one was discolored by rust. The recovered gasoline and waste oil was accepted and utilized by a recycling contractor.

It should be noted that there is evidence of two other abandoned-in-place USTs a few feet west of the above-described gasoline tanks, beneath the Harrison Street sidewalk of the adjacent property. These tanks and property are owned and operated by other parties.

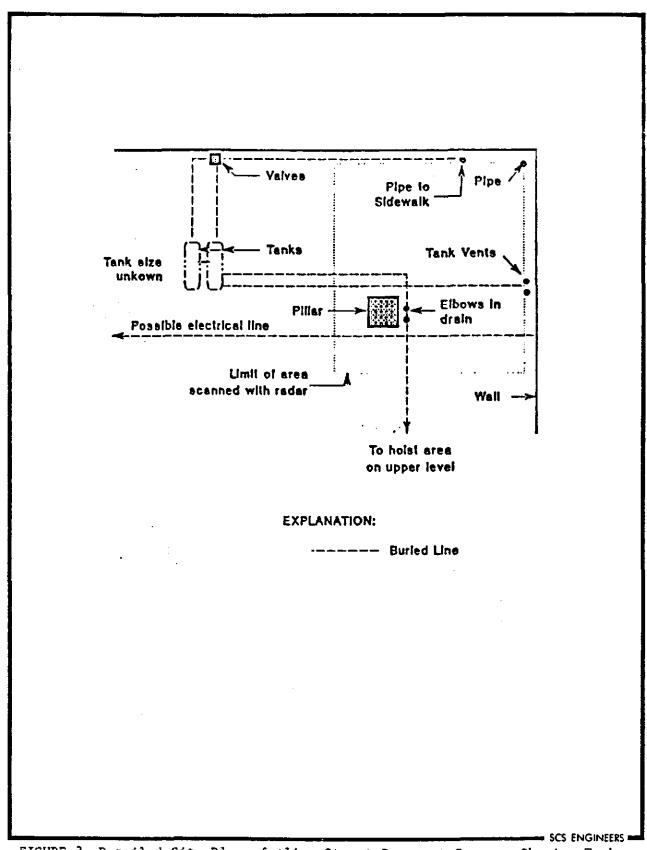


FIGURE 3: Detailed Site Plan of Alice Street Basement Garage, Showing Tank and Associated Piping Locations based on Geophysical Survey

Hydraulic Lift Area

The recent J. R. Associates geophysical investigation also identified a probable underground fluid reservoir located near the hydraulic lift area as well as three hydraulic lift rams inside the Harrison Street parking garage. Figure 4 shows the hydraulic lifts and associated piping in the area; the area of the Ground Penetrating Radar (GPR) anomaly marks the suspected location of the underground fluid reservoir.

There is no available record to indicate that integrity testing has ever been performed on any of the above-described tanks. The tanks are suspected to be the principal source(s) of the site's contamination. However, the time(s) of occurrence and total quantity of product(s) lost cannot be estimated at this time.

FIGURE 4: Detailed Site Plan of Hydraulic Lift Area in upper Harrison Street Garage, Showing Lift and associated Piping and Suspected Underground Fluid Reservoir (GPK anomaly) areas

SECTION 3

PROJECT ORGANIZATION AND FUNCTIONAL RESPONSIBILITIES

LIST OF PROJECT PERSONNEL

SCS Engineers

Dr. John P. Cummings, Project Director and Health and Safety Officer

Mr. David E. Ross, P.E., Technical Advisor And Quality Assurance Officer

Mr. Nels R. Johnson, P.E., Project Manager

Mr. Jack N. Alt, Certified Engineering Geologist

Mr. J. Don McClenagan, Field Manager

Mr. Thomas D. Gilmore, Field Geologist

Ms. Adi Constantinescu, Field Geologist

Mr. Prabhu N. Ravandur, Field Engineer

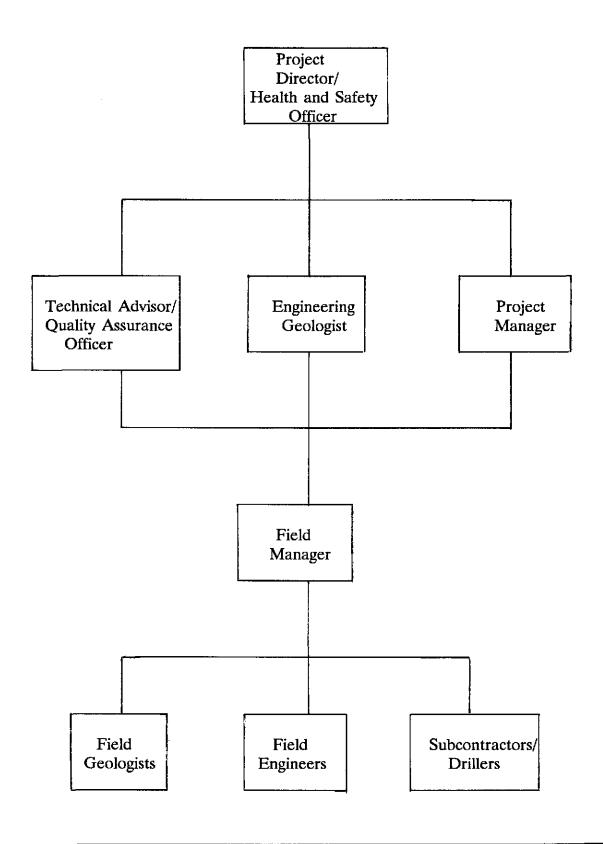
Subcontractors

SCS Field Services
J R Associates
HEW Drilling Company
Hogate Exploration
Bay Area Exploration

Contract Analytical Laboratory

SCS Analytical Laboratory 2860 Walnut Avenue Long Beach, California 90806

SCS ENGINEERS ORGANIZATIONAL STRUCTURE



FUNCTIONAL RESPONSIBILITIES

Project Director/Health and Safety Officer

The Project Director (PD) will be responsible for overall project management and supervision. In this capacity, he will also closely coordinate with USACE Project Managers in order to assure satisfactory, accurate, and timely completion of all field operations, interpretation of laboratory analytical results, establishment of and compliance with quality-assurance procedures, and other characterization activities as required. For this project, the PD also will serve as the Health and Safety Officer (HSO). In this capacity, his responsibilities will include development, implementation, and updating of the Health and Safety Plan, including assessing, and interpreting the results of site monitoring and evaluation of health hazards, with specific application to determination of appropriate corrective actions or changes in required Personal Protective Equipment (PPE) that may be mandated by changes in site working conditions or environment.

Technical Advisor/Quality Assurance Officer

The Technical Advisor (TA) will provide technical support and expertise to the project as required by specific site conditions or problems that may be encountered during the course of either field operations or interpretation of analytical results. Such conditions may include, but are not limited to, discovery of unusual and/or complex combinations of contaminants, characterization or assessment of complex or interactive contaminant plumes or migration patterns, or interpretation of ambiguous laboratory results. For this project, the TA also will serve as the Quality Assurance Officer (QAO). Because the TA/QAO is affiliated with the Long Beach Office of SCS Engineers, his QA responsibilities are separate and independent from the Dublin Office-based project management, although he will report directly to the Project Director. In this capacity, the QAO will assess, initiate, carry out, and review corrective actions required to maintain adequate quality-assurance procedures for the field collection and laboratory analysis of samples interpretation of results, and chemical characterization of the site.

Project Manager

The Project Manager (PM) will be responsible for the day-to-day management of all operations associated with the site characterization program. In this capacity, he will be responsible for conducting and coordinating smooth and timely completion of the field operations, ensuring adequacy and completeness of the sampling and monitoring program and resulting characterization, and resolving any unanticipated problems or difficulties that may occur during the daily operations. In addition, the <u>PM</u> will be responsible for maintaining compliance with the Health and Safety Plan and will audit site health and safety practices, decontamination, and environmental monitoring activities.

Field Manager

The Field Manager (FM) will be responsible for overseeing daily activities of the sampling and monitoring program. He will also monitor job progress and overall Health and Safety Plan compliance.

Field Geologists/Engineers

During drilling, well installation, water-level measurement, and sample collection activities, field geologists and/or engineers will identify sampling locations and depths, collect and preserve soil samples, log soil conditions, measure water depths, collect and preserve representative groundwater samples, complete Chain-of-Custody documentation, and ship samples to the laboratory.

SECTION 4 FIELD ACTIVITIES

INTRODUCTION

The planned field activities for this first phase of the contamination characterization program include removal and disposal of the USTs and hydraulic lifts, collection of soil samples from all excavated tank pits, collection of sludge and water samples from the wash rack sump area, basement collection drain and capped pipe in the basement, installation of a total of three groundwater monitoring wells, (one adjoining the gas UST, one adjoining the waste oil UST and one adjoining the hydraulic lifts), well development and collection of representative groundwater samples.

The field methodology and laboratory analytical procedures to be used in the collection, analysis, and interpretation of chemical data for this contamination characterization program and their basis are outlined and described below. The <u>purpose</u> of the planned operations is to: 1) remove probable sources of contamination presently on-site, 2) identify contaminants in both soil and groundwater, 3) characterize the lateral and vertical extent of contamination, 4) identify concentration levels, and 5) identify the probable direction of movement (if any) of soil and /or groundwater contamination at the Harrison Street Garage.

Installation of groundwater monitoring wells will permit the collection and analysis of representative groundwater samples surrounding the tank and lift sites in order to define the nature, extent, and concentration of contamination and to discern the probable source and direction of movement of the contamination. Periodic measurement of groundwater levels in the wells will provide information concerning site-specific hydrologic conditions and temporal changes in water levels, which will in turn permit establishment of a groundwater gradient and probable direction of flow. Similarly, soil samples collected at the time of monitoring well installation and from additional, strategically located soil borings (to be drilled during a subsequent phase of site characterization) will permit

characterization of the nature, probable source, extent, and concentration levels of any potential soil contamination in the designated areas.

Completion of the above elements is expected to permit initial characterization and assessment of the nature and extent of any soil and/or groundwater contamination present at the three individual sites being investigated. Interpretation and integration of analytical test results will permit: (1) qualitative and quantitative determination of whether chemical releases to the environment have occurred, (2) identification of probable sources and extent of contamination, (3) identification of chemical constituents and concentration levels of any contamination present, which will in turn indicate the appropriate method of disposal and/or remediation, and (4) determination of whether additional or more detailed characterization of any individual site may be required.

All field operations will be conducted and analytical test results determined so as to fully comply with all applicable federal, state, and local regulations governing underground storage tanks. The field procedures described below have been developed and will be implemented so as to meet the minimum standards or requirements outlined in the State Water Resources Control Board's (SWRCB) LUFT Field Manual (dated May 1988, and revised in part April 5, 1989) and the Tri-Regional Board Staff Recommendations for Preliminary Evaluation and Investigation of Underground Tank Sites (dated 10 August, 1990). The results of this characterization investigation will provide the basis for addressing the next phase of cleanup operations.

The sampling and analytical procedures presented in this plan will ensure that characterization of all contaminants suspected to be present is complete; consistent and reproducible sampling methods are used; proper analytical methods are applied; analytical results are accurate, precise, and complete; and the overall objectives of the contamination characterization and monitoring program are achieved. These procedures will be performed in accordance with the Tri-Regional Board Staff Recommendations document (10 August, 1990). The analyses to be performed on discrete samples collected from each

suspected source area are summarized in tabular form as Table 2. The full complement of analytical tests specified for each suspected source area (Table 2) will be performed during the initial soil sampling round associated with the tank and lift removals and the monitor well installations, including the initial groundwater samples. If certain constituents or classes of constituents are "not-detected" during the initial round, then, as previously agreed to (May and July 1991) and in concurrence with the County and RWQCB, subsequent analyses may be limited to only those constituents or methods which initially produced detectable concentrations. Such a program may result in substantial savings in both time and money, to the client, without sacrificing adequacy of cleanup, and is in keeping with the cost-reduction purpose stated in Appendix A, Page A-1, of the Tri-Regional Board Recommendations: "We do not believe that the best interest of the tank owner is served by prolonging the investigation and subsequent cleanup. Both inflation and changing laws and regulations will escalate costs to the tank owner. Also, the ability to construct on property or to transfer ownership will be severely restricted, usually by the lending institution, not the regulating agency."

The remainder of this work plan consists of sections that describe in detail the various elements of the Phase I Site Characterization Program, including: Tank and lift removal, installation of monitoring wells, procedures for soil sample collection, groundwater level measurement and groundwater sample collection. In addition, documentation of Chain-of-Custody, analytical services, and quality assurance procedures are described.

LOCATION OF UNDERGROUND UTILITIES

Prior to the beginning of any field drilling or tank removal operations, Underground Service Alert (U.S. Alert) will be contacted in order to locate any underground utilities present near the proposed investigative areas around each former tank site. In addition, a geophysical survey utilizing ground penetrating radar may also be conducted to locate the same. Such utilities will include, but may not be limited to:

- Water
- Storm and Sanitary Sewer

TABLE 2

LABORATORY ANALYSIS SUMMARY
FOR COLLECTED SOIL AND WATER SAMPLES

<u>Location</u>	TPH-G ¹	$TPH-D^2$	BTEX ³	$O.L.^4$	O&G ⁵	CIH ⁶	PCB's ⁷	PPM ⁸
Gasoline Tanks (MW-1)	X	X	X	X	X	X	X	X
Hydraulic Lift (MW-2)		X	X		X			
Waste Oil Tanks (Basement MW-3)	X	X	X		X	X	X	X
Wash Rack Sump	X	X	X		X	Ϋ́	*	X,
Collection Drain & Capped Pipe (Basement)	X	x	X		X	X		X

- 1. Total Petroleum Hydrocarbon as GAS (EPA 8015 Mod) -
- 2. Total Petroleum Hydrocarbon as Diesel (EPA 8015 Mod)~
- 3. Benzene, Toluene, Ethylbenzene, Xylene (EPA 8240)
- 4. Organic Lead (DOHS MIBK Method)
- 5. Oil & Grease (EPA 413.1)
- 6. Chlorinated Hydrocarbons (EPA 8240)
- 7. Polychlorinated Biphenyls (EPA 8080)
- -8. Priority Metals (Pb, Ni, 2N, Cr, Cd)

- Electric Power Lines
- Telephone
- Natural Gas and other High-pressure Fuel Lines
- Cable Television
- Other Facilities, such as Steam, Vacuum, or Compressed Air Lines
- Underground Storage Tanks and Associated Vent Lines or Dispenser Facilities

Precise field location of existing utility lines (or other unanticipated field conditions) may dictate the need to slightly modify proposed field locations of borings in order to avoid potential damage to the existing lines. SCS Engineers will contact the County for its approval of any such locational changes prior to the initiation of actual field work at those locations.

Identification of buried pipes or drain lines in the basement and their respective outlets or sewer hookups is of concern. The destination of discharge originated from the drains in the basement is not certain. As-built drawings for the building and city public sewers will be examined from City files, if available. If adequate records are not available, a pipe-locating service or geophysical survey will be employed in order to determine the probable routes and destinations of the basement drain lines.

COLLECTION OF SAMPLES FROM WASH RACK SUMP AND COLLECTION DRAIN AREAS

Liquid and/or sludge samples will be collected for analysis from three possible contamination source areas, including 1) the wash rack sump area in the Harrison Street garage 2) the collection drain in the Alice Street Basement and 3) the capped pipe also in the Alice Street basement. Analysis of these samples will permit identification of the contents of these areas, which currently are unknown, and will provide the basis for further drilling and sampling during a subsequent phase of characterization.

Liquid and/or sludge samples, if available, will be collected from the wash rack sump and/or adjoining lift ram. A preliminary field reconnaissance indicated that no water was

present in the sump area, although water was present in the adjoining lift ram. There is a sufficient amount of sludge or other solid residue present in the immediate sump area to collect a representative sample for analysis. Sludge will be collected using either a stainless steel or disposable plastic scoop and retained in a wide-mouth jar with a non-reactive screw-top. Representative water samples will be collected from the ram next to the sump using a disposable bailer. No water from the ram will be purged prior to sampling, as it is unknown how much product is available. The initial sample collected will be examined for the presence of floating, free product, which, if observed, will be measured and described, and any other distinguishing characteristics will be noted. A minimum of two 1-liter bottles and four 40-ml VOA vials will be collected. Samples will be sealed following collection, labeled, kept in cold storage (4°C), and transported with Chain-of-Custody documentation to a certified testing laboratory for analysis. The analyses to be performed are specified in Table 2.

Liquid samples also will be collected from the basement collection drain and capped pipe. Based on preliminary field reconnaissance, both these sources appear to contain only liquids. If a disposable bailer cannot be inserted into either opening, or if insufficient material is available, a hand-operated siphon pump with removable hoses will be used for sample collection; clean hose lines will be installed in order to avoid cross-contamination of samples between the drain and pipe sources. A minimum of two 1-liter bottles and four 40-ml VOA vials will be collected from each source, provided sufficient material is available to sample. The analytical tests to be performed on these samples are specified in Table 2.

TANK AND LIFT REMOVALS

The two gasoline USTs beneath the Harrison Street sidewalk, the two waste oil USTs in the Alice Street basement, and the three hydraulic lifts and possible associated hydraulic fluid reservoir, and any associated product piping or vent lines that are exposed all will be removed and disposed of by a State-licensed hazardous materials contractor, after first being properly cleaned, vented, degassed, and inerted. Manifests (to be appended to the

tank removal report) will document proper treatment, storage, and disposal of all tanks, associated piping, and rinsate solutions.

It is anticipated that all excavation spoils will be retained on-site until disposition can be determined. Stockpiled soil will be covered over and underneath with visqueen material as required to keep contaminants contained. The open excavations will be barricaded and/or covered until disposition of the spoils can be determined (i.e., used as backfill or hauled off-site).

Collection of Soil Samples

Following excavation and removal of the tanks or lifts from each area, representative soil samples will be collected from each site and submitted to a State-certified analytical laboratory for testing. Two soil samples will be collected from beneath the ends of each tank or lift area. These samples shall be taken from native materials not to exceed 2 feet below the bottom of each end of the tank. Discrete soil samples also will be collected from beneath each hydraulic lift ram and fluid reservoir. Groundwater is not expected to be encountered in the excavation pit, however if present soil samples will be collected from the pit walls near the tank ends at the soil/groundwater interface. A water sample will also be collected from the excavation pit, where it is present.

Soil samples will also be collected at an interval of 20 feet for associated product piping that has been present as determined to be a conduit for hazardous materials. These samples will be collected and analyzed for the same constituents as the pertinent UST regardless of their disposition.

Additional soil samples will be collected from the excavation spoils piles. SCS Engineers proposes to collect two samples for every 50 cubic yards of soil removed. The samples will be discrete or discrete and composited by the laboratory (no field compositing). Additional analyses may be required, such as Title 22 and CAM 17 metals dependant on the disposal facility and its requirements for acceptance. The two gasoline tanks and the

two waste oil tanks should comprise one excavation each, and therefore, number of samples will be determined based on the volume of the soil removed. Same procedure will be followed regarding the number of samples in the removal of hydraulic lifts and associated reservoir. Since the exact physical size of the tanks is not known at this time, it is difficult to specify the extent of excavation at the site. However, based on the available details of the tank and their location, it is estimated that the preliminary excavation at the basement would be 14 ft x 14 ft x 12 ft and that on the Harrison Street would be 12 ft x 10 ft x 8 ft.

Soil samples will be collected and retained in clean brass sleeves, the ends sealed with teflon tape, capped with plastic end caps, sealed tightly with tape, labeled, and kept in cold storage (4°C) for transport to a State-certified laboratory. During sampling, samples may be screened in the field using both visual inspection and a portable organic vapor meter.

INSTALLATION OF GROUNDWATER MONITORING WELLS

Following removal of the tanks and lifts, a total of 3 groundwater monitoring wells will be installed, one adjacent to gasoline UST, waste oil USTs and hydraulic lifts. Installation of the initial 3 wells is expected not only to permit determination of a verified downgradient groundwater flow direction and to measure water levels, but also to meet the "within 10 feet (of a former tank site)" requirement specified by the Tri-Regional Recommendations (revised August 10, 1990, Page 11). Figure 2 shows the proposed locations of the monitoring wells, each in the presumed downgradiant (i.e., eastward) groundwater flow direction from the presumed source areas, which include: (1) the gasoline tanks (2) waste oil tanks and (3) hydraulic lift areas. Each well also will be used for sampling and monitoring during the next phase of the more detailed site characterization and assessment program.

Placement Rationale

The proposed wells are designed and will be sited so as to (1) permit computation of a verified downgradient groundwater flow direction, (2) measure water levels, and (3) optimally investigate the nature and levels of contamination both at known and suspected sources of contamination. A verified downgradient direction has not yet been established for this site; however, it is provisionally assumed to subparallel the local topographic slope. Consequently, and based on an assumed easterly direction of groundwater flow, contaminants which could move from their source are expected to migrate in a generally easterly direction toward Lake Merritt.

Drilling and Installation of Wells

The proposed groundwater monitoring wells will be installed using a hollow-stem auger drilling rig. Because of the height and clearance constraints imposed by the ceilings and access ways within the existing parking structure, a small skid-or trailer-mounted rig will be utilized inside the basement. The wells near the Harrison Street garage entrance and hydraulic lift areas will be installed using a conventional truck-mounted drilling rig.

The well installation will be coordinated by a field geologist, under the supervision of a State-registered Certified Engineering Geologist (CEG). The borings will be logged in the field by the field geologist, and soils encountered will be classified using the Unified Soil Classification System (Figure 5). Well logs for each boring showing lithologies encountered, depth to groundwater, and well construction details will be included in the final written report. A sample field boring log is shown in Appendix D.

The proposed borings will be approximately 6 inches in diameter. Borings will be drilled to a total depth of approximately 35 feet below the Harrison Street grade, or at least 10 feet below the groundwater surface. A previous subsurface investigation conducted at this site in October 1990 by Subsurface Consultants, encountered groundwater at an average depth of 23 to 25 feet below the Harrison Street grade. The augers will be steam-cleaned on site at the completion of each boring. Waste water and sludge from the steam cleaning

UNIFIED SOIL CLASSIFICATION SYSTEM

GENERAL SOIL CATEGORIES			SYM	BOLS	TYPICAL SOIL TYPES		
Sign		Clean Gravel with little or no fines Gravel with more than 12% fines	GW . M		Well Graded Gravel, Gravel-Sand Mixtures		
	GRAVEL More than half coarse fraction is larger than No. 4 sieve size		GP		Poorly Graded Gravel, Gravel-Sand Mixtures		
SOII			GM		Silty Gravel, Poorly Graded Gravel-Sand-Silt Mixtures		
COARSE GRAINED SOILS Note than half is larger than No. 200 sleve			GC		Clayey Gravel, Poorly Graded Gravel-Sand-Clay Mixtures		
E GR		Clean sand with little	sw		Well Graded Sand, Gravelly Sand		
OARS Ihan ha	SAND More than half coarse fraction is smaller than No. 4 sieve size	or no fines	SP		Poorly Graded Sand, Gravelly Sand		
O S		Sand with more than 12% fines	SM		Silty Sand, Poorly Graded Sand-Silt Mixtures		
			sc		Clayey Sand, Poorly Graded Sand-Clay Mixtures		
sieve			ML		inorganic Silt and Very Fine Sand, Rock Flour, Silty or Clayey Fine Sand, or Clayey Silt with Slight Plasticity		
INE GRAINED SOILS an half is smaller than No. 200 sleve		ND CLAY it Less than 50%	CL		Inorganic Clay of Low to Medium Plasticity, Gravelly Clay, Sandy Clay, Silty Clay, Lean Clay		
NED S					Organic Clay and Organic Silty Clay of Low Plasticity		
GRAI			мн		Inorganic Silt, Micaceous or Diatomaceous Fine Sandy or Silty Soils, Elastic Silt		
正 €	SILT AND CLAY Liquid Limit Greater than 50%				Inorganic Clay of High Plasticity, Fat Clay		
J.					Organic Clay of Medium to High Plasticity, Organic Silt		
	HIGHLY ORG	ANIC SOILS	PT		Peal and Other Highly Organic Soils		

FIGURE 5: Unified Soil Classification System Chart

and excavation spoils from drilling will be collected and transferred to 55-gallon drums for temporary storage on-site. The waste water and spoils will be analyzed and the results will dictate the final disposition.

Soil samples will be collected from each boring at a minimum interval of every 5 feet, and at the soil/groundwater interface (if encountered), with a Modified California split-spoon sampler. Samples will be retained in brass sleeves, examined, sealed with teflon, capped with plastic end caps, tightly wrapped with tape, labeled, and kept in cold storage (4°C) for transport to a chemical testing laboratory certified by the California Department of Health Services. Samples submitted for analysis of heavy metal constituents will be retained in glass jars with non-reactive lids. Samples will be screened in the field using a photo-ionization detector type organic vapor meter (OVM). Protocol for sample labeling is as follows: All samples will include identification of project name or number, date and time of sampling, drill hole or monitoring well number, sample number, sample depth, and requested analyses.

Well Construction

Typical well construction details for the installation of groundwater monitoring wells are shown in Figure 6. Each monitoring well will be constructed in the borehole using flush-mounted, threaded PVC well casing. As proposed, wells located inside the building will be two inches in diameter. Factory-slotted screen with 0.020-inch slots will be placed into the aquifer, with solid PVC pipe installed above. The perforated zone of the casing will be installed from about 5 feet above the groundwater surface to the total depth of the well, such that perforated casing extends at least 10 feet below the groundwater surface.

A perforated zone of this nature should accommodate anticipated seasonal water-level fluctuations at the site. A flush-mounted, threaded end cap will be placed on the bottom of the perforated section. Couplings between the casing sections will be flush-set, threaded pipe with no glued connections. All casings will be steam-cleaned prior to installation.

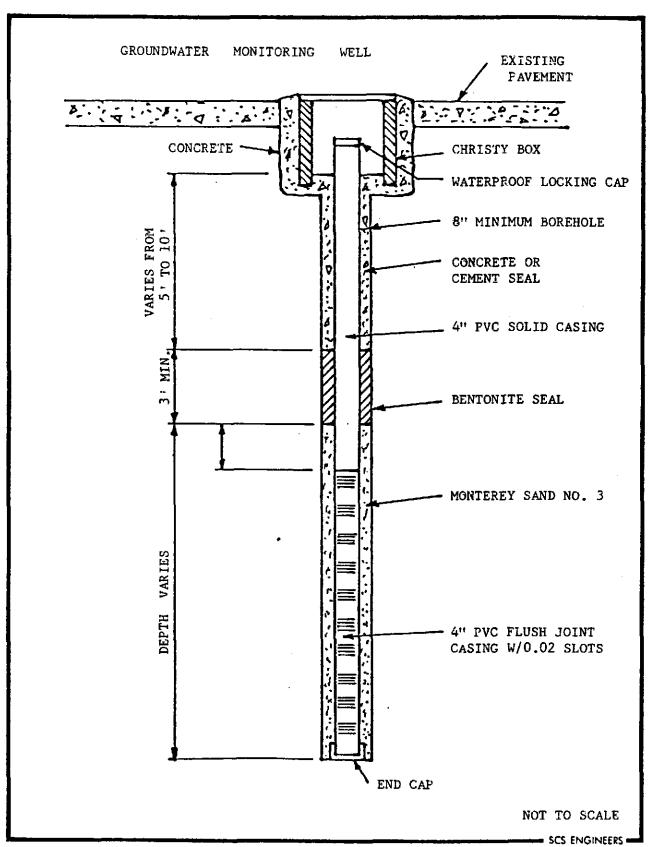


FIGURE 6: Typical Well Construction Details for the Installation of Groundwater Monitoring Wells

The well casing will be set inside the hollow augers prior to their removal in order to prevent caving of the hole prior to installation of the casing. The annular space surrounding the well screen will be filled with a filter pack, such as Monterey Sand No. 3, to a level at least 2 feet above the top of the screened interval and then capped with a bentonite seal approximately 3 feet thick. The sand will be poured slowly into the annular space between the PVC pipe and the augers. This procedure will be interrupted periodically in order to measure the depth to the top of the sand with a weighted tape. The remaining annular space above the bentonite seal will be filled with a cement/grout mixture to a level about 1 foot below grade. The top of the well will be cemented and set with a locking monument well cover. The concrete surface seal will be sloped away from the well casing at the ground surface in order to promote good drainage and prevent infiltration. The top or surface portion of the well casing will be fitted with a lockable, expandable rubber plug in order to reduce or minimize unwarranted intrusion into the casing.

A reference point on each monitoring well casing will be marked with an indelible marker and then surveyed by SCS Engineers in order to establish elevations that will be used for depth-to-water measurements and gradient calculations. The leveling survey will measure elevations to the nearest 0.01 foot and all elevations will be referred to an established benchmark or other fixed local control point of known elevation.

Well Development

Each monitoring well will be developed in order to increase its specific capacity, prevent sanding, maximize well life, and collect representative samples of the groundwater. Well development generally repairs any damage done to the native materials by the drilling operations, restores natural hydraulic properties to the adjacent soils, and improves hydraulic properties near the borehole so that water flows more freely into the well.

The wells will be developed by removing or flushing the finer material from both the local native materials and the sand filter pack surrounding the wells. This procedure will

consist first of bailing the well and then pumping or bailing the well until it produces clean water, i.e., water containing minimal amounts of suspended solids. All of the groundwater produced or removed during the well development operations will be stored temporarily on-site in approved 55-gallon drums, which will be labeled as to their contents. Subsequent testing of the purged groundwater will indicate its final disposition.

New disposable bailers will be used for all well purging and sampling activities. The use of dedicated bailers for each well will assure sample cleanliness and avoid potential for cross-contamination. Should any reusable equipment, such as pumps, be employed, all equipment will be decontaminated both prior to and subsequent to its use in each well. Decontamination will consist of steam cleaning and/or washing of equipment using trisodium phosphate soap, tap water rinse, and distilled water rinse.

Water Level Measurement

Prior to any groundwater sampling, static water-level measurements in each monitoring well will be taken using an electronic water-level indicator. Water-level measurements will be made within seven days of the initial well installation and thereafter monthly by a field geologist or engineer and the readings will be measured to the nearest 0.01 foot from the marked reference point on the top of the well casing. The monitoring wells will be sampled for soluble constituents only after completion of the water-level measurements. Water levels will be converted to elevations with respect to mean sea level (MSL), or another fixed local control point, and monthly groundwater elevation contour maps then will be constructed from the water level data.

Sealed wells should always be uncapped and left open for several minutes prior to water-level measurement in order to allow ambient groundwater levels to equilibrate. The water level will be measured by lowering the electrode and cable slowly into the well casing. The water level indicator will be turned on and the buzzer tested before lowering the cable into the well. Water levels will be reported in feet below a measured reference point, usually a mark on the top of the well casing. The point on the sounder cable

where the water level indicator will register maximum deflection will be held against the reference point and marked. The distance from the mark to the nearest footage tab will be measured using a pocket tape calibrated in hundredths of feet. Water level measurements will be repeated two or more times in order to assure accuracy of the water level measurement.

All water levels will be recorded on prepared forms of the type shown in Appendix D. The recorded data will include the depth to water, in feet below the reference point, the time and date of the measurement, and the calculated water level, depth or elevation, with respect to a fixed control point. Water level measurements will be reported to the nearest 0.01 foot.

Notes of any activity or condition which may affect the water level measurements will be made during the water level measuring. Such activities may include changes in local atmospheric conditions, pumping from nearby wells, drilling and/or testing operations.

Collection of Groundwater Samples

The following sections contain a detailed description of the equipment, well purging and sampling techniques, and methods of sample handling to be utilized in the monthly collection of representative groundwater samples for the water quality monitoring program. Initial groundwater samples will be collected, following accepted water-level measurement and well development procedures, within seven days of the initial well installation.

The depth to static water level first will be measured and recorded, as described in the section "Groundwater Level Measurements," before purging and sampling of each monitoring well begins. Next, a clear disposable bailer will be lowered into each well following water-level measurement, but prior to purging, in order to sample the upper surface of the groundwater. Any free product observed floating on the groundwater will be measured in the bailer, and its color, odor, turbidity, or other distinguishing characteristics will be noted and described.

Following free product sampling, each monitoring well will be purged of three to four well-volumes of water using disposable bailers or a submersible pump. Well purging permits a representative sample of groundwater to be obtained directly from the aquifer, rather than from water which had been standing in the well. Because the well casing diameter, total well depth, and groundwater level will be known or can be calculated for each well, an accurate estimate of well volume can be made in the field in order to estimate and measure the purge volume required to be evacuated from each well prior to sampling. If the well does not recharge fast enough to permit removing three well-casing volumes, the well will be pumped or bailed dry, and sampled as soon as sufficient recharge has occurred. Again, notations will be made as to any color, odor, turbidity, or other distinguishing characteristics in the water being purged from the well. Groundwater removed from wells prior to sample collection will be contained temporarily on-site in approved 55-gallon drums, which will be clearly labeled to identify contents as "Possibly Hazardous" and source. Subsequent testing results will dictate its final disposition.

After completion of the minimum bailing time required to adequately purge the well, the purging water level, well discharge rate, temperature, specific conductance, and pH again will be measured and recorded on the field data sheet. A typical data sheet is shown in Appendix D. The time when the purging began, the duration of purging, and the date of the sampling also will be noted on the data sheet. If a pump is used for purging of wells, it will be decontaminated both prior to and subsequent to its use in each monitoring well. Decontamination will consist of washing of equipment with trisodium phosphate soap, tap water rinse, and distilled water rinse.

Jungle at

Representative groundwater samples will be collected monthly using a disposable acrylic bailer and contained in pre-cleaned 40 ml VOA vials with teflon-coated septa or 1-liter amber jars, depending on the analysis to be performed. The type of containers, preservation, and maximum holding times permitted prior to analysis for both soil and groundwater samples will conform to EPA standards. Samples will be acidified for preservation when required by EPA protocol. The general procedure for sample collection

is as follows. Sample containers will not be pre-rinsed with sample, and will be filled slowly just to overflowing so that a convex meniscus remains over the opening of the container. Samples to be analyzed for volatiles will be collected first, allowing no head space and with as little disturbance of the water as possible. The container will then be carefully sealed with the teflon-lined cap. All efforts will be made to minimize volatilization of the samples, particularly by minimizing sample exposure to the atmosphere through collection as soon after completion of well purging or recharge as practicable and by ensuring that all air is expelled from sample containers. If air bubbles are present following sealing of sample containers, the sample should be poured out and resampled. Duplicate groundwater samples will be routinely collected.

Sealed sample containers then will be labeled with a sample tag, using similar protocol to that described above for soil samples. Labels will include: project name or number, date and time of sample collection, monitoring well number, sample number, name of person collecting the sample, and requested analyses.

Sample Handling

All samples for all analyses will be refrigerated from the time of field collection until the time the samples are analyzed in the laboratory. Samples obtained from sources or sample points known or suspected to contain high concentrations of volatile contaminants will be segregated from the other samples during handling and shipment. Samples containing high concentrations of volatile organic compounds will be shipped in separate containers to minimize potential cross contamination with other samples during shipping. Trip and field blanks (see Section 6) will be included with each container of samples shipped to the laboratory. At the end of each field day, the samples will be carefully packaged to preclude damage or breakage and sealed with tape for secure transportation to the selected laboratory. All sample shipments will be sent via an overnight carrier such as Federal Express with the proper Chain-of-Custody forms clearly documenting the sample identification, time and date of collection, and analyses to be performed. An example of the Chain-of-Custody form is included in Appendix D. A more detailed

description of Chain-of-Custody documentation is outlined in Section 5. Samples will be scheduled to arrive at the analytical lab within 24 hours after acquisition.

All soil and groundwater samples from the monitoring wells will be analyzed for the constituents listed in Table 2.

SECTION 5 DOCUMENTATION OF CHAIN OF CUSTODY

To ensure the integrity of samples from time of collection to reporting of analytical results, documentation of Chain-of-Custody is required. Custody documentation will permit tracing of the possession and handling of samples from the time of collection in the field through laboratory analysis and final disposition. The components of the custody procedure include: sample labels, field log, and Chain-of-Custody document containing analysis request. Sample field logs and Chain-of-Custody documents are included in Appendix D.

Sample labels will be attached to all sample containers in order to prevent misidentification of samples. Labels will be filled out and attached to sample containers at the time of sample collection. Protocol for sample labeling is discussed under the appropriate (i.e., soil or groundwater) sampling procedures outlined in Section 4, Field Activities.

Sample seals will be attached to the sample caps in order to detect possible contamination or unauthorized tampering of the samples during transfer. Gummed labels or tape are recommended. The seal will be attached in a manner that requires breaking of the seal in order to open the sample container.

A field sampling log will be maintained to record observations and information obtained during sampling. The field log will include:

- Location of sample point.
- Sample identification.
- Number and volume of samples taken.
- Description of sample point and sample methods.
- Date and time of collection.
- Field observations.
- Field measurements (e.g. pH, temperature, specific conductance).
- Names(s) and signature(s) of persons(s) collecting the sample.

The Chain-of-Custody document will accompany all samples delivered to the laboratory and will include sample identification, date sampled, and analyses requested. Any instructions for special handling, storage, or disposition of the samples also will be included on the request form.

The sample transmittal documents will include the shipping receipts to document sample transport, and sample Chain-of-Custody form. The acknowledgement of receipt will include date of sample receipt, identification of samples received, condition of samples as received, and signature of receiving laboratory representative on the same Chain-of-Custody form.

Copies of all documents relating to sample custody will be permanently retained by SCS Engineers and will be appended to written reports summarizing analytical test results.

SECTION 6

ANALYTICAL SERVICES AND QUALITY ASSURANCE PROCEDURES

ANALYTICAL SERVICES

A chemical testing laboratory certified by the State of California Department of Health Services will be retained to analyze all soil and water samples collected as part of the Site Characterization Program. The "Certificates of Approval" of the laboratory and Statement of Qualification of the personnel are presented in Appendix E. The primary laboratory to be used is:

SCS Analytical Laboratory 2860 Walnut Avenue Long Beach, California 90806

The minimum verification laboratory analyses to be performed on each sample will depend on the contaminants known or suspected to be present in each study area and will be in accordance with the "Tri-Regional Board Staff Recommendations for Preliminary Evaluation and Investigation of Underground Tank Sites". A tabular summary of the laboratory analyses proposed for each individual source area specifying analyte(s) sought and EPA test method is included as Table 2. All sample analyses for organic compounds will be completed within 14 days of sample collection, or as otherwise required by EPA regulations. If contaminants other than those that are suspected to be present in any given study area or sample are discovered, or can be inferred to be present, then other EPA- designated analyses also will be performed, as required. Laboratory reports will include sample identification, date sampled, date received, date analyzed, and analytical results. Copies of the analytical test results and a sample location map then will be forwarded to the County upon receipt by SCS.

Internal laboratory QA/QC tests or assessments will be included with all reported test results. A written presentation and critical evaluation of laboratory quality assurance data

will be included in site characterization program progress reports. For further explanation of the primary laboratory's QA/QC procedures, refer to the SCS Analytical Laboratory Quality Assurance Quality Control Manual. This manual is available upon request.

QUALITY ASSURANCE PROCEDURES

The quality assurance measures outlined below will be taken in order to ensure and confirm the integrity and reliability of the analytical laboratory data generated during the Site Characterization Program.

Field Quality Assurance

As a part of the field quality assurance program of the contract, trip and field blanks will accompany all groundwater samples submitted for laboratory analyses. The trip blank will consist of a container of organic-free reagent water that is kept with the field sample containers from the time the samples are originally collected in the field until they are delivered to the laboratory. The purpose of trip blanks is to determine whether samples are being contaminated during transit or sample collection. Trip blanks pertain only to analyses for volatile organic compounds; therefore, the containers must contain no headspace. Only one trip blank is needed for one day's sampling and shall satisfy trip blank requirements for both soil and groundwater materials for that day if all volatile samples are shipped in the same cooler.

The field or rinsate blank will be collected at the sample site using ultrapure water which first has been poured directly into the acrylic bailer and then bottled under the same field conditions as the representative groundwater samples. Disposable bailers are expected to be the primary sampling tool, eliminating the need for equipment decontamination and potential cross-contamination of either field samples or sampling equipment. Should any other reusable sampling equipment be employed, the rinsate blank will consist of reagent water which has been collected from the final rinse of the sampling equipment following decontamination. This will permit detection of whether sampling equipment is causing cross-contamination of samples.

Laboratory Quality Assurance

Duplicate soil and groundwater samples will be simultaneously collected from each well using the same procedures as for collection of the original samples, as outlined in Section 4. The duplicate will be analyzed in the event that the original sample has been tampered with, broken, or otherwise rendered unusable. Duplicate samples also may be used for occasional internal QA/QC purposes in order to provide field originated checks on the quality and accuracy of laboratory analytical procedures. For these purposes, the identity of the samples will be held blind to the analysts and laboratory personnel until the chemical analyses have been completed.

APPENDIX A ALAMEDA COUNTY UNDERGROUND TANK CLOSURE PLAN

Project Specialist (print)____

ALAMEDA COUNTY HEALTH CARE SERVICES AGENCY
DEPARTMENT OF ENVIRONMENTAL HEALTH
HAZARDOUS MATERIALS DIVISION
80 SWAN WAY, ROOM 200
OAKLAND, CA 94621
PHONE NO. 415/271-4320

UNDERGROUND TANK CLOSURE PLAN

* * * Complete according to attached instructions * * *

ı.	Business Name	All Right Parking	<u></u>		
		Same			
		1432 Harrison Stree			
	City	Oakland	Zip 94612	Phone	
з.					
				Phone	
4.	Land Owner	Alvin H. Bacharach,	Barbara J. Bor	suk	
	Address 383 Diab	lo Rd., Ste. 100 C	ity, State _	Danville, CA Z	ip 94526
5.	Generator name un	nder which tank w	ill be manif	ested	
		Barbara J. Borsuk		-	
	EPA I.D. No. unde	er which tank wil	l be manifes	tedCAC 000	598840

Address P.O. Box 1257 City Stockton, 95201 Phone 209-463-7108 License Type Ceneral Engineering ID# 584524 7. Consultant SCS Engineers Address 6761 Sierra Court, Suite "D" City Dublin, CA Phone 415-829-0661 8. Contact Person for Investigation Name Nels R. Johnson Title Senior Project Engineer Phone 415-829-0661 9. Number of tanks being closed under this plan 4 Length of piping being removed under this plan Unknown Total number of tanks at facility 4 10. State Registered Hazardous Waste Transporters/Facilities (see instructions). ** Underground tanks are hazardous waste and must be handled ** as hazardous waste a) Product/Residual Sludge/Rinsate Transporter Name Felcon Energy Associates EPA I.D. No. CAD 982526857 Hauler License No. 2463 License Exp. Date June 1991 Address P.O. Box 1257 City Stockton, State CA Zip 95201-1257 b) Product/Residual Sludge/Rinsate Disposal Site Name The Kiesel Company EPA I.D. No. MOT 300011160 Address 4801 Fyler Avenue City St. Louis State MO Zip 63116	6.	Contractor	Falcon Energy Associates	
License Type General Engineering ID# 584524 7. Consultant SCS Engineers Address 6761 Sierra Court, Suite "D" City Dublin, CA Phone 415-829-0661 8. Contact Person for Investigation Name Nels R. Johnson Title Senior Project Engineer Phone 415-829-0661 9. Number of tanks being closed under this plan Unknown Total number of tanks at facility 4 10. State Registered Hazardous Waste Transporters/Facilities (see instructions). ** Underground tanks are hazardous waste and must be handled ** as hazardous waste a) Product/Residual Sludge/Rinsate Transporter Name Falcon Energy Associates EPA I.D. No. CAD 982526857 Hauler License No. 2463 License Exp. Date June 1991 Address P.O. Box 1257 City Stockton, State CA Zip 95201-1257 b) Product/Residual Sludge/Rinsate Disposal Site Name The Kiesel Company EPA I.D. No. MOT 300011160 Address 4801 Fyler Avenue		Address	P.O. Box 1257	
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b) Product/Residual Sludge/Rinsate Disposal Site Name The Kiesel Company		Address	P.O. Box 1257	
Name The Kiesel Company EPA I.D. No. MOT 300011160 Address 4801 Fyler Avenue		City	Stockton, State CA	Zip ⁹⁵²⁰¹⁻¹²⁵⁷
Address 4801 Fyler Avenue		b) Product/Res	sidual Sludge/Rinsate Disposal Sit	t e
Address 4801 Fyler Avenue		Name	The Kiesel Company EPA I.D.	No. MOT 300011160
City St. Louis State MO Zip 63116		Address		
		City	St. Louis State MO	Zin 63116

	c) Tank and 1	Piping Transporter	
	Name	Falcon Energy Associates	EPA I.D. No. CAD 982526857
	Hauler 1	License No. 2463	License Exp. DateJune 1991
		P.O. Box 1257	
	City	Stockton,	State CA Zip 95201-1257
	d) Tank and	Piping Disposal Site	
	Name	Erickson Inc.	EPA I.D. No. CAD 009466392
		255 Parr Boulevard	
	City	Richmond,	State CA Zip 94801
11.		ample Collector Don Mc Clenagan	
	Company	SCS Engineers	
	Address	6761 Sierra Court, Suite "I	Dit .
	City	Dublin, State CA	Zip 94568 Phone 829-0661
12.	Laboratory		
	Name	SCS Analytical Laboratory	·
	Address	2860 Walnut Avenue	
	city	Long Beach, Sta	te <u>CA</u> Zip 90806
		pipes leaked in the pas	
•			
	· · · · · · · · · · · · · · · · · · ·		

14. Describe methods to be used for rendering tank inert

One hour prior to scheduled removal of tank, inert tank with dry ice at the

rate of 20 lb per 1000 gal capacity with Fire/Health Inspector on-site, test

tank with LEL/Oxygen meter.

Before tanks are pumped out and inerted, all associated piping must be flushed out into the tanks. All accessible associated piping must then be removed. Inaccessible piping must be plugged.

The Bay Area Air Quality Management District (771-6000), along with local Fire and Building Departments, must also be contacted for tank removal permits. Fire departments typically require the use of explosion proof combustible gas meters to verify tank inertness. It is the contractor's responsibility to bring a working combustible gas meter on site to verify tank inertness.

15. Tank History and Sampling Information

Gasoline Tanks

Tank		Material to		
Capacity	Use History (see instructions)	be sampled (tank contents, soil, ground- water, etc.)	Location and Depth of Samples	
1000 gal	Installed in 1975 contained gasoline last used - unknown	Soil/groundwater, if encountered	One at each end of tank from native materials at base of pit, not to exceed 2 ft below tank.	
1000 gal	Installed in 1982 contained gasoline last used - unknown	Soil/groundwater, if encountered	One at each end of tank from native materials at base of pit, not to exceed 2 ft below tank.	

One soil sample must be collected for every 20 feet of piping that is removed. A ground water sample must be collected should any ground water be present in the excavation.

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Excavated/Stockpiled Soil			
Stockpiled Soil Volume (Estimated)	Sampling Plan		
Unknown	See Modified Work Plan	<i>,</i>	

Stockpiled soil must be placed on bermed plastic and must be completely covered by plastic sheeting.

16. Chemical methods and associated detection limits to be used for analyzing samples

The Tri-Regional Board recommended minimum verification analyses and practical quantitation reporting limits should be followed. See attached Table 2.

Gasoline Tanks

Contaminant Sought	EPA, DHS, or Other Sample Preparation Method Number	EPA, DHS, or Other Analysis Method Number	Method Detection Limit
TPH Gasoline		EPA 8015 G	Soil/Water 10 ppm/0.5 ppm
TPH Diesel	·	EPA 8015 D	10 ppm/0.05ppm
BTEX		EPA 8020	10 ppm/0.05 pp
Oil and Grease		413.1	5 ppb/l ppb
Total Lead		AA spectroscopy	0.2 ppm/5 ppb
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17. Submit Site Health and Safety Plan (See Instructions)

14. Describe methods to be used for rendering tank inert

Before tanks are pumped out and inerted, all associated piping must be flushed out into the tanks. All accessible associated piping must then be removed. Inaccessible piping must be plugged.

The Bay Area Air Quality Management District (771-6000), along with local Fire and Building Departments, must also be contacted for tank removal permits. Fire departments typically require the use of explosion proof combustible gas meters to verify tank inertness. It is the contractor's responsibility to bring a working combustible gas meter on site to verify tank inertness.

15. Tank History and Sampling Information

Waste Oil Tanks

Tar	nk	Material to		
Capacity	Use History (see instructions)	be sampled (tank contents, soil, ground- water, etc.)	Location and Depth of Samples	
Approximately 1000 gal	Installation: Unknown contained waste oil last used: Unknown	Soil/groundwater, if encountered	One at each end of tank from native materials at base of pit, not to exceed 2 ft below tank.	
Approximately 1000 gal	Installation: Unknown contained waste oil last used: Unknown	Soil/groundwater, if encountered	One at each end of tank from native materials at base of pit, not to exceed 2 ft below tank.	

One soil sample must be collected for every 20 feet of piping that is removed. A ground water sample must be collected should any ground water be present in the excavation.

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Excavated/Stockpiled Soil				
Stockpiled Soil Volume (Estimated)	Sampling Plan			
Unknow n	See Modified Work Plan			

Stockpiled soil must be placed on bermed plastic and must be completely covered by plastic sheeting.

16. Chemical methods and associated detection limits to be used for analyzing samples

The Tri-Regional Board recommended minimum verification analyses and practical quantitation reporting limits should be followed. See attached Table 2.

Waste Oil Tanks

Contaminant Sought	EPA, DHS, or Other Sample Preparation Method Number	EPA, DHS, or Other Analysis Method Number	Method Detection Limit
			Soil/Water
TPH Diesel		EPA 8015D	10 ppm/0.05 ppm
TPH Gasoline		EPA 8015G	10 ppm/0.5 ppm
BTEX		EPA 8020	5 ppb/l ppb
Total Lead		AA Spectroscopy	0.2 ppm/5 ppb
Oil & Grease		413.1	10 ppm/0.5 ppm
Cltc		% २५०	
PCB's			
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17. Submit Site Health and Safety Plan (See Instructions)

14. Describe methods to be used for rendering tank inert

Before tanks are pumped out and inerted, all associated piping must be flushed out into the tanks. All accessible associated piping must then be removed. Inaccessible piping must be plugged.

The Bay Area Air Quality Management District (771-6000), along with local Fire and Building Departments, must also be contacted for tank removal permits. Fire departments typically require the use of explosion proof combustible gas meters to verify tank inertness. It is the contractor's responsibility to bring a working combustible gas meter on site to verify tank inertness.

15. Tank History and Sampling Information

Hydraulic Lifts

Tank Capacity Use History (see instructions)		nk	Material to		
		be sampled (tank contents, soil, ground- water, etc.)	Location and Depth of Samples		
1.	Unknown capacity		Soil/groundwater, if encountered		
2.	Unknown capacity	Installation of lifts and reservoir is unknown.		ė	
3.	Possible third UST capacity unknown	The tanks possibly contained hydraulic fluid. The date of service discontinuation is unknown.		One at each end of tank/lift from native materials at base of pit, not to exceed 2 ft below tank/lift.	

One soil sample must be collected for every 20 feet of piping that is removed. A ground water sample must be collected should any ground water be present in the excavation.

Excavated/Stockpiled Soil			
Stockpiled Soil Volume (Estimated)	Sampling Plan		
Unknown	See Modified Work Plan		

Stockpiled soil must be placed on bermed plastic and must be completely covered by plastic sheeting.

16. Chemical methods and associated detection limits to be used for analyzing samples

The Tri-Regional Board recommended minimum verification analyses and practical quantitation reporting limits should be followed. See attached Table 2.

Hydraulic Lifts

Contaminant Sought	EPA, DHS, or Other Sample Preparation Method Number	EPA, DHS, or Other Analysis Method Number	Method Detection Limit
			Soil/Water
TPH Diesel		EPA 8015 D	10 ppm/0.05 ppm
BTEX		EPA 8020	5 ppb/l ppb
Oil & Grease		413.1	10 ppm/0.5 ppm
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			4 - * ₩

17. Submit Site Health and Safety Plan (See Instructions)

	Name of Insurer Daugherty & Company, 2495 W. March Lane, Stockton
19.	Submit Plot Plan (See Instructions)
20.	Enclose Deposit (See Instructions)
21.	Report any leaks or contamination to this office within 5 days of discovery. The report shall be made on an Underground Storage Tank Unauthorized Leak/Contamination Site Report form. (see Instructions)
22.	Submit a closure report to this office within 60 days of the tank removal. This report must contain all the information list in item 22 of the instructions.
I đ and	eclare that to the best of my knowledge and belief the statement information provided above are correct and true.
Env	nderstand that information in addition to that provided above maneeded in order to obtain an approval from the Department of ironmental Health and that no work is to begin on this project il this plan is approved.
I u	nderstand that any changes in design, materials or equipment wild this plan if prior approval is not obtained.
Adm:	nderstand that all work performed during this project will be do compliance with all applicable OSHA (Occupational Safety and Hea inistration) requirements concerning personnel health and safety nderstand that site and worker safety are solely the responsibil
sha	the property owner or his agent and that this responsibility is red nor assumed by the County of Alameda.
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APPENDIX B SITE HEALTH AND SAFETY PLAN

EMPLOYEE HEALTH AND SAFETY PLAN,
POLICIES, AND PROCEDURES
FOR THE CLOSURE OF UNDERGROUND
HAZARDOUS WASTE TANKS
AND OTHER STANDARD FIELD OPERATIONS

SCS Engineers 6761 Sierra Court, Suite D Dublin, California 94568 (415) 829-0661

CONTENTS

Section			<u>Page</u>		
1	Intro	duction	. 	. 1	
		General Overview Intent Authority and Responsibilities		. 1	
	2	Safety Rules, Procedures, and Policies		. 3	
		General	· • •	. 3	
	3	Chemical Abuse/Impairment		. 7	
	4	Health and Safety Plan		. 8	
		Scope Composition of Typical Products Handled Contaminated Soils Assessment of Health and Safety Hazards Organization and Responsibilities Emergency Actions		. 8 . 9 . 9	
Apper	ndix A-1 A-2 A-3	Material Safety Data Sheets Site Specific Information and Signature Sheet Signature Sheet			

SECTION 1 INTRODUCTION

General Overview

The following Employee Health and Safety Plan, Policies, Procedures, and Practices have been established for field operations conducted by SCS Engineers, or their subcontractors, involving the removal and closure of underground hazardous waste storage tanks or soil and groundwater contamination assessment and remediation activities in Alameda County. This plan includes both job site activities, including tank removal, excavations, well installation and collection of soil and groundwater samples, and remediation activities, and off-site activities, including trucking and disposal operations, emergency response, and cleanup activities.

Intent

The intent of SCS Engineers Health and Safety Policies and Procedures is to:

- 1) Provide all employees and other individuals involved in both on-site and offsite activities with the safest possible work environment and to minimize or eliminate exposure to any hazardous substances or conditions.
- 2) Comply with the requirements of CFR Section 1900-1910 of the Code of Federal Regulations, and applicable OSHA and Cal OSHA standards.

Authority and Responsibilities

SCS has primary responsibility for the health and safety of their employees during the work outlined in the work plan. Each SCS subcontractor will be responsible for the safe and healthful performance of work by each of its employees or support personnel who may enter the site.

All subcontractors retained by SCS are required to ensure that all their employees, visitors, subcontractors, and suppliers/vendors, while on the work site and in the conduct of this investigation, comply with the provisions of this Health and Safety Plan and the minimum standards set forth under the Federal Occupational Safety and Health Act (OSHA). Any specific operation, machine, or process not covered will be governed by other applicable General Safety Orders of the OSHA, Cal/OSHA. The Subcontractor is required to know the safety regulations which apply to the operation.

SECTION 2 SAFETY RULES, PROCEDURES, AND POLICIES

General

- Employees must immediately notify the Health and Safety Officer, their Supervisor, or any other officer, of any unsafe working condition or equipment.
- A supervisor or his designate must always be present when hazardous materials are handled. No hazardous materials may be transferred or pumped, hoses disconnected/connected/drained, barrels handled, or any similar operation in any manner alone. Use the "Buddy" system - at least two people always must be present.
- Access to safety showers and fire extinguishers must be kept clear at all times.
- Smoking is not permitted on any job site unless specific smoking areas are provided and so marked.
- Any spill must be reported to a supervisor and cleaned up immediately. This
 includes small spills and spillage on drum transfer. Drum leaks shall be reported
 to a supervisor and over-packed.

Protective Clothing

Protective clothing is necessary to protect employees from hazardous products, spills, cleanup, soil contamination, and similar operations within the environment. SCS Engineers will provide appropriate protective clothing for various job assignments, at no cost, as required.

Protective clothing includes, but is not limited to:

- 1) Boots or protective shoes, depending on the job function.
- 2) Shirts, pants, or aprons sufficient to allow daily changes of clothes.
- 3) Class A, B, C, or D level personal protection equipment (PPE), as required.
- 4) Gloves appropriate for the materials handled or work environment.
- 5) Hard hats are required for all job site personnel.

Employees are required to:

- 1) Wear the designated protective clothing when instructed.
- 2) Maintain cleanliness of PPE.
- 3) Advise their supervisor of defects, loss, or damage to PPE.

Respirators

Company responsibility:

Whenever it has been determined that an airborne health hazard exists or may exist, SCS Engineers will provide and maintain the appropriate-level respirator.

Employee responsibility:

- 1) Use the appropriate respirator in accordance with the instructions and hazards determined for each particular work area, job site application, or job function.
- 2) Report any malfunction of the respirator to immediate supervisor.
- 3) Inspect the respirator prior to use for visible defects or damage.
- 4) Clean the respirator and periodically replace filters, as needed.
- 5) As preventative maintenance, store respirator in proper container or use plastic-lock bag.

Eye Protection

Safety glasses with side shields, goggles, or face shields will be provided to any employee who wants or is required to use them for any aspect or operation associated with removal, closure, sampling, or other site activities related to tank removals or other field operations.

In addition, individuals performing or working near the following operations will be required to use the indicated eye protection:

- 1) Welding, brazing, or metal flame cutting: welder's goggles with intensity filters.
- 2) Drumming: splash-proof goggles or face shield.
- 3) Pumping: face shield.

Personnel and Equipment Decontamination

Decontamination of equipment and personnel is necessary to confine the contaminants to the site and to preclude migration elsewhere. Upon leaving the work area, all major equipment, tools, and materials will be cleaned to remove grease, oil, or encrusted dirt.

Decontamination procedures are discussed in more depth below. Personnel decontamination will involve washing of hands and face with soap and water after removal of protective gear and prior to eating. Boots, respirators, gloves, and hard hats will be washed in a soap and water wash. Tyvek will be placed in a plastic bag for disposal.

Equipment Decontamination:

All major reusable equipment and other tools for boring activities will be decontaminated prior to leaving the work area. Cleaning will normally consist of scrubbing to remove encrusted materials, followed by a soap-and-water wash and potable water rinse using a high-pressure, low-volume water spray or steam cleaning unit. Containers of detergent solutions for cleaning tools, boots, and gloves will also be available.

A drill rig decontamination area will be established where the rig will be cleaned before it is moved out of the work area.

Personnel responsible for steam cleaning will use appropriate personal protective equipment.

Personnel Decontamination:

Decontamination of personnel will be performed within the designated decontamination zone. Decontamination will consist primarily of soap-and-water washing and water rinse

of exterior protective gear to remove contaminants, followed by removal of gear. Disposable coveralls will be removed by turning the clothing inside out. A general sequence of doffing procedures is outlined below. The extent of required washing, or modifications to the sequence, may be specified by the Site Health and Safety Officer as appropriate.

The minimum steps in decontamination will be as follows:

- Wash work gloves and boots;
- · Rinse respirator; and
- Wash hands and face.

Contaminated protective clothing will be properly disposed. Provisions for emergency decontamination will be available as designated by the Site Health and Safety Officer at the drilling site. Clean water will be provided to rinse work gloves and boots.

Eating, Drinking, and Smoking:

Eating, drinking, or smoking will not be allowed in the work area and decontamination zone. Potable water will be available in areas just outside the work area.

SECTION 3

CHEMICAL ABUSE/IMPAIRMENT

As employees may be working near or with hazardous or dangerous materials and conditions, and operating or working near heavy equipment, it is imperative that employees not be impaired or under the influence of ANY chemical which reduces their effectiveness in reacting to a dangerous condition. Therefore, SCS Engineers, in order to protect all employees who depend on each other, establishes the following abuse/impairment policy:

- Chemical abuse/impairment is defined as use of alcohol, medication, drugs, or other chemical substances without a doctor's permission which alters, impairs, or changes the physical and mental condition of the employee.
- Consumption of any alcoholic beverage in any quantity at any job site is absolutely prohibited. Any person observed consuming alcoholic beverages during the work day, regardless of the hour or day, will be immediately fired.
- Any employee reporting to work at any location under the influence of alcohol, smelling of alcohol, or if alcoholic containers are found in any equipment, will be immediately fired.
- Any employee found to be using any other illegal drug at any time on any job site will be immediately fired.
- Any employee taking medication under a doctor's care or who has purchased over the counter medication must advise his supervisor.
- All employees are encouraged not to smoke. SCS Engineers will discuss any legitimate request of any employee to quit smoking and help place them in a program, if sponsored by the Company's health care provider. Employees are encouraged to participate in these medically supervised programs.

SECTION 4

SCS ENGINEERS HEALTH AND SAFETY PLAN

Scope

The SCS Engineers Health and Safety Plan outlined below is intended both to provide and ensure adequate safeguards to all personnel who may be exposed to hazardous materials or conditions during the normal course of their work conducting closure and other associated site operations and activities related to underground storage tank removal and other field operations. The scope of this plan does not include unexpected or unusual occurrences.

Composition of Typical Products Handled

Most products encountered in routine tank removal and closure operations and associated soil and groundwater contamination assessment and mitigation/remediation investigations are organic compounds that commonly include, but are not limited to:

- A) diesel fuel
- B) gasoline
 - 1) leaded
 - 2) unleaded
- C) waste oil and grease
- D) kerosene
- E) hydraulic lift fluid
- F) tank and pipe rinsate
 - 1) 99 percent water
 - 2) 1 percent detergents and trace elements
- G) possible inorganic heavy metals, such as lead or zinc
- H) polychlorinated blphenyls (PCBs)

Contaminated Soils

Results of laboratory soils analyses typically take two weeks or more to complete after tank removal. Treatment of soils, contamination procedures, and site remediation are separate processes which are covered by additional safety procedures not included in this list.

Assessment of Health and Safety Hazards

Initial site operations typically encompass only removal of cleaned tanks and product piping. Therefore, level D personal protective equipment (PPE) is the normal required level of protection at this stage of site operations.

Fire and Explosion:

Two fire extinguishers with a minimum class rating of 20 BC shall be kept within at least 50 feet of the removal operation at all times during work operations. Open flames or other ignition sources are not permitted anywhere within the area of operations. NO SMOKING signs will be posted in proximity to the work site. The use of welding or other electrical-spark producing equipment is specifically prohibited in the vicinity of a contaminated site or tank containing product residue. If such operations are determined to be necessary, approval of the Health and Safety Officer or other appropriate supervisor is required and the tank must previously have been rendered inert. The local fire district also should be notified in order to determine whether a fire inspector/observer should be present. Care always should be taken not to severely impact, crush, or puncture the tank prior to inerting, especially when it is known or suspected to contain volatile or potentially explosive compounds or gases.

Other Physical Hazards:

SCS Engineers routinely encourages fencing of all tank removal and excavation sites for the duration of work operations, if existing plant fencing and security is not present or adequate. If our clients refuse, a waiver must be signed wherein the client excludes SCS Engineers from any liability or responsibility contained therein owing to the lack of fencing. Normally, barricades and caution tape are used to restrict access to the area

of work operations, and may be used to secure a site overnight if no deep excavations or other hazards are present. If deep excavations must be left open unattended, then steel trench plates or plywood should be used to completely and securely cover the excavation. Work operations that can be completed during the same day and remain under the direct supervision of the Project Manager may be exempted from the fencing requirement, with the prior approval of the Health and Safety Officer.

It is expected that the work operations involving excavation, waste oil tank removals, and collection of soil samples in the Alice Street basement will be conducted in an area of both restricted access and limited air circulation. Consequently, the additional measures outlined below will be taken in order to ensure that safe and healthful working conditions are maintained. Ear protection will be worn by all employees and subcontractors at all times when work is in progress in this area. Dust masks and/or full-face respirators also will be available at all times for protection from dust and potential airborne contaminants stirred up during excavation and tank removal. At least 2 high-volume fans will be placed at existing grates in the basement ceiling/Alice Street sidewalk - one intake, one exhaust to provide both fresh air to and air circulation within the basement area of work operations. Exhaust from stationary drilling and/or excavating equipment involved in the tank removal operations will be vented directly to the outside via closed lines. Only those vehicles or equipment directly required or involved in the removal operations will be permitted in the basement area of operations. Vehicles and other equipment shall be shut off when not in use. Equipment operators will need to exercise particular caution at all times when working in this area, both because of the low vertical clearance and the presence of overhead electrical lines near the excavation area.

No deep excavations are expected for this project. All soil sampling will be completed with mechanical equipment from the surface outside the excavation. No site personnel are allowed to enter any excavation deeper than 4 feet. Deeper excavations must be shored or braced, or must be performed using special excavation procedures following appropriate OSHA and Cal OSHA standards for stepping and/or sloping sidewalls.

If underground utilities are known or suspected to be located within or near the area of the planned excavation, U.S. Alert will be contacted in advance of the work operations to precisely locate and label the lines and/or associated facilities. Any site personnel working or excavating near operating utility lines of any kind (i.e., electrical, gas, water/sewer, etc.) should always exercise extreme caution and should immediately notify the Project Manager or other supervisor if any damage, leakage, or other problem is observed.

Chemical and Other Health Hazards:

The major chemicals suspected to be present are listed above. Material Safety Data Sheets (MSDS) are presented in Appendix A.

Airborne contaminants at the site could exceed currently recognized health limits for waste oil, gasoline, benzene, toluene, and xylene. Benzene is a suspect carcinogen which is regulated by Cal/OSHA and OSHA. Air purifying respirators are not approved for worker protection against benzene.

An organic vapor meter OVM will be routinely used to monitor the breathing zone for volatile organic compounds during excavation and other field activities. Respirators will be required if readings at any time exceed 300 ppm over background. Workers may continue work in respirators until concentrations reach 500 ppm. At that point, personnel will use airline respirators to continue work or evacuate the work zone until levels dissipate.

Contact with contaminated waste materials and soils would be expected to irritate the skin, with prolonged exposure leading to the development of skin lesions. For this reason direct skin contact with drilling soils will be avoided by wearing protective gloves. Protective gloves and safety goggles will be required in areas where waste materials and contaminated soil are handled.

Organization and Responsibilities

Project Manager:

A project-specific Senior Project Manager or Project Engineer or Scientist, or his/her designee, is specifically responsible for all aspects of daily operations and for each specific site operation regarding tank removals, soil/groundwater sampling, or well installations. This Project Manager is responsible for the project through its successful completion, and all questions or problems associated with the projects should be directed to him/her. The Project Manager also is responsible for daily safety briefings and updates or site-specific changes to work crews and subcontractors prior to the start of work operations. Any designee shall report directly to the Project Manager.

Site Health and Safety Officer:

The Project Manager is authorized to act as the Site Health and Safety Officer. The office Health and Safety Officer may appoint a designee to act as Health and Safety Officer for a specific job and he/she shall report directly to the Project Manager.

The Safety Officer is specifically given authority to take the following actions:

- Require specific health and safety precautions prior to site entry by subcontractors, their personnel, visitors, SCS personnel or any other job site participants. This includes hard hats, any appropriate eye, ear, or foot protection, respirators, or any other safety equipment that the site Safety Officer deems necessary.
- Require any worker, including subcontractor personnel, to obtain immediate medical attention.
- Deny access to the site or any portion thereof when imminent health and safety risk exists.
- Order the immediate evacuation of workers, including subcontractor personnel, from any area of the site when, in the Safety Officer's professional judgement, conditions warrant such action. This includes shutting the site down.

Emergency Actions

If any emergency involving actual or suspected personnel injury or adverse chemical exposure occurs, the Safety officer shall take the following steps:

- 1) Remove the exposed or injured person(s) from the immediate area of danger.
- 2) Render first aid, if necessary. Decontaminate the victim's outer clothing only after critical first aid has been administered.
- 3) Obtain paramedic services or ambulance services. Transport the victim(s) to the closest local hospital for proper medical care. This procedure IS TO BE FOLLOWED even if no visible injuries are apparent.
- 4) Other personnel shall be evacuated to a safe distance until it has been determined by the site Safety Officer or other emergency response personnel that a safe site exists to resume work. If any doubt or questions exist, further appropriate advice shall be sought.
- 5) At the first opportunity, the Safety Officer shall contact the Project Manager and provide details, including a written report, of the conditions leading to and response to the suspected incident and procedures taken to prevent any subsequent recurrence.
- 6) A written report of the incident shall be prepared by the Safety Officer and the Project Manager within twenty-four (24) hours following the incident. There are NO EXCEPTIONS.

Site Shut-Down:

The Safety Officer shall shut any job site down and evacuate all site personnel to safe distance, if any of the following conditions occur:

- a) Extremely strong odors
- b) Excavation conditions which are unsafe, including but not limited to dirt slippage and slumping, excessive moisture, exposed or damaged utilities, and other similar observances.
- c) Instability of any equipment or structure.
- d) In any of these events, or similar occurrences, in the judgement of the Safety Officer, work will stop at the site until a modified work plan is prepared and approved by the Project Manager and regulatory agencies as necessary.

Emergency Response and Containment:

The Safety Officer is authorized to implement appropriate emergency response in accordance with the SCS Engineers EMR procedure plan either to protect worker health and safety or to contain accidental spills so as to minimize further environmental damage. The Safety Officer is further authorized to utilize the closest available local EMR facilities when required by his judgement.

If no undue risk is present, site personnel may attempt to contain a spill using whatever safe means are available, prevent additional spillage, and prevent spill migration into any storm drains, sewers, or natural drainage and waterways.

Available On-Site Safety Equipment:

Fire extinguishers, first aid kits, water, level D suits and PPE, head protection, eye protection, and gloves are to be available at each site at all times during work operations.

APPENDIX AI MATERIAL SAFETY DATA SHEETS

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	13. NAZARD CLASSIFICATIONS 11.1 Cords of Fodors' Regulational: Flammable Squal 11.2 EAS Heare Retring for Bulk Water Transportations: Category Rotting Fre
8. WATER POLLUTION 8.1 Aquantic Testably: 22 ppm (Pt In Industry (The Invalidation States) Date and souther County (SCO): 0 b (b) 5 days, the (marx), 2 days 8.4 Face Chain, Consumptation, Reference Date not evaluate Date not evaluate 8.1 Grades of Purity, Research 95 89%; Pure 19.9%, Technical 99.3% 8.2 States of the transportation, Ampaired 8.3 Face County (Testably are presented) 8.4 Venting: Open (Testa excessed) are presearce-rectains.	32. PHYSICAL AND CHEMICAL PROPERTIES 12.1 Physical State on 19°C and 1 atom Liquid 12.2 Melinadas Weight 106.16 12.3 Peting Paint of 1 dear 246.47° = 131.9°C = 406.1°K 12.4 Proving Paint 12.5 Critical Temperatures 250.8°C = 343.8°C = 517.0°K 12.6 Critical Temperatures 250.8°C = 343.8°C = 517.0°K 12.7 Specific Gravity; C Not at 20°C Regular 12.8 Liquid Surface Tempina 12.1 Specific Gravity; C Not at 20°C Regular 12.8 Liquid Water Interfectal Templers 26°C Symmight = 0.036°C N/m at 20°C 12.10 Vapur (Con.) Specific Gravity; Not perferred 12.11 Ratio of Specific Music of Vapor (Con.): 1.097 12.12 Lations Music of Vapor (Con.): 1.097 12.13 Heast of Combustion; = 17.556 (Ru/2) is —6752 d mi/g = —106.31 % Not J/log 12.14 Name of Combustion; = 17.556 (Ru/2) is —6752 d mi/g = —106.31 % Not J/log 12.15 Music of Specifics, Not performed 12.16 Name of Self-sine, Not performed 12.17 Name of Self-sine, Not performed 12.18 Name of Self-sine, Not performed 12.19 Name of Self-sine, Not performed 12.11 Name of Self-sine, Not performed 12.12 Name of Self-sine, Not performed 12.13 Name of Self-sine, Not performed 12.14 Name of Self-sine, Not performed 12.15 Name of Self-sine, Not performed 12.16 Name of Self-sine, Not performed 12.17 Name of Self-sine, Not performed 12.18 Name of Self-sine, Not performed 12.19 Name of Self-sine, Not performed 12.11 Name of Self-sine, Not performed 12.12 Name of Self-sine, Not performed 12.13 Name of Self-sine, Not performed 12.14 Name of Self-sine, Not performed 12.15 Name of Self-sine, Not performed 12.16 Name of Self-sine, Not performed 12.17 Name of Self-sine, Not performed 12.18 Name of Self-sine, Not performed 12.19 Name of Self-sine 12.19 Name of Sel

Commer Syru 1, 2-Ometryborgers Rytol	•	Colorina S—ne moor	6. FIRE NAZAROS 6.1 Fissi-Penne 63°F C.C., 75°F D.C. 6.2 Fissimobile Limits in Art. 1.1%-7.0% 6.3 Fire Esting-widting Agentic Foom, By chamical, or carbor disorder.	IDOS TRIMIZZIZEA GRALA .81 (Stoodbrak) Investor Amerika (Bother Charles of Control of Co
Call the day Artist conta Nation and	rige if possible Keet; people a perform of men laund end eapper. Femore drainlanged malernal health and polyakon come of a	•	6.4 Fire Estinguishing Agunta had to be United Water may be restricted. 6.5 Special Hazards of Europeators franklistic har perfectly 6.6 Sentential har perfectly 6.6 Sentential his Phy., Vapor a hearing than his entitled better the Phys. Vapor a hearing that another of gratery and float hards of gratery and float hards.	11. HAZARD ELASSIFICATIONS 11.1 Gode of Federal Regulations: Florensite logal 11.2 NAS Malart Rating for Bulk Water Transportation:
Fire	F_hanks&LE Flandpack elemy repor the Vapor has remission Figure Vapor has remission Figure Vapor has remissioned basel Elemy and learning has been all port feath, any a begin may be remissioned Good a stroked containing a	Had of an endioused area. This apparatus Dieminal of Karbon Beside to fine	6.7 Ign/bon Tumpersture, 865°F 6.8 Everties' Hazont Class (Grap D 6.8 Burning Rets . 55 men/ain 6.10 Adiobetic Florer Tempershare: Data not available 6.11 Stockholmowith Ab to Fast Battle: Data not available 6.12 Florer Tempershare: Data not available 6.13 Florer Tempershare: Data not available	Colonory Rothing Fro
Exposure	of someonement. May be freely as a trace of it breathing as attached in the control of the contr	c threat action, difficult threathing, or team grid children' respiration. I original. I origi	7. ENEMICAL ELACTIVITY 2.1 Rescripty With Water. No reaction 2.2 Reactivity arth Common Majoriuls Monection 2.2 Stating During Transpart Stable 2.4 Neutraliting Against for Anide and Counties. Not partnered 2.5 Performantistion. Not performed 2.5 Institute of Performantiations Not performed 3.7 Major Ratio (Resociant to Product): Data not available 2.6 Rescripty Group; 32	Australia Eneri
(Fot Response	Desperate to equatic bis in Fourty is sharehing. He provides the provides of t	of water implicate.	E. WATER POLLUTION E.1 Aquatic Turnings	12. PHYSICAL AND EPENICAL PROPERTIES 12.1 Physical State at 15°C and 1 atra; Liquid 12.2 Molecular Weight 105.16 12.3 Sealing Parist at 1 ame; 291.8°F = 164.4°C = 417.8°K 12.4 Pressing Paids —13.3°F = 25.3°C = 348.0°K Critical Temporature; 674.8°F = 257.1°C = 830.3°K
		4. DESERVABLE CHARACTERISTICS	> 100 kg ft/96 kr/D magna/R _m -trash mater 8.2 Weterfeer Texistry: Data not evaluate 8.3 Besinglical Orygen Demana (800): E-0/15 E-0, 2.5% (Reco.), 8 days 8.4 Food Chair Committedian, Referebalt Data not evaluable	13.6 Critical Principles 54.5 Sets to 20.64 paid to 3.752 644.5 Sets to 20.64 paid to 3.752 644.5 Separate Gravity: 0.660 of 20°C (hapid) 12.6 Liquid Sets Tembers 20.63 Symmetry to 0.03003 N/m at 18.670
2.1 EC Conquestion Hydrocustom 2.2 Formula a-Cu-N 3.3 MC/UH Design 1.4 DOT SD No.: 130 3.5 CAS Registry N	-(CH ₄) ₀ -(CH ₄	4.1 Physical State (as arbigues): Liquid 4.2 Coder: Colorinas 4.3 Odor: Borszanudká, pharacteratic arpinatic		12.9 Elpoid Water Interferring Tennalists 36.00 Synamists on EDSOG N/m at 2010 12.18 Vapor (Cas) Synamic Gravitys Not synthesis 12.11 Ratio of Synamic House of Vapor (Cas): 1.000
plants plones E.E. Eymplome Fed part Figure potents if ingr Kother, and in	ethe Equipment Approvat p and hoose, lowing Especies. Vapors paul and Argo, paulous between the months of the contra- or deman and occur.	LTH HAZARDS minister or air-supplied must, supplies or tape should; not foundable and distrinuted capit inhales upon and gring, dentional, and report, personnery g. orange, headable, and asset Gar be taled. The break bit, administer applical mejorator and	S. SHIPPING INFORMATION S.1 Grades of Purity, Research, 96,99%; Pure 97-%, Commercial 95% to 9.2 Storings Temperature; Ancient 6.3 fest, Atmosphere, No teaction 6.4 Veriting Court (from a region) or products and	12.12 Lettert Haat of Vaporhartion: 148 Builto + 12.5 Edify m 3.47 X 197 J/hg 12.13 Hear of Combustant: —17,554 Builto m —9764.7 Edify = m606.41 X 107 J/hg 12.14 Hear of Despressmention, hot personnel 12.15 Hear of Sakution, hot personnel 12.15 Hear of Polymerication, hot personnel 12.15 Hear of Fally X 56 edify.
dryger if req. files out well files from both Life Short Torre both Life Taxinty by degree Life Torrety, it Life Vapor (Gas) both	umal, car' a sector. PHGESTIO ier to at haup 15 mm. SKIW v 1 Velus, 100 gam autition Limits, 200 gam to 3 vertions Grade 3. LDus v 80 a lotton, and her dismans.	N SE NOT INSLOS VOUNNIC, CET 6 SCELO: EVES: ripe Off, west with son; and asset, O min. C SCC Ing/kg Count 6 shipt: Smaring of the eves or recognitions		13.95 Limiting Volum Data not available 12.27 Soid Volum Pronunce C26 page
LB - Liquid or Social	britani Čharacisnotas, blesi kube shuffing sitt rettering : t. 9.05 ppm	nut hazard if apitied on alcohing and allowed to	100	TIS.

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Common Symmi 1, 4-DimetryConsume Kytal	- ,	Watery beyond	Colorless	Sweet ador	
		Ficals or water Freezing	Fiammable, emaling vap geom a \$6°F.	m e poduced	
Call fire depi Arpic contact spoint and s	الاستانية الرحماني بالأسان الإمانية	ole Keep people sw Clard Hapter Clarged material politikon spinnel age			
Fire	Mear as Eningue Mater m	of along reported to the contract of the contr	g ar englosed eres. Ng signifikas Nemica: Or Earbion Signis I ère	10	
Exposure	VAPOR INTERNATION BOAR MOVE IL If DIAME IN DIAME INTERNATION INTERNATION REPORT FOR EY IF SWAL INTERNATION INTERNA	History to eyes, note and Press. If orbids, will be see degrees, emball, breathing, or bins of consciousment. More to heart as If or serving has stopped; give emission temporation. If breathing is emission, give original			
Water Pollution	Man be	is. TO ACLIATIC LE is storoiste. dengerous if it enter us! health and width prestors of neath, w	ie plicals.	DENTRATIONS.	
TESPOREL TO DISCHARGE (For Properties Merithmets) back verning-tage Serverability Eventure area Sening to removed Charact or removed Charact or of physical testinant			2 LASEL 21 Cologory, Pa 22 Chair 3		
3. ENCINIC 3.5 DC Compression hydrocorbus 3.2 Permits p-Chit 3.3 abo/Lib Dougho 3.4 DOT 40 Neu 530 3.6 CAS Registry M	1 i-(CHi)a vetion: 3.2/1 07	1307	4.1 Physics' State 4.2 Calor: Coloria	ABLE EHARACTERISTICS 4 (m. oringwal): Liquid TOTAL, Characteratic promotic	
S. MEALTH MAZARDS 8.1 Personal Preference Equipment Approved parater or air-applied music gappies or local shading plants: gloves and books. 8.2 Symptoms Preference Exposures Vapors cause headening and distribute Liquid emains over and sent. If labor mice large causers among country, distribute, and rapidly developing pathornery orders. Projected, causes among a growing, promps, headening, and careful come Can be fasted. Kithing and for formage can occur. 8.3 Treatment of Exposures. NinkLATONI remove to head air, administer artical imageration and empty of maps of, call a discuss RRM, organist, sent occursing, call a discuss EVES: Rule off more for a heast 12 time BRIN, organist, work over analy and mater. 8.4 Treatment Limit Mysics. 100 gapts, to 30 met. 8.5 Short Terms Inhestration Limits. 200 ppts, to 30 met. 8.6 List Streatly, Korry, and long demage. 8.7 List Streatly, Korry, and long demage. 8.8 Vapor (Ges) inflami Districtivation. Vapors cause a night amongs of the eyes or respiratory egister if present or logit convenients to the effect is temporary. 8.8 Lists or lead forest Characteristics.					
Support is present on tight consentrations. The effect is temperaty. S.B. Libert or Solid Inthem Characteristics, Minerum hazard. It spired on elothing and abouted to remain, thus pause sharing and recovering of the older. S.10. Date: Threshold 0.00 period. S.11. SOUR Yellow, 10,000 priori.					

6. FIRE INJARDS 6.1 Flosh Perist 617F C.C. 6.2 Floremobile Limits in Air 1.154-656 6.3 Fire Estimplishing Agents. Flore By crimes, or Latter decide 6.4 Fire Estimplishing Agents that is be Used. Have may be reflective 6.5 Special Habit may be reflective 6.5 Special Habit may be reflective 6.6 Septical for the Vapor in has on the resident in Fire Vapor in has on the account of graters and float habit. 6.7 Special Habit may be reflected to a source of graters and float habit. 6.7 Special Habit may be reflected to a source of graters and float habit. 6.8 Electrical Habit Care float fl	10. HAZARD ALAISSMENT CODE (See Malaid Assertant Mandbook) A-T-U 11. HAZARD CLASSIFICATIONS 11.1 Code of Federa' Regulations: Flavorable topid 11.2 NAS Malaid Rating for Built Wylor Transportables: Calegory Rating Fro
2. BATER POLLUTION 2.1 Aquests Tornelly: 22 ppn 16t to foliage FIL /fest* union 2.3 Moreover Toxesty: Data not emission 2.3 Bindegran Drygen Demons (BOD): 0 to fit in 5 days 2.4 Food Drain Consentration Polential: Data not emission 2.5 Entirprint Information 2.1 Grades of Purity Research 55 99%; Pure 56 th., Toxersca 66 9% 2.2 Storney Temperature. Andoest 2.3 formit Attemptions (C. toxersmort) 51 2.4 Verting Open (form an emission) 51 2.5 gradure-regisaris.	12. PHYSICAL AND EXEMICAL PROPERTIES 12.1 Physical State at 15°C and 1 atom Liquid 12.2 Medicalide Weight 105 16 12.3 Medicalide Weight 105 16 12.3 Physical Weight 105 16 12.4 Physical Promises 12.5°C = 132°C = 205.3°K 12.6 Critical Temperature 645.6°C = 34.15°C = 518.2°K 12.6 Critical Temperature 645.6°C = 34.15°C = 518.2°K 12.7 Separate Gravity 12.7 Separate Gravity 12.7 Separate Gravity 12.8 Liquid Surface Temperature 3°C 657 at 20°C fiquid 12.8 Liquid Weigh Interference Temperature 3°C 657 at 20°C fiquid 12.10 Vapor (Gas.) Separate Gravity; 12.11 Separate Gravity; 12.12 Limit Heal of Vaporteriore 13.0°C at 20°C figuid 12.12 Limit Heal of Vaporteriore 13.0°C at 20°C figuid 12.13 Mart of Gravity Heals of Vapor (Gas.) 1.07°1 12.14 Limit Heal of Vaporteriore 13.0°C draw at 10°C draw at 1
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Fire	F_Amma, Fig.19back Vapp ma Was go Emingue Was m	F_AsserbBLE. Testifact energy vapor be? may excut. Testifact energy vapor be? may excut. Yearor may explose if greed or or evolutional ords. Was googles sent continemed breathing apparatus and number overcitining (including grows) Estinguest with one community about or carbon of prize with one community and order or carbon of prize with a community and order or carbon or explosed greed and or waster. Coc. explosed greed mers with waster.			
Exposure	VAPOR Impany & K orbotel, Mero K' H Drastin P Drastin P Drastin P Drastin ELGLAD We burn Martine P Martine I Fus' and P in ETE F Shin.	the supper is a shock go hir and ayes.	of threat. The in shifted freehing. Give antice inspiration of dergen Throughout shops 2-6-15 (1 major 1207 and threat 1207 and threat	S' water Ciri: C'ris mater	
Water Poliution	May be do		IFE IN VERY LOW CONCE IFE water intuities. G-to chilotole. WEID' INVERSE.	entrations.	
(San Rasperse Martinity) a Stand he se	-	-di-oak)	2. LABEL 2.1 Category: Plant 2.3 Chees: 3	mable liquid	
3.1 GG Gorganishing Class dramatic 4.1 Physical Big hypraterison 4.2 Color: Color			4. DESERVABI 4.1 Prysicol Blate (4.2 Color: Coloriesa 4.3 Oder: Aromesc	LE CHARACTERISTICS	
8. REALTH NATARES 8.1 Persons Professive Equipment Self-contained transfer appersize, artisty gopples. 8.2 Symptoms Palloreng Equipment Self-contained transfer of rose 8.57mms depression. Moderat entains of the ent contail regulation from the self-case blessor. 8.2 Treatment of Equipment should be a structure as in ord may cause blessor. 8.3 Treatment of Equipment should be a structure as a structure as in ord may cause blessor. 8.4 Treatment of Equipment should premptly, if seating along yers andted inspiration. 8.6 Personal should be should be a structure of case 3 contaminated storing before takes. 8.4 Treatment should should story ord case sontaminated storing before takes. 8.5 Should form should should story ord case 3 contaminated storing before takes. 8.6 Treatment should should story ord case 3 contaminated storing before takes. 8.7 Foreign of should should should should be should s					

6. FIRE HAZARDS	10. HAZARO ASSESSMENT CODE
8.5 Floor Form, 80°F DC , 89°F CC 8.2 Florenskin Limits in Agr, 10°4-27°4	(See Masers' Assessment Managhanis)
63 For Estinguishing Agents, Four (most	A-T-U
effective), were for carbon movide or	
P3 Chemical.	
4.4 Fire Estinguishing Agents Not to be Used: Not personnel	11. HAZARD CLASSIFICATIONS
6.5 Special Measuring of Combustion	11.1 Code at Federal Regulations:
Products Impling vapors are generated	Fightenia tour
S.S. Between in Fire Valor is feature from an	11.2 MAS Making Rating for Bull Water
6.6 Between in Fire, Vapor is heaver than an and they travel somederable distance to	Transportsting: Cologony Rolling
the bounds of grater, and but been	Fro
6.7 Ignition Temperature, 960°F	Health
6.8 Electrica' Heading, Not personnel 6.9 Surning Rate, 5.6 inm/mm	Vapor imand
5.10 Atlahate Flore Temperature:	Posory
Data Not Available	Water Political
[Cornell	Human Taxany
	Aquete Torony
7. CHEMICAL REACTIVITY	Reactedy
7.1 Reserving With Water, No reaction	Drier Demosts
7.2 Pastivity with Commer, Meterials, leg	Water 0
7.2 Substity During Transport, Stable	11.3 HFPA Hazard ChrapMenhark
7.4 Houtraining Agents for Aside and	, Calogory Chariteation
Counties Not personals	Figure Nazard (Bird)
7.5 Palymentia Han, Not personal 7.6 Invisitor of Perymentia Hanc	Restroy (retor)0
NO. BALLMAN	
7.7 Male: Ratic (Resident to	
Product): Data hip: Avadable 7.8: Reactivity Group; 32	
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	12. PHYSICAL AND CHEMICAL PROPERTIES
	12.1 Physics: State at 16°C and 1 star.
	Liquid
i	12.3 Haircula: Waight 106.17
	12.3 Botting Paint at 1 ptos
	277.5"F = 136.5"C = 409.4"K
8. WATER POLITION	277.2°F = 130.2°C = 409.4°K 12.4 Freezing Paint: =130°F = =99°C = 138°K
2. WATER POLIUTION	277.2°F = 136.2°C = 409.4°K 12.4 Freezing Paints = 176°K 12.5 Critical Temperatures:
8.1 Aqualic Taxinity; 25 ppm/86 tr/binagii/Ti_/bash water	277.0°F = 136.2°C = 409.4°K 12.4 Francing Point = 136°F = ==51°C = 176°K 12.5 Critical Temperatures 641.0°F = 343.9°C = \$17.1°K
8.1 Aquelic Yarladyr. 25 ppm 186 tr/biungii/Yi/Yara* water 8.2 Waterfowl Yarlady. Sala not ovellabe	277.3°F = 136.3°C = 409.4°K 12.4 Frending Points
8.1 Aquatic Yarisaty; 25 ppm/96 tr/biungbi/Ti _m /bas* untar 8.3 Waterfoot Yarisaty, Data not oosiaba 8.3 Besington Onyan Damana (BDO);	277.2°F = 136.2°C = 409.4°K 12.4 Freezing Select = 130°F = ==00°C = 178°K 12.5 Critical Temperature; 861.0°F = 343.0°C = 617.1°K 12.6 Critical Pronounc; 522 peak = 35.6 atm = 3.61 ans/mb 12.7 Squarter Greenby;
8.1 Aquelli Terishiyi. 25 ppm/80 tr/blueqii/Ti _m /sest vester 8.3 Weterfoot Terishiy. Data not oosiabq 8.3 Besteglich Orygen Domana (bDO); 2.5% (theo); 2.5 days	277.275 = 136.275 = 409.476 12.4 Francing Points
8.1 Aquatic Yarisaty; 25 ppm/96 tr/biungbi/Ti _m /bas* untar 8.3 Waterfoot Yarisaty, Data not oosiaba 8.3 Besington Onyan Damana (BDO);	277.3°F = 136.3°C = 409.4°K 12.6 Freezing Sealing136°F = -08°C = 178°K 12.5 Critical Temperature; 651.0°F = 343.9°C = 817.1°K 12.6 Critical Pronaum; 527 peut = 35.6 atm = 3.61 annima 12.7 Spectic Grandy; 0.867 = 20°C (p.mb) 12.8 Liquic Eurison Temalog:
8.1 Aquelic Textaley: 25 ppm/80 tr/bluegh/Tl _m /sect vester 8.2 Wete-fout Textetly, Date not evolute 8.3 Resignate Orygen Demons (NDO): 2.5% (Neor.); 5.6cys 8.4 Food Chain Consentration Rejented	277.2°F = 136.2°C = 409.4°K 12.4 Franking Spaint = 138°F = -98°C = 178°K 12.5 Critical Temperature: 651.0°F = 343.9°C = 517.1°K 12.6 Critical Pressure: 527.9 pais = 35.6 atm = 3.61 ans/m² 12.7 Spectisc Greetly: 0.967 si 20°C (base) 12.8 Liquic Eurison Templace 272.6 pm/err = 0.0292 N/m si 20°C 12.8 Liquic Water Interface! Templace 12.8 Liquic Water Interface! Templace 12.8 Liquic Water Interface! Templace
8.1 Aquelic Textaley: 25 ppm/80 tr/bluegh/Tl _m /sect vester 8.2 Wete-fout Textetly, Date not evolute 8.3 Resignate Orygen Demons (NDO): 2.5% (Neor.); 5.6cys 8.4 Food Chain Consentration Rejented	277.3°F = 136.3°C = 409.4°K 12.6 Freeding Points136°F =04°C = 178°K 12.5 Critical Temperatures 651.0°F = 343.9°C = 517.1°K 12.5 Critical Personnes 527 pais = 35.6 stm = 3.61 sths/m² 12.7 Equation Gravity: 0.667 = 30°C Daud9 12.8 Liquid Euritses Tempines 272.6 dynas/gm = 0.0292 N/m = 20°C 12.8 Liquid Wafer Interferont Tempines 35.46 synas/gm = 0.0292 N/m et al.
8.1 Aquelic Textaley: 25 ppm/80 tr/bluegh/Tl _m /sect vester 8.2 Wete-fout Textetly, Date not evolute 8.3 Resignate Orygen Demons (NDO): 2.5% (Neor.); 5.6cys 8.4 Food Chain Consentration Rejented	277.2°F = 136.2°C = 409.4°K 12.6 Freeding Relate 136°F =06°C = 178°K 12.5 Critical Temperature; 651.0°F = 343.9°C = 617.3°K 12.6 Critical Pronounce; 527 peak = 35.6 atm = 3.61 atm/mb 12.7 Squark; Groving; 0.66° oi 20°C (bound) 12.8 Linguic Eurison Freeding; 27.2 dynam/cm = 0.0292 M/m or 20°C 12.8 Linguic Water Interfaces Template; 26.46 dynam/cm = 5.02548 M/m of 20°C
8.1 Aquelic Textaley: 25 ppm/80 tr/bluegh/Tl _m /sect vester 8.2 Wete-fout Textetly, Date not evolute 8.3 Resignate Orygen Demons (NDO): 2.5% (Neor.); 5.6cys 8.4 Food Chain Consentration Rejented	277.3°F = 136.3°C = 409.4°K 12.6 Freeding Points136°F =06°C = 176°K 12.5 Critical Temperatures 651.0°F = 343.9°C = 617.1°K 12.6 Critical Pronaums 577 past = 35.6 apm = 3.61 adulymb 12.7 Spectic Condition 12.8 Liquid Eurison Templase 78.2 dynam/str = 0.0292 N/m or 20°C 12.8 Liquid Water Interfaces Templase 25.4 dynam/str = 0.0292 N/m or 20°C 12.8 Vapor (Smr.) Spectic Gravity; 12.10 Vapor (Cms.) Spectic Gravity; 12.10 Vapor (Cms.) Spectic Gravity;
8.1 Aquelic Textaley: 25 ppm/80 tr/bluegh/Tl _m /sect vester 8.2 Wete-fout Textetly, Date not evolute 8.3 Resignate Orygen Demons (NDO): 2.5% (Neor.); 5.6cys 8.4 Food Chain Consentration Rejented	277.3°F = 136.3°C = 409.4°K 12.6 Franking Paints136°F =06°C = 178°K 12.5 Critical Temperatures 651.0°F = 343.9°C = 617.1°K 12.6 Critical Pronaurus 577 paul = 31.6 atm = 3.61 atm/m² 12.7 Square = 31.6 atm = 3.61 atm/m² 12.8 Equatic Survivity: 0.067 of 20°C (burd) 12.8 Liquic Survivity: 27.2 dynum/car = 0.0292 N/m or 20°C 12.9 Liquic Waler Interfaces Template: 26.4 Square/gam = 0.02648 N/m of 20°C 12.10 Vapor (Cas) Squarity Gravity; 10.10 performer 12.11 Rotic of Squarity North of Vapor (Cas):
8.1 Aquelic Textaley: 25 ppm/80 tr/bluegh/Tl _m /sect vester 8.2 Wete-fout Textetly, Date not evolute 8.3 Resignate Orygen Demons (NDO): 2.5% (Neor.); 5.6cys 8.4 Food Chain Consentration Rejented	277.2°F = 136.2°C = 409.4°K 12.6 Francing Relation
8.1 Aquelic Textaley: 25 ppm/80 tr/bluegh/Tl _m /sect vester 8.2 Wete-fout Textetly, Date not evolute 8.3 Resignate Orygen Demons (NDO): 2.5% (Neor.); 5.6cys 8.4 Food Chain Consentration Rejented	277.3°F = 136.3°C = 409.4°K 12.6 Frending Points -136°F =00°C = 178°K 12.5 Critical Temperatures 401.0°F = 343.9°C = 617.1°K 12.6 Critical Pronounce 537.9 and = 32.6 atm = 3.61 admired 12.7 Separation Constity 12.8 Liquid Constity 12.10 Vapor (Cons) Specific Gravity; 14.11 Ratio of Specific Morth of Vapor (Cons): 1.071 12.12 Lelient Month of Vaporthrings 14.1 Blufts of Scientific Constity 14.1 Blufts of Scientific Constitutes 14.
8.1 Aquatic Tastaty; 25 ppm:PC fv/bluegh/TL _m /bas* water 8.2 Weterfoot Tastaty; 20th not enskaps 8.3 Belegita' (Dryan Damans (BDD); 2.5% (Paor.); 5 days 8.4 Facet Chain Genauntration Petinstat None	277.2°F = 136.2°C = 408.4°K 12.6 Freeding Relatio -136°F =05°C = 176°K 12.5 Critical Temperature; 651.0°F = 343.9°C = 617.3°K 12.6 Critical Pronounce; 52.7 pain = 3.6° on = 3.6°1 anti-min 12.7 Squeetic Gravity; 0.66° ni 20°C Relatio 12.8 Liquic Surfaces Template; 276.2 dynam-fart = 0.0292 M/m; ni 20°C 12.8 Liquic Wafer Interfaces! Template; 26° di Squeetic Gravity; 100 performet 12.18 Autor of Squeetic Gravity; 100 performet 12.11 Relatio of Squeetic Gravity; 100 performet 12.12 Letert Mast at Vaporhantings 144 Blut = 80°1 ant/g a 3.26° X 10° July
8.1 Aquatic Taplatey: 25 ppm/96 fo/plumph/7Lm/bash water 8.3 Weterfoot Taplatey: Date not excelled 8.3 Beliegists' Organic Demans (BDD): 2 8% (Place); 5 days 8.4 Facet Chain Consentration Polyment None 8. SHIPPING INFORMATION	277.3°F = 136.3°C = 409.4°K 12.6 Freeding Points136°F =04°C = 178°K 12.5 Critical Temperatures 451.0°F = 343.9°C = 517.1°K 12.5 Critical Temperatures 527.9 pais = 35.6 stm = 3.61 sths/m² 12.7 Spectic Gravity:
8.1 Aquelic Tertistity: 25 ppm/86 fo/Picagh/TL _m /bash unter 8.2 Weterfoot Testetty, Date not enough 8.3 Bestegate Orygen Demana (BDD): 2 8% (Paor.) 2 days 8.4 Fased Chain Consentration Potential None 8. SHIPPING INFORMATION 8.1 Greden of Purity, Research grade:	277.3°F = 136.3°C = 408.4°K 12.6 Freeding Relate -136°F = -26°C = 176°K 12.5 Critical Temperature; 651.0°F = 343.9°C = 617.3°K 12.6 Critical Pronaure; 572.7 pais = 31.6 stm = 3.61 settings 12.7 Squeetic Gravity; 0.66° oi 27°C Relate 12.8 Liquic Surface Template 27.2 dynamican = 0.0292 M/m or 27°C 12.8 Liquic Water Interfaces Template; 26'd Synamican = 0.0264 M/m of 20°C 12.10 Vapor (Gae) Squeetic Gravity; 100 speriment 12.11 Rette of Squeetic Gravity; 101 speriment 12.12 Latent Mach of Vaporisations 14.18 But 2 = 80 t safe a. 3.26'X 10° Jilig 12.12 Meat of Combustions17,760 Stu/Sp = -967° call(g a13.3'X 10° Jilig 12.14 Meat of Decomposition Not improved 12.14 Meat of Decomposition Not improved
8.1 Aqualic Tariship; 25 ppm/96 fo/Pilumph/TL_/Past value 8.3 Waterfoot Tariship, Data not assisted 8.3 Beliegita' Organ Demana (BDD): 2 8% (Past); 5 days 8.4 Fast Chain Consumitation Palantial None 9. SHIPPING INFORMATION 9.1 Grades of Purity, Restauch grade: 9.95%, pur grade 55.5%, technical grade 90.0%	277.3°F = 136.3°C = 409.4°K 12.6 Freeding Points -136°F = -48°C = 178°K 12.5 Critical Temperatures 651.0°F = 343.9°C = 617.1°K 12.6 Critical Pressures 527 past = 35° atm = 3.61 atm/m² 12.7 Squartie Gravity: 0.86° si 20°C (build) 12.8 Liquid Eurison Tembers 27.2 dynay/gri = 0.0292 N/m or 20°C 12.8 Liquid Water Interferent Tembers 27.4 dynay/gri = 0.0292 N/m or 20°C 12.10 Vaper (Coal) Squartie Gravity: 10.11 Retin of Squartie Gravity: 10.12 Liquid Eurison Horizon 12.13 Retin of Squartie Gravity: 10.14 Build = 80°1 ani/g = 3.26′ X 10°1 J/kg 12.14 Next of Combustors = 17.760 Stu/Sp = -10.77 ani/g = -113.5 X 10°1 J/kg 12.14 Meat of Combustors = 17.760 Stu/Sp = -10.77 ani/g = -113.5 X 10°1 J/kg 12.14 Meat of Combustors = 17.760 Stu/Sp = -10.77 ani/g = -113.5 X 10°1 J/kg 12.14 Meat of Scalina, Not performed
B.1 Aquelic Testathy: 25 ppm/86 for/biumph/TL _m /bash unter B.3 Weterfoot Testathy, Date not enough B.3 Besteglich Orygen Demana (BDD): 2 8% (Paor.) 2 days B.4 Fased Chain Consentration Potential None B. SHIPPING INFORMATION B.1 Greden of Purity, Research grade; 19 80%, Dur grade, 55%, technical grade 90 0%. B.2 Blenge Temper Pairs, Ambert	277.3°F = 136.3°C = 408.4°K 12.6 Frending Paints —136°F = —56°C = 176°K 12.5 Critical Temperatures 651.0°F = 343.9°C = 617.1°K 12.6 Critical Temperatures 537.9 and = 31.6 atm = 3.61 admiral 12.7 Seperature Services 12.8 Liquic Burles Tempine 12.8 Liquic Burles Tempine 12.9 Liquic Waler Interspent Tempines 27.2 dynar/gen = 0.0252 N/m at 20°C 12.10 Vaper (Cas) Seperite Gravity; Not personne 12.11 Rotic of Seperite State of Vaper (Gas): 1.071 12.12 Rotic of Seperite State of Vaper (Gas): 1.071 12.13 Notic of Seperite State of Vaper (Gas): 1.071 12.14 Notic of Seperite State of Vaper (Gas): 1.071 12.15 Notic of Seperite State of Vaper (Gas): 1.072 14.16 Not of Descriptions 14.17 Not of Seperite State of Vaper (Gas): 12.18 Not of Description (Not performed) 12.15 Not of Seperite State (Not performed) 12.16 Not of Description (Not performed) 12.17 Not of Seperite State (Not performed) 12.18 Not of Description (Not performed)
8.1 Aquelic Tersisting: 25 ppm/86 for/bi-mghi/Ti _m /best water 8.3 Weterfoot Tersistin, Date not semiale 8.3 Besteglar Orygen Dumans (bDD): 2 fth, Photo J. 5 days 8.4 Fasci Chain Consentration Potential: None 9. SHIPPING INFORMATION 9.1 Grades of Purity, Hennorth grade: 99.6%, pure grade 56.5%, sprincest grade 99.0% 8.2 Birmight Temporations, Amborit 9.3 bout Allenaphyra, No. temporaterpt	277.3°F = 136.3°C = 409.4°K 12.6 Freezing Paints -125°F = -05°C = 178°K 12.5 Critical Temperatures 651.0°F = 342.9°C = 817.1°K 12.6 Critical Temperatures 527 paul = 35° atm = 3.61 atm/m ³ 12.7 Squettle Serving: 0.86° si 20°C (squet) 12.8 Liquic Eurison Tembers 27.2 dynay/str = 0.0292 N/m or 20°C 12.8 Liquic Waler Interfaces! Tembers 26.46 Synay/str = 0.0292 N/m or 20°C 12.10 Vapor (Cas) Squettle Gravity; 10.11 Notice of Squettle Gravity; 10.12 Labort Maal of Vapor/satisms 14.13 Notice of Squettle Morth of Vapor (Gas): 1.071 12.14 Maal of Squettle Morth of Vapor (Gas): 1.212 Notice of Squettle Morth of Vapor (Gas): 1.213 Notice of Squettle Morth of Vapor (Gas): 1.214 Mort of Squettle Morth of Vapor (Gas): 1.215 Notice of Squettle Morth of Squettle of Squ
B.1 Aquelic Testathy: 25 ppm/86 for/biumph/TL _m /bash unter B.3 Weterfoot Testathy, Date not enough B.3 Besteglich Orygen Demana (BDD): 2 8% (Paor.) 2 days B.4 Fased Chain Consentration Potential None B. SHIPPING INFORMATION B.1 Greden of Purity, Research grade; 19 80%, Dur grade, 55%, technical grade 90 0%. B.2 Blenge Temper Pairs, Ambert	277.3°F = 136.3°C = 408.4°K 12.6 Freeding Relate -136°F = -00°C = 178°K 12.5 Critical Temperature; 651.0°F = 343.9°C = 617.3°K 12.6 Critical Pronaure; 57.7 peak = 25.6 stm = 2.61 seletons 12.7 Squeetic Gravity; 0.66° at 20°C (bound) 12.8 Liquic Sarines Freedom: 27.2 dyran fort = 0.0292 M/m at 20°C 12.8 Liquic Sarines freedom: Template; 26'd Syran fort = 0.0254 M/m at 20°C 12.10 Vaper (Coa) Squeetic Gravity; Not personal 12.11 Rest of Squeetic Morts of Vaper (Gas); 1.071 12.12 Letent Mail of Vaperhatting; 14.14 Buill's = 8C1 saifg at 3.25 x 10° J/kg 12.15 Rest of Combusting; Not performed 12.16 Mail of Combusting; 17.76C Stu/Sp at 19° J/kg 14.16 Mail of Schröm, Not performed 12.16 Mail of Schröm, Not performed 12.17 Mail of Schröm, Not performed 12.18 Mail of Schröm, Not performed 12.19 Mail of Puriperson Date for Supplates
8.1 Aqualic Taristity: 25 ppm/96 fo/Pilanghi/Tla_Photh union 8.3 Welenfoot Taristity, Data not excelled 8.3 Belongitat Organ Demana (BDD): 2 8% (Place); 5 days 8.4 Face Chain Consentration Polymetal None 9. SHIPPING INFORMATION 9.1 Gradue of Ruthy, Research grade: 9.00% pur grade 55% technical grade 90 0% 9.3 Blamage Temporation, Araberti 9.3 Perf Atmosphere, 6cc requested 9.4 Ventury Door (Face persons) on	277.3°F = 136.3°C = 409.4°K 12.6 Freezing Paints -125°F = -05°C = 178°K 12.5 Critical Temperatures 651.0°F = 342.9°C = 817.1°K 12.6 Critical Temperatures 527 paul = 35° atm = 3.61 atm/m ³ 12.7 Squettle Serving: 0.86° si 20°C (squet) 12.8 Liquic Eurison Tembers 27.2 dynay/str = 0.0292 N/m or 20°C 12.8 Liquic Waler Interfaces! Tembers 26.46 Synay/str = 0.0292 N/m or 20°C 12.10 Vapor (Cas) Squettle Gravity; 10.11 Notice of Squettle Gravity; 10.12 Labort Maal of Vapor/satisms 14.13 Notice of Squettle Morth of Vapor (Gas): 1.071 12.14 Maal of Squettle Morth of Vapor (Gas): 1.212 Notice of Squettle Morth of Vapor (Gas): 1.213 Notice of Squettle Morth of Vapor (Gas): 1.214 Mort of Squettle Morth of Vapor (Gas): 1.215 Notice of Squettle Morth of Squettle of Squ
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B.1 Aquelic Testatey: 25 ppm/86 for/biumph/TL _m /bash unter B.2 Weterfoot Testatey: Date not socialize B.3 Besteglian Orygen Dumana (BDD): 2 8% (Place): 5 days B.4 Feed Chain Consumitation Resented None 9. SHIPPING INFORMATION B.1 Grades of Purity, Research grade: 19.85%, pure grade 19.55%, technical grade 19.0% B.2 Blumpe Temper reluce. Amberts 9.3 Perif Almanphore. Not temperement 8.4 Venting Open (frame smooter) as pressure inscaum	277.3°F = 136.3°C = 409.4°K 12.6 Frenting Paints -126°F = -08°C = 178°K 12.5 Critical Temperatures 681.0°F = 342.9°C = 817.1°K 12.6 Critical Temperatures 537.9 min = 35.6 atm = 3.61 athlimit 12.7 Specific Stretch; 0.867 st 20°C (sp.et) 12.8 Liquid Eurison Template 272.8 dynavists = 0.0292 N/m at 20°C 12.8 Liquid Water Interposit Template; 26.46 Synavists = 0.0292 N/m at 20°C 12.10 Vaper (Cas) Specific Gravity; 10.10 persures 12.11 Retin of Specific Gravity; 10.12 Liquid Mail of Specific Gravity; 10.13 Allored Mail of Specific Gravity; 10.14 Sturic of Specific Gravity; 10.15 Allored Mail of Vaper (Cas) 1.071 12.14 Neat of Specific Order of Vaper (Cas) 12.15 Neat of Specific Start of Vaper (Cas) 12.16 Mail of Specific Start of Vaper (Cas) 12.17 Mail of Cambulature = 11,760 Sturies 12.18 Neat of Cambulature = 11,760 Sturies 12.19 Neat of Specifics, Not performed 12.11 Meat of Specifics, Not performed 12.12 Meat of Fundon, Data for Avadable 12.13 Lighting Value Data for Avadable 12.14 Heat of Fundon Data for Avadable 12.15 Limiting Value Data for Avadable 12.21 Limiting Value Data for Avadable 12.22 Limiting Value Data for Avadable 12.23 Limiting Value Data for Avadable 12.24 Limiting Value Data for Avadable
8.1 Aqualic Taristity: 25 ppm/96 fo/Pilanghi/Tla_/bash water 8.3 Weterfoot Taristity, Data not excelled 8.3 Belegita' Organ Demana (BDD): 2 8% (Paor), 5 days 8.4 Face Chain Consentration Potential None 9. SHIPPING INFORMATION 9.1 Grades of Ruthy, Research grade: 9.00% pur grade 55% technical grade 90 0% 9.3 Blanage Temporation, Arabert 9.3 Perf Atmosphere, 6cc teappement 8.4 Venting Oper (Enc. presents) as	277.3°F = 136.3°C = 409.4°K 12.6 Frenting Paints -136°F = -136°C = 178°K 12.5 Critical Temperatures 651.0°F = 343.9°C = 617.3°K 12.6 Critical Temperatures 537 past = 35.6 apm = 3.61 ashtimb 12.7 Specific Greekly: 0.867 st 20°C (p.s.6) 12.8 Liquic Eurisos Tembras 75.2 dynavists = 0.0292 N/m st 20°C 12.8 Liquic Water Interinces Template; 26.4 Synavists = 0.0292 N/m st 20°C 12.10 Vaper (Cas) Specific Greekly; Not personnes 12.11 Retin of Specific Greekly; Not personnes 12.12 Letert Model at Vaperburitare 14.14 Stu/2 = 80.1 ashig a. 3.26 X 10° J/kg 12.12 Meat of Combustare = 17.780 Stu/5s = 10°T ashig a. 3.16 X 10° J/kg 12.14 Meat of Descriptors, Not performed 13.15 Not of Specific Sturies Not performed 13.16 Meat of Performance on the performed 13.17 Meat of Specifics, Not performed 13.18 Meat of Specifics, Not performed 13.19 Meat of Specifics, Not performed 13.11 Meat of Specifics, Not performed 13.12 Meat of Performance of past 13.13 Meat of Specifics, Not performed 13.14 Meat of Fusion, Data for Avidable 13.15 Meat of Performance of past 13.17 Meat Vapor Pressures Cd past 13.18 Meat of Performance of past 13.27 Meat Vapor Pressures Cd past

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12.1 Physical State at 12°C and 1 above Liquid 12.2 Soling Point or 1 above 12.3 Soling Point or 1 above 12.4 Soling Point or 1 above 12.5 Soling Point or 1 above 12.6 Soling Point or 1 above 12.7 Soling Point or 1 above 12.8 Soling Point or 1 above 12.9 Soling Point or 1 above 12.9 Soling to 1 be soling or 17°L / bosh 12.0 Soling to 1 be soling or 17°L / bosh 12.1 Soling to 1 be soling to 1 above 12.2 Soling to 1 be soling to 1 above 12.3 Soling to 1 be soling to 1 above 12.4 Soling to 1 be soling to 1 above 12.5 Soling to 1 be soling to 1 above 12.6 Soling to 1 be soling to 1 above 12.7 Soling to 1 be soling to 1 above 12.8 Soling to 1 be soling to 1 above 12.9 Soling to 1 be soling to 1 above 12.9 Soling to 1 above 12.1 S		
4. Special Mathed of Comboston Products for personnel 4. Striker for Place Not personnel 4. Springer Compositions (2017) 4. Springer Compositions (2017) 4. Springer Compositions (2017) 5. Springer Compositions (2017) 5. Springer Compositions (2017) 5. Springer Compositions (2017) 5. Springer Compositions (2017) 6. Sp	6.1 Flosh Polini: SDCF (non)CC 5.2 Flammable Elimits in Air. 0.7%, 5% 5.3 File Estinguishing Agents Floom, dry chemical, or sarbon double 6.4 Fire Estinguishing Agents Not to be	(See Hazaid Assessment Mondbook) A-T-U
6.11 Stackthipments, As is fivel Raises ESAN red escapable 4.12 Floras Temperature. Date not excessed 7. EMEMICIAL BLACTIVITY 1.1 Bractiving with Water for section 1.2 Restrictly with Comman Materials May recorded 2.3 Stability During Transpart. Stable recording dept section 2.3 Stability During Transpart. Stable recording dept site at Active and Exaction and Ex	Used Water may be investigated. Special Makinds of Combustion. Products Not permanel. 8.8 Behavior in Fee: Not permanel. 8.7 Ignition Temperature; 640°F. 8.8 Electrical Neapold. Not permanel. 8.9 Summing Ralls of monitors. E.10 Advabate Flame Temperature; Data not available.	11.1 Ends of Federal Regulations: Combartishs issued 11.3 MAS Maserd Rating for Bull, trates Transports Nee: Calvingry Rating Fire
7.1 Reactivity with Common Materials, No reaction 7.2 Reactivity with Common Materials, No reaction 7.3 Substimp During Transport, Stable 7.4 Multratizing Agents in Action and Counties, Not personnel 7.5 Performination, Not personnel 7.6 Major Ratio (Reaction to Princetic points) 7.7 Major Ratio (Reaction to Princetic) Data not revoluble 7.8 Reactivity Color not revoluble 7.9 Reactivity Color not revoluble 8.1 Aquests Testisting 8.1 Aquests Testisting 8.2 Waterfam Testisty, Data not evoluble 8.3 Belongies? Origen Common (800); 8.3 Belongies? Origen Common (800); 8.4 Food Chain Concentration, Potentials Maria Maria 8. SHIPPING INIOMMATION 8.1 Grades of Purity Light hydracation enables 100% 8.2 Storage Temperature, Ambient 9.3 braft Almosphers, Not requirement 8.1 Storage Temperature, Ambient 9.3 braft Almosphers, Not requirement 8.1 Storage Temperature, Ambient 9.3 braft Almosphers, Not requirement 12.1 Hould of Sandras, Not permanel 12.2 Brain 1974 8.3 Storage Temperature, Ambient 9.3 braft Almosphers, Not requirement 12.1 Real of Decomposition, Not permanel 12.1 Real of Permanel Storage — 10.202 At 17.0 Permanel 12.2 Brain 1974 8.1 Colorade of Purity Light hydracation 12.2 Liquid Water Individual Colorade 12.2 Brain 1974 8.1 Storage Temperature, Ambient 9.3 braft Almosphers, Not requirement 12.1 Real of Decomposition, Not permanel 12.1 Real of Permanel Status, Not permanel 12.2 Brain 1974 8.1 Colorado 1975 8.2 Storage Temperature, Ambient 9.3 braft Almosphers, Not requirement 12.2 Brain 1974 8.2 Storage Temperature, Ambient 1974 8.3 Storage Temperature, Ambient 1974 8.4 Veniling Chen (firms anaster) 1974 8.5 Storage Temperature, Ambient 1974 8.6 Storage Temperature, Ambient 1974 8.7 Storage Temperature, Ambient 1974 8.8 Storage Temperature, Ambient 1974 8.9 Storage Temperature, Ambient 1974 8.1 Colorado 1975 8.1 Colorado 1975 8.2 Storage Temperature, Ambient 1974 8.3 Storage Temperature, Ambient 1974 8.4 Storage Temperature, Ambient 1974 8.5 Storage Temperature, Ambient 1974 8.6 Storage Temperature, Ambient	Steichigmeint; dit so Fuel Rollig: Este not evoluble Steine Tempurature. Data not available	Vapor Indent \$ Liquid or Solid Institut \$ Foregras \$ Warn Pastings Human Soucidy \$ Aquella Touride \$ Restrict (Rept 5) Restricts
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8. Track Pollution 8.1 Aquatic Taristity: 200 ppm/24 to Margal/TL./book assess 8.2 Waterian Taristity: Data not evoluble 8.3 Biological Dayger Demons (BOD): 27%, 5 days 8.4 Facel Chain Concentration: Patentiak Marea 8.9 Selection Concentration: Patentiak Marea 8.1 Suffering Information 8.2 Suffering Information 8.3 Suffering Information 8.4 Selection Concentration 8.5 Suffering Information 8.6 Selection Concentration 8.7 Suffering Information 8.8 Suffering Information 8.9 Suffering Information 8.1 Grades of Puntly: Light hydrocarbon available 100% 8.2 Suffering Information 8.3 Surregardure. Ambient 9.4 Venting Open (flame anaster) 8.4 Venting Open (flame anaster) 8.5 Reid Vapor Presource; 0.1 psin		Liquid 12.2 Molecular Weight: Not personage 12.3 Boiling Point of 1 abox 392 NOOF
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E. FIRE HAZARDS E.1. Flush Paint 100°F C.C. E.3. Fluoring Lines in Air 1.3% 4% E.3. Fire Enthysishing Signific Dispersionals, Son, in analysis also as E.4. Fire Enthysishing Agents but in its	18. HAZARD ASSISSMENT CODE (Fire HAZARS & GARRANIA NATIONAL) A.TU
Dungt Water may be verticating. 6.8 Special Hazards of Combus basis Productin, Mot perfected. 6.8 Sententies in Pire, Mot perfected. 6.7 Ignition Temperatures, 250—625°F. 6.8 Everying Masses, Rep personal. 6.8 Surving Rate, 6 personal. 6.8 Administic Thoma Temperatures. Date mot produbble. 6.11 Procedularity for pure design. 6.12 Planta Temperatures, Date not available. 6.13 Planta Temperatures, Date not available.	21. HAZARD CLASSIFICATIONS 11.1 Contin of Proture Ray desterois Combanitie Squal 11.2 MASS Maint's Reting for Such Workey Tre-haporte time. Ray design 11.3 MFFA Hazard Chamburders Category Cimanterson Health Maint (Shap) 7 Investign (Shap) 2 Reactivity (Volum) 8
7. CHIMICAL SLACINITY 7.1 Hancibots With Worker, No manipule 7.2 Processing units Communication to manipule 7.3 Stainting Cooling Transport Stable 7.4 Housewitzing Agents for Audio and Consistent Not performed 7.5 Professional Not performed 7.6 Professional Physical Stable 7.7 Professional Stable 7.8 Professional Stable 7.9 Professional Sta	
	12. PRISICAL AND CHEMICAL PROPERTIES 18.1 Physical State of 18°C and 9 above Liquid 12.2 Materials Weight his purious 12.3 Bearing Paint at 1 above 360—560°F = 152—280°C as 466—660°K
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Commun Syra Descript, median	Pipale pr	_	6. FIRE HAZARDS 6.9 Flash Point 1957 E.E. 6.2 Flammable Limits in Air; 1,3%-d-D% 6.3 Fire Extinguishing Agents. Die enumeal, foun, or carbor dioxide.	19. HAZARD ASSESSMENT CODE (See Major Gabrasament Hardhan A-T-L)
Cal he m Articles holan an	est or th found. I remove discharged mate I health and political son	ned agreement.	5.4 Pro Estinguishing Agents Not to be Used thate may be indirected 6.5 Special Massis or Combusted Products Not personnel 6.5 Behavior to Proc. Not personnel 6.7 Sembles Temps refuse, 450—545°F 6.8 Encreum! Massis to the personnel	11. HAZARD ELASSIFICATIONS 11.1 Emili of Forbiron I Impulationing Combustive liquid 11.2 HAZ Mazard Reling for Bulk Wote Transportation, Not being 11.3 HFFA Mazard Electromagnetic 11.3 HFFA Mazard Electromagnetic
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(Son Fosparni Machanical Should be e	MSE TO DISCHARGE as Methods North-money approving the province of the province	2 LASEL 2.1 Category, None 3.3 Close Not pertinent	8. NATER POLLUTION 8.1 Aquatic Toulody: 204 registrate American whed TL _v fast reside 8.2 Waterfast Toulody: Data not orolodia 8.3 Sunlegical Drygen Drimond (BOD): Data not evaluable 8.4 Feed Charle Companying lian Potentials	345—451°K 52.4 Providing Politic 8°F ~ 18°C ~ 285°K 12.6 Critical Yemperature; Not perform 12.6 Critical Pleasure; Not perform 12.7 Specific Grants; Not perform 12.7 Layer Critical Provides 12.8 Liquid Service; Termine; Data ext 12.8 Liquid Water Notestar Termine; Data ext available
	spicable spilate 3 1/1878	4. DESERVABLE CHARACTERISTICS 4.1 Physics' State (as adopted) Liquid 4.2 Coder Light from 4.3 Other: Characteristic	Nung	15 10 Vapos (Cas) Specific Oraving: Not pertinent 12.11 Ratio of Specific Hasta at Yapor 12.12 Ratio of Vapority, Hasta at Yapor 12.13 Latent Heat of Vaporitantiant Not pertinent 12.13 Not of Combustions = 15,465 Sta 10,800 ant/g a = me55.17 X 10 12.14 Need of Decomposition, Not perfor
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A-T-U **CLASSIFICATIONS** ny Englishman e Squad Halling for Bush Wotor Halling, for Bush Wotor Harr, Nigel Bused f Clean-Manadan Property Classification or (Pice) 2 AD CHEMICAL PROPERTIES ir of 18°C and I also right, Not personal l of 1 about "F = 202—230"C oc in. rd. "C = 255"K persions, Not perso ruts: Not persons rity: | III ITO'C Bould) | II Terrolon: Data end an | Intertaciat Terrolon: rointie Ipochic Gravity; His Heate at Vapor (Ges): and humanistic at 16,660, Sturith in humanistic at 16,660, Sturith in humanistic at 16,700, The promote laws, fact performed the fact, fact performed and fact, fact, and a performed as fact, and a performanistic at 16,000, ensure. Data net auptable

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State the chair of pecusions living proprie among. A most connect with depart and social Can't be disconnected the chair of the chair o		S.4 Pire Estinguishing Squess Not to be Shad Note to be Shad Not pertend S.5 Squess Nazarde of Combustion Products, instring going ore generated in Sea. S.6 Seriarion In Pine, Not performed S.7 Synthing Tompor prival. Data not presented	11. NAZARD CLASSIFICATIONS 11.1 Cords of Fodors' Regulations: CRM-E 11.2 NAS Majorid Roting to: Such Water Transportation, Not based 11.3 NEFA Majorid Constitutions:	
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Exposure	CALL FOR MEDICAL AND. LIDING ON BOLLD PRAITS IS BUT OF STATE OF ST	dersig pl'amplan. part pric ficult artit plansig dif arabar.	7. EXEMICAL REACTIVITY 7.1 Reactivity With Water, his reaction 7.2 Reactivity with Convener. Melorish, Mp. Reaction 7.3 Sussetty During Transpart; Stable 7.4 Neutritizing Agents for debte and Courtice, Nor perhaps 7.1 Perfectivities of Paymenterities 7.2 Institute of Paymenterities Not perfect 7.2 Major Raits; Properted to Product; Data not evaluate 7.2 Reservet; Strup. Data not evaluate 7.2 Reservet; Strup. Data not evaluate	12. PHYSICAL AND CHEMICAL PROPERTIES
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(See Response lance organis Frank he re	rsE 10 DischardE Motivats, Kondhout) g volor sontaminant moved (physical involvent	2. LABEL 2.1 Coloquery, Nord 2.2 Close Not purious	E. NATER POLITION E.E. Aquetic Toxinity: 0.278 ppm/96 to /bi.orgit/TL_//eash water 0.005 ppm/336-1080 10 /pmigh/TL_/ast union E.E. Welenfand Toxinity: LDu; 2000 ppm (epind date)	12.6 Critical Prinsure: Het perinsent 12.7 Specific Registy: 1.2—1.8 or 20°C (Regist) 12.8 Liquid Surface Terminer, Mot pertinsent 12.0 Liquid Water Interfered Terminer, Not pertinsent 12.16 Vapor (Society Country): Not pertinsent 12.17 Ratio of Specific Regist (Vapor (Cas)):
2. EMENIC 2.1 CD Computability 2.2 Formula (Costo 2.3 MOC/LIV Design 2.4 DOT 10 May 231 2.5 CAS Registry N	re JCI _n orien, Not Brind 15	4. DESERVABLE CHARACTERISTICS 4.1 Physics State (as phipping): Liquid as make as make 4.2 Galact, Pair palon (liquid), malorises (make) 4.2 Odiar, Pacifically, adorises 4.3 Odiar, Practically, adorises	Biplington Daypen Demont (800): Very loss L4 Food Chain Companication Personal High	Not perment 12.12 Latent Mais of Vaperbottests Not perture 12.13 Meet of Communities, Not perment 12.14 Meet of Documperation, Not perment 12.14 Meet of Shakhon, Not perment 12.14 Meet of Polymerhaties, Not perment 12.25 Meet of Pulying Data ret evaluable 12.26 Meet of Vaper Data ret evaluable 12.37 Red Vaper Pressure Data ret evaluable
\$.2 Symplems Fall 8.5 Treatment of E 8.4 Treatment Limit 8.5 Short Term, left 8.6 Tamelty by leg 8.7 Late Tamelty (8.8 Vapor (Sac) ler 93 or Limit 94 or Limit 95	etire Equipment Gioves and leaving Expensive, April Ban. Epinamir, Bellet mach with an It Value. 12 to 1.0 registal- soletion. Limite: Data rer, and restant. Grade 2, and ret LDs. Cause, strumenous and state fluori. Gramativitation. Vapon high. They served be below britant. Committed to the as- britant. Committed for britant. Committed for britant. Committed for 50 Data ret employed.	pión partiaci, aj bird mater, abla	8. SHIPPING INFORMATION 8.1 Grades of Purity, 11 grades (some Spuid, come solids) which offer primarily in that chierta acrosses (20%-46% by comptig 9.2 Storage Temperature Ambient 9.3 hart Atmosphere, NC Inque errors 8.4 Vertifing Opens	THE PERSON OF TH
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APPENDIX A2 SITE SPEACIFIC EMERGENCY INFORMATION

SITE SPECIFIC

EMERGENCY INFORMATION

Job Site:

Harrison Street Garage

1432 Harrison Street

Oakland, California 94612

Contact Person:

John P. Cummings; Office Director/Site Health & Safety Officer

SCS Engineers (415) 829-0661

Nels R. Johnson; Project Manager

SCS Engineers (415) 829-0661

Emergency Phone Numbers:

Dial 911, report location,

nature of injury or accident,

and assistance required.

Fire Protection/Paramedics:

Dial 911

Poison Control Center/San Francisco:

1-800-523-2222

or 415-476-6600

National Response Center (NRC): For toxic chemical

and oil spills

1-800-424-8802

Hospitals/Emergency Services (Figure 1):

Nearest:

Peralta Hospital 450 30th Street Oakland, California 415-451-4900

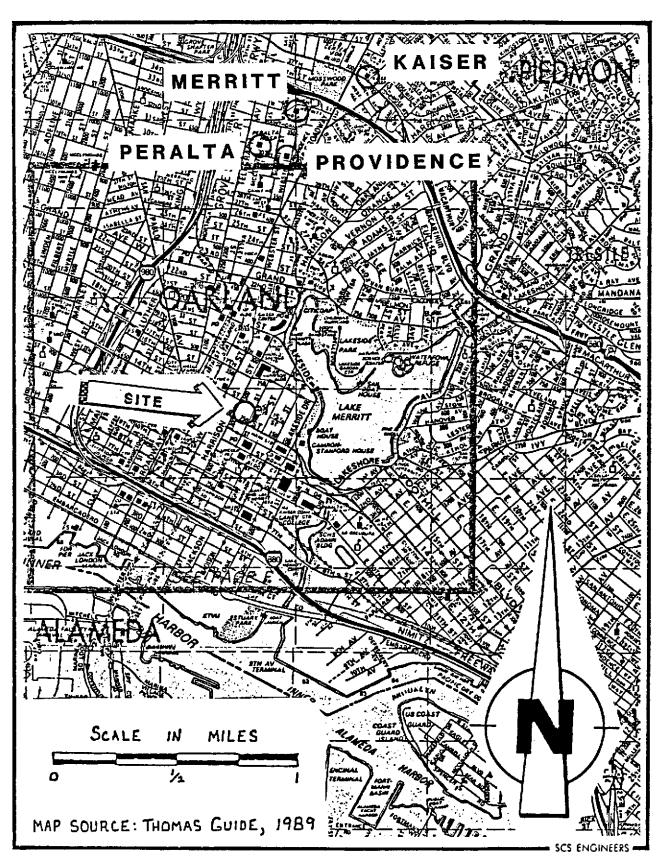
Other Hospitals in Area:

Providence Hospital 3100 Summit Street Oakland, California 415-835-4500

Merritt Hospital Hawthorne and Webster Streets Oakland, California 415-655-4000 Kaiser-Permanente Medical Center 280 W. MacArthur Boulevard Oakland, California 415-596-1000

Telephones are available in offices on the site and a cellular phone also will be present. A job site safety meeting will be held daily with the crew, including subcontractors, prior to starting excavation. NO SMOKING signs will be posted in proximity to the work site(s). Two fire extinguishes with a minimum class rating of 20BC shall be kept within at least 50 feet of the removal operation at all times during work operations. There shall be no ignition sources allowed within the area while removal operations are in progress. A first aid kit shall be present on site during all removal operations.

A copy of this notice shall be conspicuously posted in the area adjacent to removal operations, along with a copy of the fire department permit.



LOCATIONS OF OAKLAND HOSPITALS NEAR HARRISON STREET GARAGE 1432 Harrison Street, Oakland, California

APPENDIX A3 SIGNATURE SHEET

SIGNATURE SHEET

All employees of SCS Engineers, its subcontractors, or other agents must certify by signing this document that they have completed the appropriate OSHA-approved training and that they have read and will comply with this Site Health and Safety Plan.

Signature/Company	Date
Signature/Company	Date

APPENDIX C

TANK REMOVAL CONTRACTOR'S WORKMAN'S COMPENSATION INSURANCE CERTIFICATES

JAMA 2-91 NEB 11:50 BAUGHERTT W. CERTIFICATE OF INSURANCE his certificate is issued as a matter of information only and confers no rights upon the dertificate holder. This certificate does not amend, extend or alter he coverage afforded by the policies listed below. C Letter A Pacific Compensation Ins. Co. RODUCER Daugherty & Company M Letter & 2495 West March Lane P Stockton CA 95207 A Letter C N INSURED Falcon Energy Associates
P. O. Box 1257
Stockton "LIMITS AT POLICY INCEPTION" CA 95201 Stockton his is to certify that policies of insurance listed below have been issued to the insured named above for the policy period indicated. Notwithstanding any meduirement, term or condition of any contract or other document with respect o which this certificate may be issued or may pertain, the insurance afforded by the policies described herein is subject to all the terms, exclusions and conditions of such policies. Limits shown may have been reduced by paid claims. -----COVERAGES-----() Commercial GL Gnl Aggregate Prd-CompOp Agg () ()Claims Made Pers & Adv Inj (]Occurrence Each Occur) Owners & Contr Fire Damage Medical Exp -- AUTOMOBILE LIABILITY ------() Any Auto CSL () All Owned () Scheduled () Hired () Non-Owned B.I./Person B.I./Accident () Garage Liab -- EXCESS LIABILITY ------() Umbrella Form Each Occur Aggregate () O.T. Umbrella -- WORKERS COMPENSATION -------WP012191 11/30/90 11/30/91 STATUTORY W.C. Each Accident \$1,000 Employers Liab. Disease/Pol \$1,000 Disease/Emp \$1,000 Discool mp 91,00 DESCRIPTION OF Operations/Locations/Vehicles/Restrictions/Special Items RE: As their interest may appear. Should any of the above described policies be cancelled CANCELLATION: before the expiration date thereof, the issuing company will endeavor to mail ten days written notice to the certificate holder named below but failure to mail such notice shall impose no obligation or liability of any kind upon the company, its agents or representatives. NAME and ADDRESS of CERTIFICATE HOLDER SITE ADDRESS

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1432 Harrison Street Oakland, CA 94612

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

AUTHORISED ASTREEMING THE JUNE OF TIMOTHY J. Danie

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SITE APPRESS

WORKERS'

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1432 Harrison Greet Oakland, CA 94612

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SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, THE ISSUING COMPANY WILL ENDEAVOR TO MAIL 010 DAYS WRITTEN NOTICE TO THE CERTIFICATE HOLDER, NAMED TO THE LEFT, BUT FAILURE TO MAIL SUCH NOTICE SHALL IMPOSE NO OBLIGATION OR LIABILITY OF ANY KIND UPON THE COMPANY, ITE AGENTS OR REPRESENTATIVES.

9/30/81

STATUTORY

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AUTHORIZED REPRESENTATIVE

9/30/90

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SCS ENGINEERS

BORING LOG

	Project	Hole/Well #					
	Location				Diameter of Drill Hole		
	Job #				Total Depth of Hole		
	Geologist/Engineer	Date Started					
					Date Completed		
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GROUNDWATER SAMPLING DATA SHEET

Well No.:	Monthly/Quarterly/Annu	al/Other (circle one) Sample
	:	
Sampling Date:	Time:	Weather:
Sampler Name:	Company:	Title:
Sample No.:		
Type of Sampler/Pump U	sed:	
	evation (ft.):	
Sample Depth:		
Describe Well Purging	Before Sampling:	
time pump on:	time pump off:	
Type, Volume, Details	of Sample Containers:	
Field Preservation of	Samples (if any) - Describe:	
Analytical Lab Sent To	, How Packaged and Shipped, 1	Date/Time:
Describe Analytical Te	sting Requested:	
Analytical Results To	Be Sent To:	
Field Parameters: Spec	. Conductance (umhos/cm)	pH
Temp Other Field Conditions	erature	
File No.:	Reviewed I	Ву:
cc:		
Kemarks:		



CHAIN OF CUSTODY RECORD REQUEST FOR ANALYSIS



COMPANY NAME:						CARRIER:					TURNAROUND TIME REQUIRED:								
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COMPANY;		TIME:	COMPANY	<u>/:</u>		СОМ	PANY:			TIME :			C	OMP/	WY:				

APPENDIX E

STATEMENT OF QUALIFICATIONS SCS ANALYTICAL LABORATORY 2860 WALNUT AVENUE LONG BEACH, CALIFORNIA 90806



2860 WALNUT AVENUE LONG BEACH, CALIFORNIA 90806 (213) 595-9324 FAX (213) 595-6709

STATEMENT OF QUALIFICATIONS

SCS Analytical Laboratory 2860 Walnut Avenue Long Beach, CA 90806

(213) 595-9324

Laboratory Director: Lam V. Ho

July 1991

Table of Contents

Certification and Qualifications

Introduction

Certifications

Affiliations

Personnel Summary

Facility and Lab Instrumentation

Organic Analyses

Metals and Other Inorganic Analyses

Quality Assurance/Quality Control Summary

Laboratory Experience

Appendix A: Certificates of Approval

California Environmental Laboratory Accreditation

New York Certification of Approval for Laboratory Services

Appendix B: Resumes of Key Personnel

SCS ANALYTICAL LABORATORY CERTIFICATION AND QUALIFICATIONS

Introduction

SCS Engineers was founded in 1970 to provide comprehensive engineering services with an emphasis on environmental quality control systems. The firm is committed to excellence in professional services to public and private clients. The SCS Analytical Laboratory was started in 1975 to provide analytical support to the firm's engineering. Over the years since its inception, the laboratory has grown to provide analytical services to numerous private and governmental, local and national clients.

Certifications

SCS Analytical Laboratory, operating as a separate office of the SCS Engineers corporation, is certified by both California and New York states for testing solid/hazardous wastes, wastewaters, and potable waters. Copies of our certifications and related documentation are presented in Appendix A.

Affiliations

Laboratory personnel are members of the following organizations:

- * American Chemical Society
- Association of Hazardous Materials Professionals
- * Association of Analytical Chemists
- * American Water Works Association
- Soil Science Society of America
- * National Registry of Environmental Professionals

Personnel Summary:

PhD (Soil Chemistry) 1 MS (Chemistry) 3 MS (Biochemistry) 1 MS (Physics) 1 BS (Chemistry) 6 BS (Other disciplines) 2	Total Staff	17, which	include:
	MS (Chemistry)MS (Biochemistry)MS (Physics)BS (Chemistry)	3 1 1 6	

Please refer to Appendix B for resumes of our key personnel.

FACILITY AND LAB INSTRUMENTATION

SCS Analytical Laboratory is conveniently located in Signal Hill, California. The Facility occupies a 7,000 square feet building and houses numerous modern lab instruments. Some of our major lab instrumentation are listed below:

Organic Analyses

- 2 GC/MS * Gas Chromatograph/Mass Spectrometers, HP 5890 coupled with HP MSD 5070 and HP 1000 computer system for analysis of volatile, base-neutral/acid extractable organic compounds.
- 8 Gas Chromatograph * which include, HP 5890A-II, Varian 3600, and 3400. The GC are equipped with auto samplers, integrators/computerized data acquisition and the following detectors: Hall, PID, FID, ECD, TCD and FPD.
- 1 Infrared Spectrophotometer * Perkin Elmer 1320 for analysis of Total Petroleum Hydrocarbons and Oil and Grease.

Metals and Other Inorganic Analyses

- Inductively Coupled Plasma Spectrophotometer * Thermo-Jarrell Ash AtomScan 25 equipped with auto sampler and IBM PC computer and software control package.
- 2 Atomic Absorption Spectrophotometer * Varian SpectrAA-400Z flameless analysis, SpectrAA-20ABQ for flame AA, and VGA-76 Automatic Vapor Generation Accessory for mercury analysis by cold vapor technique.
- 1 Ion Chromatograph * Dionex 4500i for analysis of anionic parameters such as nitrate, nitrite, chlorides, fluoride, sulfate, etc.

QUALITY ASSURANCE/QUALITY CONTROL SUMMARY

SCS Analytical Laboratory strictly adheres to proper EPA protocols and enforces a strong quality assurance program. A QA/QC manual is available for in-house reference and for clients' inspection. The manual, reviewed and revised annually, addresses all applicable EPA or Department of Health Services requirements. Typical QA/QC procedures include:

- Analysis of blank and appropriate standards with each sample set.
- Ten percent of samples from each matrix are spiked in duplicate.
- Samples are checked for known concentration and are analyzed with each sample group.
- Use of control charts to identify QA/QC difficulties.

LABORATORY EXPERIENCE

SCS is a leader in both small- and large-scale solid waste and water contamination studies. Many of our projects have required unique sampling and analytical capabilities. Shown below are brief highlights of projects which demonstrate our analytical capabilities.

- For the SERRF project (a mass burn facility) in Long Beach, California, the SCS Laboratory analyzed ash samples for moisture, loss of ignition, free lime, ammonium salts, and total extractable heavy metals (EP toxicity extraction and California STLC extraction).
- For several major East Coast cities, commercial, institutional, and residential refuse samples were analyzed for higher heating value (BTU content), proximate and ultimate content, heavy metals, polynuclear aromatics, phenolics, and selected other constituents.
- The SCS Lab recently completed a leaching simulation study of arsenic from gold mine spoils and soils. The results were used to predict arsenic retention in the underlying soil matrix and to estimate kinetics and potential for ultimate vertical arsenic migration.
- The SCS Lab routinely supports many geotechnical/hydrogeological firms in assessing surfaces, subsurface, and groundwater contamination projects resulting from above/underground storage tanks. Analyses typically include 418.1's, EPA 8010, 8015, and 8020's.
- For the California University system, over 1,100 transformer oil samples were analyzed for PCB content. EPA sampling and analytical protocols were used through-out. Individual PCB isomers were identified.
- As a subcontractor to the Tanners Council of America, the SCS Analytical Laboratory completed a 5-year demonstration project assess the environmental effects of the sludges, plant and soil samples were analyzed for selected hazardous waste constituents.
- Investigation of toxic discharges from Washington state apple packers,.
 Monitoring wells were placed and over 30 ground water samples were drawn
 for analysis. EPA methods for sampling and analysis were closely
 followed, and the fate and degradation of diphenylamine (DPA), sodium
 orthophenylphenate (SOPP), benomyl, and thiabendazole (TBZ) were
 studied.
- In a project for the U.S. Navy, a 20 surface impoundment were investigated utilizing California Waste Extraction Test (WET) procedures. Samples of sediment and water were analyzed for the presence of hazardous waste including the explosives TNT, RXD, and HMX. Recommendations were issued relative to specific parameters for hazardous waste monitoring, where applicable.

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APPENDIX A Certificates of Approval

ENVIRONMENTAL LABORATORY ACCREDITATION/REGISTRATION List of Approved Fields of Testing and Analytes

SCS Analytical Laboratory 2860 Walnut Avenue Long Beach, CA 20805

PHONE: (213) 595-9324 CCUNTY: Los Angeles

LASCRATORY CATEGORY: Commercial CERTIFICATE NUMBER: E156

M T		
.7	icrobiology of Drinking Water and Wastewa	ter(
	otal Coliforms by Multiple Tube Fermentat	ionN 1.5 Total coliforms by Membrane Filter
F	ecal Coliforms by Multiple Tube Fermentat	ionN 1.6 Total Coliforms by MMO-MUG Drinking Water Onl
	otal Coliforms by Membrane Filter	
F	ecal Coliforms by Membrane Filter	К
Īπ	organic Chemistry and Physical Properties	of Orinking Water excluding Toxic Chemical Elements(04-12
A	kalinity	y - 2.8 MSAS
Ĉā	alcium	Y 2.9 Nitrate
Cŀ	oloride	
	prosivity	Y 2.11 Scdium
F)	uoride	Y 2.12 Sulfate
Ha	rdness	
Ma	gnesium 	Y 2.14 Iron (Colorimetric Only)
	•	2.15 Manganese (Colorimetric Only)
An	alysis of Toxic Chemical Elements in Orin	king Nater(04-12-
Ar	senic	Y 3.8 Manganese
8ai	rium	Y 3 9 Mercury
Car	dmium	Y 3.10 Selenium
Chi	romium total	y 3 11 Silver
Co	pper	Y 3.12 Zinc
Ire	00,	Y 3.12 Zinc
Lea	3d	Y 3.14 Asbestos
		A.3 Acid and Base/Neutral Compounds ————————————————————————————————————
Tat	al Icihalomethanes	
ch1	orinated.pesticides	Y 5.6 EDB and DBCP
Ch I	oroohenoxy herbicides	
la 1	ogenated Volatiles	Y 5.8 Carbamates
		5.9 Nitrogen/Phosphorus Pesticides
	iochemistry	
ir Q:	ss alpha and beta and counting error ——	N 6.7 Icdine 131N 6.8 Radioactive Strontium
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adi	11um 225	N 6.9 TritiumN 6.10 Gamma emitting Isotopes
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ado adi	on 222	
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	tic Toxicity Bicassays ——————	(
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77	Fresh Water: Static, Static/Renewal and Co	
11	Marias Chabis Chabis/Deschal and	Centinuous Flow Bicassays
11	Marias Chabis Chabis/Deschal and	Continuous Flow Bicassays

Section 86699 (1% or greater asbestos concentrations)

Substances Regulated Under the California Safe Orinking Water and Toxic Enforcement Act

(Proposition 65) and Not Included in Other Tisted Groups.

14.1

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Ü	Wastewater Inorganic Chemistry, Nutrients and Deman	d(04-)
. 1	Acidity	Y 16.22 Oxygen, dissolved
.2	Alkalinity	y 15.23 cH
. 3	Ammonia	y 16 24 Abanals
	Sicchemical Oxygen Demand	Y 15.25 Phosphata, onthor C
. 5	Boron	Y 15.25 Phosphorus, total
. 6	Bromide	Y 16.27 Potassium
.0	Calcium	Y 16.21 YOCASSIUM
. !	C800	10.50 (00) (00)
8.	= :	
. 9	Chemical Oxygen Demand	
-	Chloride	, , , , , , , , , , , , , , , , , , , ,
11	Chlorine Residual, total	
12	Cyanide	
13	Cyanide amenable to Chlorination	16.34 Sodium
14	FluorideY	16.35 Specific Conductance
15	Hardnessy	16.36 Sulfate
	Kjeldahl Nitrogeny	
	Magnesium	
16	Nitrate	16.39 Surfactants (MBAS)
id	Nitrite ————————————————————————————————————	16.39 Surractants (CAUM)
		16.40 Tannin and Lignin
20	Oil and Grease	16.41 Turbidity
21	Organic Carbon ————————————————————————————————————	•
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l	Aluminumy	17.17 Molybdenum
ŀ	AntimonyY	17 18 Nicke]
!	ArsanicY	17.19 Osmium
	0	17 20 Palladium
	9anullium	17.21 Platinum
	As July	17.22 Rhodium
		17.23 Ruthenium
	Cincollon (11)	17.24 Selenium
	Coronium, Cocai	17.25 Silver
1	Chromium, totalY CobaltY CopperY	17.26 Strontium
U (CopperY	17.28 Strontium
11	301d	17.27 [hall]um
2)	Iridium	17.28 Tin
3]	IronY	17.29 Titanium
\$ L	YY	17.30 Vanadium
5 }	langanesa ————————————————————————————————————	17.31 Zinc
,	lercury	
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C	broanic Chemistry of Wastewater (measurements by 60/M	S combination)(01-12-
V	Colatila Organica	
,	oid and Raca Neutral compounds	- Castonia Citary
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		ts by GC/MS combination)(04-03-0
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A	romatic YolatilesY	13.3 VOIVENIER IN CER O I PREMI 15
A	crolein, Acrylonitrile, Acetonitrile —————Y	19.10 Nitroarcmatics and Cyclic Ketones
Ρ	henoisY	19.11 Polynuclear Aromatics
8	enzidine	19.12 Halcethers
9	hthalara EstersY	19.13 Cardamates
Ŋ.	itrospamines ————————————————————————————————————	
		material test categories under Certificate No.

New YORK STATE DEPARTMENT OF HEALTH

DAVID AXELROD, M. D. COMMISSIONER



Expires 12:01 AM April 1, 1992 ISSUED June 7, 1991

INTERIM CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

Lab ID No.: 11243

Director: DR. LAM HO

Lab Name: SCS_ANALYTICAL LABORATORY

Address : 2860 WALNUT AVE LONG BEACH CA 90806

is hereby APPROVED as an Environmental Laboratory for the category

ENVIRONMENTAL ANALYSES NON POTABLE WATER

All approved subcategories and/or analytes are listed below:

lor. Hydrocarbon Pesticides : 4,4'-DDD 4,4'-DDB 4.4'-DDI alpha-BHC Aldrin beta-BHC Chlordane Total delta-BHC Dieldrin Budrin aldehyde

Badria Endosulfan I Bodosulfan II Endosulfan sulfate Heptachlor Heptachlor epozide

Lindane Hethoxychlor Tozaphene

Wastewater Miscellaneous : Boron, Total Cyanide, Total Phenols Oil & Grease Total Recoverable Hydrogen Ion (pH) Specific Conductance Sulfide (as S) Polychlorinated Biphenyls (ALL) Purgeable Aromatics (ALL)

Wastevater Metals III : Cobalt, Total Molyndenum, fotal Thallium, Total Haloethers (ALL) Wastewater Metals II (ALL) Mitroaromatics and Isophorone (ALL) Mitrosoamines (ALL) Notrient (ALL) Phthalate Esters (ALL) Purgeable Halocarbons (ALL)

Demand : Biochemical Oxygen Demand Chlorophenory Acid Pesticides (ALL) Chlorinated Bydrocarbons (ALL) Wastevater Metals I (ALL) Mineral (ALL) Polyuuclear Aromatics (ALL) Priority Pollutant Phenols (ALL) Residue (ALL)

Serial No.: 08677

Hebet W. Deche

Herbert W. Dickerman, M.D., Ph.D., Director Wadsworth Center for Laboratories and Research

Property of the New York State Department of Health. Valid only at the address shown. Must be conspicuously posted. Valid certificate has a red serial number.

NEW YORK STATE DEPARTMENT OF HEALTH

DAVID AXELROD, M. D. COMMISSIONER



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Address : 2860 WALNUT AVE LONG BEACH CA 90806

is hereby APPROVED as an Environmental Laboratory for the category

ENVIRONMENTAL ANALYSES/ POTABLE WATER

All approved subcategories and/or analytes are listed below:

inking Water Mon-Metals : Alkalinity Calcium Mardness

Calcium Hardness Chloride Fluoride, fotal Mitrate (as N) Hydrogen Ion (pH) Solids, fotal Dissolved Sulfate (as SO4) Drinking Water Metals (ALL)

- C:

Volatile Aromatics (ALL)

Serial No.: 08678

Herbert W. Dickerman, M.D., Ph.D., Director Wadsworth Center for Laboratories and Research

Property of the New York State Department of Health. Valid only at the address shown. Must be conspicuously posted. Valid certificate has a red serial number.

DOH-3317 (11/90)

NEW YORK STATE DEPARTMENT HEALTH

DAVID AXELROD, M. D. COMMISSIONER



Expires 12:01 AM April 1, 1992 ISSUED June 7, 1991

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Issued in accordance with and pursuant to section 502 Public Health Law of New York State

Lab ID No.: 11243

Director: DR. LAM HO

Lab Name: SCS ANALYTICAL LABORATORY

Address : 2860 WALNUT AVE LONG BEACH CA 90806

is hereby APPROVED as an Environmental Laboratory for the category

ENVIRONMENTAL ANALYSES/SOLID AND HAZARDOUS WASTE

All approved subcategories and/or analytes are listed below:

haracteristic Testing : Corrosivity Ignitability foricity Polychlorinated Biphenyls (ALL) rgeable Halocarbons (ALL)

Miscellaneous: Cyanide, Total Hydrogen Ion (pH) Sulfide (as S) Phthalate Esters (ALL)

Mitroaromatics Isophorone (ALL) Priority Pollutant Phenois (ALL)

Chlorophenoxy Acid Pesticides (ALL)
Chlorinated Hydrocarbons (ALL)
Metals I (ALL)

Chlorinated Hydrocarbons (ALL)
Hetals II (ALL) Haloethers (ALL) Ketals II (ALL) Polynuclear Aron. Hydrocarbon (ALL) Purgeable Aromatics (ALL)

Serial No.: 08679

Hebet W. Deche Herbert W. Dickerman, M.D., Ph.D., Director

Wadsworth Center for Laboratories and Research

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APPENDIX B Resumes of Key Personnel

LAM V. HO, Ph.D., LABORATORY DIRECTOR

Education

B.S. - Polytechnique Institute (Thu Duc, Vietnam), 1967, Soil Chemistry

Ph.D. - University of Florida, 1976, Soil Chemistry

Professional Licenses

Registered Environmental Professional (by the National Registry of Environmental Professionals)

Affiliations

Association of Analytical Chemists American Chemical Society American Water Works Association Soil Science Society of America

<u>Professional Experience</u>

Dr. Ho brings to SCS 20 years of experience in the environmental monitoring field which includes over 12 years of managing environmental laboratories. Dr. Ho has extensive knowledge in both organic and inorganic analyses, and is very familiar with all quality assurance/quality control (QA/QC) procedures.

Prior to joining SCS, Dr. Ho served as the Division/Laboratory Director for the Environmental and Industrial Division of Brookside Laboratories. Under his directorship, Brookside Laboratories attained several state certifications (California, New York, and Ohio) for hazardous waste testing and potable water analysis.

Analytical projects managed by Dr. Ho include the following:

- Chemical characterization of industrial wastes (to determine if waste is hazardous).
- Ground and surface water monitoring (for remedial action and/or regulatory compliance).
- NPDES monitoring (for remedial action and/or regulatory compliance).
- Municipal sewage sludge monitoring (for appropriate waste management).

LAM V. HO, Ph.D. (continued)

Dr. Ho's other relevant professional activities include the following:

- Organized and served as instructor for numerous technical seminars dealing with environmental sampling/testing.
- Spearheaded efforts to purchase state-of-the-art laboratory instrumentation (e.g., GC/MS, GC, AA, TOC analyzer, TOX analyzer).
- Assisted consultants and clients in developing appropriate monitoring plans and in understanding analytical findings.

Dr. Ho authored several important in-house documents, including:

- QA/QC manual to be used as a guideline and daily reference for all laboratory personnel.
- Laboratory waste management plan to prevent improper discharge of hazardous laboratory waste and to minimize waste generation.
- Reference manual documenting federal, state, and local regulatory requirements; common monitoring parameters for 34 selected industries; sample collection procedures; analytical procedures; and data interpretation.

Dr. Ho has published many reports and articles addressing hazardous waste management environmental monitoring issues.

DAVID C. SINCERBEAUX, LABORATORY MANAGER

Education

B.S. - California State University - Northridge, 1984, Chemistry

<u>Affiliations</u>

American Chemical Society

<u>Professional Experience</u>

As Laboratory Manager, Mr. Sincerbeaux has acquired equipment and quality personnel that have been forged into an effective team providing quality service to its many clients. He is experienced with most EPA and ASTM methods of analysis, particularly those dealing with organic compounds. He was instrumental in gaining California State Certification as a hazardous waste testing laboratory.

Major projects in which Mr. Sincerbeaux has participated include:

- Quantification of PCBs in Transformer oil for the California State University system.
- Characterization of pesticides at several different California and Arizona sites.
- Identification of hazardous compounds for both the U.S. Navy and numerous southern California redevelopment agencies.
- Analysis of landfill gas and ambient air samples from sites throughout the United States and Canada.

Mr. Sincerbeaux's experience in the trace analyses of gas samples by EPA and California state methods has helped to make the SCS Laboratory a leader in this field.

LOREE KENYON, QA/QC MANAGER, HEALTH AND SAFETY OFFICER

Education

- B.A. Williams College, Williamstown, Massachusetts, 1984, Chemistry
- M.S. University of California, Berkeley, California, 1985, Chemistry

Professional Experience

As QA/QC Manager, Ms. Kenyon oversees the laboratory's quality assurance program. Her responsibilities include ensuring that proper quality control is maintained for all analyses performed in the laboratory and directing corrective action as required. She is responsible for updating control charts quarterly to define limits for reporting of quality control data and for revising the quality control/quality assurance manual as needed.

As Health and Safety Officer, Ms. Kenyon has written a Laboratory Health and Safety Plan and provided training to all lab employees in lab safety. She performs monthly safety inspections, investigates work-related accidents, and trains all new employees in all aspects of lab safety.

Prior to her employment at SCS Analytical Laboratory, Ms. Kenyon had extensive experience analyzing volatile and semivolatile organics by GC/MS. She also served as Organics Manager at a new laboratory and was instrumental in setting up an Organics department at that lab.

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DAVID R. MIKESELL, ORGANIC SECTION MANAGER

Education

B.S. - University of California, Irvine, California, 1986, Chemistry

Professional Experience

Mr. Mikesell brings to SCS Analytical Laboratory much experience in organic analysis. He is knowledgeable in the analysis of soils, sludges, and waters for both volatiles and extractables by GC/MS. In addition, he has analyzed petroleum products, landfill gases, and contaminants in manufactured products by GC and GC/MS.

Mr. Mikesell is also experience in the analysis of organic and inorganic constituents of waters, soils, and wastes by GC, IR, AA, ICAP and classical wet chemistry. He is well versed in the EPA methods of identification of herbicides, pesticides, and volatile compounds, and characterization of landfill gas. He is also experienced in the use of atomic absorption spectroscopy to characterize metals in soils and water matrices. His background in instrumental analysis also includes IR and UV/VIS spectrometry, NMR, and Neutron Activation Analysis.

Mr. Mikesell was instrumental in obtaining the SCS Analytical Laboratory's California State Hazardous Waste certification for EPA methods 8240, 8270, 8020, and 8030.

Projects in which Mr. Mikesell has been involved include:

- Identification of hazardous compounds for both the U.S. Navy and numerous southern California redevelopment agencies.
- Characterization of landfill condensate samples.
- Identification of potential chemical hazards for the California National Guard.
- Identification of organic contaminants in cryo-engines for Hughes Aircraft.

HARJI KALTHIA, CHEMIST

Education

- B.S. Sir P.P. Institute of Technology (India), 1966, Chemistry
- M.S. Youngstown State University, Youngstown, Ohio, 1970, Organic Chemistry

Professional Experience

Mr. Kalthia brings to SCS Analytical Laboratory 20 years of experience in analytical chemistry, especially in the instrumental analysis field.

Prior to joining SCS, Mr. Kalthia was an analytical chemist for Wyeth Laboratory (Evanston, Illinois) for eight years, GC specialist/organic chemist for Mead Compuchem (Cary, Illinois) for two years, and GC/MS chemist for the Illinois EPA (Springfield, Illinois) for seven years.

Analytical techniques that Mr. Kalthia is most familiar with include: Gas chromatography/mass spectroscopy, UV/IR spectrophotometry, atomic absorption spectroscopy, and x-ray difractometry.

Presently, Mr. Kalthia serves as a GC/MS spectroscopist for SCS Analytical Laboratory. He is responsible for analyzing volatile and semivolatile organic pollutants in various types of samples, including industrial wastes, sludges, contaminated soils, waste water and ground water. He also takes part in the method development for the analysis of organic compounds in complicated matrices.