INNER HARBOR NAVIGATION CANAL
LOCK REPLACEMENT PROJECT
ORLEANS PARISH, LOUISIANA

DESIGN DOCUMENTATION REPORT NO. 1
SITE PREPARATION AND DEMOLITION
VOLUME NO. 5 OF 8

PREPARED FOR:

DEPARTMENT OF THE ARMY
NEW ORLEANS DISTRICT, CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

PREPARED BY:

WALDEMAR S. NELSON AND COMPANY, INC.
ENGINEERS AND ARCHITECTS
NEW ORLEANS, LOUISIANA

AND

DAMES AND MOORE, INC.
NEW ORLEANS, LOUISIANA

FEBRUARY 1999

Volume 5 - Above Ground Storage Tanks

Dames & Moore identified 17 above ground storage tanks within the IHNC project area. The contents and capacity of each tank were inventoried, and requirements for tank removal and disposal are provided. Thirteen (13) of these tanks will be removed by their respective owners prior to demolition. A detailed cost estimate has been prepared for the removal of the 4 remaining tanks.

The 4 remaining tanks are located at the Boland Marine and Saucer Marine sites within the East Bank Industrial Area. Three (3) are empty and 1 contains blast sand. The estimated cost to remove and dispose of the tanks is $43,900 with contract duration of 30 days.

U. S. Army
Corps of Engineers
New Orleans District

FINAL SUBMITTAL

DEMOLITION DESIGN MEMORANDUM INPUT Volume 5

ABOVE GROUND STORAGE TANKS

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APPENDICIES and SUPPORTING DOCUMENTATION

1 INTRODUCTION

This Above Ground Storage Tanks Report is one of three reports for the Environmental Support to the Inner Harbor Navigational Canal (IHNC) New Lock and Connecting Channels, Demolition Design Memorandum. The purpose of this document is to identify the Above Ground Storage Tank (AST) systems in the project area and to characterize the materials contained in each tank for final disposal requirements. Twenty-five (25) tank systems have been reported in the project area, of which only 17 tank systems were located. Nine of the 17 tanks were either inactive or located on properties that had been abandoned along the east industrial bank of the canal.

This report was completed in accordance with the final scope of work provided by the U.S. Army Corps of Engineers (USACE), dated April 3, 1998. The specific tasks that were completed during the course of this investigation on the above ground storage tanks included:

- Documentation of the number of ASTs in the project area
- Documentation of tank contents for proper disposal; and
- Collection of representative environmental samples of tank contents for chemical laboratory testing (if required).

This report provides the following:

- Summary of the ASTs located in the project area;
- Summary of the tank contents;
- Inventory and classification of regulated materials stored in each tank;
- AST Removal and Disposal Procedure
- Regulatory review;
- Waste handling, management, and disposal requirements;
- Detailed cost data.

1.1 Site Location

The IHNC project area is located on both the west and east banks of the Inner Harbor Navigation Canal in New Orleans, Louisiana. Figure 1, Project Location Map, presents a generalized map of the project area.

The ASTs are located at facilities along the canal between the riverside end of the existing IHNC Lock and Florida Avenue. The facilities are confined to the existing right-of-way for the IHNC. Above ground storage tank systems have been identified at the following facilities for a total of 17 tank systems.

• US Coast Guard	4 tanks	Active
• US Army Corps of Engineers	1 tank	Active
• Port of New Orleans	1 tank	Active
• Saucer Marine	2 tanks	In-active
• McDonough Marine	6 tanks	Active
• Mayer Yacht	1 tank	Active
• Boland Marine	2 tanks	In-active

It should be noted that ASTs were not reported at Indian Towing or at International Tank Terminal, both facilities are located on the east bank of the IHNC project area.

1.2 Site Description

Approximately 75 structures are located within the project area, of which 17 are above ground storage tank systems. Several structures are the remnants of abandoned industrial businesses including warehouses, marine manufacturing facilities, paint shops, petroleum distribution facilities, marine repair shops, and fiberglass manufacturing facilities. Active facilities along the west bank of the IHNC include the Galvez Street Wharf, the US Coast Guard Station, the Port of New Orleans, and the USACE IHNC Lock. The area along the east bank of the IHNC is occupied by abandoned businesses that were primarily associated with marine repair and petroleum distribution.

2 AST INVENTORY

Twenty-five (25) above ground storage tanks have been reported in the IHNC project area. On August 3 through 14, 1998 Dames & Moore personnel conducted a survey of the project area and identified 17 tank systems. Nine of the 17 tanks were either inactive or located on properties which had been abandoned along the east industrial bank of the canal. The following table presents the inventory of the above ground storage tanks in the IHNC project area.

Site Name	Structure No.	Structural Type	Comments
Boland Marine	18 40A	Horizontal Steel AST Horizontal Steel AST	1,000-gallon AST – Diesel – adjacent to the wharf. 500-gallon AST – Compressed Air – on the wharf over water.
Indian Towing			No AST observed.
International Tank			No AST observed.
Mayer Yacht	127	Steel ASTs	2 unmarked portable ASTs ranging from 300 to 500 gallons each - no surface stains. Tanks will be drained and removed by current operator when exiting site at end of lease. A letter has been presented to the owner requesting the contents of the tanks.
Distributors Oil	115 116		No AST observed. No AST observed.
McDonough Marine	44 61 62 64 64 66	Slab w/ Tank Concrete Slab Steel Structure Steel Shelter Skid Steel Shelter Skid Steel Structure	1,000-gallon AST – Oxygen 500-gallon AST – Propane 500-gallon AST - Motor Oil, obtain letter from owner 1,000-gallon AST - Paint Thinner, obtain letter from owner 600-gallon AST – Gasoline, obtain letter from owner 500-gallon AST – Diesel Fuel, obtain letter from owner
Saucer Marine	83A 103	Horizontal Steel AST Upright AST	1,000-gallon AST – Propane 10,000-gallon AST - Bulk Sand
Port Authority	141	Steel Frame on Slab	500-gallon AST – Diesel – no surface stains. Tank will be removed by the current operator at the end of the lease.
USACE	163	Concrete Pit	Tank has 500 gallon capacity and is currently in use (Diesel Fuel), obtain letter from owner
US Coast Guard	175 183 183 183	AST in Concrete Pit ASTs ASTs ASTs	1,500-gallon Diesel, currently in use, obtain letter from CG 550-gallon Gasoline, currently in use, obtain letter from CG 1,500-gallon Oily Water, currently in use, obtain letter from CG 1,500-gallon – Used Oil, currently in use, obtain letter from CG

2.1 Boland Marine

The Boland Marine facility (2500 Surekote Road) is the northernmost site on the east bank of the IHNC project area. Boland Marine (Boland) was located at this address until the Port of New Orleans terminated its lease in 1988. The site was used to repair and construct marine vessels. Two abandoned ASTs have been documented on the grounds and range in volume from 500 to 1,000 gallons. These tanks appear to have been used to store diesel fuel and compressed air.

Site Name	Structure No.	Structural Type	Sampled	Comments
Boland Marine	18 41A	1,000-gallon AST – Diesel 500-gallon AST - Compressed Air	NS NS	Tanks are empty and all associated hardware has been removed.

NS – not sampled due to the lack of material.

Mayer Yacht

Mayer Yacht (2100 Surekote Road) is a yacht repair and maintenance facility, which is located north of Saucer Marine on the east bank of the IHNC project area. The property is occupied and the lease with the Port of New Orleans remains active. Two unmarked ASTs have been documented on the grounds and range in volume from 300 to 500 gallons. Per discussions with Mr. Paul Dumstorf, President of Mayer Yacht, these tanks are seldom used and have been inherited from Distributor Oil (Appendix A). For structure numbers and tank locations, refer to the *Waldemar Nelson Report – Demolition Design Memorandum Input*, dated February 1999.

Site Name	Structure No.	Structural Type	Sampled	Comments
Mayer Yacht	127	Steel Hopper	NR	The hopper is empty and all associated hardware has been removed.
	NI	300-gallon AST - Diesel	NR	The tanks are portable and will be removed by the current lease holder/operator.
	NI	500-gallon AST - Waste Oil	NR	

NR-Not Required, operator identified tank volume and contents.
NI-Not identified in the Waldemar Nelson Report.

2.2 Distributors Oil

Distributors Oil (2100 Surekote Road) was a former bulk plant, which contained several ASTs. The tanks were contained in an earthen dike and were used to store gasoline and diesel fuel products. The ASTs were removed from the subject property in June 1998. The earthen dike around the ASTs was intact at the time of the removal. A limited site assessment conducted by Hydrodyne indicated petroleum hydrocarbon impact in the vicinity of the former bulk storage area. Petroleum hydrocarbons were detected in several of the borings completed during the course of the assessment. A copy of the Limited Site Assessment report can be found in Appendix D. For structure numbers and tank locations, refer to the *Waldemar Nelson Report – Demolition Design Memorandum Input*, dated February 1999.

Site Name	Structure No.	Structural Type	Sampled	Comments
Distributors Oil	115	Six Steel ASTs – Gasoline & Diesel	NA	The tanks were removed from the subject property in June 1998.
	116	Earthen Dike & ASTs	NA	

NR-Not Required, operator identified tank volume and contents.
NI-Not identified in the Waldemar Nelson Report.
NA- Not available

2.3 McDonough Marine

McDonough Marine (2300 Surekote Road) is located on the east bank of the IHNC project area. McDonough Marine is used to service marine vessels and barges. The property is occupied and the lease with the Port of New Orleans remains active. Six ASTs have been documented on the grounds and range in volume from 500 to 1,000 gallons. For structure numbers and tank locations, refer to the *Waldemar Nelson Report – Demolition Design Memorandum Input*, dated February 1999.

Site Name	Structure No.	Structural Type	Sampled	Comments
McDonough Marine	44	1,000-gallon AST – Oxygen	NR	The tanks will be removed by the current lease holder/operator.
	61	500-gallon AST – Propane	NR	
	62	500-gallon AST - Waste Oil	NR	

	64 64 66	1,000-gallon AST - Paint Thinner 600-gallon AST – Gasoline 1000-gallon AST – Diesel	NR NR NR	

NR-Not Required, operator identified tank volume and contents.

2.4 Saucer Marine

The Saucer Marine (1910 Surekote Road) facility is located on the east bank of the IHNC project area. Saucer Marine was located at this address until the property was abandoned in 1991 or 1992. The site was used to repair and construct marine vessels. Two abandoned ASTs have been documented on the grounds and range in size from 1,000 to 10,000 gallons. These tanks appear to have been used to store propane and bulk sand. For structure numbers and tank locations, refer to the *Waldemar Nelson Report – Demolition Design Memorandum Input*, dated February 1999.

Site Name	Structure No.	Structural Type	Sampled	Comments
Saucer Marine	83A	1,000-gallon AST – Propane	NS	Tank is empty and all associated hardware has been removed.
	97	1,000-gallon AST - Aqueous	NA	Tank was removed from the subject property in July 1998.
	103	10,000-gallon AST - Bulk blast sand	NS	Unable to access the tank for sampling. The tank appears to have been associated with the sand blasting operations and contained blast sand.

NS – Not sampled due to the lack of material. NA – Not available.

2.5 New Orleans Port Authority

The New Orleans Port Authority is located on the west bank of the IHNC project area. The Port Authority operates one tank system at this location. The AST volume is 500 gallons and contains diesel fuel. The diesel fuel is used in the lawn tractors and trucks operated by the Port Authority. For structure numbers and tank locations, refer to the *Waldemar Nelson Report – Demolition Design Memorandum Input*, dated February 1999.

Site Name	Structure No.	Structural Type	Sampled	Comments
Port Authority.	141	500-gallon AST - Diesel	NR	The current operator will remove the tank.

NR-Not Required, operator identified tank volume and contents.

2.6 US Army Corps of Engineers

The US Army Corps of Engineers (4635 Urquhart Street) is located on the west bank of the IHNC project area. The USACE operates one tank system at this location. The AST volume is 500 gallons and contains diesel fuel. For structure numbers and tank locations, refer to the *Waldemar Nelson Report – Demolition Design Memorandum Input*, dated February 1999.

Site Name	Structure No.	Structural Type	Sampled	Comments
USACE	163	500-gallon AST - Diesel	NR	The current operator will remove the tank.

NR-Not Required, operator identified tank volume and contents.

2.7 US Coast Guard Station

The US Coast Guard Station (4640 Urquhart Street) is located on the west bank of the IHNC project area. The Coast Guard operates four tank systems at the station. The ASTs range in volume from 500 to 1,500 gallons. Two tanks are used to store diesel fuel and gasoline; the other two tanks contain oily water and used oil. For structure numbers and tank locations, refer to the *Waldemar Nelson Report – Demolition Design Memorandum Input*, dated February 1999.

Site Name	Structure No.	Structural Type	Sampled	Comments
US Coast Guard	175	1,500-gallon AST - Diesel	NR	The current operator will remove the tanks.
	183	550-gallon AST - Gasoline	NR	
	183	1,500-gallon AST - Oily Water	NR	
	183	1,500-gallon AST - Used Oil	NR	

NR-Not Required, operator identified tank volume and contents.

3 AST Removal and Disposal

This section describes the removal and disposal procedures that the contractor shall employ during the decommissioning of the above ground storage tanks located in the IHNC. The tanks remaining at the IHNC which will be subject to this contract are located at the abandoned facilities of Boland Marine and Saucer Marine (see Figure 2, Figure 3 and Appendix B). The other tanks observed by Dames & Moore on occupied property will be removed by the respective operators.

Safety and health protocols shall be detailed in a Site Safety and Health Plan (SSHP) submitted to the USACE for approval prior to initiating site work. The SSHP shall include an Accident Prevention Plan and an Activity Hazard Analysis (AHAs) detailing material handling procedures.

The Contractor shall maintain a project log at the Contractor Field Office. This log shall be updated at the conclusion of each workday to indicate:

- The quantity of materials that have been segregated and removed, and
- The quantity of metal debris that has been removed and staged for recycling.

3.1 AST Removal Sequence

Removal of the above ground storage tanks at Saucer Marine and Boland Marine facilities will be as follows (per API RP2015 and RP1604):

- Utilities will be disconnected and the site will be secured from entry by unauthorized personnel;
- Contractor will assure that all ignition sources near the ASTs have been eliminated;
- All liquid and solid materials will be removed from the ASTs;
- All associated hardware and tank openings will be disconnected and plugged;
- Tanks will be purged of vapors and monitored using a Photoionization Detector (PID) and Combustible Gas Indicator (CGI);
- Tanks will be removed from their bases;
- Tanks will be demolished; and
- Tanks will be removed from the property for recycling.

3.2 AST Disposal

3.2.1 Boland Marine

The following ASTs are located at Boland Marine:

Site Name	Structure No.	Structural Type	Comments
Boland Marine	18 40A	Horizontal Steel AST Horizontal Steel AST	The tanks are empty and can be sold as scrap metal after the tanks have been purged of vapors.

The hardware and support apparatus associated with the tanks will be disconnected. Interior vapor conditions of each tank will be measured by the contractor. If vapors in the tanks pose little

risk for ignition, then the tank will be removed and sold as scrap metal. If there are flammable vapors present in the tanks, they will be purged with CO_2 first, prior to removal and demolition.

Once purged and removed, the tank should be loaded onto a truck with a front-end loader equipped with a grappler and transported to a scrap metal recycling facility.

3.2.2 Saucer Marine

The following ASTs are located at Saucer Marine:

Site Name	Structure No.	Structural Type	Comments
Saucer Marine	83A 103	Horizontal Steel Tank Upright AST	1,000-gallon AST - the tank is empty 10,000-gallon AST - contains bulk sand

Note: Due to the growth of brush in close proximity to the ASTs at Saucer Marine, the undergrowth should be removed before any work is conducted on the tanks. Extreme caution should be used to limit the sources of ignition near the tanks. The brush should be removed within a ten-foot radius of the tanks.

The horizontal steel tank is currently empty, but the tank should be checked for explosive vapors using a PID and CGI. The markings indicate that the tank may have contained LPG. Associated hardware will be removed and if explosive conditions exist, the tank will be purged. After purging, the tank will be removed from its base and demolished. The scrap metal will then be placed into a dump truck with a front-end loader equipped with a grappler and transported to a scrap metal recycling facility.

The upright steel tank contains bulk sand, which will be removed prior to demolition. Hardware will be disconnected and removed from the tank and the vapors of the tank will be checked with a PID and a CGI. If explosive conditions exist, the tank will be purged. After purging, the tank will be removed from its base. The tank will then be demolished and placed in a dump truck and transported to a scrap metal recycling facility.

3.3 Disposal Sites

The scrap metal generated as a result of the decommissioning of the AST in the IHNC project area can be transported to Southern Scrap Materials.

Debris Type	Disposal Facility
Metal Debris	Southern Scrap Materials 4801 Florida Avenue New Orleans, LA 70117 (504) 942-0341

3.4 Construction Contracts and Contract Duration

- The removal and disposal of the above ground storage tanks will be accomplished by one construction contract.
- The estimated construction duration for this project is 30 calendar days.

4 REGULATORY REVIEW

4.1 Hazardous and Industrial Solid Waste

Industrial Solid Waste is defined as solid waste generated by a manufacturing, industrial, or mining process, or which is contaminated by solid waste generated by such a process. Such waste may include, but is not limited to, waste resulting from the following manufacturing processes: electric power generation; fertilizer/agricultural chemicals; food and related products; by-products; inorganic chemicals; iron and steel manufacturing; leather and leather products; nonferrous metals manufacturing/foundries; organic chemicals; plastics and resins manufacturing; pulp and paper industry; rubber and miscellaneous plastic products; stone; glass, clay and concrete products; textile manufacturing; and transportation equipment. This does not include hazardous waste regulated under the Louisiana Hazardous Waste Regulations or under federal law, or waste which is subject to regulation under the Office of Conservation's Statewide Order No. 29-B, or by other agencies (LAC 33:VII.115).

Persons who generate industrial solid waste or persons who transport, process, or dispose of solid waste must, within 30 days after becoming subject to the solid waste regulations, notify the administrative authority (Louisiana Department of Environmental Quality) in writing of this activity (LAC 33:VII.503.A1). Generators must also submit annual reports to the administrative authority listing the types and quantities, in wet-weight tons per year, of industrial solid waste they have disposed of off site. This report must include the name of the transporter(s) who removed the industrial solid waste from the site and the permitted solid waste processing or disposal facility or facilities that processed or disposed of the waste. This form may be obtained from the Solid Waste Division and must be submitted by August 1 of each reporting year. Generators must maintain, for two years, all records concerning the types and quantities of industrial solid waste disposed of off site (LAC 33:VII.701).

No solid waste shall be stored or allowed to be stored long enough to cause a nuisance, health hazard, or detriment to the environment as determined by the administrative authority (LAC 33:VII.703.A1).

A solid waste that exhibits the characteristic of toxicity, but is not listed as a hazardous waste in LAC 33:V.4901, has the Hazardous Waste Number that corresponds to the toxic contaminant causing it to be hazardous. The Hazardous Waste Number can be found in Table 5 of the LAC 33:V.4901 document.

If a categorically hazardous waste is discharged without authorization and threatens or results in an emergency condition (that causes danger to public health and safety, causes significant adverse impact to the land, water or air, or severe property damage), the discharger must notify the Department of Public Safety 24-hour Louisiana Hazardous Materials Hotline at 504-925-6595 within one hour of the discharge and in accordance with other provisions of the LAC 33:I.Chapter 39. For all other non-emergency conditions, notification to Louisiana Hazardous Materials Hotline must be given within 24 hours of the discharge (LAC 33:V.105.J).

Samples which are collected for the sole purpose of testing to determine its characteristics or composition, are not subject to any requirements of LAC 33:V.Subpart I or to the notification requirements of LAC 33:V.Subpart I, Subsection A, when the sample is being transported to a laboratory for the purpose of testing or the sample is being stored by the sample collector before

transport to a laboratory for testing (LAC 33:V.105.D.4a). In order to be eligible for the above referenced exemption, a sample collector shipping samples to a laboratory must comply with the Louisiana Department of Public Safety (LDPS), U.S. Postal Service (USPS) or any other applicable shipping requirements (LAC 33:V.105.D.4b).

A generator who transports, or offers for transportation, hazardous waste for off-site treatment, storage, or disposal must prepare a manifest before transporting the waste off site pursuant to the requirements of LAC 33:V.1107 – 1111. All generators must comply with the requirements of LAC 33:V.1511. Each generator shall prepare a contingency plan. The contingency plan must include the information as specified in LAC 33:V.1513.A, B, C, D.2, and F. The contingency plan shall include a section describing emergency response procedure as specified in LAC 33:V.1513.F.

5 COST ESTIMATION

The scope of work outlined for this project was determined from existing reports and the limited site surveys completed on the leased properties that make up the IHNC project area. The cost to remove the ASTs at Boland Marine and Saucer Marine is estimated to be $43,897.59. Detailed cost estimates are included in Appendix C.

6 CONCLUSIONS

A site survey was conducted for the ASTs on the leased properties of the IHNC project area. ASTs were found to be located at Boland Marine, Mayer Yacht, McDonough Marine, Saucer Marine, the New Orleans Port Authority, the Army Corps of Engineers, and the US Coast Guard facilities. The tanks ranged in size from 500 to 10,000 gallons and contained various petroleum products and bulk sand. All of the ASTs at the IHNC subject property will be removed by the respective owners, except those located at Boland Marine and Saucer Marine. These four ASTs will be removed according to the methods found herein.

All four of the tanks documented at Boland Marine and Saucer Marine that need to be removed will be disconnected from utilities and ignition sources removed. The two tanks located at Boland Marine and one of the tanks at Saucer Marine are empty and will be removed and disposed of as scrap metal, after vapor purging. The other tank located at Saucer Marine contains bulk sand and the sand will be removed prior to demolition. The bulk sand will be placed with the blast sand and disposed offsite as construction debris. Tanks then will be checked with a PID and a CGI for vapors, and demolished, if no explosive conditions exist. If explosive conditions are apparent, the tanks will be purged, then demolished and sent to a scrap metal recycling facility.

Figures

Adapted from U.S. Geological Survey
NEW ORLEANS EAST
QUADRANGLE
7.5 Minute Series (Topographic)
1992

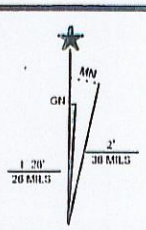

Figure 1
SITE LOCATION MAP

Inner Harbor Navigation Canal
New Orleans, Louisiana

Scale: 1:24 000
Contour Interval: 10'

DAMES & MOORE

MAYER YACHT SERVICE

FLOOD PROTECTION LEVEE

SURE KOTE ROAD

GATE

LIMESTONE ROADWAY

EARTHEN DIKE

FORMER FUEL TANK FARM

CONCRETE

USTs

CONCRETE COVER

DISTRIBUTOR'S OIL CO
2100 SUREKOTE ROAD
NEW ORLEANS, LA
OFFICE & WAREHOUSE BLDG.

GRASS & SHELL COVER

INDUSTRIAL CANAL

SB-3-1
0-2
ND
ND
433

SB-6-1
0-2
ND
ND
<10

SB-15-1
0-2
ND
ND
133

SB-45-1
0 - 2
N/A
N/A
4,090

SB-16-1
0-2
ND
ND
<10

SB-17-1
0-2
ND
1.1
<10

SB-18-1
0-2
ND
1.3
3,220

SB-43-1
0-2
N/A
N/A
243

SB-42-2
2 - 4
N/A
N/A
114

SB-23-1
0-2
0.010
40
3,280

SB-22-1
0-2
0.110
91
12,700

SB-27-1
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ND
ND
<10

SB-34-1
0-2
ND
ND
<10

SB-36-1
0-2
ND
ND
<10

SB-39-1
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N/A
N/A
11

SB-33-1
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0.411
23
8,820

SB-40-1
0-2
N/A
N/A
2,240

SB-35-1
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ND
<10

SB-2-1
0-2
ND
ND
<10

SB-1-1
0-2
ND
ND
<10

SB-5-1
0-2
ND
ND
682

SB-4-1
0-2
ND
ND
<10

SB-8-1
0-2
0.697
63
1,530

SB-47-2
2 - 4
%/A
%/A
129

SB-7-1
0-2
ND
ND
147

SB-10-1
0-2
ND
3.0
15,200

SB-9-1
0-2
ND
16
1,860

SB-46-2
2 - 4
N/A
N/A
94

SB-12-1
0-2
ND
5.8
559

SB-11-1
0-2
ND
2.5
<10

SB-14-1
0-2
0.041
51
22,200

SB-44-2
2 - 4
N/A
N/A
6,680

SB-13-1
0-2
ND
ND
746

SB-20-1
0-2
3.63
460
21,900

SB-19-1
0-2
ND
88
7,040

SB-41-2
2 - 4
N/A
N/A
697

SB-49-2
2 - 4
N/A
N/A
83

SB-21-2
2-4
ND
6.4
684

SB-24-1
0-2
ND
ND
<10

SB-25-1
0-2
ND
ND
<10

SB-26-1
0-2
ND
ND
<10

SB-29-1
0-2
ND
ND
<10

SB-28-1
0-2
ND
ND
<10

SB-30-1
0-2
0.035
77
<10

SB-31-1
0-2
0.018
26
5,380

SB-37-2
2 - 4
N/A
N/A
7,320
1,150

SB-38-2
2 - 4
N/A
N/A
5,600

SB-48-1
0-2
N/A
N/A
1,410

SB-32-2
2-4
1.90
540
7,480

SB-2-1	SOIL SAMPLE LOCATION
0-2	DEPTH BELOW LAND SURFACE (BLS)
ND	TOTAL BTEX CONCENTRATION (mg/kg)
ND	TPH-G CONCENTRATION (mg/kg)
<10	TPH-D CONCENTRATION (mg/kg)
210	TPH-OIL CONCENTRATION (mg/kg)

BDL BELOW DETECTION LIMIT

LEGEND	
	FLOOD PROTECTION LEVEE
	EARTHEN DIKE
	FENCE LINE
SB-1	SOIL BORING LOCATION

FORMER INDIAN TOWING CO.

CONTAMINANT PLUME

SCALE IN FEET: 20 10 0 20

SOIL HYDROCARBON CONCENTRATION MAP

FIGURE 2

0 - 4' BELOW LAND SURFACE (BLS)

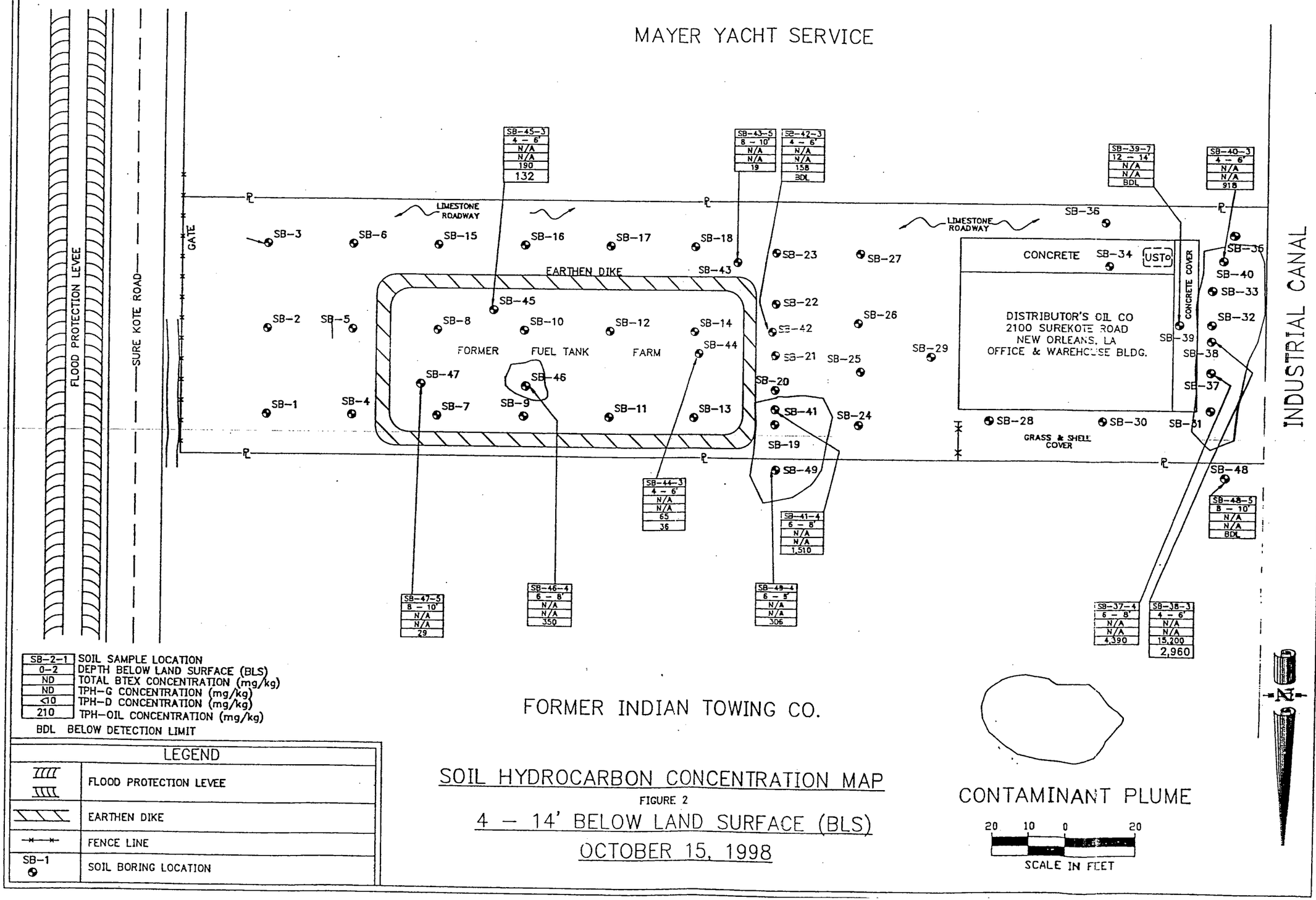
JULY 15 & OCTOBER 15, 1998

HYDRODYNE ENVIRONMENTAL, INC.
LOUISIANA METAIRIE
1416 CARROLLTON AVE.
METAIRIE, LA 70005
hydrodyne@comm.net
(504)835-6018 OFF./(504)833-3056 FAX.

DISTRIBUTOR'S OIL CO.
LOUISIANA NEW ORLEANS
FORMER BULK PLANT
2100 SUREKOTE ROAD
NEW ORLEANS, LA

DRAWN: T.W.
CHECKED: R.M.
DATE: NOV. 98
JOB NO.: LA 98-29
SHEET: FIG. 2A

MAYER YACHT SERVICE



SB-2-1	SOIL SAMPLE LOCATION
0–2	DEPTH BELOW LAND SURFACE (BLS)
ND	TOTAL BTEX CONCENTRATION (mg/kg)
ND	TPH–G CONCENTRATION (mg/kg)
<10	TPH–D CONCENTRATION (mg/kg)
210	TPH–OIL CONCENTRATION (mg/kg)

BDL BELOW DETECTION LIMIT

LEGEND	
	FLOOD PROTECTION LEVEE
	EARTHEN DIKE
	FENCE LINE
SB-1	SOIL BORING LOCATION

FORMER INDIAN TOWING CO.

SOIL HYDROCARBON CONCENTRATION MAP

FIGURE 2

4 – 14' BELOW LAND SURFACE (BLS)

OCTOBER 15, 1998

CONTAMINANT PLUME

20 10 0 20

SCALE IN FEET

HYDRODYNE ENVIRONMENTAL, INC.
METAIRIE, LOUISIANA
1416 CARROLLTON AVE.
METAIRIE, LA 70005
hydrodyne@comm.net
(504)835-6018 OFF./(504)833-3056 FAX.

DISTRIBUTOR'S OIL CO.
NEW ORLEANS, LOUISIANA
FORMER BULK PLANT
2100 SUREKOTE ROAD
NEW ORLEANS, LA

DRAWN: T.W.
CHECKED: R.M.
DATE: NOV. 98
JOB NO.: LA 98-29
SHEET: FIG. 2B

MAYER YACHT SERVICE

FLOOD PROTECTION LEVEE

SURE KOTE ROAD

GATE

INDUSTRIAL CANAL

LIMESTONE ROADWAY

LIMESTONE ROADWAY

EARTHEN DIKE

FORMER FUEL TANK FARM

CONCRETE

USTo

CONCRETE COVER

DISTRIBUTOR'S OIL CO
2100 SUREKOTE ROAD
NEW ORLEANS, LA
OFFICE & WAREHOUSE BLDG.

GRASS & SHELL COVER

SB-1 SB-2 SB-3 SB-4 SB-5 SB-6 SB-7 SB-8 SB-9 SB-10 SB-11 SB-12 SB-13 SB-14 SB-15 SB-16 SB-17 SB-18 SB-19 SB-20 SB-21 SB-22 SB-23 SB-24 SB-25 SB-26 SB-27 SB-28 SB-29 SB-30 SB-31 SB-32 SB-33 SB-34 SB-35 SB-36 SB-37 SB-38 SB-39 SB-40 SB-41 SB-42 SB-43 SB-44 SB-45 SB-46 SB-47 SB-48 SB-49

	GWS-45	GWS-42	GWS-43	GWS-34	GWS-39	GWS-40	GWS-5	GWS-9	GWS-44	GWS-13	GWS-41	GWS-21	GWS-47	GWS-46	GWS-49	GWS-48	GWS-32	GWS-37	GWS-38
0-2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ND	N/A	N/A	N/A	ND	N/A	N/A	ND	ND	N/A	ND	N/A	ND	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ND	20	6	BDL	ND	3	69	ND	ND	279	ND	24	ND	N/A	N/A	N/A	BDL	ND	23	181
7	7		BDL	<1			<1	<1		<1	7	<1	54	12	15		47.3	6	36

FREE PHASE HYDROCARBONS ENCOUNTERED DURING DRILLING OF SOIL BORINGS SB-32 SB-37, & SB-38

CONTAMINANT PLUME

GWS-37	GROUNDWATER SAMPLE LOCATION
0-2	DEPTH BELOW LAND SURFACE (BLS)
ND	TOTAL BTEX CONCENTRATION (mg/kg)
ND	TPH-G CONCENTRATION (mg/kg)
<10	TPH-D CONCENTRATION (mg/kg)
7	TPH-OIL CONCENTRATION (mg/kg)

BDL BELOW DETECTION LIMIT

LEGEND	
	FLOOD PROTECTION LEVEE
	EARTHEN DIKE
	FENCE LINE
GWS-37	GROUNDWATER SAMPLE LOCATION

FORMER INDIAN TOWING CO.

GROUNDWATER HYDROCARBON CONCENTRATION MAP

FIGURE 3

JULY 15 & OCTOBER 15, 1998

20 10 0 20

SCALE IN FEET

HYDRODYNE ENVIRONMENTAL, INC.
1416 CARROLLTON AVE.
METAIRIE, LA 70005
hydrodyne@comm.net
(504)835-6018 OFF./(504)833-3056 FAX.

DISTRIBUTOR'S OIL CO.
FORMER BULK PLANT
2100 SUREKOTE ROAD
NEW ORLEANS, LA

DRAWN: T.W.
CHECKED: R.M.
DATE: NOV. 98
JOB NO.: LA 98-29
SHEET: FIG. 3A

Appendix A

RECORD OF TELEPHONE CONVERSATION

DATE: 2-4-99 TIME: 11:45 pm JOB NO.:

RECORDED BY: Lance Whisman OWNER/CLIENT:

TALKED WITH: Paul Damstorf OF Mayer Yacht

NATURE OF CALL: INCOMING ☐ OUTGOING ☐ PHONE # (504) 945-0089

ROUTE TO:	INFORMATION	ACTIONS

MAIN SUBJECT OF CALL:

ITEMS DISCUSSED: Spoke with Paul Damstorf (President)

2 portable ASTs on site
1 - 500 gallon waste oil tank
1 - 300 gallon diesel tank
Both tanks are seldom used.

300 gallon tank was removed from water during the last flood

Both tanks were inheirited from Distributor oil Co.

FAX # (504) 945-0830

McDONOUGH MARINE SERVICE
1750 Clearview Parkway ▪ Metairie, LA 70001-2470
504-780-8100 ▪ LA Wats 800-227-4348 ▪ Fax 504-780-8200
A Division of Marmac Corporation

January 25, 1999

Mr. Lance Whisman
Dames and Moore/TUL
2021 South Lewis Avenue, Suite 300
Tulsa, OK 74104-5707

RE: AST MEMO

Dear Mr. Whisman:

This letter will confirm that there are six above ground bulk storage containers, which are currently still being utilized by our operations at 2300 Surekote Road in New Orleans, Louisiana. These tanks have the following approximate volume capacities and products.

Tanks	*Approximate Capacity*
Waste oil storage tank	528 gallons
Diesel storage tank	940 gallons
Paint thinner tank	971 gallons
Gasoline storage tank	564 gallons
Propane tank	250 gallons
Oxygen tank	500 gallons

The oxygen and propane tanks are mounted on concrete slabs while all of the other tanks are mounted inside steel containment pans.

Should you need any additional information about these containers, please let me know.

Sincerely yours,

David C. Hanby, Jr.

DCHjr/pca

PORT OF NEW ORLEANS

January 20, 1999

Mr. Lance Whisman
Dames & Moore
2021 South Lewis Avenue
Tulsa, Oklahoma 74104
Fax: (918) 744-6549

RE: Above Ground Storage Tank at the Claiborne Facility

Dear Lance:

As we discussed yesterday, the AGST located near the Claiborne Storeroom (the facility adjacent to the south of the Galves Wharf) is used by Port personnel to fuel tractors and grass cutting equipment. It is a 500 gallon diesel tank that was installed approximately six years ago. The Port plans to relocate this tank in the future when this operation moves to another location.

Should you have any questions, please contact me.

Very truly Yours,

Tony Laperous
General Operations
Environmental

Appendix B

PHOTOGRAPHIC LOG
AST Report
IHNC Project

Saucer Marine

1. View to the southwest of a cylindrical above ground storage tank (Structure 103) which was used to contain blast sand. The tank is abandoned with most of the associated piping disconnected.

2. View to the west/northwest at the base of the above mentioned tank.

PHOTOGRAPHIC LOG
AST Report
IHNC Project

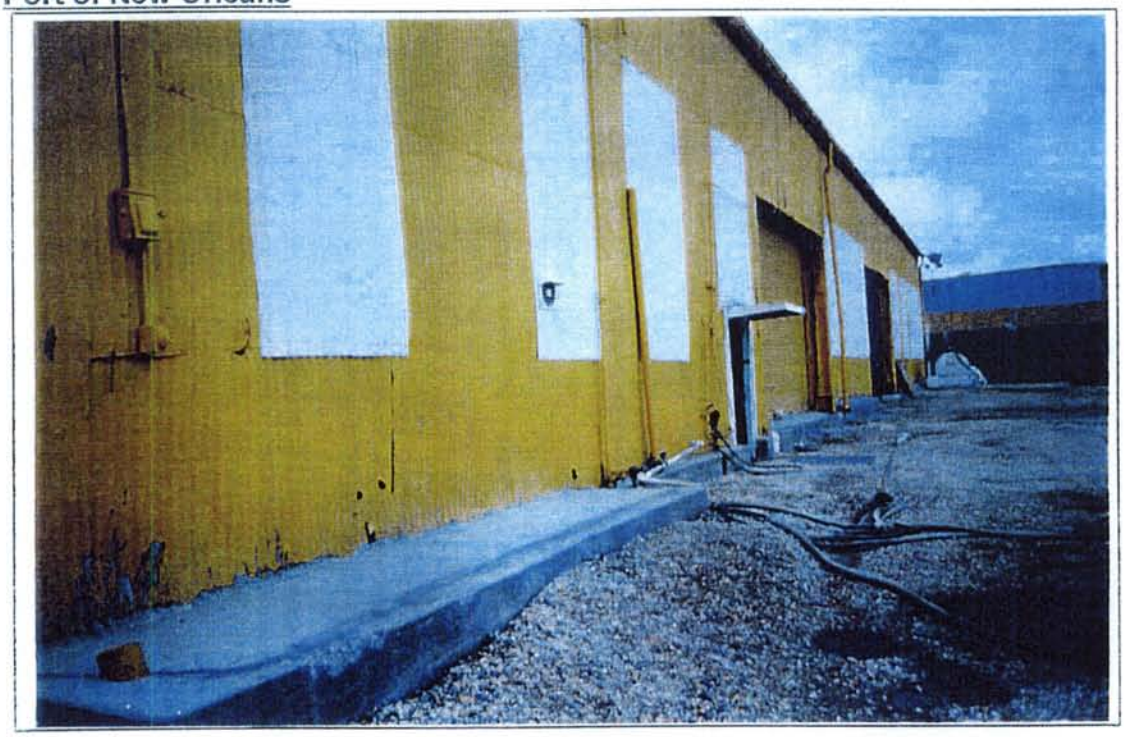
3. View to the southwest of an above ground storage tank (Structure 83A) which was placarded (1075) as containing a highly flammable gas.

4. View of the ports on the top of the tank (Structure 83A). The tank is currently empty.

PHOTOGRAPHIC LOG
AST Report
IHNC Project

5. View of a discharge port on the bottom of the tank (Structure 83A). The associated piping is still connected to the tank.

Port of New Orleans



6. View to the north along the east side to a Metal Structure used by the maintenance department of the new Orleans Port Authority. A small above ground storage tank with associated concrete berm is in the background.

PHOTOGRAPHIC LOG
AST Report
IHNC Project

7. View to the northwest of a 500-gallon diesel tank which is used by the maintenance department of the New Orleans Port Authority.

8. View to the southwest of the above mentioned tank.

PHOTOGRAPHIC LOG
AST Report
IHNC Project

Boland Marine

9. View to the southwest of a cylindrical above ground storage tank (Structure 41A) which was used to contain compressed air The tank is abandoned with most of the associated piping disconnected.

10. View to the south of the AST (Structure 41A) which was used to contain compressed air. The tank is abandoned with most of the associated piping disconnected.

Appendix C

ESTIMATED PROJECT TOTAL
SAUCER & BOLAND MARINE
IHNC DEMOLITION DESIGN MEMORANDUM

	BOLAND	SAUCER	TOTAL
SUB-TOTAL	4,505.60	5,730.60	10,236.20
15% OVERHEAD & PROFIT	675.84	859.59	1,535.43
20% CONTINGENCY	1,036.29	1,318.04	2,354.33
REMOVAL COST	5,181.44	6,590.19	11,771.63
DISPOSAL COST	4,000.00	4,000.00	8,000.00
ENGINEERING & DESIGN	3,000.00	3,000.00	6,000.00
CONSTRUCTION MANAGEMENT	2,000.00	2,000.00	4,000.00
TOTAL ESTIMATED PROJECT COST	**20,399.17**	**23,498.42**	**43,897.59**

ESTIMATED COST TO REMOVE AND DISPOSE 2 ABOVEGROUND STORAGE TANKS
BOLAND MARINE
IHNC DEMOLITION DESIGN MEMORANDUM

EQUIPMENT	QTY	HOURLY RATE	NO. OF HOURS	TOTAL ($)
LOADER FRONT-END, 2.00 CY BUCKET	1	39.75	20	795.00
9.0 CY GRAPPLE	1	9.03	20	180.60
SINGLE OR TANDEM AXLE DUMP TRUCK	1	25.00	20	500.00
		TOTAL EQUIPMENT COST ($)		1,475.60

LABOR	QTY	HOURLY RATE	NO. OF HOURS	TOTAL ($)
FIELD SUPER	1	40.00	28	1,120.00
EQUIPMENT OPERATORS				
FRONT-END LOADER	1	28.00	20	560.00
DRIVERS	1	25.00	20	500.00
LABORERS	2	15.00	20	300.00
		TOTAL LABOR COST ($)		2,480.00

MISCELLANEOUS EXPENSES	QTY	HOURLY RATE	NO. OF MONTHS	TOTAL ($)
FIELD TRAILER	1	500.00	1	500.00
PORT-O-POTTY	1	50.00	1	50.00
		TOTAL MISCELLANEOUS COST ($)		550.00

SUB-TOTAL	4,505.60
15% OVERHEAD & PROFIT	675.84
20% CONTINGENCY	1,036.29
REMOVAL COST	5,181.44
DISPOSAL COST	4,000.00
ENGINEERING & DESIGN	3,000.00
CONSTRUCTION MANAGEMENT	2,000.00
TOTAL ESTIMATED PROJECT COST	**20,399.17**

ESTIMATED COST TO REMOVE AND DISPOSE 2 ABOVEGROUND STORAGE TANKS
SAUCER MARINE
IHNC DEMOLITION DESIGN MEMORANDUM

EQUIPMENT	QTY	HOURLY RATE	NO. OF HOURS	TOTAL ($)
LOADER FRONT-END, 2.00 CY BUCKET	1	39.75	20	795.00
9.0 CY GRAPPLE	1	9.03	20	180.60
BOBCAT	1	33.25	20	665.00
SINGLE OR TANDEM AXLE DUMP TRUCK	1	25.00	20	500.00
		TOTAL EQUIPMENT COST ($)		2,140.60

LABOR	QTY	HOURLY RATE	NO. OF HOURS	TOTAL ($)
FIELD SUPER	1	40.00	28	1,120.00
EQUIPMENT OPERATORS				
FRONT-END LOADER	1	28.00	20	560.00
BOBCAT	1	28.00	20	560.00
DRIVERS	1	25.00	20	500.00
LABORERS	2	15.00	20	300.00
		TOTAL LABOR COST ($)		3,040.00

MISCELLANEOUS EXPENSES	QTY	HOURLY RATE	NO. OF MONTHS	TOTAL ($)
FIELD TRAILER	1	500.00	1	500.00
PORT-O-POTTY	1	50.00	1	50.00
		TOTAL MISCELLANEOUS COST ($)		550.00

SUB-TOTAL	5,730.60
15% OVERHEAD & PROFIT	859.59
20% CONTINGENCY	1,318.04
REMOVAL COST	6,590.19
DISPOSAL COST	4,000.00
ENGINEERING & DESIGN	3,000.00
CONSTRUCTION MANAGEMENT	2,000.00
TOTAL ESTIMATED PROJECT COST	**23,498.42**

Appendix D

PORT OF
NEW ORLEANS

May 6, 1999

Mr. Gerald J. Dicharry, Jr.
Senior Project Manager
Department of the Army, COE
Post Office Box 60267
New Orleans, Louisiana 70160-0267

Re: Distributors Oil Environmental Report

Dear Joe:

Enclosed for your keeping is a copy of the Secondary Limited Site Assessment report on the Distributors Oil site as prepared by Hydrodyne Environmental, Inc.

Please call me if I can be of further assistance.

Sincerely,

Clayton L. Miller
Industrial Development
Manager

cc: J. Cocchiara

HYDRODYNE ENVIRONMENTAL INC.
ENVIRONMENTAL CONSULT • DESIGN
1416 Carrollton Avenue • Metairie, Louisiana 70005
504-835-6018 • Fax 833-3056

SECONDARY LIMITED SITE ASSESSMENT
DISTRIBUTOR'S OIL COMPANY
FORMER BULK PLANT
2100 SUREKOTE ROAD
NEW ORLEANS, LOUISIANA
ORLEANS PARISH

PREPARED FOR:
MR. BOB LAX
DISTRIBUTOR'S OIL COMPANY
4085 FLORIDA BLVD.
BATON ROUGE, LOUISIANA 70805

NOVEMBER 30, 1998

PROJECT NO. LA 98-29

Prepared by:
HYDRODYNE ENVIRONMENTAL, INC.
1416 CARROLLTON AVENUE
METAIRIE, LA. 70005
(504) 835-6018

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1.0 INTRODUCTION

Hydrodyne Environmental, Inc. (Hydrodyne) contracted with Distributor's Oil Company to perform a secondary limited subsurface site assessment of the Distributor's Oil Company former bulk plant facility located at 2100 Surekote Road in New Orleans, Orleans Parish, Louisiana (Figures 1 – 3A – Appendix A). The secondary limited site assessment was performed as per a verbal request from the client rather than at the request of a governmental agency. A proposal to perform the secondary limited site assessment was submitted to the client on October 7, 1998 and signed authorization to proceed was received the same day.

1.1 PURPOSE

The purpose of the secondary limited site assessment was to further determine the vertical and horizontal extent of petroleum impact to the subsurface soils and groundwater inside and outside the existing earthen dike which formerly contained several aboveground storage tanks (ASTs), West of the former office building near the Industrial Canal, and from 2 off–site soil borings installed along the fence line of the adjacent former Indian Towing property . An initial limited site assessment was conducted at the site in July 1998.

1.2 SCOPE OF WORK

The secondary limited site assessment proposal indicated the scope of work for the project

would include:

- The completion of 12 soil borings to between 8 – 12' below land surface (BLS) with a direct push Geoprobe drill rig in the areas described above;

- Field screening of the soil samples with a Photoionization Detector (PID) collected continuously every 2' during drilling and selection of 2 soil samples exhibiting the highest PID reading for laboratory analysis; In addition, the project proposal included the collection of 12 groundwater samples from each soil boring for laboratory analysis;

- Collection and submittal for laboratory analysis (TPH–Diesel (TPH–D) and TPH–Oil (TPH –O) of at least 24 soil samples and 12 groundwater samples from 12 soil borings installed on and off–site during the secondary limited site assessment;

- Preparation of a limited site assessment report to include a description of the field activities of the assessment; the PID readings for the collected soil samples; soil boring logs; soil and groundwater laboratory results; an area vicinity map and a general arrangement site maps indicating the soil and the groundwater sample locations and hydrocarbon concentrations. The secondary limited site assessment project activities were conducted in accordance with the approved work plan dated October 7, 1998.

1.3 LEVEL OF INVESTIGATIVE EFFORT

The client, Distributor's Oil Company, was interested in gathering data to substantiate through soil and groundwater sample analytical results the vertical and horizontal impact to the subsurface integrity of the subject property. The project activities were conducted by Mr. Richard Murphy, Senior Geologist and Mr. Gerald Roach, Environmental Specialist.

2.0 SUBJECT PROPERTY DESCRIPTION

The subject property is the location of a former bulk plant which contained several ASTs formerly containing gasoline and diesel fuel products inside and earthen dike, a vacant office and warehouse building, and one former underground storage tank (UST) on the Industrial Canal in New Orleans, Orleans Parish, Louisiana (Figures 1 – 3A– Appendix A). The vacant office and warehouse building is located in the Western portion of the property near the Industrial Canal. The former UST tankbay is approximately 15' feet South of the office building. The UST tankbay formerly contained 1 steel 1,000 gallon UST. Several aboveground storage tanks (ASTs) were removed from inside the earthen dike approximately 5 months ago. The earthen dike formerly containing the ASTs is intact and there are limestone and grass covered areas on the drive areas and the perimeters of the site (Figures 2A– 3A – Appendix A).

AST removal date ~2/98

3.0 METHOD OF INVESTIGATION

The subsurface investigation consisted of the drilling and sampling of 13 soil borings, SB-37 through SB-49 (Figures 2A – 3A – Appendix A) to approximately 8 – 12' BLS. The proposed work plan dated October 7, 1998 indicated 12 soil borings would be installed to 12' BLS during the secondary site assessment. However, based upon observations made during the site assessment 1 additional soil boring was drilled during the field portion of the project. Mr. Richard Murphy chose the location of the soil borings based on the location and laboratory data presented during the previous limited site assessment project. Hydrodyne personnel supervised Crescent Geotechnical Services, Inc. (Crescent) in the placement, drilling, and sampling of the 13 soil borings. The soil borings were drilled with an All Terrain Vehicle (ATV) mounted Terraprobe drill rig and sampled with Geoprobe direct push sampling equipment.

3.1 SOIL BORING LOCATIONS

As previously mentioned, the soil borings installed during the secondary limited site assessment were inside and outside the earthen dike formerly containing the ASTs, between the former office building and the Industrial Canal, and also offsite near the adjacent property fence line in order to further delineate the previously identified petroleum impact to the subsurface soils and groundwater at the subject property (Figures 2A – 3A – Appendix A).

3.2 SOIL SAMPLE COLLECTION

A total of 26 soil samples were collected for analysis during the secondary limited site assessment field activities. Continuous soil samples were collected at 2' intervals from 0 to 12' BLS using 1" thin walled stainless steel direct push Geoprobe sampling tubes during the advancement of each soil boring. Clean disposable acetate liners were inserted into the stainless steel sampling tubes in order to recover the soil samples from each 2' interval for field screening with a Photo ionization Detector (PID). The plastic liners were split open and the soil samples were visually described in the field using a modified Unified Soil Classification System description in the field and recorded on field soil boring logs (Refer to Soil Boring Logs in Appendix C).

Soil samples were split length wise for descriptive purposes and also to collect 2 soil samples from each 2' foot interval during drilling. One half of the soil sample from each 2' interval was placed in a clean glass jar and filled approximately fifty percent, covered with aluminum foil, labeled and allowed to stand for approximately 30–45 minutes. The headspace in the jars was then measured with a HNu Model DL 101 Photo ionization Detector (PID) in order to determine the presence of non–methane volatile organic constituents (VOCs) in the headspace within the jars. The soil vapor concentration measurements were recorded from the PID in parts per million (PPM) on field soil boring log field forms. A summary of the PID readings appears in Table 2 on Page 9.

The other half of the soil sample collected from each 2' foot interval was placed into a 4 ounce jar (cleaned and provided by the laboratory), labeled for identification and placed on ice in an insulated cooler to ensure sample preservation during sample collection. Two soil samples with the highest PID headspace readings were sent to the analytical laboratory for testing. A summary of the reported laboratory results for the soil samples appears in Table 3 on Page 12. A detailed

copy of the soil sample laboratory report and the chain of custody is included in Appendix B.

The soil borings installed with the Geoprobe drill rig were properly plugged and abandoned with a bentonite slurry and completed at grade on the same day they were installed. The Geoprobe sampling equipment was decontaminated using a procedure of a non-phosphate soap and tap water rinse prior to and between each soil boring location.

3.3 GROUNDWATER SAMPLE COLLECTION

In addition to the 26 soil samples collected from the 13 soil borings, 13 groundwater samples were also collected from each of the soil borings as they produced groundwater. The groundwater samples were collected from the soil borings subsequent to soil sample collection and the field screening procedures. The groundwater samples were collected through 3/4" PVC temporary piezometers covered with a thin cloth installed in each soil boring. The groundwater was allowed a sufficient amount of time to enter into each of the piezometers and was then sampled through 5/8 inch clean disposable polyethylene tubing. The groundwater was pumped to the surface through the disposable tubing using a small electric peristaltic pump into 1 liter bottles (cleaned and provided by the testing laboratory). Table 4 on Page 14 is a summary of the groundwater sample results. A detailed copy of the groundwater sample laboratory report and chain of custody is included in Appendix B.

Table 1 on Page 7 is a summary of the soil boring location, date and depth, as well as the depth of the local perched water table. The general soil stratigraphy consisted of crushed clam shell and loose dry gray silty clays to approximately 2' BLS. The soil stratigraphy from 2 – 12' BLS consisted of alternating gray silts and silty clays with organic lenses and sand lenses with roots.

TABLE 1
DISTRIBUTOR'S OIL COMPANY
FORMER BULK PLANT
2100 SUREKOTE ROAD
NEW ORLEANS, LOUISIANA

SOIL BORING LOCATION AND DEPTH
(All Depths in Feet Below Land Surface (BLS)

OCTOBER 15, 1998

SAMPLE NUMBER	DATE	SAMPLE DEPTH	INITIAL WATER ENCOUNTERED
SB-37-2	10-15-98	2 - 4	3
SB-37-4	10-15-98	6 - 8	3
SB-38-2	10-15-98	2 - 4	3
SB-38-3	10-15-98	4 - 6	3
SB-39-1	10-15-98	0 - 2	N/A
SB-39-7	10-15-98	12 - 14	13
SB-40-1	10-15-98	0 - 2	N/A
SB-40-3	10-15-98	4 - 6	5
SB-41-2	10-15-98	2 - 4	N/A
SB-41-4	10-15-98	6 - 8	5
SB-42-2	10-15-98	2 - 4	N/A
SB-42-3	10-15-98	4 - 6	8
SB-43-1	10-15-98	0 - 2	N/A
SB-43-5	10-15-98	8 - 10	8
SB-44-2	10-15-98	2 - 4	N/A
SB-44-3	10-15-98	4 - 6	6.5
SB-45-1	10-15-98	0 - 2	N/A
SB-45-3	10-15-98	4 - 6	6

SB-46-2	10-15-98	2 - 4	N/A
SB-46-4	10-15-98	6 - 8	8
SB-47-2	10-15-98	2 - 4	N/A
SB-47-5	10-15-98	8 - 10	8
SB-48-1	10-15-98	0 - 2	N/A
SB-48-5	10-15-98	8 - 10	8
SB-49-2	10-15-98	2 - 4	N/A
SB-49-4	10-15-98	6 - 8	8

TABLE 2
DISTRIBUTOR'S OIL COMPANY
FORMER BULK PLANT
2100 SUREKOTE ROAD
NEW ORLEANS, LOUISIANA

SOIL SAMPLE PHOTO IONIZATION
DETECTOR (PID) FIELD READINGS
HNU MODEL DL 101
(Depths in Feet Below Land Surface)
(Readings in PPM)

OCTOBER 15, 1998

DEPTH	SB-37	SB-38	SB-39	SB-40	SB-41	SB-42
0 – 2	26.8	60	0.8	20.1	7.0	14.2
2 – 4	41.2	93.8	0	1.2	86.2	69.2
4 – 6	NS	93.8	0	6.4	NS	75.4
6 – 8	13.4	NS	0	2.2	3	3
8 – 10	NS	NS	0	NS	NS	10
10 – 12	NS	NS	0	NS	NS	NS
12 – 14	NS	NS	0	NS	NS	NS

DEPTH	SB-43	SB-44	SB-45	SB-46	SB-47	SB-48	SB-49
0 – 2	11.5	24.5	12.4	NS	6	31	5
2 – 4	2.5	46.4	NS	26.9	12	4	41
4 – 6	0.5	24.1	3.9	1.1	1	3	NS
6 – 8	0	2	1.1	1.3	1	5	4
8 – 10	2	NS	NS	1.1	0	7	2

The "NS" notation indicates that No Sample was collected at the depth shown in the table.

4.0 SAMPLE STORAGE AND TRANSPORT

The 26 soil samples collected for analysis from the 13 soil borings installed at the subject property were placed in 4 ounce glass containers (cleaned and provided by the laboratory). The 13 groundwater samples collected from the 13 selected soil borings were containerized into 1 liter amber bottles vials and sealed with lined protective tops. Following collection of each soil sample, the sample containers were sealed and labeled in accordance with strict chain of custody protocol, placed in an ice filled storage container, and cooled to insure thermal preservation during collection and transportation to the analytical laboratory. The soil and groundwater samples collected during the secondary limited site assessment were sealed in the cooler and delivered to Greyhound Bus Lines for transportation to Baton Rouge. Representatives of Environmental Laboratories picked up the cooler and samples from Greyhound and returned them to their laboratory for analytical testing.

5.0 CHAIN OF CUSTODY PROCEDURES

Hydrodyne personnel were responsible for the sampling, custody, and care of the collected soil and groundwater samples until the sample containers were transferred to Greyhound Bus Lines for delivery to the laboratory. The chain of custody records were completed on-site during sampling and included at a minimum the following information:

- Project Name/ Project Identification Number
- Facility Location
- Date, Time and Sampling Location
- Number of Containers Submitted
- Analysis Requested
- Signature of all Persons Relinquishing the sample

6.0 LABORATORY ANALYSIS REQUEST & RESULTS

The soil and groundwater samples collected from soil borings SB–37 through SB–49 were analyzed for Total Petroleum Hydrocarbons –Diesel (TPH–D) (EPA Method 8015–Modified California Department of Health Sciences) and Total Petroleum Hydrocarbons – Oil (TPH–O). Only 5 selected soil samples were analyzed for TPH–Oil. The TPH–Diesel results for the collected soil samples ranged from a low of Below Detection Limit (BDL) in soil samples SB–39–7 (12 – 14') & SB–48–5 (8 – 10') to a high of 15,200 mg/kg in soil sample SB–38–3 (4 – 6'). Several other soil samples contained significant TPH–Diesel concentrations including soil samples SB–SB–37–2 (7,320 mg/kg), SB–37–4 (4,390 mg/kg), SB–38–2 (5,600 mg/kg), SB–40–1 (2,240 mg/kg), SB–44–2 (6,680 mg/kg), and SB–45–1 (4,090 mg/kg). The TPH–Oil results for the collected soil samples ranged from a low of BDL in soil sample SB–42–3 (4–6') to 2,960 mg/kg and 1,150 in soil samples SB–38–3 (4 –6') and SB–36–2 (2– 4'). Table 3 on Pages 12 and 13 is a summary of the soil sample laboratory analytical results. A detailed copy of the soil sample analytical results is included in Appendix B.

Additionally, the laboratory results for the 13 groundwater samples collected indicated moderate to significant concentrations of TPH–Diesel & TPH–Oil were present in 7 of the 13 groundwater samples collected during the secondary limited site assessment. TPH–Diesel laboratory results for the collected groundwater samples ranged from a low of BDL in GWS–43 to a high of 279 mg/L in groundwater sample GWS–44. TPH–Oil concentrations ranged from a low of 6 mg/L to a high of 36 mg/L in GWS–38. Free Phase Hydrocarbons (FPH) with a strong diesel odor were discovered during the advancement of soil boring SB–38. Table 4 on Page 14 is a summary of the groundwater sample results. A detailed copy of the analytical data

reported by the testing laboratory for the collected soil and groundwater samples and the chain of custody are presented in detail in Appendix B of this report.

TABLE 3
DISTRIBUTOR'S OIL COMPANY
FORMER BULK PLANT
2100 SUREKOTE ROAD
NEW ORLEANS, LOUISIANA

SOIL SAMPLE ANALYTICAL RESULTS
(Units in mg/kg)

OCTOBER 15, 1998

SAMPLE NUMBER	SAMPLE DEPTH	TPH-DIESEL	TPH-OIL
SB-37-2	2 - 4'	7,320	1,150
SB-37-4	6 - 8'	4,390	NS
SB-38-2	2 - 4'	5,600	NS
SB-38-3	4 - 6'	15,200	2,960
SB-39-1	0 - 2'	11	NS
SB-39-7	12 - 14'	BDL	NS
SB-40-1	0 - 2'	2,240	NS
SB-40-3	4 - 6'	918	NS
SB-41-2	2 - 4'	697	NS
SB-41-4	6 - 8'	1,510	NS
SB-42-2	2 - 4'	114	NS
SB-42-3	4 - 6'	158	BDL
SB-43-1	0 - 2'	243	NS
SB-43-5	8 - 10'	19	NS
SB-44-2	2 - 4'	6,680	NS

SB-44-3	4 - 6'	65	36
SB-45-1	0 - 2'	4,090	NS
SB-45-3	4 - 6'	190	132
SB-46-2	2 - 4'	94	NS
SB-46-4	8 - 10'	350	NS
SB-47-2	2 - 4'	129	NS
SB-47-5	8 - 10'	29	NS
SB-48-1	0 - 2'	1,410	NS
SB-48-5	8 - 10'	BDL	NS
SB-49-2	2 - 4'	83	NS
SB-49-4	8 - 10'	306	NS

The "mg/kg" units notation is approximately equal to parts per million units. The "BDL" notation indicates that the parameter of interest was analyzed but was Below Detection Limit of the laboratory analytical instrument. The "NS" notation indicates that No Sample was collected laboratory analysis at the particular depth indicated in the table.

TABLE 4
DISTRIBUTOR'S OIL COMPANY
FORMER BULK PLANT
2100 SUREKOTE ROAD
NEW ORLEANS, LOUISIANA

SOIL BORING GROUNDWATER
SAMPLE ANALYTICAL RESULTS
(Units in mg/L)

OCTOBER 15, 1998

SAMPLE LOCATION	TPH-DIESEL	TPH-OIL
GWS – 37	25	6
GWS – 38	181	36
GWS – 39	3	NS
GWS – 40	69	NS
GWS– 41	24	NS
GWS– 42	6	NS
GWS – 43	BDL	NS
GWS – 44	279	NS
GWS – 45	20	7
GWS – 46	12	NS
GWS – 47	54	NS
GWS – 48	ND	NS
GWS – 49	ND	NS

The "mg\L" units notation is approximately equal to parts per million units. The "ND" notation indicates that the parameter of interest was analyzed but was Not Detected by the laboratory analytical instrument. The "NS" notation indicates that the parameter of interest was not analyzed for the particular sample.

7.0 CONCLUSIONS AND RECOMMENDATIONS

Based upon the field observations and the analytical test results presented in this report, it is concluded that moderate to significant amounts of sorbed petroleum hydrocarbon constituents (TPH–Diesel & TPH–Oil) were present in 13 of the 26 soil samples collected (summarized in Table 3 on Pages 12 & 13) from the 13 soil borings installed at the site (Figures 2A & 2B – Appendix A). The highest TPH–Diesel concentrations were indicated in soil sample SB–38–3 (15,200 mg/kg) at the 4 – 6' level BLS. The highest TPH–Oil concentrations were also indicated in soil sample SB–38–3 (2,960 mg/kg). Several additional soil samples collected indicated TPH–Diesel concentrations of 200 mg/kg or more from 4 – 8' BLS (Refer to Figure 2B – Appendix A). Laboratory analysis confirms the presence of the TPH–Diesel & TPH–Oil constituents in these soil samples.

Additionally, the laboratory results for the 13 groundwater samples collected indicated moderate to significant concentrations of TPH–Diesel & TPH–Oil were present in 7 of the 13 groundwater samples collected during the secondary limited site assessment(Figure 3A – Appendix A). TPH–Diesel laboratory results for the collected groundwater samples ranged from a low of BDL in GWS–43 to a high of 279 mg/L in groundwater sample GWS–44. TPH–Oil concentrations ranged from a low of 6 mg/L to a high of 36 mg/L in GWS–38. Free Phase Hydrocarbons (FPH) with a strong diesel odor were discovered during the advancement of soil boring SB–37 and SB–38 (Refer to Figure 3A – Appendix A).

Hydrodyne recommends preparation of a Corrective Action Plan (CAP) proposal for the active remediation of the petroleum impacted subsurface soil and groundwater at the Distributor's Oil Company former bulk plant facility located at 2100 Surekote Road in New

Orleans, Louisiana. In addition, since FPH was discovered during the advancement of soil borings SB-37 and SB-38 during the secondary limited site assessment and also at SB-32 during the initial site assessment, it will be necessary to recover and dispose of the FPH from the subsurface soils and groundwater on the East side of the former office building and the Industrial Canal.

The conclusions provided in this report are based solely upon the information and data presented in this document. This report has been prepared in accordance with generally accepted environmental consulting practices and no warranty, expressed or implied, is made as to the professional advice provided under the terms of the contract agreement for this project and included in this report.

This report is based on field data collected and information received from the client, other parties associated with the client and other responsible third parties during the period of July 2, 1998 to November 30, 1998. The conclusions are based on available information cited herein, and should be reviewed within this context. Should conditions at the site in question change, or additional information become available, especially with regard to prior site conditions, it may be necessary to modify these conditions and recommendations accordingly in the future.

APPENDIX A

FIGURE 1

AREA VICINITY MAP

FIGURES 2A & 2B

SOIL HYDROCARBON CONCENTRATION MAP

FIGURE 3A

GROUNDWATER HYDROCARBON CONCENTRATION MAP

NEW ORLEANS EAST, LA.

NE/4 NEW ORLEANS 15' QUADRANGLE

29090-H1-TF-024

1992

J. NO: LA 98-29
PARISH OF: ORLEANS
STATE: LOUISIANA
DATE: JULY '98
DRAWN: R.M.
CHECK: R.M.
FIG NO.: 1

HYDRODYNE ENVIRONMENTAL, INC.

1416 CARROLLTON AVE.
METAIRIE, LA 70005
(504) 835-6018
(504) 833-3056 FAX

DISTRIBUTOR'S OIL COMPANY, INC.
FORMER NEW ORLEANS BULK PLANT

2100 SUREKOTE ROAD
NEW ORLEANS, LA

APPENDIX B

REPORTED SOIL AND GROUNDWATER SAMPLE

LABORATORY ANALYTICAL RESULTS

environmental laboratories, incorporated

11441 Industriplex Blvd., Suite 110, Baton Rouge, LA 70809 (504) 293-9300 Fax (504) 291-2899

11/10/98

ELI Analysis No. P810001-1

Client: Hydrodyne Environmental, Inc.
1416 Carrollton Ave.
Metairie, LA 70005

Attn: Richard Murphy

Project Name: Distributor's Oil Co. / New Orleans, LA

Project No: LA 9829

Sample ID: SB-37-2

Sample Matrix: Soil

Sampled By: R. Murphy / Hydrodyne Environmental, Inc.

Date Collected: 10/15/98 @ 9:10AM

Parameter	Concentration (MG/KG)	Detection Limi (MG/KG)
Total Petroleum Hydrocarbons (Diesel)	7320	500
Total Petroleum Hydrocarbons (Oil)	1150	50

*METHOD: EPA Test Method 8015B (SW-846, 3rd. Edition)

Date/Time Analyzed: TPH-D - 10/28/98 @ 11:51PM
TPH-O - 10/26/98 @ 5:38PM

BDL = Below Detection Limits

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John D. Trahan

environmental laboratories, incorporated

11441 Industriplex Blvd., Suite 110, Baton Rouge, LA 70809 (504) 293-9300 Fax (504) 291-2899

11/10/98

ELI Analysis No. P810001-2

Client: Hydrodyne Environmental, Inc.
1416 Carrollton Ave.
Metairie, LA 70005

Attn: Richard Murphy

Project Name: Distributor's Oil Co. / New Orleans, LA

Project No: LA 9829

Sample ID: SB-37-4

Sample Matrix: Soil

Sampled By: R. Murphy / Hydrodyne Environmental, Inc.

Date Collected: 10/15/98 @ 9:12AM

Parameter	Concentration (MG/KG)	Detection Limi (MG/KG)
Total Petroleum Hydrocarbons (Diesel)	4390	200

*METHOD: EPA Test Method 8015B (SW-846, 3rd. Edition)

Date/Time Analyzed: 10/26/98 @ 6:47PM

BDL = Below Detection Limits

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environmental laboratories, incorporated

11441 Industriplex Blvd., Suite 110, Baton Rouge, LA 70809 (504) 293-9300 Fax (504) 291-2899

11/10/98

ELI Analysis No. P810001-3

Client: Hydrodyne Environmental, Inc.
1416 Carrollton Ave.
Metairie, LA 70005

Attn: Richard Murphy

Project Name: Distributor's Oil Co. / New Orleans, LA

Project No: LA 9829

Sample ID: SB-38-2

Sample Matrix: Soil

Sampled By: R. Murphy / Hydrodyne Environmental, Inc.

Date Collected: 10/15/98 @ 9:25AM

Parameter	Concentration (MG/KG)	Detection Limi (MG/KG)
Total Petroleum Hydrocarbons (Diesel)	5600	200

*METHOD: EPA Test Method 8015B (SW-846, 3rd. Edition)

Date/Time Analyzed: 10/29/98 @ 12:59AM

BDL = Below Detection Limits

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11441 Industriplex Blvd., Suite 110, Baton Rouge, LA 70809 (504) 293-9300 Fax (504) 291-2899

11/10/98

ELI Analysis No. P810001-4

Client: Hydrodyne Environmental, Inc.
1416 Carrollton Ave.
Metairie, LA 70005

Attn: Richard Murphy

Project Name: Distributor's Oil Co. / New Orleans, LA

Project No: LA 9829

Sample ID: SB-38-3

Sample Matrix: Soil

Sampled By: R. Murphy / Hydrodyne Environmental, Inc.

Date Collected: 10/15/98 @ 9:27AM

Parameter	Concentration (MG/KG)	Detection Limi (MG/KG)
Total Petroleum Hydrocarbons (Diesel)	15200	1000
Total Petroleum Hydrocarbons (Oil)	2960	200

*METHOD: EPA Test Method 8015B (SW-846, 3rd. Edition)

Date/Time Analyzed: TPH-D - 10/29/98 @ 5:32PM
TPH-O - 10/27/98 @ 12:27AM

BDL = Below Detection Limits

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11/10/98

ELI Analysis No. P810001-5

Client: Hydrodyne Environmental, Inc.
1416 Carrollton Ave.
Metairie, LA 70005

Attn: Richard Murphy

Project Name: Distributor's Oil Co. / New Orleans, LA

Project No: LA 9829

Sample ID: SB-39-1

Sample Matrix: Soil

Sampled By: R. Murphy / Hydrodyne Environmental, Inc.

Date Collected: 10/15/98 @ 9:45AM

Parameter	Concentration (MG/KG)	Detection Lim. (MG/KG)
Total Petroleum Hydrocarbons (Diesel)	11	10

*METHOD: EPA Test Method 8015B (SW-846, 3rd. Edition)

Date/Time Analyzed: 10/27/98 @ 1:35AM

BDL = Below Detection Limits

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11/10/98

ELI Analysis No. P810001-6

Client: Hydrodyne Environmental, Inc.
1416 Carrollton Ave.
Metairie, LA 70005

Attn: Richard Murphy

Project Name: Distributor's Oil Co. / New Orleans, LA

Project No: LA 9829

Sample ID: SB-39-7

Sample Matrix: Soil

Sampled By: R. Murphy / Hydrodyne Environmental, Inc.

Date Collected: 10/15/98 @ 10:24AM

Parameter	Concentration (MG/KG)	Detection Lim (MG/KG)
Total Petroleum Hydrocarbons (Diesel)	BDL	10

*METHOD: EPA Test Method 8015B (SW-846, 3rd. Edition)

Date/Time Analyzed: 10/27/98 @ 2:43AM

BDL = Below Detection Limits

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11/10/98

ELI Analysis No. P810001-7

Client: Hydrodyne Environmental, Inc.
1416 Carrollton Ave.
Metairie, LA 70005

Attn: Richard Murphy

Project Name: Distributor's Oil Co. / New Orleans, LA

Project No: LA 9829

Sample ID: SB-40-1

Sample Matrix: Soil

Sampled By: R. Murphy / Hydrodyne Environmental, Inc.

Date Collected: 10/15/98 @ 10:35AM

Parameter	Concentration (MG/KG)	Detection Lim (MG/KG)
Total Petroleum Hydrocarbons (Diesel)	2240	50

*METHOD: EPA Test Method 8015B (SW-846, 3rd. Edition)

Date/Time Analyzed: 10/27/98 @ 3:51AM

BDL = Below Detection Limits

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11/10/98

ELI Analysis No. P810001-8

Client: Hydrodyne Environmental, Inc.
1416 Carrollton Ave.
Metairie, LA 70005

Attn: Richard Murphy

Project Name: Distributor's Oil Co. / New Orleans, LA

Project No: LA 9829

Sample ID: SB-40-3

Sample Matrix: Soil

Sampled By: R. Murphy / Hydrodyne Environmental, Inc.

Date Collected: 10/15/98 @ 10:53AM

Parameter	Concentration (MG/KG)	Detection Lim (MG/KG)
Total Petroleum Hydrocarbons (Diesel)	918	50

*METHOD: EPA Test Method 8015B (SW-846, 3rd. Edition)

Date/Time Analyzed: 10/27/98 @ 4:59AM

BDL = Below Detection Limits

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11/10/98

ELI Analysis No. P810001-9

Client: Hydrodyne Environmental, Inc.
1416 Carrollton Ave.
Metairie, LA 70005

Attn: Richard Murphy

Project Name: Distributor's Oil Co. / New Orleans, LA

Project No: LA 9829

Sample ID: GWS-37

Sample Matrix: Water

Sampled By: R. Murphy / Hydrodyne Environmental, Inc.

Date Collected: 10/15/98 @ 12:35PM

Parameter	Concentration (MG/L)	Detection Lim. (MG/L)
Total Petroleum Hydrocarbons (Diesel)	25	1
Total Petroleum Hydrocarbons (Oil)	6	1

*METHOD: EPA Test Method 8015B (SW-846, 3rd. Edition)

Date/Time Analyzed: TPH-D - 10/26/98 @ 5:06AM
TPH-O - 10/25/98 @ 10:56AM

BDL = Below Detection Limits

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11/10/98

ELI Analysis No. P810001-10

Client: Hydrodyne Environmental, Inc.
1416 Carrollton Ave.
Metairie, LA 70005

Attn: Richard Murphy

Project Name: Distributor's Oil Co. / New Orleans, LA

Project No: LA 9829

Sample ID: GWS-38

Sample Matrix: Water

Sampled By: R. Murphy / Hydrodyne Environmental, Inc.

Date Collected: 10/15/98 @ 12:39PM

Parameter	Concentration (MG/L)	Detection Lim (MG/L)
Total Petroleum Hydrocarbons (Diesel)	181	20
Total Petroleum Hydrocarbons (Oil)	36	20

*METHOD: EPA Test Method 8015B (SW-846, 3rd. Edition)

Date/Time Analyzed: TPH-D - 10/25/98 @ 12:05PM
TPH-O - 10/25/98 @ 12:05PM

BDL = Below Detection Limits

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ELI Analysis No. P810001-11

Client: Hydrodyne Environmental, Inc.
1416 Carrollton Ave.
Metairie, LA 70005

Attn: Richard Murphy

Project Name: Distributor's Oil Co. / New Orleans, LA

Project No: LA 9829

Sample ID: GWS-39

Sample Matrix: Water

Sampled By: R. Murphy / Hydrodyne Environmental, Inc.

Date Collected: 10/15/98 @ 12:45PM

Parameter	Concentration (MG/L)	Detection Lim (MG/L)
Total Petroleum Hydrocarbons (Diesel)	3	1

*METHOD: EPA Test Method 8015B (SW-846, 3rd. Edition)

Date/Time Analyzed: 10/25/98 @ 1:13PM

BDL = Below Detection Limits

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11/10/98

ELI Analysis No. P810001-12

Client: Hydrodyne Environmental, Inc.
1416 Carrollton Ave.
Metairie, LA 70005

Attn: Richard Murphy

Project Name: Distributor's Oil Co. / New Orleans, LA

Project No: LA 9829

Sample ID: GWS-40

Sample Matrix: Water

Sampled By: R. Murphy / Hydrodyne Environmental, Inc.

Date Collected: 10/15/98 @ 12:53PM

Parameter	Concentration (MG/L)	Detection Lim (MG/L)
Total Petroleum Hydrocarbons (Diesel)	69	10

*METHOD: EPA Test Method 8015B (SW-846, 3rd. Edition)

Date/Time Analyzed: 10/26/98 @ 6:14AM

BDL = Below Detection Limits

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ELI Analysis No. P810001-13

Client: Hydrodyne Environmental, Inc.
1416 Carrollton Ave.
Metairie, LA 70005

Attn: Richard Murphy

Project Name: Distributor's Oil Co. / New Orleans, LA

Project No: LA 9829

Sample ID: SB-41-2

Sample Matrix: Soil

Sampled By: R. Murphy / Hydrodyne Environmental, Inc.

Date Collected: 10/15/98 @ 11:36AM

Parameter	Concentration (MG/KG)	Detection Lim (MG/KG)
Total Petroleum Hydrocarbons (Diesel)	697	50

*METHOD: EPA Test Method 8015B (SW-846, 3rd. Edition)

Date/Time Analyzed: 10/27/98 @ 6:07AM

BDL = Below Detection Limits

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11/10/98

ELI Analysis No. P810001-14

Client: Hydrodyne Environmental, Inc.
1416 Carrollton Ave.
Metairie, LA 70005

Attn: Richard Murphy

Project Name: Distributor's Oil Co. / New Orleans, LA

Project No: LA 9829

Sample ID: SB-41-4

Sample Matrix: Soil

Sampled By: R. Murphy / Hydrodyne Environmental, Inc.

Date Collected: 10/15/98 @ 11:39AM

Parameter	Concentration (MG/KG)	Detection Lim. (MG/KG)
Total Petroleum Hydrocarbons (Diesel)	1510	50

*METHOD: EPA Test Method 8015B (SW-846, 3rd. Edition)

Date/Time Analyzed: 10/27/98 @ 7:15AM

BDL = Below Detection Limits

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11/10/98

ELI Analysis No. P810001-15

Client: Hydrodyne Environmental, Inc.
1416 Carrollton Ave.
Metairie, LA 70005

Attn: Richard Murphy

Project Name: Distributor's Oil Co. / New Orleans, LA

Project No: LA 9829

Sample ID: GWS-41

Sample Matrix: Water

Sampled By: R. Murphy / Hydrodyne Environmental, Inc.

Date Collected: 10/15/98 @ 1:09PM

Parameter	Concentration (MG/L)	Detection Lim (MG/L)
Total Petroleum Hydrocarbons (Diesel)	24	1
Total Petroleum Hydrocarbons (Oil)	7	1

*METHOD: EPA Test Method 8015B (SW-846, 3rd. Edition)

Date/Time Analyzed: TPH-D - 10/26/98 @ 10:47AM
TPH-O - 10/26/98 @ 10:47AM

BDL = Below Detection Limits

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11/10/98

ELI Analysis No. P810001-16

Client: Hydrodyne Environmental, Inc.
1416 Carrollton Ave.
Metairie, LA 70005

Attn: Richard Murphy

Project Name: Distributor's Oil Co. / New Orleans, LA

Project No: LA 9829

Sample ID: GWS-42

Sample Matrix: Water

Sampled By: R. Murphy / Hydrodyne Environmental, Inc.

Date Collected: 10/15/98 @ 1:10PM

Parameter	Concentration (MG/L)	Detection Lim (MG/L)
Total Petroleum Hydrocarbons (Diesel)	6	1

*METHOD: EPA Test Method 8015B (SW-846, 3rd. Edition)

Date/Time Analyzed: 10/25/98 @ 4:37PM

BDL = Below Detection Limits

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11/10/98

ELI Analysis No. P810001-17

Client: Hydrodyne Environmental, Inc.
1416 Carrollton Ave.
Metairie, LA 70005

Attn: Richard Murphy

Project Name: Distributor's Oil Co. / New Orleans, LA

Project No: LA 9829

Sample ID: SB-42-2

Sample Matrix: Soil

Sampled By: R. Murphy / Hydrodyne Environmental, Inc.

Date Collected: 10/15/98 @ 11:54AM

Parameter	Concentration (MG/KG)	Detection Lim (MG/KG)
Total Petroleum Hydrocarbons (Diesel)	114	10

*METHOD: EPA Test Method 8015B (SW-846, 3rd. Edition)

Date/Time Analyzed: 10/27/98 @ 3:09PM

BDL = Below Detection Limits

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11/10/98

ELI Analysis No. P810001-18

Client: Hydrodyne Environmental, Inc.
1416 Carrollton Ave.
Metairie, LA 70005

Attn: Richard Murphy

Project Name: Distributor's Oil Co. / New Orleans, LA

Project No: LA 9829

Sample ID: SB-42-3

Sample Matrix: Soil

Sampled By: R. Murphy / Hydrodyne Environmental, Inc.

Date Collected: 10/15/98 @ 12:01PM

Parameter	Concentration (MG/KG)	Detection Lim (MG/KG)
Total Petroleum Hydrocarbons (Diesel)	158	10
Total Petroleum Hydrocarbons (Oil)	BDL	10

*METHOD: EPA Test Method 8015B (SW-846, 3rd. Edition)

Date/Time Analyzed: TPH-D - 10/27/98 @ 4:17PM
TPH-O - 10/27/98 @ 4:17PM

BDL = Below Detection Limits

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11/10/98

ELI Analysis No. P810001-19

Client: Hydrodyne Environmental, Inc.
1416 Carrollton Ave.
Metairie, LA 70005

Attn: Richard Murphy

Project Name: Distributor's Oil Co. / New Orleans, LA

Project No: LA 9829

Sample ID: SB-43-1

Sample Matrix: Soil

Sampled By: R. Murphy / Hydrodyne Environmental, Inc.

Date Collected: 10/15/98 @ 12:21PM

Parameter	Concentration (MG/KG)	Detection Limit (MG/KG)
Total Petroleum Hydrocarbons (Diesel)	243	10

*METHOD: EPA Test Method 8015B (SW-846, 3rd. Edition)

Date/Time Analyzed: 10/27/98 @ 5:25PM

BDL = Below Detection Limits

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11/10/98

ELI Analysis No. P810001-20

Client: Hydrodyne Environmental, Inc.
1416 Carrollton Ave.
Metairie, LA 70005

Attn: Richard Murphy

Project Name: Distributor's Oil Co. / New Orleans, LA

Project No: LA 9829

Sample ID: SB-43-5

Sample Matrix: Soil

Sampled By: R. Murphy / Hydrodyne Environmental, Inc.

Date Collected: 10/15/98 @ 1:32PM

Parameter	Concentration (MG/KG)	Detection Lim (MG/KG)
Total Petroleum Hydrocarbons (Diesel)	19	10

*METHOD: EPA Test Method 8015B (SW-846, 3rd. Edition)

Date/Time Analyzed: 10/27/98 @ 6:33PM

BDL = Below Detection Limits

Quality Assurance
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11/10/98

ELI Analysis No. P810001-21

Client: Hydrodyne Environmental, Inc.
1416 Carrollton Ave.
Metairie, LA 70005

Attn: Richard Murphy

Project Name: Distributor's Oil Co. / New Orleans, LA

Project No: LA 9829

Sample ID: GWS-43

Sample Matrix: Water

Sampled By: R. Murphy / Hydrodyne Environmental, Inc.

Date Collected: 10/15/98 @ 2:45PM

Parameter	Concentration (MG/L)	Detection Lim (MG/L)
Total Petroleum Hydrocarbons (Diesel)	BDL	1

*METHOD: EPA Test Method 8015B (SW-846, 3rd. Edition)

Date/Time Analyzed: 10/25/98 @ 5:45PM

BDL = Below Detection Limits

Quality Assurance
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11/10/98

ELI Analysis No. P810001-22

Client: Hydrodyne Environmental, Inc.
1416 Carrollton Ave.
Metairie, LA 70005

Attn: Richard Murphy

Project Name: Distributor's Oil Co. / New Orleans, LA

Project No: LA 9829

Sample ID: GWS-44

Sample Matrix: Water

Sampled By: R. Murphy / Hydrodyne Environmental, Inc.

Date Collected: 10/15/98 @ 2:50PM

Parameter	Concentration (MG/L)	Detection Limi (MG/L)
Total Petroleum Hydrocarbons (Diesel)	279	20

*METHOD: EPA Test Method 8015B (SW-846, 3rd. Edition)

Date/Time Analyzed: 10/26/98 @ 11:56AM

BDL = Below Detection Limits

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11/10/98

ELI Analysis No. P810001-23

Client: Hydrodyne Environmental, Inc.
1416 Carrollton Ave.
Metairie, LA 70005

Attn: Richard Murphy

Project Name: Distributor's Oil Co. / New Orleans, LA

Project No: LA 9829

Sample ID: SB-44-2

Sample Matrix: Soil

Sampled By: R. Murphy / Hydrodyne Environmental, Inc.

Date Collected: 10/15/98 @ 2:04PM

Parameter	Concentration (MG/KG)	Detection Limi (MG/KG)
Total Petroleum Hydrocarbons (Diesel)	6680	200

*METHOD: EPA Test Method 8015B (SW-846, 3rd. Edition)

Date/Time Analyzed: 10/29/98 @ 6:41AM

BDL = Below Detection Limits

Quality Assurance
Quality Control

John D. Trahan

environmental laboratories, incorporated

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11/10/98

ELI Analysis No. P810001-24

Client: Hydrodyne Environmental, Inc.
1416 Carrollton Ave.
Metairie, LA 70005

Attn: Richard Murphy

Project Name: Distributor's Oil Co. / New Orleans, LA

Project No: LA 9829

Sample ID: SB-44-3

Sample Matrix: Soil

Sampled By: R. Murphy / Hydrodyne Environmental, Inc.

Date Collected: 10/15/98 @ 2:06PM

Parameter	Concentration (MG/KG)	Detection Lim. (MG/KG)
Total Petroleum Hydrocarbons (Diesel)	65	10
Total Petroleum Hydrocarbons (Oil)	36	10

*METHOD: EPA Test Method 8015B (SW-846, 3rd. Edition)

Date/Time Analyzed: TPH-D - 10/27/98 @ 8:50PM
TPH-O - 10/27/98 @ 8:50PM

BDL = Below Detection Limits

Quality Assurance
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11/10/98

ELI Analysis No. P810001-25

Client: Hydrodyne Environmental, Inc.
1416 Carrollton Ave.
Metairie, LA 70005

Attn: Richard Murphy

Project Name: Distributor's Oil Co. / New Orleans, LA

Project No: LA 9829

Sample ID: GWS-45

Sample Matrix: Water

Sampled By: R. Murphy / Hydrodyne Environmental, Inc.

Date Collected: 10/15/98 @ 3:30PM

Parameter	Concentration (MG/L)	Detection Limit (MG/L)
Total Petroleum Hydrocarbons (Diesel)	20	2
Total Petroleum Hydrocarbons (Oil)	7	1

*METHOD: EPA Test Method 8015B (SW-846, 3rd. Edition)

Date/Time Analyzed: TPH-D - 10/26/98 @ 1:05PM
TPH-O - 10/25/98 @ 11:26PM

BDL = Below Detection Limits

Quality Assurance
Quality Control

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11/10/98

ELI Analysis No. P810001-26

Client: Hydrodyne Environmental, Inc.
1416 Carrollton Ave.
Metairie, LA 70005

Attn: Richard Murphy

Project Name: Distributor's Oil Co. / New Orleans, LA

Project No: LA 9829

Sample ID: GWS-46

Sample Matrix: Water

Sampled By: R. Murphy / Hydrodyne Environmental, Inc.

Date Collected: 10/15/98 @ 3:50PM

Parameter	Concentration (MG/L)	Detection Lim. (MG/L)
Total Petroleum Hydrocarbons (Diesel)	12	1

*METHOD: EPA Test Method 8015B (SW-846, 3rd. Edition)

Date/Time Analyzed: 10/26/98 @ 12:33AM

BDL = Below Detection Limits

Quality Assurance
Quality Control

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11/10/98

ELI Analysis No. P810001-27

Client: Hydrodyne Environmental, Inc.
1416 Carrollton Ave.
Metairie, LA 70005

Attn: Richard Murphy

Project Name: Distributor's Oil Co. / New Orleans, LA

Project No: LA 9829

Sample ID: GWS-47

Sample Matrix: Water

Sampled By: R. Murphy / Hydrodyne Environmental, Inc.

Date Collected: 10/15/98 @ 3:55PM

Parameter	Concentration (MG/L)	Detection Limi (MG/L)
Total Petroleum Hydrocarbons (Diesel)	54	10

*METHOD: EPA Test Method 8015B (SW-846, 3rd. Edition)

Date/Time Analyzed: 10/26/98 @ 2:13PM

BDL = Below Detection Limits

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11/10/98

ELI Analysis No. P810001-28

Client: Hydrodyne Environmental, Inc.
1416 Carrollton Ave.
Metairie, LA 70005

Attn: Richard Murphy

Project Name: Distributor's Oil Co. / New Orleans, LA

Project No: LA 9829

Sample ID: SB-45-1

Sample Matrix: Soil

Sampled By: R. Murphy / Hydrodyne Environmental, Inc.

Date Collected: 10/15/98 @ 2:21PM

Parameter	Concentration (MG/KG)	Detection Limi (MG/KG)
Total Petroleum Hydrocarbons (Diesel)	4090	200

*METHOD: EPA Test Method 8015B (SW-846, 3rd. Edition)

Date/Time Analyzed: 10/29/98 @ 8:57AM

BDL = Below Detection Limits

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11/10/98

ELI Analysis No. P810001-29

Client: Hydrodyne Environmental, Inc.
1416 Carrollton Ave.
Metairie, LA 70005

Attn: Richard Murphy

Project Name: Distributor's Oil Co. / New Orleans, LA

Project No: LA 9829

Sample ID: SB-45-3

Sample Matrix: Soil

Sampled By: R. Murphy / Hydrodyne Environmental, Inc.

Date Collected: 10/15/98 @ 2:27PM

Parameter	Concentration (MG/KG)	Detection Lim (MG/KG)
Total Petroleum Hydrocarbons (Diesel)	190	10
Total Petroleum Hydrocarbons (Oil)	132	10

*METHOD: EPA Test Method 8015B (SW-846, 3rd. Edition)

Date/Time Analyzed: TPH-D - 10/28/98 @ 2:31AM
TPH-O - 10/28/98 @ 2:31AM

BDL = Below Detection Limits

Quality Assurance
Quality Control

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11/10/98

ELI Analysis No. P810001-30

Client: Hydrodyne Environmental, Inc.
1416 Carrollton Ave.
Metairie, LA 70005

Attn: Richard Murphy

Project Name: Distributor's Oil Co. / New Orleans, LA

Project No: LA 9829

Sample ID: SB-46-2

Sample Matrix: Soil

Sampled By: R. Murphy / Hydrodyne Environmental, Inc.

Date Collected: 10/15/98 @ 2:52PM

Parameter	Concentration (MG/KG)	Detection Limi (MG/KG)
Total Petroleum Hydrocarbons (Diesel)	94	10

*METHOD: EPA Test Method 8015B (SW-846, 3rd. Edition)

Date/Time Analyzed: 10/28/98 @ 3:38AM

BDL = Below Detection Limits

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11/10/98

ELI Analysis No. P810001-31

Client: Hydrodyne Environmental, Inc.
1416 Carrollton Ave.
Metairie, LA 70005

Attn: Richard Murphy

Project Name: Distributor's Oil Co. / New Orleans, LA

Project No: LA 9829

Sample ID: SB-46-4

Sample Matrix: Soil

Sampled By: R. Murphy / Hydrodyne Environmental, Inc.

Date Collected: 10/15/98 @ 2:58PM

Parameter	Concentration (MG/KG)	Detection Lim. (MG/KG)
Total Petroleum Hydrocarbons (Diesel)	350	10

*METHOD: EPA Test Method 8015B (SW-846, 3rd. Edition)

Date/Time Analyzed: 10/28/98 @ 4:46AM

BDL = Below Detection Limits

Quality Assurance
Quality Control

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11/10/98

ELI Analysis No. P810001-32

Client: Hydrodyne Environmental, Inc.
1416 Carrollton Ave.
Metairie, LA 70005

Attn: Richard Murphy

Project Name: Distributor's Oil Co. / New Orleans, LA

Project No: LA 9829

Sample ID: GWS-49

Sample Matrix: Water

Sampled By: R. Murphy / Hydrodyne Environmental, Inc.

Date Collected: 10/15/98 @ 4:50PM

Parameter	Concentration (MG/L)	Detection Limi (MG/L)
Total Petroleum Hydrocarbons (Diesel)	15	1

*METHOD: EPA Test Method 8015B (SW-846, 3rd. Edition)

Date/Time Analyzed: 10/26/98 @ 2:50AM

BDL = Below Detection Limits

Quality Assurance
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11/10/98

ELI Analysis No. P810001-33

Client: Hydrodyne Environmental, Inc.
1416 Carrollton Ave.
Metairie, LA 70005

Attn: Richard Murphy

Project Name: Distributor's Oil Co. / New Orleans, LA

Project No: LA 9829

Sample ID: GWS-48

Sample Matrix: Water

Sampled By: R. Murphy / Hydrodyne Environmental, Inc.

Date Collected: 10/15/98 @ 4:55PM

Parameter	Concentration (MG/L)	Detection Lim: (MG/L)
Total Petroleum Hydrocarbons (Diesel)	BDL	1

*METHOD: EPA Test Method 8015B (SW-846, 3rd. Edition)

Date/Time Analyzed: 10/26/98 @ 3:58AM

BDL = Below Detection Limits

Quality Assurance
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11/10/98

ELI Analysis No. P810001-34

Client: Hydrodyne Environmental, Inc.
1416 Carrollton Ave.
Metairie, LA 70005

Attn: Richard Murphy

Project Name: Distributor's Oil Co. / New Orleans, LA

Project No: LA 9829

Sample ID: SB-47-2

Sample Matrix: Soil

Sampled By: R. Murphy / Hydrodyne Environmental, Inc.

Date Collected: 10/15/98 @ 3:42PM

Parameter	Concentration (MG/KG)	Detection Limi (MG/KG)
Total Petroleum Hydrocarbons (Diesel)	129	10

*METHOD: EPA Test Method 8015B (SW-846, 3rd. Edition)

Date/Time Analyzed: 10/28/98 @ 8:10AM

BDL = Below Detection Limits

Quality Assurance
Quality Control

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11/10/98

ELI Analysis No. P810001-35

Client: Hydrodyne Environmental, Inc.
1416 Carrollton Ave.
Metairie, LA 70005

Attn: Richard Murphy

Project Name: Distributor's Oil Co. / New Orleans, LA

Project No: LA 9829

Sample ID: SB-47-5

Sample Matrix: Soil

Sampled By: R. Murphy / Hydrodyne Environmental, Inc.

Date Collected: 10/15/98 @ 3:48PM

Parameter	Concentration (MG/KG)	Detection Limi (MG/KG)
Total Petroleum Hydrocarbons (Diesel)	29	10

*METHOD: EPA Test Method 8015B (SW-846, 3rd. Edition)

Date/Time Analyzed: 10/28/98 @ 9:18AM

BDL = Below Detection Limits

Quality Assurance
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11/10/98

ELI Analysis No. P810001-36

Client: Hydrodyne Environmental, Inc.
1416 Carrollton Ave.
Metairie, LA 70005

Attn: Richard Murphy

Project Name: Distributor's Oil Co. / New Orleans, LA

Project No: LA 9829

Sample ID: SB-48-1

Sample Matrix: Soil

Sampled By: R. Murphy / Hydrodyne Environmental, Inc.

Date Collected: 10/15/98 @ 4:16PM

Parameter	Concentration (MG/KG)	Detection Limit (MG/KG)
Total Petroleum Hydrocarbons (Diesel)	1410	50

*METHOD: EPA Test Method 8015B (SW-846, 3rd. Edition)

Date/Time Analyzed: 10/29/98 @ 11:14AM

BDL = Below Detection Limits

Quality Assurance
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11/10/98

ELI Analysis No. P810001-37

Client: Hydrodyne Environmental, Inc.
1416 Carrollton Ave.
Metairie, LA 70005

Attn: Richard Murphy

Project Name: Distributor's Oil Co. / New Orleans, LA

Project No: LA 9829

Sample ID: SB-48-5

Sample Matrix: Soil

Sampled By: R. Murphy / Hydrodyne Environmental, Inc.

Date Collected: 10/15/98 @ 4:23PM

Parameter	Concentration (MG/KG)	Detection Limi (MG/KG)
Total Petroleum Hydrocarbons (Diesel)	BDL	10

*METHOD: EPA Test Method 8015B (SW-846, 3rd. Edition)

Date/Time Analyzed: 10/28/98 @ 2:59PM

BDL = Below Detection Limits

Quality Assurance
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11/10/98

ELI Analysis No. PS10001-38

Client: Hydrodyne Environmental, Inc.
1416 Carrollton Ave.
Metairie, LA 70005

Attn: Richard Murphy

Project Name: Distributor's Oil Co. / New Orleans, LA

Project No: LA 9829

Sample ID: SB-49-2

Sample Matrix: Soil

Sampled By: R. Murphy / Hydrodyne Environmental, Inc.

Date Collected: 10/15/98 @ 4:52PM

Parameter	Concentration (MG/KG)	Detection Limi (MG/KG)
Total Petroleum Hydrocarbons (Diesel)	83	10

*METHOD: EPA Test Method 8015B (SW-846, 3rd. Edition)

Date/Time Analyzed: 10/28/98 @ 4:07PM

BDL = Below Detection Limits

Quality Assurance
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11/10/98

ELI Analysis No. P810001-39

Client: Hydrodyne Environmental, Inc.
1416 Carrollton Ave.
Metairie, LA 70005

Attn: Richard Murphy

Project Name: Distributor's Oil Co. / New Orleans, LA

Project No: LA 9829

Sample ID: SB-49-4

Sample Matrix: Soil

Sampled By: R. Murphy / Hydrodyne Environmental, Inc.

Date Collected: 10/15/98 @ 4:59PM

Parameter	Concentration (MG/KG)	Detection Limi (MG/KG)
Total Petroleum Hydrocarbons (Diesel)	306	10

*METHOD: EPA Test Method 8015B (SW-846, 3rd. Edition)

Date/Time Analyzed: 10/28/98 @ 10:42PM

BDL = Below Detection Limits

Quality Assurance
Quality Control

John D. Trahan

QA/QC DATA

SOIL DUPLICATE / MATRIX SPIKE RECOVERY

E.L.I. Sample No.: P810001-14

Analysis Date: 10/27/98

ANALYSIS	BLANK CONC.	CONC. SPIKE ADDED (MG/KG)	SAMPLE RESULTS	DUPLICATE CONCENTRATION	RPD	CONC. MS	% REC
TOTAL PETROLEUM HYDROCARBONS (TPH) (DIESEL)	BDL	100	1510	1560	3	DILUTED OUT	---

$$\text{Matrix Spike Percent Recovery (\%REC)} = \frac{\text{Spike Sample Result (Conc. MS)} - \text{Sample Result}}{\text{Concentration of Spike Added}} \times 100$$

$$\text{Relative Percent Difference (RPD)} = \frac{\text{Sample Conc.} - \text{Duplicate Conc.}}{(\text{Sample Conc.} + \text{Duplicate Conc.}) / 2} \times 100$$

* UNITS = MG/KG

QA/QC DATA

SOIL DUPLICATE / MATRIX SPIKE RECOVERY

E.L.I. Sample No.: P810001-31

Analysis Date: 10/28/98

ANALYSIS	BLANK CONC.	CONC. SPIKE ADDED (MG/KG)	SAMPLE RESULTS	DUPLICATE CONCENTRATION	RPD	CONC. MS	% REC
TOTAL PETROLEUM HYDROCARBONS (TPH) (DIESEL)	BDL	100	350	311	12	316	*MI

$$\text{Matrix Spike Percent Recovery (\%REC)} = \frac{\text{Spike Sample Result (Conc. MS)} - \text{Sample Result}}{\text{Concentration of Spike Added}} \times 100$$

$$\text{Relative Percent Difference (RPD)} = \frac{\text{Sample Conc.} - \text{Duplicate Conc.}}{(\text{Sample Conc.} + \text{Duplicate Conc.}) / 2} \times 100$$

* UNITS = MG/KG
* MI = MATRIX INTERFERANCE

QA/QC DATA

SOIL MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

E.L.I. Sample No. P810001-38

Analysis Date: 10/28/98

ANALYSIS	BLANK CONCENTRATION	CONC. SPIKE ADDED (MG/KG)	SAMPLE RESULTS	DUPLICATE CONCENTRATION	RPD	CONCENTRATION MS	PERCENT RECOVERY
TOTAL PETROLEUM HYDROCARBONS (TPH) DIESEL	BDL	100	83	102	21	180	97

$$\text{MATRIX SPIKE RECOVERY (\%REC)} = \frac{\text{SPIKE SAMPLE RESULT (CONC. MS) - SAMPLE RESULT}}{\text{CONCENTRATION OF SPIKE ADDED}}$$

$$\text{RELATIVE PERCENT DIFFERENCE (RPD)} = \frac{\text{SAMPLE CONC. - DUPLICATE CONC.}}{\text{(SAMPLE CONC. + DUPLICATE CONC.) / 2}} \times 100$$

* UNITS = MG/KG

QA/QC DATA

WATER DUPLICATE / MATRIX SPIKE RECOVERY

E.L.I. Sample No.: LABORATORY CONTROL STANDARD

Analysis Date: 10/22/98

ANALYSIS	BLANK CONC.	CONC. SPIKE ADDED (MG/L)	SAMPLE RESULTS	DUPLICATE CONCENTRATION	RPD	CONC. MS	% REC
TOTAL PETROLEUM HYDROCARBONS (TPH) (DIESEL)	BDL	10.0	---	---	---	10.6	106

$$\text{Matrix Spike Percent Recovery (\%REC)} = \frac{\text{Spike Sample Result (Conc. MS)} - \text{Sample Result}}{\text{Concentration of Spike Added}} \times 100$$

$$\text{Relative Percent Difference (RPD)} = \frac{\text{Sample Conc.} - \text{Duplicate Conc.}}{(\text{Sample Conc.} + \text{Duplicate Conc.}) / 2} \times 100$$

* UNITS = MG/L

environmental laboratories, incorporated

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* SUMMARY REPORT *

Client: Hydrodyne Environmental, Inc.
1416 Carrollton Ave.
Metairie, LA 70005

Attn: Richard Murphy

Project Location: Distributor's Oil Co. / New Orleans, LA

Project No: LA 9829

Sample Matrix: Soil

ELI No.	SAMPLE IDENTIFICATION	TPH DIESEL CONCENTRATION
P810001-1	SB-37-2	7320
P810001-2	SB-37-4	4390
P810001-3	SB-38-2	5600
P810001-4	SB-38-3	15200
P810001-5	SB-39-1	11
P810001-6	SB-39-7	BDL
P810001-7	SB-40-1	2240
P810001-8	SB-40-3	918
P810001-13	SB-41-2	697
P810001-14	SB-41-4	1510
P810001-17	SB-42-2	114
P810001-18	SB-42-3	158

BDL = Below Detection Limits

* All values have units of MG/KG

Quality Assurance
Quality Control

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* SUMMARY REPORT *
(Cont'd)

Client: Hydrodyne Environmental, Inc.
1416 Carrollton Ave.
Metairie, LA 70005

Attn: Richard Murphy

Project Location: Distributor's Oil Co. / New Orleans, LA

Project No: LA 9829

Sample Matrix: Soil

ELI No.	SAMPLE IDENTIFICATION	TPH DIESEL CONCENTRATION
P810001-19	SB-43-1	243
P810001-20	SB-43-5	19
P810001-23	SB-44-2	6680
P810001-24	SB-44-3	65
P810001-28	SB-45-1	4090
P810001-29	SB-45-3	190
P810001-30	SB-46-2	94
P810001-31	SB-46-4	350
P810001-34	SB-47-2	129
P810001-35	SB-47-5	29
P810001-36	SB-48-1	1410
P810001-37	SB-48-5	BDL

BDL = Below Detection Limits

* All values have units of MG/KG

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* SUMMARY REPORT *
(Cont'd)

Client: Hydrodyne Environmental, Inc.
1416 Carrollton Ave.
Metairie, LA 70005

Attn: Richard Murphy

Project Location: Distributor's Oil Co. / New Orleans, LA

Project No: LA 9829

Sample Matrix: Soil

ELI No.	SAMPLE IDENTIFICATION	TPH DIESEL CONCENTRATION
P810001-38	SB-49-2	83
P810001-39	SB-49-4	306

BDL = Below Detection Limits

* All values have units of MG/KG

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* SUMMARY REPORT *

Client: Hydrodyne Environmental, Inc.
1416 Carrollton Ave.
Metairie, LA 70005

Attn: Richard Murphy

Project Location: Distributor's Oil Co. / New Orleans, LA

Project No: LA 9829

Sample Matrix: Soil

ELI No.	SAMPLE IDENTIFICATION	TPH OIL CONCENTRATION
P810001-1	SB-37-2	1150
P810001-4	SB-38-3	2960
P810001-18	SB-42-3	BDL
P810001-24	SB-44-3	36
P810001-29	SB-45-3	132

BDL = Below Detection Limits

* All values have units of MG/KG

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Quality Control

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* SUMMARY REPORT *

Client: Hydrodyne Environmental, Inc.
1416 Carrollton Ave.
Metairie, LA 70005

Attn: Richard Murphy

Project Location: Distributor's Oil Co. / New Orleans, LA

Project No: LA 9829

Sample Matrix: Water

ELI No.	SAMPLE IDENTIFICATION	TPH DIESEL CONCENTRATION
P810001-9	GWS-37	25
P810001-10	GWS-38	181
P810001-11	GWS-39	3
P810001-12	GWS-40	69
P810001-15	GWS-41	24
P810001-16	GWS-42	6
P810001-21	GWS-43	BDL
P810001-22	GWS-44	279
P810001-25	GWS-45	20
P810001-26	GWS-46	12
P810001-27	GWS-47	54
P810001-32	GWS-49	15

BDL = Below Detection Limits

* All values have units of MG/L

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* SUMMARY REPORT *
(Cont'd)

Client: Hydrodyne Environmental, Inc.
1416 Carrollton Ave.
Metairie, LA 70005

Attn: Richard Murphy

Project Location: Distributor's Oil Co. / New Orleans, LA

Project No: LA 9829

Sample Matrix: Water

ELI No.	SAMPLE IDENTIFICATION	TPH DIESEL CONCENTRATION
P810001-33	GWS-48	BDL

BDL = Below Detection Limits

* All values have units of MG/L

environmental laboratories, incorporated

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* SUMMARY REPORT *

Client: Hydrodyne Environmental, Inc.
1416 Carrollton Ave.
Metairie, LA 70005

Attn: Richard Murphy

Project Location: Distributor's Oil Co. / New Orleans, LA

Project No: LA 9829

Sample Matrix: Water

ELI No.	SAMPLE IDENTIFICATION	TPH OIL CONCENTRATION
P810001-9	GWS-37	6
P810001-10	GWS-38	36
P810001-15	GWS-41	7
P810001-25	GWS-45	7

BDL = Below Detection Limits

* All values have units of MG/L

Quality Assurance
Quality Control

P3:00

Page 1 of 4

Environmental Laboratories, Inc.
11441 Industriplex Blvd., Suite 110
Baton Rouge, LA 70809
(504) 293-9300

Chain of Custody Record

Project No. LA98-29

Project Name: Dispatch Oil Co 2100 Service Road N.O. LA

Sampler (Signature) / Company: [signature] / Hydrocarbon Environmental

Sample Identification	Date	Time	Sample Matrix	NO. OF CONT.	Analysis Requested: TPH-D	Analysis Requested: TPH-ORO	REMARKS
SB-34-2	10/15/98	9:10	Soil	1	✓	✓	FAX RESULTS TO
SB-34-4	10/15/98	9:12	Soil	1	✓		RICK ASAP
SB-38-2	10/15/98	9:25	Soil	1	✓		(504) 853-3556
SB-38-3	10/15/98	9:27	Soil	1	✓	✓	
SB-39-1	10/15/98	9:45	Soil	1	✓		
SB-39-7	10/15/98	10:24	Soil	1	✓		
SB-40-1	10/15/98	10:35	Soil	1	✓		
SB-40-3	10/15/98	10:53	Soil	1	✓		
GWS-37	10/15/98	12:35	WATER	1	✓	✓	
GWS-38	10/15/98	12:39	WATER	1	✓	✓	

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Relinquished by: (Signature)	Date	Time	Received by: (Signature)
[signature]	10/16/98	9:16	Deidre Romero				
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Relinquished by: (Signature)	Date	Time	Received by: (Signature)
Relinquished by: (Signature)	Date	Time	Received for Laboratory by: (Signature)	Date	Time	Remarks:	
			D. Romero	10/16/98	9:16AM		

Page 2 of 4

Environmental Laboratories, Inc.
11441 Industriplex Blvd., Suite 110
Baton Rouge, LA 70809
(504) 293-9300

Chain of Custody Record

Project No.: LA98-79
Project Name: Dispensaries Oil Co. N.O LA 210 Superfund
Sampler (Signature) / Company: Hydrocarbon Environmental

Sample Identification	Date	Time	Sample Matrix	NO. OF CONT.	Analysis Requested: TPH-D	Analysis Requested: TPH-ORO	REMARKS
GWS-39	10/15/98	12:45	WATER	1	—		
GWS-46	10/15/98	12:53	WATER	1	—		
SB-41-2	10/15/98	11:36	Soil	1	—		
SB-41-4	10/15/98	11:39	Soil	1	—		
GWS-41	10/15/98	1309	WATER	1	—	—	
GWS-42	10/15/98	1310	WATER	1	—		
SB-42-2	10/15/98	12:04	Soil	1	—		
SB-42-3	10/15/98	12:01	Soil	1	—	—	
SB-43-1	10/15/98	12:21	Soil	1	—		
SB-43-5	10/15/98	1332	Soil	1	—		

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Relinquished by: (Signature)	Date	Time	Received by: (Signature)
	10/16/98	0914	Deidre Romero				
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Relinquished by: (Signature)	Date	Time	Received by: (Signature)
Relinquished by: (Signature)	Date	Time	Received for Laboratory by: (Signature)	Date	Time	Remarks:	
			D. Romero	10/16/98	9:16 AM		

X

Environmental Laboratories, Inc.
11441 Industriplex Blvd., Suite 110
Baton Rouge, LA 70809
(504) 293-9300

Chain of Custody Record

Project No. LA98-29

Project Name: Distributors Oil Co 2100 Succession St N.O. CA

Sampler (Signature) / Company: [signature] / HydroDyne Environmental

Sample Identification	Date	Time	Sample Matrix	NO. OF CONT.	Analysis Requested: TPH D	Analysis Requested: TPH-GO	REMARKS
GWS-43	10/15/98	1445	WATER	1	—		
GWS-44	10/15/98	1450	WATER	1	—		
SB-44-2	10/15/98	1404	Soil	1	—		
SB-44-3	10/15/98	1406	Soil	1	—	✓	
GWS-45	10/15/98	1530	WATER	1	—	—	
GWS-46	10/15/98	1550	WATER	1	—		
GWS-47	10/15/98	1555	WATER	1	—		
SB-45-1	10/15/98	1421	Soil	1	—		
SB-45-3	10/15/98	1427	Soil	1	—	✓	
SB-46-2	10/15/98	1452	Soil	1	—		1

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Relinquished by: (Signature)	Date	Time	Received by: (Signature)
[signature]	10/16/98	09:16	Deidre Romero				
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Relinquished by: (Signature)	Date	Time	Received by: (Signature)
Relinquished by: (Signature)	Date	Time	Received for Laboratory by: (Signature)	Date	Time	Remarks:	
			D. Romero	10/16/98	9:16 AM		

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Environmental Laboratories, Inc.
11441 Industriplex Blvd., Suite 110
Baton Rouge, LA 70809
(504) 293-9300

Chain of Custody Record

Project No.: CA-98-29
Project Name: 2100 Sycamore Road Distributors O/ W.O. CA
Sampler (Signature) / Company: [signature] / Hydrocarbon Environmental

Sample Identification	Date	Time	Sample Matrix	NO. OF CONT.	Analysis Requested TPH-D	REMARKS
SB-46-4	10/15/98	1458	Soil	1	—	
GWS-49	10/15/98	1650	WATER	1	—	
GWS-48	10/15/98	1655	WATER	1	—	
SB-47-2	10/15/98	1542	Soil	1	—	
SB-47-5	10/15/98	1548	Soil	1	—	
SB-48-1	10/15/98	1616	Soil	1	—	
SB-48-5	10/15/98	1623	Soil	1	—	
SB-49-2	10/15/98	1652	Soil	1	—	
SB-49-4	10/15/98	1659	Soil	1	—	

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Relinquished by: (Signature)	Date	Time	Received by: (Signature)
[signature]	10/16/98	0916	Deidre Romero				
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Relinquished by: (Signature)	Date	Time	Received by: (Signature)
Relinquished by: (Signature)	Date	Time	Received for Laboratory by: (Signature) D. Romero	Date 10/16/98	Time 9:16 AM	Remarks:	

environmental laboratories, incorporated
11441 Industriplex Blvd., Suite 110, Baton Rouge, LA 70809 (504) 293-9300 Fax (504) 291-2899

DATE: 10/16/98
TIME: 9:16 AM

SAMPLE INTEGRITY VERIFICATION FORM

Client: Hydrodyne Env.
Shipper: Client Delivered

Number of sample containers: 39

	YES	NO
Chain of Custody provided?	✓	
Storage container(s) in tact?	✓	
Sample container(s) free of breakage?	✓	
Sample(s) received on ice?	✓	

If you have answered No to any of the above questions, explain:

Temperature: _____ °C

Inspector's signature: Deidra Romero

001

Page 4 of 4

Environmental Laboratories, Inc.
11441 Industriplex Blvd., Suite 110
Baton Rouge, LA 70809
(504) 293-9300

Chain of Custody Record

Project No.	Project Name	
GA98-29	Distributions 01 N.O. GA	2100 Sycamore Road

Sampler (Signature) / Company: [signature] / Hydrodyne Engineering

Sample Identification	Date	Time	Sample Matrix	NO. OF CONT.	Analysis Requested TPH-D	REMARKS
SB-46-4	10/15/98	1458	Soil	1	—	
GWS-49	10/15/98	1650	Water	1	—	
GWS-48	10/15/98	1655	Water	1	—	
SB-47-2	10/15/98	1542	Soil	1	—	
SB-47-5	10/15/98	1548	Soil	1	—	
SB-48-1	10/15/98	1616	Soil	1	—	
SB-48-5	10/15/98	1623	Soil	1	—	
SB-49-2	10/15/98	1652	Soil	1	—	
SB-49-4	10/15/98	1659	Soil	1	—	

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Relinquished by: (Signature)	Date	Time	Received by: (Signature)
[signature]	10/16/98	0916	Deidre Romero				
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Relinquished by: (Signature)	Date	Time	Received by: (Signature)
Relinquished by: (Signature)	Date	Time	Received for Laboratory by: (Signature) D. Romero	Date 10/16/98	Time 9:16 AM	Remarks:	

environmental laboratories, incorporated
11441 Industriplex Blvd., Suite 110, Baton Rouge, LA 70809 (504) 293-9300 Fax (504) 291-2899

DATE: 10/16/98
TIME: 9:16 AM

SAMPLE INTEGRITY VERIFICATION FORM

Client: Hydrotype Env
Shipper: Client Delivered

Number of sample containers: 39

	YES	NO
Chain of Custody provided?	✓	
Storage container(s) in tact?	✓	
Sample container(s) free of breakage?	✓	
Sample(s) received on ice?	✓	

If you have answered No to any of the above questions, explain:

Temperature: _____ °C

Inspector's signature: Deidre Romero

APPENDIX C

SOIL BORING LOGS

HYDRODYNE
ENVIRONMENTAL, INC.
1416 CARROLLTON AVE.
METAIRE, LA 70005
(504) 835-6018

BORING LOG
BORING #: SB-37
DRILLING METHOD: GEOPROBE
BACKFILL METHOD: GROUT
LOGGED BY: R. MURPHY

DISTRIBUTORS OIL COMPANY
2100 SUREKOTE ROAD
NEW ORLEANS, LA
PROJECT #: LA 98-29
DATE: 10/15/98

SOIL DESCRIPTION	DEPTH (feet)	SAMPLE #	SAMPLE DEPTH	SAMPLING METHOD	LAB SAMPLE	PROFILE	GROUNDWATER DEPTH	PID (ppm)	SOIL TPH DIESEL (mg/kg)	SOIL TPH OIL (mg/kg)	GROUND WATER TPH DIESEL (mg/L)	GROUND WATER TPH OIL (mg/L)
Shell and Grass Cover w/ Small Roots Loose Dry Gray Silty Clay	1 2	SB-37-1	0'-2'					26.8				
Damp Loose Gray Silty Clay w/ Strong Diesel Odor Free Phase Product at 3'	3 4	SB-37-2	2'-4'				▽	41.2	7320	1150	25	6
NO RECOVERY	5 6	SB-37-3	4'-6'									
Wet Gray Silty Clay	7 8	SB-37-4	6'-8'					13.4	4390	NS		

BORING TERMINATION DEPTH
8' BELOW GROUND SURFACE

SET 3/4" PIEZOMETER TO 8'

COMMENTS:

SOIL TYPES

SAND SILT CLAY PEAT

LOAM CONCRETE FILL ASPHALT

LOG SYMBOLS

BDL = BELOW DETECTION LIMITS

ND= NOT DETECTED

NS = NO SAMPLE

SAMPLING METHODS

- 1" PUSH RODS
- HAND AUGER
- SPLIT SPOON
- SHELBY TUBE
- PIEZOMETER GW

HYDRODYNE
ENVIRONMENTAL, INC.
1416 CARROLLTON AVE.
METAIRE, LA 70005
(504) 835-6018

BORING LOG
BORING #: SB-38
DRILLING METHOD: GEOPROBE
BACKFILL METHOD: GROUT
LOGGED BY: R. MURPHY

DISTRIBUTORS OIL COMPANY
2100 SUREKOTE ROAD
NEW ORLEANS, LA
PROJECT #: LA 98-29
DATE: 10/15/98

SOIL DESCRIPTION	DEPTH (feet)	SAMPLE #	SAMPLE DEPTH	SAMPLING METHOD	LAB SAMPLE	PROFILE	GROUNDWATER DEPTH	PID (ppm)	SOIL TPH DIESEL (mg/kg)	SOIL TPH OIL (mg/kg)	GROUND WATER TPH DIESEL (mg/L)	GROUND WATER TPH OIL (mg/L)
Tan Topsoil Loose Dry Gray Silty Clay w/ Diesel Odor	1	SB-38-1	0'-2'					60				
	2											
Loose Damp Gray Silty Clay w/ Strong Diesel Odor	3	SB-38-2	2'-4'				▽	93.8	5600	NS	181	36
	4											
Wet Gray Silty Clay w/ Strong Diesel Odor and Petroleum Sheen on Surface	5	SB-38-3	4'-6'					93.8	15200	2960		
	6											
NO RECOVERY	7	SB-38-4	6'-8'									
	8											

BORING TERMINATION DEPTH
8' BELOW GROUND SURFACE

SET 3/4" PIEZOMETER TO 8'

COMMENTS:

SOIL TYPES

SAND SILT CLAY PEAT

LOAM CONCRETE FILL ASPHALT

LOG SYMBOLS

BDL = BELOW DETECTION LIMITS

ND= NOT DETECTED

NS = NO SAMPLE

SAMPLING METHODS

- 1" PUSH RODS
- HAND AUGER
- SPLIT SPOON
- SHELBY TUBE
- PIEZOMETER GW

HYDRODYNE
ENVIRONMENTAL, INC.
1416 CARROLLTON AVE.
METAIRE, LA 70005
(504) 835-6018

BORING LOG
BORING #: SB-39
DRILLING METHOD: GEOPROBE
BACKFILL METHOD: GROUT
LOGGED BY: R. MURPHY

DISTRIBUTORS OIL COMPANY
2100 SUREKOTE ROAD
NEW ORLEANS, LA
PROJECT #: LA 98-29
DATE: 10/15/98

SOIL DESCRIPTION	DEPTH (feet)	SAMPLE #	SAMPLE DEPTH	SAMPLING METHOD	LAB SAMPLE	PROFILE	GROUNDWATER DEPTH	PID (ppm)	SOIL TPH DIESEL (mg/kg)	SOIL TPH OIL (mg/kg)	GROUND WATER TPH DIESEL (mg/L)	GROUND WATER TPH OIL (mg/L)
2" Concrete Cover Dry Medium Stiff Gray Clay w/ Shells	1–2	SB-39-1	0'-2'					0.8	11	NS		
Dry Medium Stiff Gray Clay w/ Silt and Shells	3–4	SB-39-2	2'-4'					0				
Damp Gray Silty Clay	5–6	SB-39-3	4'-6'					0				
Damp Gray Silt Organic Peat w/ Roots	7–8	SB-39-4	6'-8'					0				
Damp Gray Silt	9–10	SB-39-5	8'-10'					0				
Damp Gray Silt Organic Peat w/ Roots	11–12	SB-39-6	10'-12'					0				
Wet Gray Silty Clay	13–14	SB-39-7	12'-14'				▽	0	BDL	NS	3	NS

BORING TERMINATION DEPTH
14' BELOW GROUND SURFACE

SET 3/4" PIEZOMETER TO 14'

SOIL TYPES

SAND SILT CLAY PEAT

LOAM CONCRETE FILL ASPHALT

LOG SYMBOLS

BDL = BELOW DETECTION LIMITS

ND= NOT DETECTED

NS = NO SAMPLE

SAMPLING METHODS

- 1" PUSH RODS
- HAND AUGER
- SPLIT SPOON
- SHELBY TUBE
- PIEZOMETER GW

HYDRODYNE
ENVIRONMENTAL, INC.
1416 CARROLLTON AVE.
METAIRE, LA 70005
(504) 835-6018

BORING LOG
BORING #: SB-40
DRILLING METHOD: GEOPROBE
BACKFILL METHOD: GROUT
LOGGED BY: R. MURPHY

DISTRIBUTORS OIL COMPANY
2100 SUREKOTE ROAD
NEW ORLEANS, LA
PROJECT #: LA 98-29
DATE: 10/15/98

SOIL DESCRIPTION	DEPTH (feet)	SAMPLE #	SAMPLE DEPTH	SAMPLING METHOD	LAB SAMPLE	PROFILE	GROUNDWATER DEPTH	PID (ppm)	SOIL TPH DIESEL (mg/kg)	SOIL TPH OIL (mg/kg)	GROUND WATER TPH DIESEL (mg/L)	GROUND WATER TPH OIL (mg/L)
Shell Cover Gray Silty Clay	1–2	SB-40-1	0'-2'					20.1	2240	NS		
Gray Silty Clay w/ Diesel Odor	3–4	SB-40-2	2'-4'					1.2				
Damp Gray Silty Clay w/ Large Root	5–6	SB-40-3	4'-6'				▽	6.4	918	NS	69	NS
Wet Gray Silty Clay w/ Large Roots	7–8	SB-40-4	6'-8'					2.2				
NO RECOVERY	9–10	SB-40-5	8'-10'									
NO RECOVERY	11–12	SB-40-6	10'-12'									

BORING TERMINATION DEPTH
12' BELOW GROUND SURFACE

SET 3/4" PIEZOMETER TO 12'

COMMENTS:

SOIL TYPES

SAND SILT CLAY PEAT

LOAM CONCRETE FILL ASPHALT

LOG SYMBOLS

BDL = BELOW DETECTION LIMITS

ND= NOT DETECTED

NS = NO SAMPLE

SAMPLING METHODS

- 1" PUSH RODS
- HAND AUGER
- SPLIT SPOON
- SHELBY TUBE
- PIEZOMETER GW

HYDRODYNE
ENVIRONMENTAL, INC.
1416 CARROLLTON AVE.
METAIRE, LA 70005
(504) 835-6018

BORING LOG
BORING #: SB-41
DRILLING METHOD: GEOPROBE
BACKFILL METHOD: GROUT
LOGGED BY: R. MURPHY

DISTRIBUTORS OIL COMPANY
2100 SUREKOTE ROAD
NEW ORLEANS, LA
PROJECT #: LA 98-29
DATE: 10/15/98

SOIL DESCRIPTION	DEPTH (feet)	SAMPLE #	SAMPLE DEPTH	SAMPLING METHOD	LAB SAMPLE	PROFILE	GROUNDWATER DEPTH	PID (ppm)	SOIL TPH DIESEL (mg/kg)	SOIL TPH OIL (mg/kg)	GROUND WATER TPH DIESEL (mg/L)	GROUND WATER TPH OIL (mg/L)
Shell and Grass Cover Tan Sand Gray Silt w/ Strong Diesel Odor	1	SB-41-1	0'-2'					7				
	2											
Damp Gray Silt w/ Strong Diesel Odor and Roots	3	SB-41-2	2'-4'					86.2	697	NS		
	4											
NO RECOVERY	5	SB-41-3	4'-6'				▽				24	7
	6											
Loose Wet Gray Silty Clay w/ Petroleum Sheen on Water	7	SB-41-4	6'-8'					3	1510	NS		
	8											

BORING TERMINATION DEPTH
8' BELOW GROUND SURFACE

SET 3/4" PIEZOMETER TO 8'

COMMENTS:

SOIL TYPES

SAND SILT CLAY PEAT

LOAM CONCRETE FILL ASPHALT

LOG SYMBOLS

BDL = BELOW DETECTION LIMITS

ND= NOT DETECTED

NS = NO SAMPLE

SAMPLING METHODS

- 1" PUSH RODS
- HAND AUGER
- SPLIT SPOON
- SHELBY TUBE
- PIEZOMETER GW

HYDRODYNE
ENVIRONMENTAL, INC.
1416 CARROLLTON AVE.
METAIRE, LA 70005
(504) 835-6018

BORING LOG
BORING #: SB-42
DRILLING METHOD: GEOPROBE
BACKFILL METHOD: GROUT
LOGGED BY: R. MURPHY

DISTRIBUTORS OIL COMPANY
2100 SUREKOTE ROAD
NEW ORLEANS, LA
PROJECT #: LA 98-29
DATE: 10/15/98

SOIL DESCRIPTION	DEPTH (feet)	SAMPLE #	SAMPLE DEPTH	SAMPLING METHOD	LAB SAMPLE	PROFILE	GROUNDWATER DEPTH	PID (ppm)	SOIL TPH DIESEL (mg/kg)	SOIL TPH OIL (mg/kg)	GROUND WATER TPH DIESEL (mg/L)	GROUND WATER TPH OIL (mg/L)
Lose Sand Cover Loose Tan Sand Loose Gray Silty Clay w/ Diesel Odor	1 2	SB-42-1	0'-2'					14.2				
Loose Gray Silty Clay w/ Diesel Odor	3 4	SB-42-2	2'-4'					69.2	114	NS		
Damp Loose Gray Silty Clay w/ Diesel Odor	5 6	SB-42-3	4'-6'					75.4	158	BDL		
Damp Gray Silty Clay	7 8	SB-42-4	6'-8'				▽	3			6	NS
Wet Soft Gray Silty Clay w/ Large Roots	9 10	SB-42-5	8'-10'					10				

BORING TERMINATION DEPTH
10' BELOW GROUND SURFACE

SET 3/4" PIEZOMETER TO 10'

COMMENTS:

SOIL TYPES

SAND SILT CLAY PEAT

LOAM CONCRETE FILL ASPHALT

LOG SYMBOLS

BDL = BELOW DETECTION LIMITS

ND= NOT DETECTED

NS = NO SAMPLE

SAMPLING METHODS

- 1" PUSH RODS
- HAND AUGER
- SPLIT SPOON
- SHELBY TUBE
- PIEZOMETER GW

HYDRODYNE
ENVIRONMENTAL, INC.
1416 CARROLLTON AVE.
METAIRE, LA 70005
(504) 835-6018

BORING LOG
BORING #: SB-43
DRILLING METHOD: GEOPROBE
BACKFILL METHOD: GROUT
LOGGED BY: R. MURPHY

DISTRIBUTORS OIL COMPANY
2100 SUREKOTE ROAD
NEW ORLEANS, LA
PROJECT #: LA 98-29
DATE: 10/15/98

SOIL DESCRIPTION	DEPTH (feet)	SAMPLE #	SAMPLE DEPTH	SAMPLING METHOD	LAB SAMPLE	PROFILE	GROUNDWATER DEPTH	PID (ppm)	SOIL TPH DIESEL (mg/kg)	SOIL TPH OIL (mg/kg)	GROUND WATER TPH DIESEL (mg/L)	GROUND WATER TPH OIL (mg/L)
Shell Cover Loose Gray Silt w/ Slight Diesel Odor	1 2	SB-43-1	0'-2'					11.5	243	NS		
Loose Dry Gray Silt w/ Slight Diesel Odor	3 4	SB-43-2	2'-4'					2.5				
Loose Dry Gray Silt w/ Small Roots	5 6	SB-43-3	4'-6'					0.5				
Damp Gray Silt w/ Small Roots	7 8	SB-43-4	6'-8'				▽	0			BDL	NS
Damp Gray Silt w/ Small Roots	9 10	SB-43-5	8'-10'					2	19	NS		

BORING TERMINATION DEPTH
10' BELOW GROUND SURFACE

SET 3/4" PIEZOMETER TO 10'

COMMENTS:

SOIL TYPES

SAND SILT CLAY PEAT

LOAM CONCRETE FILL ASPHALT

LOG SYMBOLS

BDL = BELOW DETECTION LIMITS

ND = NOT DETECTED

NS = NO SAMPLE

SAMPLING METHODS

- 1" PUSH RODS
- HAND AUGER
- SPLIT SPOON
- SHELBY TUBE
- PIEZOMETER GW

HYDRODYNE
ENVIRONMENTAL, INC.
416 CARROLLTON AVE.
METAIRE, LA 70005
(504) 835-6018

BORING LOG
BORING #: SB-44
DRILLING METHOD: GEOPROBE
BACKFILL METHOD: GROUT
LOGGED BY: R. MURPHY

DISTRIBUTORS OIL COMPANY
2100 SUREKOTE ROAD
NEW ORLEANS, LA
PROJECT #: LA 98-29
DATE: 10/15/98

SOIL DESCRIPTION	DEPTH (feet)	SAMPLE #	SAMPLE DEPTH	SAMPLING METHOD	LAB SAMPLE	PROFILE	GROUNDWATER DEPTH	PID (ppm)	SOIL TPH DIESEL (mg/kg)	SOIL TPH OIL (mg/kg)	GROUND WATER TPH DIESEL (mg/L)	GROUND WATER TPH OIL (mg/L)
Tan Topsoil (Inside Dike)	1	SB-44-1	0'-2'					24.5				
Loose Dry Gray Silt w/ Diesel Odor	2											
Loose Dry Gray Silt w/ Diesel Odor and Roots	3	SB-44-2	2'-4'					46.4	6680	NS		
	4											
Dry Loose Gray Silt w/ Diesel Odor	5	SB-44-3	4'-6'				▽	24.1	65	36		
	6										279	NS
Wet Gray Silt	7	SB-44-4	6'-8'					2				
	8											

BORING TERMINATION DEPTH
8' BELOW GROUND SURFACE

SET 3/4" PIEZOMETER TO 8'

COMMENTS:

SOIL TYPES

SAND SILT CLAY PEAT

LOAM CONCRETE FILL ASPHALT

LOG SYMBOLS

BDL = BELOW DETECTION LIMITS

ND = NOT DETECTED

NS = NO SAMPLE

SAMPLING METHODS

- 1" PUSH RODS
- HAND AUGER
- SPLIT SPOON
- SHELBY TUBE
- PIEZOMETER GW

HYDRODYNE
ENVIRONMENTAL, INC.
416 CARROLLTON AVE.
METAIRE, LA 70005
(504) 835-6018

BORING LOG
BORING #: SB-45
DRILLING METHOD: GEOPROBE
BACKFILL METHOD: GROUT
LOGGED BY: R. MURPHY

DISTRIBUTORS OIL COMPANY
2100 SUREKOTE ROAD
NEW ORLEANS, LA
PROJECT #: LA 98-29
DATE: 10/15/98

SOIL DESCRIPTION	DEPTH (feet)	SAMPLE #	SAMPLE DEPTH	SAMPLING METHOD	LAB SAMPLE	PROFILE	GROUNDWATER DEPTH	PID (ppm)	SOIL TPH DIESEL (mg/kg)	SOIL TPH OIL (mg/kg)	GROUND WATER TPH DIESEL (mg/L)	GROUND WATER TPH OIL (mg/L)
Loose Tan Topsoil (Inside Dike)	1	SB-45-1	0'-2'					12.4	4090	NS		
Loose Dry Gray Silt	2											
NO RECOVERY	3	SB-45-2	2'-4'									
	4											
Loose Dry Gray Silt w/ Slight Petroleum Odor	5	SB-45-3	4'-6'					3.9	190	132		
	6										20	7
Wet Gray Silt	7	SB-45-4	6'-8'					1.1				
	8											

BORING TERMINATION DEPTH
8' BELOW GROUND SURFACE

SET 3/4" PIEZOMETER TO 8'

COMMENTS:

SOIL TYPES

SAND SILT CLAY PEAT

LOAM CONCRETE FILL ASPHALT

LOG SYMBOLS

BDL = BELOW DETECTION LIMITS

ND= NOT DETECTED

NS = NO SAMPLE

SAMPLING METHODS

- 1" PUSH RODS
- HAND AUGER
- SPLIT SPOON
- SHELBY TUBE
- PIEZOMETER GW

HYDRODYNE
ENVIRONMENTAL, INC.
1416 CARROLLTON AVE.
METAIRE, LA 70005
(504) 835-6018

BORING LOG
BORING #: SB-46
DRILLING METHOD: GEOPROBE
BACKFILL METHOD: GROUT
LOGGED BY: R. MURPHY

DISTRIBUTORS OIL COMPANY
2100 SUREKOTE ROAD
NEW ORLEANS, LA
PROJECT #: LA 98-29
DATE: 10/15/98

SOIL DESCRIPTION	DEPTH (feet)	SAMPLE #	SAMPLE DEPTH	SAMPLING METHOD	LAB SAMPLE	PROFILE	GROUNDWATER DEPTH	PID (ppm)	SOIL TPH DIESEL (mg/kg)	SOIL TPH OIL (mg/kg)	GROUND WATER TPH DIESEL (mg/L)	GROUND WATER TPH OIL (mg/L)
Tan Topsoil (Inside Dike)	1	SB-46-1	0'-2'									
NO RECOVERY	2											
Loose Gray Silt w/ Small Roots	3	SB-46-2	2'-4'					26.9	94	NS		
	4											
Loose Dry Gray Silt w/ Small Roots	5	SB-46-3	4'-6'					1.1				
	6											
Wet Gray Silt	7	SB-46-4	6'-8'					1.3	350	NS		
	8						▽				12	NS
Wet Gray Silt	9	SB-46-5	8'-10'					1.1				
	10											

BORING TERMINATION DEPTH
10' BELOW GROUND SURFACE

SET 3/4" PIEZOMETER TO 10'

COMMENTS:

SOIL TYPES

SAND SILT CLAY PEAT

LOAM CONCRETE FILL ASPHALT

LOG SYMBOLS

BDL = BELOW DETECTION LIMITS

ND= NOT DETECTED

NS = NO SAMPLE

SAMPLING METHODS

- 1" PUSH RODS
- HAND AUGER
- SPLIT SPOON
- SHELBY TUBE
- PIEZOMETER GW

HYDRODYNE
ENVIRONMENTAL, INC.
416 CARROLLTON AVE.
METAIRE, LA 70005
(504) 835-6018

BORING LOG
BORING #: SB-47
DRILLING METHOD: GEOPROBE
BACKFILL METHOD: GROUT
LOGGED BY: R. MURPHY

DISTRIBUTORS OIL COMPANY
2100 SUREKOTE ROAD
NEW ORLEANS, LA
PROJECT #: LA 98-29
DATE: 10/15/98

SOIL DESCRIPTION	DEPTH (feet)	SAMPLE #	SAMPLE DEPTH	SAMPLING METHOD	LAB SAMPLE	PROFILE	GROUNDWATER DEPTH	PID (ppm)	SOIL TPH DIESEL (mg/kg)	SOIL TPH OIL (mg/kg)	GROUND WATER TPH DIESEL (mg/L)	GROUND WATER TPH OIL (mg/L)
Tan Topsoil (inside Dike)	1	SB-47-1	0'-2'					6				
Loose Gray Silt	2											
Loose Gray Silt	3	SB-47-2	2'-4'					12	129	NS		
	4											
Loose Gray Silt	5	SB-47-3	4'-6'					1				
	6											
Loose Gray Silt	7	SB-47-4	6'-8'					1				
	8						▽				54	NS
Loose Gray Silt	9	SB-47-5	8'-10'					0	29	NS		
	10											

BORING TERMINATION DEPTH
10' BELOW GROUND SURFACE

SET 3/4" PIEZOMETER TO 10'

COMMENTS:

SOIL TYPES

SAND SILT CLAY PEAT

LOAM CONCRETE FILL ASPHALT

LOG SYMBOLS

BDL = BELOW DETECTION LIMITS

ND= NOT DETECTED

NS = NO SAMPLE

SAMPLING METHODS

- 1" PUSH RODS
- HAND AUGER
- SPLIT SPOON
- SHELBY TUBE
- PIEZOMETER GW

HYDRODYNE
ENVIRONMENTAL, INC.
1416 CARROLLTON AVE.
METAIRE, LA 70005
(504) 835-6018

BORING LOG
BORING #: SB-48
DRILLING METHOD: GEOPROBE
BACKFILL METHOD: GROUT
LOGGED BY: R. MURPHY

DISTRIBUTORS OIL COMPANY
2100 SUREKOTE ROAD
NEW ORLEANS, LA
PROJECT #: LA 98-29
DATE: 10/15/98

SOIL DESCRIPTION	DEPTH (feet)	SAMPLE #	SAMPLE DEPTH	SAMPLING METHOD	LAB SAMPLE	PROFILE	GROUNDWATER DEPTH	PID (ppm)	SOIL TPH DIESEL (mg/kg)	SOIL TPH OIL (mg/kg)	GROUND WATER TPH DIESEL (mg/L)	GROUND WATER TPH OIL (mg/L)
Grass Cover Loose Gray Silty Clay	1	SB-48-1	0'-2'					31	1410	NS		
	2											
Damp Soft Gray Clay w/ Slight Petroleum Odor	3	SB-48-2	2'-4'					4				
	4											
Damp Soft Gray Clay w/ Slight Petroleum Odor	5	SB-48-3	4'-6'					3				
	6											
Damp Medium Stiff Gray Clay w/ Slight Petroleum Odor	7	SB-48-4	6'-8'				▽	5			BDL	NS
	8											
Damp Medium Stiff Gray Clay w/ Slight Petroleum Odor	9	SB-48-5	8'-10'					7	BDL	NS		
	10											

BORING TERMINATION DEPTH
10' BELOW GROUND SURFACE

SET 3/4" PIEZOMETER TO 10'

COMMENTS:

SOIL TYPES

SAND SILT CLAY PEAT

LOAM CONCRETE FILL ASPHALT

LOG SYMBOLS

BDL = BELOW DETECTION LIMITS

ND= NOT DETECTED

NS = NO SAMPLE

SAMPLING METHODS

- 1" PUSH RODS
- HAND AUGER
- SPLIT SPOON
- SHELBY TUBE
- PIEZOMETER GW

HYDRODYNE
ENVIRONMENTAL, INC.
1416 CARROLLTON AVE.
METAIRE, LA 70005
(504) 835-6018

BORING LOG
BORING #: SB-49
DRILLING METHOD: GEOPROBE
BACKFILL METHOD: GROUT
LOGGED BY: R. MURPHY

DISTRIBUTORS OIL COMPANY
2100 SURFKOTE ROAD
NEW ORLEANS, LA
PROJECT #: LA 98-29
DATE: 10/15/98

SOIL DESCRIPTION	DEPTH (feet)	SAMPLE #	SAMPLE DEPTH	SAMPLING METHOD	LAB SAMPLE	PROFILE	GROUNDWATER DEPTH	PID (ppm)	SOIL TPH DIESEL (mg/kg)	SOIL TPH OIL (mg/kg)	GROUND WATER TPH DIESEL (mg/L)	GROUND WATER TPH OIL (mg/L)
Grass Cover Soft Gray Silt w/ Strong Petroleum Odor	1	SB-49-1	0'-2'					5	83	NS		
	2											
Loose Soft Gray Silt w/ Strong Petroleum Odor	3	SB-49-2	2'-4'					41				
	4											
NO RECOVERY	5	SB-49-3	4'-6'									
	6											
Soft Loose Damp Gray Silt w/ Mild Petroleum Odor	7	SB-49-4	6'-8'				▽	4	306	NS	15	NS
	8											
Wet Gray Silt	9	SB-49-5	8'-10'					2				
	10											

BORING TERMINATION DEPTH
10' BELOW GROUND SURFACE

SET 3/4" PIEZOMETER TO 10'

COMMENTS:

SOIL TYPES

SAND SILT CLAY PEAT

LOAM CONCRETE FILL ASPHALT

LOG SYMBOLS

BDL = BELOW DETECTION LIMITS

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SAMPLING METHODS

- 1" PUSH RODS
- HAND AUGER
- SPLIT SPOON
- SHELBY TUBE
- PIEZOMETER GW

Appendix E

SAMPLING and ANALYSIS PLAN

ENVIRONMENTAL SUPPORT TO INNER HARBOR NAVIGATION CANAL NEW LOCK AND CONNECTING CHANNELS
New Orleans, Louisiana

ABOVE-GROUND TANKS AND OTHER REMAINING CONTAINERIZED WASTES

Prepared for

U. S. Army Corps of Engineers
New Orleans District
New Orleans, Louisiana

Prepared by

Dames & Moore

2021 South Lewis Avenue, Suite 300, Tulsa, Oklahoma 74120
Voice: (918) 744-5886 Fax: (918) 744-6549

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LIST OF APPENDICES

LIST OF ACRONYMS

AST	Aboveground Storage Tank
CGI	Combustible Gas Indicator
FB	Field Blank
FID	Flame Ionization Detector
HSP	Health & Safety Plan
IHNC	Inner-Harbor Navigational Channel
LFL	Lower Flammability Limit
LQ	Liquid
NOCOE	New Orleans Corps of Engineers
PEL	Personnel Exposure Limit
PID	Photoionzation Detector
PPE	Personal Protective Equipment
QA/QC	Quality Assurance/Quality Control
SAP	Sampling & Analysis Plan
SB	Sandblasting Solids
SL	Sludge
SOW	Scope of Work
TB	Trip Blank
VOC	Volatile Organic Compound

1.0 SITE BACKGROUND

The project site is located on both the east and west banks of the Inter-Harbor Navigation Canal (IHNC) between Florida Avenue and the St. Claude Avenue bridge. All structures within these limits, including utilities, are to be removed except for the following: IHNC Lock structure and related facilities, bridges (St. Claude, Claiborne, and Florida Avenues) and approach ramps and floodwalls. Demolition of these items will be addressed separately.

This Sampling & Analysis Plan (SAP) specifically addresses characterization of aboveground storage tank (AST) contained materials as well as tank and piping construction materials for final disposal. There are 25 aboveground storage tanks (ASTs) which have been identified for removal. Of these, 16 are located at active sites while nine are at inactive areas. Of the nine tanks at inactive areas, three contain sandblasting material. These are estimated quantities provided by the New Orleans Corps of Engineers (NOCOE) and actual numbers on site may vary. The existing tanks will be left and the majority of tank contents will be removed by the current lessees/owner upon vacating their sites. All tanks, whether active, inactive, or unused, and their contents will be reviewed.

2.0 PROJECT OBJECTIVES

The objective of this SAP specifically addresses characterization of AST- contained materials as well as tank and piping construction materials for final disposal. The appropriate means of disposal will be determined based upon the results of sampling. Tanks and their contents may be recycled, reused, or landfilled to accomplish final disposal. Field activities will include field screening followed by chemical laboratory testing to determine the most cost-effective method and sequence of demolition and disposal of regulated materials.

3.0 SAMPLE LOCATION AND FREQUENCY

The number and location of samples collected during characterization activities will be dependant on the nature of the waste material. This information will be determined on an individual task basis. Dames & Moore has assumed that one composite liquid sample will be collected from product holding tanks and that one sandblasting solids sample will be collected from each solids holding tank.

4.0 SAMPLE DESIGNATION

A unique sample numbering system will be used to identify each sample for chemical or field screening analysis. In addition, this sample numbering system will be used to identify all trip blanks, field blanks and field duplicates. Each unique sample number will consist of the components described below.

The following 6-digit designation will be used to identify the INC. AST samples:

NO-AST = New Orleans Corps of Engineers IHNC Aboveground Storage Tanks

Each sample location will be identified by an alpha-code corresponding to the sample type, followed by a four digit sample location number, as appropriate. The alpha codes are as follows:

LQ = Liquids
SL = Sludges
SB = Sand Blasting Solids

The following codes will be used for QC samples, and will be added as prefixes to the sample location:

TB = trip blank
FB = field blank

NOTE: Field duplicates will be utilized but not identified to the laboratory.

If tank liquids are present in separate phases, the sampling depths will be designated by the phase interval (e.g, a liquid sample from a depth of 8 to 10 feet would be given the suffix "8/10").

The following are examples of the sample numbering to be used during the project:

NO-AST-SL-TK01:	New Orleans Corps of Engineers IHNC Aboveground Storage Tank, Sludge Sample from Tank 01.
NO-AST-LQ-TK02-6/7':	New Orleans Corps of Engineers IHNC Aboveground Storage Tank, Liquid Samples from Tank 2, Interval of 6 to 7 feet.

5.0 SAMPLING EQUIPMENT AND PROCEDURES

The sampling requirements for this Scope of Work (SOW) are expected to involve soil/solid matrix and tank/aqueous matrix sampling. The data collected during sampling is presented on the Sample Collection Form in Appendix A The following subsections present the procedures which shall be employed during waste characterization sampling for waste disposal.

5.1 EQUIPMENT

The equipment necessary to complete the tank sampling shall be assembled. The suggested equipment is as follows:

- Sample containers shall be prepared and labeled for all parameters to be tested.

- Coliwasa and Sludge Judge sampling devices.
- Non-sparking wrench for bolted access.
- Bolt cutters and 10W-30 lubricant.
- A field log book.
- Decontamination materials.
- Personal protective equipment (PPE) which includes; chemical resistant coveralls, latex inner gloves, chemical resistant outer gloves, chemical resistant boot covers, face shield or chemical splash goggles and hard hat (see the Task Specific- HSP).
- Field Screening Instruments
- Personal safety monitoring instruments (see the Task Specific-HSP).

5.2 TANK OPENING PROCEDURES

Prior to initiating tank sampling, the sampling team shall record a description of the site and the area from which the sample is being taken. In addition, any markings on the tank, the condition of the tank, and the approximate location of the tank will be noted on a site map.

Empty and opened tanks will be addressed first. Dames & Moore personnel will open each empty tank using spark-proof tools. Full or partially-full tanks will also be opened using spark-proof tools. The sampling team will assign each tank a number and record that number. On active sites, the sampling team will request that a site representative open the tank access. On inactive sites, access may be obtained by forced removal of bolts or locks. For bolted access ports, the bolts securing the port cover will be removed by a non-sparking wrench. If the bolt cannot be removed by the non-sparking wrench, it will be cut using bolt cutters. For locked access tanks on inactive sites, the lock will be removed with bolt cutters. If the tank is orignally found to be locked, a new lock will be placed on the tank access upon completion of tank sampling. If grease, oil, or other agent is used to facilitate access port removal, it will be used sparingly.

Record tank identification number and general location in Field Log Book and on corresponding sample tag. Record sample tag ID number in Field Log Book. A health and safety screen will be performed by a designated member of the sampling team. They will screen the area around the tank with a PID. If this screen is below the action levels specified in the HSP, they will open the tank and screen the contents of the tank. The results will be recorded in the sampling team's field log book. If the Personnel Exposure Levels (PELs) are exceeded, appropriate measures will be implemented as described in the HSP prior to initiation of sample collection.

Using the appropriate level of protection indicated by the health and safety screening, the sample team will open the tank and record tank content characteristics in the field notebook.

5.3 TANK SAMPLING PROCEDURES

Tanks should be sampled from the least-to-worst degrees of contamination. Liquid and sludge phases will be sampled using a reuseable Teflon coliwasa. The coliwasa will be advanced as deep as possible. The exposed end will be capped and the coliwasa removed containing a column of liquid. If the coliwasa is not

long enough to reach the bottom of the tank, a reuseable polycarbonate Sludge Judge will be used to extract a sludge sample and to record the sludge depth. Upon sample removal, the various phases will be composited into sampling containers. Sufficient sample volume will be collected to enable waste characterization analysis. The laboratory will determine the volume required. Once the liquid sampling is complete, the coliwasa will be removed and decontaminated. When sampling is complete, tighten all tank bolts and replace locks as applicable.

For volatile analysis of liquid samples, after sample collection invert the sample container(s) and tap several times. If bubbles appear, empty the bottle and recollect the sample. It must be noted that if preservatives are used and the sample bottle has to be emptied, it will be necessary to add new preservative or another preservative-prepared bottle must be used. Wipe off the sample container(s). Fill out and attach sample tag to the sample container including sample number. Complete the chain-of-custody, and place sample(s) in cooler maintained under ice or ice packs (at 4°C), in preparation for shipping.

6.0 DECONTAMINATION

6.1 PERSONNEL

Persons working on the site shall undergo decontamination before leaving the site. In most instances, removal of protective clothing will suffice for decontamination. Facilities for storage of reusable protective clothing and for the disposal of clothing contaminated beyond reuse will be constructed or placed on site. Also, facilities for decontaminating hands, boots, and gloves, consisting of a detergent wash and water rinse, will be provided.

To facilitate the decontamination process, decontamination zones will be constructed. The decontamination zone for sampling equipment, and miscellaneous small tools will be established near the site. The decontamination area will consist of a low-lying area covered with a 6-mil polyethylene sheet. At the completion of decontamination procedures at each site, the debris will be enclosed in the polyethylene sheet and deposited into 55-gallon drums for later disposal.

6.2 EQUIPMENT

Precautions will be taken to prevent the potential transfer of contamination from one tank location to another during the field activities. Equipment used to sample tank materials will be decontaminated prior to use at each tank location. This equipment includes but is not limited to small tools, coliwasa, and Sludge Judge. The following paragraph describes the decontamination procedures that will be used at the site.

Liquid and sludge samplers used to obtain samples for chemical analyses will be decontaminated after each use according to the following procedure:

- Scrub off a majority of the tank contents using potable water. Sampling equipment may also be washed by performing a high-pressure low-volume hot water/steam wash of the disassembled parts.
- Wash with a mixture of potable water and Alconox® detergent.
- Rinse three times with distilled water.
- Rinse with methanol and allow to air dry. Hexane may be used if particularly oily samples are encountered.

7.0 FIELD EQUIPMENT

The field personnel assigned to the project will assemble as much of the field equipment as feasible prior to mobilization to the site. At this time the equipment will be checked to ensure that it is in proper working order, and required maintenance will be performed. Tools and equipment that may be needed for field maintenance will be assembled at this time, and pertinent sections of the manuals will be photocopied for reference in the field.

The field personnel will become familiar with the calibration of the instruments, as outlined in the respective manuals, and will make the calibrations on regular basis as described in the following sections. Appendix A provides a copy of the form to be completed for each instrument at the time of calibration. The equipment that will be necessary for field calibration of the instruments, such as buffer solutions and calibration gases, will be assembled for mobilization to the site. The in-field analytical instruments which are routinely used during the field activities include:

- Photoionization detector (PID) or Flame Ionization Detector (FID).
- Combustible gas indicator (CGI) or explosimeter.
- Hydac conductivity, temperature and pH meter.

Descriptions of the field equipment to be utilized in the field investigation are presented in the following sections.

7.1 FIELD SCREENING DEVICES

7.1.1 Photoionization Detector/Flame Ionization Detector

A PID or FID is a quantitative instrument that measures the total concentration of numerous organic vapors in air. The instruments are calibrated by introducing pressurized gas from a cylinder with a known organic vapor concentration into the detector. Once the reading has stabilized, the display of the instrument is adjusted to match the known concentration. A calibration of this type is performed each day prior to using the instrument.

If the output differs greatly from the known concentration of the calibration gas, the initial procedure to remedy the problem is a thorough cleaning of the instrument. The cleaning process normally removes

foreign materials (i.e., dust, moisture) that affect the calibration of the instrument. If this procedure does not rectify the problem, further troubleshooting is performed until the problem is resolved. If the problem cannot be resolved by the field personnel, the instrument will be returned to the manufacturer for repair and a replacement unit shipped to the site immediately. The manufacturer's manual will accompany the instrument.

The PID must be kept clean for accurate operation. Foreign materials can be rinsed or wiped off, or blown out of the detector. The cord between the analyzer and the recorder should not be wound tightly, and will be inspected visually for integrity before going into the field. A battery check indicator is included on the equipment and will be checked prior to going into the field and prior to use. The batteries will be fully charged each night. The analyzer, probe, and meter will be packed securely and handled so as to minimize the risk of damage.

7.1.2 Combustible Gas Indicator (CGI)/Explosimeter

The explosimeter or combustible gas indicator (CGI) is an air monitoring device designed to indicate a flammable/explosive atmosphere and the level of oxygen present. The CGI registers combustible gas or vapors in terms of their Lower Flammability Limit (LFL), which is the lowest concentration at which a combustible gas may ignite (or explode) under normal atmospheric conditions. Since the instrument measures both the level of oxygen in the atmosphere and the level a combustible gas reaches before igniting, the calibration of the instrument comprises a two-step process.

The oxygen portion of the instrument is calibrated by placing the meter in normal atmospheric air and rotating the CAL. OXYGEN control knob until the oxygen meter reads exactly 20.8 percent oxygen. This calibration will be done once daily when in use.

The combustible gas indicator is calibrated to pentane at the laboratory to indicate directly the percentage LFL of pentane in air. It is recommended that the gas detector be calibrated daily and whenever the detector filament is replaced.

The calibration kit included with the CGI contains a calibration gas cylinder, a flow control and an adaptor hose. Recalibration instructions are as follows:

- Attach the flow control to the recommended calibration gas tank (pentane).
- Connect the adaptor-hose to the flow control.
- Open flow control valve.
- Connect the adaptor-hose fitting to the inlet of the instrument. After about 15 seconds the LFL meter pointer should be stable and within the range specified on the calibration sheet accompanying the calibration equipment. If the meter pointer is not in the correct range, stop the flow, and remove the right hand side cover. Turn on the flow and adjust the "S" control with a small screw driver to obtain a reading as specified on the calibration sheet.
- Disconnect the adaptor-hose fitting from the instrument and replace the sidecover.

7.1.3 Conductance, Temperature, And pH Tester

A HyDAC conductance, temperature, and pH tester, or equivalent, will be used at the site. The unit has the following detection ranges: conductance 0 to 20,000 µmhos/cm; temperature 0 to 160°F; and pH 0 to 14. Conductance and temperature are factory calibrated: however, conductance will be checked against a standard solution of known conductance each day and recalibrated, if necessary.

The pH will be calibrated prior to each use by immersing the pH electrode in a pH 7.0 buffered solution. The electrode is then placed in a pH 4.0 or 10.0 buffered solution and the "SLOPE" potentiometer on the tester adjusted to display the value of the buffer solution chosen.

The tester and probes will be packed in a protective case for transport. The probes must be kept clean, and will be rinsed with distilled water after each use. The buffer solutions used in calibration will be packed with the meter.

7.1.4 Immunoassay-Based Field Testing

An immunoassay field screening kit (e.g. EnSys PETRO RIS® Soil Test or equivalent) is a semi-quantitative instrument used to screen solids for the presence of petroleum fuels. Immunoassay combines the specific binding characteristics of an antibody molecule with a readout system that can detect and quantify petroleum compounds. The immunoassay kit is designed to detect gasoline, diesel and/or other fuels with minimal interference from non-petroleum organics. A soil or solid material sample is extracted with methanol, filtered and diluted. The prepared sample and an enzyme-labeled analyte are added to antibody-coated tubes where they compete to bind with the antibodies. Coloring reagents are added to the solution which reacts with the enzyme to give a darker color. A higher concentration of petroleum hydrocarbons means fewer enzymes have attached to the antibodies, giving a lighter color. A photometer compares the color development of the sample to a known standard.

7.2 DECONTAMINATION SUPPLIES

The decontamination wash solutions will consist of Alconox® detergent and potable water, distilled water, methanol, and hexane in accordance with procedures outlined previously. Other supplies will include buckets, tubs, and brushes. The decontamination supplies will be transported in sealed unbreakable containers. The containers will be inspected visually for leaks or contamination prior to each use.

7.3 RESPIRATORS, CARTRIDGES, AND FILTERS

Air purifying filter/cartridge respirators will be donned by sampling personnel if field situations warrant. The respirators will be fitted with cartridges as defined in the HSP. These cartridges are National Institute for Occupational Safety and Health-tested (NIOSH), and NIOSH- and MSHA (Mine Safety and Health Administration)-approved. The cartridge is approved for use in atmospheres containing at least 19.5 percent oxygen and less than 0.1 percent organic vapors by volume.

8.0 ENVIRONMENTAL SAMPLE HANDLING AND PACKING

8.1 SAMPLE CONTAINERS

Sample containers will be provided by the analytical laboratory. The containers will be either high density polyethylene or glass with Teflon®-lined lids and will be pretreated with preservatives as applicable. The type of sample containers and preservatives required for each analyses are specified in Section 9.2.

8.2 SAMPLE HANDLING AND DECONTAMINATION

After sample collection in the field, the exterior of the sample containers will be decontaminated if gross contamination is present. The sample containers will be handled with gloves until decontaminated with a detergent wash and water rinse. Care will be taken to avoid damaging the temporary labeling during decontamination. After decontamination, permanent labels will be placed on clean sample container exteriors.

The sample containers will be well-cushioned with packing materials when they are placed in the insulated cooling chests for transportation to the laboratory. Care will be taken to seal bottle caps tightly. The samples will be shipped via overnight carrier to the laboratory to arrive no later than 48 hours after the time sampled.

8.3 PROCEDURES FOR PACKING AND SHIPPING LOW CONCENTRATION SAMPLES

Samples will be packaged as follows:

- Use water-proof metal (or equivalent strength plastic) ice chests or coolers only.
- After determination of specific samples to be submitted and filling out the pertinent information on the sample label and tag, put the label on the bottle or vial prior to packing. For bottles other than Volatile Organic Compounds (VOC vials), secure the lid with strapping tape (tape on VOC vials may cause contamination).
- Mark volume level on bottle with grease pencil. VOC vials will be completely filled to eliminate head space, and will not be marked with a grease pencil.
- Place about three inches of inert cushioning material such as vermiculite in the bottom of the cooler.
- Enclose the bottles in clear plastic bags through which sample tags and labels are visible, and seal the bag. Place bottles upright in the cooler in such a way that they do not touch and will not touch during shipment.
- Place bubble wrap and/or packing material around and among the sample bottles, to partially cover them (no more than halfway).
- Add sufficient ice (double bagged) between and on top of the samples to cool them and keep them at approximately 4°C until received by the analytical laboratory.
- Fill cooler with cushioning material.
- Put paperwork (Chain-of-Custody Record) in a waterproof plastic bag and tape it with duct tape to the inside lid of the cooler.

- Tape the drain of the cooler shut with duct tape.
- Secure lid by wrapping the cooler completely with strapping, duct or clear shipping tape at a minimum of two locations. Do not cover any labels.
- Attach completed shipping label to top of the cooler.
- Label "This Side Up" on the top of the cooler, "Up" with arrow denoting direction on all four sides, and "Fragile" on at least two sides.
- Affix numbered and signed custody seals on front right, and back left of cooler. Cover seals with wide, clear tape.

8.4 PROCEDURES FOR PACKING AND SHIPPING MEDIUM CONCENTRATION SAMPLES

An effort will be made to identify samples suspected of having elevated contaminant concentrations based on field observations and screening tests. These samples will be segregated and packed in a separate container to the extent allowed by prevailing field conditions. Lids for these samples, except for volatile samples, will be sealed to the containers with tape in addition to the normal processing used on all samples collected. Medium concentration samples will be packed in the same manner as described in Section 8.3 for low concentration samples.

8.5 CHAIN-OF-CUSTODY RECORDS

As part of the sampling plan, chain-of-custody protocols will be established to provide documentation that samples were handled by authorized individuals as a means to maintain sample integrity. The chain-of-custody form will contain the following information:

- Sample identification number;
- Date, time, and depth of sample collection;
- Sample type (e.g. sludge);
- Type and number of container;
- Requested analyses;
- Field notes and laboratory notes;
- Project name and location;
- Name of collector;
- Laboratory name and contact person; and
- Signature of persons relinquishing or receiving samples.

Chain-of-custody records will be maintained for each laboratory sample. At the end of each day on which samples are obtained, and prior to the transfer of the samples off-site, chain-of-custody documentation will be completed for each sample. Information on the chain-of-custody form will be verified to ensure that the information is consistent with the information on the container labels and in the field log book. A sample Chain-of-Custody form to be used during this investigation is presented in Appendix A.

Upon receipt of the sample cooler at the laboratory, the laboratory custodian will break the shipping container seal, inspect the condition of the samples, and sign the chain-of-custody form to document receipt

of the sample containers. Information on the chain-of-custody form will be verified to ensure that the information is consistent with the information on the container labels. If the sample containers appear to have been opened or tampered with, this should be noted by the person receiving the samples under the section entitled "Remarks." The completed chain-of-custody records will be included with the analytical report prepared by the laboratory.

9.0 SAMPLE ANALYSIS

Samples will be delivered to a Missouri Valley District Corps of Engineering certified laboratory for analysis. The objectives of analysis and methodologies to be employed are detailed in the following sections.

9.1 OBJECTIVES

The goal of material characterization is not a complete chemical analysis but rather to determine the most cost-effectively and acceptable means of disposal. A secondary objective is to determine what wastestreams may be aggregated together during final removal of tank contents and disposal. Some materials may be suitable for recycling as raw product or for fuel blending while others may be characterized as hazardous waste. Through initial field screening, laboratory analytical costs will be mimized. Field screening will assess the hazardous characteristic of corrosivity, the presence of flammable materials, and the presence of volatile organic compounds.

9.2 METHODOLOGY

The following table summarizes the analytical methodologies to be used as well as the sample containers to be provided, sample holding times, and sample preservation.

Parameter	Material	Sample Collection	Sample Preservation	Sample Holding	EPA Method
Fuel Fingerprint	LQ & SL				
Total Organic Halides	LQ & SL				
BTU and Ash	LQ & SL				
Polychlorinated Biphenyls	LQ & SL				
Toxicity Characteristic Leaching Procedure (Full)	SB				
Reactivity/Corrosivity/ Igniteability	SB				

10.0 SITE DOCUMENTATION

10.1 FIELD LOG BOOKS

Each Field Team member will maintain a personal field log book while on the site. Information recorded in the log book will be written in an objective, factual manner so that persons reading the entries will be able to determine the sequence of events as they occurred in the field. If notes are made in the log book by someone other than the owner of the book, this will be indicated by the writer's signature and date. Information that may be recorded in the field log book include:

- Date and time of entry;
- Sample number;
- Sample description;
- Method of sampling;
- Location of sampling;
- Sketch of sample location;
- Field measurements such as pH, conductivity, temperature, PID readings and CGI readings;
- Names and phone numbers of field contacts, and persons on-site;
- Estimate of total volume of sampled material;
- Tank dimensions, tank construction materials, piping, layout, contents, and secondary containment; and
- Weather and field conditions during and sampling.

In addition to the above information, the following forms (see Appendix A) will be used to record detailed data:

- Field Memorandum - used to outline daily activities for information of project manager and file records; and
- Field Equipment Calibration Log - used to ensure that each field instrument is calibrated on the schedule required and to the manufacturers specifications.

10.2 CORRECTIONS TO DOCUMENTATION

Errors or mistakes in the original field data will be crossed out with a single line, and the person making the correction will initial it. No data will be erased. In some circumstances, original documents may be transcribed, making appropriate changes and eliminating errors. In these cases, the successive documents will be dated, numbered as sequential drafts and the originals maintained in the project file. Field logs will be stored onsite during the field activities, and moved to the project files upon completion of the work effort.

11.0 QUALITY ASSURANCE/QUALITY CONTROL

The objective of the Quality Assurance/Quality Control (QA/QC) program is to demonstrate that the data produced are scientifically valid, defensible, and of known precision and accuracy. QC will be maintained in the field by adhering to the procedures outlined in the SAP; by properly and fully documenting sample information on chain-of-custody forms; by maintaining field logs documenting field activities; and by the collection of QC samples. The QC samples will be analyzed to assess laboratory performance and to assess the possibility of cross-contamination.

11.1 QUALITY ASSURANCE/QUALITY CONTROL SAMPLES

As part of the Quality Control program, QC samples will be prepared and collected to provide data for the subsequent review, interpretation, and validation of the analytical data. Three types of QC samples for tank contents will be prepared or collected: (1) trip blanks and (2) duplicate (replicate) samples. The QA/QC samples are discussed in more detail below.

11.1.1 Trip Blanks

Trip blanks will be prepared by the off-site analytical laboratory and shipped to the site with the sample containers. Two trip blank vials will be packed with each shipment of samples submitted to the laboratory for VOC analyses. The trip blanks will analyzed for VOCs and will be used to assess the possibility of cross-contamination of the samples during shipment to the laboratory.

11.1.2 Duplicate Samples

Collection of duplicate samples provides for evaluation of the laboratory's performance by comparing analytical results of two samples from the same location. Duplicate samples will be collected at a minimum rate of 10% (1 in 10). Duplicates will be labeled as independent samples so they can not be identified as duplicates by the laboratory (blind duplicates). The collection of duplicate samples will be noted in the field log book.

11.2 QA/QC SAMPLING PROCEDURES

In order for duplicate sample analysis to be valid, the duplicate samples must be as homogeneous as possible. Duplicate sandblasting solids, sludges, and liquids samples will be split so that stratification of contaminants will be distributed equally between the samples. Half of the sample will be transferred to the regular sample container; the duplicate half will be transferred to the similarly labeled duplicate or split sample container. Samples will be handled by personnel wearing nitrile gloves to avoid contamination.

Sandblasting solids samples obtained for analyses other than VOCs, will be homogenized prior to filling the sample jars. Moisture content, particle size, and absorption properties of the sandblasting solids may inhibit complete homogenization. The sandblasting solids sample to be homogenized will be placed initially in a stainless-steel bowl. After the removal of stones, vegetation, or other debris, the sandblasting solids will

be blended with a stain-less steel sampling trowel or spoon until it appears uniform in color and texture. The samples will then be place into the sample containers.

Duplicate liquid and sludge samples will be obtained by consecutively filling additional sets of sample jars using the same sampling equipment. Duplicate samples for VOC analysis will be filled first from the same coliwasa or Sludge Judge. Samples collected for VOC analysis will be place directly into the sample jars. The sample jars will be completely filled to minimize the loss of volatiles

APPENDIX A

Field Forms

Field Sampling Memorandum

New Orleans Corps of Engineers
Inter-Harbor Navigational Channel AST Characterization

Activity:

Signature & Date

Title

Field Equipment Calibration Log
New Orleans Corps of Engineers
Inter-harbor Navigational Channel AST Characterization

"I have read the Health & Safety Plan (HSP) and the Sampling & Analysis Plan (SAP) for the project and I understand them. I agree to comply with all of the HSP and SAP provisions. I understand that I could be prohibited from working on the project for violating any of the HSP and SAP requirements specified in the Plans."

	Name	Signature
Site Manager		
Site Safety Officer		
Calibration Personnel		

Daily Instrument Calibration Check Sheet

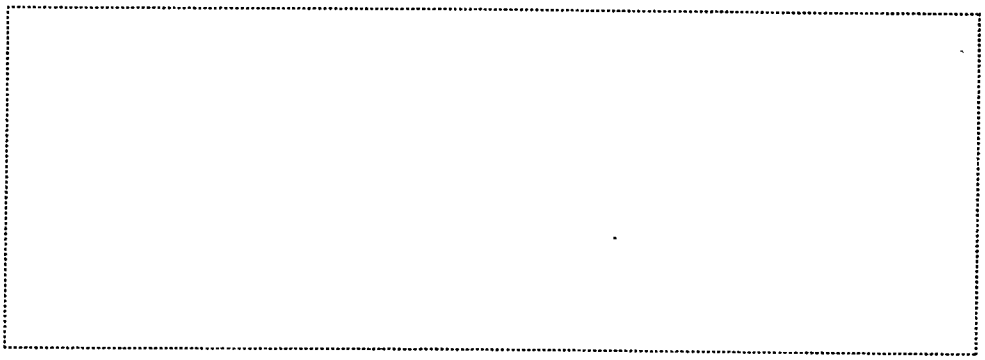
Date	Instrument	Battery OK?	Zero Adjust OK?	Calibration Gas (ppm)	Reading (ppm)	Calibrated by:

Field Monitoring Activity Log

Date	Activity Monitored	Time	Location	Reading	Action	Reading By:

Sample Collection Form - Liquids & Sludge

Tank Location & Sketch - Show phase depths as appropriate



Site Location:_____

Tank No.:_____ Tank Construction: _____ Piping Constr.:_____
Tank Vol:_____ Approx. Tk. Dimensions:_____ Tk. Foundation:_____
PID/FID Reading:_____ CGI Reading:_____ Odor:_____
Color: _____ Sheen? Y / N Phases? Y / N
Secondary Cont? Y / N Containmt. Matl. _____

Sample ID: _____
Field Blank No.:_____
Trip Blank No.:_____
Duplicate ID:_____
Sample Analyses: (Liquids Only) PCB TOX FingerPrint BTU/Ash

(Sandblast Solids) TCLP React/Corr/Ignite

Sample Observations:_____

Sampler Name:_____ Date:_____

COC Form - Copy

APPENDIX B

OPERATIONAL PLAN
ABOVE-GROUND TANKS AND OTHER REMAINING CONTAINERIZED WASTES

1.0 MOBILIZATION AND SITE PREPARATION

Dames & Moore personnel will begin mobilization activities for the above-ground tank investigation within one weeks after approval of the Work Plan and receipt of authorization to proceed. Initial mobilization activities will include scheduling personnel and the tank sampling and decontamination equipment. Site work will begin approximately two weeks after notice to proceed.

At the site, Dames & Moore will prepare various working areas at the INHC sites. A centralized location will be selected upon arrival at the site to facilitate characterization of the tanks, field screening and sample shipping. The Field Laboratory and shipping area should be housed inside a building, preferably with a refrigerator for sample holding prior to shipping.

Dames & Moore personnel will locate designated tanks throughout the INHC sites. These tanks will be inspected and their condition noted in the sampling team's Field Log Book. It is understood that the contents of ASTs will be removed by the owners at active sites. However, tanks at inactive sites may still contain product at the time of characterization.

As such, empty and opened tanks will be addressed first. Dames & Moore personnel will open each empty tank using spark-proof tools. Full or partially-full tanks will also be opened using spark-proof tools. The opened tanks will be sampled upon opening, and after Health & Safety Plan (HSP) screening, with a Teflon coliwasa. Individual samples will then be transported to the Field Laboratory for screening tests. Screening tests conducted at the Field Laboratory will include pH and total petroleum hydrocarbon analyses. Testing wastes will be composited into 55-gallon 17E drums for disposal.

Dames & Moore personnel will conduct a final review of the sites to locate and gather any debris or waste material associated with this project. All equipment and gear will be decontaminated prior to departing the project site. Any waste material and wastewater associated with this operation will be drummed, labeled and stored for final disposal. Dames & Moore will demobilize upon receiving clearance from the NOCOE representative.

2.0 TANK AND CONTAINER SURVEYS

The tank and container surveys will be conducted prior to sampling to identify any possible problems with tank and/or container access and egress. Each of the field monitoring units will be field tested each day prior to beginning sample collection. The tank and container surveys will be conducted in accordance with the work plan.

The field monitoring unit readings will be recorded in the AST Field Log Book. As a minimum, the field data will be transferred to a computer at the completion of a survey area and/or at the end of the survey day. Two backup copies of each days data will be made. One copy will remain at the site and the second copy will be sent to the Dames & Moore Tulsa, Oklahoma office.

3.0 ENVIRONMENTAL SAMPLING LABORATORY ANALYSIS

If field screening methods indicate that a given substance obtained from an AST or container is unknown samples will be obtained and placed into appropriate containers supplied by the laboratory. Sampling will be in accordance with the SAP drafted for this portion of the project. To prevent cross-contamination, sampling team members will don a new pair of disposable gloves prior to collecting each new laboratory sample. We anticipate 22 samples will be collected from the various ASTs. In addition, three samples of waste sandblasting material will be collected from each container where it is encountered. The samples will be collected, handled, and shipped in accordance with the Work Plan.

Collected liquid and sandblasting material samples will be submitted to an off-site laboratory for analysis on a standard turn-around basis. Analytical results will be available three weeks after receipt by the laboratory.

4.0 REPORT PREPARATION

A draft report on above-ground tanks and other remaining containerized wastes will be submitted two weeks following receipt of the laboratory data. A final report will be submitted two weeks after receipt of USACE comments on the draft report.

Appendix F

SITE SAFETY AND HEALTH PLAN

ENVIRONMENTAL SUPPORT TO INNER HARBOR NAVIGATION CANAL NEW LOCK AND CONNECTING CHANNELS
New Orleans, Louisiana

ABOVE-GROUND TANKS AND OTHER REMAINING CONTAINERIZED WASTES

Prepared for

U. S. Army Corps of Engineers
New Orleans District
New Orleans, Louisiana

Prepared by

Dames & Moore

2021 South Lewis Avenue, Suite 300, Tulsa, Oklahoma 74120
Voice: (918) 744-5886 Fax: (918) 744-6549

TABLE OF CONTENTS

SITE SPECIFIC HEALTH AND SAFETY PLAN

TITLE PAGE - AST

Dames & Moore

PROJECT NAME: Inner Harbor Navigation Canal - **Above-Ground Tanks (AST)**	**CONTRACT NO:** DACW29-97-D-0019 **DELIVERY ORDER NO:** 0011
JOBSITE ADDRESS: Between Florida Avenue and the Mississippi River on the east and west side of the Inner Harbor Navigation Canal in New Orleans LA.	**PROJECT NO:** 08768-027-161
PROJECT MANAGER: Jon Seekins	**PHONE NO:** (918) 744-5886
SITE CONTACT: Michelle Barnett	**PHONE NO:** (918) 744-5886

OBJECTIVES OF FIELD WORK: Environmental support for the demolition of aboveground structures (including tanks), an inventory of regulated materials, demolition and disposal requirements, and cost estimation data. Contents of 25 tanks will be sampled.

SITE TYPE: Check as many as applicable

(X) Active	( ) Landfill	( ) Natural
(X) Inactive	( ) Uncontrolled	(X) Municipal
(X) Secure	(X) Industrial	
(X) Unsecure	( ) Residential	
( ) Enclosed space	( ) Well Field	

DESCRIPTION AND FEATURES: Summarize below. Include principal operations and unusual features (containers, buildings, dikes, power lines, hills, slopes, river).
The project is located on both the east and west banks of the Inner Harbor Navigation Canal (IHNC) and consist of active and inactive sites, The U.S. Coast Guard (USCG) Station, and areas operated by the US Army Corps of Engineers (USACE).

SURROUNDING POPULATION: (X) Residential (X) Industrial ( ) Rural (X) Urban (X) Commercial: ( ) Other:

SITE SPECIFIC SAFETY AND HEALTH PLAN

EMERGENCY CONTACTS & APPROVAL PAGE

Dames & Moore

EMERGENCY CONTACTS		
Project Site Manager	**Jon W. Seekins**	918 744-5886
Site Safety & Health Officer	**Michelle Barnett**	918 744-5886
Alternate SSHO	**Jon W. Seekins**	918 744-5886
Maintenance	Yes -- Site control	
EPA Release Report No.	(800)-424-8802	
National Meteorological Center, NOAA/NWS	5200 Auth Road Camp Spring, MD	(301) 763-8016
Local/Regional Airport		

CONTINGENCY PLANS

See Appendix H

HEALTH AND SAFETY PLAN APPROVALS

Prepared by: Dennis Day	Date: June 30, 1998
Reviewed by: Jon W. Seekins	Date: July 3, 1998
Project Manager:	Date:

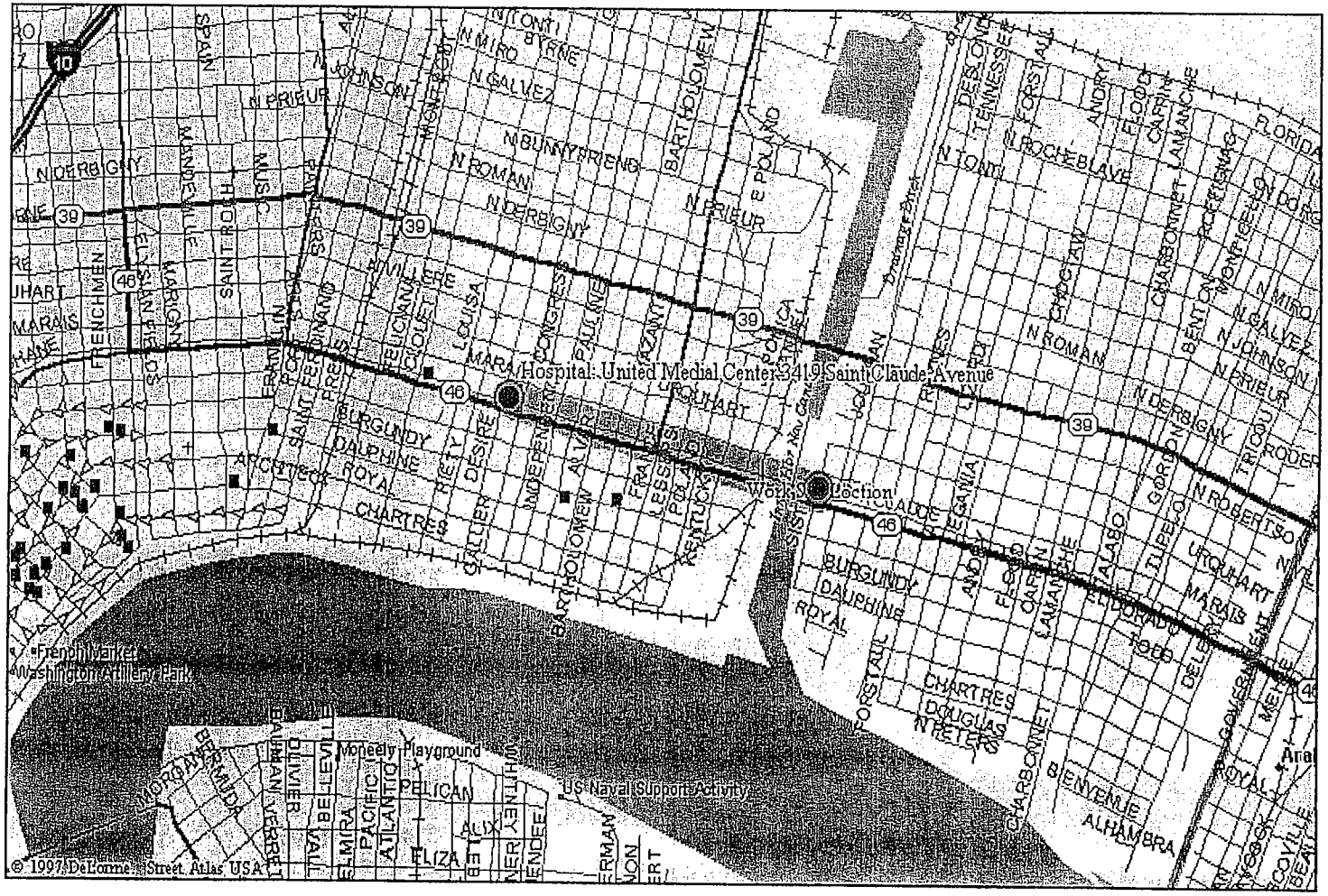
EMERGENCY CONTACTS	Contact/PHONE	24-Hour Hotline
Project Manager	**Jon W. Seekins**	**918-744-5886**
Safety and Health Manager	**Dennis W. Day**	**402-596-1356**
Industrial Hygienist	**Dennis W. Day**	**402-596-1356**
First Aid/CPR on-site responder (2 required)	**Michelle Barnett**	**918 744-5886**
First Aid/CPR on-site responder	**Jon W. Seekins**	**918 744-5886**
EPA Region 6 Compliance Assurance and Enforcement Division	Main Branch Phone: (214)665-6468 Fax: (214)665-2168	24 Hour Noncompliance Hotline: (214)665-6595
LA HAZARDOUS WASTE DIVISION	James H. Brent, Ph.D.	(504) 765-0232 fax 0617
New Orleans Fire Department 317 Decatur Street	(504) 565-7800 fax 7848	**911**
New Orleans 4th District Police 3751 General Degaulle Drive	(504) 364-5000 fax5004	**911**
LA State Police Troop B **2101 I-10 SERVICE ROAD KENNER, LOUISIANA**	Captain Mel Ryan, Troop B Commander	(504)471-2775 fax 2784
LA OFFICE OF PUBLIC HEALTH PUBLIC HEALTH STATISTIC	Joan Borstell	(504) 568-7401 fax 8297
Poison Control Center Tulane Medical Center Emergency	(504) 588-5711 fax 7429	911
Medical Surveillance, Dames & Moore	Nita Drolet	(303) 299-7827

MEDICAL EMERGENCY		
Hospital Name:	**Saint Claude Medical Center**	**(504) 948-8245**
Hospital Address:	**3419 Saint Claude Avenue**	**(504) 948-8245**
Name of Contact at Hospital:	**Rusty Foster**	
Name of 24-Hour Ambulance:		Phone: 911
Route to Hospital: - See attached map.		

SITE SPECIFIC SAFETY AND HEALTH PLAN

HOSPITAL MAP ROUTE

Dames & Moore



SITE SPECIFIC SAFETY AND HEALTH PLAN

HISTORY AND WASTE CHARACTERIZATION PAGE ***AST***

Dames & Moore

HISTORY: According to the land use studies the IHNC location has had several businesses/activities including: warehousing, marine manufacturing, paint manufacturing equipment, marine repair, petroleum distributors, marine repair, fiberglass manufacturing facilities occuping various areas over the years. A detailed historical account is available from the Project Site Manager.

Of the 25 tanks, 16 are located on active sites while 9 in inactive sites. 3 tanks contain sandblast material, the remaining tanks contain, petroleum products, unknown or are empty.

WASTE TYPES: (X) Liquid (X) Solid (X) Sludge ( ) Gas ( ) Unknown ( ) Other **specify**:

WASTE CHARACTERISTICS: Check as many as applicable.

( ) Corrosive (X) Flammable ( ) Radioactive

(X) Toxic (X) Volatile ( ) Reactive

( ) Inert Gas (X) Unknown

WORK ZONES: Work zones will be shown on "WORK ZONE MAP PAGE."

Work Zones around the sampling locations during sampling will include:

- EZ: Within 15 feet of invasive work activities.
- CRZ: Immediately outside the EZ.
- SZ: All other areas.

HAZARDS OF CONCERN: Check as many as applicable.

(X) Heat Stress
( ) Cold Stress
(X) Explosive/Flammable
( ) Oxygen Deficient
( ) Radiological
(X) Biological
( ) Other **specify**:

( ) Noise
(X) Inorganic Chemicals
(X) Organic Chemicals
( ) Motorized Traffic
( ) Heavy Machinery
(X) Slips, Trips & Falls

PRINCIPAL DISPOSAL METHODS AND PRACTICES:

Disposable equipment and PPE will be bagged and retained until the results of sampling are received. PPE that may be contaminated will be considered as potential Investigative Derived Waste; and be subject to waste profile testing in order to determine disposal options.

Provide steel sack disposal bags labeled: Dames & Moore Investigation _/ /98 potential IDW

SITE SPECIFIC SAFETY AND HEALTH PLAN

HAZARDOUS MATERIAL SUMMARY PAGE ***AST***

Dames & Moore

HAZARDOUS MATERIAL SUMMARY: BOLD waste type

CHEMICALS Amounts/Units:	SOLIDS Amounts/Units:	SLUDGES Amounts/Units:	SOLVENTS Amounts/Units:	OILS Amounts/Units:	OTHER Amounts/Units:
		Residuals in Oil/Water	**Benzene** **Ethylbenzene** **Xylene** **Toluene** Hydrocarbons	Gasoline Diesel Oils	Sandblast Material/Paint: Potential Heavy Metals: Lead Chromium Cadmium

OVERALL HAZARD EVALUATION: ( ) High (X) Medium ( ) Low ( ) Unknown (Where tasks have different hazards, evaluate each. Attach additional sheets if necessary)

JUSTIFICATION: **Majority of work accomplished in well ventilated outdoor areas. Confined space entry will not occur.**

FIRE/EXPLOSION POTENTIAL: ( ) High (X) Medium ( ) Low ( ) Unknown

BACKGROUND REVIEW: (X) COMPLETE ( ) INCOMPLETE

TABLE 1
EXPOSURE LIMITS AND SELECTED PHYSICAL CHARACTERISTICS AST

COMPOUND	EXPOSURE VALUE[a] PEL/TLV	IDLH[b] LEVEL	LEL[c]	UEL[d]	IP[e]	VP[f]	CARCINOGEN
Gasoline	300 ppm- (TWA)-PEL/TLV 500 ppm (STEL)-PEL/TLV		1.4%	7.6%			IARC-2B NIOSH-X
Benzene	1 ppm-(TWA) PEL 5 ppm (STEL)-PEL	3000 ppm	1.3%	7.9%	9.24 eV	75 mm	EPA-A IARC-1 NIOSH-X NTP-1 OSHA-X TLV-A2
Ethyl benzene	100 ppm (TWA)-PEL/TLV 125 ppm (STEL)-PEL/TLV	2,000 ppm	1.0%	6.7%	8.76 eV	(79°F): 10 mm	EPA-D
Xylenes (o-, m-, p-isomers)	100 ppm (TWA)-PEL/TLV 150 ppm (STEL)-PEL/TLV	1,000 ppm	1.1/1.0/1.0%	7.0/7.0/7.0%	8.56/8.56/8.44eV	7/9/9 mm	EPA-D IARC-3
Naphtha	100 ppm-PEL	10,000 ppm	-- --	-- --		<5 mm	-- --
Toluene	50 ppm (TWA)-TLV 150 ppm(STEL)-PEL	2,000 ppm	1.2%	7.1%	8.82 eV	(65°F):20 mm)	EPA-D IARC-3
Hexane (n-Hexane)	50 ppm (TWA)-PEL/TLV	5000 ppm	1.1%	7.5%	10.18 eV	(77°F):150 mm	
Tetraethyl lead	0.075 mg/m^3 (TWA)-PEL	40 mg/m^3	1.8%		11.10 eV	0.2 mm	IARC-3
Tetramethyl lead	0.075 mg/m^3 (TWA)-PEL	40 mg/m^3			8.50 eV	23 mm	IARC-3
Ethylene dibromide	20 ppm (TWA)-PEL 30 ppm (Ceiling)-PEL 50* ppm (STEL)-PEL *5 min peak per 8-hr shift	400 ppm			9.45 eV	12 mm	EPA-B2 IARC-2A NIOSH-X NTP-2 TLV-A2
Ethylene dichloride	1 ppm (TWA)-PEL 2 ppm (STEL)-PEL	1000 ppm	6.2%	16%	11.05 eV	64 mm	EPA-B2 IARC-2B NIOSH-X NTP-2
Diesel	-----	-----	1.3%	6.0%-		----	See MSDS
Lead	0.050 mg/m^3	100 mg/m^3	NA	NA	NA	0	
Cadmium	See Appendix A						
Chromium	See Appendix A						

(Attachment 7)

footnotes on following page:

(a) Permissible Exposure Limit (OSHA) or Threshold Limit Value (ACGIH). More Conservative Value Utilized.
(b) Immediately Dangerous to Life and Health
(c) Lower Explosive Limit
(d) Upper Explosive Limit
(e) Ionization Potential
(f) Vapor Pressure

Ceiling - The concentration that shall not be exceeded during any part of the working exposure
EPA - U.S. Environmental Protection Agency
IARC - International Agency for Research on Cancer
NTP - National Toxicology Program
STEL - Short-Term Exposure Limit. Usually a 15-minute time-weighted average (TWA) exposure that should not be exceeded at any time during a workday, even if the 8-hour TWA is within the TLV-TWA, or PEL-TWA.
TWA - Time-weighted average exposure concentration for a normal 8-hour (TLV, PEL) workday and a 40-hour workweek.

Carcinogen Designations:

EPA-A: Human Carcinogen: sufficient evidence from epidemiological studies to support a causal association between exposure and cancer.
-B: Probable Human Carcinogen: weight of evidence of human carcinogenicity based on epidemiological studies is limited: agents for which weight of evidence of carcinogenicity based on animal studies is sufficient.
-B2: Sufficient evidence from animal studies: inadequate evidence or no data from epidemiological studies.
-D: Not Classifiable as to Human Carcinogenicity: Inadequate human and animal evidence of carcinogenicity or no data are available.
IARC-1: Carcinogenic to Humans: sufficient evidence of carcinogenicity
-2A: Probably Carcinogenic to Humans: limited human evidence. sufficient evidence in experimental animals
-2B: Possibly Carcinogenic to Humans: limited evidence in humans in the absence of sufficient evidence in experimental animals
-3: Not Classifiable as to Carcinogenicity to Humans
NIOSH-X: Carcinogen defined with no further categorization
NTP-1: Known to be carcinogenic: sufficient evidence from human studies
-2: Reasonably anticipated to be a carcinogen: limited evidence from studies in humans or sufficient evidence from studies in experimental animals
OSHA-X: Carcinogen defined with no further categorization
TLV-A2: Suspected Human Carcinogen: Agent is carcinogenic in experimental animals at dose levels, by route(s) of administration, at site(s), of histologic type(s), or by mechanism(s) considered relevant to worker exposure. Available epidemiological studies are conflicting or insufficient to confirm an increased risk of cancer in exposed humans.

TABLE 2
ROUTES OF ENTRY, SYMPTOMS OF EXPOSURE, FIRST AID TREATMENT, AND TARGET ORGANS

COMPOUND	ROUTES OF ENTRY	SYMPTOMS OF EXPOSURE	GENERAL FIRST AID TREATMENT	TARGET ORGANS
Benzene	Inhalation, ingestion, skin absorption, skin and/or eye contact	Irritation of eyes, nose, respiratory system, giddiness, headache, nausea, staggered gait, fatigue, anorexia, lassitude, dermatitis, bone marrow depressant	eye: irrigate immediately skin: soap wash promptly breath: respiratory support swallow: medical attention immediately	blood, central nervous system, skin, eyes, bone marrow respiratory system
Ethylbenzene	Inhalation, ingestion skin and/or eye contact	Irritation of eyes, mucous membrane, headache, dermatitis, narcosis, coma	eye: irrigate immediately skin: water flush promptly breath: respiratory support swallow: medical attention immediately	eyes, upper respiratory system, skin, central nervous system
Hexane (n-Hexane)	Inhalation, ingestion skin and/or eye contact	Lightheadedness, nausea, headache, numbness of extremities, muscle weakness, irritation of eyes, nose, dermatitis, chemical pneumonia, giddiness	eye: irrigate immediately skin: soap wash immediately breath: respiratory support swallow: medical attention immediately	eyes, skin, respiratory system
Tetraethyl lead	Inhalation, skin absorption, ingestion, skin and/or eye contact	Insomnia, lassitude, anxiety, tremor, hyper-reflexia, spastic, bradycardia, hypotension, hypothermia, pallor, nausea, anorexia, low-weight, disorientation, hallucinations, psychosis, mania, coma, convulsions, eye irritation	eye: irrigate immediately skin: soap wash immediately breath: respiratory support swallow: medical attention immediately	central nervous system cardiovascular system, kidneys, eyes
Tetramethyl lead	Inhalation, skin absorption ingestion, skin and/or eye contact	Insomnia, bad dreams, restless, anxious, hypotension, nausea, anorexia, delirium, mania, convulsions, coma	eye: irrigate immediately skin: soap wash immediately breath: respiratory support swallow: medical attention immediately	central nervous system cardiovascular system, kidneys, eyes
Ethylene dibromide	Inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation of respiratory system, eyes, dermatitis with vesiculation	eye: irrigate immediately skin: soap wash immediately breath: respiratory support swallow: medical attention immediately	respiratory system, liver, kidneys, skin, eyes
Ethylene dichloride	Inhalation, skin absorption, ingestion, skin and/or eye contact	Central nervous system, depression, nausea, vomiting, dermatitis, irritation of eyes, corneal opacity	eye: irrigate immediately skin: soap wash promptly breath: respiratory support swallow: medical attention immediately	kidneys, liver, eyes, skin, central nervous system
Xylenes (o-, m-, p- isomers)	Inhalation, ingestion, skin absorption, skin and/or eye contact	Dizziness, excitement, drowsiness, incoherence, staggering gait, irritation, of eyes, nose, throat, corneal vacuolization, nausea, vomiting, abdominal pain, dermatitis	eye: irrigate immediately skin: soap wash promptly breath: respiratory support swallow: medical attention immediately	central nervous system, eyes, gastrointestinal tract, blood, liver kidneys, skin

TABLE 2 - Continued

COMPOUND	ROUTES OF ENTRY	SYMPTOMS OF EXPOSURE	GENERAL FIRST AID TREATMENT	TARGET ORGANS
Naphtha	Inhalation, ingestion, skin and/or eye contact	Light headedness, drowsiness, irritation eyes, nose, skin, dermatitis	eye: irrigate immediately skin: soap wash promptly breath: respiratory support swallow: medical attention immediately	respiratory system, eyes, skin
Diesel	See Attachment 7			
Toluene	Inhalation, ingestion skin absorption, skin and/or eye contact	Fatigue, weakness, confusion, euphoria, dizziness, headache, dilated pupils, lacrimation, nervousness, muscle fatigue, insomnia, paresthesia, dermatitis	eye: irrigate immediately skin: soap wash promptly breath: respiratory support swallow: medical attention immediately	central nervous system, liver, kidneys, skin
Motor Oil (waste)	Inhalation, ingestion, skin absorption, skin and/or eye contact	Irritation of eyes, mucous membranes and respiratory system, central nervous system depression and/or excitation, headache, nausea, drowsiness, dizziness, insomnia, confusion, tremors, dry and red skin upon contact.	Move victim to fresh air and call emergency medical care; if not breathing, give artificial respiration; if breathing is difficult, give oxygen. In case of contact with material, immediately flush eyes with running water for at least 15 minutes. Wash skin with soap and water. Remove and isolate contaminated clothing and shoes at the site.	----
Lead	See Appendix A			
Chromium	See Appendix A			
Cadmium	See Appendix A			

General First Aid Treatment

EYE
irrigate immediately - If this chemical contacts the eyes, immediately wash the eyes with large amounts of water, occasionally lifting the lower and upper lids. Get medical attention immediately. Contact lenses should not be worn when working with this chemical.

SKIN
soap wash immediately- If this chemical contacts the skin, immediately wash the contaminated skin with soap and water. If this chemical penetrates the clothing, immediately remove the clothing, wash the skin with soap and water and get medical attention promptly.

soap wash promptly - If this chemical contacts the skin, promptly wash the contaminated skin with soap and water. If this chemical penetrates through the clothing, promptly remove the clothing and wash the skin with soap and water. Get medical attention promptly.

water flush immediately- If this chemical contacts the skin, flush the contaminated skin with water promptly. If this chemical penetrates the clothing, immediately remove the clothing and flush the skin with water promptly. If irritation persists after washing, get medical attention.

BREATH
respiratory support- If a person breathes large amount of this chemical, move the exposed person to fresh air at once. If breathing has stopped, perform mouth to mouth resuscitation. Keep the affected person warm and at rest. Get medical attention as soon as possible.

SWALLOW
medical attention- Immediately If this chemical has been swallowed, get medical attention immediately.

SITE SPECIFIC SAFETY AND HEALTH PLAN

TASK DESCRIPTION PAGE ***AST***

Dames & Moore

FIELD ACTIVITIES COVERED UNDER THIS PLAN - ATTACH ACTIVITY HAZARD ANALYSIS FOR EACH TASK				HAZARD		
TASK DESCRIPTION/SPECIFIC TECHNIQUE-STANDARD OPERATING PROCEDURES/SITE LOCATION (Attach additional sheets as necessary)	Type	Primary	Contingency	SCHEDULE		
1A Mobilization & Demobilization 1B Site Walk Through, Site Survey	Intrusive	A B C **D**	A B **C** D or	Hi	Med	Low
	Non-intrusive	Modified	**Exit Area**			
2 Sampling Above and/or Below Ground Tanks	Intrusive	A B C **D**	A B **C** D or	Hi	**Med**	Low
	Non-intrusive	**Modified**	**Exit Area**	Physical Hazard		
3	Intrusive	A B C D	A B C D or	Hi	Med	Low
	Non-intrusive	Modified	Exit Area			
4	Intrusive	A B C D	A B C D or	Hi	Med	Low
	Non-intrusive	Modified	Exit Area			
5	Intrusive	A B C D	A B C D	Hi	Med	Low
	Non-intrusive	Modified	Exit Area			

PERSONNEL* AND RESPONSIBILITIES (Include subcontractors) Responsibilities are described on the following page.

NAME	OFFICE SYMBOL	HEALTH CLEARANCE?	RESPONSIBILITIES	ONSITE?
	Backhoe Operator		Install Trench	
Jon Seekins	Project Manager	Y	MANAGER/Alternate SSHO	
Michelle Barnett	Sampler	Y	OVERSIGHT/MONITORING/SAMPLING	
Jon Seekins	SSHO Alternate	Y		
Michelle Barnett	Safety Manager	Y	SSHO	

DESCRIPTION OF RESPONSIBILITIES

Site Safety and Health Personnel. The Site Safety and Health Officer (SSHO) in conjunction with the Site Supervisor ensures that the provisions of this SSHP are adequate and implemented in the field. Project Managers and Technical Managers are to take all necessary actions to guarantee site safety. Changing field conditions may require decisions to be made concerning adequate protection programs. Personnel assigned as SSHO must be experienced and meet the additional training requirements specified by OSHA in 29 CFR 1910.120 and this SSHP. The SSHO is also responsible for conducting site inspections on a regular basis in order to ensure the effectiveness of this plan.

Organizational Responsibility

Project Manager

- Overall responsibility for project schedule;
- Manage and schedule and coordinate changes;
- Develop cost estimates for work identified.
- Identify scope of work;
- Estimate schedule for work;
- Request that a technical team be appointed;
- Identify resources needed (specialized expertise);
- est schedule or contingencies.
- Enforce disciplinary action when unsafe acts or practices occur;
- Grant permission for site access;
- Designate site security;
- Enforce the buddy system.

Safety Manager

- Keep safety and health records;
- Prepare safety and health reports;
- Confirm an employee's suitability for work based on the physician's recommendation;
- Enforce site control;
- Designate signs.

Site Safety and Health Officer (SSHO) and Alternate SSHO

- Conduct safety meetings.
- Monitor on-site hazards and conditions;
- Audit compliance with the Site Safety and Health Plan (SSHP);
- Enforce safety procedures;
- Designate facilities, and equipment for health and safety;
- Select, dispense, and ensure availability of Personal Protective Equipment (PPE);
- Periodically inspect PPE and ensure proper storage and maintenance;
- Monitor for heat and cold stress;
- Set up decontamination lines, control decontamination, prepare decontamination solutions, and monitor;
- Notify and serve as liaison with emergency response personnel;
- Train employees on emergency procedures and evacuation routes;

Sampler (Project or Field)

- Conduct sampling;
- Package and ship samples off site;
- Dispose of contaminated materials (Re: Work Plan).

SITE SPECIFIC SAFETY AND HEALTH PLAN

PPE BY TASK PAGE ***AST***

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PROTECTIVE EQUIPMENT: Specify by task. Indicate type and/or material as necessary. Use copies of this sheet if needed.

TASKS: 1 - 2 - 3 - 4 (X)Primary
LEVEL: A - B - C - D - Modified ( ) Contingency

Respiratory: (X) Not Needed
( ) SCBA, Airline:
( ) APR:
( ) Cartridge:
( ) Escape Mask:
( ) Other:

Head and Eye: ( ) Not Needed
(X) Safety Glasses:
( ) Face Shield:
(X) Goggles*
(X) Hard Hat:
*Either safety glasses or over-goggles

Boots: ( ) Not Needed
(X) Boots: Leather steel-toed & shank work boots
( ) Overboots:Latex or Nitrile
( ) Rubber:

Prot. Clothing: (X) Not Needed
( ) Encapsulated Suit:
( ) Splash Suit:
( ) Apron
( ) Tyvek Coverall:
( ) Saranex Coverall:
( ) Cloth Coverall:
( ) Other:

Gloves: ( ) Not Needed
( ) Undergloves:
(X) Gloves: Nitrile
(X) Overgloves*: optional
*Cotton to preclude abrasion of Nitrile
( ) Other - specify below:

TASKS: 1 - 2 - 3 - 4 ( ) Primary *
LEVEL: A - B - C - D - Modified (X) Contingency or Back-off and wait for natural ventilation

Respiratory: ( ) Not Needed
( ) SCBA, Airline:
(X) APR:Full Face MSA Advantage 1000
(X) Cartridge: OV
( ) Escape Mask:
( ) Other:

Head and Eye: ( ) Not Needed
( ) Safety Glasses:
( ) Face Shield:
( ) Goggles:
(X) Hard Hat:
(X) Other:Incl w Respirator full-face

Boots: ( ) Not Needed
( ) Boots: Leather steel-toed & shank work boots
( ) Overboots:
(X) Rubber:

Prot. Clothing: ( ) Not Needed
( ) Encapsulated Suit:
( ) Splash Suit:
( ) Apron
(X) Tyvek Coverall:
( ) Saranex Coverall:
( ) Cloth Coverall:
( ) Other:

Gloves: ( ) Not Needed
( ) Undergloves:
(X) Gloves: Nitrile
(X) Overgloves: optional

( ) Other - specify below:

TASKS: 1 - 2 - 3 - 4 - 5 - ___ ( ) Primary
LEVEL: A - B - C - D - Modified ( ) Contingency

Respiratory: ( ) Not Needed
( ) SCBA, Airline:
( ) APR:
( ) Cartridge:
( ) Escape Mask:
( ) Other:

Head and Eye: ( ) Not Needed
( ) Safety Glasses:
( ) Face Shield:
( ) Goggles:
( ) Hard Hat:
( ) Other:

Boots: ( ) Not Needed
( ) Boots: Leather steel-toed & shank work boots
( ) Overboots:
( ) Rubber:

Prot. Clothing: ( ) Not Needed
( ) Encapsulated Suit:
( ) Splash Suit:
( ) Apron
( ) Tyvek Coverall:
( ) Saranex Coverall:
( ) Cloth Coverall:
( ) Other:

Gloves: ( ) Not Needed
( ) Undergloves:
( ) Gloves:
( ) Overgloves:

( ) Other - specify below:

TASKS: 1 - 2 - 3 - 4 - 5 - ( ) Primary
LEVEL: A - B - C - D - Modified ( ) Contingency

Respiratory: ( ) Not Needed
( ) SCBA, Airline:
( ) APR:
( ) Cartridge:
( ) Escape Mask:
( ) Other:

Head and Eye: ( ) Not Needed
( ) Safety Glasses:
( ) Face Shield:
( ) Goggles:
( ) Hard Hat:
( ) Other:

Boots: ( ) Not Needed
( ) Boots: Leather steel-toed & shank work boots ( ) Overboots:
( ) Rubber:

Prot. Clothing: ( ) Not Needed
( ) Encapsulated Suit:
( ) Splash Suit:
( ) Apron
( ) Tyvek Coverall:
( ) Saranex Coverall:
( ) Cloth Coverall:
( ) Other:

Gloves: ( ) Not Needed
( ) Undergloves:
( ) Gloves:
( ) Overgloves:

( ) Other - specify below:

SITE SPECIFIC SAFETY AND HEALTH PLAN

AIR MONITORING BY TASK PAGE ***AST***

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MONITORING EQUIPMENT: Specify by task. Indicate type as necessary. Attach additional sheets as necessary.

INSTRUMENT	TASK	ACTION GUIDELINES		COMMENTS (Includes schedules of use)
Combustible Gas Indicator	1 - 2 - 3 - 4	0-10% LEL 10% **>10% LEL** 21.0% 02 <19.5% 02 **>22.5% 02**	No explosion hazard Proceed w/caution, continuous monitoring **Explosion hazard; interrupt task/evacuate, reassess** Oxygen normal Oxygen deficient; notify SSHO. **Interrupt task/evacuate**	Monitor prior to any intrusive work in the general area to establish a baseline; monitor during intrusive work continuously and while doing any trench entry. Monitor every FIVE minutes during initial trench excavation.
Radiation Survey Meter	1 - 2 - 3 - 4 - 5	3X Background **>2mR/hr**	Notify SSHO **Interrupt task/evacuate**	(X) Not Needed
Photoionization Detector Type **OVM** ( ) 11.7 ev (X) 10.2 ev ( ) 9.8 ev ( ) ___ ev	1 - 2 - 3 - 4	**Specify: Hnu** >5ppm; sustained >1 minute, depart site upwind, monitor with Benzene detector tubes.		Monitor prior to any intrusive work in the general area to establish a baseline; monitor during intrusive work continuously and while doing any trench entry. Monitor every FIVE minutes during initial trench excavation.
Flame Ionization Detector Type _____	1 - 2 - 3 - 4 - 5 - ___	**Specify:**		(X) Not Needed
Detector Tubes Type : Benzene Type _____	1 - 2 - 3 - 4 - ___	**Specify:**		Use whenever Hnu readings exceed 1 ppm for 5 minutes
Respirable Dust Monitor Type _____ Type _____	1 - 2 - 3 - 4 - 5 - ___	**Specify:**		(X) Not Needed
Other **Specify**	1 - 2 - 3 - 4 - 5 - ___	**Specify:**		(X) Not Needed

SITE SPECIFIC SAFETY AND HEALTH PLAN

DECONTAMINATION PAGE AST

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DECONTAMINATION PROCEDURES

ATTACH SITE MAP INDICATING EXCLUSION, DECONTAMINATION, AND SUPPORT ZONES AS PAGE TWO

Personnel Decontamination	Sampling Equipment Decontamination	Heavy Equipment Decontamination
Level D decon will be used. Wipe down leather boots with wet wipes. Wipe off exterior of safety glasses or goggles with wet wipes. Wipe off exterior of gloves with wet wipes and bag for disposal as sanitary waste. Wash hands and face as soon as practical. Summarize below and/or attach diagram of decon area.	All small equipment will be bagged for later decon. Bags are to be labeled Dames & Moore investigation and dated. Later decon will be soap and water wash using Alconox. All personnel deconning equipment will wear latex gloves. See: Sampling Plan for details as to sample container decon. Summarize below and/or attach diagram of decon area.	Heavy equipment will be deconned on-site using water and Alconox. Water use will be minimized. Work Plan includes equipment decontamination procedures.
Containment and Disposal Method Note: Segregate clean and dirty equipment throughout site work using labeled Hefty@ Steel sacks	**Containment and Disposal Method**	**Containment and Disposal Method**

SITE SPECIFIC SAFETY AND HEALTH PLAN

WORK ZONE PAGE

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THIS PAGE RESERVED FOR MAP (Show Exclusion, Contamination Reduction, and Support Zones for each tank sampled. Indicate evacuation and reassembly points.)

SITE SPECIFIC SAFETY AND HEALTH PLAN

SIGNATURE PAGE

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The following personnel have read and fully understand the contents of this Site Safety and Health Plan and referenced appendices and further agree to all requirements contained herein. Further more the individuals are fully trained and have required clearances. Attach copies of current HTRW and first aid training, medical clearance, and respiratory fit test records.

Name	Affiliation	Date	Signature

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Appendix A: Toxicological Assessment and Decision Logic for Major Potential Contaminants On-site

Major Potential PAH Contaminants at the Site.

Creosote contains Polynuclear Aromatic Hydrocarbons (PAHs). Often the creosote treatment involved the use of contaminated waste oils and petroleum hydrocarbons. Sites where creosote is a present must, thus, be assessed for PAHs and hydrocarbons.

Chemical and Toxicological characteristics of the Contaminants of Concern.

Note: The toxicological effects (i.e. effects that result in toxic effects in the body) listed here range from those that are simply annoying to serious health effects. These effects are discussed in this section without regard to actual potential exposure risk at this site.

Asbestos. Asbestos hazards are associated with the crystalline form(s) of asbestos. The fibers given off during sampling events are respirable. Asbestos is not easily removed from the body and does not dissolve or change chemically within the body.
Once in the body, asbestos moves through soft tissue, causes soft tissue scarring and encystment, and can initiate cancers. Asbestos is an A1 carcinogen, and this effect is not dose dependant -- for this reason Asbestos exposure must be kept to a minimum.
OSHA: The legal airborne Permissible Exposure Limit (PEL) for Asbestos is **1 f/cc** averaged over an 8-hour workshift.
The EPA limit for releases of Asbestos offsite is .01f/cc above background levels.

Total PAHs. PAHs can be formed in any hydrocarbon combustion process and may be released from oil spills. The less efficient the combustion process, the higher the PAHs emission factor is likely to be. The major sources are stationary sources, such as heat and power generation, refuse burning, industrial activity, such as coke ovens, and coal refuse heaps. Because of the large number of sources, most people are exposed to very low levels of PAHs. The PAHs tend to adsorb on particulate matter. In the environment, PAHs are photo-oxidized, and react with oxidants and oxides of sulfur.

Exposure to PAH's will be based on the concept of Additive Effect of Threshold Limit Values for Mixtures as defined by the American Conference of Industrial Hygienists (ACGIH). Since PAH's have the same target organ effects and environmental dispersion pathway, the assumption will be that the total amount of PAH component present will be affecting the work force.

PAH's can be expected as adsorbed contaminant on soils that are obviously stained and/or exuding an aromatic odor indicative of generalized volatile contaminant spillage. Exposure to a work force would be expected via the inhalation of soil particulate.

OSHA: The legal airborne Permissible Exposure Limit (PEL) for the a typical PAH compound (floranthene) is **20 ug/m^3 (.02 mg/m^3)** averaged over an 8-hour workshift. When compared to the visible dust limit, 500 to 1000 **ug/m^3 (5 to 10 mg/m^3)**, you can see that visible dust is not a good means of determining PAH exposure.

Since most PAH contaminated sites where creosote has been used, are also contaminated with hydrocarbons, the relative amount of hydrocarbon contamination is a good indication of PAH contaminant concentration associated with creosote. In areas where the soil is stained, both misting and slow, deliberate sampling methods must be used to minimize airborne dusts. If visible dust is observed, workers must move to Level C contingency PPE.

Lead. Heavy, soft gray metal. Lead exposure can cause a variety of health problems. The earliest symptoms may be tiredness, trouble sleeping, stomach problems, constipation, headaches, irritability, and depression. Higher levels may cause aching and weakness in the arms and legs, trouble concentrating and remembering things, and may cause a low blood count (anemia). Lead exposure increases the risk of high blood pressure.

Repeated exposure can result in the build-up of lead in the body. This build-up results in lead being deposited in the bones. When referring to the amount of lead in the bones, the term "body burden" is often

used. Body burden implies that the body is storing lead rather than excreting the lead through waste products or carrying the lead in the blood. Because this lead is not being excreted in urine or carried in the blood, urine and blood samples will not be an indicator of the total lead present in the body. Blood samples are an indication of lead exposure for approximately 2-4 weeks after the exposure incident. Then as the body begins to deposit lead in the bone, blood samples become a less accurate indication of lead exposure.

The lead in the bone may be released from the bone tissue when certain processes within the body occur. One of these processes is be when the body begins to use the calcium stored in the bone as a substitute for calcium lacking in the diet. When the calcium is removed from the bone, the lead held in the bone tissue, also, begins to enter the blood stream. This process is one of the reasons why women of childbearing age are cautioned to avoid exposure to lead. Lead is a probable terratogen, that means that a developing fetus can be severely injured by exposure to lead.

Lead can cause serious permanent kidney or brain damage when exposures are high.

Lead exposure can occur by inhalation or ingestion.

OSHA: The legal airborne Permissible Exposure Limit (PEL) for Lead is **50 ug/m^3 (.05 mg/m^3)** averaged over an 8-hour workshift.

Benzene. Colorless to light-yellow liquid with an aromatic odor. Exposure can cause symptoms of dizziness, lightheadedness, headaches, and vomiting. High exposures may cause convulsions and coma, and irregular heartbeat. Repeated exposure can damage the blood forming organs causing anemia (aplastic). Long term exposure can cause drying and scaling of the skin. Benzene is an A1 carcinogen proven to cause leukemia in humans.

Benzene is the primary contaminant of concern in hydrocarbon spills due to is classification as a A1 carcinogen.

OSHA: The legal airborne Permissible Exposure Limit (PEL) for Benzene is **1ppm** averaged over an 8-hour workshift.

Cadmium. Cadmium compounds have low volatility and exist in air primarily as suspensions of fine particulate matter.

- When inhaled, a fraction of this particulate matter is deposited in the airway.
- Large particles (e.g., 10 um) tend to be deposited in the upper airway, while small particles (e.g., 0.1 um) tend to penetrate to the alveoli.
- While some soluble cadmium compounds may undergo limited absorption in the upper respiratory tree, the major site of absorption is the alveoli.

Cadmium can affect you when breathed in. Cadmium is a CARCINOGEN, a TERATOGEN, and may cause REPRODUCTIVE DAMAGE. HANDLE WITH EXTREME CAUTION. Breathing Cadmium can irritate the lungs causing coughing and/or shortness of breath. Higher exposures can cause a build-up of fluid in the lungs (pulmonary edema), a medical emergency, with severe shortness of breath.
Repeated low exposures can cause permanent kidney and lung damage, anemia, and loss of smell. High exposure to Cadmium may cause nausea, salivation, vomiting, cramps, and diarrhea. Cadmium can cause a flu-like illness with chills, headache, aching and/or fever.
OSHA: The legal airborne Permissible Exposure Limit (PEL) for Cadmium is **5 ug/m^3 (.005 mg/m^3)** averaged over an 8-hour workshift.

Chromium
Chromium powder can affect you when breathed in.
Chromium fumes can cause "metal fume fever," a flu-like illness lasting about 24 hours with chills, aches, cough and fever.

OSHA: The legal airborne Permissible Exposure Limit (PEL) is **1 mg/m3** averaged over an 8-hour workshift.

PCBs. Polychlorinated biphenyls (PCBs) are synthetic chemical compounds consisting of chlorine, carbon and hydrogen. First synthesized in 1881, PCBs are relatively fire-resistant, very stable, do not conduct electricity and have low volatility at normal temperatures. These and other properties have made them desirable components in a wide range of industrial and consumer products. Some of these same properties make PCBs environmentally hazardous especially their extreme resistance to chemical and biological breakdown by natural processes in the environment. PCBs are also known by their various brand names which include Aroclor, Pyranol, Interteen, and Hyvol.

PCB mixtures are usually light coloured liquids that feel like thick, oily molasses. However, some PCB compounds form sticky, yellow liquids or a brittle gum ranging in colour from amber to black. PCBs are soluble in most organic solvents but are almost insoluble in water, so when added to it they sink to the bottom. Most PCBs are non-volatile at normal temperatures (i.e., below 40 C).

While there have been many laboratory experiments and other studies that have tried to determine the full health effects of PCBs on humans, none has been definitive. As a result, even expert opinion varies significantly on this subject. Scientists generally agree it is unlikely that serious injury would result from short-term low-level exposure to PCBs. However, most are concerned about possible adverse health effects of long-term exposure to even low concentrations of these substances. PCBs can enter the body through skin contact, by the inhalation of vapours or by ingestion of food containing PCB residues.

The most commonly observed health effect from extensive exposure to PCBs is chloracne, a painful and disfiguring skin condition, similar to adolescent acne. Liver damage can also result. People who might be exposed to PCBs include those servicing some types of electrical equipment, maintenance workers who clean up spills or leaks of PCB fluids, employees of scrap metal or salvage companies, and waste collection workers.

OSHA: The PEL is 0.5 mg/m³ (for PCB mixes with 54 percent chlorine) or 1 mg/m³ (for PCB mixes with 42 percent chlorine) for an 8-hour workday to protect workers from noncancer harmful health effects.

Hazard Evaluation and Initial Sampling Efforts.

This site has not been fully characterized. Site history indicates that hydrocarbons and lumber treating chemicals (creosote) were used on the site.

The first step should soil or water contamination be suspected is to assume that exposure during sampling will be occurring. Samplers will done HEPA-OV Cartridge equipped Air Purifying Respirators (APRs) and take soil samples. These samples will be analyzed for PAHs, PCBs and lead. In lieu of laboratory analysis, immunoassay field methods may be used.

If analysis indicates that any of these chemicals are present, contact the site Industrial Hygiene staff for air dispersion calculations and specific routines to assess exposure.

PAH and lead levels will be considered predicative of Chromium and Cadmium relative contamination for initial sampling. As results for soils sampled are obtained this assumption will be reevaluated.

All asbestos samplers will be required to wear HEPA equipped APRs.

Environmental Fate.

PAHs have K_{oc} values that are characteristic of chemicals that tend to readily adsorb to the soil particulate or any other particulate present. PAH's are expected to bind strongly to soil and to not leach extensively to ground water through volatilization.

Photolysis and hydrolysis do not appear to be significant PAH breakdown processes in soil. However while little volatilization will occur from the soil, leaching to groundwater is possible. PAH's released to the water will dissolve at ambient pH's. The dissociated form will degrade (hours to days).

Photolysis is expected to occur near the water surface and biodegradation in the water column is expected. Biodegradation probably becomes significant after acclimation (may take several weeks). PAH's with 4 or

less aromatic rings are degraded by microbes. Transport of PAH biodegradation products to groundwater has been documented in some cases.

Lead. If released or deposited in the soil, lead will be retained in the upper 2-5 cm. of soil, especially in soils with at least 5% organic matter or a pH of 5 or above. Leaching is not a significant process under most circumstances. Lead enters water from runoff or wastewater. Lead is effectively removed from the water column to the sediment by adsorption to organic matter and clay minerals. When released to the atmosphere, lead will generally be in a dust or adsorbed to particulate matter.

Benzene. Benzene released into the soil is subject to rapid volatilization near the surface. That does not evaporate, will be highly to very highly mobile in the soil and may leach to groundwater. Benzene uniformly distributed to 1 and 10 cm through the soil has a half-life of 7.2 to 38.4 days. If benzene is released to the water, rapid volatilization may occur. Benzene will not adsorb to particulates. Biodegradation may occur. Benzene released to the atmosphere will exist in the vapor phase. Benzene is fairly soluble in water and is removed from the atmosphere by rains.

PCBs . Enter air as solid or liquid aerosols or vapor and can stay in air more than 10 days.

- When in air, can travel long distances in the wind.
- Move from air to soil and water during snows or rain events.
- Most stick tightly to soil particles; a small amount dissolves in water.
- Take several years to break down in soil.

Chromium and Cadmium. If released or deposited in the soil, lead will be retained in the upper 2-5 cm. of soil, especially in soils with at least 5% organic matter or a pH of 5 or above. Leaching is not a significant process under most circumstances. When released to the atmosphere, lead will generally be in a dust or adsorbed to particulate matter.

Asbestos. Asbestos does not degrade in the soil or water, and remains chemically intact.

Initial Sampling Toxicological Exposure Limitations

PAH's

Onsite contaminant concentrations could exceed inhalation exposure maximum limits for PAH's and lead if all the contaminants were airborne as dust particles. However, even under worst case scenarios, dust generation would not cause all the soils on the site to suddenly become airborne, only a portion of the chemicals of concern would adsorb to dust particulates; and only approximately 60 per cent of the airborne dust particulates would be of respirable size.

Usually 5 mg/m^3 is assumed to be the airborne particulate concentration necessary to have visible dust. Since many PAH dust exposure maximum levels are below 5 mg/m^3; visible dust cannot be used as an indicator of acceptable exposure limits. Consequently, High Efficiency Particulate (HEPA) cartridge equipped respirators will be required for all personnel in the Exclusion Zone during sampling activities where PAH contamination is suspected or confirmed. This precaution is needed because PAH's being semi-volatile can enter the body as inhaled dust or soil particulate. Once in the body, the higher core temperature in the body or metabolic activity make the PAH's available and potentially cause a dose-response pathway to be completed internally.

Since complete suspension of these contaminates on site is 1) not physically probable and 2) misting of the sampling area will continually remove particulates from the air; HEPA cartridges will be used and the PID will be continually monitored. If the PID records a sustained deflection of 1 PPM, the workers will evacuate the Exclusion Zone. The assumption will be that newly exposed PAH's will be in areas where volatile organics are also present. The presence of volatile organics as evidenced by sustained PID readings will require that the site be further evaluated as to PAH potential exposure.

Evaluation for potential exposures to PAH's will require soil sampling and attendant air dispersion calculations and air monitoring for particulates. Unfortunately we do not have instrumentation to monitor real time for PAH's. PAH sampling will require that laboratory analyticals or immunoassay be

accomplished. Therefor until results are obtained and interpreted, HEPA-OV cartridge full-face air purifying respirators will be required. On-site monitoring sequence is as follows:

- Visible dust: 2 L/min flow rate personal air sampling pumps will be used to draw air through filter cassettes. Cassettes will be packaged and sent to contract laboratory for analysis.
- On-going site work will continue with dust suppression engineering controls required. Personnel will don HEPA cartridge air purifying respirators.
- If organic vapors are also present (See below), HEPA-OV combo cartridges will be donned.

Volatile Organics

In order to detect if **any** chemicals are being volatilized a Photo-Ionization Detector (PID) will be used to scan the sampling sites. Any deflection (defined as needle deflection that indicates one reading over 1 ppm) of the PID will initiate the use of benzene colorimetric tubes. In the event that either the benzene colorimetric tubes show benzene at 5 ppm, sampling activities will cease and the Industrial Hygiene staff will be notified. On-site monitoring sequence is as follows:

- Any sustained deflection of the PID: benzene colorimetric tubes will be used;
- Benzene in excess of 5 ppm detected: work will cease and Exclusion Zone will be allowed to ventilate. Retesting and assigning of respirator protection will commence after a 30-minute ventilation interval.
- Industrial Hygiene staff will be notified of both sampling efforts and will provide further protocols.

Lead & Tetraethyl Lead.

Dust levels of 5 mg/m^3 (100 times .05 mg/m^3) Lead, would necessitate the use of supplied air respirators. In all areas where visible dust is present and soil staining or other obvious signs of contamination (drum fragments, intact drums, chemical containers, buried treated wood), lead contamination will be suspected. Testing for both lead and PAH soil adsorbed components will ensue. This testing will be done using 2 L/min flow rate through filter loaded cassettes. Filter analyticals for both lead and PAH's will be requested of the testing laboratory.

The OSHA PEL is 50ug/m^3 (.050 mg/m^3); the action level (AL) is 30 ug/m^3 (.030 mg/m^3). Onsite work may expose workers above the PEL. Biological monitoring of exposure is necessary if the airborne concentration exceeds 30 ug/m3 (.030 mg/m3) for 30 days in 12 consecutive months.

Onsite contaminant concentrations could exceed inhalation exposure maximum limits for lead. Consequently, High Efficiency Particulate (HEPA) cartridge equipped respirators will be required for all personnel in any lead

Contaminant area during sampling activities. Air monitoring will be performed to assess the degree of exposure to lead particulates during on-site investigative work and to confirm the adequacy of the level of personal protective equipment being used.

- Employee exposure is that exposure which would occur if the employee were not using a respirator.
- **Full shift (for at least 7 continuous hours) personal samples including at least one sample for each shift for each job classification in each work area will be conducted in areas where lead contaminated soil is expected.**
  - Full shift personal samples will be representative of the monitored employee's regular, daily exposure to lead.
  - Monitoring for the initial determination may be limited to a representative sample of the exposed employees who the employer reasonably believes are exposed to the greatest airborne concentrations of lead in the workplace.

Chromium and Cadmium are normally determined through off-site laboratory analysis. PAH and lead levels will be considered predicative of Chromium and Cadmium relative contamination for initial sampling. As results for soils sampled are obtained this assumption will be reevaluated.

ASBESTOS (29 CFR 1910.1001 and 29 CFR 1926.1101)

***Employee exposure* means that exposure to airborne asbestos that would occur if the employee were not using respiratory protective equipment. All personnel sampling asbestos will be monitored as described herein.**

Exposure monitoring - How:
Employee exposure shall be determined using **breathing zone air samples** (8-hour TWA and 30-minute short-term exposures)
Representative 8-hour TWA employee exposures: One or more samples representing full-shift exposures

- For:
  - Each **shift**
  - Each **employee**
  - Each **job classification**
- In each **work area**

Representative 30-minute short-term employee: One or more samples representing 30 minute exposures (operations that are most likely to produce exposures above the excursion limit) for:

- For:
  - Each **shift**
  - Each **job classification**
- In each **work area**

Initial monitoring.

- **Immediately before/at the initiation** of the operation (1926.1101)
- When **employees may reasonably be expected to be exposed to airborne concentrations at or above the action level and/or excursion limit** (1910.1001)
- Made from breathing zone air samples that are representative of the 8-hour TWA and 30-minute short-term exposures of each employee.
- Representative 8-hour TWA employee exposure shall be determined on the basis of **one or more** samples representing full-shift exposure for employees in each work area.
- Representative 30-minute short-term employee exposures shall be determined on the basis of **one or more** samples representing 30-minute exposures associated with operations that are most likely to produce exposures above the excursion limit for employees in each work area.

Historical Documentation for Initial monitoring - May be used when:

- Employer has monitored:
  - After **December 20, 1985** (for the TWA) and
  - After March 14, 1988, (for the excursion limit)
- Monitoring satisfies all the above requirements and the analytical requirements listed in 29 CFR 1910.1001/1926.1101
- Documentation has occurred within the past calendar year (12 months)

Objective Data for Initial monitoring - May be used when such data relates that:
"asbestos is **not capable of being released** in airborne concentrations at or above the action level and/or excursion limit **under the expected conditions** of processing, use, or handling" - then no initial monitoring is required

Appendix B: Site Records

Contingency Plan Visitors Log

Date	Name	Time IN	Time OUT	PPE Used	Training Date	Meds Date	RPP Fit Test Dates

Daily Safety Inspection Log

The SSHO will develop a code for each Work Area, PPE, and Work Equipment

Date	Work Area Checked	Employees Present	PPE Used	Work Equipment Used	Safety & Health Issues

Preparers Signature

DAILY INSTRUMENT CALIBRATION CHECK SHEET

Instrument _____
Serial # _____

Date	Instrument	Battery Check Ok?	Zero Adjust Ok?	Calibration Gas (ppm)	Reading (ppm)	Calibrated By	

AIR MONITORING READINGS

Air Monitor's Name(s)	
Date	
Project Name	
Project Number	
Site Conditions	
Barometric Pressure	
Humidity	
Temperature	
Estimated Wind Direction	
Estimated Wind Speed (i.e., calm, moderate, strong)	
Weather Conditions	
Comments	

Site Diagram Showing Monitoring Locations

Readings

Time	Location	Instrument Type	Reading %, ppm/other	Survey Type*	Work Activity

* Survey Type
  - BZ = Breathing Zone
  - A = General Area, Perimeter
  - C = Contact (1"-2" from source)
  - BS = Borehole Space
  - TS = Trench Space

ACTIVITY HAZARD ANALYSIS SECTION

The following section contains Activity Hazard Analysis (AHAs). Chose the Activity Hazard Analysis that describe site activities and attach to the current SSHP. Should tasks change, go back and attach the needed AHA's for the new tasks. For items in the AHA's that are not applicable to the current site, have the Safety Manager or Site Safety and Health Officer strike through and initial deletions.

ACTIVITY HAZARD ANALYSIS

ACTIVITY: MOBILIZATION

Analyzed By/Date_____

Reviewed By/Date_____

ACTIVITY	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
Mobilization of equipment/supplies	Heavy lifting	• Use proper lifting techniques, size up the load, use teamwork, never twist or turn when lifting. • Wear appropriate personal protective equipment. • Objects greater than 60 lbs require assistance or use of a mechanical lifting device.
	Slip, trip, fall	• Hazards will be identified and remedied by implementation of engineering controls. • Good housekeeping procedures. • Continual inspection of work areas.
	Faulty/damaged equipment	• Equipment will be inspected upon arrival and at the beginning of each shift. • Equipment to be inspected by competent mechanic and certified to be in safe operating condition.
Installation of temporary support facilities	Equipment operators	• Equipment will be operated by trained/experienced personnel only. • Self-propelled equipment shall have an audible backup alarm. • All equipment operations will be performed in accordance with Section 18 of EM385-1-1.
	Noise	• Implement engineering controls to required sound levels. • Utilize hearing protection devices above 85 decibels.
	Hand/power tools	• Hand/power tools shall be inspected before each use. • Use proper tools designed for the activity.
	Cold stress	• Wear layered insulated clothing. • Remove wet clothing as soon as possible. • Take breaks in warm area.

ACTIVITY HAZARD ANALYSIS

ACTIVITY: SITE PREPARATION

Analyzed By/Date_____

Reviewed By/Date_____

ACTIVITY	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
Set up trailers and hook up utilities • Install utility poles • Move trailers onto site • Secure and tie down trailers • Place aggregate in support zone • Place frac tanks and fuel tanks	• Safety hazards from use of heavy equipment • Electrical hazards during hook-up of wiring • Pouring aggregate in support zone • Contact to contaminated media while on site • Handling of heavy materials • Fire, explosion, or spills from fuel tanks	• Ensure that all workers are clear of area when moving trailers. • Use only trained, qualified electrician to install wiring. • Keep non-essential personnel out of area while pouring and spreading rock. • Survey site for hazardous materials prior to work in this area. • Inspect tanks for spills, have fire extinguishers on site, train personnel in use and recognition of problems with fuel storage and transfer.
Clearing and grubbing • Driving heavy equipment onto site • Scraping and piling vegetation and debris	• Driving over workers • Injury to workers while loading or moving materials • Exposure to contaminated soils • Creation and inhalation of dust • Discovery of UXO	• Train all site workers to avoid moving equipment. • Load materials with equipment and not by hand. • Survey area prior to work on site. • Monitor the air during this operation for discovery of contaminated soils. • Use dust suppression techniques specified in DCP. • If UXO are discovered, immediately cease operations, evacuate site, and SSHO shall contact FPPB.
Install fencing around work zones • Drive equipment around perimeter of site • Drive fence posts into ground • Hang fabric onto posts and secure	• Tripping on materials on the site • Safety hazards from use of post driving equipment • Injury from handling of heavy fencing materials • Exposure to contaminated media on the site	• Clear site of tripping and slipping hazards. • Use caution while operating post driving equipment. • Use equipment to haul heavy materials. • Be alert for the presence of contaminated areas. • Wear PPE specified in Section _____. • Brief all workers on the hazards to be anticipated.

ACTIVITY HAZARD ANALYSIS

ACTIVITY: SITE WALK THROUGH, SITE SURVEYS, AND SAMPLING GRID LAYOUT

Analyzed By/Date_____

Reviewed By/Date_____

ACTIVITY	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
Site walk-through, surveys, and sampling grid layout	Exposure to irritant and toxic plants	• Wear long sleeved clothing and slacks to minimize contact. • Appropriate first aid for personnel's' known allergic reactions.
	Slip, trip, and fall	• Be alert at all times. • Wear steel toed boots. • Good housekeeping.
	Sprains and strains	• Safe lifting techniques.
	Wildlife	• Avoid wildlife when possible. In case of an animal bite, perform first aid. Perform a tick check after leaving a wooded or vegetated area.
	Terrain	• Inspection or determination of road conditions and structures shall be made in advance to assure that clearances and load of any machinery or equipment is safe.
	Equipment	• Ensure all maintenance is performed on vehicles before going to the field.
	Fallen power lines	• Ensure fallen power lines are not energized.
	Structures	• Avoid buildings which are not structurally sound.
	Heat stress	• Shift work hours. • Sufficient fluid intake. • Monitor employees.
	Cold stress	• Wear layered insulated clothing. • Remove wet clothing as soon as possible. • Take breaks in warm area.
	Contact with potentially contaminated materials	• Continually inspect the work area for slip, trip and fall hazards. • Real time air monitoring will take place. • If necessary, proper personal protective clothing and equipment will be utilized.

ACTIVITY HAZARD ANALYSIS

ACTIVITY: AIR SAMPLING AND MONITORING

Analyzed By/Date_____

Reviewed By/Date_____

ACTIVITY	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
Air sampling and monitoring	Electrical	• Grounded plugs should be used. • Generators or air pumps should be used in dry areas, away from possible ignition sources. • Do not stand in water or other liquids when handling equipment. • Electrical equipment shall conform with OSHA 1910.303(a), 1910.305(a),(f),(f)(3). • Ground fault interrupters are used in the absence of properly grounded circuitry or when portable tools must be used in wet areas. • Extension cords should be protected from damage and maintained in good condition.
	Sampling pumps Ambient environment and readings	• Air pumps should be placed within easy reach using an OSHA approved ladder, elevated platform or by placing the pump on at stake. • Personnel should be thoroughly familiar with the use, limitations and operating characteristics of the monitoring instruments. • Perform continuous monitoring in variable atmospheres. • Use intrinsically safe instruments until the absence of combustible gases or vapor is anticipated.
	Cut hazards	• Use care when handling corrosive substances. • Wear adequate hand and eye protection. • 15-minute eyewash and first aid should be available. • Handle and store corrosives in appropriate areas.

ACTIVITY HAZARD ANALYSIS

ACTIVITY: SAMPLING OF ABOVE AND/OR BELOW GROUND TANKS

Analyzed By/Date Not Needed_____

Reviewed By/Date_____

ACTIVITY	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
Sampling of above and/or below ground tanks	Tanks	• In order to identify potential exposures, the tank history and contents should be known, or a general class of chemical thought to be contained in the tank should be identified. • Before work on a tank begins, a thorough evaluation of the tanks structural integrity should be completed by a competent individual. • If a tank is not determined to be stable, a separate platform, not attached to or dependent upon the vessel, should be utilized.
	Scaffolding or ladders	• It is preferable to use means other than the attached scaffolds or ladders to gain access to the tops of tanks. • Manlifts must comply with OSHA regulations requiring toe boards and handrails for work platforms greater than 10 feet. • All scaffolds used on-site must conform with OSHA regulations 29 CFR 1910.28 and ladders to 29 CFR 1910.25 and .26.
	Heavy machinery	• If a remote opening and/or sampling is conducted, the machinery must meet the specific OSHA requirements such as but not limited to seatbelts must be worn at all times, roll bar must be in place on the vehicle, back-up alarm must be in working condition, and maintenance records on the vehicle should be maintained while on site.
	Noxious gases	• Provide personnel with appropriate monitoring equipment prior to and during tank sampling.
	Sprains/strains	• Use proper lifting techniques. • Get assistance if needed. • Use proper techniques when opening sampling ports.
	Confined space	• Oxygen levels may be inadequate, non-existent, or displaced, in which case a confined space entry procedure is required. • Before an employee enters a confined space, a confined space entry permit and procedure must be completed.
	Equipment	• Utilize non-sparking equipment and tools for tanks suspected or known to contain flammable materials.

ACTIVITY HAZARD ANALYSIS

ACTIVITY: COMPATIBILITY TESTING

Analyzed By/Date Not Needed_____

Reviewed By/Date_____

ACTIVITY	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
Compatibility testing	Splashing/spills	• Wear safety glasses or face shield to protect from splattering or extreme water reactives. • Wear chemical gloves to protect hands in case of spills.
	Heating test tubes	• Never point a test tube at anyone while heating it. Substances can be bumped out of the tube as a result of improper heating. • If possible, utilize a laboratory facility or establish a temporary laboratory area on-site.
	Improper mixing	• Always add the unknown material to water when mixing.

ACTIVITY HAZARD ANALYSIS

ACTIVITY: SAFETY PROGRAM AND PROCEDURES

Analyzed By/Date_____

Reviewed By/Date_____

ACTIVITY	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
Safety program and procedures	General practices	• At least one copy of this plan shall be available at the project site, in a location readily available to all personnel, including visitors. • As practical, personnel should practice contamination avoidance. All solid and liquid samples should be collected in such a manner as to minimize contact with the material. • Contaminated protective equipment, such as respirators, hoses, boots, etc., shall not be removed from the area of potential contamination until it has been cleaned or properly packaged and labeled. • Legible and understandable precautionary labels which comply with the hazard communication standard shall be affixed prominently to all containers of contaminated scrap, waste, debris, and clothing. • Removal of contaminated solids from protective clothing or equipment by blowing, shaking, or any other means that disperse contaminants into the air is prohibited. • No food or beverages shall be present or consumed in the regulated area. • No tobacco products shall be present or used in the regulated area. • Cosmetics shall not be applied within the regulated area. • Contaminated materials shall be stored in tightly closed containers, in well-ventilated areas. • Emergency equipment shall be located outside storage areas in readily accessible locations that will remain minimally contaminated in an emergency. • All areas that have been determined as uncontaminated inside the regulated area will be clearly marked as such. No personnel, equipment, etc., shall be in these areas until they have been decontaminated. • Ensure that no one is required to lift more than 60 pounds. • All crew personnel on site shall use the buddy system (working in pairs or teams). If protective equipment or noise levels impair communications, then prearranged hand signals shall be used for communication. Visual contact shall be maintained between crew members at all times, and crew members must observe each other for signs of toxic exposure.

ACTIVITY HAZARD ANALYSIS

ACTIVITY: SAFETY PROGRAM AND PROCEDURES

Analyzed By/Date_____

Reviewed By/Date_____

ACTIVITY	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
Safety program and procedures (cont'd)	General practices (cont'd)	Indication of adverse effects include, but are not limited to: changes in complexion and skin coloration; changes in coordination; changes in demeanor; excessive salivation and pupillary response and changes in speech pattern. • Employees shall inform their partners or fellow team members of nonvisible effects of overexposure to toxic materials. The symptoms of such overexposure may include: Headaches; dizziness; nausea; blurred vision; cramps; irritation of eyes, skin, or respiratory tract. • Visitors to the site shall abide by the following: All visitors shall be instructed to stay outside the exclusion and contamination reduction zones and remain within the support zone during the extent of their stay. Visitors shall be cautioned to avoid skin contact with contaminated or potentially contaminated surfaces; Visitors requesting to observe work conducted in the exclusion zone (EZ) must wear all appropriate PPE prior to entry into that zone. If respiratory protective devices are necessary, visitors who wish to enter the exclusion zone must produce evidence that they have had a complete physical examination, respirator training, and have been fit tested for the respirator to be used within the past 12 months.
Operating procedures	Drilling equipment operations	• Specific elements of this section may not be applicable depending on the type of drilling equipment used and/or for the anticipated scope of this project. Prior to the start of site work, the drilling subcontractor will inspect all drilling equipment in the presence of the Site Supervisor.
	General drilling practices	• The departing driller shall inform the oncoming driller of any special hazards or ongoing work that may affect the safety of the crew. • Fire fighting equipment shall not be tampered with and shall not be removed for other than the intended fire fighting purposes or for servicing.

ACTIVITY HAZARD ANALYSIS

ACTIVITY: SAFETY PROGRAM AND PROCEDURES

Analyzed By/Date_____

Reviewed By/Date_____

ACTIVITY	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
Operating procedures (cont'd)	General drilling practices (cont'd)	• If lubrication fittings are not accessible with guards in place, machinery shall be stopped for oil and greasing. • Rigging material equipment for material handling shall be checked prior to use on each shift and as often as necessary to ensure it is safe. Defective rigging shall be removed from service. • The area around the derrick ladder shall be kept clear to provide unimpeded access to the ladder. • Work areas and walkways shall not be obstructed. • The rotary table of the rig floor shall be kept free of obstructions and free of undue accumulation of oil, water, ice, or circulating fluids.
	Hoisting operations	• The derrick must not be raised until the rig has been blocked, leveled, and chocked. • Drillers shall never engage the rotary clutch without watching the rotary table and ensuring it is clear of personnel and equipment. • Unless the draw works is equipped with an automatic feed control, the brake shall not be left unattended without first being tied down. • Drill pipe or casing shall not be picked up suddenly. • Drill pipe shall not be hoisted until the driller is sure that the pipe is latched in the elevator, or the derrick man has signaled that he may safely hoist the pipe. • During instances of unusual loading of the derrick or mast, such as when making an unusually hard pull, only the driller should be on the rig floor and no one shall be on the rig or derrick. • The brakes on the draw works of every drilling rig shall be tested by each driller, when he comes on shift, to determine whether they are in good order.

ACTIVITY HAZARD ANALYSIS

ACTIVITY: SAFETY PROGRAM AND PROCEDURES

Analyzed By/Date_____

Reviewed By/Date_____

ACTIVITY	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
Operating procedures (cont'd)	Hoisting operations (cont'd)	• The brakes shall be thoroughly inspected by a competent individual each week. • A hoisting line with a load imposed shall not be permitted to be in direct contact with any derrick member or stationary equipment, unless it has been specifically designed for line contact. • Workers shall never stand near the well bore whenever any wire line device is being run. • Hoisting control stations shall be kept clean and controls labeled as to their functions.
	Riding hoisting equipment	• Under no circumstances will personnel be permitted to ride the traveling block or elevators, nor will the cat line be used as a personnel carrier.
	Cat line operations	• Only experienced workers will be allowed to operate the cat head controls. The kill switch must be clearly labeled and operational prior to operation of the cat line. • The cat head area must be kept free of obstructions and entanglements. • The operator shall not use more wraps than necessary to pick up the load. More than one layer of wrapping is not permitted. • Personnel shall not stand near, step over, or go under a cable or cat line which is under tension. • Employees rigging loads on cat lines shall: keep out from under the load; keep fingers and feet where they will not be crushed; be sure to signal clearly when the load is being picked up; use standard visual signals only and not depend on shouting to coworkers; and make sure the load is properly rigged, since a sudden jerk in the cat line will shift or drop the load.
	Pipe handling	• Pipe shall be loaded and unloaded, layer by layer, with the bottom layer pinned or blocked securely on all four corners. Each successive layer should be effectively blocked or chocked. • Workers shall not be permitted on top of the load during loading, unloading, or transferring of pipe or rolling stock.

ACTIVITY HAZARD ANALYSIS

ACTIVITY: SAFETY PROGRAM AND PROCEDURES

Analyzed By/Date_____

Reviewed By/Date_____

ACTIVITY	POTENTIAL HAZARD	RECOMMENDED CONTROLS
Operating procedures (cont'd)	Pipe handling (cont'd)	• Employees shall be instructed never to try to stop rolling pipe or casing; they should be instructed to stand clear of rolling pipe. • Slip handles shall be used to lift and move slips. Employees should not be permitted to kick slips into position. • When pipe is being hoisted, personnel shall not stand where the bottom end of the pipe could whip and strike them. • Pipe stored in racks, catwalks, or on flatbed trucks shall be chocked to prevent rolling.
	Derrick operations	• The derrick climber shall be used whenever climbing the derrick should be tied off, or otherwise protected from falling when working in an unguarded elevated position. • All stands of pipe and drill collars racked in a derrick shall be secured with rope or otherwise adequately secured. • Tools, derrick parts, or materials of any kind shall not be thrown from the derrick. • The elevators must be properly clamped onto all pipe joints prior to the driller engaging the load.
	Making and breaking joints	• Tongs shall be used for the initial making up and breaking of the joint. The rotary table should not be used for the initial breaking of a joint. • Employees making or breaking joints shall not be permitted to stand within the arc of the tong handles when the tong pull line is under tension. Employees should handle the tongs only by the appropriate handles. • Employees shall be trained in the safe use of spinning chains. Spinning chains should not be handled near the rotary table while it is in motion.
	Excavation safety	• If excavation activities must be performed, a SSHP addenda shall be prepared and approved prior to work start.
	Confined-space entry	• If confined-space entry must be performed, a SSHP addenda shall be prepared and approved prior to work start.

ACTIVITY HAZARD ANALYSIS

ACTIVITY: SAFETY PROGRAM AND PROCEDURES

Analyzed By/Date_____

Reviewed By/Date_____

ACTIVITY	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
Heat illness prevention	Heat stress	• One or more of the following control measures can be used to help control heat stress and are mandatory if any site worker has a heart rate in excess of 110 beats per minute (measured immediately prior to rest period): Site workers will be encouraged to drink plenty of water throughout the day. They will be advised to slightly increase their salt intake by lightly salting their food; on-site drinking water will be kept cool (50 to 60°F) to encourage personnel to drink frequently; a work regimen that will provide adequate rest periods for cooling down will be established, as required; all personnel will be advised of the dangers and symptoms of heat stroke, heat exhaustion, and heat cramps; cooling devices such as vortex tubes or cooling vests should be used when personnel must wear impermeable clothing in conditions of extreme heat; employees should be instructed to monitor themselves and coworkers for signs of heat stress and to take additional breaks as necessary; a shaded rest area must be provided. All breaks should take place in the shaded rest area; employees shall not be assigned to other tasks during breaks; employees shall remove impermeable garments during rest periods. This includes white Tyvek-type garments; and all employees shall be informed of the importance of adequate rest, acclimation, and proper diet in the prevention of heat stress disorders. • The signs of heat stress disorders are as follows: Heat Cramps - Heat cramps are caused by heavy sweating and inadequate electrolyte replacement. Signs and symptoms include muscle spasms and pain in the hands, feet, and abdomen; Heat Exhaustion - Heat exhaustion occurs from increased stress on various body organs. Signs and symptoms include; pale, cool, moist skin; heavy sweating; dizziness, nausea; and fainting; and Heat Stroke - Heat stroke is the most serious form of heat stress and should always be treated as a medical emergency. The body's temperature regulation system fails, and the body temperature rapidly rises to critical levels. Immediate action must be taken to cool the body before serious death or injury occurs. Signs and symptoms of heat stroke include red, hot, usually dry skin; lack of, or reduced perspiration; nausea; dizziness and confusion; strong, rapid pulse and confusion; and coma.

ACTIVITY HAZARD ANALYSIS

ACTIVITY: SAFETY PROGRAM AND PROCEDURES

Analyzed By/Date _____

Reviewed By/Date _____

ACTIVITY	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
Heat illness prevention (cont'd)	Hearing conservation	• All on-site personnel shall wear hearing protection with a Noise Reduction Rating (NRR) of at least 20 when noise levels exceed 85 dBA. All site personnel who may be exposed to noise shall also receive baseline and annual audiograms and training as to the causes and prevention of hearing loss. Whenever possible, equipment that does not generate excessive noise levels will be selected for this project. If the use of noisy equipment is unavoidable, wherever possible, barriers, or increased distance will be used to minimize worker exposure to noise.
Sanitation	Potable water	• The following rules apply for all project field operations: an adequate supply of potable water will be provided at each work site; portable containers used to dispense drinking water shall be capable of being tightly closed, and shall be equipped with a tap dispenser. Water shall not be drunk directly from the container; containers used for drinking water shall be clearly marked and not used for any other purpose; and disposable cups will be supplied; both a sanitary container for unused cups and a receptacle for disposing of used cups shall be provided.
	Non-potable water	• Outlets for non-potable water shall be identified to clearly indicate that the water is unsafe and is not to be used for drinking, washing, or cooking purposes. There shall be no cross connection (open or potential) between potable and non-potable water systems. Non-potable and potable water systems shall be separated so as to minimize confusion and possible cross contamination.
	Toilet facilities	• Toilet facilities shall be available for employees. If permanent toilet facilities are not available, i.e., the work site is more than 500 feet from a building with an accessible toilet, than a portable chemical toilet(s) will be provided.
	Trash collection	• Trash collection from the contamination reduction zone (CRZ) will be separated as routine hazardous waste. Trash collected in the support and break areas will be disposed of as non-hazardous waste. Labeled trash receptacles will be set up in the CRZ and in support zone.

ACTIVITY HAZARD ANALYSIS

ACTIVITY: DEMOBILIZATION

Analyzed By/Date_____

Reviewed By/Date_____

ACTIVITY	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
Removal of temporary support facility/supplies	Truck traffic	• Signal person will be provided when truck drivers view is partially obstructed. • The signal person will wear an orange safety vest to identify themselves. • Trucks will have an audible backup alarm.
	Heavy lifting	• Use proper lifting techniques. • Objects greater than 60 lbs require assistance or use of a mechanical lifting device.
	Slip, trip, and fall	• Keep walkway clear of debris and obstructions. • Use good housekeeping procedures.

USACE ACCIDENT REPORTING SECTION

Insert USACE Accident Reporting Section

(For Safety Staff only)	REPORT NO.	EROC CODE	UNITED STATES ARMY CORPS OF ENGINEERS ACCIDENT INVESTIGATION REPORT *(For Use of this Form See Help Menu and USACE Suppl to AR 385-40)*	REQUIREMENT CONTROL SYMBOL: CEEC-S-8(R2)

1. ACCIDENT CLASSIFICATION

PERSONNEL CLASSIFICATION	INJURY/ILLNESS/FATAL	PROPERTY DAMAGE	MOTOR VEHICLE INVOLVED	DIVING
GOVERNMENT ☐ CIVILIAN ☐ MILITARY	☐	☐ FIRE INVOLVED ☐ OTHER	☐	☐
☐ CONTRACTOR	☐	☐ FIRE INVOLVED ☐ OTHER	☐	☐
☐ PUBLIC	☐ FATAL ☐ OTHER		☐	

2. PERSONAL DATA

a. Name *(Last, First, MI)*	b. AGE	c. SEX ☐ MALE ☐ FEMALE	d. SOCIAL SECURITY NUMBER	e. GRADE
f. JOB SERIES/TITLE	g. DUTY STATUS AT TIME OF ACCIDENT ☐ ON DUTY ☐ TDY ☐ OFF DUTY			

h. EMPLOYMENT STATUS AT TIME OF ACCIDENT
[1] ☐ ARMY ACTIVE [2] ☐ ARMY RESERVE [3] ☐ VOLUNTEER
[4] ☐ PERMANENT [5] ☐ FOREIGN NATIONAL [6] ☐ SEASONAL
[7] ☐ TEMPORARY [8] ☐ STUDENT
[9] ☐ OTHER (Specify)

3. GENERAL INFORMATION

a. DATE OF ACCIDENT *(month/day/year)*	b. TIME OF ACCIDENT *(Military time)* hrs	c. EXACT LOCATION OF ACCIDENT	d. CONTRACTOR'S NAME (1) PRIME: (2) SUBCONTRACTOR:

e. CONTRACT NUMBER _____
☐ CIVIL WORKS ☐ MILITARY
☐ OTHER *(Specify)* _____

f. TYPE OF CONTRACT
☐ CONSTRUCTION ☐ SERVICE
☐ A/E ☐ DREDGE
☐ OTHER *(Specify)* _____

g. HAZARDOUS/TOXIC WASTE ACTIVITY
☐ SUPERFUND ☐ DERP
☐ IRP ☐ OTHER *(Specify)* _____

4. CONSTRUCTION ACTIVITIES ONLY *(Fill in line and corresponding code number in box from list - see help menu)*

a. CONSTRUCTION ACTIVITY _____ (CODE) #

b. TYPE OF CONSTRUCTION EQUIPMENT _____ (CODE) #

5. INJURY/ILLNESS INFORMATION *(Include name on line and corresponding code number in box for items e, f & g - see help menu)*

a. SEVERITY OF ILLNESS/INJURY (CODE) #	B. ESTIMATED DAYS LOST	C. ESTIMATED DAYS HOSPITALIZED	D. ESTIMATED DAYS RESTRICTED DUTY

e. BODY PART AFFECTED
PRIMARY _____ (CODE) #
SECONDARY _____ (CODE) #

f. NATURE OF ILLNESS / INJURY _____ (CODE) #

g. TYPE AND SOURCE OF INJURY/ILLNESS
TYPE _____ (CODE) #
SOURCE _____ (CODE) #

6. PUBLIC FATALITY *(Fill in line and correspondence code number in box - see help menu)*

a. ACTIVITY AT TIME OF ACCIDENT _____ (CODE) #

b. PERSONAL FLOATATION DEVICE USED? ☐ YES ☐ NO ☐ N/A

7. MOTOR VEHICLE ACCIDENT

a. TYPE OF VEHICLE
☐☐ PICKUP/VAN ☐☐ AUTOMOBILE
☐☐ TRUCK ☐☐ OTHER *(Specify)* _____

b. TYPE OF COLLISION
☐ SIDE SWIPE ☐ HEAD ON ☐ REAR END
☐ BROADSIDE ☐ ROLL OVER ☐ BACKING
☐ OTHER *(Specify)* _____

c. SEAT BELTS	USED	NOT USED	NOT AVAILABLE
(1) FRONT SEAT			
(2) REAR SEAT			

8. PROPERTY/MATERIAL INVOLVED

a. NAME OF ITEM	B. OWNERSHIP	C. $ AMOUNT OF DAMAGE
(1)		
(2)		
(3)		

9. VESSEL/FLOATING PLANT ACCIDENT *(Fill in line and correspondence code number in box from list - see help menu)*

a. TYPE OF VESSEL/FLOATING PLANT _____ (CODE) #

b. TYPE OF COLLISION/MISHAP _____ (CODE) #

10. ACCIDENT DESCRIPTION *(Use additional paper, if necessary)*

See attached page.

11. CAUSAL FACTOR(S) *(Read Instruction Before Completing)*

a. (Explain YES answers in item 13)

	YES	NO
DESIGN: Was design of facility, workplace or equipment a factor?	☐	☐
INSPECTION/MAINTENANCE: Were inspection & maintenance procedures a factor?	☐	☐
PERSON'S PHYSICAL CONDITION: In your opinion, was the physical condition of the person a factor?	☐	☐
OPERATING PROCEDURES: Were operating procedures a factor?	☐	☐
JOB PRACTICES: Were any job safety/health practices not followed when the accident occurred?	☐	☐
HUMAN FACTORS: Did any human factors such as, size or strength of person, etc., contribute to accident?	☐	☐
ENVIRONMENTAL FACTORS: Did heat, cold, dust, sun, glare, etc., contribute to the accident?	☐	☐

a. *(CONTINUED)*

	YES	NO
CHEMICAL AND PHYSICAL AGENT FACTORS: Did exposure to chemical agents, such as dust, fumes, mists, vapors or physical agents, such as, noise, radiation, etc., contribute to accident?	☐	☐
OFFICE FACTORS: Did office setting such as, lifting office furniture, carrying, stooping, etc., contribute to the accident?	☐	☐
SUPPORT FACTORS: Were inappropriate tools/resources provided to properly perform the activity/task?	☐	☐
PERSONAL PROTECTIVE EQUIPMENT: Did the improper selection, use or maintenance of personal protective equipment contribute to the accident?	☐	☐
DRUGS/ALCOHOL: In your opinion, was drugs or alcohol a factor to the accident	☐	☐

b. WAS A WRITTEN JOB/ACTIVITY HAZARD ANALYSIS COMPLETED FOR TASK BEING PERFORMED AT TIME OF ACCIDENT?

☐ YES *(If yes, attach a copy.)* ☐ NO

12. TRAINING

a. WAS PERSON TRAINED TO PERFORM ACTIVITY/TASK?	b. TYPE OF TRAINING.	c. DATE OF MOST RECENT FORMAL TRAINING.
☐ YES ☐ NO	☐ CLASSROOM ☐ ON JOB	(Month) (Day) (Year)

13. FULLY EXPLAIN WHAT ALLOWED OR CAUSED THE ACCIDENT; INCLUDE DIRECT AND INDIRECT CAUSES *(See instruction for definition of direct and indirect causes.) (Use additional paper, if necessary)*

a. DIRECT CAUSE

See attached page.

b. INDIRECT CAUSE(S)

See attached page.

14. ACTION(S) TAKEN, ANTICIPATED OR RECOMMENDED TO ELIMINATE CAUSE(S).

DESCRIBE FULLY:

See attached page.

15. DATES FOR ACTIONS IDENTIFIED IN BLOCK 14.

a. BEGINNING (Month/Day/Year)	b. ANTICIPATED COMPLETION (Month/Day/Year)		
c. SIGNATURE AND TITLE OF SUPERVISOR COMPLETING REPORT CORPS _____ CONTRACTOR _____	d. DATE *(Mo/Da/Yr)*	e. ORGANIZATION IDENTIFIER *(Div, Br, Sect)*	f. OFFICE SYMBOL

16. MANAGEMENT REVIEW *(1st)*

a. ☐ CONCUR b. ☐ NON CONCUR c. COMMENTS

SIGNATURE	TITLE	DATE

17. MANAGEMENT REVIEW *(2nd - Chief Operations, Construction, Engineering, etc.)*

a. ☐ CONCUR b. ☐ NON CONCUR c. COMMENTS

SIGNATURE	TITLE	DATE

18. SAFETY AND OCCUPATIONAL HEALTH OFFICE REVIEW

a. ☐ CONCUR b. ☐ NON CONCUR c. ADDITIONAL ACTIONS/COMMENTS

SIGNATURE	TITLE	DATE

19. COMMAND APPROVAL

COMMENTS

COMMANDER SIGNATURE	DATE

*U.S. GOVERNMENT PRINTING OFFICE: 1993-0-791-757

10. ACCIDENT DESCRIPTION *(Continuation)*

13a. DIRECT CAUSE *(Continuation)*

13b.	INDIRECT CAUSES *(Continuation)*

14.	ACTION(S) TAKEN, ANTICIPATED, OR RECOMMENDED TO ELIMINATE CAUSE(S) *(Continuation)*

GENERAL. Complete a separate report for each person who was *injured, caused,* or *contributed* to the accident (excluding uninjured personnel and witnesses). Use of this form for reporting USACE employee first-aid type injuries not submitted to the Office of Workers' Compensation Programs (OWCP) shall be at the descretion of the FOA commander. Please type or print legibly. Appropriate items shall be marked with an "X" in box(es). If additional space is needed, provide the information on a separate sheet and attach to the completed form. Ensure that these instructions are forwarded with the completed report to the designated management reviewers indicated in sections 16. and 17.

INSTRUCTIONS FOR SECTION 1 — ACCIDENT CLASSIFICATION. *(Mark All Boxes That Are Applicable.)*

a. GOVERNMENT. Mark "CIVILIAN" box if accident involved government civilian employee; mark "MILITARY" box if accident involved U.S. military personnel.

(1) INJURY/ILLNESS/FATALITY — Mark if accident resulted in any government civilian employee injury, illness, or fatality that requires the submission of OWCP Forms CA-1 (injury), CA-2 (illness), or CA-6 (fatality) to OWCP; mark if accident resulted in military personnel lost-time or fatal injury or illness.

(2) PROPERTY DAMAGE — Mark the appropriate box if accident resulted in any damage of $1000 or more to government property (including motor vehicles).

(3) VEHICLE INVOLVED — Mark if accident involved a motor vehicle, *regardless* of whether "INJURY/ILLNESS/FATALITY" or "PROPERTY DAMAGE" are marked.

(4) DIVING ACTIVITY — Mark if the accident involved an in-house USACE diving activity.

b. CONTRACTOR.

(1) INJURY/ILLNESS/FATALITY — Mark if accident resulted in any contractor lost-time injury/illness or fatality.

(2) PROPERTY DAMAGE — Mark the appropriate box if accident resulted in any damage of $1000 or more to contractor property (including motor vehicles).

(3) VEHICLE INVOLVED — Mark if accident involved a motor vehicle, *regardless* of whether "INJURY/ILLNESS/FATALITY" or "PROPERTY DAMAGE" are marked.

(4) DIVING ACTIVITY — Mark if the accident involved a USACE Contractor diving activity.

c. PUBLIC.

(1) INJURY/ILLNESS/FATALITY — Mark if accident resulted in public fatality or permanent total disability. (The "OTHER" box will be marked when requested by the FOA to report an unusual non-fatal public accident that could result in claims against the government or as otherwise directed by the FOA Commander).

(2) VOID SPACE — Make no entry.

(3) VEHICLE INVOLVED — Mark if accident resulted in a fatality to a member of the public and involved a motor vehicle, *regardless* of whether "INJURY/ILLNESS/FATALITY" is marked.

(4) VOID SPACE — Make no entry.

INSTRUCTIONS FOR SECTION 2 — PERSONAL DATA

a. NAME — (MANDATORY FOR GOVERNMENT ACCIDENTS. OPTIONAL AT THE DISCRETION OF THE FOA COMMANDER FOR CONTRACTOR AND PUBLIC ACCIDENTS). Enter last name, first name, middle initial of person involved.

b. AGE — Enter age.

c. SEX — Mark appropriate box.

d. SOCIAL SECURITY NUMBER — (FOR GOVERNMENT PERSONNEL ONLY) Enter the social security number (or other personal identification number if no social security number issued).

e. GRADE — (FOR GOVERNMENT PERSONNEL ONLY) Enter pay grade. Example: O-6; E-7; WG-8; WS-12; GS-11; etc.

f. JOB SERIES/TITLE — For *government civilian employees* enter the pay plan, full series number, and job title, e.g. GS-0810/Civil Engineer. For *military personnel* enter the primary military occupational specialty (PMOS), e.g., 15A30 or 11G50. For *contractor employees* enter the job title assigned to the injured person, e.g. carpenter, laborer, surveyor, etc.,

g. DUTY STATUS — Mark the appropriate box.

(1) ON DUTY — Person was at duty station during duty hours or person was away from duty station during duty hours but on official business at time of the accident.

(2) TDY - Person was on official business, away from the duty station and with travel orders at time of accident. Line-of-duty investigation required.

(3) OFF DUTY - Person was not on official business at time of accident

h. EMPLOYMENT STATUS — (FOR GOVERNMENT PERSONNEL ONLY) Mark the most appropriate box. If "OTHER" is marked, specify the employment status of the person.

INSTRUCTION FOR SECTION 3 — GENERAL INFORMATION

a. DATE OF ACCIDENT — Enter the month, day, and year of accident.

b. TIME OF ACCIDENT — Enter the local time of accident in military time. Example: 1430 hrs (not 2:30 p.m.).

c. EXACT LOCATION OF ACCIDENT — Enter facts needed to locate the accident scene. (installation/project name, building number, street, direction and distance from closest landmark, etc.,).

d. CONTRACTOR NAME

(1) PRIME — Enter the exact name (title of firm) of the prime contractor.

(2) SUBCONTRACTOR — Enter the name of any subcontractor involved in the accident.

e. CONTRACT NUMBER — Mark the appropriate box to identify if contract is civil works, military, or other: if "OTHER" is marked, specify contract appropriation on line provided. Enter complete contract number of prime contract, e.g., DACW 09-85-C-0100.

f. TYPE OF CONTRACT — Mark appropriate box. A/E means architect/engineer. If "OTHER" is marked, specify type of contract on line provided.

g. HAZARDOUS/TOXIC WASTE ACTIVITY (HTW) — Mark the box to identify the HTW activity being performed at the time of the accident. For Superfund, DERP, and Installation Restoration Program (IRP) HTW activities include accidents that occurred during inventory, predesign, design, and construction. For the purpose of accident reporting, DERP Formerly Used DoD Site (FUDS) activities and IRP activities will be treated separately. For Civil Works O&M HTW activities mark the "OTHER" box.

INSTRUCTIONS FOR SECTION 4 — CONSTRUCTION ACTIVITIES

a. CONSTRUCTION ACTIVITY — Select the *most appropriate* construction activity being performed at time of accident from the list below. Enter the activity name and place the corresponding code number identified in the box.

CONSTRUCTION ACTIVITY LIST

1. MOBILIZATION
2. SITE PREPARATION
3. EXCAVATION/TRENCHING
4. GRADING (EARTHWORK)
5. PIPING/UTILITIES
6. FOUNDATION
7. FORMING
8. CONCRETE PLACEMENT
9. STEEL ERECTION
10. ROOFING
11. FRAMING
12. MASONRY
13. CARPENTRY
14. ELECTRICAL
15. SCAFFOLDING/ACCESS
16. MECHANICAL
17. PAINTING
18. EQUIPMENT/MAINTENANCE
19. TUNNELING
20. WAREHOUSING/STORAGE
21. PAVING
22. FENCING
23. SIGNING
24. LANDSCAPING/IRRIGATION
25. INSULATION
26. DEMOLITION

INSTRUCTIONS FOR SECTION 13—CAUSES

a. DIRECT CAUSES—The direct cause is that single factor which most directly lead to the accident. See examples below.

b. INDIRECT CAUSES—Indirect causes are those factors which contributed to but did not directly initiate the occurrence of the accident.

Examples for section 13:

a. Employee was dismantling scaffold and fell 12 feet from unguarded opening.
Direct cause: failure to provide fall protection at elevation.
Indirect causes: failure to enforce USACE safety requirements; improper training/motivation of employee (possibility that employee was not knowledgeable of USACE fall protection requirements or was lax in his attitude towards safety); failure to ensure provision of positive fall protection whenever elevated; failure to address fall protection during scaffold dismantling in phase hazard analysis.

b. Private citizen had stopped his vehicle at intersection for red light when vehicle was struck in rear by USACE vehicle. (note USACE vehicle was in proper/safe working condition).
Direct cause: failure of USACE driver to maintain control of and stop USACE vehicle within safe distance.
Indirect cause: Failure of employee to pay attention to driving (defensive driving).

INSTRUCTIONS FOR SECTION 14—ACTION TO ELIMINATE CAUSE(S)

DESCRIPTION—Fully describe all the actions taken, anticipated, and recommended to eliminate the cause(s) and prevent reoccurrence of similar accidents/illnesses. Continue on blank sheets of paper if necessary to fully explain and attach to the completed report form.

INSTRUCTIONS FOR SECTION 15—DATES FOR ACTION

a. BEGIN DATE—Enter the date when the corrective action(s) identified in Section 14 will begin.

b. COMPLETE DATE—Enter the date when the corrective action(s) identified in Section 14 will be completed.

c. TITLE AND SIGNATURE—Enter the title and signature of supervisor completing the accident report. For a GOVERNMENT employee accident/illness the immediate supervisor will complete and sign the report. For PUBLIC accidents the USACE Project Manager/Area Engineer responsible for the USACE property where the accident happened shall complete and sign the report. For CONTRACTOR accidents the Contractor's project manager shall complete and sign the report and provide to the USACE supervisor responsible for oversight of that contractor activity. This USACE Supervisor shall also sign the report. Upon entering the information required in 15.d, 15.e and 15.f below, the responsible USACE supervisor shall forward the report for management review as indicated in Section 16.

d. DATE SIGNED—Enter the month, day, and year that the report was signed by the responsible supervisor.

e. ORGANIZATION NAME—For GOVERNMENT employee accidents enter the USACE organization name (Division, Branch, Section, etc.) of the injured employee. For PUBLIC accidents enter the USACE organization name for the person identified in block 15.c. For CONTRACTOR accidents enter the USACE organization name for the USACE office responsible for providing contract administration oversight.

f. OFFICE SYMBOL—Enter the latest complete USACE Office Symbol for the USACE organization identified in block 15.e.

INSTRUCTIONS FOR SECTION 16—MANAGEMENT REVIEW (1st)

1ST REVIEW—Each USACE FOA shall determine who will provide 1st management review. The responsible USACE supervisor in section 15.c shall forward the completed report to the USACE office designated as the 1st Reviewer by the FOA. Upon receipt, the Chief of the Office shall review the completed report, mark the appropriate box, provide substantive comments, sign, date, and forward to the FOA Staff Chief (2nd review) for review and comment.

INSTRUCTIONS FOR SECTION 17—MANAGEMENT REVIEW (2nd)

2ND REVIEW—The FOA Staff Chief (i.e., FOA Chief of Construction, Operations, Engineering, Planning, etc.) shall mark the appropriate box, review the completed report, provide substantive comments, sign, date, and return to the FOA Safety and Occupational Health Office.

INSTRUCTIONS FOR SECTION 18—SAFETY AND OCCUPATIONAL HEALTH REVIEW

3RD REVIEW—The FOA Safety and Occupational Health Office shall review the completed report, mark the appropriate box, ensure that any inadequacies, discrepancies, etc, are rectified by the responsible supervisor and management reviewers, provide substantive comments, sign, date and forward to the FOA Commander for review, comment, and signature.

INSTRUCTION FOR SECTION 19—COMMAND APPROVAL

4TH REVIEW—The FOA Commander shall (to include the person designated Acting Commander in his absence) review the completed report, comment if required, sign, date, and forward the report to the FOA Safety and Occupational Health Office. Signature authority shall not be delegated.

b. TYPE OF CONSTRUCTION EQUIPMENT—Select the equipment involved in the accident from the list below. Enter the name and place the corresponding code number identified in the box. If equipment is not included below, use code 24, "OTHER", and write in specific type of equipment.

CONSTRUCTION EQUIPMENT

1. GRADER
2. DRAGLINE
3. CRANE (ON VESSEL/BARGE)
4. CRANE (TRACKED)
5. CRANE (RUBBER TIRE)
6. CRANE (VEHICLE MOUNTED)
7. CRANE (TOWER)
8. SHOVEL
9. SCRAPER
10. PUMP TRUCK (CONCRETE)
11. TRUCK (CONCRETE/TRANSIT MIXER)
12. DUMP TRUCK (HIGHWAY)
13. DUMP TRUCK (OFF HIGHWAY)
14. TRUCK (OTHER)
15. FORKLIFT
16. BACKHOE
17. FRONT-END LOADER
18. PILE DRIVER
19. TRACTOR (UTILITY)
20. MANLIFT
21. DOZER
22. DRILL RIG
23. COMPACTOR/VIBRATORY ROLLER
24. OTHER

INSTRUCTIONS FOR SECTION 5—INJURY/ILLNESS INFORMATION

a. SEVERITY OF INJURY / ILLNESS - Reference para 2-10 of USACE Suppl 1 to AR 385-40 and enter code and description from list below.

NOI	NO INJURY
FAT	FATALITY
PTL	PERMANENT TOTAL DISABILITY
PPR	PERMANENT PARTIAL DISABILITY
LWD	LOST WORKDAY CASE INVOLVING DAYS AWAY FROM WORK
NLW	RECORDABLE CASE WITHOUT LOST WORKDAYS
RFA	RECORDABLE FIRST AID CASE
NRI	NON-RECORDABLE INJURY

b. ESTIMATED DAYS LOST—Enter the estimated number of workdays the person will lose from work.

c. ESTIMATED DAYS HOSPITALIZED—Enter the estimated number of workdays the person will be hospitalized.

d. ESTIMATED DAYS RESTRICTED DUTY—Enter the estimated number of workdays the person, as a result of the accident, will not be able to perform all of their regular duties.

e. BODY PART AFFECTED—Select the most appropriate primary and when applicable, secondary body part affected from the list below. Enter body part name on line and place the corresponding code letters identifying that body part in the box.

GENERAL BODY AREA	CODE	BODY PART NAME
ARM/WRIST	AB	ARM AND WRIST
	AS	ARM OR WRIST
TRUNK, EXTERNAL MUSCULATURE	B1	SINGLE BREAST
	B2	BOTH BREASTS
	B3	SINGLE TESTICLE
	B4	BOTH TESTICLES
	BA	ABDOMEN
	BC	CHEST
	BL	LOWER BACK
	BP	PENIS
	BS	SIDE
	BU	UPPER BACK
	BW	WAIST
	BZ	TRUNK OTHER
HEAD, INTERNAL	C1	SINGLE EAR INTERNAL
	C2	BOTH EARS INTERNAL
	C3	SINGLE EYE INTERNAL
	C4	BOTH EYES INTERNAL
	CB	BRAIN
	CC	CRANIAL BONES
	CD	TEETH
	CJ	JAW
	CL	THROAT, LARYNX
	CM	MOUTH
	CN	NOSE
	CR	THROAT, OTHER
	CT	TONGUE
	CZ	HEAD OTHER INTERNAL
ELBOW	EB	BOTH ELBOWS
	ES	SINGLE ELBOW
FINGER	F1	FIRST FINGER
	F2	BOTH FIRST FINGERS
	F3	SECOND FINGER
	F4	BOTH SECOND FINGERS
	F5	THIRD FINGER
	F6	BOTH THIRD FINGERS
	F7	FOURTH FINGER
	F8	BOTH FOURTH FINGERS
TOE	G1	GREAT TOE
	G2	BOTH GREAT TOES
	G3	TOE OTHER
	G4	TOES OTHER
HEAD, EXTERNAL	H1	EYE EXTERNAL
	H2	BOTH EYES EXTERNAL
	H3	EAR EXTERNAL
	H4	BOTH EARS EXTERNAL
	HC	CHIN
	HF	FACE
	HK	NECK/THROAT
	HM	MOUTH/LIPS
	HN	NOSE
	HS	SCALP
KNEE	KB	BOTH KNEES
	KS	KNEE
LEG, HIP, ANKLE, BUTTOCK	LB	BOTH LEGS/HIPS/ANKLES/BUTTOCKS
	LS	SINGLE LEG/HIP ANKLE/BUTTOCK
HAND	MB	BOTH HANDS
	MS	SINGLE HAND
FOOT	PB	BOTH FEET
	PS	SINGLE FOOT
TRUNK, BONES	R1	SINGLE COLLAR BONE
	R2	BOTH COLLAR BONES
	R3	SHOULDER BLADE
	R4	BOTH SHOULDER BLADES
	RB	RIB
	RS	STERNUM (BREAST BONE)
	RV	VERTEBRAE (SPINE; DISC)
	RZ	TRUNK BONES OTHER
SHOULDER	SB	BOTH SHOULDERS
	SS	SINGLE SHOULDER
THUMB	TB	BOTH THUMBS
	TS	SINGLE THUMB
TRUNK, INTERNAL ORGANS	V1	LUNG, SINGLE
	V2	LUNGS, BOTH
	V3	KIDNEY, SINGLE
	V4	KIDNEYS, BOTH
	VH	HEART
	VL	LIVER
	VR	REPRODUCTIVE ORGANS
	VS	STOMACH
	VV	INTESTINES
	VZ	TRUNK, INTERNAL; OTHER

f. NATURE OF INJURY/ILLNESS - Select the most appropriate nature of injury / illness from the list below. This nature of injury / illness shall correspond to the primary body part selected in 5e, above. Enter the nature of injury / illness name on the line and place the corresponding CODE letters in the box provided.

* The injury or condition selected below must be caused by a specific incident or event which occurred during a single work day or shift.

GENERAL NATURE CATEGORY	CODE	NATURE OF INJURY NAME
*TRAUMATIC INJURY OR DISABILITY	TA	AMPUTATION
	TB	BACK STRAIN
	TC	CONTUSION; BRUISE; ABRASION
	TD	DISLOCATION
	TF	FRACTURE
	TH	HERNIA
	TK	CONCUSSION
	TL	LACERATION, CUT
	TP	PUNCTURE
	TS	STRAIN, MULTIPLE
	TU	BURN, SCALD, SUNBURN
	TI	TRAUMATIC SKIN DISEASES/ CONDITIONS INCLUDING DERMATITIS
	TR	TRAUMATIC RESPIRATORY DISEASE
	TQ	TRAUMATIC FOOD POISONING
	TW	TRAUMATIC TUBERCULOSIS
	TX	TRAUMATIC VIROLOGICAL/ INFECTIVE/PARASITIC DISEASE
	T1	TRAUMATIC CEREBRAL VASCULAR CONDITION/STROKE
	T2	TRAUMATIC HEARING LOSS
	T3	TRAUMATIC HEART CONDITION
	T4	TRAUMATIC MENTAL DISORDER; STRESS; NERVOUS CONDITION
	T8	TRAUMATIC INJURY — OTHER (EXCEPT DISEASE, ILLNESS)

**A nontraumatic physiological harm or loss of capacity produced by systemic infection; continued or repeated stress or strain; exposure to toxins, poisons, fumes, etc.; or other continued and repeated exposures to conditions of the work environment over a long period of time. For practical purposes, an occupational illness/disease or disability is any reported condition which doses not meet the definition of traumatic injury or disability as described above.

GENERAL NATURE CATEGORY	CODE	NATURE OF INJURY NAME
**NON-TRAUMATIC ILLNESS/DISEASE OR DISABILITY		
RESPIRATORY DISEASE	RA	ASBESTOSIS
	RB	BRONCHITIS
	RE	EMPHYSEMA
	RP	PNEUMOCONIOSIS
	RS	SILICOSIS
	R9	RESPIRATORY DISEASE, OTHER
VIROLOGICAL, INFECTIVE & PARASITIC DISEASES	VB	BRUCELLOSIS
	VC	COCCIDIOMYCOSIS
	VF	FOOD POISONING
	VH	HEPATITIS
	VM	MALARIA
	VS	STAPHYLOCOCCUS
	VT	TUBERCULOSIS
	V9	VIROLOGICAL/INFECTIVE/ PARASITIC — OTHER
DISABILITY, OCCUPATIONAL	DA	ARTHRITIS, BURSITIS
	DB	BACK STRAIN, BACK SPRAIN
	DC	CEREBRAL VASCULAR CONDITION; STROKE
	DD	ENDEMIC DISEASE (OTHER THAN CODE TYPES R&S)
	DE	EFFECT OF ENVIRONMENTAL CONDITION
	DH	HEARING LOSS
	DK	HEART CONDITION
	DM	MENTAL DISORDER, EMOTIONAL STRESS NERVOUS CONDITION
	DR	RADIATION
	DS	STRAIN, MULTIPLE
	DU	ULCER
	DV	OTHER VASCULAR CONDITIONS
	D9	DISABILITY, OTHER
SKIN DISEASE OR CONDITION	SB	BIOLOGICAL
	SC	CHEMICAL
	S9	DERMATITIS, UNCLASSIFIED

g. TYPE AND SOURCE OF INJURY/ILLNESS (CAUSE) - Type and Source Codes are used to describe what caused the incident. The Type Code stands for an ACTION and the Source Code for an OBJECT or SUBSTANCE. Together, they form a brief description of how the incident occurred. Where there are two different sources, code the initiating source of the incident (see example 1, below). Examples:

(1) An employee tripped on carpet and struck his head on a desk.
TYPE: 210 (fell on same level) SOURCE: 0110 (walking/working surface)

NOTE: This example would NOT be coded 120 (struck against) and 0140 (furniture).

(2) A Park Ranger contracted dermatitis from contact with poison ivy/ oak.
TYPE: 510 (contact) SOURCE: 0920 (plant)

(3) A lock and dam mechanic punctured his finger with a metal sliver while grinding a turbine blade.
TYPE: 410 (punctured by) SOURCE: 0830 (metal)

(4) An employee was driving a government vehicle when it was struck by another vehicle..
TYPE: 800 (traveling in) SOURCE: 0421 (government-owned vehicle, as driver)

NOTE: The Type Code 800, "Traveling In" is different from the other type codes in that its function is not to identify factors contributing to the injury or fatality, but rather to collect data on the type of vehicle the employee was operating or traveling in at the time of the incident.

Select the most appropriate TYPE and SOURCE identifier from the list below and enter the name on the line and the corresponding code in the appropriate box.

CODE	TYPE OF INJURY NAME
	STRUCK
0110	STRUCK BY
0111	STRUCK BY FALLING OBJECT
0120	STRUCK AGAINST
	FELL, SLIPPED, TRIPPED
0210	FELL ON SAME LEVEL
0220	FELL ON DIFFERENT LEVEL
0230	SLIPPED, TRIPPED (NO FALL)
	CAUGHT
0310	CAUGHT ON
0320	CAUGHT IN
0330	CAUGHT BETWEEN
	PUNCTURED, LACERATED
0410	PUNCTURED BY
0420	CUT BY
0430	STUNG BY
0440	BITTEN BY
	CONTACTED
0510	CONTACTED WITH (INJURED PERSON MOVING)
0520	CONTACTED BY (OBJECT WAS MOVING)
	EXERTED
0610	LIFTED, STRAINED BY (SINGLE ACTION)
0620	STRESSED BY (REPEATED ACTION)
	EXPOSED
0710	INHALED
0720	INGESTED
0730	ABSORBED
0740	EXPOSED TO
0800	TRAVELING IN

CODE	SOURCE OF INJURY NAME
0100	BUILDING OR WORKING AREA
0110	WALKING/WORKING SURFACE (FLOOR, STREET, SIDEWALKS, ETC)
0120	STAIRS, STEPS
0130	LADDER
0140	FURNITURE, FURNISHINGS, OFFICE EQUIPMENT
0150	BOILER, PRESSURE VESSEL
0160	EQUIPMENT LAYOUT (ERGONOMIC)
0170	WINDOWS, DOORS
0180	ELECTRICITY

CODE	SOURCE OF INJURY NAME
0200	ENVIRONMENTAL CONDITION
0210	TEMPERATURE EXTREME (INDOOR)
0220	WEATHER (ICE, RAIN, HEAT, ETC.)
0230	FIRE, FLAME, SMOKE (NOT TOBACCO)
0240	NOISE
0250	RADIATION
0260	LIGHT
0270	VENTILATION
0271	TOBACCO SMOKE
0280	STRESS (EMOTIONAL)
0290	CONFINED SPACE
0300	MACHINE OR TOOL
0310	HAND TOOL (POWERED: SAW, GRINDER, ETC.)
0320	HAND TOOL (NONPOWERED)
0330	MECHANICAL POWER TRANSMISSION APPARATUS
0340	GUARD, SHIELD (FIXED, MOVEABLE, INTERLOCK)
0350	VIDEO DISPLAY TERMINAL
0360	PUMP, COMPRESSOR, AIR PRESSURE TOOL
0370	HEATING EQUIPMENT
0380	WELDING EQUIPMENT
0400	VEHICLE
0411	AS DRIVER OF PRIVATELY OWNED/RENTAL VEHICLE
0412	AS PASSENGER OF PRIVATELY OWNED/RENTAL VEHICLE
0421	DRIVER OF GOVERNMENT VEHICLE
0422	PASSENGER OF GOVERNMENT VEHICLE
0430	COMMON CARRIER (AIRLINE, BUS, ETC.)
0440	AIRCRAFT (NOT COMMERCIAL)
0450	BOAT, SHIP, BARGE
0500	MATERIAL HANDLING EQUIPMENT
0510	EARTHMOVER (TRACTOR, BACKHOE, ETC.)
0520	CONVEYOR (FOR MATERIAL AND EQUIPMENT)
0530	ELEVATOR, ESCALATOR, PERSONNEL HOIST
0540	HOIST, SLING CHAIN, JACK
0550	CRANE
0551	FORKLIFT
0560	HANDTRUCK, DOLLY
0600	DUST, VAPOR, ETC.
0610	DUST (SILICA, COAL, ETC.)
0620	FIBERS
0621	ASBESTOS
0630	GASES
0631	CARBON MONOXIDE
0640	MIST, STEAM, VAPOR, FUME
0641	WELDING FUMES
0650	PARTICLES (UNIDENTIFIED)
0700	CHEMICAL, PLASTIC, ETC.
0711	DRY CHEMICAL—CORROSIVE
0712	DRY CHEMICAL—TOXIC
0713	DRY CHEMICAL—EXPLOSIVE
0714	DRY CHEMICAL—FLAMMABLE
0721	LIQUID CHEMICAL—CORROSIVE
0722	LIQUID CHEMICAL—TOXIC
0723	LIQUID CHEMICAL—EXPLOSIVE
0724	LIQUID CHEMICAL—FLAMMABLE
0730	PLASTIC
0740	WATER
0750	MEDICINE
0800	INANIMATE OBJECT
0810	BOX, BARREL, ETC.
0820	PAPER
0830	METAL ITEM, MINERAL
0831	NEEDLE
0840	GLASS
0850	SCRAP, TRASH
0860	WOOD
0870	FOOD
0880	CLOTHING, APPAREL, SHOES
0900	ANIMATE OBJECT
0911	DOG
0912	OTHER ANIMAL
0920	PLANT
0930	INSECT
0940	HUMAN (VIOLENCE)
0950	HUMAN (COMMUNICABLE DISEASE)
0960	BACTERIA, VIRUS (NOT HUMAN CONTACT)

CODE	SOURCE OF INJURY NAME
1000	PERSONAL PROTECTIVE EQUIPMENT
1010	PROTECTIVE CLOTHING, SHOES, GLASSES, GOGGLES
1020	RESPIRATOR, MASK
1021	DIVING EQUIPMENT
1030	SAFETY BELT, HARNESS
1040	PARACHUTE

INSTRUCTIONS FOR SECTION 6 — PUBLIC FATALITY

a. ACTIVITY AT TIME OF ACCIDENT—Select the activity being performed at the time of the accident from the list below. Enter the activity name on the line and the corresponding number in the box. If the activity performed is not identified on the list, select from the *most* appropriate primary activity area (water related, non-water related or other activity), the code number for "Other", and write in the activity being performed at the time of the accident.

WATER RELATED RECREATION

1. Sailing
2. Boating—powered
3. Boating—unpowered
4. Water skiing
5. Fishing from boat
6. Fishing from bank dock or pier
7. Fishing while wading
8. Swimming/supervised area
9. Swimming/designated area
10. Swimming/other area
11. Underwater activities (skin diving, scuba, etc.)
12. Wading
13. Attempted rescue
14. Hunting from boat
15. Other

NON-WATER RELATED RECREATION

16. Hiking and walking
17. Climbing (general)
18. Camping/picnicking authorized area
19. Camping/picnicking unauthorized area
20. Guided tours
21. Hunting
22. Playground equipment
23. Sports/summer (baseball, football, etc.)
24. Sports/winter (skiing, sledding, snowmobiling etc.)
25. Cycling (bicycle, motorcycle, scooter)
26. Gliding
27. Parachuting
28. Other non-water related

OTHER ACTIVITIES

29. Unlawful acts (fights, riots, vandalism, etc.)
30. Food preparation/serving
31. Food consumption
32. Housekeeping
33. Sleeping
34. Pedestrian struck by vehicle
35. Pedestrian other acts
36. Suicide
37. "Other" activities

b. PERSONAL FLOTATION DEVICE USED—If fatality was water-related was the victim wearing a person flotation device? Mark the appropriate box.

INSTRUCTIONS FOR SECTION 7—MOTOR VEHICLE ACCIDENT

a. TYPE OF VEHICLE—Mark appropriate box for each vehicle involved. If more than one vehicle of the same type is involved, mark both halves of the appropriate box. USACE vehicle(s) involved shall be marked in left half of appropriate box.

b. TYPE OF COLLISION—Mark appropriate box.

c. SEAT BELT—Mark appropriate box.

INSTRUCTIONS FOR SECTION 8—PROPERTY/ MATERIAL INVOLVED

a. NAME OF ITEM—Describe all property involved in accident. Property/material involved means material which is damaged or whose use or misuse contributed to the accident. Include the name, type, model; also include the National Stock Number (NSN) whenever applicable.

b. OWNERSHIP—Enter ownership for each item listed. (Enter one of the following: *USACE; OTHER GOVERNMENT; CONTRACTOR: PRIVATE)*

c. $ AMOUNT OF DAMAGE—Enter the total estimated dollar amount of damage (parts and labor), if any.

INSTRUCTIONS FOR SECTION 9—VESSEL/ FLOATING PLANT ACCIDENT

a. TYPE OF VESSEL/FLOATING PLANT—Select the most appropriate vessel/floating plant from list below. Enter name and place corresponding number in box. If item is not listed below, enter item number for "OTHER" and write in specific type of vessel/ floating plant.

VESSEL/FLOATING PLANTS

1. ROW BOAT
2. SAIL BOAT
3. MOTOR BOAT
4. BARGE
5. DREDGE/HOPPER
6. DREDGE/SIDE CASTING
7. DREDGE/DIPPER
8. DREDGE/CLAMSHELL BUCKET
9. DREDGE/PIPE LINE
10. DREDGE/DUST PAN
11. TUG BOAT
12. OTHER

b. COLLISION/MISHAP—Select from the list below the object(s) that contributed to the accident or were damaged in the accident.

COLLISION/MISHAP

1. COLLISION W/OTHER VESSEL
2. UPPER GUIDE WALL
3. UPPER LOCK GATES
4. LOCK WALL
5. LOWER LOCK GATES
6. LOWER GUIDE WALL
7. HAULAGE UNIT
8. BREAKING TOW
9. TOW BREAKING UP
10. SWEPT DOWN ON DAM
11. BUOY/DOLPHIN/CELL
12. WHARF OR DOCK
13. OTHER

INSTRUCTIONS FOR SECTION 10—ACCIDENT DESCRIPTION

DESCRIBE ACCIDENT—Fully describe the accident. Give the sequence of events that describe what happened leading up to and including the accident. Fully identify personnel and equipment involved and their role(s) in the accident. Ensure that relationships between personnel and equipment are clearly specified. Continue on blank sheets if necessary and attach to this report.

INSTRUCTIONS FOR SECTION 11—CAUSAL FACTORS

a. Review thoroughly. Answer each question by marking the appropriate block. If any answer is yes, explain in item 13 below. Consider, as a minimum, the following:

(1) DESIGN—Did inadequacies associated with the building or work site play a role? Would an improved design or layout of the equipment or facilities reduce the likelihood of similar accidents? Were the tools or other equipment designed and intended for the task at hand?

(2) INSPECTION/MAINTENANCE—Did inadequately or improperly maintained equipment, tools, workplace, etc. create or worsen any hazards that contributed to the accident? Would better equipment, facility, work site or work activity inspections have helped avoid the accident?

(3) PERSON'S PHYSICAL CONDITION—Do you feel that the accident would probably not have occurred if the employee was in "good" physical condition? If the person involved in the accident had been in better physical condition, would the accident have been less severe or avoided altogether? Was over exertion a factor?

(4) OPERATING PROCEDURES—Did a lack of or inadequacy within established operating procedures contribute to the accident? Did any aspect of the procedures introduce any hazard to, or increase the risk associated with the work process? Would establishment or improvement of operating procedures reduce the likelihood of similar accidents?

(5) JOB PRACTICES—Were any of the provisions of the Safety and Health Requirements Manual (EM 385-1-1) violated? Was the task being accomplished in a manner which was not in compliance with an established job hazard analysis or activity hazard analysis? Did any established job practice (including EM 385-1-1) fail to adequately address the task or work process? Would better job practices improve the safety of the task?

(6) HUMAN FACTORS—Was the person under undue stress (either internal or external to the job)? Did the task tend toward overloading the capabilities of the person; i.e., did the job require tracking and reacting to many external inputs such as displays, alarms, or signals? Did the arrangement of the workplace tend to interfere with efficient task performance? Did the task require reach, strength, endurance, agility, etc., at or beyond the capabilities of the employee? Was the work environment ill-adapted to the person? Did the person need more training, experience, or practice in doing the task? Was the person inadequately rested to perform safely?

(7) ENVIRONMENTAL FACTORS—Did any factors such as moisture, humidity, rain, snow, sleet, hail, ice, fog, cold, heat, sun, temperature changes, wind, tides, floods, currents, dust, mud, glare, pressure changes, lightning, etc., play a part in the accident?

(8) CHEMICAL AND PHYSICAL AGENT FACTORS—Did exposure to chemical agents (either single shift exposure or long-term exposure) such as dusts, fibers (asbestos, etc.), silica, gases (carbon monoxide, chlorine, etc.,), mists, steam, vapors, fumes, smoke, other particulates, liquid or dry chemicals that are corrosive, toxic, explosive or flammable, by-products of combustion or physical agents such as noise, ionizing radiation, non-ionizing radiation (UV radiation created during welding, etc.) contribute to the accident/incident?

(9) OFFICE FACTORS—Did the fact that the accident occurred in an office setting or to an office worker have a bearing on its cause? For example, office workers tend to have less experience and training in performing tasks such as lifting office furniture. Did physical hazards within the office environment contribute to the hazard?

(10) SUPPORT FACTORS—Was the person using an improper tool for the job? Was inadequate time available or utilized to safely accomplish the task? Were less than adequate personnel resources (in terms of employee skills, number of workers, and adequate supervision) available to get the job done properly? Was funding available, utilized, and adequate to provide proper tools, equipment, personnel, site preparation, etc?

(11) PERSONAL PROTECTIVE EQUIPMENT—Did the person fail to use appropriate personal protective equipment (gloves, eye protection, hard-toed shoes, respirator, etc.) for the task or environment? Did protective equipment provided or worn fail to provide adequate protection from the hazard(s)? Did lack of or inadequate maintenance of protective gear contribute to the accident?

(12) DRUGS/ALCOHOL—Is there any reason to believe the person's mental or physical capabilities, judgement, etc., were impaired or altered by the use of drugs or alcohol? Consider the effects of prescription medicine and over the counter medications as well as illicit drug use. Consider the effect of drug or alcohol induced "hangovers".

b. WRITTEN JOB/ACTIVITY HAZARD ANALYSIS—Was a written Job/Activity Hazard Analysis completed for the task being performed at the time of the accident? Mark the appropriate box. *If one was performed, attach a copy of the analysis to the report.*

INSTRUCTIONS FOR SECTION 12—TRAINING

a. WAS PERSON TRAINED TO PERFORM ACTIVITY/TASK?—For the purpose of this section "trained" means the person has been provided the necessary information (either formal and/or on-the-job (OJT) training) to competently perform the activity/task in a safe and healthful manner.

b. TYPE OF TRAINING—Mark the appropriate box that best indicates the type of training; (classroom or on-the-job) that the injured person received before the accident happened.

c. DATE OF MOST RECENT TRAINING—Enter the month, day, and year of the last *formal* training completed that covered the activity-task being performed at the time of the accident.

Appendix E: Respiratory Protection Program

DAMES & MOORE

Firmwide
Health and Safety
Program and Procedure Manual

Procedure No.: HS 150

Date: July 1, 1990

Supercedes:

Approved: Gary R. Krieger MD
GARY R. KRIEGER, MD

Subject: RESPIRATORY PROTECTION PROGRAM

This Procedure establishes the Dames & Moore Respiratory Protection Program. It establishes responsibilities and basic requirements for Dames & Moore personnel who are required to work in situations where respiratory hazards may be present. This Procedure was developed in accordance with the Federal OSHA Respiratory Protection Standard (29 CFR 1910.134), the American National Standards Institute (ANSI) Practices for Respiratory Protection (Z88.2), and the NIOSH Guide to Respiratory Protection.

This Respiratory Protection Program addresses both field and fixed facility (laboratory) operations. As a result, some portions of the Program will have two different procedures for the same task, such as in the Hazard Evaluation/Respirator Selection section.

Dames & Moore will provide approved and certified respirators and component parts to employees at no cost to the individual. Employees will use this respiratory protective equipment in accordance with this Procedure, and the instructions and training that are provided.

DAMES & MOORE **Firmwide** **Health and Safety** **Program and Procedure Manual**	Procedure No.: HS 150.1 Date: July 15, 1994 Supercedes: July 1, 1990 Approved: Gary R. Krieger MD GARY R. KRIEGER, MD
Subject: RESPIRATORY PROTECTION PROGRAM: PROGRAM ADMINISTRATION AND RESPONSIBILITIES	

The Respiratory Protection Program is administered by the Dames & Moore Division Health and Safety Manager (DHSM) with assistance from the Office Safety Coordinators (OSC). The DHSM will:

- Oversee the implementation of the Respiratory Protection Program in the Division;
- Periodically audit and evaluate the Program implementation at Division offices;
- Evaluate this Procedure on an on-going basis to see that it reflects current practice and regulations;
- Evaluate various makes and types of respirators to determine their suitability for Division use;
- Provide qualitative and, as appropriate, quantitative fit tests to staff;
- Assist OSCs in their implementation of this Procedure;
- Develop and provide training programs as described in Procedure HS 110;
- Maintain records of Employee Fit-Testing and Training; and
- Coordinate with the Firmwide Medical Director in the evaluation of the medical qualifications of wearers (see HS 120.2).

The OSCs are responsible for assisting the DHSM in the implementation of the Respiratory Protection Program by:

- Providing guidance to staff regarding the use of respiratory protective equipment that is approved under this procedure;

- Under certain circumstances, providing qualitative fit tests to staff;
- Providing feedback to the DHSM regarding program effectiveness. Project Managers (PM) and Site Safety Officers (SSO) are responsible for:
- Implementing this Procedure, as described in the site-specific health and safety plan, in all field operations; and
- Providing feedback to the DHSM regarding program effectiveness.

Laboratory managers and supervisors are responsible for:

- Implementing this Procedure in all applicable laboratory operations; and
- Providing feedback to the DHSM regarding program effectiveness.

Staff members are responsible for:

- Complying with this Procedure as it applies to their activities; and
- Providing feedback to their supervisor regarding program effectiveness.

The Firmwide Health and Safety Director, or his designee, is responsible for undertaking, on a periodic basis, a formal evaluation of the effectiveness of the Dames & Moore Respiratory Protection Program.

DAMES & MOORE

Firmwide
Health and Safety
Program and Procedure Manual

Procedure No.: HS 150.2
Date: July 15, 1994
Supercedes: July 1, 1990
Approved: Gary R. Krieger MD
GARY R. KRIEGER, MD

Subject: RESPIRATORY PROTECTION PROGRAM:
TYPES OF RESPIRATORS

Only respirators approved and certified by the National Institute for Occupational Safety and Health (NIOSH) or the Mine Safety and Health Administration (MSHA) under 30 CFR Part 11 shall be used by Dames & Moore personnel. Such respirators are listed in the NIOSH Certified Equipment List, which is issued in December of each year.

Respirators can be divided into two categories, negative pressure and positive pressure. Within these categories, the following types of respirators are approved for use by Dames & Moore personnel:

- Negative pressure:
  - half-face air purifying respirators;
  - full-face air purifying respirators.

- Positive pressure:
  - powered air purifying respirators;
  - pressure-demand self-contained breathing apparatus (2215 psi only);
  - airline/supplied air respirator with escape bottle.

Dames & Moore will provide employees with an opportunity to fit test negative pressure air purifying respirators from several manufacturers in order that an employee will get the appropriate fit. For the purposes of uniformity and availability, the following hierarchy will be followed when fit-testing negative pressure air purifying respirators:

- Half-face:
  1 - Mine Safety Appliances;
  2 - American Optical;
  3 - Scott;
  4 - Any other certified half-face respirator.

- Full-face:
  1 - Mine Safety Appliances;
  2 - American Optical;
  3 - Scott;
  4 - Any other certified full-face respirator.

Descriptions of these types of respirators and their capabilities are provided in the Respiratory Protection Training course.

Dames & Moore personnel will not alter any respirator from its approved configuration for any reason. Respirator components and cartridges/filters from one manufacturer cannot be interchanged with those from another manufacturer; to do so voids the NIOSH/MSHA approval and compromises the effectiveness of the respirator. Any question in this regard should be directed to the DHSM.

DAMES & MOORE

Firmwide
Health and Safety
Program and Procedure Manual

Procedure No.: HS 150.3
Date: July 15, 1994
Supercedes: July 1, 1990
Approved: Gary R. Krieger MD
GARY R. KRIEGER, MD

Subject: RESPIRATORY PROTECTION PROGRAM:
HAZARD EVALUATION FOR RESPIRATOR SELECTION

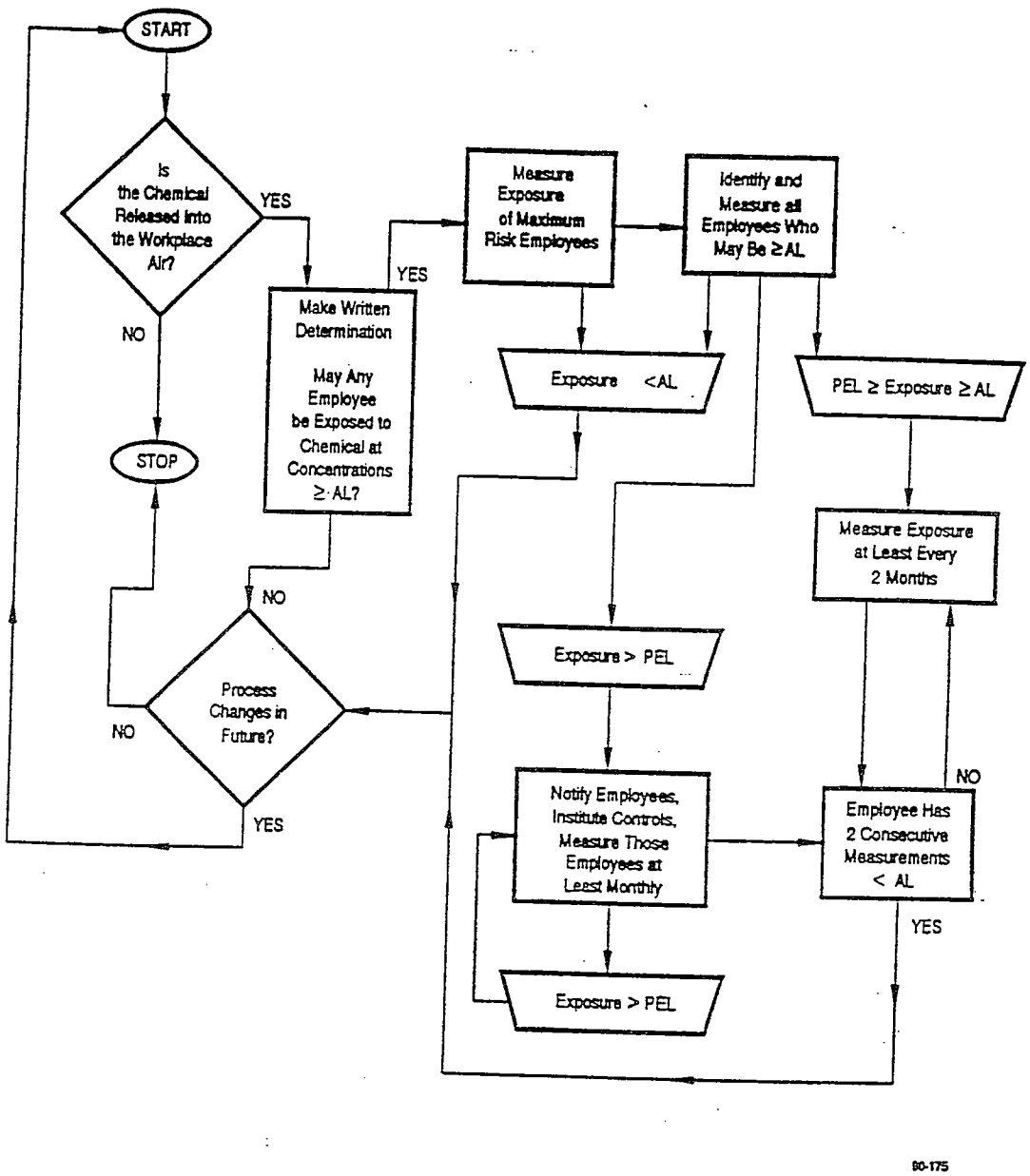
This procedure is for facilities whose operations and exposures can be characterized by traditional industrial hygiene survey methods. For example, a chemist performing extractions can wear a personal sampler during the course of a day's operation; the chemist's exposure to the chemicals used in the extraction process can be evaluated using NIOSH methods. It can then be determined if the chemist is over-exposed; if so, engineering (i.e., ventilation system) or administrative controls can be considered. As a last resort, respiratory protection will be used.

It may not be feasible to use this hazard evaluation procedure for field operations. Instead, the procedures of the Exposure Monitoring Program in HS 180 should be integrated with the Respirator Selection guidance in HS 150.4. Site-specific procedures will be presented in each site-specific health and safety plan.

To initiate the hazard evaluation process, an industrial hygienist, under the direction of a Certified Industrial Hygienist (CIH), will evaluate the operation, noting the chemicals present and the manner in which they are used. The industrial hygienist will determine the health hazards associated with the chemicals and establish an exposure sampling strategy. The accompanying chart illustrates the steps in the determination of employee's exposures to chemicals in the workplace.

The industrial hygienist will use area sampling, personal sampling, or a combination of these to determine the level of exposure. If employees are exposed above the action level, the industrial hygienist will notify the DHSM, who will work with the industrial hygienist and location management to determine the feasibility of initiating the use of engineering controls, such as local exhaust ventilation, or administrative controls to reduce exposures. For further information on this process, reference Chapter 17 in Fundamentals of Industrial Hygiene, 3rd ed., National Safety Council, Chicago, IL, 1989.

If engineering controls cannot be used, or if they must be augmented with personal protective equipment, this Respiratory Protection Program will be established at the facility.



The NIOSH-recommended employee exposure determination and measurement strategy. The health standard for each individual substance should be consulted for detailed requirements. In the flow chart, AL=Action Level and PEL=Permissible Exposure Limit.

Subject: RESPIRATORY PROTECTION PROGRAM:
RESPIRATOR SELECTION

The industrial hygienist or the DHSM will determine the appropriate type of respirator for a specific hazard. The selection of respiratory protective equipment will be based upon these five basic steps:

- Identification of the hazard;
- Evaluation of the hazard level;
- Consideration of the user's personal characteristics;
- Consideration of the conditions of use;
- Use of an approved respirator.

The accompanying Respirator Decision Flow Diagram outlines the decision process typically used at Dames & Moore.

IDENTIFICATION OF THE HAZARD

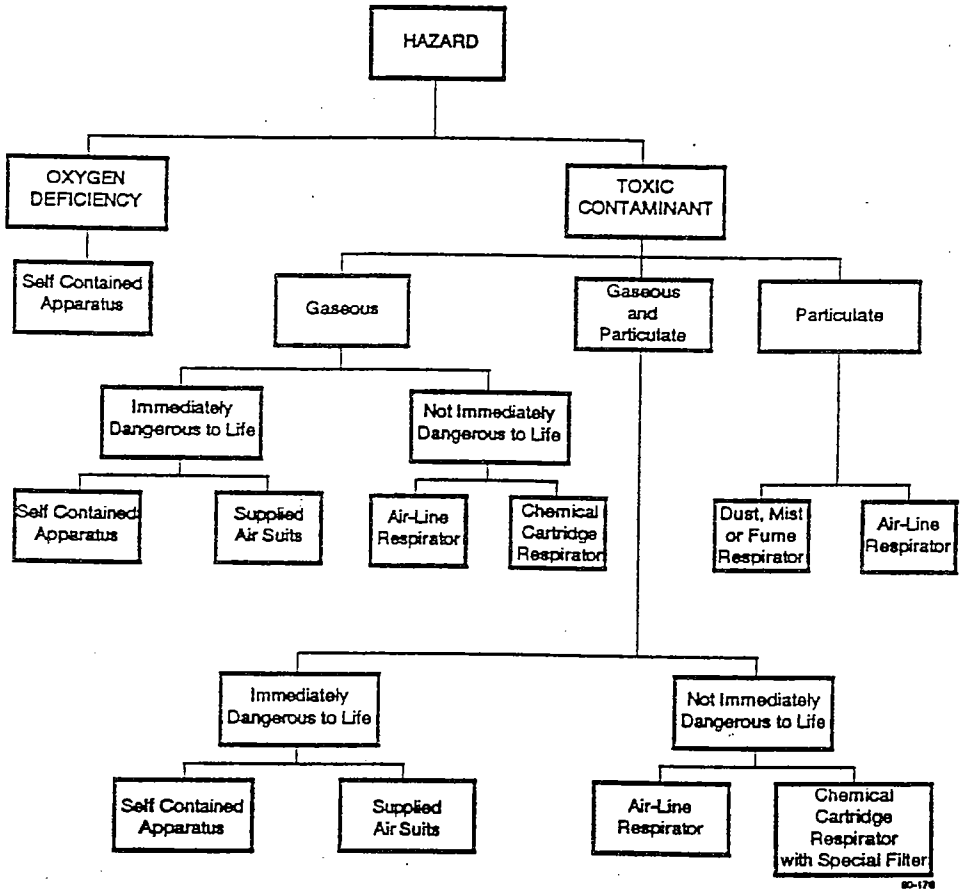
Identification of the type of hazard is the first step in the selection of a respirator. Although the number of hazardous conditions which might require a respirator are virtually limitless, they will generally fall into one of the following five categories:

Gas or Vapor Contaminant

Gases are substances which normally exist as such at ordinary temperature and pressure; e.g., carbon monoxide or sulfur dioxide, where as vapors are the gaseous state of substances that would be solid or liquid at ordinary temperature and pressure; e.g., acetone or benzene vapors.

Most gases and vapors are colorless but may have a distinctive odor which helps in hazard identification. The odor threshold of many gases and vapors are below the Permissible Exposure Limit (PEL) or Threshold Limit Value (TLV) and odor therefore can be used as an indication of a hazard. A few gases and vapors, however, have odor thresholds above their respective PEL's and the perception of their odor indicates that a

RESPIRATOR DECISION FLOW DIAGRAM



hazardous concentration has already been exceeded. The DHSM can provide information regarding odor thresholds for specific chemicals. Regardless of the relationship between the odor threshold and PEL, the perception of contaminant odor is an indication of respirator leakage or cartridge breakthrough and the respirator wearer should exit the area immediately.

Particulate Contaminants

Particulate contaminants are made up of tiny particulates or droplets of a substance. Many of these particles are so small (less than 50 microns in diameter) they cannot be seen and those less than 10 microns in diameter can be easily inhaled. Particles less than 5 microns in diameter are small enough to reach deep into the lungs or into the alveoli.

Particulates are produced by mechanical means through the disintegration processes such as grinding, crushing, drilling, blasting or spraying; or by physiochemical reactions such as combustion, vaporization, distillation, sublimation, calcination or condensation.

Combination of Contaminants

Gaseous and particulate contaminants frequently occur together. Paint spraying, for example, produces both paint mist (particulate) and solvent vapors (gaseous). Smoke also contains particulates and gases.

Oxygen Deficient Atmospheres

In an oxygen deficient atmosphere, the problem is not the presence of something harmful but the absence of something essential. Such atmospheres are most commonly found in confined and usually poorly ventilated spaces; such as silos, petrochemical tanks, and the holds of ships. Oxygen deficient atmospheres are classified as immediately dangerous to life or health (IDLH).

An accurate description of an oxygen deficient atmosphere is important for proper respirator selection, but no one definition has been universally accepted. For Dames & Moore and OSHA compliance purposes, an oxygen-deficient atmosphere contains less than 19.5 percent oxygen.

IDLH Atmospheres

This is an atmosphere where employee exposure can:

- Cause serious injury or death within a short period of time (e.g., high concentrations of carbon monoxide or hydrogen sulfide);
- Cause serious delayed effects (e.g., airborne radioactive materials or cancer-causing agents);
- Prevent exposed personnel from escaping the environment within 30 minutes.

Once a hazardous situation has been categorized as one of the hazards above (i.e., gas, vapor, particulate, oxygen deficient, IDLH), an initial decision can be made concerning the general type of respirator that may be selected. HS 150.11 describes general types of respirators available and a decision logic chart for respirator selection based on these five hazard types is presented in this procedure.

EVALUATION OF THE HAZARD LEVEL

The second consideration in selecting a respirator is the level or concentration of the hazard requiring the respirator. The concentration of the air contaminant and how it compares to the TLV or PEL for that substance must be known in order to determine the "protection factor" which the respirator must provide, which is the ratio of the concentration of the contaminant outside the respirator to that inside the respirator under conditions of use. Respirators should be selected so that the concentration inside the respirator will not exceed the TLV or PEL.

$$MUC = PF \times TLV$$
$$PF = MUC/TLV$$

Where MUC = maximum use concentration
PF = protection factor
TLV = threshold limit value (or use PEL-permissible exposure limit).

Respirator protection factors tend to vary depending upon the specific standard cited. The list below presents protection factors that are generally accepted in the absence of standards that indicate otherwise.

Half-face filter or chemical cartridge respirator	10
Full-face filter or chemical cartridge respirator	50
Powered air-purifying respirator	100
Self-contained breathing apparatus, pressure-demand (SCBA)	10,000 +

CONSIDERATION OF THE USER'S PERSONAL CHARACTERISTICS

Medical Condition

The use of any type of respirator will impose some physiological stress on the user. For example:

- Air-purifying respirators make breathing more difficult because the filter or cartridge impedes the flow of air;
- The special exhalation valve on an open circuit pressure demand respirator requires the wearer to exhale against some resistance;
- The bulk and weight of an SCBA can be a burden;
- If the wearer is using an airline respirator, they might have to drag up to 300 feet of hose around.

All these factors can significantly increase the employee's workload and wearers shall have medical examinations to determine if they are medically able to wear respiratory protective equipment without aggravating preexisting medical problems.

In order for the Firmwide Medical Director to render a qualified opinion on employee respirator usage, the examining physician should be provided with the following information:

- The type of respiratory protection equipment to be used, and its modes of operation;
- The tasks an employee will perform while wearing the respirator;
- The length of time that the employee might wear the equipment; and
- Any substance to which the employee could be exposed, and related toxicity.

Emotional and Mental Factors

Emotional and mental factors must also be considered when employees wear respirators. Some individuals feel claustrophobic when wearing them, especially with protective clothing. If there are indications that an individual suffers from chronic claustrophobia, that individual should not be placed in such a situation.

Physical Characteristics

Scars, hollow temples, very prominent cheekbones, deep skin creases, and lack of teeth or dentures may cause respirator facepiece sealing problems. Full dentures should be retained when wearing a respirator, but partial dentures may or may not have to be removed, depending upon the possibility of swallowing them under duress.

Corrective Lenses

If glasses or goggles are required, they shall be worn so as not to effect the respirator.

If a full facepiece respirator is worn, a proper seal cannot be established due to eyeglasses temple bars extending through the sealing edge of the facepiece. Wearing contact lenses with any type of respirator is not permitted.

Systems have been developed for mounting corrective lenses inside full facepieces; and when a person must wear corrective lenses, the proper facepiece and lenses must be obtained to provide good vision, comfort, and a gas-tight seal. Dames & Moore will arrange, at no cost to the employee, for such systems to be provided to those personnel who need them. The DHSM can provide assistance in this area.

CONSIDERATION OF THE CONDITIONS OF USE

Eye Irritation

If the air contaminant can cause eye irritation a full facepiece respirator should be used.

Skin Irritation or Absorption Through the Skin

Some airborne contaminants are extremely irritating to the skin (ammonia or hydrochloric acid) while others are capable of being absorbed through

the skin and into the bloodstream with serious and possibly fatal results (hydrocyanic acid or organophosphate pesticides such as parathion, malathion or tetraethyl pyrophosphate).

Rubber facepiece material can cause skin irritation dermatitis for some individuals; the use of non-allergenic silicone facepieces can help alleviate this condition.

Communication

Speech communication may be necessary in jobs where a respirator is required. Conventional respirators, however, distort the human voice to some extent and shouting can cause facepiece or component leakage.

Mechanical speech transmission devices called speaking diaphragms are available as an integral part of some respirators. These consist of a resonant cavity and diaphragm which amplify sound in the frequency range most important to speech intelligibility. The diaphragm acts as a barrier to entry of ambient atmospheres and should be carefully handled and protected by a cover to prevent puncture or breakage.

Methods of electronically transmitting speech from the respirator utilize microphones connected to a telephone, facepiece, or earlobe while the amplifier, power pack and speaker or transmitter are attached to the exterior of the mask, are carried on the body or are remotely located.

Respirators with electric or electronic speech transmission devices having an integral or body-attached battery power supply should be used with caution in explosive atmospheres, and connecting cables from microphones inside the facepiece must have gas-tight seals were they emerge from the facepiece. When the loudspeaker diaphragm is part of the barrier between the respirator wearer and the ambient atmosphere, it should be inspected frequently for leakage and protected from puncture or breakage.

Location of Hazardous Work Area

The location of the contaminated area with respect to a possible source of respirable air requires special consideration. When using an airline respirator, the distance that the wearer can travel into a contaminated atmosphere is limited by the length of hose connected to the source of respirable air. The hose also requires that the user must enter and leave the area by the same route unless the device is equipped with an auxiliary air cylinder appropriate for use in withdrawal. While wearing an SCBA or

filter respirator, a person may leave the contaminated area by any approved exit, but one must make certain that the device will afford protection until reaching respirable air, taking into account possible delays.

Duration of Task

Work time usually determines the period for which respiratory protection is needed, including time necessary to enter and leave a contaminated area. A self-contained breathing apparatus or chemical cartridge respirator provides respiratory protection for relatively short periods, whereas an airline respirator provides protection for as long as the facepiece is supplied with adequate respirable air. Particulate-filter respirators can provide protection for long periods, without need for filter replacement, but only if the atmospheric particulate loading is low. Therefore, for protracted periods of use, an airline respirator offers definite advantages over a filter respirator. Some respirators have a means for indicating remaining service life. Some type of warning is available for all self-contained breathing apparatus. This may be a pressure gauge, timer or an audible or physical alarm. The user must understand the operation and limitations of each type of warning device. Most chemical-cartridge respirators have no indicator of remaining service life. Canisters and cartridges should be changed according to the manufacturer's directions, or as specified in a site-specific health and safety plan.

Activity Required

The work area to be covered, work rate, and mobility of the wearer in carrying out the work should be considered in respirator selection. Air-purifying respirators present minimal interference with the wearer's movement. Supplied air respirators with trailing hoses severely restrict the area the wearer can cover and present a potential hazard if the hose comes in contact with machinery or other objects. SCBA presents a size and weight penalty which may restrict climbing and movement in tight places.

The wearer's work rate determines his respiratory minute volume, maximum inspiratory flow rate, and inhalation and exhalation breathing resistance. The respiratory minute volume is of great significance in self-contained and airline respirators operated from cylinders since it determines their operating life; it is also a factor in cartridge service life on air-purifying respirators. Useful life under moderate work conditions may be one-third of that under rest conditions.

The high breathing resistance of air-purifying respirators under conditions of heavy work can result in distressed breathing.

Work in Low Temperatures

The major problem in the use of respirators at low temperatures is freezing of exhalation valves, and for full facepieces, poor visibility.

Full facepieces are designed so that the incoming fresh air sweeps over the inside of the lens to reduce fogging. Otherwise, it would be impossible to wear a full facepiece even at ordinary room temperature without severe fogging. Anti-fog compounds may be used to coat the inside of the lens to prevent fogging at room temperatures and down to temperatures approaching 32 degrees Fahrenheit (°F). However, below 0°F, anti-fog compounds will not prevent severe fogging.

Full facepieces are available with nose cups that direct moist exhaled air through the exhalation valve. A properly fitted nose cup should, in theory, allow adequate visibility at temperatures down to -30° F.

At very low temperatures, the exhalation valve may collect moisture and freeze open, allowing the wearer to breathe contaminated air, or freeze closed, which prevents normal exhalation.

High-pressure connections on SCBA may leak because of metal contracting at low temperatures. The connections should not be overtightened since they may break when the temperature returns to normal.

Work in High Temperatures

A person working in areas of high ambient or radiant temperature is already under stress, and any additional stress resulting from use of respirators should be minimized. This can be done by selecting and using respirators having minimum weight and breathing resistance. Supplied-air respirators and hoods and suits having an adequate supply of cool breathing air are recommended. Also, a simple Venturi valve, operated by compressed breathing air, is available for cooling purposes.

USE OF AN APPROVED RESPIRATOR

Having considered the type of hazard, the level of the hazard, user characteristics, and the conditions of use, a decision may be made concerning the appropriate type of respirator. HS 150.4 presents a decision logic diagram for

selecting the types of respirator, and certain other guides are useful as well; for example the NIOSH Respirator Decision Logic, DHHS (NIOSH) Publication No. 87-108. HS 150.10 provides a description of various types of respirators.

As important as selecting the right type of respirator is the selection of an approved respirator. The National Institute for Occupational Safety and Health (NIOSH) provides a testing, approval, and certification program for respiratory protective devices. Approved devices are listed in the NIOSH Publication, NIOSH Certified Equipment List. This publication is updated periodically with the addition of newly approved equipment and deletion of equipment which has lost its approval.

All approved devices have a "TC" (Tested and Certified) number permanently printed on each item; this number is referenced in the NIOSH Certified Equipment list described above.

Only NIOSH/MSHA approved respiratory protective equipment will be issued to and worn by Dames & Moore employees.

No employee will be assigned to a task that requires the use of a respirator unless it has been determined that the person is physically able to perform the task using an appropriate respirator. This determination will be made on an annual basis by the Dames & Moore Firmwide Medical Director. All Dames & Moore personnel who will be using respiratory protective equipment must also be participants in the Dames & Moore Medical Surveillance Program (see HS 120). In baseline and subsequent medical examinations, participants will undergo, among others, a pulmonary function test; the results of this exam will be reviewed by the Firmwide Medical Director to determine the participant's fitness for use of respiratory protective equipment. The components of the various examinations are described in HS 120.2.

Periodic exposure monitoring of respirator users will be conducted in accordance with the parameters set forth in HS 180.

Dames & Moore uses available resources available to screen each employee required to wear respiratory protective equipment before they perform their work task. Some factors that may impose hardships on an employee required to wear respiratory protective equipment are described below:

Physiological Factors

Wearing any type of respirator imposes some physiological stress on the wearer. With air-purifying devices, resistance to inhalation is always experienced because the filter or chemical cartridge restricts airflow; in addition, the wearer must work against the exhalation valve upon expiration. Similar breathing resistance is encountered when using pressure-demand type airline respirators or SCBA because the spring-loaded exhalation valve used is designed to always maintain positive pressure within the mask; this feature requires an additional 1.5 to 3.0 psi of exhalation pressure to open this type of exhalation valve. The bulk and weight of SCBAs (up to 35 lbs.) is of some concern, especially when an

employee must perform strenuous work. Airline respirator units require that the wearer drag around the hose or airline, which provides additional physiological stress.

Pulmonary Factors

In the physical exam, respirator wearers are examined for any evidence of respiratory impairment such as emphysema, obstructive lung disease or bronchial asthma. Historical and clinical evidence of impairment of pulmonary function, including x-ray findings or a reduction in vital capacity or forced expiratory volume, may justify a restriction from wearing a respirator that restricts inhalation and exhalation, even though the individual may be able to perform adequately in a continuous-flow supplied air device.

Cardiovascular Consideration

The use of air-purifying demand or pressure-demand supplied air devices may pose a serious problem for employees with cardiovascular disease, but they may be able to use continuous flow devices. As always, the physician must make a final determination.

If an employee has cardiovascular disease, serious consideration should be given to assigning him where he need not require the use of respiratory protection and also where he need not respond to an emergency situation or escape from a contaminated area with respiratory protective devices.

Health Conditions

Conditions that may prevent an employee from wearing a respirator, and thus from working in a contaminated area, include:

- Diabetes;
- Epilepsy;
- Alcoholism;
- Use of certain medication;
- Punctured ear drum;
- Skin sensitivities;
- Impaired or non-existent sense of smell;
- Any other condition that the physician determines to place the employee at added physical risk.

DAMES & MOORE

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Procedure No.: HS 150.6
Date: July 15, 1994
Supercedes: July 1, 1990
Approved: Gary R. Krieger MD
GARY R. KREGER, MD

Subject: RESPIRATORY PROTECTION PROGRAM:
RESPIRATOR FIT TESTING

Respirator fit testing is required by OSHA and ANSI. Fit testing is required at least annually for Class 1 employees, however, OSHA requires it every 6 months for asbestos workers. Dames & Moore provides each respirator user a fit test in order to select the specific type, make, and model of negative pressure respirator for use by the wearer.

The following policies are observed in the fitting and use of the respirator:

- Fit testing for positive pressure respirators (see HS 150.11) is not required;

- Personnel shall be allowed to use only the specific make(s) and model(s) of air purifying respirators for which the person has obtained a satisfactory fit verified through fit testing procedures;

- An employee is not permitted to use any respirator not previously fit tested or if the results of the fit test indicated that the person was unable to obtain a satisfactory fit;

- No facial hair or glasses are allowed that will interfere with the attainment of a good seal. Facial hair (e.g., some moustaches) that does not interfere with a good facepiece-to-face seal is permissible. However, facial hair, specifically beards, that contacts the sealing surface of the respirator is specifically prohibited;

- Dames & Moore will provide persons requiring glasses with specially mounted glasses inside the full-face respirator. Under no circumstances will contact lenses be worn while using any type of respirator;

- If it is found that an employee cannot obtain a good facepiece-to-face seal because of facial features or medical factors, that equipment shall not be used and they shall not enter an atmosphere requiring the use of that equipment;

- The Division Health and Safety Manager and the Office Safety Coordinators will keep records of the make, model, size, and type of respirator each employee has been fit tested with. The record will include the date and signature of the person performing the test;

- Fit tests will be repeated at least annually; asbestos operations personnel will be fit-tested every six months;

- Specific fit test criteria for asbestos operations personnel are found in Procedure HS 190; and

- Dames & Moore respirator fit testing criteria are found in HS 150.12.

Respirator Fit Considerations

Each make and model of respirator facepiece has a slightly different fit. Although each manufacturer designs their facepieces to fit as broad a cross section of the working population as possible, no respirator fits everyone.

Conditions which may adversely affect a good facepiece fit include:

- growth of beard;
- sideburns;
- a hairline that projects under the facepiece;
- temple pieces on glasses;
- facial scars;
- facial injuries;
- round face shape;
- dentures.

Dames & Moore provides employees with respirators from several manufacturers so that each person can select a respirator that fits properly and is reasonably comfortable. It is in the process of matching the respirator to the individual user that a fit testing procedure is needed.

Dames & Moore personnel who are assigned to field operations in which respiratory protection may be required must be clean shaven at the time of assignment; a neatly-trimmed moustache that does not extend beyond the corners of the mouth and does not otherwise interfere with acceptable respirator fit is permissible. Exceptions to this policy can only be granted by the Firmwide Medical Director.

Although equipment selection is important to the success of a respiratory protection program, the proper use of the equipment is equally important. Proper use can be ensured by carefully training employees in the selection, use and maintenance of the provided respiratory equipment.

Dames & Moore provides initial respiratory protection training for Class 1 personnel in the 40-hour course, and usually includes respiratory protection review in the annual Class 1 refresher training. Training is also provided on an "as needed" basis. Dames & Moore respiratory protection training criteria are described in Procedure HS 110.3.8. The training will cover at least the following topics:

- Dames & Moore Respiratory Protection Program;
- Overview of Respiratory Protection;
- Physiology of the Respiratory System;
- Classification of Respiratory Hazards;
- Air-Purifying Respirators;
- Air-Supplied Respirators;
- Respirator Selection, Use and Limitations;
- Fit testing, maintenance and cleaning.

DAMES & MOORE

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Procedure No.: HS 150.8
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Approved: Gary R. Krieger MD
GARY R. KRIEGER, MD

Subject: RESPIRATORY PROTECTION PROGRAM:
INSPECTION, MAINTENANCE, CLEANING, AND STORAGE

Respirator maintenance is a integral part of Dames & Moore's Respiratory Protection Program. Wearing a poorly maintained or malfunctioning respirator is, in one sense, more dangerous than not wearing a respirator at all because workers wearing defective devices think they are protected when in reality they are not. It is the responsibility of the Project Manager and/or Site Safety Officer to see that project personnel comply with inspection, cleaning, maintenance and storage requirements. The program requires at a minimum:

- Inspection for defects, including a leak check;
- Repair as required;
- Cleaning and disinfecting; and
- Proper and sanitary storage of equipment.

The maintenance program should ensure that each worker's respirator remains as effective as when it was new.

Inspection For Defects And Maintenance

If properly performed, inspections will identify damaged or malfunctioning respirators before they can be used. The OSHA standard outlines two types of inspections:

- Before and after use; and
- During cleaning.

All respiratory equipment will be inspected thoroughly during the cleaning process and before the apparatus is used. Any defects will be repaired or the defective part replaced. Proper inspection, maintenance, and cleaning of respiratory equipment is the responsibility of the user of the equipment. Inspection procedures are described in HS 150.9.

Cleaning

Cleaning and sanitizing of the units is accomplished in the following manner:

- The apparatus is broken down into its components as described in the manufacturer's schematic display that accompanies the unit. This step also affords the opportunity to thoroughly inspect each of the components for any defects, excessive wear and tear, etc. Discard any previously used cartridges.

- Thoroughly wash the facepiece and mask components in a cleaning and sanitizing solution, such as one ounce of powdered MSA Cleaner-Sanitizer to 1 gallon of warm water (120°F). The components should be scrubbed with a sponge or soft brush to remove dust, dirt, or other contaminants.

- Thoroughly rinse all component pieces in warm water. This step is important because residuals of cleaning solutions can cause irritation and/or dermatitis for some individuals.

- Air dry all components thoroughly, inspect them again for any defects, reassemble the units, and store properly until the next use.

Storage

Respirators will be stored in a convenient, clean and sanitary location to protect them against dust, sunlight, excessive heat or cold, excessive moisture, damaging chemicals and mechanical damage. They will be stored individually, (e.g., not stacked one upon the other or in cramped spaces) to prevent distortion of rubber or other elastomeric parts. Respirators should be stored in plastic bags, preferably in the cartons in which they came, and readily identifiable as to the individual to whom it has been assigned.

AIR PURIFYING RESPIRATORS

Air-purifying respirators should be checked as follows before and after each use:

1. Examine the facepiece for:

   - Excessive dirt;
   - Cracks, tears, holes, or physical distortion of shape from improper storage;
   - Inflexibility of rubber facepiece (stretch and knead to restore flexibility);
   - Cracked or badly scratched lenses in full facepieces;
   - Incorrectly mounted full facepiece lenses, or broken or missing mounting clips; and
   - Cracked or broken air-purifying element holder(s), badly worn threads, or missing gasket(s) if required.

2. Examine the head straps or head harness for:

   - Breaks;
   - Loss of elasticity;
   - Broken or malfunctioning buckles and attachments; and
   - Excessively worn serrations on head harness, which might permit slippage (full facepieces only).

3. Examine the inhalation and exhalation valves for the following after removing its cover:

   - Foreign material, such as detergent residue, dust particles, or human hair under the valve seat;
   - Cracks, tears, or distortion in the value material;
   - Improper insertion of the valve body in the facepiece;
   - Cracks, breaks, or chips in the valve body, particularly in the sealing surface;
   - Missing or defective valve cover; and
   - Improper installation of the valve in the valve body.

4. Examine the air-purifying element for:

   - Incorrect cartridge, canister, or filter for the hazard;
   - Incorrect installation, loose connections, missing or worn gasket, or cross threading in the holder;
   - Expired shelf-life date on the cartridge or canister; and
   - Cracks or dents in the outside case of the filter, cartridge or canister.

5. If the device has a corrugated breathing tube, examine it for:

   - Broken or missing end connectors;
   - Missing or loose hose clamps; and
   - Deterioration, determined by stretching the tube and looking for cracks.

ATMOSPHERE-SUPPLYING RESPIRATORS

For a routinely used atmosphere-supplying device, use the following procedures:

1. If the device is a tight fitting facepiece, use the procedures outlined under air-purifying respirators, except those pertaining to the air-purifying elements.

2. If the device is a hood, helmet, blouse or full suit, use the following procedures:

   - Examine the hood, blouse, or full suit for rips and tears, seam integrity, etc;
   - Examine the protective headgear, if required, for general condition with emphasis on the suspension inside the headgear.
   - Examine the protective face shield, if any, for cracks or breaks or impaired vision; and
   - Make sure the protective screen is intact and secured correctly over the face shield of abrasive blasting hoods and blouses.

3. Examine air supply systems for:

   - Integrity and good condition of air supply lines and hoses, including attachment and end fittings; and
   - Correct operation and condition of all regulators, or other air flow regulators.

SCBA INSPECTION PROCEDURES

Before a self-contained breathing apparatus can be used, it must be properly inspected to help prevent malfunctions during use. The checklist that follows can help ensure proper inspection.

Checklist: PRESSURE-DEMAND SCBA WITHOUT MODE SELECT LEVER

Prior to starting checklist, make sure that:

- High-pressure-hose connector is tight on cylinder fitting;

- Bypass valve is closed;
- Mainline valve is closed; and
- Regulator outlet is not covered or obstructed.

Back Pack and Harness Assembly Straps

- Visually inspect for complete set; and
- Visually inspect for frayed or damaged straps.

Buckles

- Visually inspect for mating ends;
- Check locking function.

Back plate and cylinder lock

- Visually inspect back plate for cracks and missing rivets or screws; and
- Visually inspect cylinder hold-down strap; physically check strap tightener and lock to assure that it is fully engaged.

Cylinder and Cylinder Valve Assembly

Cylinder

- Physically check to assure that it is tightly fastened to back plate;
- Visually inspect for large dents or gouges in metal;
- Check hydrostatic test date to assure it is current; and
- Check that cylinder is fully charged.

Head and valve assembly

- Visually determine cylinder valve lock is present;

- Visually inspect cylinder gauge for condition of face, needle, and lens; and

- Open cylinder valve; listen or feel for leakage around packing. (If leakage is noted, do not use until repaired.) Note function of valve lock.

Regulator and High-Pressure Hose

High-pressure hose and connector

Listen or feel for leakage in hose or at hose-to-cylinder connector. (Bubble in outer hose covering may be caused by seepage of air through hose when stored under pressure. This does not necessarily indicate a faulty hose.)

Regulator and low-pressure alarm

- Place mouth onto or over regulator outlet and blow. A positive pressure should be created and maintained for 5 to 10 seconds without loss of air. Next, inhale to create a slight negative pressure on regulator; hold for 5 to 10 seconds. Vacuum should remain constant. This tests integrity of the diaphragm. Any loss of pressure or vacuum during this test indicates a leak in the apparatus;

- Ascertain that regulator outlet is not covered or obstructed. Open and close bypass valve momentarily to assure flow of air through by-pass system;

- Cover regulator outlet with palm of hand. Open mainline valve and read regulator gauge (must read at least 1,800 psi and not more than rated cylinder pressure);

- Remove hand from outlet and replace in rapid movement. Repeat twice more. Air should escape when hand is removed each time, indicating a positive pressure in chamber; and

- Close cylinder valve, leaving the main line valve open, and slowly move hand from regulatory outlet to allow air to flow slowly. Gauge should begin to show immediate loss of pressure

as air flows. Low-pressure alarm should sound between 520 and 480 psi. Remove hand completely from outlet and close mainline valve.

Facepiece and Corrugated Breathing Tube

Facepiece

- Visually inspect straps and harness for damaged serrations and deteriorated rubber. Visually inspect rubber facepiece body for signs of deterioration or extreme distortion;

- Visually inspect lens for proper seal in rubber facepiece, retaining clamp properly in place, and absence of cracks or large scratches;

- Visually inspect exhalation valve for visible deterioration or buildup of foreign materials; and

- Carry out negative pressure test for overall seal and check of exhalation valve. In monthly inspection, place mask against face and use following procedure; in preparing for use, don back pack, then facepiece, and use following procedure:

  With facepiece held tightly to face (or facepiece properly donned), stretch breathing tube to open corrugations and place thumb or hand over end of connector. Inhale, negative pressure should be created inside mask, causing it to pull tightly to face for 5-10 seconds. If negative pressures drops this indicates a leak in the facepiece or breathing tube.

Breathing tube and connector

- Stretch breathing tube and visually inspect for deterioration and holes;

- Visually inspect connector to assure good condition of threads and for presence and proper condition of rubber gasket seal.

Storage of Units

- Cylinder refilled as necessary and unit cleaned and inspected;

- Cylinder valve closed;
- High-pressure-hose connector tight on cylinder;
- Pressure bled off of high-pressure hose and regulator;
- Bypass valve closed;
- Mainline valve closed;
- All straps completely loosened and laid straight; and
- Facepiece properly stored to protect against dust, direct sunlight, extreme temperatures, excessive moisture, and damaging chemicals.

NOTE: SCBA CYLINDERS ARE NEVER TO BE SHIPPED WITH COMPRESSED AIR IN THEM UNLESS ALL PROVISIONS FOR COMPLYING WITH DOT HAZARDOUS MATERIALS REGULATIONS ARE MET.

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GARY R. KRIEGER, MD

Subject: RESPIRATORY PROTECTION PROGRAM:
EVALUATION OF PROGRAM EFFECTIVENESS

In compliance with 29 CFR 1910.134 and ANSI Z88.2, Dames & Moore will evaluate its Respiratory Protection Program effectiveness regularly so that all persons involved are being provided with appropriate respiratory protection. This will be accomplished through the Dames & Moore Firmwide Health and Safety Director and action will be taken to correct defects in the program.

Project Managers and Site Safety Officers will perform spot inspections of respirator use to see that:

- The proper types of respirators are being used for the job;
- Employees properly perform positive/negative pressure fit tests prior to entering contaminated areas;
- Individuals who are required to wear respirators have received proper training;
- Respirators are inspected and maintained properly;
- Respirator storage is satisfactory;
- Respiratory hazards are monitored;
- The respirators being used are in good operating condition; and
- Medical surveillance of the respirator user is being carried out.

They will also periodically consult with respirator users about respirator comfort, interference to breathing, interference with job performance and their confidence in respirator effectiveness.

To determine the continued need for respiratory protection or a necessity for additional protection, there will be appropriate surveillance of the work area and the degree of employee exposure or stress, including area and personal monitoring of contaminant levels and types.

Data obtained from periodic inspections of respirator use, work area surveillance, medical surveillance, and wearer comments will be reviewed and analyzed to evaluate the continued effectiveness of the program. Any evidence of excessive exposure to a hazardous atmosphere will be investigated and action taken to remedy the problem.

AIR PURIFYING RESPIRATORS

These respirators remove contaminants from the air breathed but do not supply oxygen. They cannot be worn in oxygen deficient atmospheres.

Particulate (dust, mist, fume) Removing

These respirators are called "dust", "mist", or "fume" respirators and remove particulates by a filtering action before they can be inhaled. They offer no protection against atmospheres containing contaminant gases or vapors.

The airflow resistance of a particulate-removing respirator filter element increases as the quantity of particles it retains increases, thus increasing the breathing resistance. As a rule of thumb, when comfortable breathing is impaired because of dust build-up, the filter should be replaced. The performance of some filter materials is also affected by open storage in very humid atmospheres and care should be taken in storing filter elements.

NIOSH approves air-purifying and powered air-purifying particulate removing respirators to protect the wearer against one or more of the following hazards:

- Dust exposure, where the OSHA allowable daily exposure for the dust is not less than 0.05 mg/m^3;
- Mist exposure, where the OSHA allowable daily exposure for the mist is not less than 0.05 mg/m^3;
- Metal fume exposure, where the OSHA allowable daily exposure for the fume is not less than 0.05 mg/m^3;
- Dust, fume, and mist exposure, where the OSHA allowable daily exposure for the dust, fume, or mist is less than 0.05 mg/m^3;

- Exposure to radon daughters and radon daughters attached to dusts, fumes, and mist;

- Exposure to asbestos-containing dusts or mists; and

- Exposure to dusts or mists which cause the formation of scar tissue in the lungs (pneumoconiosis and fibrosis-producing materials).

- Dust, Mist, and Fume Half-Face Respirator

The half-face respirator fits over the nose and under the chin. The half-face usually produces a good facepiece to face seal but not as good a seal as the full facepiece. Depending on the filter used, the half-mask is approved for use against fumes or dusts and mists having a PEL or TLV greater than 0.05 mg/m^3.

- High-Efficiency Half-Face Respirator

These respirators use a high efficiency filter and can be used against dusts, mists, and fumes with PEL or TLV less than 0.05 mg/m^3.

- Dust, Mist, and Fume Full Facepiece Respirator

Full facepiece respirators cover the face from the hairline to below the chin. They provide more protection to the face, and give a better seal than do the half- or quarter-masks. These respirators provide protection against dusts, mists, fumes, or any combination of these contaminants depending upon the type of filter used.

- Powered Dust, Mist, and Fume (PAPR) Respirators (Asbestos Operations)

These respirators use a blower that passes the contaminated air through a filter where the contaminant is removed and passes the purified air into the facepiece. The face covering can be a half-mask, full-face mask, hood, or helmet.

The advantage of using a powered air-purifying respirator is that it supplies air at a positive pressure within the facepiece, hood, or helmet, so that any leakage is outward. The protection provided depends on the air-purifying element and the type and concentration of the contaminants. Powered respirators must deliver at least 4 cubic feet per minute (cfm) to a tight fitting facepiece such as a mask and at least 7 cfm to a loose

fitting helmet or hood. If the powered respirator is battery operated, it should provide the airflows mentioned for at least 4 hours without having to recharge the battery.

Gas and Vapor Removing Respirators

Vapor and gas-removing respirators use cartridges or canisters containing chemicals to absorb or react with specific vapors and gases to remove them from the air breathed. The basic difference between a cartridge and a canister is the volume of the sorbent. Generally a "cartridge" refers to a smaller chemical filtering element which attaches directly to the facepiece, whereas a "canister" refers to a larger chemical filter element held in a harness connected to the facepiece by a corrugated breathing tube. A color code system is used to assist in identifying the approved uses for individual cartridges and canisters. Table 1 lists various air contaminants and their associated colors. Labels on the cartridge and canister will also indicate the maximum concentration in which the element can be used and in some cases, the service life or expiration date of the element. However, it should be emphasized that personnel should not attempt to memorize the color coding. The label should always be reviewed to determine what contaminants the cartridge or canister may be used for.

Cartridges and canisters are available for protection against single chemicals such as ammonia or against entire classes such as organic vapors depending on the cartridge or canister used.

Important note: because a cartridge or canister label indicates it may be useful against a class of contaminants, e.g., organic vapors, it does not ensure that it is useful for all chemicals within that class. If in doubt, contact the OSC or DHSM for specific uses.

These respirators are available in either half-face or full-face models. The full-facepiece canister respirators are also referred to as "gas masks."

Colors Used for Respirator Filters or Canisters

Atmospheric Contaminants	Color
Acid gases	White
Chlorine gas	White with 1/2-inch yellow stripe completely around the canister near the bottom
Organic vapors	Black
Ammonia gas	Green
Acid gases and ammonia gas	Green with 1/2-inch white stripe completely around the canister near the bottom
Carbon monoxide	Blue
Acid gases and organic vapors	Yellow
Acid gases, organic vapors, and ammonia gases	Brown
Radioactive materials, except tritium and noble gases*	Purple (magenta)
Particulates (dusts, fumes, mists, designated fogs, or smokes) in combination with any of the above with gases or vapors	Canister color for contaminant, as above, with 1/2 inch gray stripe around the canister near the top
All of the above atmospheric contaminants	Red with 1/2-inch gray stripe completely around the canister near the top

*Also acceptable for particulates with a TLV less than 0.05 mg/m^3 and asbestos.

ATMOSPHERE SUPPLYING RESPIRATORS

Atmosphere supplying respirators, rather than removing the hazardous material from the air, exclude the workplace air altogether and provide clean air from an independent source. Because of this, they can be used for protection against particulates, gases, or vapors and can also be used in oxygen deficient atmospheres.

Supplied-Air Respirators

A supplied-air respirator uses a central source of breathing air that is delivered through an air supply line or hose. Because the user is completely dependent on the integrity of the air supply line or hose and damage to same might prevent his escape from a contaminated area, a supplied-air respirator cannot be used in atmospheres immediately dangerous to life or health (see combination atmosphere supplying respirator, below).

The trailing air supply hose or line can severely restrict the wearer's mobility, and can become tangled with others' lines if more than one person is using an airline respirator in the exclusion zone. This may make a supplied-air respirator unsuitable for those who must move frequently between widely separated work stations.

A great advantage of the airline respirator is that it can be used for long, continuous periods.

Airline Devices

- The air source for airline devices is either a compressor or air tanks. The following requirements meet the specifications for Grade D breathing air, and apply to air supplied for airline devices:
  - The oxygen content of the compressed air should be between 19.5 to 23.5 percent oxygen and the rest mainly nitrogen;
  - Hydrocarbon concentrations must not exceed 5 mg/m^3;
  - The carbon monoxide concentration must not exceed 20 parts per million;
  - Carbon dioxide concentrations must not exceed 1,000 parts per million; and

- There must not be any pronounced odor present.

To be assured that these conditions are met, the following steps should be taken:

- The air compressor must be located where contaminated air cannot enter the system;

- Alarms indicating compressor failure and overheating must be installed in the system;

- If the compressor is oil-lubricated it must have a high temperature and/or carbon monoxide (CO) alarm. If there is no CO alarm, frequent carbon monoxide tests of the air must be made to ensure that the CO level does not exceed 20 parts per million;

- Bottled compressed air that is obtained from a vendor must be accompanied by a certification attesting that the air meets or exceeds Grade D specifications; and

- All airline couplings must be incompatible with outlets for other gas systems.

Demand Airline Device

In a demand device, the air enters the facepiece only on "demand" of the wearer, i.e., when the person inhales. This is due to the nature of the valve and pressure regulator.

During inhalation there is a negative pressure in the mask, so if there is leakage, contaminated air may enter the mask and be breathed by the user. The leakage problem is a major drawback of the demand device. Demand devices are also available with a full-face mask, which provides a better seal than does the half-mask. DEMAND DEVICES ARE NOT TO BE USED IN DAMES & MOORE OPERATIONS;

Pressure Demand Airline Device

The pressure demand device has a regulator and valve design such that there is a continuous flow (until a fixed static pressure is attained) of air into the facepiece at all times, regardless of the "demand" of the user. The airflow into the mask creates a positive pressure outward. As

such, there is no problem of contaminant leakage into the facepiece. This is a significant advantage of this type of device. ONLY PRESSURE-DEMAND DEVICES ARE TO BE USED IN DAMES & MOORE OPERATIONS.

such, there is no problem of contaminant leakage into the facepiece. This is a significant advantage of this type of device. ONLY PRESSURE-DEMAND DEVICES ARE TO BE USED IN DAMES & MOORE OPERATIONS.

Self-Contained Breathing Apparatus (SCBA)

The self-contained breathing apparatus (SCBA) allows the user to carry a respirable breathing supply with him and does not need a stationary air source such as a compressor to provide breathable air. The SCBAs used by Dames & Moore provide a 30 minute supply of air.

Since SCBA's provide a breathing air supply which is not dependent on a trailing hose or airline, pressure demand SCBA's may be used in atmospheres immediately dangerous to life or health (IDLH). An open circuit demand (not pressure demand) SCBA may have facepiece leakage and cannot be used in IDLH environments. Also, some devices are only approved for "escape from" and not "entry into" a hazardous atmosphere.

Open Circuit SCBA

An open circuit SCBA exhausts the exhaled air to the atmosphere instead of recirculating it. A tank of compressed air carried on the back supplies air via a regulator to the facepiece. Because there is no recirculation of air, the service life of the open circuit SCBA is shorter than a closed circuit system. The air supply is limited to the amount in the cylinder and therefore, the respirator cannot be used for extended periods without recharging or replacing the cylinders. Because these respirators are bulky and heavy, they are often unsuitable for strenuous work or use in confined spaces. Two types of open circuit SCBA are available, "demand" or "pressure demand."

- Demand SCBA - DEMAND SCBAS ARE NOT TO BE USED IN DAMES & MOORE OPERATIONS

- Pressure Demand SCBA
  The pressure demand open circuit SCBA has a regulator and valve design which maintains a positive pressure in the facepiece at all times regardless of "demand" of the user. As such, there is no problem of contaminant leakage into the facepiece. This is a significant advantage of the pressure demand device.

Combination Atmosphere Supplying Respirator: Supplied Air and SCBA

Designed primarily as a long duration device, the respirator combines an airline respirator with an auxiliary air supply (usually compressed air) to protect against the possible failure of the primary air supply (the airline). The additional supply can be approved for 5 to 15 minutes or even longer. The choice depends upon how long it would take to escape from the toxic atmosphere if the primary air supply failed. This type of unit may be used in IDLH environments.

Subject: RESPIRATORY PROTECTION PROGRAM:
QUALITATIVE FIT TEST PROCEDURES

An employee shall be allowed to use only the specific makes(s) and model(s) of air purifying respirators for which the person has obtained a satisfactory fit verified through fit testing procedures. An employee is not permitted to use any respirator not previously fit tested or if the results of the fit test indicated that the person was unable to obtain a satisfactory fit. Fit tests will not be performed on persons with facial hair as described in HS 150.6.

Dames & Moore's qualitative fit test procedures involve two stages of testing. Stage I involves a simple respirator negative and positive pressure sealing check for facepiece fit. Stage II involves the exposure of the respirator wearer to a test atmosphere. This will include two separate atmosphere tests to double check the adequate fit of the respirator to the wearer. The respirator is to be worn for five minutes prior to beginning the fit test.

NOTE: During any fit test, respiratory head straps must be as comfortable as possible. Over tightening the straps can reduce facepiece leakage, but the wearer may not be able to tolerate the mask for any period of time.

Stage I

- Negative Pressure Sealing Checks For Tightly Fitting Air Purifying Respirators

  The wearer performs this test after donning an air purifying respirator. The test consists of closing off the inlets of the cartridge(s), canister or filters by covering them with the palm(s) of the hand(s) so that air cannot pass, inhaling gently, and holding one's breath for at least ten seconds. If a facepiece collapses slightly and no inward leakage of air into the facepiece is detected, it can be reasonably assumed that the fit of the respirator to the wearer is satisfactory.

  This is used only as a gross determination of fit when the respirator is to be worn in relatively toxic atmospheres. None the less, this test shall be used each time prior to entering a toxic atmosphere.

- **Positive Pressure Seal Check for Air Purifying Respirators with Inhalation and Exhalation Valves.**

  This test is very much like the negative pressure sealing check, above and is conducted by closing off the exhalation valve and exhaling gently. The fit is considered satisfactory if a slight positive pressure can be built up inside the facepiece for at least 10 seconds without detecting any outward leakage of air between the sealing surface of the facepiece and the wearer's face.

  This test is also used only as a gross determination of fit when the respirator is to be worn in relatively toxic atmospheres. This test shall be used each time prior to entering a toxic atmosphere.

NOTE: The positive and negative pressure sealing checks can also be used on SCBA facepieces to determine gross fit characteristics.

Stage II

A person wearing an air purifying respirator will be exposed to two test agents: isoamyl acetate--an odorous vapor--and stannic chloride--an irritant smoke. The respirator will be equipped with a cartridge which effectively removes the test agents from respired air. If the wearer is unable to detect penetration of the test agent into the respirator, the wearer has achieved a satisfactory fit.

The Dames & Moore fit test form (see attached Qualitative Fit Test Worksheet) will be completed by the examiner and signed by the employee subjected to the test, with copies sent to the appropriate locations for recordkeeping after the test has been completed.

The examiner is to brief the employee on the basics of the use and limitations of the respirators. The employee should be able to demonstrate their familiarity with inspection, cleaning, maintenance and storage of the respirator.

Division Health and Safety Managers should note that there are specific fit testing protocols mandated by Federal regulations for respirator use in atmospheres containing the following substances:

- Asbestos - 29 CFR 1910.1001 and 1926.58
- Benzene - 29 CFR 1910.1028
- Lead - 29 CFR 1910.1025 and 1926.62
- Formaldehyde - 29 CFR 1910.1048
- Cadmium - 29 CFR 1910.1027 and 1926.63

Procedures for the Isoamyl Acetate Vapor (Banana Oil) Test--The isoamyl acetate fit test may be conducted by using a plastic bag as a test hood hung from the ceiling over a coat hanger suspended by twine. Inside the plastic bag, a piece of cloth saturated with isoamyl acetate is attached at the top of the bag. Alternatively, an isoamyl acetate ampule may be used. Either method should produce an isoamyl acetate vapor concentration well above the general odor detection range of 1 to 10 ppm. The OSHA Permissible Exposure Limit is 100 ppm.

- The wearer dons the respirator in a normal manner, and waits five minutes. The respirator will be fitted with organic vapor cartridges;
- The wearer enters the test enclosure, so that the head and shoulders are well inside the bag;
- If the wearer smells banana oil, he returns to clean air and readjusts the facepiece and/or adjusts the headstraps without unduly tightening them;
- The wearer repeats the second step. If he does not smell banana oil, he is assumed to have obtained a satisfactory fit. If he smells the vapor, an attempt should be made to find the leakage point. If the leak cannot be located, another brand of respirator with a facepiece of the same type should be tried.
- After a fit is obtained, if the respirator is an air-purifying device, it must be equipped with the correct filter(s), cartridges(s), or canister for the anticipated hazard.

During the test, the subject should make movements that approximate a normal working situation. These may include, but not necessarily be limited to, the following, each for 30 seconds:

- Normal breathing;
- Deep breathing, as during heavy exertion. This should not be done long enough to cause hyperventilation;
- Side-to-side and up-and-down head movements. These movements should be exaggerated, but should approximate those that take place on the job;
- Talking. This is most easily accomplished by reading a prepared test, such as the "Rainbow Passage" (see the accompanying figure), loudly enough to be understood by someone standing nearby;

- Other exercises may be added depending upon the situation. For example, if the wearer is going to spend a significant part of his time bent over at some task, it may desirable to include an exercise simulating this motion. Jogging in place may also be performed by the test subject.

The major drawback of the isoamyl acetate test is that the odor threshold varies widely among individuals. Furthermore, the sense of smell is easily dulled and may deteriorate during the test so that the wearer can detect only high vapor concentrations. Another disadvantage is that isoamyl acetate smells pleasant, even in high concentrations. Therefore, a wearer may say that the respirator fits although it has a large leak. Therefore, check these test results out carefully and move on to the next test atmosphere.

Procedures for the Irritant Smoke (Stannic Chloride) Test--This test is similar to the isoamyl acetate test in concept. It usually involves exposing the respirator wearer to an irritating aerosol produced by commercially available smoke tubes normally used to check the quality of ventilation systems. When the tube ends are broken and air is passed through it, the material inside reacts with the moisture in the air to produce a dense, highly irritating smoke, consisting of hydrochloric acid absorbed on small solid particles. As a qualitative means of determining respirator fit, this test has a distinct advantage in that the wearer usually reacts involuntarily to leakage by coughing or sneezing. The likelihood of this giving a false indication of proper fit is reduced. On the other hand, the aerosol is very irritating and must be used carefully to avoid injury. Also, it is advisable to have exhaust ventilation behind the subject to protect the person doing the testing.

This test can be used for both air-purifying and atmosphere-supplying respirators, but air-purifying respirators must have a high-efficiency filter(s). After the test, it may be necessary to replace the high-efficiency filter(s) on the air-purifying respirator with another type of air-purifying element(s) depending upon the hazard to which the respirator wearer is to be exposed. This test can be used for worker training or respirator selection.

The irritant smoke test will be conducted by using a plastic bag as a test hood. The bag shall be hung from the ceiling over a coat hanger suspended by twine. A small hole is made in the top portion of the bag so that the irritant smoke can be dispensed into the bag when the test subject has entered the bag.

The air purifying respirator to be used in this test must be equipped with a high efficiency filter.

The irritant smoke fit test will be performed as follows:

- The wearer puts on the respirator normally, taking care not to tighten the headstraps uncomfortably. Once the respirator is on, the subject waits five minutes and then enters the suspended bag so that the head and shoulders are well inside the bag;

- Once the subject is inside the bag, the tester shall begin to add the irritant smoke in small quantities at first, pausing between puffs from the applicator;

- Normal breathing;

- Deep breathing, as during heavy exertion. This should not be done long enough to cause hyperventilation;

- Side-to-side and up-and-down head movements. These movements should be exaggerated, but should approximate those that take place on the job;

- Talking. This is most easily accomplished by reading a prepared text, such as the "Rainbow Passage", loudly enough to be understood by someone standing nearby;

- Other exercises may be added depending upon the situation. For example, if the wearer is going to spend a significant part of his time bent over at some task, it may desirable to include an exercise simulating this motion. Jogging in place may also be performed by the test subject. Exercises should be performed for at least 30 seconds.

- If the wearer detects no leakage, the tester may increase the smoke density, still remaining alert to his reaction.

NOTE: When fit testing half-face respirators with irritant smoke, the test subject must keep his eyes tightly closed to avoid irritation. Also, the wearer should be well clear of the test area before removing the respirator.

DAMES & MOORE
RESPIRATORY PROTECTION
QUALITATIVE FIT TEST WORKSHEET

Employee Name _____ Employee No. _____

Office Location _____ SSN _____

Last Medical Exam _____ Corrective Lenses? _____

	RESPIRATOR 1	RESPIRATOR 2	RESPIRATOR 3
Equipment Type:			
Manufacturer:			
Model:			
Size:			
Material:			

TEST RESULTS	RESPIRATOR 1	RESPIRATOR 2	RESPIRATOR 3
(1) Negative Pressure Test	P___ F___	P___ F___	P___ F___
(2) Positive Pressure Test	P___ F___	P___ F___	P___ F___
(3) Isoamyl Acetate Vapor Test	P___ F___	P___ F___	P___ F___
(4) Irritant Smoke Test	P___ F___	P___ F___	P___ F___

- Briefed on fundamental principles of respiratory protection, use, inspection, cleaning, maintenance and storage of equipment. Yes ___ No ___
- Isoamyl acetate odor recognition. Yes ___ No ___
- Briefed on the procedure for obtaining a lens kit for use with full-face respirators. Yes ___ No ___

I hereby certify that the subject employee has been FIT tested according to procedures specified in the Dames & Moore Respiratory Protection Program. The results of the test indicate that the subject employee attains a satisfactory fit on the above respiratory protective equipment.

_____ _____ _____
Examiner's Name (Print) Examiner's Signature Date

_____ _____
Employee's Signature Date

Copies to: (1) DHSM (2) Employee (3) Employee's OSC 6/94

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Firmwide
Health and Safety
Program and Procedure Manual

Procedure No.: HS 150.13
Date: July 15, 1994
Supercedes:
Approved: Gary R. Krieger MD
GARY R. KRIEGER, MD

Subject: RESPIRATORY PROTECTION PROGRAM:
QUANTITATIVE FIT TEST PROCEDURES

OSHA's respiratory protection regulations (29 CFR 1910.134) allow either qualitative or quantitative fit-testing. However, National Institute for Occupational Safety and Health (NIOSH) researchers only endorse quantitative fit-testing. Dames & Moore employees are allowed to use only the specific makes(s) and model(s) of air purifying respirators for which the person has obtained a satisfactory fit verified through fit testing procedures, whether qualitative or quantitative. When made available, employees are encouraged to undergo quantitative fit testing because it is recognized as the more protective method for evaluating fit.

Quantitative fit test procedures involve exposing a person to a challenge chemical while wearing a specially-equipped respirator. The respirator has cartridges which are capable of filtering out the challenge chemical, and is connected to a machine which measures the ratio of the chemical concentrations inside and outside the respirator. While undergoing the fit-test, the wearer conducts a series of movements which simulate the movements that occur during work.

Before a quantitative fit test is conducted, it must be noted that there are specific fit testing protocols mandated by Federal regulations for respirator use in atmospheres containing the following substances, which require specific fit test procedures:

- Asbestos - 29 CFR 1910.1001 and 1926.58
- Benzene - 29 CFR 1910.1028
- Lead - 29 CFR 1910.1025 and 1926.62
- Formaldehyde - 29 CFR 1910.1048
- Cadmium - 29 CFR 1910.1027 and 1926.63

The quantitative fit-testing protocols described in this procedure are for the general use of respirators. Should the wearer(s) be involved in work where there is a potential for exposure to any of the substances listed above, the fit-testing procedures are to be applied in such a manner to comply with the

substance-specific regulations that are involved. The fit-test procedures of the above-listed standards vary, so each individual standard should be reviewed to see that the test procedures to be used will comply.

The following procedures are to be used when quantitatively fit-testing individuals for the general use of air-purifying respirators. The following procedures are an agglomerated modification of best available practices, derived under a review of the historical types of Dames & Moore projects, using the professional judgement of a qualified industrial hygienist. Modifications to these procedures can be made, if the conditions under which the respirator is to be worn warrant.

1. Start up the testing apparatus, calibrate it, and make any other preparations necessary, such as creating a data file.

2. Verify that the wearer has been medically qualified to wear a respirator. If so, proceed with the test. If not, they should not be tested.

3. Describe the testing procedure to the wearer, making sure they understand the purpose of the test and the actions expected of them.

4. The fit test shall not be conducted on an individual who exhibits any hair growth in the area of the respirator which may affect the seal, such as stubble, a beard, wide moustache, or long sideburns.

5. Ask the wearer about their familiarity with the principles of respiratory protection, and the limitations, use and care of respirators. If they are unfamiliar with respiratory protection or are in need of a refresher, they are to be trained in accordance with 29 CFR 1910.134 before being allowed to wear a respirator in the field. Dames & Moore procedure HS 150.7 describes the training which must be conducted.

6. The wearer should select a test respirator (a variety of models and sizes are to be offered) that provides the most comfortable fit, or is like one they already have; put it on and wear it for a minimum of three minutes.

NOTE: During any fit test, respiratory head straps must be as comfortable as possible. Over tightening the straps can reduce facepiece leakage, but the wearer may not be able to tolerate the mask for any period of time.

7. After the facepiece probe has been blocked, the wearer is to conduct the negative and positive pressure checks described in HS 150.12, Stage I procedures.

DAMES & MOORE
RESPIRATORY PROTECTION
QUANTITATIVE FIT TEST WORKSHEET

Employee Name _____ Employee No. _____

Office Location _____ SSN _____

Last Medical Exam _____ Corrective Lenses? _____

	RESPIRATOR 1	RESPIRATOR 2	RESPIRATOR 3
Equipment Type:			
Manufacturer:			
Model:			
Size:			
Material:			

TEST RESULTS	RESPIRATOR 1	RESPIRATOR 2	RESPIRATOR 3
(1) Negative Pressure Test	P___ F___	P___ F___	P___ F___
(2) Positive Pressure Test	P___ F___	P___ F___	P___ F___
(3) Overall Fit Factor Achieved	_____	_____	_____
(4) Printout/Strip Chart Attached	_____	_____	_____

- Briefed on fundamental principles of respiratory protection, use, inspection, cleaning, maintenance and storage of equipment. Yes ___ No ___
- Briefed on the procedure for obtaining a lens kit for use with a full-face respirator. Yes ___ No ___

I hereby certify that the subject employee has been FIT tested according to procedures specified in the Dames & Moore Respiratory Protection Program. The results of the test indicate that the subject employee attains a satisfactory fit on the above respiratory protective equipment.

_____ _____ _____
Examiner's Name (Print) Examiner's Signature Date

_____ _____
Employee's Signature Date

Copies to: (1) DHSM (2) Employee (3) Employee's OSC 3/94

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fitting helmet or hood. If the powered respirator is battery operated, it should provide the airflows mentioned for at least 4 hours without having to recharge the battery.

Gas and Vapor Removing Respirators

Vapor and gas-removing respirators use cartridges or canisters containing chemicals to absorb or react with specific vapors and gases to remove them from the air breathed. The basic difference between a cartridge and a canister is the volume of the sorbent. Generally a "cartridge" refers to a smaller chemical filtering element which attaches directly to the facepiece, whereas a "canister" refers to a larger chemical filter element held in a harness connected to the facepiece by a corrugated breathing tube. A color code system is used to assist in identifying the approved uses for individual cartridges and canisters. Table 1 lists various air contaminants and their associated colors. Labels on the cartridge and canister will also indicate the maximum concentration in which the element can be used and in some cases, the service life or expiration date of the element. However, it should be emphasized that personnel should not attempt to memorize the color coding. The label should always be reviewed to determine what contaminants the cartridge or canister may be used for.

Cartridges and canisters are available for protection against single chemicals such as ammonia or against entire classes such as organic vapors depending on the cartridge or canister used.

Important note: because a cartridge or canister label indicates it may be useful against a class of contaminants, e.g., organic vapors, it does not ensure that it is useful for all chemicals within that class. If in doubt, contact the OSC or DHSM for specific uses.

These respirators are available in either half-face or full-face models. The full-facepiece canister respirators are also referred to as "gas masks."

ATMOSPHERE SUPPLYING RESPIRATORS

Atmosphere supplying respirators, rather than removing the hazardous material from the air, exclude the workplace air altogether and provide clean air from an independent source. Because of this, they can be used for protection against particulates, gases, or vapors and can also be used in oxygen deficient atmospheres.

Supplied-Air Respirators

A supplied-air respirator uses a central source of breathing air that is delivered through an air supply line or hose. Because the user is completely dependent on the integrity of the air supply line or hose and damage to same might prevent his escape from a contaminated area, a supplied-air respirator cannot be used in atmospheres immediately dangerous to life or health (see combination atmosphere supplying respirator, below).

The trailing air supply hose or line can severely restrict the wearer's mobility, and can become tangled with others' lines if more than one person is using an airline respirator in the exclusion zone. This may make a supplied-air respirator unsuitable for those who must move frequently between widely separated work stations.

A great advantage of the airline respirator is that it can be used for long, continuous periods.

Airline Devices

- The air source for airline devices is either a compressor or air tanks. The following requirements meet the specifications for Grade D breathing air, and apply to air supplied for airline devices:
  - The oxygen content of the compressed air should be between 19.5 to 23.5 percent oxygen and the rest mainly nitrogen;
  - Hydrocarbon concentrations must not exceed 5 mg/m^3;
  - The carbon monoxide concentration must not exceed 20 parts per million;
  - Carbon dioxide concentrations must not exceed 1,000 parts per million; and

such, there is no problem of contaminant leakage into the facepiece. This is a significant advantage of this type of device. ONLY PRESSURE-DEMAND DEVICES ARE TO BE USED IN DAMES & MOORE OPERATIONS.

Self-Contained Breathing Apparatus (SCBA)

The self-contained breathing apparatus (SCBA) allows the user to carry a respirable breathing supply with him and does not need a stationary air source such as a compressor to provide breathable air. The SCBAs used by Dames & Moore provide a 30 minute supply of air.

Since SCBA's provide a breathing air supply which is not dependent on a trailing hose or airline, pressure demand SCBA's may be used in atmospheres immediately dangerous to life or health (IDLH). An open circuit demand (not pressure demand) SCBA may have facepiece leakage and cannot be used in IDLH environments. Also, some devices are only approved for "escape from" and not "entry into" a hazardous atmosphere.

Open Circuit SCBA

An open circuit SCBA exhausts the exhaled air to the atmosphere instead of recirculating it. A tank of compressed air carried on the back supplies air via a regulator to the facepiece. Because there is no recirculation of air, the service life of the open circuit SCBA is shorter than a closed circuit system. The air supply is limited to the amount in the cylinder and therefore, the respirator cannot be used for extended periods without recharging or replacing the cylinders. Because these respirators are bulky and heavy, they are often unsuitable for strenuous work or use in confined spaces. Two types of open circuit SCBA are available, "demand" or "pressure demand."

- Demand SCBA - DEMAND SCBAS ARE NOT TO BE USED IN DAMES & MOORE OPERATIONS

- Pressure Demand SCBA
  The pressure demand open circuit SCBA has a regulator and valve design which maintains a positive pressure in the facepiece at all times regardless of "demand" of the user. As such, there is no problem of contaminant leakage into the facepiece. This is a significant advantage of the pressure demand device.

An employee shall be allowed to use only the specific makes(s) and model(s) of air purifying respirators for which the person has obtained a satisfactory fit verified through fit testing procedures. An employee is not permitted to use any respirator not previously fit tested or if the results of the fit test indicated that the person was unable to obtain a satisfactory fit. Fit tests will not be performed on persons with facial hair as described in HS 150.6.

Dames & Moore's qualitative fit test procedures involve two stages of testing. Stage I involves a simple respirator negative and positive pressure sealing check for facepiece fit. Stage II involves the exposure of the respirator wearer to a test atmosphere. This will include two separate atmosphere tests to double check the adequate fit of the respirator to the wearer. The respirator is to be worn for five minutes prior to beginning the fit test.

NOTE: During any fit test, respiratory head straps must be as comfortable as possible. Over tightening the straps can reduce facepiece leakage, but the wearer may not be able to tolerate the mask for any period of time.

Stage I

- Negative Pressure Sealing Checks For Tightly Fitting Air Purifying Respirators

  The wearer performs this test after donning an air purifying respirator. The test consists of closing off the inlets of the cartridge(s), canister or filters by covering them with the palm(s) of the hand(s) so that air cannot pass, inhaling gently, and holding one's breath for at least ten seconds. If a facepiece collapses slightly and no inward leakage of air into the facepiece is detected, it can be reasonably assumed that the fit of the respirator to the wearer is satisfactory.

  This is used only as a gross determination of fit when the respirator is to be worn in relatively toxic atmospheres. None the less, this test shall be used each time prior to entering a toxic atmosphere.

Procedures for the Isoamyl Acetate Vapor (Banana Oil) Test--The isoamyl acetate fit test may be conducted by using a plastic bag as a test hood hung from the ceiling over a coat hanger suspended by twine. Inside the plastic bag, a piece of cloth saturated with isoamyl acetate is attached at the top of the bag. Alternatively, an isoamyl acetate ampule may be used. Either method should produce an isoamyl acetate vapor concentration well above the general odor detection range of 1 to 10 ppm. The OSHA Permissible Exposure Limit is 100 ppm.

- The wearer dons the respirator in a normal manner, and waits five minutes. The respirator will be fitted with organic vapor cartridges;
- The wearer enters the test enclosure, so that the head and shoulders are well inside the bag;
- If the wearer smells banana oil, he returns to clean air and readjusts the facepiece and/or adjusts the headstraps without unduly tightening them;
- The wearer repeats the second step. If he does not smell banana oil, he is assumed to have obtained a satisfactory fit. If he smells the vapor, an attempt should be made to find the leakage point. If the leak cannot be located, another brand of respirator with a facepiece of the same type should be tried.
- After a fit is obtained, if the respirator is an air-purifying device, it must be equipped with the correct filter(s), cartridges(s), or canister for the anticipated hazard.

During the test, the subject should make movements that approximate a normal working situation. These may include, but not necessarily be limited to, the following, each for 30 seconds:

- Normal breathing;
- Deep breathing, as during heavy exertion. This should not be done long enough to cause hyperventilation;
- Side-to-side and up-and-down head movements. These movements should be exaggerated, but should approximate those that take place on the job;
- Talking. This is most easily accomplished by reading a prepared test, such as the "Rainbow Passage" (see the accompanying figure), loudly enough to be understood by someone standing nearby;

The irritant smoke fit test will be performed as follows:

- The wearer puts on the respirator normally, taking care not to tighten the headstraps uncomfortably. Once the respirator is on, the subject waits five minutes and then enters the suspended bag so that the head and shoulders are well inside the bag;

- Once the subject is inside the bag, the tester shall begin to add the irritant smoke in small quantities at first, pausing between puffs from the applicator;

- Normal breathing;

- Deep breathing, as during heavy exertion. This should not be done long enough to cause hyperventilation;

- Side-to-side and up-and-down head movements. These movements should be exaggerated, but should approximate those that take place on the job;

- Talking. This is most easily accomplished by reading a prepared text, such as the "Rainbow Passage", loudly enough to be understood by someone standing nearby;

- Other exercises may be added depending upon the situation. For example, if the wearer is going to spend a significant part of his time bent over at some task, it may desirable to include an exercise simulating this motion. Jogging in place may also be performed by the test subject. Exercises should be performed for at least 30 seconds.

- If the wearer detects no leakage, the tester may increase the smoke density, still remaining alert to his reaction.

NOTE: When fit testing half-face respirators with irritant smoke, the test subject must keep his eyes tightly closed to avoid irritation. Also, the wearer should be well clear of the test area before removing the respirator.

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Firmwide
Health and Safety
Program and Procedure Manual

Procedure No.: HS 150.13
Date: July 15, 1994
Supercedes:
Approved: Gary R. Krieger MD
GARY R. KRIEGER, MD

Subject: RESPIRATORY PROTECTION PROGRAM:
QUANTITATIVE FIT TEST PROCEDURES

OSHA's respiratory protection regulations (29 CFR 1910.134) allow either qualitative or quantitative fit-testing. However, National Institute for Occupational Safety and Health (NIOSH) researchers only endorse quantitative fit-testing. Dames & Moore employees are allowed to use only the specific makes(s) and model(s) of air purifying respirators for which the person has obtained a satisfactory fit verified through fit testing procedures, whether qualitative or quantitative. When made available, employees are encouraged to undergo quantitative fit testing because it is recognized as the more protective method for evaluating fit.

Quantitative fit test procedures involve exposing a person to a challenge chemical while wearing a specially-equipped respirator. The respirator has cartridges which are capable of filtering out the challenge chemical, and is connected to a machine which measures the ratio of the chemical concentrations inside and outside the respirator. While undergoing the fit-test, the wearer conducts a series of movements which simulate the movements that occur during work.

Before a quantitative fit test is conducted, it must be noted that there are specific fit testing protocols mandated by Federal regulations for respirator use in atmospheres containing the following substances, which require specific fit test procedures:

- Asbestos - 29 CFR 1910.1001 and 1926.58
- Benzene - 29 CFR 1910.1028
- Lead - 29 CFR 1910.1025 and 1926.62
- Formaldehyde - 29 CFR 1910.1048
- Cadmium - 29 CFR 1910.1027 and 1926.63

The quantitative fit-testing protocols described in this procedure are for the general use of respirators. Should the wearer(s) be involved in work where there is a potential for exposure to any of the substances listed above, the fit-testing procedures are to be applied in such a manner to comply with the

DAMES & MOORE
RESPIRATORY PROTECTION
QUANTITATIVE FIT TEST WORKSHEET

Employee Name _____ Employee No. _____

Office Location _____ SSN _____

Last Medical Exam _____ Corrective Lenses? _____

	RESPIRATOR 1	RESPIRATOR 2	RESPIRATOR 3
Equipment Type:			
Manufacturer:			
Model:			
Size:			
Material:			

TEST RESULTS	RESPIRATOR 1	RESPIRATOR 2	RESPIRATOR 3
(1) Negative Pressure Test	P__ F__	P__ F__	P__ F__
(2) Positive Pressure Test	P__ F__	P__ F__	P__ F__
(3) Overall Fit Factor Achieved	_____	_____	_____
(4) Printout/Strip Chart Attached	_____	_____	_____

- Briefed on fundamental principles of respiratory protection, use, inspection, cleaning, maintenance and storage of equipment. Yes ___ No ___
- Briefed on the procedure for obtaining a lens kit for use with a full-face respirator. Yes ___ No ___

I hereby certify that the subject employee has been FIT tested according to procedures specified in the Dames & Moore Respiratory Protection Program. The results of the test indicate that the subject employee attains a satisfactory fit on the above respiratory protective equipment.

_____ _____ _____
Examiner's Name (Print) Examiner's Signature Date

_____ _____
Employee's Signature Date

Copies to: (1) DHSM (2) Employee (3) Employee's OSC 3/94

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Appendix F: Medical Surveillance Requirements and Sample Physician's Certification Form

MEDICAL SURVEILLANCE REQUIREMENTS

Physician's opinion

The physician's written opinion about employees' ability to perform hazardous remediation work shall contain:

The physician's recommended special protective measures or limitations upon the employee's assigned work

The physician's opinion about any detectable medical condition that would place the employee at increased risk of material impairment of the employees health given the anticipated exposures to hazardous and toxic wastes

Any recommended limitations upon the employee's use of respirators, including a determination of whether the employee can wear a powered air purifying respirator if a physician determines that the employee cannot wear a negative air pressure respirator
A statement that the employee has been informed and advised about the results of the examination. The statement must clarify that the patient understands that given his/her past medical history and anticipated on-site working conditions, the additional qualitative risk to his/her health.

Attach copies of employees' medical certification to this Appendix.

Appendix G: Training Requirements and Sample On-Site Training Certification Form

Hazardous Waste Operations Training Requirements:

Employees (general equipment operators, general laborers and labor supervisory personnel not assigned HAZWASTE supervisory duties) who may be exposed to hazardous materials:

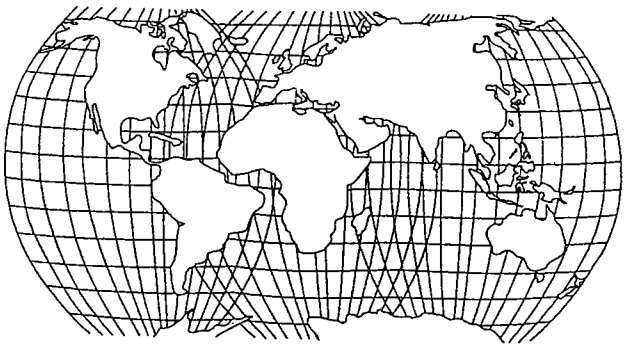
- Receive at least 40 hours of safety and health instruction before engaging in hazardous waste operations
- Receive a minimum of 3 days of actual field experience under the direct supervision of a trained, experienced HAZWASTE Foreman/Supervisor

Employees (ground water monitoring technicians, land survey crews who stay on the site boundary, geo-physical monitoring technicians who monitor only undisturbed surface soil location) who are on site only occasionally for limited periods of time:

- Receive at least 24 hours of safety and health instruction before engaging in hazardous waste operations
- Receive a minimum of 1 day of actual field experience under the direct supervision of a trained, experienced HAZWASTE Foreman/Supervisor

Employees who may be exposed to hazardous materials also receive 8 hours annual refresher training thereafter. Site documentation of training will include the original training certificate and all refresher-training certificates. Personnel will be required to carry on their person to the site, wallet cards showing the latest refresher training certification.

HAZWASTE Foreman/Supervisors directly responsible for, or who supervise employees at this hazardous waste site, will receive at least 8 additional hours of specialized training on managing such operations. (29 CFR 1910.120 Hazardous Waste Operations Supervisor Course).



DOCUMENTATION OF ON-SITE HTRW FIELD EXPERIENCE

NAME:

DATE:

SITE:

ON SITE SUPERVISOR:

DURATION OF SUPERVISED SITE ACTIVITY:

TYPE OF SUPERVISED SITE ACTIVITY:

As a site supervisor trained in accordance with 29 CFR 1910.120 (40 hours of initial training, required annual refreshers, and an additional 8 hours of supervisory training), I supervised the above named individual.

SITE HAZWASTE FOREMAN/SUPERVISOR'S SIGNATURE:

ADDITIONAL INFORMATION RELEVANT TO THIS SUPERVISED FIELD EXPERIENCE (optional entry):

Instructions for use of this form:

The site worker is to enter each of the required queries. (I.e. Date, Site, etc.)
The site supervisor is to sign the above statement and initial each of the query entries.
The worker is responsible for maintaining this form, and all other such forms used to document three days total supervised field experience.

Attach copies of employees' 29 CFR 1910.120 training and refresher training certification to this Appendix.

Appendix H: Contingency Evacuation Plan Outline

EMERGENCY RESPONSE/CONTINGENCY PLAN

Personnel Roles and Lines of Authority

- The SSHO has primary responsibility for responding to and correcting emergency situations involving on site personnel. This includes taking appropriate measure to ensure the safety of site personnel and the public. Possible actions may involve evacuation of personnel from the site area, and evacuation of adjacent residents.
- The SSHO is additionally responsible for ensuring that corrective measures have been implemented, appropriate authorities notified, and follow-up reports completed when the emergency is directly related to activities on-site.

Pre-Emergency Planning

The SSHO must coordinate an emergency response/contingency plan.

Prior to initiating on-site activities, the appropriate local emergency response teams listed in *EMERGENCY CONTACTS & APPROVAL PAGE,* page 2 of this SSHP will be contacted and informed as to the site location, the activities to be conducted, the anticipated hazards, the levels of personal protection equipment required on-site, and any other pertinent information.

In the event of a worker-related injury; the -Safety Manager will be notified. The associated SSHO responsibilities include the following:

- Establishing site evacuation routes and zones.
- Notifying offsite emergency response teams.
- Assessing emergencies.

Safety equipment will be maintained on site. This safety equipment will include:

- For rescue purposes, two- (2) positive pressure SCBA. These will be dedicated and marked "For Emergency Only". The SCBA will be maintained in the CRZ.
- Emergency eyewashes and showers in compliance with ANSI Z358.1
- Fire Extinguishers with a minimum rating of 20-A: 120-B: C will be maintained on the site and in all vehicles that enter the EZ.

Emergency phone numbers and area maps to nearest medical facilities will be laminated and posted on-site.

Lines of Authority in an Emergency

In the event of an emergency:

- The Contractor SSHO will be in charge, or;
- When an offsite emergency response team is on-site, this team will be lead by an Incident Commander or officer in charge. The -Safety Manager will act as a liaison to Incident Commander or the officer in charge.

Site Security and Control

In cases where an emergency situation does not pose a threat to the public and offsite emergency response teams will not be dispatched to the site, the SSHO will be responsible for coordinating the appropriate emergency response and communicating with the public as necessary.

However, if an emergency arises that presents an immediate threat to the public or otherwise requires additional support, the SSHO may activate the emergency response system in the manner prescribed by the offsite emergency response organization.

In an emergency situation when the police, fire department, or other local emergency response team has been dispatched to the site, the local authorities will mandate site security and control.

Emergency/Accident Recognition and Prevention

All personnel will bring to the attention of the SSHO any unsafe condition, practice, or circumstance associated with or resulting from the on-site activities.

In cases of **immediate hazard** to employees or the public:

- Any employee on the scene will take all practicable steps to eliminate or neutralize the hazard; this may include leaving the site.
- Follow-up consultation with the -Safety Manager must be made at the first opportunity.
- In such circumstances, the SSHO will take the necessary steps to ensure that the investigation can be completed safely. Such steps will include: notification changes in procedures, removal or neutralization of a hazard, consultation with appropriate experts, or the use of a specialist.

In cases where the hazard is **not an immediate danger** to the employees, the SSHO will be consulted regarding appropriate corrective measures.

If a hazard poses an **immediate threat to the public**, the SSHO will be responsible for activating the emergency response system in the manner prescribed by the local fire and police departments.

In the event that any member of the team experiences any **extreme adverse effects or symptoms of chemical exposure** while on-site; the entire team will immediately leave the site and seek appropriate medical aid.

In the event that any member of the work force is **overcome, incapacitated, or traumatically injured** while on-site:

1. The remaining members will immediately call for assistance and make reasonable efforts to rescue the affected person.
2. At least one person will remain outside the problem area until help arrives.
3. Once removed from the problem area the affected person will not be left unattended.
4. If possible, limited personnel decontamination will be conducted, but only if time is not critical to getting the injured person to medical aid.
   Note: In cases where personnel contamination has occurred, those persons involved will make every reasonable effort to **decontaminate themselves**, so minimal spreading of contaminants occur.
5. Medical aid will be acquired either via ambulance or SSHO directed transfer of personnel to the medical facility using site vehicles.
   - The SSHO will determine the fitness of the driver.
   - If the driver's fitness is questioned, medical assistance must be contacted by phone.

INCIDENT/ACCIDENT REPORT

An Incident/Accident Report will be completed by the SSHO following any accident involving on-site personnel. A copy of the report will be attached to this SSHP or filed and referenced from this SSHP. A copy of the report will be submitted to the Safety Manager within 24 hours.

Safety Distances and Places of Refuge

The SSHO will establish safe evacuation distances prior to initiation of field activities.

- An emergency evacuation assembly point will be designated daily by the SSHO based on the current wind direction.
- The emergency evacuation assembly point will be located upwind and will be updated as needed.
- The location of the evacuation points will be recorded in the **Safety & Health Log.**

Evacuation Routes and Procedures

All evacuation routes will be designated to move personnel away from an affected area in a safe and efficient manner and to establish efficient traffic patterns for fire and emergency equipment during an emergency response.

- These evacuation routes will be located at a safe distance upwind of all areas of activities.
- The SSHO will be responsible for personnel accounting at each emergency evacuation assembly point.

Emergency Decontamination

In addition to routine decontamination procedures, emergency decontamination procedures must be established. In an emergency, the primary concern is to prevent the loss of life or severe injury to site personnel.

- If immediate medical treatment is required to save a life; limited decontamination will be performed or the person will be wrapped in a blanket.
- Any person, who is not fully decontaminated and requires transportation to a medical facility, will be wrapped in a blanket to protect the emergency vehicle. As an alternative, the seats of the emergency vehicle will be covered with polyethylene or a blanket.
- If a worker has been contaminated with an extremely toxic or corrosive material that could cause severe injury or loss of life, decontamination will be performed immediately.
- The SSHO will designate personnel who are not directly involved in the emergency to properly dispose of contaminated clothing and equipment.

Emergency Medical Treatment and First Aid

At least **two** team members will have successfully completed a Red Cross sponsored course in adult first aid and cardiopulmonary resuscitation.

Prior to the start of work, the SSHO will make arrangements for medical facilities, ambulance service, and medical personnel to be available for prompt attention to the injured.

On-site activities will require a first aid kit located within the support zone.

Emergency telephone numbers and reporting instructions for ambulance, hospital, poison control center, fire department, and police will be conspicuously posted or available.

If the SSHO determines that a situation exists that could threaten human health or the environment outside the site area, he/she will immediately notify the local fire department, Safety Manger, and the National Response Center. The telephone report will include:

- Name and telephone number or reporter
- Name and address of facility
- Time and type of incident (e.g., release, fire)
- Name and quantity of material(s) involved, to the extent known, and the location of the discharge within the facility
- The extent of injuries, if any
- The possible hazards to human health, or the environment, outside of the site area
- Actions the person reporting the discharge proposed to take to contain, clean up, and remove the substance

Exclusion Zone Personnel Decontamination.

Any person who becomes ill or injured in the exclusion zone must be decontaminated to the maximum extent possible.

- If the injury or illness is minor, full decontamination must be completed prior to transport.
- If the patient's condition is serious, at least partial decontamination must be completed (i.e., complete disrobing of the victim and redressing in clean coveralls or wrapping in a blanket.)

All injuries and illnesses must immediately be reported to the project manager.

Any person being transported to a clinic or hospital for treatment must take with them information on the chemical(s) at the site.

Any vehicle used to transport contaminated personnel will be treated and cleaned as necessary.

Emergency Response Procedure

All site personnel will be responsible for responding to incipient fires and other minor emergencies. The SSHO will have ready access to all fire fighting equipment and first-aid supplies during site operations.

In the event of fire, spill, or other emergencies that cannot be controlled, all site personnel will evacuate to a predesignated location. Site personnel will wait in the designated zone for further instructions from the SSHO or emergency response personnel.

During an emergency, the SSHO will direct all reasonable measures necessary to ensure that fires, explosions, and releases do not occur, recur, or spread to other hazardous waste at the site. These measures will include, where applicable, collecting and containing release material and removing or isolating containers.

Critique of Response and Follow-up

A follow-up meeting will be held after any emergency situation to assess the actions taken. The Safety Manager, the SSHO, and other individuals as appropriate will attend the meeting.

- A record of the meeting will be kept by the SSHO.
- Recommendations from the meeting will be incorporated into the future responses to emergency situations.

The SSHO will ensure that all emergency equipment listed in this contingency plan is cleaned and fit for use before operations are resumed.

Emergency Response Briefings and Review

- During the site briefings, all employees will be trained in and reminded of provisions of the emergency response plan, communication systems, and evacuation routes.
- The plan will be reviewed and revised if necessary, on a regular basis by the SSHO. This will ensure that the plan is adequate and consistent with prevailing site conditions.

Evacuation Alarm Procedures

In the event of an emergency which necessitates an evacuation of the site; the following alarm procedures may be implemented:

- Verbal notification of other employees.
- Personnel will be expected to proceed to the Support Zone with their buddy.
- Personnel will remain at the SZ until the SSHO provides further instructions.

Fire or Explosion

The -SSHO will advise the fire commander of the location, nature, and identification of the hazardous materials onsite.

Spill or Leaks

In the event of a spill or a leak caused by activities on-site; site personnel will:

- Inform the SSHO immediately;
- Locate the source of the spillage and stop the flow if this can be done safely; and,
- Begin containment and recovery of the spilled materials.