

1R - 484

# WORKPLANS

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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: 1R0484 – Elliott B-9 Tank Battery #2 and #3 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 #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 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**

Between May 5 and May 30, 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 at a pit area located north of the tank battery, and installation of 20-mill thickness synthetic liners in the bottom of the excavations. Soil was also excavated to about 1 foot bgs in an area north and west 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 ("*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*").

On October 16, 2007, Scarborough Drilling, Inc. (Scarborough) installed a monitoring well (MW-1) about 20 feet southeast (down gradient) of the pit using an air rotary rig. Well MW-1 was drilled to about 90 feet bgs and constructed the well with 2-inch schedule 40 PVC. 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. On October 16, 2008, 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 (arsenic, barium, cadmium, chromium, lead, magnesium, mercury, potassium, selenium, silver and sodium), major anions and cations (chloride, fluoride, Nitrate as N, sulfate and bicarbonate,

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carbonate, hydroxide alkalinity), pH and total dissolved solids (TDS). No BTEX was reported in the sample and the dissolved metal concentrations were less than the New Mexico Water Quality Control Commission (WQCC) human health standards. Chloride was reported in sample MW-1 at 3,500 milligrams per liter (mg/L) and total dissolved solids (TDS) was 6,610 mg/L. The chloride and TDS exceeded the WQCC domestic water quality standards of 250 mg/L and 1,000 mg/L, respectively.

On December 3, 2007, Scarborough drilled monitoring MW-2 about 100 feet northwest (up gradient) of the pit using procedures and method similar to well MW-1. Well MW-2 was advanced to approximately 91 feet bgs and about 20 feet of well screen was placed near the bottom of the boring from approximately 67.61 and 86.92 feet bgs. Groundwater stabilized at approximately 80.80 feet bgs. On December 4, 2007, LAI personnel collected groundwater samples from well MW-2. DHL analyzed the samples for BTEX, dissolved metal, major anions and cations. No BTEX was reported in the samples and dissolved metals were less than the WQCC human health standards. Chloride and TDS were also less than WQCC domestic water quality standards of 250 mg/L and 1,000 mg/L, respectively.

On April 8, 2008, LAI personnel collected additional samples from wells MW-1 and MW-2 using methods and procedures previously described. DHL analyzed the samples for BTEX, anions and cations. No BTEX was reported in the samples. Chloride and TDS were reported in sample MW-1 at 4,410 mg/L and 7,980 mg/L, respectively, and exceeded the WQCC domestic water quality standards. Chloride and TDS were less than the WQCC domestic water standards in the sample MW-2. Table 1 presents a summary of monitoring well drilling and completion details. Table 2 presents a summary of the groundwater samples results. Figure 2 presents the well locations. Attachment A presents the monitoring well completion diagrams.

#### **Proposed Groundwater Investigation**

JHHC proposes to monitor groundwater at the Site using the existing wells (MW-1 and MW-2) and well MW-2 at the Elliott B-9 Tank Battery #1, #4 and #5. Well MW-2 at the Elliott B-9 Tank Battery #1, #4 and #5 is located about 1,000 feet southeast and hydraulically down gradient of the Site. This well will serve as a clean down gradient well. JHHC proposes to collect groundwater samples from the 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.

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.

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

Summary of Monitoring Well Drilling and Completion Details  
 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

| Well | Drilled Depth<br>(Feet BGS) | Drill Date | Well Depth<br>(Feet TOC) | Casing Stickup<br>(Feet) | Screen Interval<br>(Feet BGS) | Stabilized<br>Groundwater Level<br>(Feet BGS) |
|------|-----------------------------|------------|--------------------------|--------------------------|-------------------------------|---|
| MW-1 | 90                          | 10/16/2007 | 90.27                    | 2.81                     | 66.13 - 85.44                 | 79.48<br>(10/16/2007)                         |
| MW-2 | 91                          | 12/03/2007 | 90.44                    | 2.89                     | 67.61 - 86.92                 | 80.80<br>(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  
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Summary of Laboratory Analysis of Monitoring Well Samples  
John H. Hendrix Corporation, Elliott B-9 Tank Battery #2 and #3  
Unit Letter D (NW/4,NW/4), Section 9, Township 22 South, Range 37 East  
Lea County, New Mexico

| Parameter                | Reporting Units | EPA/NMED<br>Threshold | MW-1<br>10/16/07 | MW-1<br>4/08/08 | MW-2<br>12/04/07 | MW-2<br>4/08/08 |
|--------------------------|-----------------|-----------------------|------------------|-----------------|------------------|-----------------|
| <b>Characteristics</b>   |                 |                       |                  |                 |                  |                 |
| Chloride                 | mg/L            | 250                   | 3,500            | 4,410           | 222              | 229             |
| Fluoride                 | mg/L            | 1.6                   | 1.51             | --              | --               | --              |
| Nitrate-N                | mg/L            | 10                    | 9.87             | --              | --               | --              |
| Sulfate                  | mg/L            | 600                   | 243              | 226             | 205              | 203             |
| Alkalinity, Bicarbonate  | mg/L            | --                    | 271              | 273             | 188              | 210             |
| Alkalinity, Carbonate    | mg/L            | --                    | <10              | <10             | <10              | <10             |
| Alkalinity, Hydroxide    | mg/L            | --                    | <10              | <10             | <10              | <10             |
| Alkalinity, Total        | mg/L            | --                    | 271              | 273             | 188              | 210             |
| pH                       | pH units        | 6 - 9                 | 6.94             | 6.72            | --               | 6.84            |
| Total Dissolved Solids   | mg/L            | 1,000                 | 6,610            | 7,980           | 973              | 920             |
| <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                   | 0.00852          | --              | 0.01520          | --              |
| Barium                   | mg/L            | 1.0                   | 0.100            | --              | 0.047            | --              |
| Cadmium                  | mg/L            | 0.01                  | <0.0003          | --              | <0.0003          | --              |
| Calcium                  | mg/L            | --                    | 358              | --              | 82               | --              |
| Chromium                 | mg/L            | 0.05                  | <0.002           | --              | <0.002           | --              |
| Lead                     | mg/L            | 0.05                  | <0.0003          | --              | <0.0003          | --              |
| Magnesium                | mg/L            | --                    | 98.9             | --              | 39.0             | --              |
| Mercury                  | mg/L            | 0.002                 | <0.00008         | --              | <0.00008         | --              |
| Potassium                | mg/L            | --                    | 18.8             | --              | 7.2              | --              |
| Selenium                 | mg/L            | 0.05                  | 0.00821          | --              | 0.01290          | --              |
| Silver                   | mg/L            | 0.05                  | <0.001           | --              | <0.001           | --              |
| Sodium                   | mg/L            | --                    | 1,860            | --              | 133              | --              |

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

1. mg/L: Milligrams per liter

2. <: Below method detection limit

## Figures

FIGURE 1- SITE LOCATION # 1 AND # 2



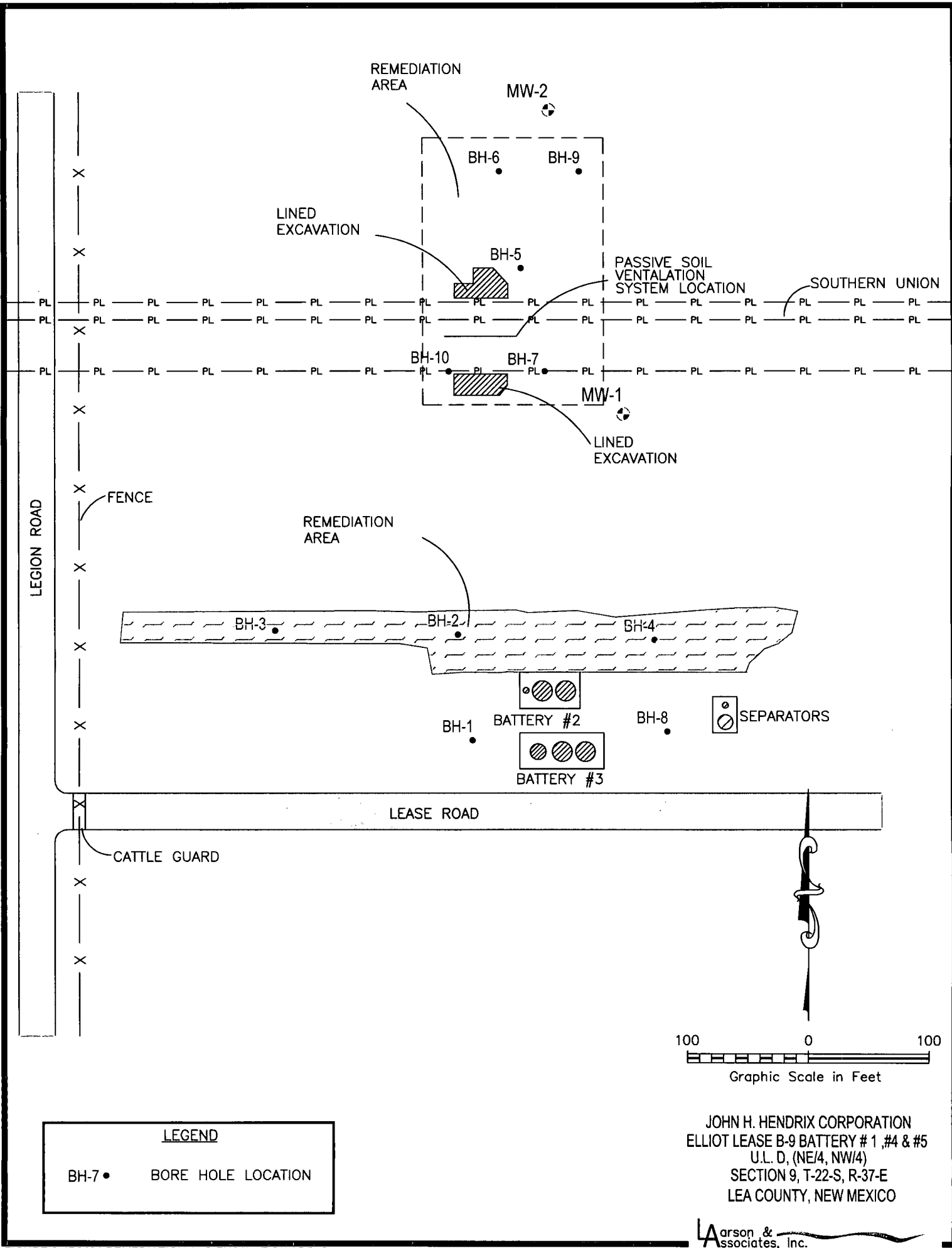
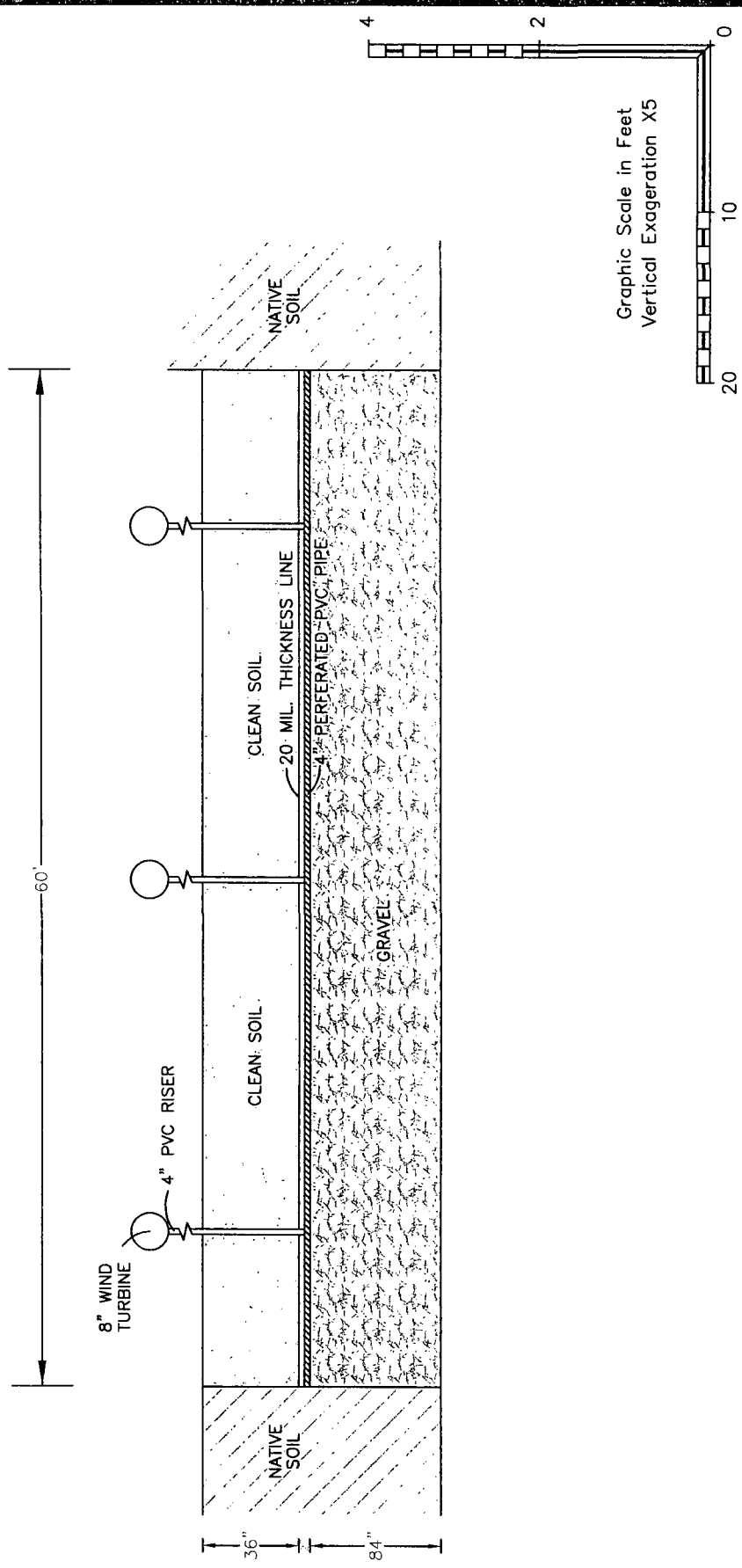


FIGURE 2- IR0484 REMEDIATION AND EXCAVATION AREAS



Graphic Scale in Feet  
Vertical Exaggeration X5

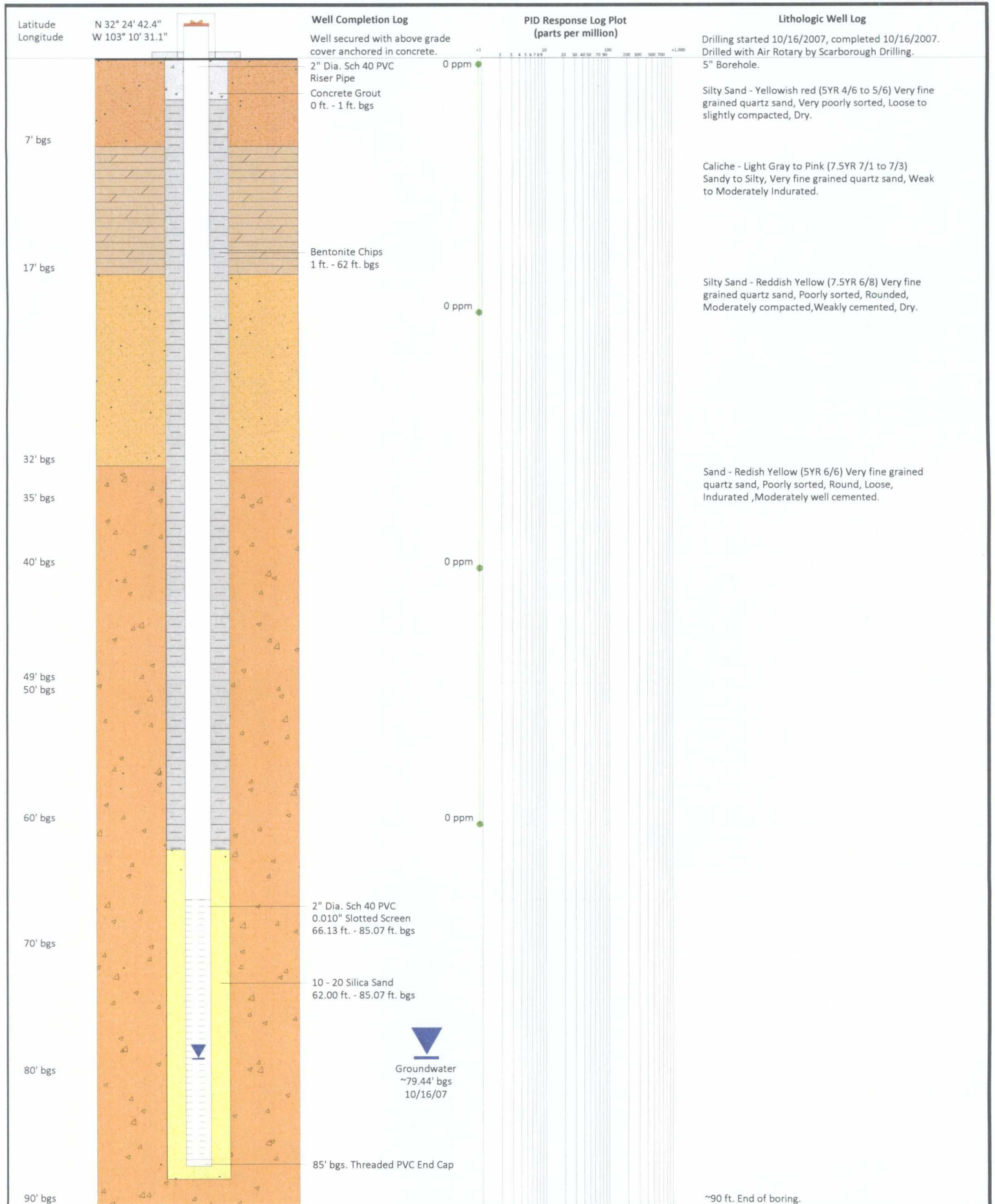
JOHN H. HENDRIX CORPORATION  
ELLIOT LEASE B-9 BATTERY # 2, & #3  
U.L. D, (NW/4, NW/4)  
SECTION 9, T-22-S, R-37-E  
LEA COUNTY, NEW MEXICO

Laarson &  
Associates, Inc.  
Environmental Consultants

FIGURE 3- IR0484 PASSIVE VENTILATION SYSTEM CROSS SECTION

**Attachment A**

**Monitoring Well Completion Diagrams**

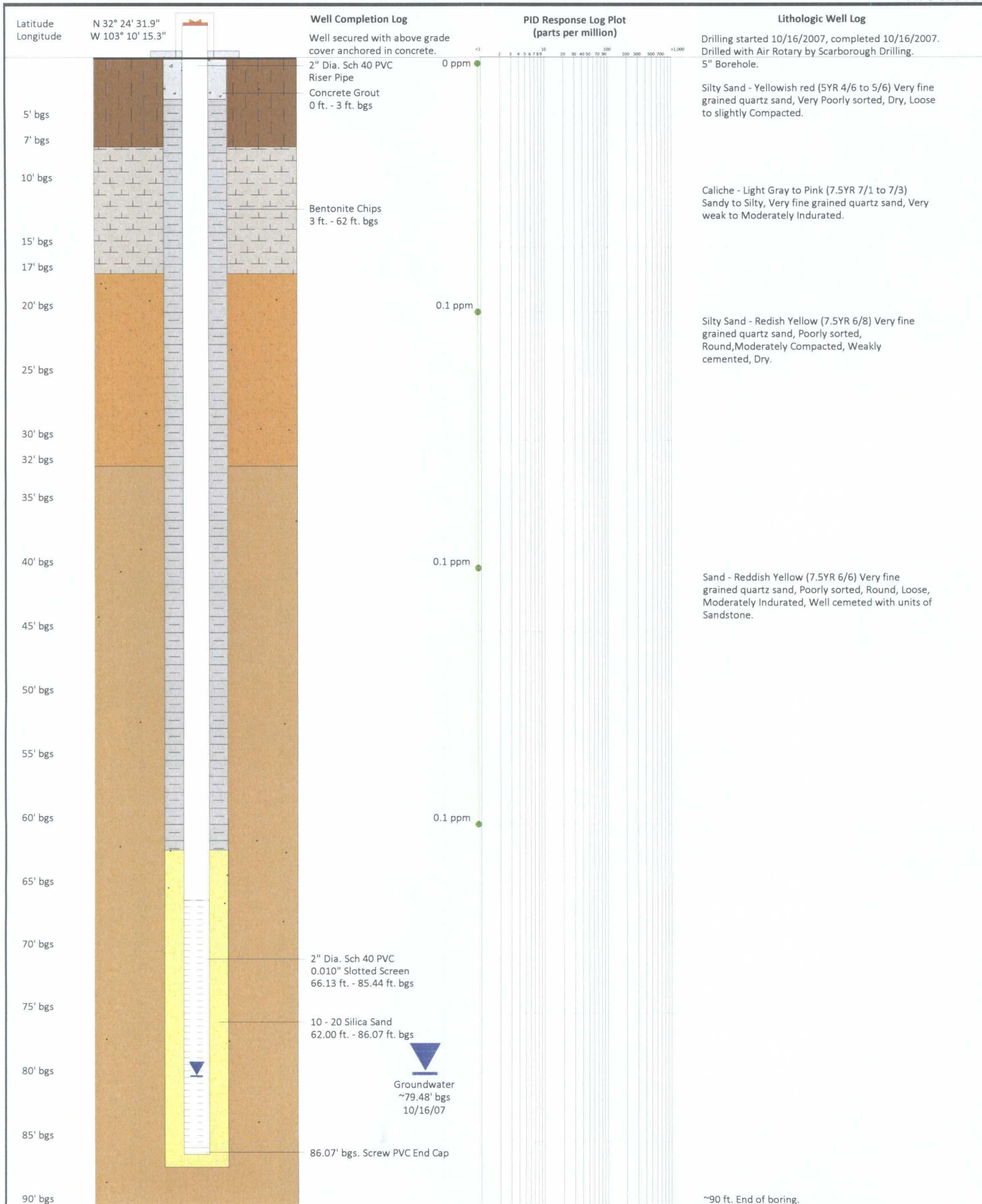


MW-1 Boring &amp; Completion Log

John Hendrix Corporation - Elliot B-9 Battery # 2 &amp; 3

#1R0483

**Arson & Associates, inc.**  
Environmental Consultants



John Hendrix Corporation - Elliot B-9 Battery # 2 & 3  
#1R0483