SEACOR
PROJECT HEALTH AND SAFETY PLAN

This Health and Safety Plan is specifically prepared for:

Project location: GE Nuclear Facility
Vallecitos Road
Sunol, California

Job Number: 50027-001-05

The possible hazards on this job are expected to be: Chemical, physical, radioactive

Required personal protective equipment for this project: Level D

(Update to level C if required by monitoring)

All personnel participating in the field must be trained in the general and specific hazards unique to the job and, if applicable, must meet recommended medical examination requirements.

This plan is prepared to inform all field personnel, including SEACOR subcontractors, of the potential hazards on the site. However, each subcontractor must assume responsibility for his own employees' health and safety.

SEACOR
HEALTH AND SAFETY PLAN

1. Site: GE Nuclear Facility 2. Job No.: 50027-001-05

3. Location: Valecitos Road, Sunol, CA

4. Plan Prepared By: Dave O'Rourke (Name) 7/23/91 (Date)

5. Plan Approved By: John Lambie (PM (Project Manager)) 7/25/91 (Date)

Dave O'Rourke (DHSO (Designated Health and Safety Officer)) 7/23/91 (Date)

6. Plan Revised By: Jed Douglas (Name) 10/23/91 (Date)

7. Revision Approved By: John M. Lambie (PM) 10/24/91 (Date)

(DHSO) (Date)

8. Facility Description: An inactive nuclear power generation facility currently being used for research purposes only.

9. Status (active, inactive, unknown): active

10. Surroundings (location with respect to residences, businesses, natural features, etc.):

Approximately 7 miles southwest of Livermore in a largely undeveloped area in the foothills south of Mount Diablo.

11. Site map (attach map showing salient features, including location of SEACOR's work and location of contaminated areas).

12. Climate: not relevant

		JUL	OCT	JAN	APR
12a.	Average wind speed and direction:				
12b.	Mean High Temperature				
	Mean Low Temperature				

13. Site history (origin of contamination and history of injuries, exposure, chemical spills, complaints, etc.):

In the past, underground storage tanks were located on the property, and industrial solvents have been used in reportably small quantities. In addition, chemical projects containing metals and wood preservative compounds may have been used at the facility.

14. Description of SEACOR's work (including location with respect to areas of known or suspected contamination):

Trenching and soil sampling along pipeline and pump.

15. Chemical Contaminants:

15a. List chemical contaminants that have been identified, their concentration, and the environmental media in which they are present. Hazardous property information for selected chemicals appears in the Appendix. Review this information for all chemicals listed below. If chemicals are not listed in the Appendix, you must enter the hazardous property information in the Appendix in the spaces provided.

Chemical	Environmental Media (Enter Code)	Measured Concentration Minimum	Maximum
Diesel	So	Unknown	

Code for environmental media:

S1	Sludge
GW	Ground water
SW	Surface water
LW	Liquid waste
So	Soil
A	Air
Other	Specify

15b. List chemical contaminants that are suspected to be present.

Metals, Semi-volatile compounds

15c. Has the site been adequately characterized to the best of your knowledge?

Yes xx No ____

If yes, list applicable references or previous reports/studies.

GE has long-term monitoring and characterization studies concerning the levels and distribution of radioactivity on-site.

16. Hazard Analyses

List all activities in the Job Activity column and assign a number to each activity (example: 1. Groundwater Sampling). Identify how each category of hazard exists at each activity. See example hazard analyses in Appendix 2.

Activity Number	Job Task	Mechanical	Electrical	Chemical	Temperature	Acoustical	Radioactive	O2 Deficiency-Confined Space	Biohazard
1	Soil Sampling	X	X	X	X	X	X		

17. Procedures to mitigate hazards

Identify procedures to mitigate all hazards listed in Item 16 by placing the task number next to the appropriate mitigating measure. Listing of standard procedures is not inclusive. A specific procedure must be entered to mitigate each hazard identified in Item 16.

Activity List Number	
	Mechanical Hazards
1	Do not stand near backhoe buckets and earth moving equipment.
1	Verify that all equipment is in good condition.
1	Do not stand or walk under elevated loads or ladders.
1	Do not stand near unguarded excavation and trenches.
1	Do not enter excavation or trenches over 5 feet deep that are not properly guarded, shored or sloped.
	Consult DHSO if other mechanical hazards exist.
	Electrical Hazards
	Locate and mark buried utilities before drilling.
	Utilities located by:_____ on _____.
1	Maintain at least 10-foot clearance from overhead power lines.
1	Contact utility company for minimum clearance from high voltage power lines.
	If unavoidably close to buried or overhead power lines, have power turned off, with circuit breaker locked and tagged.
	Properly ground all electrical equipment.
	Avoid standing in water when operating electrical equipment.
	If equipment must be connected by splicing wires, make sure all connections are properly taped.

Be familiar with specific operating instructions for each piece of equipment.

Chemical Hazards

1 Use personal protective equipment indicated in Section 18.

1 Conduct direct reading air monitoring to evaluate respiratory and explosion hazards (list instrument, action level, monitoring location, and action to be taken in Section 19).

1 Consult DHSO for personal air monitoring.

Temperature Hazards

Heat Stress

1 When temperature exceeds 70·F, take frequent breaks in shaded area. Unzip or remove coveralls during breaks. Have cool water or electrolyte replenishment solution available. Drink small amounts frequently to avoid dehydration. Count the pulse rate for 30 seconds as early as possible in the rest period. If the pulse rate exceeds 110 beats per minute at the beginning of the rest period, shorten the work cycle by one-third.

Cold Stress

Wear multi-layer cold weather outfits. The outer layer should be of wind-resistant fabric.

0· to -30·F total work time is 4 hours. Alternate 1 hour in and 1 hour out of low-temperature area. Below -30·F, consult Industrial Hygienist.

Drink warm fluid. Provide warm shelter for resting. Use buddy system. Avoid heavy sweating.

Acoustical Hazards

1	Use earplugs or earmuffs when noise level prevents conversation in normal voice at distance of three feet.

O_2 Deficiency - Confined Space Hazards

Confined spaces include trenches, pits, sumps, elevator shafts, tunnels, or any other area where circulation of fresh air is restricted or the ability to readily escape from the area is restricted. Consult DHSO and Corporate Health and Safety Policy prior to entering confined spaces.

	Obtain permits for confined space entry.
	Monitor O_2 and organic vapors before entering. If the following values are exceeded, DO NOT ENTER. - O_2 less than 19.5% or greater than 25%. - Total hydrocarbons greater than 5 ppm above background, if all air contaminants have not been identified. - Concentrations of specific contaminants exceeding action level in Section 19 if all air contaminants are identified.
	Monitor O_2 and organic vapors continuously while inside confined space. If values cited in Item 1 are exceeded, EXCAVATE IMMEDIATELY. Record instrument readings.
	At least one person must be on standby outside the confined space who is capable of pulling workers from confined space in case of emergency.
	Use portable fans or blowers to introduce fresh air to confined spaces whenever use of respirator is required.
	Work involving the use of flame, arc, spark, or other source of ignition is prohibited within a confined space.

Radiation Hazards

1	If radiation meter indicates 2 mr/hr or more, leave the area, and consult DHSO.
	Check with GE personnel regarding radation monitoring.

Biohazards

_____	Poison oak, poison ivy.
_____	Infectious waste.
_____	Rabid animals.
_____	Ticks, mosquitoes, and other insects (disease carriers or poisonous). Avoid breathing dust in dry desert or central valley areas (valley fever).
_____	Biological or animal laboratories.
_____	_____
_____	_____
_____	_____

18. Required Personal Protective Equipment

Place the activity number from Section 17 next to each item of personal protective equipment required for that task. All personal safety equipment must meet ANSI standards or equivalent.

LEVEL: _____A _____B _____C __X__D

HEAD

__1__ HARDHAT

_____

EYE/FACE

_____ SAFETY _____ FACE

__1__ GLASSES _____ SHIELD

_____ GOGGLES

HAND

__1__ NEOPRENE _____ NITRILE _____ PVC

_____ VITON __1__ UNDERGLOVE _____ OTHER

BODY

_____ FULL ENCAPSULATING SUIT: _____

_____ TWO PIECE RAINSUIT, MATERIAL = _____

_____ ONE PIECE SPLASH SUIT, MATERIAL = _____

_____ HOODED TYVEK SUIT

1 HOOD TYVEK/SARANAX SUIT

_____ HOODED TYVEK/POLYETHYLENE SUIT

_____ CLOTH COVERALLS

_____ HIGH VISIBILITY VEST

_____ OTHER _____

LUNG

_____ SCBA (open circuit, pressure demand): _____

_____ FULL-FACE RESPIRATOR, cartridge = _____

1 HALF-MASK RESPIRATOR, cartridge = organic vapor, if necessitated by monitoring

_____ OTHER _____

EAR

1 EARPLUG, type = _____

_____ EARMUFF, type = _____

FOOT

1 STEEL-TOED BOOTS, type = _____

1 DISPOSABLE OVERBOOTS, type = _____

OTHER SAFETY EQUIPMENT

_____ Traffic safety cones

1 Barrier tape

_____ Blast alarm

_____ Ground fault circuit interruptor

_____ Lifeline harness

_____ Ventilation blower/fan

_____ Radiation Dosimeter

19. Action Levels

A. Protection Levels

1. Unknown Contaminants

For totally unknown contaminants, the following levels of protection should be utilized:

Breathing Zone HNu/OVA
Reading for 1 minute

Background	Level D
>0-5 ppm above background	Level C
5-500 ppm above background	Level B
500-1,000 ppm above background	Level A

2. Known Contaminants

Instrument & Date of Calibration	Calibration Standard	Span Setting/ Gas Select	Action Level Above Background (Breathing Zone)	Action
OVM/daily	isobutylene	100 ppm	5 ppm+ for 2 minutes	Don respirator (Level C)
			100+	Leave area (Level C)
				Upgrade to Level B
				Upgrade to Level A

B. Explosion Hazard Not Applicable

Instrument & Date of Calibration	Action Level Above Background (Ambient Air)	Action
Combustible gas indicator	Less than 20% LEL	Leave Area

C. Oxygen Deficiency Not Applicable

Instrument & Date of Calibration	Action Level (Ambient Air)	Action
O_2 meter	Less than 19.5% O_2 More than 23% O_2	Do not enter

D. Other Instruments Not Applicable

Instrument & Date of Calibration		Action Level (Breathing Zone/Ambient Air)	Action
Instrument:	Date:		
Dreager pump/tubes			
Radiation monitor			
Heat stress meter			
Noise meter			
H_2S meter			
Others			

20. Site Control/Work Zones

Describe location of exclusive zone, hot line, contamination reduction zone, and decontamination area and other control procedure(s). Show location on site plan.

Exclusion zone around sampling will be delineated with barrier tape.

21. Decontamination Procedures

21a. Equipment Decontamination

Sampling equipment decontaminated by TSP wash and double rinse.

21b. Personnel Decontamination

Dispose of all protective clothing (tyvek, gloves, etc.) in appropriate containers.

22. Investigation-Derived Material Disposal

Drill cuttings/well water: _____

Decontamination solutions: Drummed and disposed of after characterization.

Protective clothing: Disposed of in appropriate containers.

Other: _____

23. Site Resources

Toilet facilities: Onsite

Drinking water supply: Onsite

Telephone: Mobile/Cellular onsite

Radio: ---

Other: ---

24. Required Emergency Equipment Location

Safety shower/eyewash: Do not have one

First aid kit: Onsite

Fire extinguisher: Onsite

Other: _____

25. Emergency Telephone Numbers

Ambulance: 911

Police: 911

Fire Department: 911

Hospital: Valley Memorial Hospital 447-7000

Client Contact: Sue Dahlin 862-4345

Poison Control Center: (800) 523-2202
in (415) 476-6600

Project Manager Office 691-0131 Home _____

DHSO Office 296-7877 Home _____

26. Emergency Routes: Attach map showing route to nearest hospital.

Highway 84 to Livermore

North on Holmes Street

Corner of Holmes and Stanley

27. Contingency Plans: Describe contingency plans for emergencies, including emergency signals and evacuation routes. If formal contingency plan document has been prepared, attach a copy.

Evacuation routes are clearly marked in paint on the ground.

28. Project Personnel List and Safety Plan Distribution Record

28a. SEACOR employees

All project staff must sign, indicating that they have read and understand the Health and Safety Plan. A copy of this Health and Safety Plan must be made available for their review and readily available at the job site.

Employee Name	Date of Hazmat of other applicable Safety & Health Training	Date Distributed	Signature
Dave O'Rourke	10/88		
John Lambie	12/89		
Neal Farrar	12/90		
Jed Douglas	08/91		

28b. Subcontractors

A copy of this Health and Safety Plan shall be provided to subcontractors who may be affected by activities covered under the scope of this Health and Safety Plan. All subcontractors must comply with applicable OSHA, EPA, and local government rules and regulations.

Firm Name	Contact Person	Date Distributed
Kvilhaug Drilling	Chris Prurier	
Steadman Associates		

29. Health and Safety Meeting - All personnel participating in the project must receive initial health and safety orientation. Thereafter, a brief tailgate safety meeting is required as deemed necessary by the Site Safety Officer.

Date	Topics	Name of Attendant	Firm Name	Employee Initials

30. Visitor - It is SEACOR's policy that a visitor must furnish his/her own personal protective equipment. All visitors are required to sign the Visitor Log and comply with the Health and Safety Plan requirements. If the visitor represents a regulatory agency concerned with job site health and safety issues, the Site Safety Officer shall also immediately notify DHSO.

VISITOR LOG

Name of Visitor	Firm Name	Date of Visit	Signature

HEALTH AND SAFETY PLAN APPENDIX 1

HAZARDOUS PROPERTY INFORMATION

This Appendix contains hazardous property information for selected compounds. Place a check mark next to each compound identified in Section 15, and review the hazardous property information for those compounds. If you have identified compounds in Section 15 that are not listed in the Appendix, you must list the compounds and enter the appropriate information.

(Include copies of Material Safety Data Sheets for selected compounds in addition to or in lieu of completion of Appendix 1.)

HAZARD PROPERTY INFORMATION

Check if Present	Material	Water Solubility[a]	Specific Gravity	Vapor Density	Flash Point-F	Vapor Pressure[a]	LEL UEL	LD 50 mg/kg	TLV-TWA[a]	IDLH Level	Odor Threshold or Warning Concentration	Hazard Property[j]	Dermal Toxicity[k]	Acute Exposure Symptoms[l]
Volatile Organic Priority Pollutants														
	Acrolein	22%	0.8410	1.9	-15	214mm	2.8% 31%	46	0.1ppm	5ppm	0.1-16.6 (0.21-0.5)	BCED	BJ	ABDFGHIKLM NOPQR
	Acrylonitrile	7.1%	0.8060	1.8	30	83mm	3% 17%	82	2ppm	4,000ppm	19-100	BCEGD	DIG	FGIKLMNQR
	Benzene	820ppm	0.8765	2.8	12	75mm	0.339% 7/1%	3,800	11ppm	2,000ppm	4.68	BCGD	CIG	BCDFHIKLMN OQR
	Bromomethane	0.1g	1.732	3.3	none	1.88atm	13.5%c 14.5%		5ppmh	2,000ppm	no odor	CD		BCDEIJKLMN OQR
	Bromodichloromethane	insoluble	1.980	--	none	n/a	nonflam	916	none established	none specified		CGD		BIMN
	Bromoform	0.01g	2.887	--	none	5mm	nonflam	1,147	0.5ppm	n/a	530	CED		BCDKMN
	Carbon Tetrachloride	0.08%	1.5967	5.3	none	91mm	nonflam	2,800	5ppmh	300ppm	21.4-200	CD	JGH	ABCFGHKNQ
	Chlorobenzene	0.01g	1.1058	3.9	84	8.8ppm	1.3% 9.6%	2,910	75ppm	2,400ppm	0.21-60	BCD	CIF	BCFIKLMNOP QR
	Chloroethane	0.6g	0.8978	2.2	-58	1.36atm	3.8% 15.4%		1,000ppm	20,000ppm		BCD		BFHIKMWP
	2-Chloroethylvinyl Ether	insoluable	1.0475	3.7	80	30mm	--	250	none established	none specified		BCD		HIM
	Chloroform	0.8g	1.4832	4.12	none	160mm	nonflam	800	10ppmh	1,000ppm	50-307 fatigue (>4096)	CD		BCEGIKLMN
	Chloromethane	0.74%	0.9159	1.8	32	50atm	7.6% 19%		50ppmh	10,000ppm	10-100 no odor (500-1000)	BCD	DHF	ABCDEFGIJK LOQR
	Dibromochloromethane	insoluble	2.451	--	--	--	--	848	none established	none specified		BCD		BFHIMNPQ
	1,1-Dichloroethane (DCA)	0.1g	1.1757	8.4	22	182mm	6% 16%	725	100ppm	4,000ppm	5ppm	BCD		ABHIMNO

HAZARD PROPERTY INFORMATION

Check if Present	Material	Water Solubility[a]	Specific Gravity	Vapor Density	Flash Point·F	Vapor Pressure[a]	LEL UEL	LD 50 mg/kg	TLV-TWA[a]	IDLH Level	Odor Threshold or Warning Concentration	Hazard Property[j]	Dermal Toxicity[k]	Acute Exposure Symptoms[l]
Volatile Organic Priority Pollutants														
	1,2-Dichloroethane	0.8%	1.2554	3.4	55	87mm	6.2% 16%	670	10ppmh	1,000ppm	6ppm	BCDG		BCFGOLMN Q
	1,1-Dichloroethylene (DCE)	2,250 mg/l @ 77·F	–	3.4	3	591mm	7.3% 16.0%	200	5ppmh	none specified		BCD		BIMN
	Trans-1,2-Dichloroethylene	slightly soluble	1.2565	–	36	400mm	9.7% 12.8%		none established	none specified	.0043mg/l	BCD		ABFILOQ
	1,2 Dichloropropane	0.26%	1.1583	3.9	60	40mm	3.4% 14.5%	1,900	75ppm	2,000ppm	50	BCD		ABGHIKMN O
	Cis-1,3-Dichloropropane	insoluable	1.2	3.8	83	28mm	5% 14.5%		1ppmh	none specified		BCD		ABGIKLMN P
	Trans-1,3-Dichloropropane	insoluable	1.2	3.8	83	28mm	5% 14.5%		1ppmh	none specified		BCD		ABGIKLMN P
	Ethyl Benzene	0.015g	0.867	3.7	59	7.1mm	1.0% 6.7%	3,500	100ppm	2,000ppm		BCD	CIF	ABFHIKLM NPQR
	Methylene Chloride	slightly soluble	1.335	2.9	none	350mm	12%c unavailable	167	100ppmh	5,000ppmh	25-320 (200)	CED	CIF	BCIKLMNP R
	1,1,2,2-Tetrachloroethane	0.19%	1.5953	5.8	none	5mm	nonflam		1ppmh	150ppm	3-5	CD		ABCFHIKL MNOQ
	Tetrachloroethylene	0.15g/ml	1.6227	5.8	none	15.8mm	nonflam	8,850	50ppmh	500ppm	4.68%-50 (160-690)	CD		ACFHIKLM NP
	1,1,1-Trichloroethane (TCA)	0.7g	1.3390	4.6	none	100mm	8.0%c 10.5%	10,300	350ppm	1,000ppm	20-400 (500-1,000)	BCED		ABEFHIKL NOP
	1,1,2-Trichloroethane	0.45	1.4397	4.6	none	19mm	6%c 15.5%	1,140	10ppm	500ppm	-0-	C		BEFGHIKM NOPQ
	Trichloroethylene (TCE)	0.1%	1.4642	4.5	90d	58mm	12.5% 90%	4,920	50ppmh	1,000ppm	21.4-400	BC		BFKLNOPQ
	Trichlorofluoromethane	0.11g	1.494	–	none	0.91atm	nonflam		1,000ppm	10,000ppm	135-209	CD		BFHKLQ

HAZARD PROPERTY INFORMATION

Check if Present	Material	Water Solubility[a]	Specific Gravity	Vapor Density	Flash Point°F	Vapor Pressure[a]	LEL UEL	LD 50 mg/kg	TLV-TWA[a]	IDLH Level	Odor Threshold or Warning Concentration	Hazard Property[j]	Dermal Toxicity[k]	Acute Exposure Symptoms[l]
Volatile Organic Priority Pollutants														
	Toluene	0.05g	0.866	3.2	40	22mm	1.3& 7.1%	5,000	100ppm	2,000ppm	0.17-40 Fatigue (300-400)	BC	BHE	BEFHIKLM MNOPQ
	Vinyl Chloride	negligible	0.9100	2.24	-108	3.31atm	3.6% 33%	500	1ppm	none specified	260	BCEG	DJG	ABFHIKL MR
Metals														
	Arsenic	b	5.727	n/a	none	n/a	f		10μg/m³	none specified		CEG	CJG	ACDJMOQ R
	Beryllium	b	1.85	n/a	none	n/a	f		2μg/m³	none specified		C		IJMNR
	Cadmium	b	8.642	n/a	none	n/a	f	225	0.5mg/m³	40/mg3		C		ABGHIKL MNQR
	Chromium	b	7.20	n/a	none	n/a	f		0.5mg/m³h	500/mg3		C		FMNQ
	Copper	b	8.92	n/a	none	n/a	f		0.1mg/m³	none specified		C		FGIJMOQR
	Lead	b	11.3437	n/a	none	n/a	f		50μg/m³	none specified		C		ACDFGKO QR
	Mercury	b	13.5939	7.0	none	0.0021mm	f		50μg/m³h	28mg/m³		C		AGLMNQ
	Nickel	b	8.9	n/a	none	n/a	f		1mg/m³	none specified		C		DGHLMN Q
	Silver	b	10.5	n/a	none	n/a	f		0.01mg/m³	none specified		C		IN
	Thallium	b	11.85	n/a	none	n/a	f		0.01mg/m³	20mg/m³		C	BG	ADGLNOQ
	Zinc	b	7.14	n/a	none	n/a	f		none established	none specified		C		DF
Miscellaneous														
	Asbestos	insoluble	2.5	n/a	none	n/a	nonflam		0.2- 2 fibers/cc	none specified		CG		MN

HAZARD PROPERTY INFORMATION

Check if Present	Material	Water Solubility[a]	Specific Gravity	Vapor Density	Flash Point·F	Vapor Pressure[e]	LEL UEL	LD 50 mg/kg	TLV-TWA[g]	IDLH Level	Odor Threshold or Warning Concentration	Hazard Property[j]	Dermal Toxicity[k]	Acute Exposure Symptoms[l]
Volatile Organic Priority Pollutants														
	Cyanides	58-72%		n/a	none	n/a	nonflam		5mg/m³	50mg/m³		CE		FKLNPQ
	PCB (Generic)	slightly	--	n/a	none	n/a	nonflam		1.0μg/m³	none specified		CG		CHLPQ
	Phenol	8.4%	1.0576	3.2	175	0.36mm	1.8% 8.6%	414	5ppm	100ppm	0.47-5 (48)	C		ABCDGIKM NOQR
	Xylene	0.00003%	0.8642	3.7	84	9mm	1.1% 7%	5,000	100ppm	10,000ppm	0.5-200 (200)	BCD		ABFHIKLM NPQ
	Acetone	soluble	0.8	2.0	-4	400mm	2.6% 12.8%	9,750	750ppm	10,000ppm	100	BCD	DI	N
	Chromic Acid	soluble	1.67-2.82	n/a	none	n/a	nonflam		none established	none specified		ACEG		GIN
	Diesel Fuel	insoluble	0.81-0.90	--	130	--	0.6-1.3 6-7.5		none established	none specified	0.08	BC	ABC	IN
	Gasoline	insoluble	0.72-0.76	3-4	-45	variable	1.4% 7.6%		300ppm	none specified	0.005-10 x 0.25	CD	AB	IN
	Kerosene	insoluble	0.83-1.0	--	100-165	5	0.7% 5.0%		none established	none specified	1.0	BCD	AB	IN

HAZARDOUS PROPERTY INFORMATION
EXPLANATIONS AND FOOTNOTES

Water solubility is expressed in different terms in different references. Many references use the term "insoluble" for materials that will not readily mix with water, such as gasoline. However, most of these materials are water soluble at the part per million or part per billion level. Gasoline, for example, is insoluable in the gross sense, and will be found as a discreet layer on top of the groundwater. But certain gasoline constituents, such as benzene, toluene, and xylene will also be found in solution in the groundwater at the part per million or part per billion level.

a. Water solubility expressed as 0.2g means 0.2 grams per 100 grams water at 20•C.

b. Solubility of metals depends on the compound in which they are present.

c. Several chlorinated hydrocarbons exhibit no flash point in conventional sense, but will burn in presence of high energy ignition source or will form explosive mixtures at temperatures above 200•F.

d. Practically non-flammable under standard conditions.

e. Expressed as mm Hg under standard conditions.

f. Explosive concentrations of airborne dust can occur in confined areas.

g. Values for Threshold Limit Value - Time weighted Average (TLV-TWA) are OSHA Permissible Exposure Limits except where noted in h and i.

h. TLV-TWA adopted by the American Conference of Governmental Industrial Hygienists, which is lower than the OSHA PEL.

i. TLV-TWA recommended by the national institute for Occupational Safety and Health (NIOSH). A TLV or PEL has not been adopted by ACGIH or OSHA.

j. A - corrosive
B - flammable
C - toxic
D - volatile
E - reactive
F - radioactive
G - carcinogen
H - infectious

k. Dermal Toxicity data is summarized in the following three categories:

Skin Penetration

- A - negligible penetration (solid-polar)
+ B - slight penetration (solid-nonpolar)
++ C - moderate penetration (liquid/solid-nonpolar)
+++ D - high penetration (gas/liquid-nonpolar)

Systemic Potency

E - slight hazard - LD_{50} = 500 - 15,000 mg/kg
lethal dose for 70 kg/man = 1 pint - 1 quart

F - moderate hazard - LD_{50} = 50 - 500 mg/kg
lethal dose for 70 kg/man = 1 ounce - 1 pint

G - extreme hazard - LD_{50} = 10 - 50 mg/kg
lethal dose for 70 kg/man = drops to 20 ml

Local Potency

H - slight - reddening of skin

I - moderate - irritation/inflammation of skin

J - extreme - tissue destruction/necrosis

l. Acute Exposure Symptoms

A - abdominal pain
B - central nervous system depression
C - comatose
D - convulsions
E - confusion
F - dizziness
G - diarrhea
H - drowsiness
I - eye irritation
J - fever
K - headache
L - nausea
M - respiratory system irritation
N - skin irritation
O - tremors
P - unconsciousness
Q - vomiting
R - weakness

APPENDIX 2
HAZARD ANALYSIS EXAMPLES

Hazard Analyses

List all activities in the Job Activity Column and assign a number to each activity (example: 1. Drilling, Soil Sampling and Well Installation). Identify how each category of hazard exists at each facility.

Activity Number	Job Task	Mechanical	Electrical	Chemical	Temperature	Acoustical	Radioactive	O_2 Deficiency Confined Space	Biohazard
1	Drilling, Soil Sampling and Well Installation	Rig Equipment, materials handling	Overhead/buried power lines at two locations	Potentially in soils and groundwater	Heat Stress	Rig Noise	NE	NE	NE
2	Well Development	Pumping Equipment	Generator	Potentially in soils and groundwater	Heat stress	Pumping Equipment	NE	NE	NE
3	Groundwater Sampling from Monitoring Wells	NE, potentially pumping equipment	NE		Heat stress	NE	NE	NE	NE
4	Geophysical Survey	Portable equipment weight and bulkiness	Portable Equipment	NE	NE	NE	Nuclear Gauges	NE	Mosquitos, snakes
5	Excavation of Contaminated Soil, Gasoline Station	Excavation stability, mechanical equipment	Utilities	Same as 1, free and dilute product	Heat Stress	Excavation equipment	NE	Excavation can be a confined space	NE
6	Inspect Excavation of Landfill (Domestic Non-hazardous Waste)	Excavation stability shoring stability	NE	Same as 1, broad range organic/inorganic	Heat Stress	NE	Pot. from hospital and other wastes	Excavation can be a confined space	Microbes, insects, rodents, birds

= Not Expected