

1R - 483

# WORKPLANS

DATE:

6-15-08

RECEIVED  
2008 JUN 23 AM 11 44

June 15, 2008

VIA EMAIL: [wprice@state.nm.us](mailto: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: 1R0483 – Elliott B-9 Tank Battery #1, #4 and #5 Groundwater Investigation Work Plan  
Unit D (NW/4, NW/4), Section 9, Township 22 South, Range 37 East  
Lea County, New Mexico**

Dear Mr. Price:

This work plan 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 investigate groundwater conditions in the vicinity of a former pit at the Elliott B-9 Tank Battery #1, #4 and #5 (Site) located in unit C (NE/4, NW/4), Section 9, Township 22 South, Range 37 East, in Lea County, New Mexico. The Site's latitude and longitude is 32° 24' 39.3" north and 103° 10' 12.4" west, respectively. Figure 1 presents a location and topographic map.

#### **Background**

Between April 2, 2008 and May 2, 2008, JHHC conducted soil remediation at the Site according to a remediation plan approved by the OCD on December 17, 2007. Soil remediation consisted of removing historic hydrocarbons to a depth of approximately seven (7) feet below ground surface (bgs) at two (2) locations in a pit area located west of the tank battery, and installation of 20-mill thickness synthetic liners in the bottom of the excavations. Soil was also excavated to about 3 feet bgs west and south of the tank battery. The excavations were filled with clean soil and seeded to landowner specifications. A final report was issued to the OCD on June 15, 2008 ("*1R0483 – Elliott B-9 Tank Battery #1, #4 and #5 Remediation Report, Unit C (NE/4, NW/4), Section 9, Township 22 South, Range 37 East, Lea County, New Mexico*").

On October 16, 2007, Scarborough Drilling, Inc. (Scarborough) used an air rotary rig to drill a monitoring well (MW-1) about 20 feet southeast (down gradient) of the pit. Well MW-1 was drilled to about 90 feet bgs and constructed with 2-inch schedule 40 PVC. About 20 feet of factory slotted well screen (0.010 inch) was placed near the bottom of the boring between about 67.03 and 86.34 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 77.99 feet bgs.

On October 16, 2007, LAI personnel collected groundwater samples from well MW-1. DHL Laboratories, Inc. (DHL), located in Round Rock, Texas, analyzed the samples for BTEX, dissolved metals, major anions and cations (chloride, fluoride, Nitrate as N, sulfate and bicarbonate, carbonate, hydroxide alkalinity), pH and

Mr. Wayne Price  
June 15, 2008  
Page 2

total dissolved solids (TDS). No BTEX was reported in the samples and dissolved metal concentrations were less than the New Mexico Water Quality Control Commission (WQCC) human health standards. Chloride and TDS were reported at 1,710 milligrams per liter (mg/L) and 3,300 mg/L, respectively, and exceeded the WQCC domestic water quality standards of 250 mg/L and 1,000 mg/L, respectively.

On December 3, 2007, Scarborough drilled well MW-2 about 200 feet northwest (up gradient) of the pit using methods previously described. Well MW-2 was completed at about 91 feet bgs and about 20 feet of well screen was placed between approximately 70.50 and 89.81 feet bgs. Groundwater stabilized at approximately 78.79 feet bgs. On December 4, 2007, LAI personnel collected groundwater samples from well MW-2. DHL analyzed the samples for BTEX, dissolved metals, anions and cations. No BTEX was reported in the samples and dissolved metals, ions and anions were less than the WQCC standards.

On April 8, 2008, LAI personnel collected additional groundwater 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 and TDS were reported in sample MW-1 at 2,070 mg/L and 3,980 mg/L, respectively. The chloride and TDS in sample MW-1 exceeded the WQCC domestic water quality standards of 250 mg/L and 1,000 mg/L, respectively. Chloride and TDS were less than the WQCC domestic water quality standards in sample MW-2. Table 1 presents a summary of the monitoring well drilling and completion details. Table 2 presents a summary of the laboratory analysis. Figure 2 presents the well locations. Attachment A presents the well completion diagrams.

#### **Proposed Groundwater Investigation**

JHHC proposes to install a monitoring well about 400 feet southeast (down gradient) of well MW-1 to assess the extent of the chloride and TDS. The monitoring well will be drilled and constructed using methods previously described. JHHC proposes to collect groundwater samples from the monitoring wells on a semi-annual (twice yearly) schedule for 1 year to assess changes in groundwater quality. The groundwater samples will be analyzed for major anions and cations and a report will be submitted to the OCD within 45-days following receipt of the laboratory report following the second semi-annual event. Figure 2 presents the proposed well location.

JHHC appreciates OCD approval of this work plan. 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](mailto: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-0483

**Summary of Monitoring Well Drilling and Completion Details**  
**John H. Hendrix Corporation, Elliott B-9 #1, #4 and #5 Tank Battery**  
**Unit C (NE/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)	Stabilized Groundwater Level (Feet BGS)
MW-1	90	10/16/2007	90.27	3.30	67.03 - 86.34	77.99 (10/16/2007)
MW-2	91	12/03/2007	92.84	2.40	70.50 - 89.81	78.79 (12/03/2007)

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

1. BGS: Feet below ground surface

2. TOC: Depth measured from top of PVC well casing.

Table 2

Summary of Laboratory Analysis of Monitoring Well Samples  
 John H. Hendrix Corporation, Elliott B-9 Tank Battery #1, #4 and #5  
 Unit C (NE/4,NW/4), Section 9, Township 22 South, Range 37 East  
 Lea County, New Mexico

Parameter	Reporting Units	WQCC Threshold (mg/L)	MW-1 10/16/07	MW-1 4/8/08	MW-2 12/4/07	MW-2 4/8/08
Chloride	mg/L	250	1,710	2,070	57	61.7
Fluoride	mg/L	1.6	1.70	--	--	--
Nitrate-N	mg/L	10	1.83	--	--	--
Sulfate	mg/L	600	223	214	88	87.2
Alkalinity, Bicarbonate	mg/L	--	215	200	204	240
Alkalinity, Carbonate	mg/L	--	<10	<10	<10	<10
Alkalinity, Hydroxide	mg/L	--	<10	<10	<10	<10
Alkalinity, Total	mg/L	--	215	200	204	240
pH	pH units	6 - 9	7.02	6.44	--	6.95
Total Dissolved Solids	mg/L	1,000	3,300	3,980	542	535
<b>Volatile Organics</b>						
Benzene	mg/L	0.01	<0.0008	<0.0008	<0.0008	<0.0008
Ethylbenzene	mg/L	0.75	<0.002	<0.002	<0.002	<0.002
Toluene	mg/L	0.75	<0.002	<0.002	<0.002	<0.002
Total Xylenes	mg/L	0.62	<0.003	<0.003	<0.003	<0.003
Total BTEX	mg/L	--	<0.0078	<0.0078	<0.0078	<0.0078
<b>Metals</b>						
Arsenic	mg/L	0.1	0.00694	--	0.02200	--
Barium	mg/L	1.0	0.073	--	0.034	--
Cadmium	mg/L	0.01	<0.0003	--	<0.0003	--
Calcium	mg/L	--	370	--	37	--
Chromium	mg/L	0.05	<0.002	--	<0.002	--
Lead	mg/L	0.05	<0.0003	--	<0.0003	--
Magnesium	mg/L	--	167	--	15	--
Mercury	mg/L	0.002	<0.00008	--	<0.00008	--
Potassium	mg/L	--	12.7	--	4.4	--
Selenium	mg/L	0.05	0.00938	--	0.00653	--
Silver	mg/L	0.05	<0.001	--	<0.001	--
Sodium	mg/L	--	445	--	93	--

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

1. mg/L: Milligrams per liter
2. <: Below method detection limit
3. --: No data available

## Figures

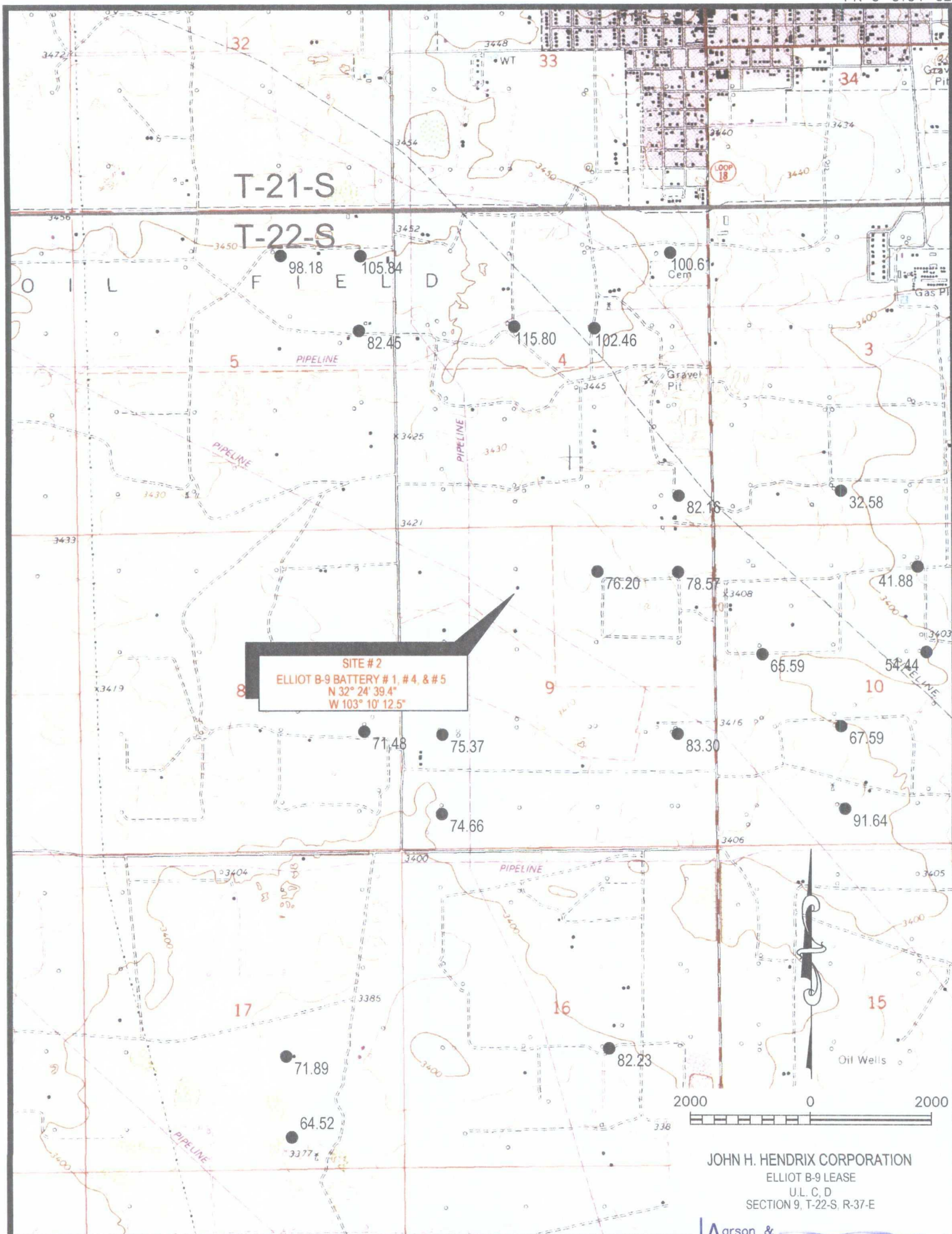
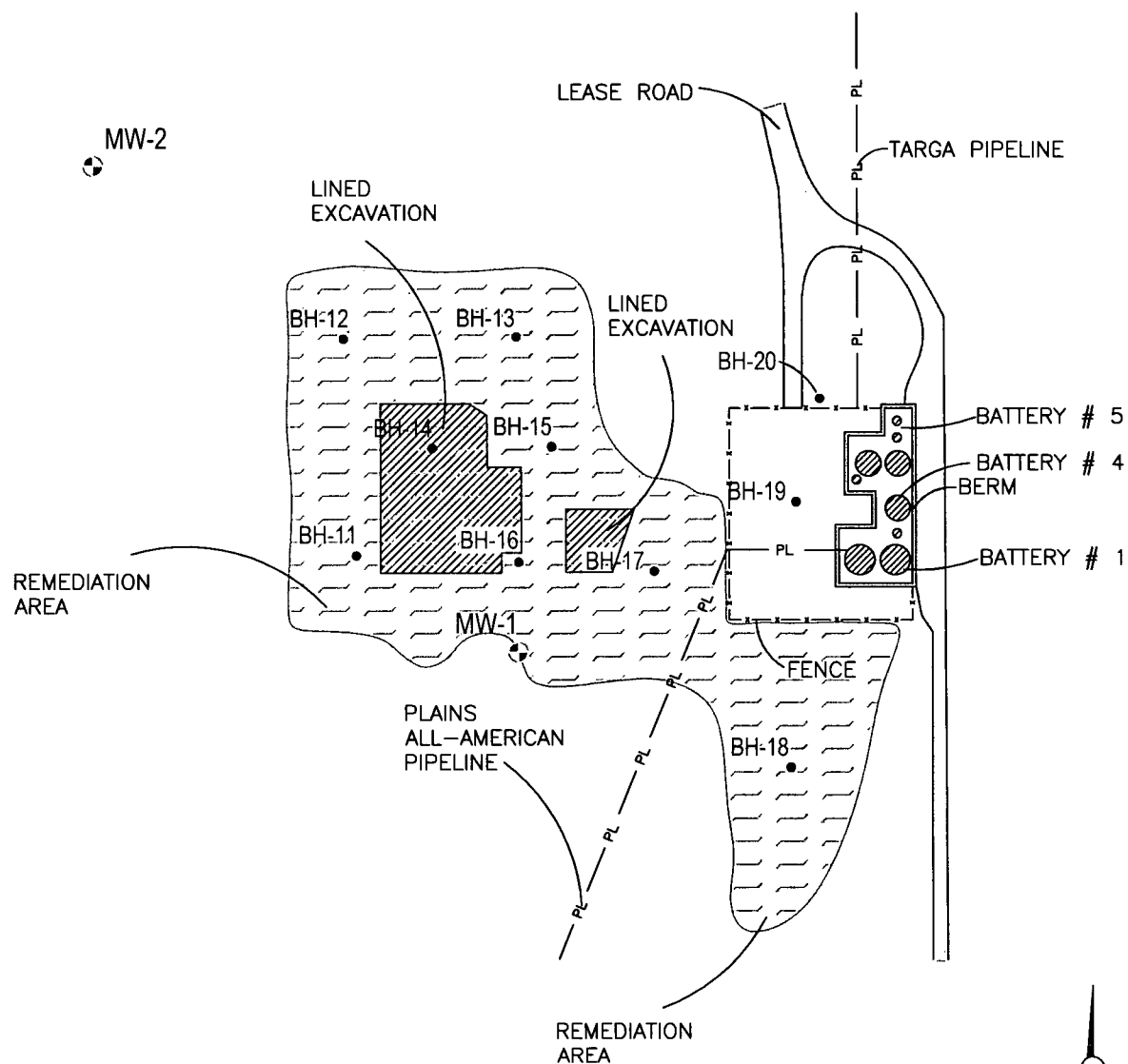


FIGURE 1- SITE LOCATION #1 AND #2

JOHN H. HENDRIX CORPORATION  
 ELLIOT B-9 LEASE  
 U.L.C.D.  
 SECTION 9, T-22-S, R-37-E

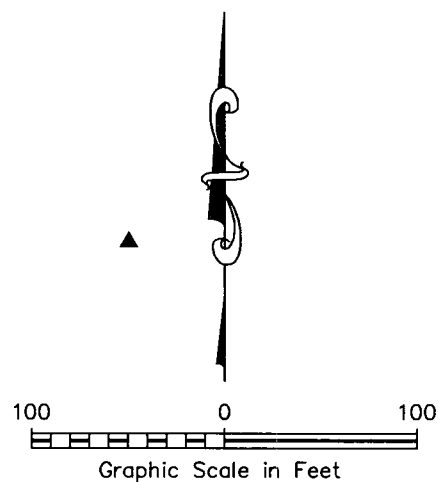
Larson & Associates, Inc.  
 Environmental Consultants





# LEGEND

- BH-11 • BORE HOLE LOCATION
- MW-2 ◉ MONITORING WELL LOCATION
- ▲ PROPOSED MONITORING WELL LOCATION



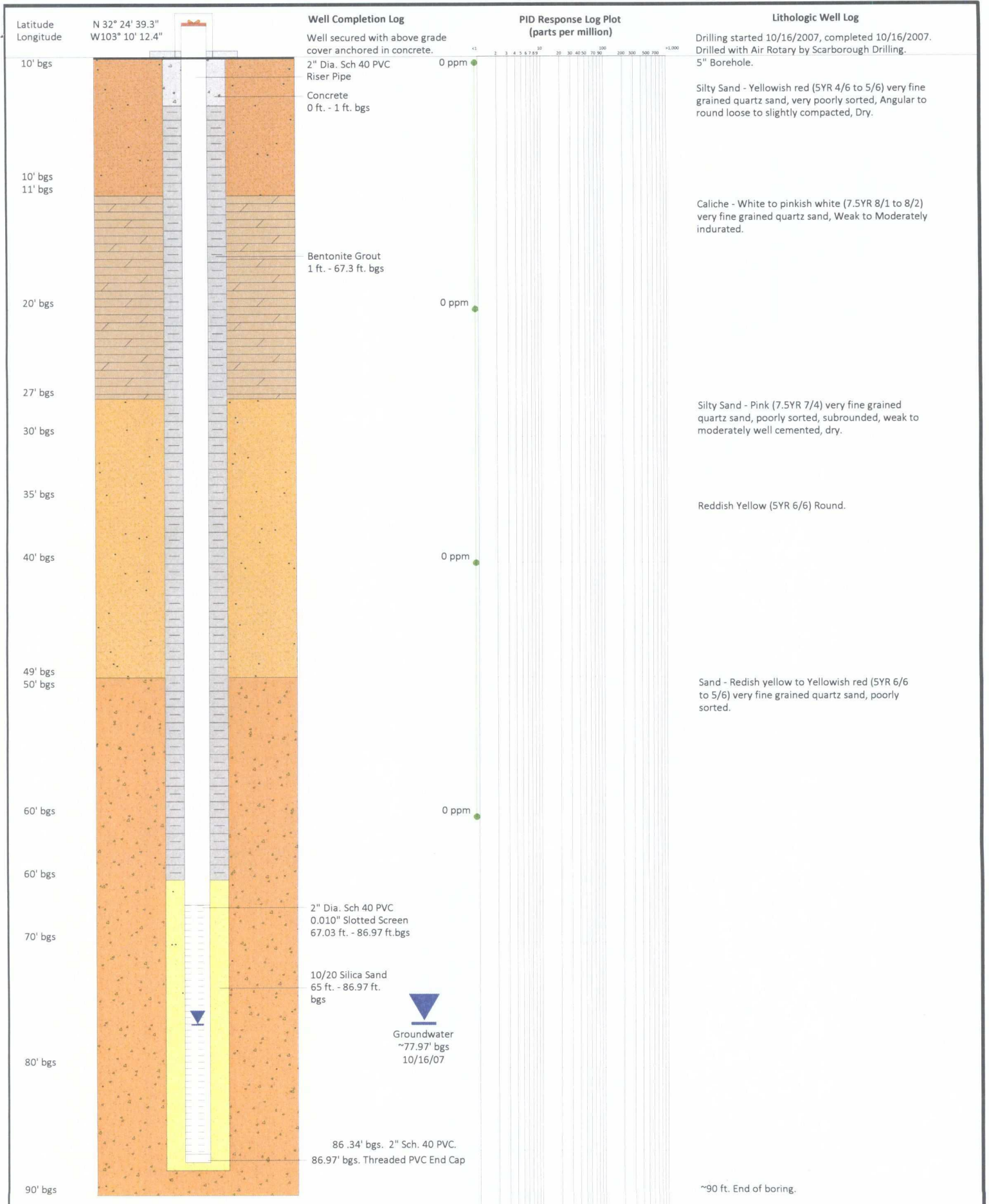
JOHN H. HENDRIX CORPORATION  
 ELLIOT LEASE B-9 BATTERY # 1, #4 & #5  
 U.L. D, (NE/4, NW/4)  
 SECTION 9, T-22-S, R-37-E  
 LEA COUNTY, NEW MEXICO

Larson & Associates, Inc.  
 Environmental Consultants

FIGURE 2- IR0483 REMEDIATION AND EXCAVATION AREAS

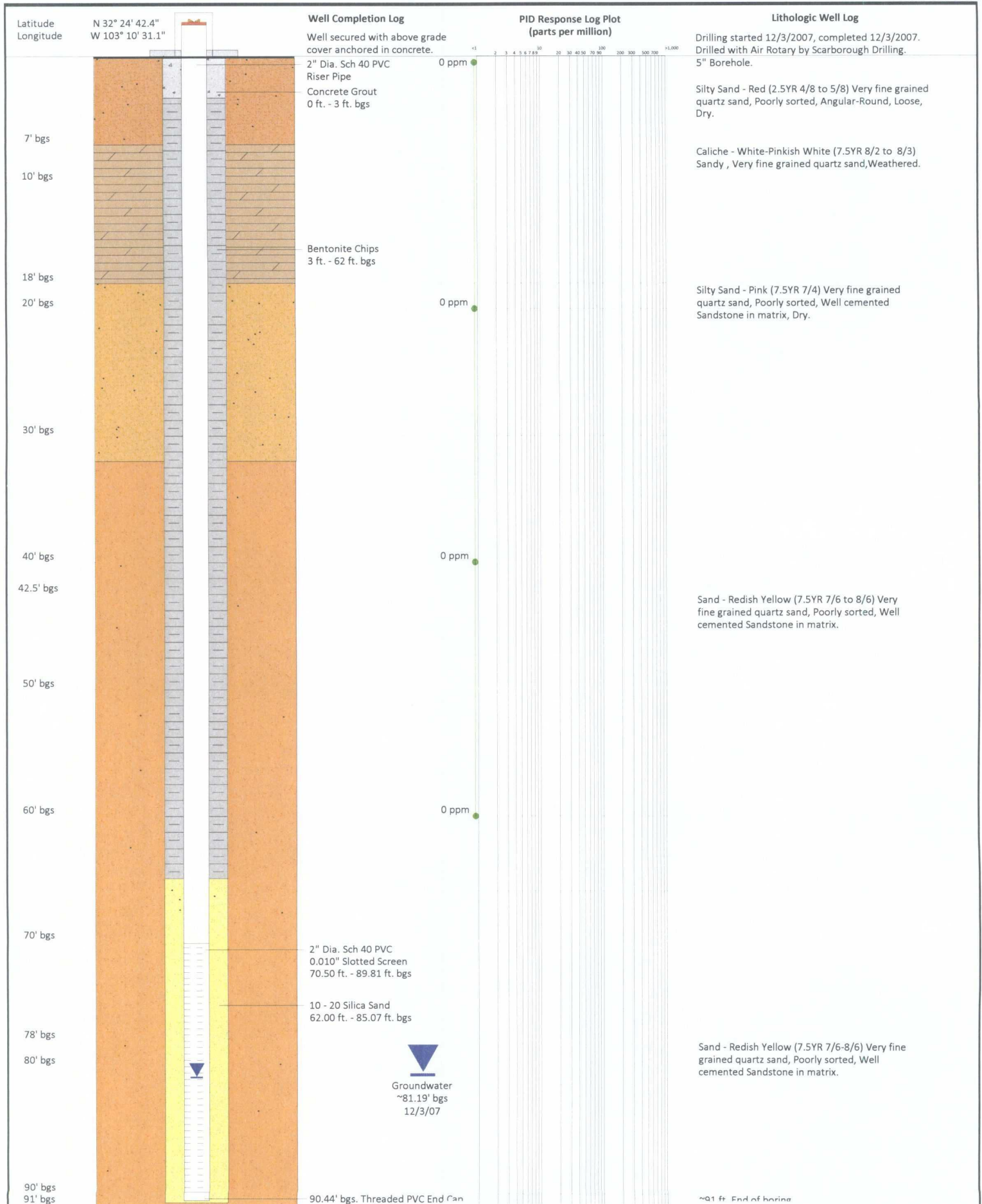
**Attachment A**

**Monitoring Well Completion Diagrams**



John Hendrix Corporation - Elliot B-9 Battery # 1, 4, & 5  
#1R0484

**La**arson &  
Associates, inc.  
Environmental Consultants



John Hendrix Corporation - Elliot B-9 Battery # 1, 4, & 5  
#1R0484

**LA**arson &  
Associates, inc.  
Environmental Consultants