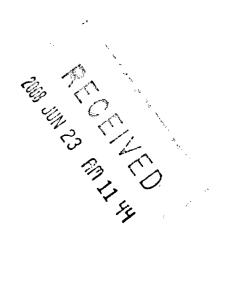
# $1R - \frac{484}{84}$

# REPORTS

# DATE:





June 15, 2008

arson &

SSOCIATES, INC.

VIA EMAIL: wprice@state.nm.us VIA CERTIFIED MAIL

Mr. Wayne Price, Chief State of New Mexico – Department of Natural Resources Oil Conservation Division – Environmental Bureau 1220 South St. Francis Drive Santa Fe, New Mexico 87505

## Re: 1R0484 – Elliott B-9 Tank Battery #2 and #3 Remediation Report Unit D (NW/4, NW/4), Section 9, Township 22 South, Range 37 East Lea County, New Mexico

#### Dear Mr. Price:

This report is submitted to the New Mexico Oil Conservation Division (OCD) on behalf of John H. Hendrix Corporation (JHHC) by Larson & Associates, Inc. (LAI), its consultant, to document remediation of historic hydrocarbon contamination at the Elliott B-9 Tank Battery #2 and #3 (Site) located in unit D (NE/4, NW/4), Section 9, Township 22 South, Range 37 East, in Lea County, New Mexico. The soil remediation was a voluntary action performed by JHHC in accordance with a remediation plan approved by the OCD on December 17, 2007. The Site's latitude and longitude is 32° 24' 42.4" north and 103° 10' 31.1" west, respectively. Figure 1 presents a location and topographic map.

#### **Background**

On March 24, 2006, LAI, on behalf of JHHC, submitted an investigation plan to the OCD proposing to collect soil samples at ten (10) locations (BH-1 through BH-10) using an air rotary rig. The investigation plan was approved on March 29, 2006. Scarborough Drilling, Inc. (Scarborough) advanced the borings between 6 and 80 feet below ground surface (bgs) and collected soil samples using split-spoon and jam tube samplers. The split-spoon and jam tube samplers were thoroughly cleaned between uses by washing with a solution of laboratory-grade detergent and water, and rinsed with distilled water. The soil samples were placed in clean glass jars, labeled, preserved in an ice chest and delivered under chain of custody control to Environmental Lab of Texas, Inc. (ELOT) located in Odessa, Texas. ELOT analyzed the samples for benzene, toluene, ethylbenzene, xylene (BTEX) using method 8021B, total petroleum hydrocarbons (TPH), including gasoline range organics (GRO) and diesel range organics (DRO), using method 8015modified and chloride using method 300. The sample results were submitted to the OCD in an investigation report titled, "Investigation Report of Historic Contamination and Remediation Plan, John H. Hendrix Corporation, Elliott B-9 Lease, Battery #2 and #3, Unit D (NW/4, NW/4), Section 9, Township 22 South, Range 37 East, Lea County, New Mexico, January 9, 2007". Following its review of the report, the OCD requested JHHC to install a monitoring well in the pit area. During a technical meeting on August 29, 2007, the OCD agreed to installation of the well in close proximity and down gradient (southeast) of the pit. Appendix A presents OCD correspondence.

#### **Monitoring Wells and Samples**

On October 16, 2007, Scarborough drilled monitoring well MW-1 approximately 20 feet southeast of the

Mr. Wayne Price June 15, 2008 Page 2

pit. The well was constructed with 2-inch schedule 40 PVC installed in a 5-inch diameter boring that was advanced to approximately 90 feet bgs. Approximately 20 feet of factory slotted well screen (0.010 inch) was placed near the bottom of the boring between about 66.13 and 85.44 feet bgs and surrounded with 10 to 20 graded silica sand. The sand was placed to about 2 feet above the screen and the remainder of the boring was filled with bentonite chips to about 1 foot bgs. The well was secured with a locking cap and locking steel cover anchored in a 3 x 3 foot concrete pad. Groundwater stabilized in the well at approximately 79.48 feet bgs. Table 1 presents a summary of the well drilling and completion details. Figure 2 presents the monitoring well location.

Soil samples were collected at ground surface, 20, 40 and 60 feet bgs using methods previously described and were analyzed by ELOT for TPH and chloride. TPH was reported in the 60-foot sample at 71.9 milligrams per kilogram (mg/Kg) and was less than the method detection limit in the remaining samples. The highest chloride value was reported in the 20-foot sample at 1,540 mg/Kg and decreased to 331 mg/Kg in the 60-foot sample. Groundwater samples were collected on October 16, 2007, after the well was developed and purged by pumping and hand bailing. The purged water was placed in a portable tank and disposed at an OCD approved facility by Vista Services, Inc. The groundwater samples were collected using a dedicated polyethylene bailer and carefully poured into laboratory prepared containers, which were labeled, chilled in an ice chest and delivered under chain of custody control to DHL Laboratories, Inc. (DHL), located in Round Rock, Texas. DHL analyzed the groundwater samples for BTEX, dissolved metals (arsenic, barium, cadmium, chromium, lead, magnesium, mercury, potassium, selenium, silver and sodium), major anions and cations (chloride, fluoride, Nitrate as N, sulfate and bicarbonate, carbonate, hydroxide alkalinity), pH and total dissolved solids (TDS). Table 2 presents a summary of the soil sample results. Table 3 presents a summary of the groundwater sample results.

Referring to Table 3, chloride (3,500 mg/L) and TDS (6,610 mg/L) were reported in the groundwater samples above the New Mexico Water Quality Control Commission (WQCC) domestic water quality standards of 250 milligrams per liter (mg/L) and 1,000 mg/L, respectively. No BTEX was reported in the sample, and dissolved metals were less than the WQCC human health standards.

On December 3, 2007, monitoring well MW-2 was installed about 100 feet northwest (up gradient) of the pit. Well MW-2 was drilled to approximately 91 feet bgs and completed using methods previously discussed. The well screen was placed between approximately 67.61 and 86.92 feet bgs and groundwater stabilized at approximately 80.80 feet bgs. Soil samples were collected during drilling at ground surface, 20. 40 and 60 feet bgs and were analyzed for chloride. The highest chloride value was reported in the 20-foot sample (55.2 mg/Kg) and decreased to 10.9 mg/Kg) in the 60-foot sample. Groundwater samples were collected from well MW-2 on December 4, 2007, and analyzed by DHL for BTEX, anions and cations. No BTEX was reported in the groundwater samples, and chloride and TDS were below the WQCC domestic water quality standards of 250 mg/L and 1,000 mg/L, respectively.

On April 8, 2008, LAI personnel collected samples from wells MW-1 and MW-2 using methods and procedures previously described. The samples were analyzed by DHL for BTEX, anions and cations. No BTEX was reported in the samples, but chloride (4,410 mg/L) and TDS (7,980 mg/L) exceeded the WQCC domestic water quality standards in sample MW-1. Chloride and TDS were below the WQCC domestic water standards of 250 mg/L and 1,000 mg/L, in the sample MW-2. Table 3presents a summary of the groundwater sample results. Appendix B presents the laboratory reports.

Mr. Wayne Price June 15, 2008 Page 3

#### Soil Remediation

Between May 5 and May 30, 2008, soil remediation was performed at the according to the OCD approved remediation plan. Environmental Plus, Inc. (EPI), located in Eunice, New Mexico, was contracted to provide excavation services and removed soil from about 1 to 2 feet bgs north and west of the tank battery and to approximately 7 feet bgs at two (2) locations in former pit area located north of the tank battery. The pit excavations measured approximately 25 x 40 x 7 feet (north excavation) and 40 x 50 x 7 feet (south excavation) and were lined with a 20-mil thickness polyethylene material before filling with clean soil. The surface of the pit excavations were crowned for storm rainwater drainage. The remaining excavations were also filled with clean soil and the entire remediation area was seeded with a blend of side oats and gramma grass, as requested by the landowner. EPI hauled approximately 4,548 cubic yards of contaminated soil to the JHHC centralized surface waste management facility (NM-02-0021) located in the W/2 SW/4 and W/2 NW/4, Section 15, Township 24 South and Range 35 East NMPM. Appendix C presents photographs.

#### Soil Vapor Extraction System

On May 15, 2008, the OCD approved an amendment to the remediation plan for installation of a passive soil ventilation system in a pipeline right-of- way that crosses the pit area. Three (3) active natural gas pipelines, owned by Southern Union Gas Services, are located in the right-of-way and JHHC proposed to install the soil ventilation system as a health, safety and environment precaution. The oil ventilation system is centrally located in the right-of-way between the north and south pit excavations. The SVE system consists of an 18-inch wide trench excavated to approximately 7 feet bgs and about 60 feet long. The trench was filled with gravel to about 3 feet bgs. A 4-inch diameter perforated PVC lateral was placed near top of the gravel and extends the entire length of the trench. Three (3) vertical PVC risers were attached to PVC lateral to support 8-inch diameter wind turbines. The entire length of trench was covered with 20-mill thickness polyethylene material and covered with approximately three (3) feet of clean soil. Figure 2 presents a location drawing for the SVE system. Figure 3 presents a cross-sectional diagram of the soil ventilation system.

#### **Conclusion**

JHHC requests a letter from the OCD requiring no further action for soil remediation at the Site. Please contact Ms. Carolyn Haynes with JHHC at (575) 390-9689 if you have questions. I may be reached with questions at (432) 687-0901 or email mark@laenvironmental.com. Sincerely,

Larson & Associates, Inc.

Mark J. Larson, P.G., C.P.G., C.G.W.P. Senior Project Manager

Encl.

cc: Carolyn Haynes, JHHC Larry Johnson, OCD District 1

Tables

Table 1

1R-0484

John H. Hendrix Corporation, Elliott B-9 Tank Battery #2 and #3 Summary of Monitoring Well Drilling and Completion Details

Unit D (NW/4, NW/4), Section 9, Township 22 South, Range 37 East Lea County, New Mexico

Well	Drilled Depth (Feet BGS)	Drill Date	Well Depth (Feet TOC)	Casing Stickup (Feet)	Screen Interval (Feet BGS)	Stablized Groundwater Level (Feet BGS)
MW-1	06	10/16/2007	90.27	2.81	66.13 - 85.44	79.48
	······································					(10/16/2007)
MW-2	16	12/03/2007	90.44	2.89	67.61 - 86.92	80.80
						(12/03/2007)

Notes: Wells Drilled and Installed by Scarborough Drilling, Inc., Lamea, Texas, using Air Rotoary Methods.

Feet below ground surface 1. BGS: 2. TOC:

Depth measured from top of PVC well casing.

Table 2

Summary of Laboratory Analysis of Monitoring Well Soil Samples John H. Hendrix Corporation, Elliott B-9 Tank Battery #2 and #3 1R-0484

Unit D (NW/4, NW/4), Section 9, Township 22 South, Range 37 East

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, New R
County
Lea

Sample	Depth (Feet)	Date	GRO C6 - C12 (mg/Kg)	DRO > C12 - C28 (mg/Kg)	TPH C6 - C28 (mg/Kg)	Chloride (mg/Kg)
RRAL:					1,000	
I-WM	0	10/16/2007	<18.6	<18.6	<37.2	52.8
	20	10/16/2007	<19.4	<19.4	<38.8	1,540
	40	10/16/2007	<17.7	<17.7	<35.4	225
	60	10/16/2007	<18.0	71.9	71.9	331
MW-2	0	12/03/2007		ł	B	<4.97
	50	12/03/2007	I	ł	I	. 55.2
	40	12/03/2007	ł	ł	ł	10.9

Notes: Analysis performed by Environmental Laboratories of Texas, Odessa, Texas

Results are reported in milligrams per kilogram (mg/Kg)

Gasoline - range organics

Total Petroleum Hydrocarbons (Sum of GRO + DRO)

Diesel - range organics

Less than method detection limit

No data available

1. GRO: 2. DRO: 3. TPH:

4/08/08 <0.0008 <0.002 <0.002 <0.003 <0.0078 **MW-2** <10 210 6.84 229 203 210 <10 920 I I ł ł ł ł ł ł ł 1 ł ł <0.00008 0.047 <0.0003 12/04/07 <0.0008 <0.0078 0.01520 <0.0003 0.01290 <0.002 <0.003 <0.002 <0.002 **MW-2** <0.001 39.0 82. 7.2 205 188 <10 <10 188 133 222 --973 ł ł 4/08/08 <0.0008 <0.0078 <0.002 <0.002 <0.003 **MW-1** 4,410 7,980 6.72 226 273 <10 <10 273 1 1 ł ł 1 1 ł 1 ł ł l ł 1 10/16/07 <0.0003 0.00821 <0.0003 <0.00008 <0.0008 <0.003 <0.002 <0.0078 0.00852 <0.002 <0.001 <0.002 0.100 **MW-1** 6,610 98.9 18.8 1,860 3,500 358 6.94 1.51 9.87 <10 <sup>∠</sup>10 243 271 271 EPA/NMED Threshold 6-9 1,000 0.002 0.75 0.75 0.62 0.1 1.0 0.01 0.05 0.05 0.05 250 1.6 10 600 0.05 0.01 Í I I I ł ۱ ł **Reporting Units** pH units mg/L Alkalinity, Bicarbonate Alkalinity, Carbonate Alkalinity, Hydroxide **Total Dissolved Solids** Volatile Organics Alkalinity, Total Characteristics Ethylbenzene **Total Xylenes** Magnesium Parameter Chromium Potassium Nitrate-N **Total BTEX** Cadmium Benzene Toluene Chloride Fluoride Barium Calcium Mercury Selenium Sulfate Lead Arsenic Sodium Metals Silver H

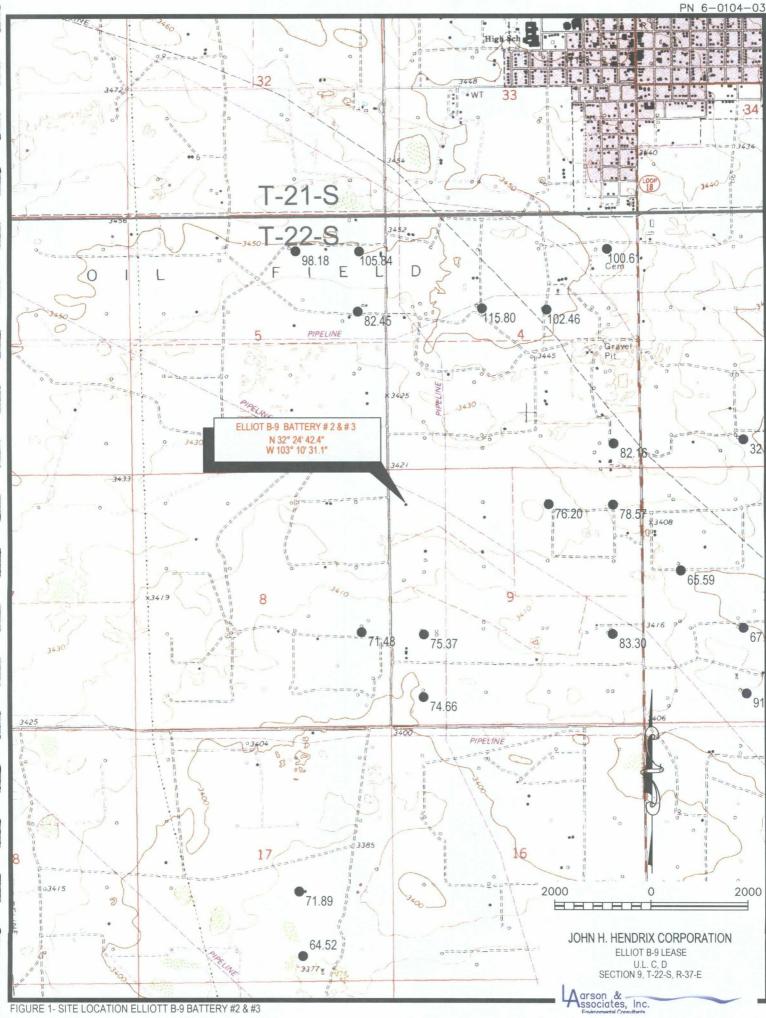
2. <: Below method detection limit

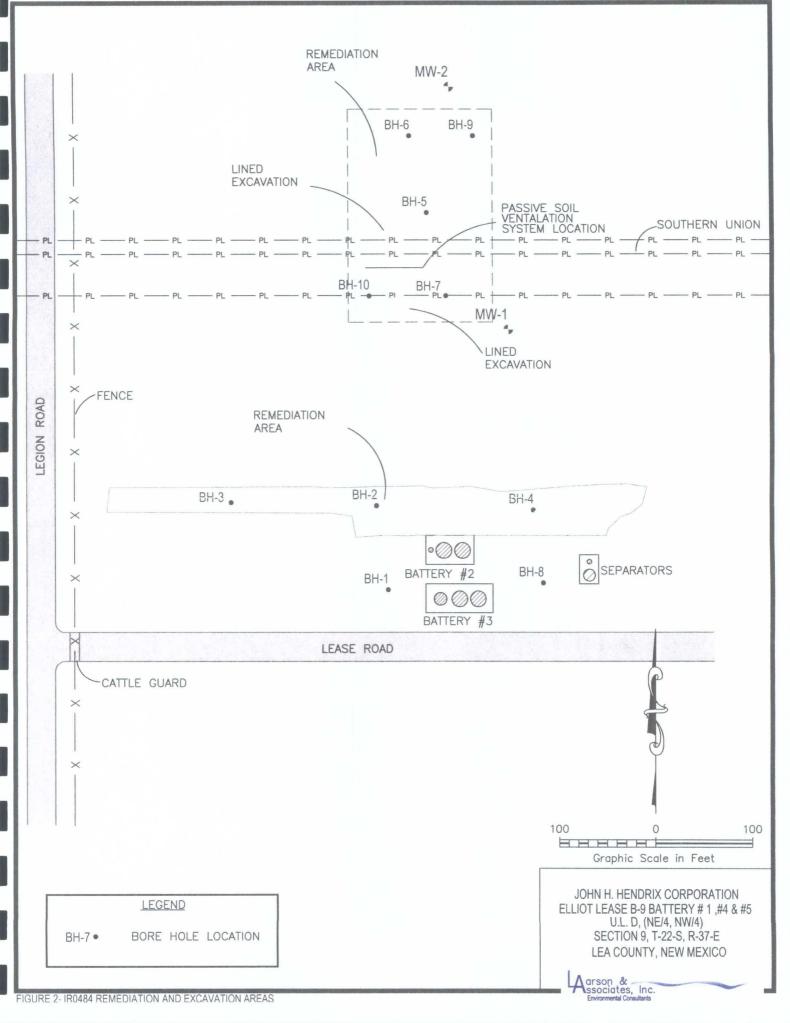
1. mg/L: Milligrams per liter

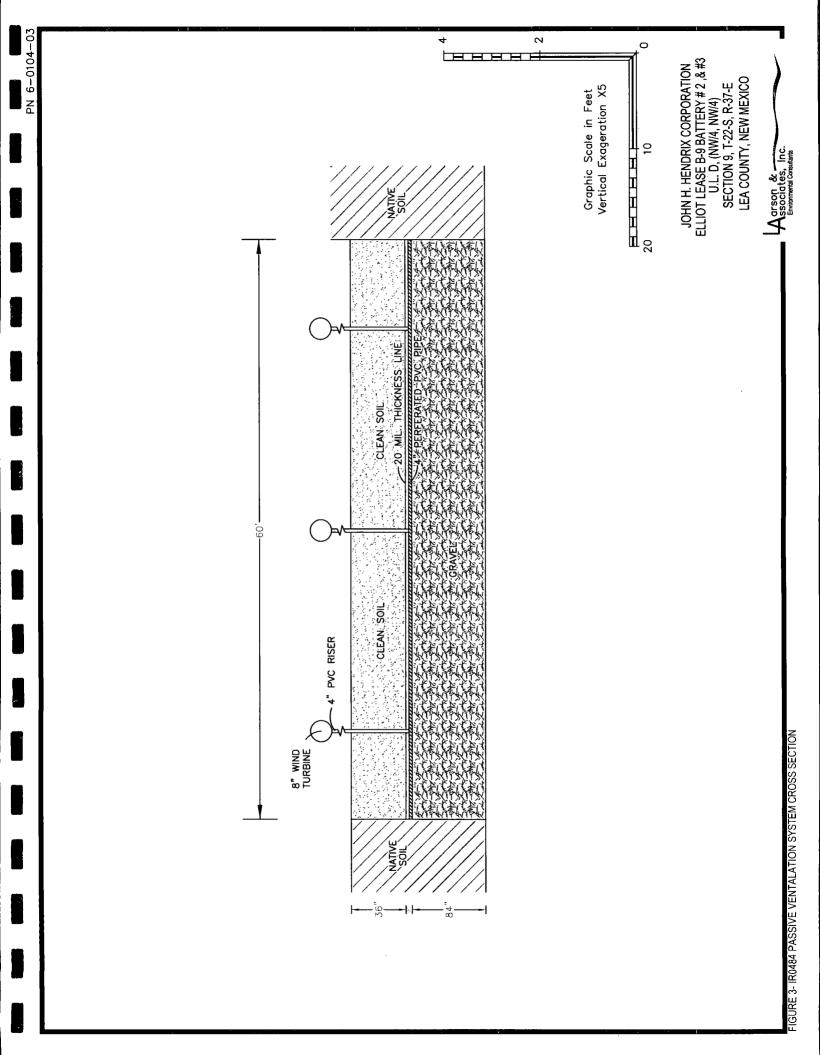
Notes: Analysis performed by DHL Analytical, Inc., Round Rock, Texas

# Figures

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Appendix A

OCD Correspondence

#### Mark Larson

From:	Hansen, Edward J., EMNRD [edwardj.hansen@state.nm.us]
Sent:	Thursday, May 15, 2008 5:08 PM
То:	Mark Larson
Cc:	cdoranhaynes@hotmail.com; Price, Wayne, EMNRD
Subject:	RE: 1R0483 Remediation Plan Modification Request, John H. Hendrix Corporation, Elliott B-9
-	Tank Battery #2 and #3, Unit D (NW/4, NW/4), Section 9, Township 22 South, Range 37 East,
	Lea County, New Mexico
Attachments:	image001.jpg

#### Dear Mr. Larson:

The New Mexico Oil Conservation Division (OCD) has reviewed your request submitted May 14, 2008 on behalf of John H. Hendrix Corporation (JHHC) for amending the approved Remediation Plan (1R483). The OCD hereby conditionally approves the proposed amendment to the Plan:

JHHC shall monitor bioremediation progress of the vapor extraction gallery on a quarterly basis. An alternate frequency may be approved once efficacy of the gallery has been established.

Please be advised that NMOCD approval of this amendment does not relieve the owner/operator of responsibility should operations pose a threat to ground water, surface water, human health or the environment. In addition, NMOCD approval does not relieve the owner/operator of responsibility for compliance with any OCD, federal, state, or local laws and/or regulations.

If you have any questions regarding this matter, please contact me at 505-476-3489.

Edward J. Hansen Hydrologist Environmental Bureau

From: Mark Larson [mailto:Mark@laenvironmental.com]
Sent: Wednesday, May 14, 2008 4:37 PM
To: Price, Wayne, EMNRD
Cc: Hansen, Edward J., EMNRD; cdoranhaynes@hotmail.com
Subject: Re: 1R0483 Remediation Plan Modification Request, John H. Hendrix Corporation, Elliott B-9 Tank Battery #2 and #3, Unit D (NW/4, NW/4), Section 9, Township 22 South, Range 37 East, Lea County, New Mexico

#### Dear Wayne,

This modification request is submitted to the New Mexico Oil Conservation Division (OCD) per your telephone conversation on May 13, 2008, with Ms. Carolyn Haynes of John H. Hendrix Corporation (JHHC). Per your conversation with Ms. Haynes, JHHC requests this modification to the remediation plan approved by the OCD on December 17, 2007, for minimizing the potential for fire, explosion, environmental and structural damage that may be caused by excavating under and around three (3) natural gas pipelines owned by Southern Union Gas Services. The natural gas pipelines are under pressure and buried at approximately three (3) feet below ground surface (bgs) in a right of way that crosses from east to west near the northern part of the remediation area. Two (2) pipelines are located near the north side of the right of way and the third pipeline is located approximately 18 feet south. As discussed with Ms. Haynes, JHHC will remove contaminated soil over the pipelines and install a soil vapor extraction lateral in the area between the pipelines to bioremediate residual hydrocarbons. The area north and south of the pipeline right of way will be remediated according to the OCD approved remediation plan. The soil vapor extraction lateral will be installed to about ten (10) feet bgs and constructed with a slotted PVC lateral and solid vertical risers that will be equipped with wind-activated turbines to extract soil vapors. Soil samples will be collected from the vapor extraction gallery and analyzed for total petroleum

hydrocarbons (TPH) to monitor bioremediation progress and results will be submitted to the OCD. Your approval of this modification is requested. Please do hesitate to contact me if you have questions.

Mark J. Larson Sr. Project Manager / President 507 N. Marienfeld St., Ste. 202 Midland, Texas 79701 (432) 687-0901 (office) (432) 687-0456 (fax) (432) 556-8656 (cell) mark@laenvironmental.com



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#### Mark Larson

From:	Hansen, Edward J., EMNRD [edwardj.hansen@state.nm.us]
Sent:	Thursday, May 15, 2008 5:50 PM
То:	Mark Larson
Cc:	cdoranhaynes@hotmail.com; Price, Wayne, EMNRD
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-	Tank Battery #2 and #3, Unit D (NW/4, NW/4), Section 9, Township 22 South, Range 37 East,
	Lea County, New Mexico
Attachments:	image001.jpg

Mark,

Just to clear up some confusion: OCD's records indicate that the OCD case # for the Elliott B-9 TB #2 and #3, Unit D is <u>1R484</u>

and the OCD case # for the Elliott B-9 TB #1, #4 and #5, Unit C is 1R483.

Hope this helps.

From: Hansen, Edward J., EMNRD
Sent: Thursday, May 15, 2008 4:08 PM
To: 'Mark Larson'
Cc: cdoranhaynes@hotmail.com; Price, Wayne, EMNRD
Subject: RE: 1R0483 Remediation Plan Modification Request, John H. Hendrix Corporation, Elliott B-9 Tank Battery #2 and #3, Unit D (NW/4, NW/4), Section 9, Township 22 South, Range 37 East, Lea County, New Mexico

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#### Mark J. Larson

Sr. Project Manager / President 507 N. Marienfeld St., Ste. 202 Midland, Texas 79701 (432) 687-0901 (office) (432) 687-0456 (fax) (432) 556-8656 (cell) <u>mark@laenvironmental.com</u>

arson & sociates, Inc. Environmental Consultants

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Appendix B

Laboratory Reports

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Appendix C

Photographs

John H. Hendrix Corporation

# Elliot B-9 Tank Battery #2 & #3



Remediation Area North of SUG Pipelines Looking Northwest



Remediation Area North of SUG Pipelines Looking South

John H. Hendrix Corporation

Elliot B-9 Tank Battery #2 & #3



Remediation Area North of SUG Pipeline Looking North

R



Remediation Area North of Tank Battery Looking West

# John H. Hendrix Corporation

# Elliot B-9 Tank Battery #2 & #3



Remediation Area Northwest of Tank Battery Looking West



Remediation Area North of SUG Pipelines Looking West

# John H. Hendrix Corporation

# Elliot B-9 Tank Battery #2 & #3



Remediation Area South of SUG Pipelines Looking Southeast



Remediation Area South of SUG Pipelines Looking Southwest

John H. Hendrix Corporation

# Elliot B-9 Tank Battery #2 & #3



Liner Installation North of SUG Pipelines Looking West



Liner Installation South of SUG Pipelines Looking South

## John H. Hendrix Corporation

# Elliot B-9 Tank Battery #2 & #3



Soil Vapor Extraction Area Looking West



Finished Remediation Area South of SUG Pipelines Looking West

# John H. Hendrix Corporation

# Elliot B-9 Tank Battery #2 & #3



Finished Remediation Area North of Tank Battery Looking East



No. of Concession, Name

Finished Remediation Area Northwest of Tank Battery Looking West

# John H. Hendrix Corporation

# Elliot B-9 Tank Battery #2 & #3



Soil Vapor Extraction System Installation Looking West



Soil Vapor Extraction System Installation Looking East

# John H. Hendrix Corporation

State of the local division of the local div

# Elliot B-9 Tank Battery #2 & #3



Soil Vapor Extraction System Installation Looking East



Finished Soil Vapor Extraction System and Remediation Area Looking North