8/27/90

PROPOSAL FOR
REMEDIATION/CHARACTERIZATION
OF
FUEL HYDROCARBON CONTAMINATION

1535 WEBSTER STREET
ALAMEDA, CA

AUGUST 24, 1990

Uriah Inc.
An Environmental Services Company

August 24, 1990

Mr. Ariu Levi
Hazardous Materials Specialist
Alameda County Department of Environmental Health
Hazardous Materials Program
80 Swan Way, Room 200
Oakland, CA 94621

RE: Proposal for Characterization/Remediation of Fuel Hydrocarbon Contamination of Soils and Groundwater at 1535 Webster Street, Alameda, CA

Dear Mr. Levi:

We have this afternoon, been authorized by Mr. Ed Ferrar, to submit the following work plan on his behalf concerning characterization and remediation of fuel hydrocarbon contamination at the above referenced site. The tasks set forth herein are intended to respond to requirements typically set forth by the County of Alameda and meet guidelines promulgated by the San Francisco Bay Region Water Quality Control Board (RWQCB).

Uriah proposes to define the vertical and lateral extent of contamination in the area of known contamination (sites previously occupied by underground fuel storage tanks) through exploratory excavation with a backhoe or other appropriate mechanical excavator. Contamination would be tracked organoleptically, with field instrumentation such as the Photovac "Tip I" vapor analyzer, a liquid to liquid extraction process known as the Hanby System, and/or thin layer chromatography. At such time as the extent of contamination had been determined and/or it becomes unfeasible to excavate further (e.g. upon encountering significant subsurface utilities, a building, or roadway) samples would be acquired from the floor and sidewalls of the excavation. Each sample would be obtained from an undisturbed block of soil brought to grade within the excavator bucket. After removing the top 1"-2" of soil within the bucket, a clean brass sampling tube (1.92 inches in diameter by 6.0 inches in length) would be driven into the remaining soil and completely filled. Promptly upon removing the sampling tube

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from the soil, the ends of the tube would be covered with aluminum foil, fitted with plastic caps, and wrapped with black electrical tape. Each tube would be marked and placed on dry ice for transportation under chain of custody to ChromaLab, Inc. of San Ramon, a certified hazardous waste analytical laboratory. All soil samples would be analyzed for Total Petroleum Hydrocarbons as Gasoline (TPH-G), benzene, toluene, total xylenes, and ethylbenzene (BTX&E) using EPA Methods 5030/8015-8020, Total Petroleum Hydrocarbons as Diesel (TPH-D) using EPA Methods 3550/8015, and Total Oil and Grease (TOG) using SM 503 D&E.

Should the extent of the ability to excavate be reached before plume boundaries are determined, it is proposed that any further extent of lateral migration be determined through soil vapor analysis. This procedure involves inserting 7/8 inch diameter, stainless steel probes fitted with retractable, slotted shield points into the soil at various depths to be determined by lithologic conditions and accessibility to the subsurface. Samples of soil vapor (i.e. gases which occupy the space between soil particles and which would include hydrocarbon contaminants, if present) would be acquired at the site of each probe insertion by withdrawing the probe approximately two inches and exposing the slotted-shield points-thus permitting the aspiration of a volume of soil gas through a Photovac "Tip I" vapor analyzer which had been calibrated using a 50 parts per million (ppm) hexane standard. Contour maps would be prepared utilizing computer modeling which would show vapor phase contaminant patterns and thus also approximate liquid phase contamination.

In order to ascertain whether groundwater has been impacted, it is proposed that regulatory agency records be accessed in order to determine hydraulic gradient in the area and that three 2" diameter groundwater monitoring wells be installed- at locations to be determined. Each well boring would be advanced with a truck/trailer mounted drill rig equipped with 8" outside diameter, continuous-flight hollow stem augers and logged using the Unified Soil Classification System. If the wells are placed in an area previously excavated as described above, it is proposed that no samples be acquired for chemical analyses. If, however, this is not the case, it is proposed that soil samples would be obtained at five foot intervals between 5 feet and at the top of the capillary fringe within a California Modified Split Spoon Sampler driven through the hollow stem of the drilling auger(s). Immediately upon the opening of the sampler, the ends of the 1.92 inch x 6.0 inch, clean, brass sampling tubes contained within would be wrapped with aluminum foil, fitted with plastic caps, sealed with black electrical tape, labeled, and placed on dry ice for transportation to Chromalab, Inc. under chain of custody. It is proposed that the samples be analyzed for TPH-D, TPH-G, BTX&E, and TOG as described above. The limit of detection for TPH-D in soil is 5 ppm, 10 ppm for TOG, 2.5 ppm for TPH-G, and 5 ppb for benzene, toluene, total xylenes, and ethylbenzene.

Monitoring wells will be constructed in accordance with protocol set forth under "Well Details" of Appendix "A", each to a depth of approximately 40 feet (fifteen feet below the point at which groundwater is first encountered). Proposed well development procedures also appear in Appendix "A". Fluids produced from the development process would be held on site in a secured container until laboratory results are received and appropriate disposal protocol developed. Tailings will be stored on site on visqueen and covered also pending receipt of laboratory data.

Samples from each developed well would be acquired with a clean acrylic or teflon bailer lowered into the well to a point immediately below the water surface. Each water sample would be transferred to one (1) amber glass sample bottle and two (2) Volatile Organic Analysis (VOA) vials, promptly sealed with teflon-lined screw caps, labeled, placed on blue ice and transported to ChromaLab, Inc. under chain of custody for analyses for TPH-G, BTX&E using EPA Methods 5030/8015-602, TPH-D using EPA Methods 3510/8015, and TOG using SM 503 A&E. The limit for detection for TPH-G in water is 30 parts per billion (ppb), for TPH-D- 50 ppb, and for benzene, toluene, total xylenes, and ethylbenzene- 0.3 ppb.

Sample blanks and/or duplicates of soil and water samples will be acquired as specified by the County of Alameda.

All sampling equipment will be steam cleaned or thoroughly scrubbed with alconox solution followed by a distilled water rinse prior to being brought on site and between all samplings.

REMEDIATION

Excavated soils which contain levels of gasoline above those acceptable to concerned regulatory agencies may be remediated through aeration in accordance with specifications for this procedure set forth by the Bay Area Air Quality Management District (BAAQMD). It is proposed that determination of the volume of soil which may be aerated per day be based upon the results of analytical data acquired during the excavation process. As we would expect to encounter clayey soils in the area to be excavated, aeration of the soils in a timely manner will likely require mechanical manipulation; i.e. thin spreading of the soil for tilling in order to break down soil particles and expose more gasoline contaminated surfaces to the air per unit of time. At such time as levels of TPH-G and BTX&E are reduced to below limits of concern, the soil may be disposed of at a Class III Landfill, or application may be made for use on site (as backfill or landscaping material). Confirmation of the success of the treatment process would be through the collection and certified analysis of composite soil samples (one composite from four points for each 50 cubic yards of soil treated) for TPH-G, and BTX&E.

Soils containing less volatile hydrocarbon contaminants may be remediated using aerobic biodegradation procedures. A number of common, non-pathogenic bacteria and fungi are known to be capable of thoroughly degrading fuel hydrocarbons to form non-toxic end products (i.e. carbon dioxide, minerals, and water).

Subsequent to the completion of on-site tasks, and the receipt of laboratory data, reports would be prepared for each phase of work. This would include methodology, maps, graphs, and modeling, as well as conclusions and recommendations.

If you have any questions, or if we may otherwise be of assistance, please contact either of the undersigned at (415) 455-4991.

Sincerely,

Cameron Toyne

Cameron Toyne
Geologist
and

Denise A. Rapp

Denise A. Rapp
Vice-President, Uriah Inc.

CT/DAR:ms
enc. Appendix "A"- Well Construction and Logging Details
Appendix "B"- Health and Safety Plan

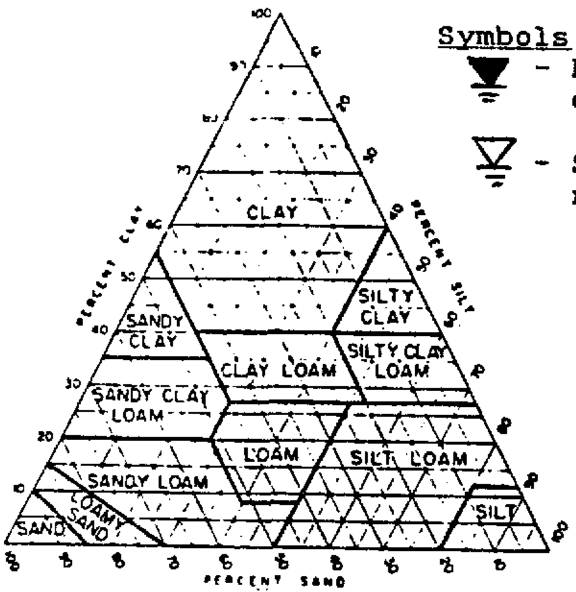
WELL LOG
KEY TO ABBREVIATIONS

Sampling Method

Cal. Mod. - California modified split-spoon sampler (2" inner diameter) driven 18" by a 140-pound hammer having a 30" drop. Where penetration resistance is designated "P", sampler was instead pushed by drill rig.

Disturbed - Sample taken from drill-return materials as they surfaced.

n/a - Not applicable



SOIL TEXTURAL CLASSES

Symbols

▼ - First encountered ground water

▽ - Static ground recovery

Drilling Method

HSA - Hollow stem auger
CFA - Continuous flight auger
Air - Reverse air circulation
HND - Hand Auger

OVR (ppm)

ND - No Detection

GRAIN-SIZE SCALE

GRADE LIMITS inches	U.S. Standard sieve size		GRADE NAME
			Boulders
12.0			
			Cobbles
3.0	3.0 in.		
			Gravel
0.19	No. 4		
		Coarse	
0.08	No. 10		
		Medium	Sand
	No. 40		
		Fine	
	No. 200		
			Silt
			Clay

Key To Boring Logs

PRIMARY DIVISIONS			GROUP SYMBOL	SECONDARY DIVISIONS
COARSE GRAINED SOILS — MORE THAN HALF OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVELS MORE THAN HALF OF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE	CLEAN GRAVELS (LESS THAN 5% FINES)	GW	Well graded gravels, gravel-sand mixtures, little or no fines
			GP	Poorly graded gravels or gravel-sand mixtures, little or no fines.
		GRAVEL WITH FINES	GM	Silty gravels, gravel-sand-silt mixtures, non-plastic fines.
			GC	Clayey gravels, gravel-sand-clay mixtures, plastic fines.
	SANDS MORE THAN HALF OF COARSE FRACTION IS SMALLER THAN NO. 4 SIEVE	CLEAN SANDS (LESS THAN 5% FINES)	SW	Well graded sands, gravelly sands, little or no fines.
			SP	Poorly graded sands or gravelly sands, little or no fines.
		SANDS WITH FINES	SM	Silty sands, sand-silt mixtures, non-plastic fines.
			SC	Clayey sands, sand-clay mixtures, plastic fines.
FINE GRAINED SOILS — MORE THAN HALF OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS LIQUID LIMIT IS LESS THAN 50%		ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity.
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
			OL	Organic silts and organic silty clays of low plasticity.
	SILTS AND CLAYS LIQUID LIMIT IS GREATER THAN 50%		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.
			CH	Inorganic clays of high plasticity, fat clays.
			OH	Organic clays of medium to high plasticity, organic silts.
HIGHLY ORGANIC SOILS			Pt	Peat and other highly organic soils.

DEFINITION OF TERMS

U.S. STANDARD SERIES SIEVE: 200, 40, 10, 4 — CLEAR SQUARE SIEVE OPENINGS: 3/4", 3", 12"

SILTS AND CLAYS	SAND			GRAVEL		COBBLES	BOULDERS
	FINE	MEDIUM	COARSE	FINE	COARSE		

GRAIN SIZES

SANDS AND GRAVELS	BLOWS/FOOT†
VERY LOOSE	0 - 4
LOOSE	4 - 10
MEDIUM DENSE	10 - 30
DENSE	30 - 50
VERY DENSE	OVER 50

RELATIVE DENSITY

SILTS AND CLAYS	STRENGTH‡	BLOWS/FOOT†
VERY SOFT	0 - 1/4	0 - 2
SOFT	1/4 - 1/2	2 - 4
FIRM	1/2 - 1	4 - 8
STIFF	1 - 2	8 - 16
VERY STIFF	2 - 4	16 - 32
HARD	OVER 4	OVER 32

CONSISTENCY

†Number of blows of 140 pound hammer falling 30 inches to drive a 2 inch O.D. (1-3/8 inch I.D.) split spoon (ASTM D-1586).

‡Unconfined compressive strength in tons/sq. ft. as determined by laboratory testing or approximated by the standard penetration test (ASTM D-1586), pocket penetrometer, torvane, or visual observation.

UNIFIED SOIL CLASSIFICATION SYSTEM
(ASTM D-2487)

Soil Color derived from the MUNSELL Soil Color Charts

SOIL BORING LOG Figure #4

PROJECT NO. ______ LOCATION ______

CLIENT. ______ LOGGED BY Walter Floyd- Geologist

BORE HOLE NO. ______ MONITOR HOLE NO. MW-1, MW-2, MW-3 ELEVATION ______

DATE DRILLED ______ START ______ FINISH ______

DRILLING METHOD H/S Augers SAMPLING METHOD CA MOD. SS DRILLED BY ______

DEPTH BELOW SURFACE	SOIL DESCRIPTION (TEXTURE, COLOR, MOISTURE, CONSISTENCY, GRAIN SIZE, ETC.)	UNIFIED SOIL CLASSIF.	PENETRATION COLLECTED (Blows 6"x6"x6")	WELL CONSTRUCTION DETAILS (Christy Box)	
0–5	Fill Materila- Dark brown, SILTY SAND, diesel odor. Sand is fine grained, loose, damp.	SM		2" Blank PVC	Cement
10	THIS IS AN EXAMPLE ONLY				
15	Thin layers of silt within SAND (SM). Tan, mottled gray, strong product odor, medium dense, stiff.	SM	7,10,13		Grout
20	Gray, fine SANDS (SP), uniformly graded, inter-bedded with thin layers of SAND (SM). Product odor present, stiff, medium dense, micalious.	SP	10,16,22		
25			12,18,24		
	SILT (ML)- tan to light gray, friable, very stiff, product odor present.	ML			
30	Same.		7,9,11		
					Bentonite
35	Same.		9,18,50		
				2" Slotted PVC	#3 Monterey Sand
40	Same. Odors becoming more faint.		7,14,32		
45			8,17,32		

SOIL BORING LOG

PROJECT NO. ____________ LOCATION ____________

CLIENT ____________ LOGGED BY Walter Floyd- Geologist

BORE HOLE NO. ____________ MONITOR HOLE NO. ____________ ELEVATION ____________

DATE DRILLED ____________ START ____________ FINISH ____________

DRILLING METHOD ____________ SAMPLING METHOD ____________ DRILLED BY ____________

DEPTH BELOW SURFACE	SAMPLES COLLECTED: INT	OVR ppm	SAMPLE NO	SOIL DESCRIPTION (TEXTURE, COLOR, MOISTURE, CONSISTENCY, GRAIN SIZE, ETC.)	UNIFIED SOIL CLASSIF.	GRAPHIC LOG	PENETRATION COLLECTED: Blows 6"x6"x6"	SPT	WELL CONSTRUCTION DETAILS
					ML				2" Slotted PVC; #3 Monterey Sand
50				Same.			8,14,38		
55				Same.			8,15,37		
60				Same.			8,18,40		
				Boring terminated @ 62 feet and converted to a ground-water monitoring well.					Screw Cap
65									

Figure #3

WELL DETAILS

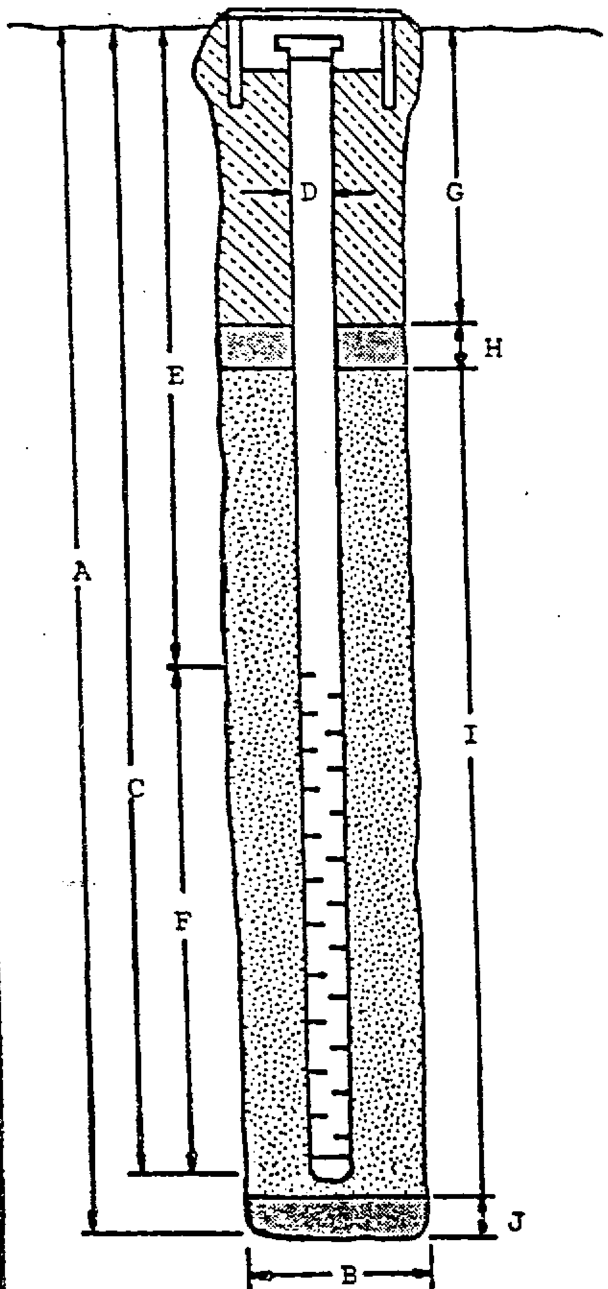
PROJECT NAME: ______ BORING/WELL NO. MW-1, MW-2 & MW-3

PROJECT NUMBER: ______ CASING ELEVATION: ______

WELL PERMIT NO.: ______ SURFACE ELEVATION: ______

THIS IS AN EXAMPLE ONLY

G-5 Vault Box



A. Total Depth: 62'

B. Boring Diameter: 8"

Drilling method: H/S Auger

C. Casing Length: 62'

Material: PVC

D. Casing Diameter: 2"

E. Depth to Perforations: 37'

F. Perforated Length: 25'

Perforated Interval: 62'-37'

Perforation Type: Factory Slot

Perforation Size: 0.020"

G. Surface Seal: 5'-0'

Seal Material: Cement

H. Seal: 35'-32'

Seal Material: Bentonite

I. Gravel Pack: 62'-35'

Pack Material: Monterey Sand

Size: #3

J. Bottom Seal: ______

Seal Material: ______

** The interval between the Bentonite Seal and the Cement Surface Seal (32'-5') will be backfilled with Grout.

EXAMPLE EXAMPLE EXAMPLE

GROUNDWATER MONITORING WELL DEVELOPMENT AND SAMPLING REPORT

On ______________, Uriah, Inc. staff collected one groundwater sample from the newly installed monitoring well located at ________________________________.

Methodology

Depth to groundwater was measured with an electronic tape after development and recharge as well as before and after the well was purged for sampling.

The well was developed with the use of a hand pump until the groundwater was clay and/or silt free. The well was then purged using a hand pump until the pH, conductivity, and temperature were stabilized and the groundwater was observed to be relatively free of sandy silt and other grit material. The pH, conductivity, and temperature measurements acquired are referenced on Chart I, attached.

The groundwater sample was collected with a new, disposable polyethylene bailer and appeared clean and contained little, if any, suspended soil sediment. The sample was promptly transferred from the bailer into two (2) 40 milliliter capacity Volatile Organics Analysis (VOA) vials and a one liter amber glass sample bottle, immediately sealed with teflon-lined screw caps, labeled, placed on blue ice and transported to a certified hazardous waste analytical laboratory under chain of custody for analysis for _____________________ using EPA Methods___________.

All development and sampling equipment was cleansed with a solution of Trisodium Phosphate (TSP) prior to use. All produced fluids were contained on-site until analytical results are received, at which time all fluids will be disposed of properly.

Laboratory Results

The laboratory results as received from the certified hazardous waste analytical laboratory are enclosed.

Conclusions

The levels of all constituents analyzed for were found to be ______________.

Prepared By: DAR

EXAMPLE EXAMPLE EXAMPLE

CHART I
(MW-1)

GROUNDWATER MONITORING WELL SAMPLING DATA:

DEPTH OF WELL (feet)	DEPTH TO WATER (feet)	DEPTH OF WATER (feet)	VOL. OF WELL (Gal.)	MIN. VOL. TO BE PUMPED (Gal.)	
35.6	22.3	13.3	2.2	6.6	(A minimum of 3 well volumes)

Date:
Sample #:

GAL. PUMPED	TIME	pH	CONDUCTIVITY (mohms/cm)	TEMPERATURE (Centigrade)
0	1:24p	6.5	1430	17.0
1	1:26p	6.3	1450	17.0
2	1:28p	6.1	1450	16.0
3	1:30p	6.4	1430	16.0
4	1:32p	6.3	1490	16.0
5	1:34p	6.3	1470	16.0
6	1:36p	6.3	1480	16.0
7	1:38p	6.3	1480	16.0

** This is an example of the documentation of data acquired attendant to groundwater monitoring well development and sampling.

HEALTH AND SAFETY PROCEDURES FOR SOIL REMEDIATION AND/OR SOIL BORINGS/MONITORING WELL INSTALLATIONS

The following Health and Safety Procedures have been developed for personnel involved in the remediation of fuel hydrocarbon contaminated soils and/or the installation of soil borings and/or monitoring wells.

While this protocol is considered generally appropriate, modifications may made by qualified service providers and/or regulatory agency representatives in response to site specific conditions.

HEALTH AND SAFETY STAFF

Mr. John Rapp, Registered Environmental Health Specialist
Mr. Cameron Toyne, Geologist

PUBLIC HEALTH/ENVIRONMENTAL HAZARD ASSESSMENT

Hazards associated with the performance of exploratory soil borings are those related to: 1) Exposure to the hydrocarbon contaminated soils being explored, 2) The potential for ignition of flammable/explosive vapors, and 3) The physical hazards associated with working with/near heavy equipment.

HAZARDS OF CHEMICAL EXPOSURE

All soils to be handled are contaminated with gasoline and diesel fuel. The most toxic constituents present are believed to be the aromatic constituents of gasoline- benzene, toluene, xylenes, and ethylbenzene (BTX&E); with benzene the most toxic of these having been identified as a carcinogen and forming as much as 3.5% of gasoline by weight. Due to the volatile nature of the aromatics, the most significant route of potential exposure would appear to be via inhalation. Secondary routes of exposure would include dermal (by direct contact with contaminated soil) and by the incidental ingestion of hydrocarbon contaminated dusts. The measures prescribed for the minimization of risks associated with the aforementioned routes of exposure are described below.

HAZARDS ASSOCIATED WITH FLAMMABLE VAPORS

Although the levels of fuel hydrocarbons within soils encountered are typically low to moderate, it is recognized that there is a potential for vapors to collect within the flammable range.

The measures for early detection of these vapors are described below.

PHYSICAL HAZARDS

The physical hazards attendant to the performance of site investigations are those associated with working on/near mechanized equipment. Appropriate procedures attendant to the operation of equipment to be utilized on this project are already in force and are well known to our staff. Further, work-rest cycles will be established and adhered to so as to provide adequate rest periods; liquids will also be available to preclude problems associated with heat stress.

RISK FACTORS AND ASSOCIATED MITIGATION PROCEDURES

Type of Risk	Route of Exposure	Mitigating Factor(s)
Chemical	Inhalation	-Air purifying respirators with organic vapor and dust filters. -A hydrocarbon vapor survey meter will be used to determine exposure.
Chemical	Dermal/Ingestion	-Optimum use of equipment to minimize direct exposure to the soil. -Use of protective clothing. -The nature of the project does not involve the uncontrolled release of toxic materials.
Flammable Vapors	--	-A hydrocarbon vapor meter will be used to determine the percent of the lower explosive limit (LEL) present at the excavation.
Physical	--	-Physical hazards attendant to this project are no diff-

erent from those at drilling or excavation projects involving non-regulated materials.

- The use of trained and experienced staff; properly attired and using appropriate and well-maintained equipment.

WORK AREA

Only authorized personnel will be permitted within the work area. This area will be clearly marked and monitored.

DECONTAMINATION PROCEDURES

General procedures for handwashing and disposal of soiled clothing will be adhered to.