



September 23, 1994

RE: Fraser Shipyards, Inc.
Remedial Action Plan
SEH No. FRASE9401.00

RECEIVED

SEP 27 1994

Mr. Steven LaValley
Hazardous Waste Specialist
Wisconsin Department of Natural Resources
1705 Tower Avenue
Superior, WI 54880

Dear Mr. LaValley:

On behalf of Fraser Shipyards, Inc. (Fraser), Short Elliott Hendrickson Inc. (SEH) is submitting this Remedial Action Plan (RAP) to the Wisconsin Department of Natural Resources (WDNR) for select areas of concern (AOC) at Fraser Shipyards in Superior, Wisconsin. This RAP has been prepared in accordance with the recommendations provided in the Site Investigation and Closure Plan, dated May 26, 1994 prepared by SEH. In subsequent discussion, the WDNR recommended that a Remedial Action Plan be prepared for select AOCs at the facility to obtain closure. Petroleum contaminated soils were identified at AOCs #1, #3, and #7 at concentrations exceeding the proposed ch. NR720 Wisconsin Administrative Code interim soil cleanup standards. The concentrations of DRO exceed the proposed interim, soil cleanup standard of 100 to 250 mg/kg (range dependent on soil permeability) and, therefore, remediation of the soil is warranted. Benzene and 1,2-dichlorobenzene were also detected at low concentrations in soil samples collected from AOC #3. Even though this area was occasionally used to stage dirty solvents, the detected compounds appear to be petroleum related based on the absence of other solvent related constituents and, therefore, AOC #3 will be treated as a petroleum contaminated area.

The purpose of this plan is to provide details of the remedial alternative chosen for the AOCs, a schedule and other pertinent project information to the WDNR, Fraser, and SEH personnel involved with this project. The Fraser Shipyards, Inc. Site Investigation Work Plan dated November 1993 and Site Investigation and Closure Plan dated May 1994 provide site history, waste handling procedures, and other pertinent project information, including a Site Health and Safety Plan.

Project Contacts

1. Ron Peterson, Superintendent
Fraser Shipyards, Inc.
Third Street and Clough Avenue
Superior, WI 54880
(715) 394-7787
2. Steve LaValley, Hazardous Waste Specialist
Wisconsin Department of Natural Resources
1705 Tower Avenue
Superior, WI 54880
(715) 392-7988
3. Cyrus Ingraham, P.E., Project Manager
Gloria Chojnacki, Environmental Scientist
Short Elliott Hendrickson Inc.
421 Frenette Drive
Chippewa Falls, WI 54729
(715) 720-6231
(715) 720-6229

Site Location

Fraser is located at Third Street and Clough Avenue in Superior, Wisconsin as shown in Figure 1, "Site Location Map." Fraser operates a steel shipbuilding and repair facility located on approximately 65 acres. The property contains various shops, offices, and warehouse space and two dry-docks for ship repair. The site is located on Howard's Bay in the Superior, Wisconsin harbor on Lake Superior. The general site layout is shown on Figure 2, "Site Plan."

Background - Site Investigation

As part of the activities performed to obtain closure of an unlicensed hazardous waste facility, SEH performed a site investigation at Fraser on January 11, 24, and 25, 1994. The investigation at AOCs #1, #3, and #7 consisted of soil borings and backhoe excavations in which soil samples were collected for laboratory analysis. The purpose of the investigation was to determine the presence or absence of contaminated soils at each AOC. Table 1, "Site Investigation - Analytical Results," summarizes the laboratory results of the site investigation.

The investigation of AOC #1 indicates that DRO concentrations range from non-detectable to 4,370 µg/g and appear to be highest along the roadway. No VOCs were identified above the proposed ch. NR720 Wis. Admin. Code interim soil cleanup standards. The extent of impacted soil was not determined during the site investigation at AOC #1.

The investigation of AOC #3 indicates that DRO concentrations range from 79.2 µg/g to 1,820 µg/g. Benzene was detected at a concentration of 0.05 µg/g and concentrations of 1,2-dichlorobenzene range from 0.29 µg/g to 0.43 µg/g. The extent of impacted soil was not determined during the site investigation at AOC #3.

The investigation of AOC #7 indicates that DRO concentrations range from 115 µg/g to 843 µg/g. The extent of impacted soil was not determined during the site investigation. Analysis for poly chlorinated biphenyl compounds (PCB) indicated a concentration of 1.0 µg/g, which is below the WDNR soil cleanup objective of 5 ppm for PCBs as stated in an internal memorandum dated February 17, 1987.

Table 1 Site Investigation - Analytical Results				
AOC #	Sample		Analytical Parameters	
	I.D.	Depth	DRO µg/g	VOC (8010/8020) µg/g
1	B-1	(2.5-3')	94.4	--
	B-2	(2-2.5')	4,370	--
	B-3	(2-2.5')	X	--
	B-4	(2-2.5')	176	--
	B-5	(2-2.5')	--	--
	B-6	(2-2.5')	--	--
	Composite		--	0.0444 xylenes
3	B-7	(2-2.5')	1,820	0.05 benzene
	B-8	(2-2.5')	79.2	0.43 1,2-dichlorobenzene 0.05 benzene
				0.29 1,2-dichlorobenzene
7	B-17	(2-2.5')	843	--
	B-18	(0-6")	131	--
	B-19	(0-6")	115	--
x	analyzed but not detected			
--	indicates parameter not analyzed for			
DRO =	Diesel Range Organics			
VOC =	Volatile Organic Compounds			

Remedial Excavation

SEH proposes to excavate areas of soil contamination as identified by the Site Investigation at AOCs #1, #3, and #7. The vertical and horizontal extent of impacted soil has not been determined and will be defined in the field at the time of excavation. The approximate areas of excavation are shown on Figure 3, "AOC #1," Figure 4, "AOC #3," and Figure 5, "AOC #7."

Contaminated soil will be excavated with a backhoe and transported to the area south of AOC #12 and north of the roadway as indicated on Figure 2. This area has been designated for bioremediation treatment at Fraser. Bioremediation piles (bio-piles) will be constructed pending approval of this Remedial Action Plan and Form 440-120, "Application to Treat or Dispose of Petroleum Contaminated Soil," which is included as an attachment. Soil samples will be collected during the excavation and screened with a Flame Ionization Detector (FID). Excavation will progress outward from the contaminated soil sample locations previously identified during the Site Investigation until field analysis and observations indicate that soil contamination has been adequately removed. Vertical excavation limits will also be determined by field analysis and observations or will continue to a depth of approximately one foot below the apparent shallow water table.

Excavation at AOC #1 will be limited to the south by the southern property fence line. No soil will be excavated beyond property boundaries. An underground power line traverses AOC #1 through the contaminated zone. The area around the underground power line will be hand excavated and the line will be left intact. There are no physical obstructions/structures in the vicinity of AOC #3 which would impede the excavation activities. Excavation at AOC #7 will be limited to the east and west by the storage shed walls and to the south by the property fence line. It is expected that 500 to 1,000 cubic yards of contaminated soil will be removed from the three AOCs.

Post Excavation Sampling

Confirmatory soil samples will be collected from the walls and floor of the final excavation at each AOC on 25 foot grid intervals as specified in the WDNR Guidance for Conducting Environmental Response Actions. Sample collection will be performed in accordance with SEH standard protocols which are included as an attachment to this remedial action plan. Post excavation samples will be maintained at a temperature of less than four degrees Celsius in ice filled coolers and shipped to a WDNR approved laboratory using one day air service under chain of custody procedures. A minimum of five laboratory verification samples, one from each wall and one from the base of the excavation will be collected from each AOC. Samples from the sidewalls at AOCs #1, #3, and #7 will be analyzed for DRO using the WDNR extended DRO method. Samples from the floor of the excavations will be analyzed for the following parameters:

<u>Area</u>	<u>Parameter</u>	<u>Method</u>
AOC #1, #7	DRO P VOC	WDNR extended DRO Method EPA SW 846-8020
AOC #3	DRO VOC	WDNR extended DRO Method EPA SW846-8021

Enviroscan Corp. of Rothschild, Wisconsin, has been selected to perform the laboratory analysis for the Fraser project. Enviroscan Corp.'s Wisconsin certified laboratory number is 737053130. Specific documentation and QA/QC procedures which will be followed are included in the Fraser Shipyards, Inc. Site Investigation Work Plan (November 1993).

Prior to treatment, three laboratory samples will be collected from the excavated soils and analyzed for lead, DRO and PVOCs. Soil samples will also be collected at this time for nutrient analysis and to determine approximate capacity of indigenous biological degraders.

Soil Treatment

SEH proposes to treat 500 to 1,000 cubic yards of petroleum contaminated soil from AOCs #1, #3, and #7 using bioremediation. The excavated soil will be transported to the bioremediation treatment area, as indicated on Figure 2 and Figure 6, "Bioremediation Site Plan." Contaminated soil will cover approximately 4,500 square feet in three biopiles measuring approximately 15 feet by 100 feet. The treatment area is located about 70 feet south of Howard's Bay on Lake Superior and approximately 150 feet east of the nearest business.

The treatment area is generally flat with a slope of less than one percent. Surface soils are classified as udorthents. Udorthents occupy areas where the original soil profile has been altered by the addition of more than about a foot of soil. Based on soil boring logs completed at the time of the site investigation, the fill materials at Fraser consist of fine to coarse grained sand with some silt and clay.

Groundwater at the site is estimated to be at a depth of four to six feet below the surface based on site investigation soil boring logs. Surface water surrounding the treatment area will typically percolate into soil due to the granular nature of the fill material. In the event of heavy precipitation, surface water runoff would be expected to flow south from the treatment area toward the roadway. The bio-pile will be lined and a one foot clay curbing will be constructed around each bio-pile to prevent precipitation infiltration and leachate runoff from the treatment area.

Biopile Construction

Bio-piles will be constructed on 20 mil thick polyethylene liner as shown in Figure 6, "Bio-Pile Detail." Contaminated soil will be mixed with wood chips at a ratio of four parts soil to one part wood chips. Wood chips will increase the permeability of the mixture and aid the flow of oxygen through the pile. Necessary nutrients and microorganism inoculum for biodegradation of petroleum residuals will be added at the time of construction, if needed, based on the preconstruction soil analysis. Four inch diameter slotted PVC pipes will be placed throughout the bio-pile at 2 foot depth intervals to vent heat and aerate the pile. A length of vinyl garden soaker hose or perforated PVC pipe will be placed at the top of the pile for the purpose of adding water and nutrients as needed during system operation. Twelve temperature probes (four per bio-pile) will be placed within the bio-piles to monitor heat generation as an indication of microbial activity. The pile will be covered with 10 mil thick polyethylene sheeting to reduce odors, control runoff, retain heat, and reduce evaporation. The sheeting will be secured with tires and ropes.

Soil Sampling

Samples will periodically be collected from the piles to determine remediation progress. One sample will be collected per 200 cubic yards of soil mixture. Random samples will be collected and analyzed for DRO monthly for three months and quarterly thereafter, if necessary. A sampling grid will be established on each bio-pile, measuring 5 feet by 5 feet. Each grid section will be further divided into 2 depth intervals, surface to 3 feet and 4 to 6 feet. The sampling grid is shown on Figure 6. A calculator with a random number generator will be used to select a sample from each depth interval. This will be repeated for each

Mr. Steven LaValley
September 8, 1994
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pile. Sampling will continue until DRO concentrations stop decreasing or until levels are below the proposed ch. NR720, Table 1, "Interim Soil Cleanup Guideline" of 100 ppm. Results of soil analysis will be submitted to WDNR. Soil temperature will be monitored at the time of sample collection to verify that optimum rates of biodegradation are maintained.

Estimated Emissions


Based on the results of previous sampling summarized in Table 1, no significant VOC emissions are expected. Benzene emissions are estimated to total 0.119 pounds and total petroleum hydrocarbons as DRO emissions 1,359 pounds throughout the life of the project. Hourly emissions will be well below the regulatory limits of 5.7 pounds per hour.


Site Closure

Six confirmatory soil samples for verification of remediation will be collected for system closure when DRO concentration are below 100 ppm. Samples will be collected randomly in each pile and submitted for laboratory analysis of DRO and VOCs. Treated soil will be spread on vacant Fraser property following WDNR approval. Vent piping and plastic sheeting will be removed from the soil mixture and disposed. The vacant land at the Fraser bioremediation area will continue to be used for Fraser related industrial purposes.

SEH respectfully requests approval of this RAP. Excavation and bio-pile construction can begin within 15 days of receiving WDNR approval. The bio-pile construction will be completed within two weeks after receipt of preconstruction analytical results. Periodic sampling will begin one month after completion of the bio-piles. Based on review of available technical information, we anticipate closure of the site within one to two years after startup of remediation. If you have any questions or comments regarding this Remedial Action Plan, please feel free to contact us.

Sincerely,


Gloria Chojnacki, CHMM
Environmental Scientist


Cyrus Ingraham, P.E.
Project Manager

pcs

Attachments

c: Ron Peterson, Superintendent - Fraser Shipyards, Inc.

Figures

Figure 1 - Site Location Map

Figure 2 - Site Plan

Figure 3 - AOC #1

Figure 4 - AOC #3

Figure 5 - AOC #7

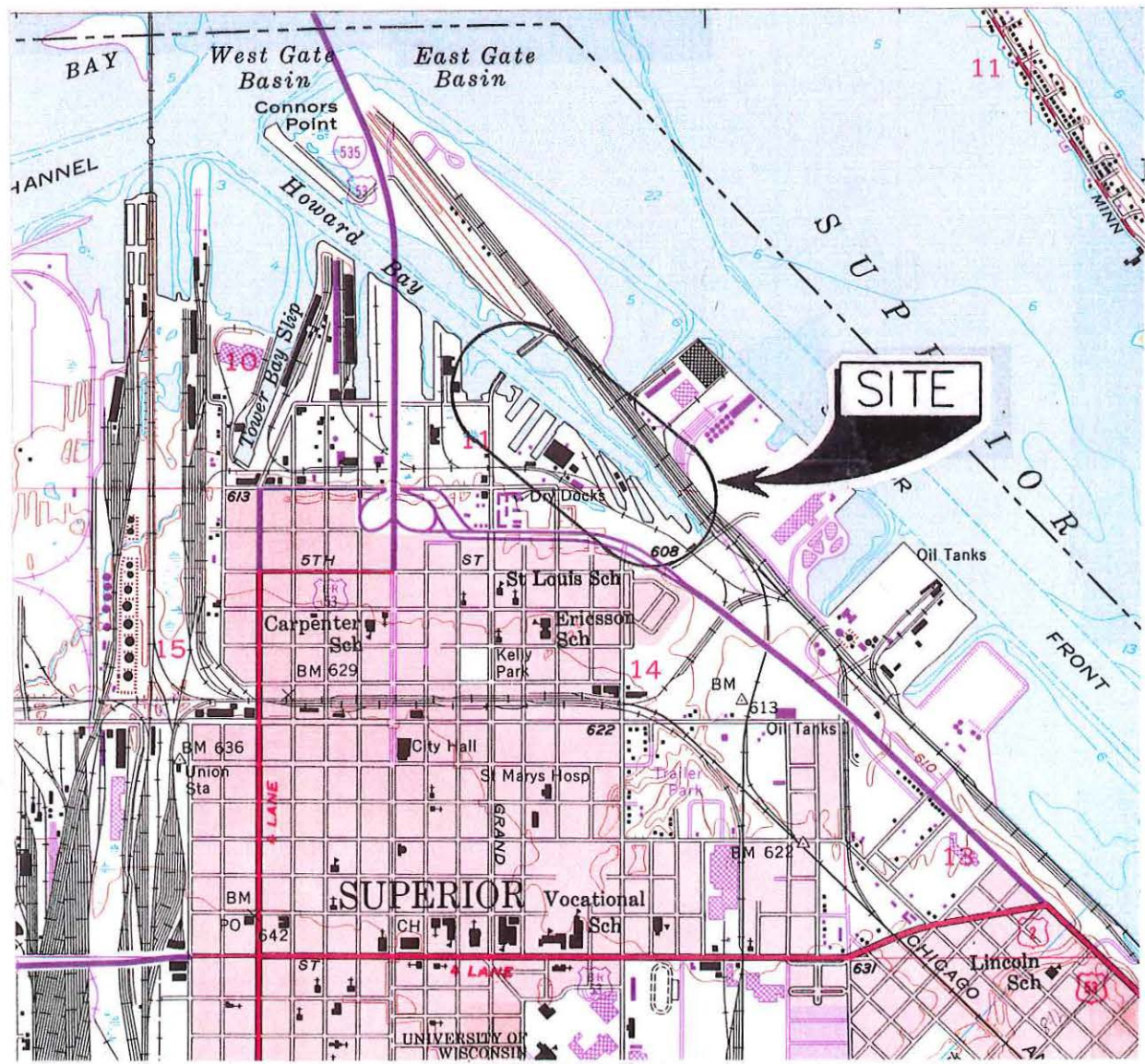
Figure 6 - Bioremediation Site Plan

Figure 7 - Bio-Pile Detail

REPRODUCED FROM
USGS SUPERIOR QUADRANGLE
 WISCONSIN - DOUGLAS CO. 7.5 MINUTE SERIES



SCALE: 1"=2,000'



DRAWN BY:
KEA 10/18/93
 CHECKED BY:

FIGURE 1
FRASER SHIPYARDS, INC.
SUPERIOR, WISCONSIN

FILE NO.
FRASE9401
DRG. NO.
9401FZA1



SCALE: 1"=40'

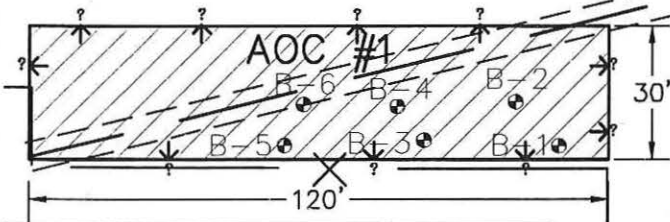
GARAGE

HOWARDS BAY

TRAILER

PORTABLE LUNCH ROOM

UNDERGROUND POWER LINE



FIRST STREET

LEGEND

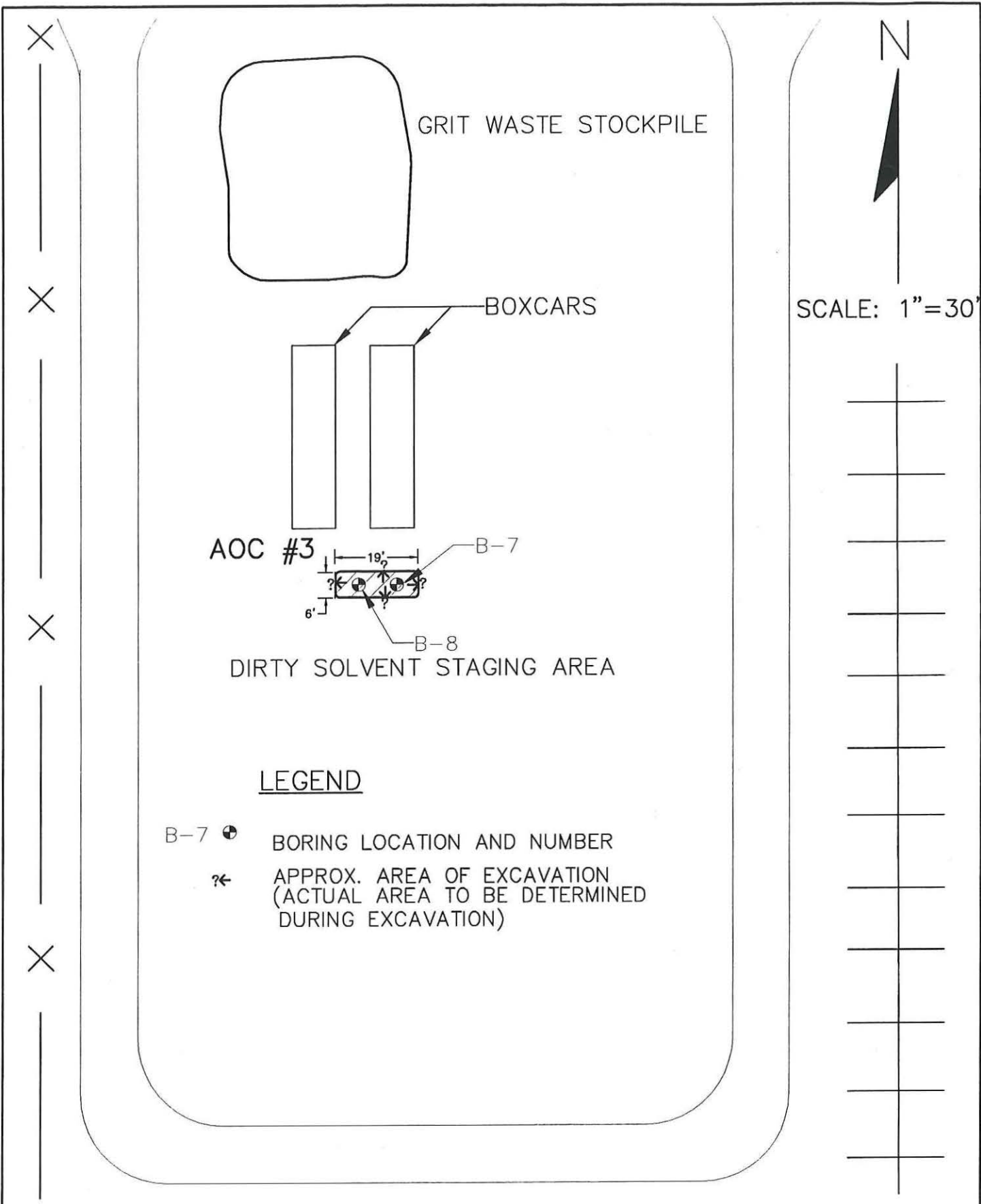
- B-1 ⊕ BORING LOCATION AND NUMBER
- ↓ APPROX. AREA OF EXCAVATION (ACTUAL AREA TO BE DETERMINED DURING EXCAVATION)
- - - - AREA TO BE LEFT INTACT



DRAWN BY:
KEA 10/19/93
CHECKED BY:

FIGURE 3
FRASER SHIPYARDS, INC.
AOC #1

FILE NO.
FRASE9401
DRG. NO.
9401FZH1



SLIP NO. 7

N

SCALE: 1"=30'

FABRICATION SHOP & MACHINE SHOP BUILDING

STORM SEWER OUTLET

JOINER'S SHOP

AOC #7

B-18

B-17

B-19

TRANSFORMER STAGING AREA

LEGEND

B-17 ○

BACKHOE SAMPLE LOCATION AND NUMBER

↓
?

APPROX. AREA OF EXCAVATION
(ACTUAL AREA TO BE DETERMINED DURING EXCAVATION)



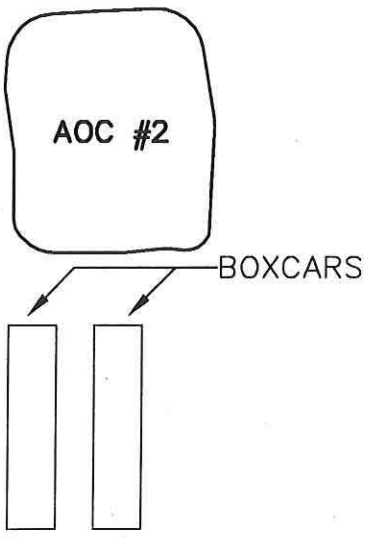
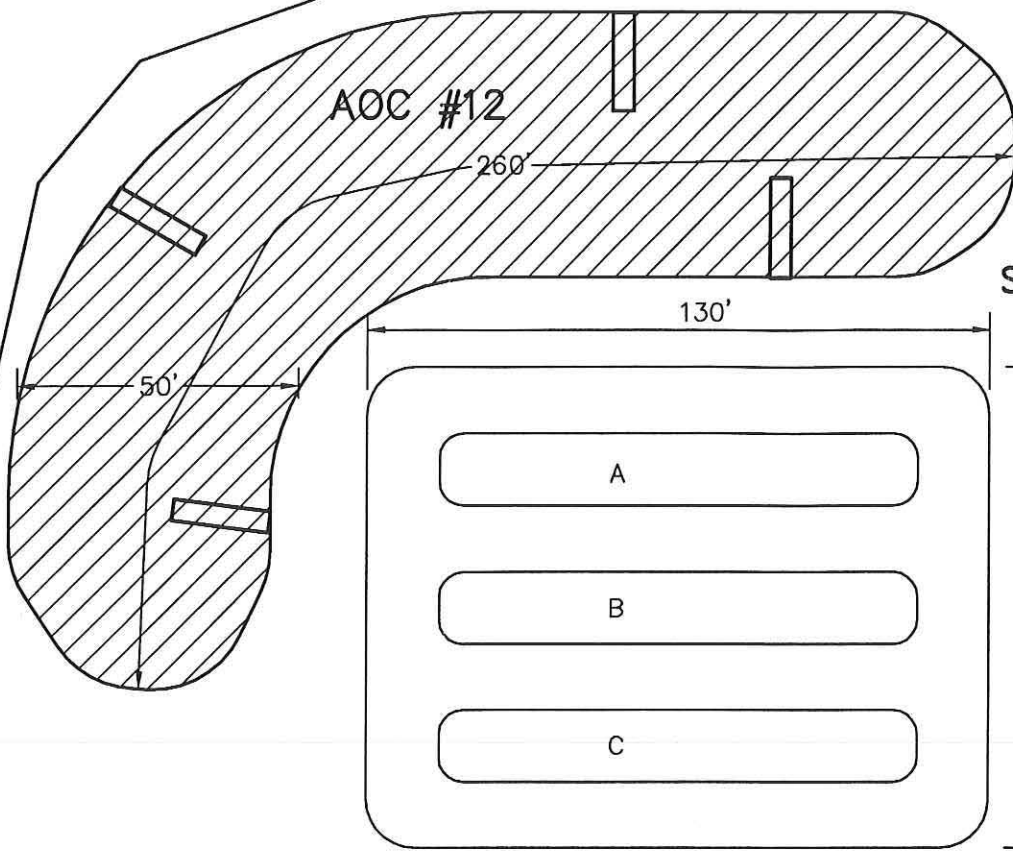
DRAWN BY:
KEA 10/18/93
CHECKED BY:

FIGURE 5
FRASER SHIPYARDS, INC.
AOC #7

FILE NO.
FRASE9401
DRG. NO.
9401FZH7

HOWARDS BAY

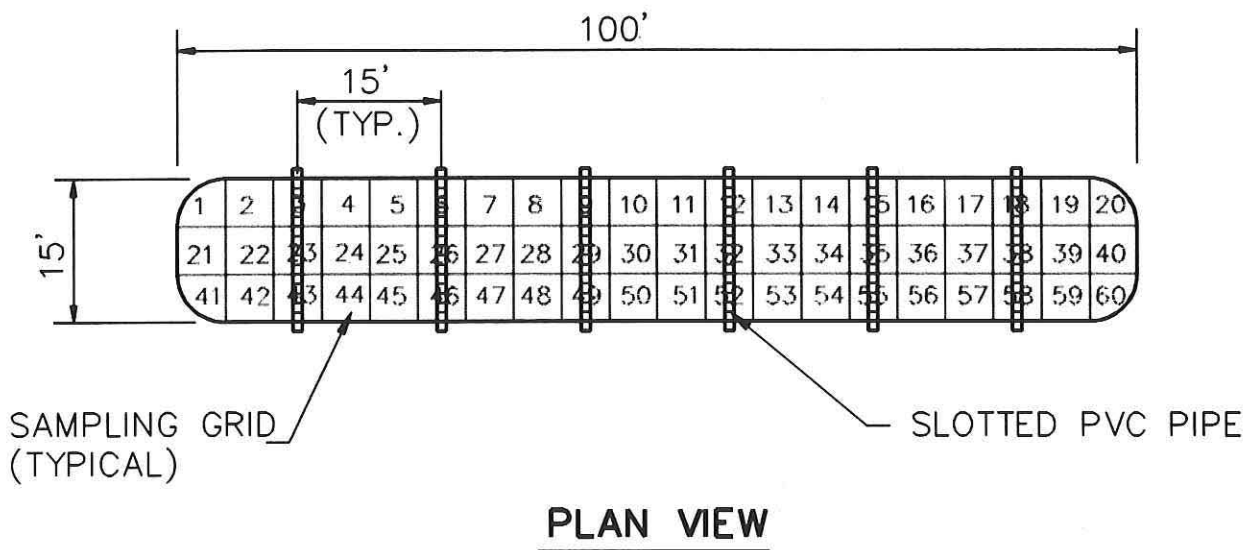
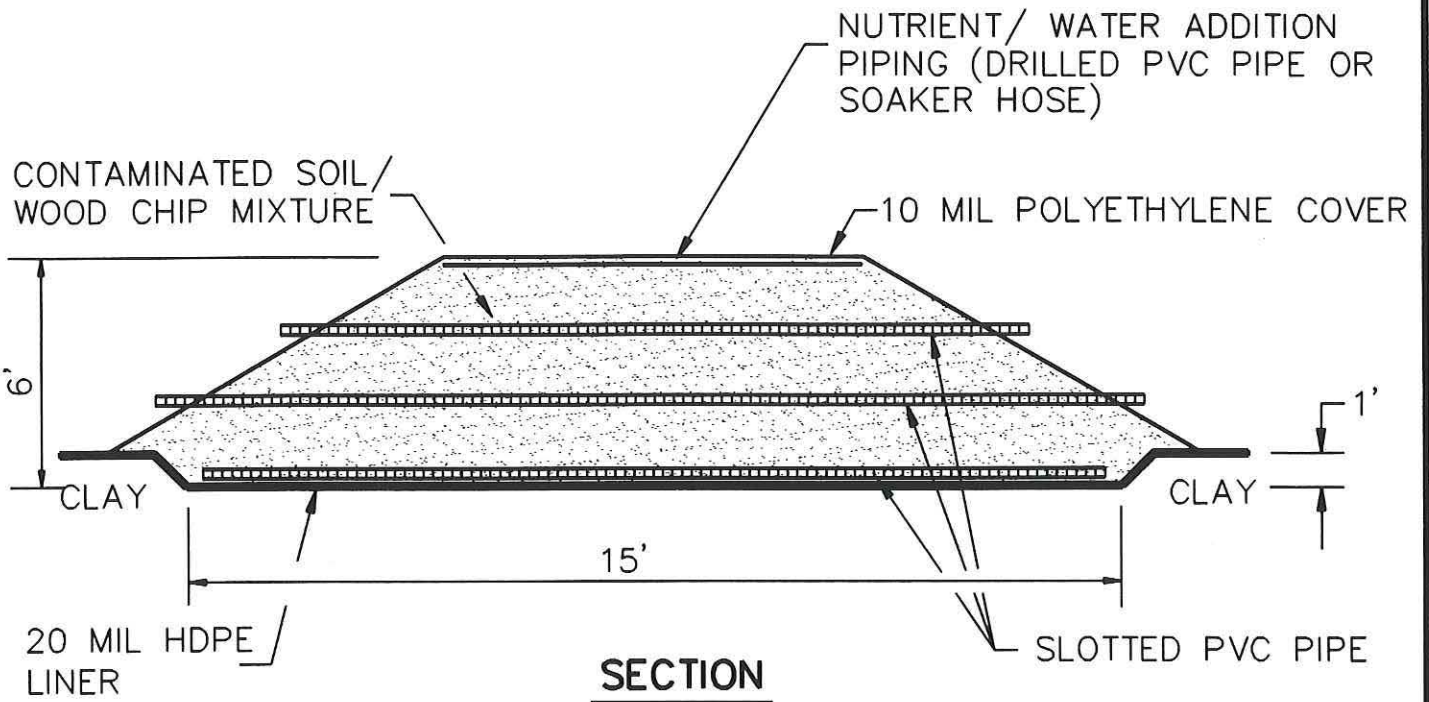
N



DRAWN BY:
KEA 9/23/94
CHECKED BY:

FIGURE 6
FRASER SHIPYARDS, INC.
BIOREMEDIATION SITE PLAN

FILE NO.
FRASE9401
DRG. NO.
9401FZH15



DRAWN BY:
TJZ 9/23/94
CHECKED BY:
CWI 9/23/94

FIGURE 7
FRASER SHIPYARDS, INC.
BIO-PILE DETAIL

FILE NO.
FRASE9401
DRG. NO.
9401FZH16

Application to Treat or Dispose of Petroleum Contaminated Soil

APPLICATION TO TREAT OR DISPOSE OF PETROLEUM CONTAMINATED SOIL

Form 4400-120

This form is required by the Department of Natural Resources for leaking underground storage tank sites to ensure that petroleum contaminated soil is treated or disposed of in compliance with NR 500-540, NR 158 and NR 419, Wis. Adm. Code. Failure to comply with applicable statutes and administrative rules may lead to violations of subchapters III and IV of ch. 144, Wis. Stats. and may result in forfeitures of not less than \$10 or more than \$25,000 for each violation, pursuant to ss. 144.426(1), 144.74 (1), and 144.99, Wis. Stats., or fines of not less than \$100 or more than \$150,000 or imprisonment for not more than 10 years, or both, pursuant to s. 144.74 (2), Wis. Stats. Each day of a continuing violation constitutes a separate violation. Department approval of this form is required prior to site remediation, except for soils to be buried in landfills.

DIRECTIONS: 1) Complete part I. 2) Select the treatment option in part II. Pretreatment approval is required for any treatment other than landfill burial. Submit this form to the DNR project manager for approval. 3) If your treatment option is landfill burial, complete part III before submitting the ORIGINAL form to the project manager. 4) If soil will be used as cover at a landfill, first submit this form for approval and then, after part III has been completed, resubmit the ORIGINAL to the project manager.

4.91.2.2P

ALL SITES MUST COMPLETE PART I

Part I. Source of Soil

Site/Facility Name Fraser Shipyards, Inc.

Site LD. # (for DNR use only)

Site Address Third Street & Clough Ave.
Superior, WI

Contact Name Ron Peterson, Superintendent

City, State, Zip Code

1/4, 1/4, Section, Township, and Range

Sec. 11, T49N, R14W

The information on this form is accurate to the best of my knowledge.

NOTE: Soil generators responsible for waste disposed of in landfills may incur future liability.

Signature of Soil Generator

Telephone Number (include area code)

(715) 394-7787

Consulting Firm Short, Elliott, Hendrickson, Inc. Contact Cyrus Ingraham, P.E. Telephone Number (715) 720-6231

Estimated Volume Contaminated Soil
850 Tons/cubic yards (circle one)

Soil Type (USCS)
 sand (SP, SW)
 silty/clayey sands (SM, SC)
 silt (ML, MH, OL)
 clay (CL, CH, OH)
 gravel (GC, GM, GP, GW)
 peat (PT)

Type of Petroleum Contamination (Circle):

Gasoline Diesel Fuel/#2 Fuel Oil

Other _____

Distance to Nearest Residence/Business 50 feet

Contaminant concentration:

One screened sample for each 15 yds³ and one laboratory analysis for each 300 yds³ of contaminated soil when the field instrument registers contamination OR one laboratory analysis for each 100 yds³ when the field instrument does not register contamination on soil shown to be contaminated during the site investigation/excavation or stockpiling. PLEASE ATTACH A TABLE LISTING RESULTS OF BOTH FIELD SCREENING AND LAB ANALYSES, AND INCLUDE SUPPORTING LAB REPORTS, IN ADDITION TO THE TPH AND BENZENE INFORMATION REQUESTED BELOW. NOTE: DILHR requires a minimum of 3 laboratory samples on excavated soil for PECFA claims.

Total Benzene in soil to be remediated (attach calculations) 0.119 lbs

Total Petroleum Hydrocarbons(TPH) in soil to be remediated (attach calculations) 1,359 lbs

Total TPH as DRO

**TABLE 3
FRASER SHIPYARDS, INC.
FIELD AND ANALYTICAL RESULTS**

AOC #	SAMPLE ID	DEPTH	FIELD SCREEN			ANALYTICAL PARAMETERS						
			FID units	PID units	PCB ppm	PCB ug/g	DRO ug/g	VOC (8010/8020) ug/g	Cd ug/g	Cr ug/g	Hg ug/g	Pb ug/g
1	B-1	(2.5-3')	1000+	331	--	--	94.4	--	--	--	--	--
	B-2	(2-2.5')	20	96	--	--	4,370	--	--	--	--	--
	B-3	(2-2.5')	1000+	31	--	--	X	--	--	--	--	--
	B-4	(2-2.5')	300	27	--	--	176	--	--	--	--	--
	B-5	(2-2.5')	600	104	--	--	--	--	--	--	--	--
	B-6	(2-2.5')	180	108	--	--	--	--	--	--	--	--
	COMPOSITE		--	--	--	--	--	0.0444 xylenes	--	--	--	--
2	GRIT SP		--	--	--	--	--	1.63	45.6	X	461	
3	B-7	(2-2.5')	590	51	--	--	1,820	0.05 benzene	--	--	--	--
	B-8	(2-2.5')	74	6	--	--	79.2	0.43 1,2-dichlorobenzene 0.05 benzene 0.29 1,2-dichlorobenzene	--	--	--	--
4	B-13	(2-2.5')	2	--	--	--	30.7	--	--	--	--	--
	B-14	(2-2.5')	7.5	--	--	--	X	--	--	--	--	--
5	B-9	(2-2.5')	1000+	42	--	--	--	X	0.18	22.7	0.083	685
	B-10	(0-6")	0	36	--	--	--	--	--	--	--	--
	B-10	(2-2.5')	--	--	--	--	--	X	0.28	274*	0.25	270
	B-11	(0-6")	0	34	--	--	--	--	0.64	22.2	X	66.1
	B-12	(0-6")	1.4	34	--	--	--	--	--	--	--	--
	B-12	(2-2.5')	1000+	50	--	--	--	X	0.38	23.1	X	177
6	B-15	(0-6")	1	--	<0.5	--	X	--	--	--	--	--
7	B-17	(2-2.5')	1.5	--	0.5 - 1	--	843	--	--	--	--	--
	B-18	(0-6")	2	--	0.5	--	131	--	--	--	--	--
	B-19	(0-6")	2.5	--	1.0	1.0	115	--	--	--	--	--
8	B-20	(0-1')	1	--	--	--	--	0.0058 benzene 0.150 toluene	0.218	7.53	0.0509	167
	B-21	(2-2.5')	1	--	--	--	--	X	X	4.94	X	X
9	B-22	(2-2.5')	1	--	--	--	163	0.0291 toluene	--	--	--	--
10	G-1	(surface)	1	--	--	--	--	--	--	--	--	--
	G-2	(surface)	1.5	--	--	--	--	0.104 toluene	0.08	4.01	X	X
	G-3	(surface)	3.5	--	--	--	--	X	0.115	36.0	X	133
	G-4	(surface)	1	--	--	--	--	--	--	--	--	--
	G-5	(surface)	1	--	--	--	--	--	--	--	--	--
	G-6	(surface)	2	--	--	--	--	--	--	--	--	--
	G-7	(surface)	1	--	--	--	--	--	--	--	--	--
	G-8	(surface)	1	--	--	--	--	--	--	--	--	--
11	DEFERRED											
12 & 13	TP-1	(5')	2	--	--	--	--	--	--	--	--	--
	TP-2	(5')	1	--	--	--	--	--	--	--	--	--
	TP-3	(5-6')	1	--	--	--	--	--	--	--	--	--
	TP-4	(5.5-6')	1	--	--	--	--	--	--	--	--	--
	TP-5	(2.5')	15	--	--	--	--	0.356 tetrachloroethylene	--	--	--	--
	TP-6	(5')	13	--	--	--	--	X	--	--	--	--
	TP-7	(6')	350	--	--	--	--	0.420 toluene	--	--	--	--
	TP-8	(4')	2	--	--	--	--	--	--	--	--	--
14	C-1	(0-6")	--	--	--	--	--	--	--	--	--	503**
	C-1	(17-20")	--	--	--	--	--	--	--	--	--	261
	C-2	(0-1")	--	--	--	--	--	--	--	--	--	221
	C-2	(4-5")	--	--	--	--	--	--	--	--	--	218
	C-3	(0-2")	--	--	--	--	--	--	--	--	--	38.7
	C-3	(11-13")	--	--	--	--	--	--	--	--	--	16.0
	C-4	(0-2")	--	--	--	--	--	--	--	--	--	266
	C-4	(6-8")	--	--	--	--	--	--	--	--	--	364

* TCLP - Cr, B-10 (2-2.5') = none detected

** TCLP - Pb, C-1 (0-6") = 1.27mg/l

SP = stockpile

-- indicates parameter not analyzed for

X = analyzed but not detected

ENVIROSCAN

February 1, 1994

Short Elliott Hendrickson, Inc.
421 Frenette Drive
Chippewa Falls, WI 54729

FEB 01 1994
CHIPPewa FALLS, WISCONSIN

ENVIRONMENTAL SERVICES

Attn: Cy Ingraham/Gloria Chojnacki

Re: Analytical Results
FRASE9401.00

Please find enclosed the analytical results for the samples received January 13, 1994. All analyses were done in accordance with EPA Methods (EPA-600/4-79-020, March, 1983 or SW-846, Third Edition).

The chain of custody document is enclosed.

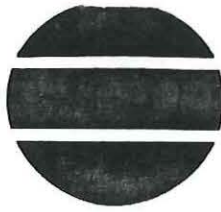
If you have any questions about the results, please call. Thank you for using Enviroscan Corp. for your analytical needs.

Sincerely,
Enviroscan Corp.

Bruce M. Schertz
Bruce M. Schertz
Inorganic Laboratory Supervisor

cc: Mr. Ron Peterson
Fraser Shipyard
P.O. Box 997
Superior, WI 54880

ANALYTICAL REPORT



Short Elliott Hendrickson, Inc.
421 Frenette Drive
Chippewa Falls, WI 54729

CUST NUMBER: FRASE9401.0
SAMPLED BY: Client
DATE REC'D: 01/13/94
REPORT DATE: 01/28/94
PREPARED BY: LMP
REVIEWED BY: *[Signature]*

Attn: Gloria Chojnacki

EPA 8020	Units	Detection Limit	AOC#1-COMPOSITE 01/11/94	Analyzed Date
Benzene	ng/g	2.1	X	01/14/94
Bromoform	ng/g	21.0	X	01/14/94
Bromomethane	ng/g	42.0	X	01/14/94
Carbon Tetrachloride	ng/g	5.2	X	01/14/94
Chlorobenzene	ng/g	21.0	X	01/14/94
Chloroethane	ng/g	21.0	X	01/14/94
2-Chloroethylvinyl Ether	ng/g	52.0	X	01/14/94
Chloroform	ng/g	5.2	X	01/14/94
Chloromethane	ng/g	21.0	X	01/14/94
Chlorodibromomethane	ng/g	5.2	X	01/14/94
1,2-Dichlorobenzene	ng/g	10.0	X	01/14/94
1,3-Dichlorobenzene	ng/g	10.0	X	01/14/94
1,4-Dichlorobenzene	ng/g	5.2	X	01/14/94
Bromodichloromethane	ng/g	5.2	X	01/14/94
1,1-Dichloroethane	ng/g	5.2	X	01/14/94
1,2-Dichloroethane	ng/g	5.2	X	01/14/94
1,1-Dichloroethylene	ng/g	4.1	X	01/14/94
cis-1,2-Dichloroethylene	ng/g	5.2	X	01/14/94
trans-1,2-Dichloroethylene	ng/g	5.2	X	01/14/94
Methylene Chloride	ng/g	26.0	X	01/14/94
1,2-Dichloropropane	ng/g	5.2	X	01/14/94
cis-1,3-Dichloropropene	ng/g	21.0	X	01/14/94
1,3-Dichloropropene	ng/g	5.2	X	01/14/94
Ethylbenzene	ng/g	10.0	X	01/14/94
1,1,2,2-Tetrachloroethane	ng/g	10.0	X	01/14/94
Tetrachloroethylene	ng/g	5.2	X	01/14/94
Toluene	ng/g	21.0	X	01/14/94
1,1,1-Trichloroethane	ng/g	5.2	X	01/14/94
1,1,2-Trichloroethane	ng/g	5.2	X	01/14/94
Trichloroethylene	ng/g	2.1	X	01/14/94
Vinyl Chloride	ng/g	2.1	X	01/14/94
Trichlorofluoromethane	ng/g	10.0	X	01/14/94
Dichlorodifluoromethane	ng/g	21.0	X	01/14/94
m- & p-Xylene	ng/g	10.0	21.3	01/14/94
o-Xylene	ng/g	10.0	23.1	01/14/94

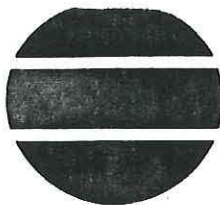
Analytical No.:

525

X = Analyzed but not detected.
Results calculated on a dry weight basis.

Analyses conducted in accordance with Enviroscan Quality Assurance Program.

ANALYTICAL REPORT



Short Elliott Hendrickson, Inc.
421 Frenette Drive
Chippewa Falls, WI 54729

CUST NUMBER: FRASE9401.0
SAMPLED BY: Client
DATE REC'D: 01/13/94
REPORT DATE: 01/28/94
PREPARED BY: LMP *z.m.*
REVIEWED BY: *[Signature]*

Attn: Gloria Chojnacki

EPA 8020	Units	Detection Limit	B-7 01/11/94	Analyzed Date
Benzene	µg/g	0.03	0.05	01/24/94
Bromoform	µg/g	0.31	X	01/24/94
Bromomethane	µg/g	0.64	X	01/24/94
Carbon Tetrachloride	µg/g	0.08	X	01/24/94
Chlorobenzene	µg/g	0.31	X	01/24/94
Chloroethane	µg/g	0.31	X	01/24/94
2-Chloroethylvinyl Ether	µg/g	0.80	X	01/24/94
Chloroform	µg/g	0.08	X	01/24/94
Chloromethane	µg/g	0.31	X	01/24/94
Chlorodibromomethane	µg/g	0.08	X	01/24/94
1,2-Dichlorobenzene	µg/g	0.16	0.43	01/24/94
1,3-Dichlorobenzene	µg/g	0.16	X	01/24/94
1,4-Dichlorobenzene	µg/g	0.08	X	01/24/94
Bromodichloromethane	µg/g	0.08	X	01/24/94
1,1-Dichloroethane	µg/g	0.08	X	01/24/94
1,2-Dichloroethane	µg/g	0.08	X	01/24/94
1,1-Dichloroethylene	µg/g	0.07	X	01/24/94
cis-1,2-Dichloroethylene	µg/g	0.08	X	01/24/94
trans-1,2-Dichloroethylene	µg/g	0.08	X	01/24/94
Methylene Chloride	µg/g	0.39	X	01/24/94
1,2-Dichloropropane	µg/g	0.08	X	01/24/94
cis-1,3-Dichloropropene	µg/g	0.31	X	01/24/94
1,3-Dichloropropene	µg/g	0.08	X	01/24/94
Ethylbenzene	µg/g	0.16	X	01/24/94
1,1,2,2-Tetrachloroethane	µg/g	0.16	X	01/24/94
Tetrachloroethylene	µg/g	0.08	X	01/24/94
Toluene	µg/g	0.31	X	01/24/94
1,1,1-Trichloroethane	µg/g	0.08	X	01/24/94
1,1,2-Trichloroethane	µg/g	0.08	X	01/24/94
Trichloroethylene	µg/g	0.03	X	01/24/94
Vinyl Chloride	µg/g	0.03	X	01/24/94
Trichlorofluoromethane	µg/g	0.16	X	01/24/94
Dichlorodifluoromethane	µg/g	0.31	X	01/24/94
m- & p-Xylene	µg/g	0.16	X	01/24/94
o-Xylene	µg/g	0.16	X	01/24/94

Analytical No.:

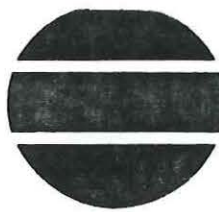
527

X = Analyzed but not detected.

Results calculated on a dry weight basis.

Analyses conducted in accordance with Enviroscan Quality Assurance Program.

ANALYTICAL REPORT



Short Elliott Hendrickson, Inc.
421 Frenette Drive
Chippewa Falls, WI 54729

CUST NUMBER: FRASE9401.0
SAMPLED BY: Client
DATE REC'D: 01/13/94
REPORT DATE: 01/28/94
PREPARED BY: LMP
REVIEWED BY: *[Signature]*

Attn: Gloria Chojnacki

EPA 8020	Units	Detection Limit	B-8 01/11/94	Analyzed Date
Benzene	µg/g	0.03	0.05	01/24/94
Bromoform	µg/g	0.31	X	01/24/94
Bromomethane	µg/g	0.63	X	01/24/94
Carbon Tetrachloride	µg/g	0.09	X	01/24/94
Chlorobenzene	µg/g	0.31	X	01/24/94
Chloroethane	µg/g	0.31	X	01/24/94
2-Chloroethylvinyl Ether	µg/g	0.78	X	01/24/94
Chloroform	µg/g	0.09	X	01/24/94
Chloromethane	µg/g	0.31	X	01/24/94
Chlorodibromomethane	µg/g	0.09	X	01/24/94
1,2-Dichlorobenzene	µg/g	0.16	0.29	01/24/94
1,3-Dichlorobenzene	µg/g	0.16	X	01/24/94
1,4-Dichlorobenzene	µg/g	0.09	X	01/24/94
Bromodichloromethane	µg/g	0.09	X	01/24/94
1,1-Dichloroethane	µg/g	0.09	X	01/24/94
1,2-Dichloroethane	µg/g	0.09	X	01/24/94
1,1-Dichloroethylene	µg/g	0.07	X	01/24/94
cis-1,2-Dichloroethylene	µg/g	0.09	X	01/24/94
trans-1,2-Dichloroethylene	µg/g	0.09	X	01/24/94
Methylene Chloride	µg/g	0.40	X	01/24/94
1,2-Dichloropropane	µg/g	0.09	X	01/24/94
cis-1,3-Dichloropropene	µg/g	0.31	X	01/24/94
1,3-Dichloropropene	µg/g	0.09	X	01/24/94
Ethylbenzene	µg/g	0.16	X	01/24/94
1,1,2,2-Tetrachloroethane	µg/g	0.16	X	01/24/94
Tetrachloroethylene	µg/g	0.09	X	01/24/94
Toluene	µg/g	0.31	X	01/24/94
1,1,1-Trichloroethane	µg/g	0.09	X	01/24/94
1,1,2-Trichloroethane	µg/g	0.09	X	01/24/94
Trichloroethylene	µg/g	0.04	X	01/24/94
Vinyl Chloride	µg/g	0.04	X	01/24/94
Trichlorofluoromethane	µg/g	0.16	X	01/24/94
Dichlorodifluoromethane	µg/g	0.31	X	01/24/94
m- & p-Xylene	µg/g	0.16	X	01/24/94
o-Xylene	µg/g	0.16	X	01/24/94

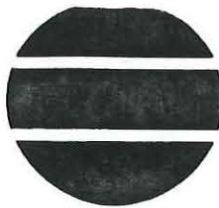
Analytical No.:

528

X = Analyzed but not detected.
Results calculated on a dry weight basis.

Analyses conducted in accordance with Enviroscan Quality Assurance Program.

ANALYTICAL REPORT



Short Elliott Hendrickson, Inc.
421 Frenette Drive
Chippewa Falls, WI 54729

CUST NUMBER: FRASE9401.00
SAMPLED BY: Client
DATE REC'D: 01/13/94
REPORT DATE: 01/28/94
PREPARED BY: DJB *OSB*
REVIEWED BY: *[Signature]*

Attn: Gloria Chojnacki

Modified Diesel Range Organics (DRO)
Parameter # 78919

	DRO	Date Ext	Date Analyzed	Analytical No.
	-----	-----	-----	-----
B-1	94.4 (2,4)	01/13/94	01/16/94	521
B-2	4,370. (2,4)	01/13/94	01/16/94	522
B-3	X	01/13/94	01/17/94	523
B-4	176. (2,4)	01/13/94	01/17/94	524
B-7	1,820. (2,4)	01/13/94	01/20/94	527
B-8	79.2 (2,4)	01/13/94	01/20/94	528

Detection Limit 5.0
Units $\mu\text{g/g}$

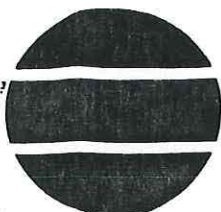
X = Analyzed but not detected.
Results calculated on a dry weight basis.

Notes: Only above indicated notes apply.

- (1) The chromatogram is distinct for diesel.
- (2) The chromatogram is not distinct for diesel. It has characteristics of a product which has significant peaks within the DRO window.
- (3) The chromatogram is not distinct for diesel. All peaks within the DRO window were quantitated.
- (4) The chromatogram also contained significant peaks outside the DRO window.
- (5) The chromatogram also contained significant peaks and a raised baseline outside the DRO window.

The replicate spike recovery of this batch of samples was found to be 102.% and 98.8%.

REQUEST FOR SERVICES



SCAN

303 W. MILITARY RD. ROTHSCHILD, WI 54474 1-800-338-SCAN

CLIENT INFORMATION

Name: Gloria Chojacki
 Company: SEH Inc.
 Address: 421 Frenette DR.
Chippewa Falls, WI 54729
 Phone: (715) 723-8516
 P.O. # / Project #: FRASE 9401.00
 Quote / Reference #: _____

Turnaround Time _____

Normal

Rush

Date Needed _____

(Preapproved by Lab)

ANALYTICAL REQUESTS

(use separate sheet if necessary)

DRO SOIL DRO
 VOC-8010/8010/8010
 TOTAL Cd, Cr, Hg, Pb
 MPREP 5175

Note: Terms and conditions printed on back apply. **21-0412**

Sample Type

Sample Handling

(Check all that apply)

- Groundwater
- Wastewater
- Soil
- Solid Waste
- Oil
- Other _____

- Nonhazardous
- Flammable
- Skin Irritant
- Highly Toxic
- Other (specify) _____
- Refrigerate
- Work in Hood
- Wear Gloves

LAB USE ONLY	DATE	TIME	No. of Containers		SAMPLE ID					REMARKS
			COMP	GRAB						
21000521	1-11-94	10:00		X ²	B-1 ✓	X				
21000522		10:30		X ²	B-2 ✓	X				
21000523		11:00		X ²	B-3 ✓	X				
21000524		11:30		X ²	B-4 ✓	X				
21000525		-	2	2	AOC #1 - Composite	X				
21000526		11:00	1		AOC #2 - GRIT Sample		X			
21000527		1:40		3	B-7 ✓	X	X			
21000528		1:50		3	B-8 ✓	X	X			
21000529	✓	2:00		3	B-9 2-2.5' ✓	X	X			
21000530	1-11-94	2:30		1	B-10 2-2.5' ✓	X	X			Poor Recovery

PORT - Bee TC FRASER SH

CHAIN OF CUSTODY RECORD

SAMPLERS: (Signature)
Gloria Chojacki

RELINQUISHED BY: (Signature) G. Chojacki DATE/TIME 1-12-94 08:00 RECEIVED BY: (Signature) _____

RELINQUISHED BY: (Signature) _____ DATE/TIME _____ RECEIVED BY: (Signature) _____

RELINQUISHED BY: (Signature) _____ DATE/TIME _____ RECEIVED FOR LABORATORY BY: (Signature) _____ DATE/TIME 1/13/94

Del'v: Hand Comm Rec'd on ice

Ship. Cont. OK? N N/A

Rec'd Refrig.? N N/A

Seals OK? N N/A

Samples leaking? Y N/A

Comments: _____

Copy of Report to SEH

February 16, 1994

Short Elliott Hendrickson, Inc.
421 Frenette Drive
Chippewa Falls, WI 54729

Attn: Gloria Chojnacki

Re: FRASE9401.00

Please find enclosed the analytical results for the samples received January 27, 1994.

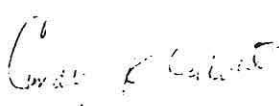
The Diesel Range Organics (DRO) analysis was completed using the WI. DNR Modified DRO Method. All other analyses were done in accordance with EPA Methods (EPA-600/4-79-020, March, 1983 or SW-846, Third Edition).

The chain of custody document is enclosed.

If you have any questions about the results, please call. Thank you for using Enviroscan Corp. for your analytical needs.

Sincerely,

Enviroscan Corp.


Cindy K. Calvert
Senior Analytical Chemist

ANALYTICAL REPORT



Short Elliott Hendrickson, Inc.
121 Frenette Drive
Chippewa Falls, WI 54729

CUST NUMBER: FRASE9401.00
SAMPLED BY: Client
DATE REC'D: 01/27/94
REPORT DATE: 02/15/94
PREPARED BY: DJB *QTB*
REVIEWED BY: *JS*

Attn: Gloria Chojnacki

Modified Diesel Range Organics (DRO)
Parameter # 78919

	DRO	Date Ext	Date Analyzed	Analytical No.
B-13	30.7 (2,4)	01/28/94	02/04/94	1177
B-14	X	01/28/94	02/04/94	1178
B-15	X	01/28/94	02/04/94	1179
B-17	* 843. (2,5)	01/28/94	02/04/94	1180
B-18	131. (2,4)	01/28/94	02/08/94	1181
B-19	115. (2,4)	01/28/94	02/04/94	1182
B-22	163. (2,4)	01/28/94	02/04/94	1185

Detection Limit .6.6
Units $\mu\text{g/g}$

* = The surrogate recovery for this sample was low, so the DRO result may also be low.

X = Analyzed but not detected.

Results calculated on a dry weight basis.

Notes: Only above indicated notes apply.

- (1) The chromatogram is distinct for diesel.
- (2) The chromatogram is not distinct for diesel. It has characteristics of a product which has significant peaks within the DRO window.
- (3) The chromatogram is not distinct for diesel. All peaks within the DRO window were quantitated.
- (4) The chromatogram also contained significant peaks outside the DRO window.
- (5) The chromatogram also contained significant peaks and a raised baseline outside the DRO window.

The replicate spike recovery of this batch of samples was found to be 90.% and 101.%.

FRASERS CAN

303 W. MILITARY RD. ROTHSCHILD, WI 54474 1-800-338-SCAN

CLIENT INFORMATION

Name: Gloria Chojnacki
 Company: SEH Inc.
 Address: 421 Frenette Dr.
Chippewa Falls, WI 54729
 Phone: (715) 723-8506
 P.O. # / Project #: FRASE9401-00
 Quote / Reference #: _____
 Note: Terms and conditions printed on back apply.

Turnaround Time _____

Normal
 Rush
 Date Needed _____

(Preapproved by Lab)

ANALYTICAL REQUESTS

(use separate sheet if necessary)

Sample Type

- (Check all that apply)
- Groundwater
 - Wastewater
 - Soil
 - Solid Waste
 - Oil
 - Other _____

Sample Handling

- Nonhazardous
- Flammable
- Skin Irritant
- Highly Toxic
- Other (specify) _____
- Refrigerate
- Work in Hood
- Wear Gloves

21-6412

SIL DRO		Extended DRD		S-PCB		VOC's		Total Cd, Cr, Hg, Pb		M/REP 75, Pb	
---------	--	--------------	--	-------	--	-------	--	----------------------	--	--------------	--

LAB USE ONLY	DATE	TIME	No. of Containers		SAMPLE ID						REMARKS
			COMP	GRAB							
12001177	1-25-94	8:00		2	B-13	✓	X				
12001178		8:00		2	B-14	✓	X				
12001179		8:10	2		B-15	✓	X				
12001180		8:40		2	B-17	✓	X				
12001181		8:40		2	B-18	✓	X				
12001182		8:40	2		B-19	✓	X	X			
12001183		8:50	2		B-20	✓			X	X	
12001184	✓	8:50		3	B-21	✓			X	X	
12001185	1-25-94	9:05		3	B-22	✓	X	X			

SHORT - ALL TO FRASERSH FRASERSH

CHAIN OF CUSTODY RECORD

SAMPLERS: (Signature)
G. Chojnacki / Daniel R. Reed

RELINQUISHED BY: (Signature) G. Chojnacki DATE/TIME 1-26-94 2:40 RECEIVED BY: (Signature) _____

RELINQUISHED BY: (Signature) _____ DATE/TIME _____ RECEIVED BY: (Signature) _____

RELINQUISHED BY: (Signature) _____ DATE/TIME _____ RECEIVED FOR LABORATORY BY: (Signature) _____ DATE/TIME _____

Del'v. Hand Comm: _____
 Ship. Cont. OK? N N/A Rec'd
 Rec'd Refrig.? N N/A on
 Seals OK? N N/A in
 Samples leaking? Y N/A in
 Comments: Report + Copy Short

Standard Operating Procedures

Protocol for Excavation Sampling and Investigation of Subsurface Soils – Backhoe

A backhoe is used at the site for excavating surface and subsurface soils from specific locations. This provides for visual observation of subsurface conditions, and allows for collection of soil samples at depth. Excavated soils are loaded directly onto trucks for transport to a landfill or treatment facility. When possible, "clean" soils are kept separate from contaminated soils and all "clean" soils are used as backfill for the final excavation. Clean offsite granular soils are used as backfill for the excavation after sampling is performed.

Soil samples are generally collected from varying depths to obtain representative samples. A grab sample of soil is extracted from the excavation using the backhoe bucket, and the bucket is then placed on the ground surface next to the excavation. A sample is collected from the bucket using decontaminated stainless-steel sampling equipment. Visual observations are made of the test pits during excavation activities, and soil samples are classified in the field by SEH's Site Representative. Sample lithology is recorded using the Unified Soil Classification System. Soil test pit logs, documenting soil types and subsurface conditions, are completed by the Site Representative.

During excavation and sampling activities, soils are screened for the presence of volatile organic compounds (VOCs) using a photoionization detector (PID) or flame ionization detector (FID). VOCs are common components of a variety of environmental contaminants, including industrial solvents, petroleum products and wide range of other industrial compounds. The PID and FID are also used to monitor ambient air concentrations at the excavation and within the work zone during the soil excavation, in accordance with SEH's Site Safety Plan. Personal protective equipment is utilized by sampling personnel during sampling, as specified in the Site Safety Plan.

Soil samples are obtained from the central portion of each bucket, and not from areas near the bucket surface. Stainless-steel sampling equipment used to collect the soil sample from the bucket is decontaminated between samples using a soap and water wash followed by a distilled water rinse.

Soil samples are collected in laboratory-clean glass sample jars. These are labelled with the sample designation, location, date, time and sampler. Sample collection and preservation procedures will follow the latest WDNR LUST Guidance protocol. Collected samples are preserved on ice and shipped to the contracted analytical laboratory. SEH standard chain-of-custody procedures are followed regarding the shipment and receipt of samples.

Soil Vapor Monitoring – FID

Soil vapor (headspace) measurements are made on soil samples collected by soil boring, test pit and pipe trenching activities. The field instrument used is a Foxboro Organic Vapor Analyzer (OVA) Model 128 portable flame ionization detector (FID) that has been laboratory calibrated. The FID is calibrated in the field using 100 ppm methane prior to conducting any sample measurements. This instrument provides the following analytical screening capability:

Accuracy:	Based on the use of a calibration gas with operating temperatures between 10 and 40 degrees C. within +/- 20% for 0 to 10 ppm within +/- 20% for 0 to 100 ppm within +/- 20% for 0 to 1000 ppm
Response Time:	Approximately 2 seconds for 90% of final reading
Detection Limit:	0.2 ppm methane
Response to Petroleum:	Recorded as meter deflection based on the above referenced calibration.

The following procedure is used in determining headspace gas concentrations in each soil sample:

1. Half-fill one clean sealable plastic bag with the sample to be analyzed and immediately seal. Plastic bags are 10 oz. volume capacity.
2. Headspace is allowed to develop for 10 minutes. The bag is vigorously shaken for 15 seconds both at the beginning and end of the headspace development period. Where ambient temperatures are below 32° F (0° C), headspace development is conducted within a heated vehicle or building.
3. After headspace development, the plastic bag is punctured with the instrument sampling probe to a point about one-half of the headspace depth. Care is exercised to avoid uptake of water droplets or soil particles.
4. Following probe insertion through the plastic bag, the highest meter response is recorded as the headspace concentration.

Samples are also examined visually by an environmental professional for staining or other signs of contamination.

Laboratory Soil Sample Handling

Soil samples are collected for laboratory analyses at selected intervals using clean stainless steel or disposable plastic utensils and placed in clean glass jars provided by the testing laboratory. Soil is either weighed (per WDNR Guidance) or used to completely fill the laboratory sampling jars. Samples are then immediately placed in a cooler on ice. All sampling utensils are either disposed of (plastic) or cleaned using a detergent-water mixture and triple rinsed with distilled water. Soil samples are then repacked at the office and sent to the laboratory for analyses following chain-of-custody procedures.