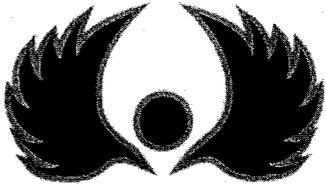


PHOENIX 
ENVIRONMENTAL
ASSOCIATES, INCORPORATED

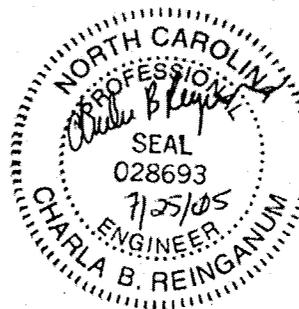
Abbott Laboratories

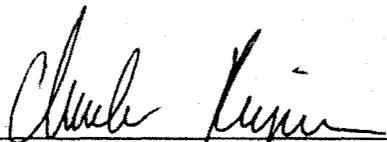
*Former Abbott Laboratories Facility
Laurinburg, North Carolina*

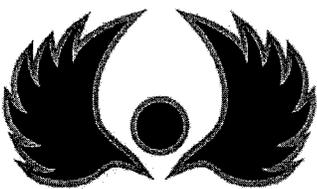


***Monitored Natural Attenuation
Progress Report 1
Corrective Action Plan Implementation
Groundwater Incident No. 518280***

July 2004




Charla Reinganum, P.E.
Phoenix Environmental Associates, Inc.
530 Audubon Place
Highland Park, Illinois 60035



**PHOENIX
ENVIRONMENTAL**
ASSOCIATES, INCORPORATED

Former Abbott Laboratories Facility
Laurinburg, North Carolina

*Monitored Natural Attenuation
Progress Report 1
Corrective Action Plan Implementation
Groundwater Incident No. 518280
July 2004*

Release Date: 30 January 2001
Quantity: 1,500 Gallons of No. 2 Fuel Oil
Source: Subsurface AST Piping
Latitude: 34.799605992
Longitude: -79.454220773

Responsible Party Representative:
Curtis Michols
Senior Environmental Specialist
Abbott Laboratories
200 Abbott Park Road
Abbott Park, Illinois 60064
(847)-937-0863

Property Owner:
QualPak
16000 Joy Street
Laurinburg, North Carolina 28352
(910) 610-1203

Prepared by:
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530 Audubon Place
Highland Park, Illinois 60035
(847)-266-0650

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INTRODUCTION

This *Monitored Natural Attenuation Progress Report No. 1, Groundwater Incident No. 518280 (Progress Report No. 1)* for the former Abbott Laboratories (Abbott) facility located at 16000 Joy Street, Laurinburg, Scotland County, North Carolina is being submitted to the North Carolina Department of Environment and Natural Resources (NCDENR) to fulfill the annual reporting requirements presented in the approved Corrective Action Plan for this incident. This progress report covers activities performed during the period September 2004 through March 2005, which covers the initial annual reporting period for the Monitored Natural Attenuation (MNA) corrective action to address groundwater contamination that originated from a January 2000 No. 2 fuel oil release that occurred at the facility.

The following field activities were performed during this reporting period:

- September 2004 and April 2005 Monitored Natural Attenuation groundwater monitoring.
- Monthly free product inspection of monitoring well FR-6.

This progress report is being submitted, on behalf of Abbott, by Phoenix Environmental Associates, Inc. (Phoenix; formerly known as Matrix Environmental Southeast, Inc.) of Highland Park, Illinois, a North Carolina licensed engineering corporation. Excel Environmental Associates (Excel), PLLC of Gastonia, North Carolina, which also is a North Carolina licensed engineering company, provided technical and field support of the reported activities. Severn Trent Laboratories of Chicago, Illinois (STL-Chicago) (a North Carolina-certified analytical laboratory) provided the laboratory analytical services.

Unless otherwise noted, these activities were performed in accordance with the *Corrective Action Plan* (Matrix Environmental Southeast, Inc. 2004, the *MNA CAP*) for groundwater incident No. 518280 that was approved by the NCDENR on 21 June 2004.

This progress report is organized into the following three sections:

- Section 1.0 – Monitored Natural Attenuation Groundwater Monitoring
- Section 2.0 – Free Product Inspection
- Section 3.0 – Future Actions

The facility location is shown in Figure E-1 and the location of the fuel oil release area at the facility is shown in Figure E-2. Benzene and Ethylbenzene are the two contaminants impacting the groundwater that require corrective action under the *MNA CAP*. Benzene and Ethylbenzene have been detected in previous groundwater samples collected in the immediate vicinity of the fuel oil release in excess of the North Carolina Administrative Code subchapter 2L groundwater standards (the 2L standards, 15A NCAC 2L.0202) of 1 microgram per liter ($\mu\text{g/L}$) and 70 $\mu\text{g/L}$, respectively that were in effect at the time of the *MNA CAP* submission. Detailed information on the facility history, groundwater release incident, initial response actions, and prior groundwater investigations were presented in the NCDENR-approved *Comprehensive Site Assessment Groundwater Incident No. 518280* (Matrix Environmental Southeast, Inc., June 2003) and the *MNA CAP*.

SECTION 1

MONITORED NATURAL ATTENUATION GROUNDWATER MONITORING

1.1 INTRODUCTION

This section presents the field activities performed and analytical data obtained from the September 2004 and March 2005 MNA groundwater monitoring events. These groundwater monitoring events were performed following the procedures presented in Appendix G of the *MNA CAP*.

The purpose of the MNA Groundwater Monitoring Program is to demonstrate the effectiveness of the MNA corrective action in meeting the following two objectives:

- To reduce Benzene and Ethylbenzene groundwater concentrations in the aquifer in the vicinity of the fuel oil release where exceedances of their respective 2L standards have been observed.
- To prevent offsite migration of the Benzene and Ethylbenzene fuel oil release groundwater plume in exceedances of their respective 2L standards.

Effective 1 April 2005, the 2L standard for Ethylbenzene was increased from 70 µg/L to 550 µg/L. The Benzene 2L standard remains at 1 µg/L.

The MNA Groundwater Monitoring Network consists of the 12 monitoring wells shown in Figure 1-1.

The monitoring objective of each well and well construction information are presented in Table 1-1. Analytical data was obtained during each sampling event from eight (8) of the monitoring wells.

1.2 FIELD PROCEDURES

At each of the eight monitoring wells at which analytical samples were collected, the static water level was measured prior to sampling. This information was used to determine groundwater elevation levels and to calculate the minimum purge volume needed prior to sample collection. The static water levels were measured using a combination interface probe/electronic water level meter (Heron H.01L Oil and Water Interface Probe).

Groundwater samples were collected using a low-flow sampling technique. Groundwater was withdrawn at each monitoring well using a Grundfos Redi Flo 2 submersible pump or a peristaltic pump (used for the ½-inch diameter wells) with an approximate flow rate of 0.5 liters per minute. The submersible pump (or dedicated tubing for the peristaltic pump) was placed at mid-water depth. Dedicated tubing was used at each monitoring location. Based on the water level data, one purge volume of water was withdrawn at each location prior to obtaining well stabilization data. An inflow sampling device, Horiba U7 multi-parameter water quality meter, YSI 95 dissolved oxygen meter, Hanna HI 8733 conductivity meter and Hach 50230 OPR meter with flow thru cell were used to measure the following field parameters: dissolved oxygen, redox potential, pH, temperature, specific conductivity and turbidity measurements. Each well was considered to be stabilized after one purge volume had been removed and the following criteria were met:

- ± 0.1 for pH
- $\pm 5\%$ for specific conductivity
- $\pm 10\%$ for turbidity

During the March 2005 sampling event, water elevations and dissolved oxygen field measurements were also obtained at the following four monitoring wells: FR-2; FR-4; FR-5; and FR-9d. These measurements were obtained used the field procedures described above. The September 2004 and March 2005 well purging and field parameter data are presented in Tables 1-2 and 1-3, respectively. The well sampling forms are presented in Appendix A.

Immediately following stabilization, groundwater samples were collected from the outflow of the tubing for Benzene and Ethylbenzene analyses. Each groundwater sample was collected directly into three (3) 40-milliliter glass vials containers containing hydrogen chloride as a preservative.

The groundwater samples were sent to STL- Chicago for laboratory analysis using United States Environmental Protection Agency Method 8260B.

During each sampling event, one field duplicate groundwater sample and extra sample volume for a laboratory matrix spike/matrix spike duplicate analysis were collected from monitoring well FR-6D. To monitor for potential cross-contamination effect, one trip blank was collected and laboratory analyzed for Benzene and Ethylbenzene during the September 2004 sampling event and one field blank was collected and laboratory analyzed for Benzene and Ethylbenzene during the March 2005 sampling event. The field blank was collected by pumping distilled water through the submersible pump after it has been decontaminated. The trip blank was prepared by the STL-Chicago and was kept with the sampling vials.

The Redi Flo2 submersible pump was decontaminated between wells by placing the pump into a 5-gallon bucket containing water and Alconox (a low-foaming phosphate-free detergent) and pumping for approximately three minutes followed by repeating this procedure in a 5-gallon bucket containing distilled water.

The purge water was managed and disposed of by discharging into, and treating through, the onsite south groundwater treatment system.

1.3 RESULTS

1.3.1 Field Data

The September 2004 and April 2005 static water-level data are presented in Table 1-4. The dissolved oxygen data collected during this reported period is summarized in Table 1-5.

1.3.2 Analytical Data

The Benzene and Ethylbenzene groundwater analytical results for this reporting period are presented in Table 1-6. The laboratory analytical reports for the data are presented in Appendix B.

Benzene was detected in groundwater samples from four monitoring wells in September 2004 (FR-3D; FR-6; FR-6D; and FR-7D) and in groundwater samples from three monitoring wells in March 2005 (FR-3D; FR-6; and FR-6D). Ethylbenzene was detected in the groundwater samples from two monitoring wells in September 2004 (FR-6 and FR-6D) and only in the groundwater sample from monitoring well FR-6 in March 2005.

1.4 DATA EVALUATION

The water elevation and dissolved oxygen data collected during this reporting period will be used as part of a future evaluation of the effectiveness of the monitored natural attenuation corrective action.

As shown in Table 1-6, Benzene was observed to be present in excess of its 2L standard in groundwater samples collected from three monitoring wells in September 2004 (FR-3D; FR-6; and FR-6D) and in groundwater samples collected from two monitoring wells in March 2005 (FR-3D and FR-6). The maximum reported Benzene groundwater concentration during the September 2004 and March 2005 sampling events were observed in the groundwater samples from monitoring well FR-6, at a reported concentration of 60 µg/L and 68 µg/L, respectively. Ethylbenzene was not observed to be present in excess of its current 2L standard during either sampling events; the maximum reported Ethylbenzene concentration was 100 µg/L (monitoring well FR-6).

The cumulative Benzene and Ethylbenzene analytical data from May 2000 through the current reporting period are summarized in Table 1-7.

Throughout this five-year monitoring period, Ethylbenzene has not been observed present in any of the monitoring wells at a concentration exceeding its current 2L standard of 550 µg/L.

Figure 1-2 presents the location of a cross section along the longitudinal centerline of the Benzene groundwater plume and Figure 1-3 presents the cross sectional representation of the Benzene groundwater plume based on the September 2004 and March 2005 data. As shown in Figure 1-3, the limits of the Benzene groundwater plume in excess of the Benzene 2L standard extends slightly beyond monitoring well FR-3D.

The Benzene groundwater concentrations observed during the current reporting period are consistent with previously reported concentrations. These cumulative data indicate that the Benzene plume is stable with no increasing downgradient contaminant concentrations and the remaining impacted areas in close proximity to the source of the release.

SECTION 2

FREE PRODUCT INSPECTION

Monitoring well FR-6, which is located in the vicinity of the former Underground Storage Tank pit, was inspected monthly for the presence of free product. Free product was observed and recovered from this location during 2001. The purpose of the current inspection program is to document the conditions at monitoring well FR-6 for one year.

The free product inspections were performed using a combination interface probe/electronic water level meter (Heron H.01L Oil and Water Interface Probe). The free product inspection observations for the period September 2004 through March 2005 are presented in Table 2-1. The free product observations are reported as apparent free product thickness. The observed apparent free product thickness for the current reporting period ranged from no apparent free product present to less than 1 inch of apparent free product present.

The observed apparent thickness of free product measured in monitoring wells is usually much greater than the true thickness of the free product present in the aquifer. This exaggeration is most pronounced in media with strong capillary effects, such as the interbedded clays and silts present in the upper aquifer at this site (USEPA, 1996). Therefore, based on the small magnitude of the observed apparent free product thickness, and the physical phenomena that exaggerate the differences between apparent free product thickness and true free product thickness, it is concluded that the free product data obtained from monitoring FR-6 during the current reporting period indicates a residual sheen present on the water table rather than the presence of free product.

SECTION 3

FUTURE ACTIONS

3.1 FREE PRODUCT INSPECTION

Abbott will continue the monthly free product inspections of monitoring well FR-6 through August 2005 to fulfill the *MNA CAP* requirement to perform 12 monthly free product inspections at this location. Provided that no free product is observed, the NCDENR will be notified for their concurrence of discontinuation of the inspection program in September 2005.

3.2 MNA GROUNDWATER MONITORING

Abbott will perform quarterly MNA groundwater monitoring beginning in September 2005 and continuing for four quarters (September, December, March, and June) in preparation for requesting termination of the corrective action in accordance with 15A NCAC 02L.0106(m).

Ethylbenzene was included in the MNA Groundwater Monitoring Program because of one observed exceedance of its former 2L standard. As discussed in Section 1.4, Ethylbenzene has not been observed present in any groundwater sample collected from MNA Groundwater Monitoring Network monitoring wells at a concentration exceeding its current 2L standard of 550 µg/L throughout the five-year monitoring period associated with this release. Therefore, Abbott is requesting from the NCDENR permission to remove Ethylbenzene as a parameter to be monitored as part of the *MNA CAP* implementation.

The MNA groundwater monitoring will continue to be performed in accordance with the *MNA CAP* procedures (except for eliminating Ethylbenzene as a monitored parameter).

Under the *MNA CAP* requirements, Abbott is required to perform only annual MNA groundwater monitoring, but may elect to increase the frequency of the MNA groundwater monitoring events to demonstrate termination of the corrective action. If data from any of the

quarterly sampling events indicate that the appropriateness of termination of the corrective action can not be demonstrated currently (e.g. a substantive increase in Benzene groundwater concentrations), Abbott may suspend the quarterly MNA groundwater monitoring program by notifying the NCDENR of the revised MNA groundwater monitoring schedule.

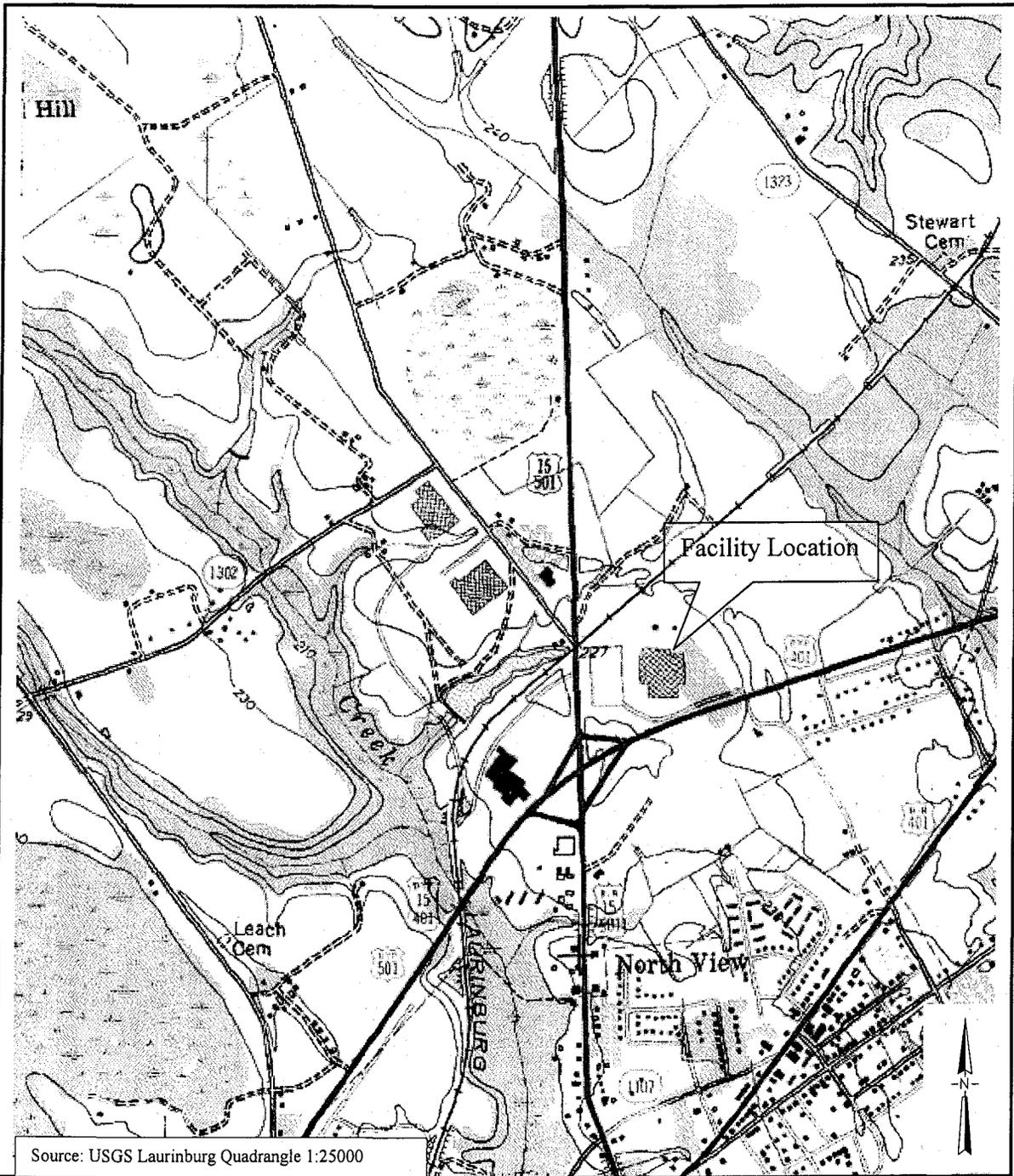
3.3 REGULATORY REPORTING

Abbott will prepare the second annual progress report following the completion of the June 2006 groundwater monitoring event. This progress report will be submitted to the NCDENR by 15 August 2006. This reporting schedule replaces the annual reporting schedule presented in the *MNA CAP*.

In addition, it is anticipated that Abbott will submit a variance request to allow for exceedances of the Benzene 2L standard in the immediate vicinity of the former incident. The variance will be prepared and submitted to the NCDENR in accordance with 15A NCAC 02L.0113.

REFERENCES

USEPA. *How to Effectively Recover Free Product at Leaking Underground Storage Tank Sites*, EPA 510-R-96-001, September 1996.



Source: USGS Laurinburg Quadrangle 1:25000



Figure E-1



FACILITY LOCATION MAP
 MNA CAP IMPLEMENTATION
 Former Abbott Laboratories Facility
 Laurinburg, North Carolina

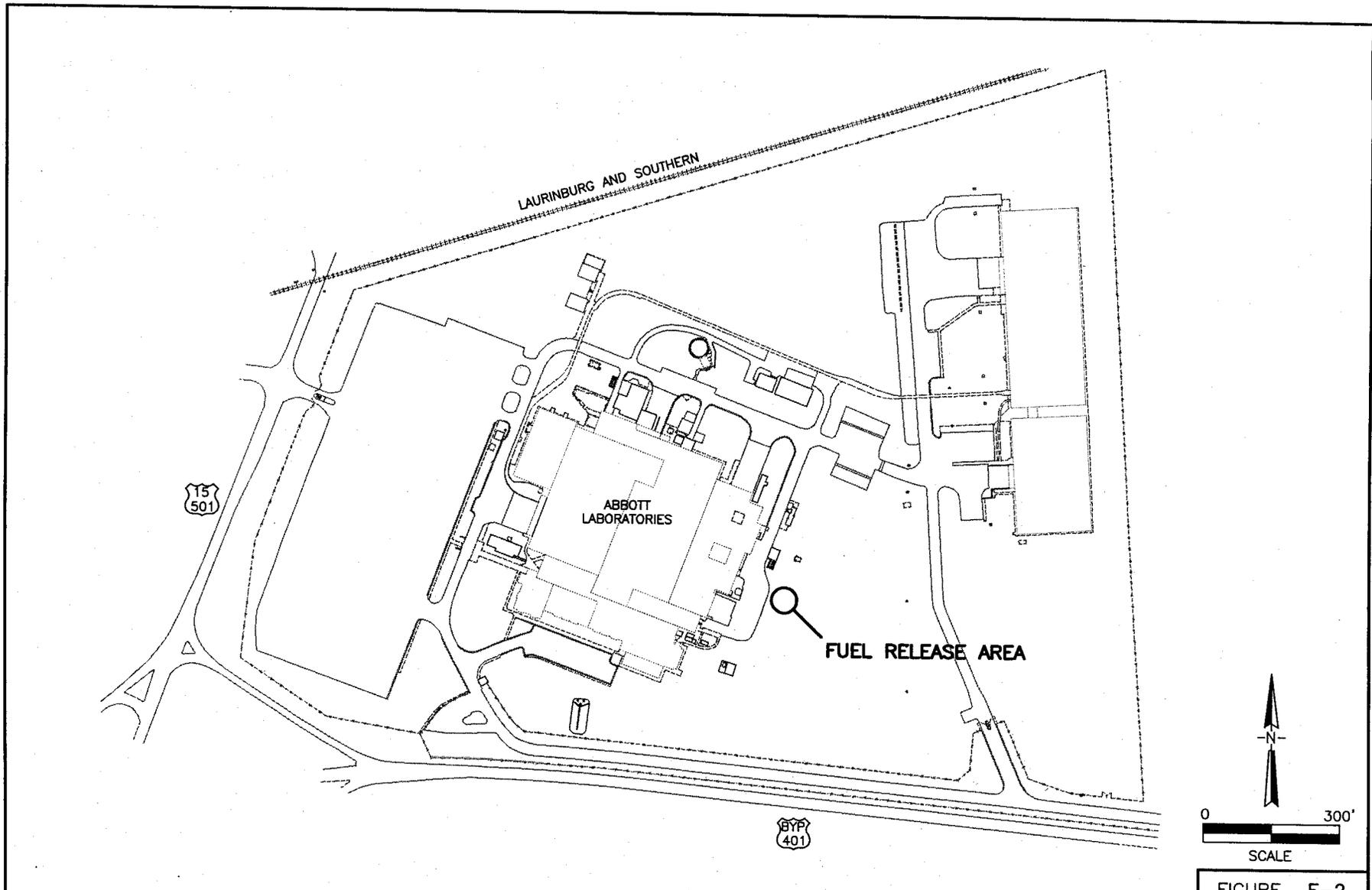
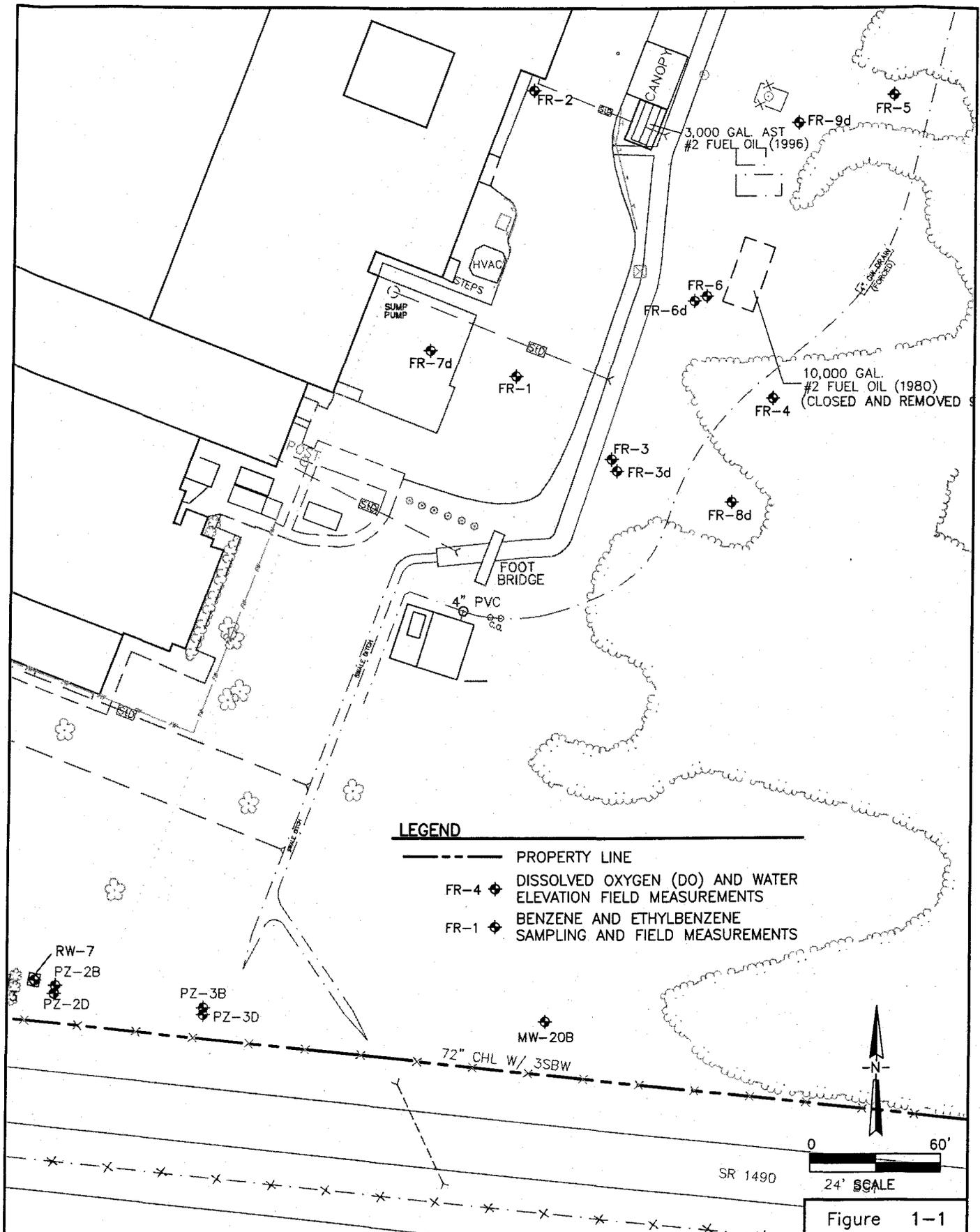


FIGURE E-2

PHOENIX ENVIRONMENTAL ASSOCIATES, INCORPORATED

FUEL OIL RELEASE AREA
 MNA CAP IMPLEMENTATION
 FORMER ABBOTT LABORATORIES FACILITY
 Laurinburg, North Carolina



LEGEND

- PROPERTY LINE
- FR-4 ◆ DISSOLVED OXYGEN (DO) AND WATER ELEVATION FIELD MEASUREMENTS
- FR-1 ◆ BENZENE AND ETHYLBENZENE SAMPLING AND FIELD MEASUREMENTS

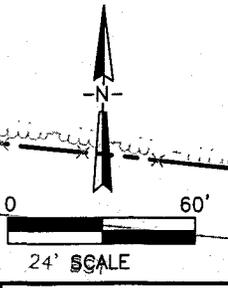
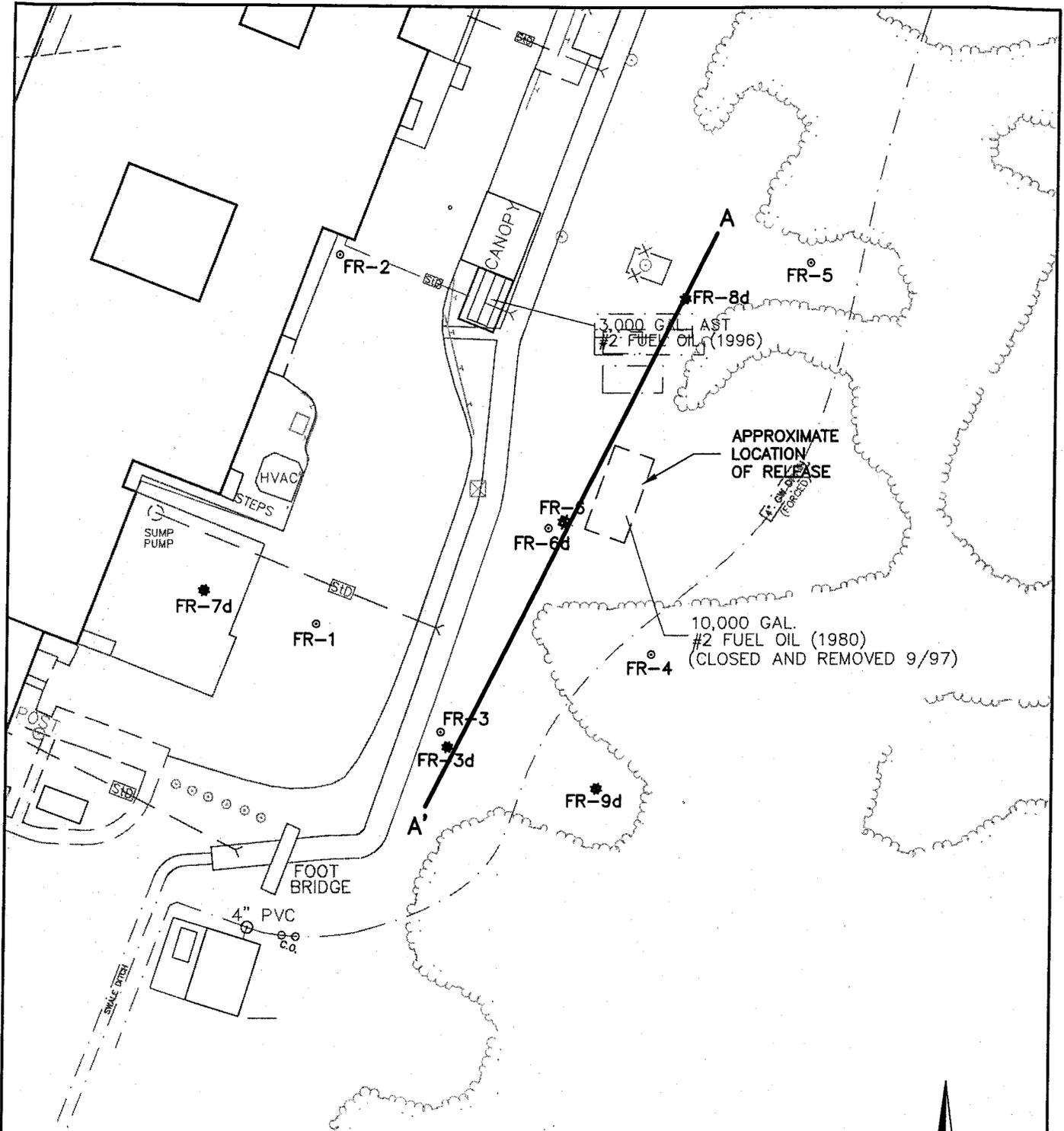


Figure 1-1



MNA CAP GROUNDWATER MONITORING NETWORK
 MNA CAP IMPLEMENTATION
 FORMER ABBOTT LABORATORIES FACILITY
 Laurinburg, North Carolina



LEGEND

- SHALLOW MONITORING WELL
- DEEP MONITORING WELL
- CROSS SECTION LOCATION

0 50'
SCALE

FIGURE 1-2

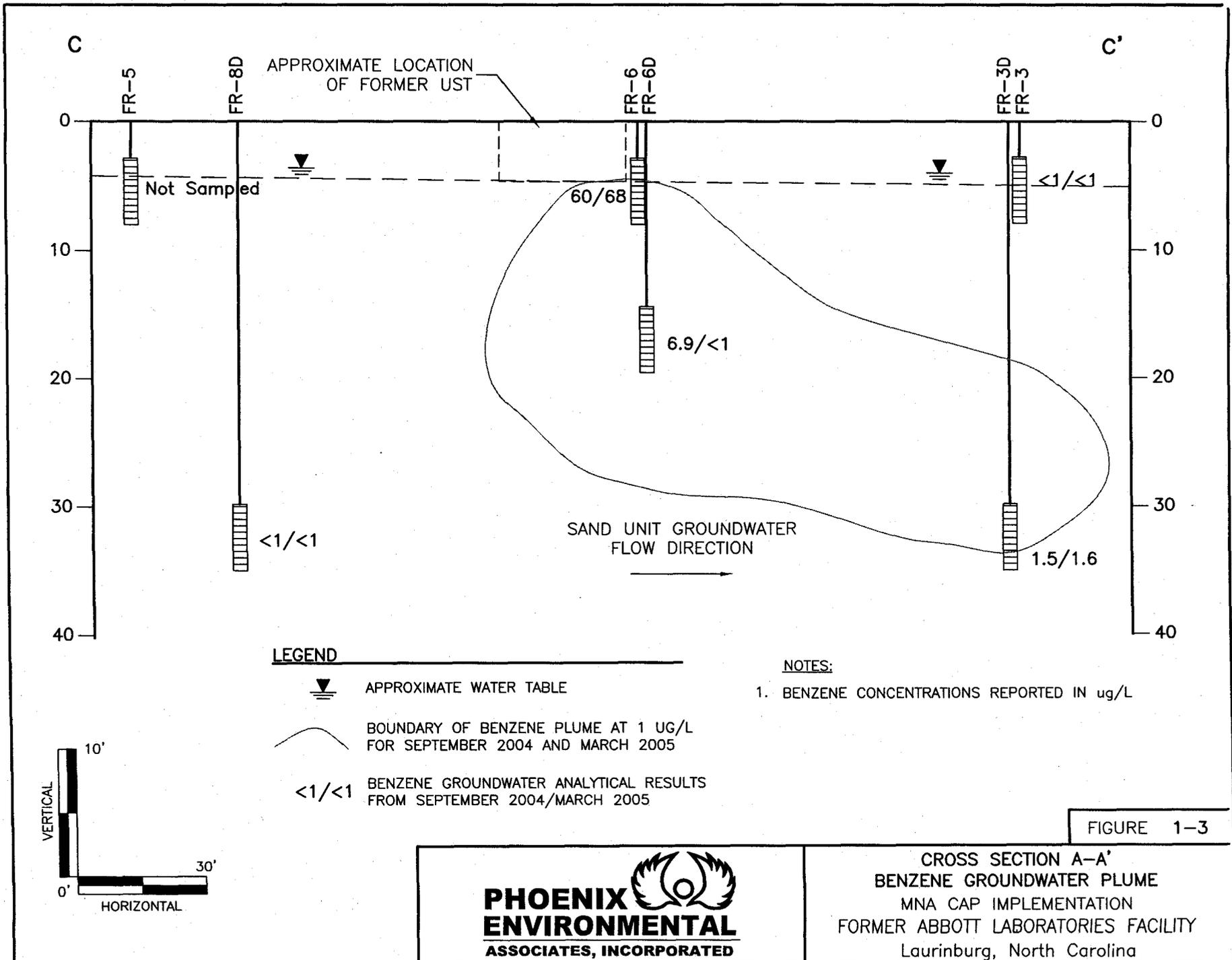


TABLE 1-1
MNA GROUNDWATER MONITORING NETWORK
WELL SPECIFICATIONS

GROUNDWATER INCIDENT NO. 518280
MNA CAP IMPLEMENTATION
FORMER ABBOTT LABORATORIES FACILITY
LAURINBURG, NORTH CAROLINA

Well ID	Description of Sampling Location	Monitoring Purpose	Ground Elevation (MSL)	TOC Elevation (MSL)	Screening Interval (in ft bgs)	Casing Diameter (in inches)
FR-1	Shallow Down- and Side-gradient	Plume Delineation, Dissolved Oxygen, Water Elevation	227.02	227.02	3 - 8	2
FR-2	Shallow Upgradient	Dissolved Oxygen, Water Elevation	227.01	227.01	3 - 8	2
FR-3	Shallow Downgradient	Plume Delineation, Dissolved Oxygen, Water Elevation	228.17	230.17	1 - 6	2
FR-4	Shallow sidegradient	Dissolved Oxygen, Water Elevation	228.15	230.15	1 - 6	2
FR-5	Shallow Upgradient	Dissolved Oxygen, Water Elevation	228.69	230.69	1 - 6	2
FR-6	Shallow Source Area	Plume Delineation, Dissolved Oxygen, Water Elevation	228.66	230.66	1 - 6	2
FR-6d	Deep Source Area	Plume Delineation, Dissolved Oxygen, Water Elevation	228.62	230.62	12.5 - 17.5	2
FR-3d	Deep Downgradient	Plume Delineation, Dissolved Oxygen, Water Elevation	227.17	229.67	29 - 35	0.5
FR-7d	Deep Down-and Side-Gradient	Plume Delineation, Dissolved Oxygen, Water Elevation	226.45	226.45	29 - 35	0.5
FR-8d	Deep Down-and Side-Gradient	Plume Delineation, Dissolved Oxygen, Water Elevation	228.32	230.82	29 - 35	0.5
FR-9d	Deep Upgradient	Dissolved Oxygen, Water Elevation	228.31	230.81	29 - 35	0.5
MW-20B	Deep Downgradient Property Line	Plume Delineation, Dissolved Oxygen, Water Elevation	228.87	228.62	17 - 27	2

Key:

- ft = feet
- bgs = below ground surface
- MSL = Mean Sea Level

TABLE 1-2
SEPTEMBER 2004
MONITORING WELL PURGE AND FIELD DATA
(Page 1 of 2)

GROUNDWATER INCIDENT NO. 518280
MNA CAP IMPLEMENTATION
FORMER ABBOTT LABORATORIES FACILITY
LAURINBURG, NORTH CAROLINA

Monitoring Well Location	Time	Cumulative Purge Volume (in gallons)	Stabilization			Other Field Parameters		
			pH (Standard Units)	Conductivity (in μ mhos/cm)	Turbidity (NTU)	Dissolved Oxygen (in mg/L)	ORP (in mV)	Temperature (in °C)
FR-1	1130	0	5.6	50.5	210	3.8	76	27.1
	1140	1.2	5.6	50.7	190	3.1	75	27.2
	1142	1.9	5.6	50.7	190	2.3	75	27.2
	1145	2.5	5.6	50.7	185	3.1	75	27.2
	Final	-	5.6	51.2	210	3.0	72	27.2
FR-3	Initial	0	5.2	35	350	4.9	94	22.5
	1010	0.73	5.2	35	290	4.5	100	22.5
	1015	1.0	5.1	35	260	4.5	100	22.5
	1017	1.5	5.1	35	251	4.5	100	22.5
	Final	-	5.2	35	301	4.5	100	22.5
FR-3D	1020	0	4.6	22	NR	2.9	130	23.5
	1025	0.4	4.5	22	NR	2.6	133	23.9
	1027	1.0	4.5	22	NR	2.6	133	23.9
	1030	1.5	4.6	22	NR	2.6	133	23.9
	Final	-	4.6	24	NR	2.5	130	23.9
FR-6	Initial	0	6.5	80	300	1.5	78	27.1
	1045	0.56	6.2	75	290	1.8	76	27.1
	1050	1.0	6.2	75	288	1.7	78	27.2
	1100	1.5	6.2	78	270	1.6	78	27.2
	Final	-	6.3	78	260	2.1	76	27.0
FR-6D	Initial	0	6.0	64	150	4.7	46	22.0
	NR	2.3	5.8	64	250	2.4	66	21.8
	NR	3.1	5.8	64	250	2.4	66	21.8
	NR	4.0	5.8	64	255	2.4	66	21.8
	Final	-	5.8	64	199	2.1	65	21.6
FR-7D	Initial	0	5.4	53	600	4.4	91	24.0
	1115	0.78	5.2	52	260	4.2	95	24.0
	1117	1.0	5.2	52	265	4.1	98	24.0
	1120	1.50	5.2	52	261	4.1	98	24.0
	Final	-	5.2	53	307	4.1	99	24.0

TABLE 1-2
SEPTEMBER 2004
MONITORING WELL PURGE AND FIELD DATA
 (Page 2 of 2)

GROUNDWATER INCIDENT NO. 518280
MNA CAP IMPLEMENTATION
FORMER ABBOTT LABORATORIES FACILITY
LAURINBURG, NORTH CAROLINA

Monitoring Well Location	Time	Cumulative Purge Volume (in gallons)	Stabilization			Other Field Parameters		
			pH (Standard Units)	Conductivity (in μ mhos/cm)	Turbidity (NTU)	Dissolved Oxygen (in mg/L)	ORP (in mV)	Temperature (in °C)
FR-8D	Initial	0	5.9	56	350	40.0	64	21.0
	0920	NR	5.9	72	500	5.5	57	21.0
	0922	NR	5.8	72	360	4.1	57	21.0
	0924	NR	5.8	70	366	4.1	56	21.0
	0926	NR	5.8	66	380	4.1	55	21.0
	Final	NR	6.0	59	498	4.2	66	21.0
MW-20B	Initial	0	4.3	46	151	2.2	141	21.3
	NR	4	4.4	46	150	2.2	136	21.3
	NR	5	4.4	46	155	2.2	141	21.3
	NR	6	4.4	46	149	2.2	140	21.3
	NR	-	4.4	46	110	2.3	121	21.4

Key:

- μ mhos/cm = microsiemens per centimeter
- mg/L = milligrams per liter
- NTU = nephelometric turbidity units
- mV = millivolts
- NR = not recorded
- °C = degrees Centigrade

TABLE 1-3
MARCH 2005 MONITORING WELL PURGE AND FIELD DATA
 (Page 1 of 2)

GROUNDWATER INCIDENT NO. 518280
MNA CAP IMPLEMENTATION
FORMER ABBOTT LABORATORIES FACILITY
LAURINBURG, NORTH CAROLINA

Monitoring Well Location	Time	Cumulative Purge Volume (in gallons)	Stabilization			Other Field Parameters		
			pH (Standard Units)	Conductivity (in mhos/cm)	Turbidity (NTU)	Dissolved Oxygen (in mg/L)	ORP (in mV)	Temperature (in °C)
FR-1	930	0	6.93	0.042	19.8	8.02	153	19.1
	938	1	6.14	0.035	18.2	2.36	196	18.8
	942	2	6.12	0.035	18.6	2.32	199	18.6
	946	3	6.10	0.036	18.4	2.30	198	18.6
FR-3	1000	0	5.34	0.025	11.4	7.02	173	11.8
	1005	0.5	5.35	0.012	10.2	1.02	175	11.8
	1009	1.5	5.35	0.012	8.3	1.01	178	11.9
	1013	2.5	5.35	0.012	8.3	0.98	179	11.9
FR-3D	930	0	5.28	0.045	74.7	3.14	182	12.6
	935	0.05	5.22	0.035	999	1.70	187	15.0
	939	0.75	5.22	0.035	999	1.70	189	15.0
	943	0.85	5.22	0.035	999	1.71	189	15.0
	947	0.95	5.22	0.035	999	1.71	189	15.0
FR-6	1100	0	5.70	0.369	23.6	7.46	26	11.7
	1104	0.25	6.12	0.391	18.2	3.20	-18	11.1
	1108	1.25	6.11	0.391	18.1	3.19	-18	11.2
	1112	2.25	6.11	0.391	18.1	3.19	-18	11.1
FR-6D	1035	0	5.58	0.040	14.3	7.12	146	17.8
	1043	2.0	5.71	0.047	12.5	3.06	70	18.1
	1047	3.0	5.72	0.047	10.2	3.01	71	18.2
	1051	4.0	5.72	0.047	9.6	3.00	72	18.3
FR-7D	900	0	5.48	61.2	534	4.50	188	12.9
	910	0.115	4.82	0.047	799	1.99	190	12.0
	914	0.175	5.23	0.048	819	2.60	205	11.9
	918	0.23	5.22	0.048	810	2.60	205	11.9
	922	0.275	5.22	0.048	810	2.60	205	11.9
FR-8D	1000	0	5.24	0.035	36.6	3.39	172	12.0
	1010	0.5	5.67	0.038	999	3.29	181	12.2
	1014	0.75	5.67	0.038	999	3.29	181	12.2
	1018	1.00	5.67	0.038	999	3.29	181	12.2
	1022	1.25	5.67	0.038	999	3.29	180	12.2
	1026	1.50	5.66	0.038	999	3.29	181	12.2

TABLE 1-3
MARCH 2005 MONITORING WELL PURGE AND FIELD DATA
 (Page 2 of 2)

GROUNDWATER INCIDENT NO. 518280
MNA CAP IMPLEMENTATION
FORMER ABBOTT LABORATORIES FACILITY
LAURINBURG, NORTH CAROLINA

Monitoring Well Location	Time	Cumulative Purge Volume (in gallons)	Stabilization			Other Field Parameters		
			pH (Standard Units)	Conductivity (in mhoms/cm)	Turbidity (NTU)	Dissolved Oxygen (in mg/L)	ORP (in mV)	Temperature (in °C)
MW-20B	1125	0	5.36	0.054	17.7	4.07	107	15.4
	1140	3.75	4.88	0.055	9	2.50	151	17.2
	1144	4.75	4.87	0.056	8.6	1.46	151	17.1
	1148	5.75	4.87	0.055	8.4	1.35	151	17.2
FR-2	1200	0				6.11		
	1206	0.75				6.10		
	1210	1.00				6.10		
	1214	1.50				6.08		
FR-4	1230	0				5.27		
	1232	0.25				5.36		
	1236	0.50				5.35		
	1240	0.75				5.36		
FR-5	1130	0				5.31		
	1232	0.25				6.30		
	1236	1.0				6.30		
	1240	1.5				6.30		
FR-9D	1030	0				3.06		
	1031	0.1				2.99		
	1035	0.5				2.99		
	1039	1.0				3.00		

Key:

mhoms/cm = siemens per centimeter
 mg/L = milligrams per liter
 NTU = nephelometric turbidity units
 mV = millivolts
 °C = degrees Centigrade

Notes:

Greyed areas indicate that no data were collected. These monitoring well locations were purged and field screened for dissolved oxygen only.

**TABLE 1-4
WATER ELEVATION DATA**

**GROUNDWATER INCIDENT NO. 518280
MNA CAP IMPLEMENTATION
FORMER ABBOTT LABORATORIES FACILITY
LAURINBURG, NORTH CAROLINA**

Monitoring Well Identification	Top of Casing Elevation (ft MSL)	September 2004		March 2005	
		Depth to Water (ft)	Water-Level Elevation (ft MSL)	Depth to Water (ft)	Water-Level Elevation (ft MSL)
FR-1	227.02	0.5	226.52	3.2	223.82
FR-3	230.17	3.5	226.67	6.3	223.87
FR-3d	229.67	32.3	197.37	32.38	197.29
FR-6	230.66	4.54	226.12	6.52	224.14
FR-6d	230.62	5.35	225.27	8.03	222.59
FR-7d	226.45	30.19	196.26	29.25	197.2
FR-8d	230.82	32.10	198.72	32.64	198.18
MW-20B	227.94	1.5	226.44	4.7	223.24
FR-2	227.01	NM	NM	2.9	224.11
FR-4	230.15	NM	NM	6.85	223.3
FR-5	230.69	NM	NM	6.28	224.41
FR-9d	230.81	NM	NM	31.98	198.83

Key:

ft = feet

MSL = Mean Sea Level

NM = Not Measured

**TABLE 1-5
DISSOLVED OXYGEN FIELD DATA**

**GROUNDWATER INCIDENT NO. 518280
MNA CAP IMPLEMENTATION
FORMER ABBOTT LABORATORIES FACILITY
LAURINBURG, NORTH CAROLINA**

Well Screening Interval ¹	Well ID	Dissolved Oxygen (in mg/L)	
		September 2004	March 2005
Shallow	FR-1	2.81	2.33
	FR-2	NM	6.09
	FR-3	4.50	1.00
	FR-4	NM	5.36
	FR-5	NM	6.30
	FR-6	1.80	3.19
Deep	FR-6d	2.30	3.02
	MW-20B	2.23	1.77
	FR-3d	2.57	1.71
	FR-7d	4.10	2.60
	FR-8d	4.13	3.29
	FR-9d	NM	2.99

Key:
mg/L = milligram per liter
NM = not measured

Note:

- ¹ The following definitions are used to describe the well screening interval:
 Shallow = Screened at a depth less than 8 ft bgs
 Deep = Screened at a depth greater than 12 ft bgs
- ² Dissolved Oxygen value represents the average of final three field measurements.

TABLE 1-7

CUMULATIVE VOC ANALYTICAL DATA
(Page 1 of 2)

GROUNDWATER INCIDENT NO. 518280
MNA CAP IMPLEMENTATION
FORMER ABBOTT LABORATORIES FACILITY
LAURINBURG, NORTH CAROLINA

Location	Sampling Date	Parameter (in ug/L)	
		Benzene ¹	Ethylbenzene ¹
FR-1	May-00	1 U	1 U
	May-01	0.1 U	0.14 U
	Sep-01	0.1 U	0.14 U
	Mar-02	1 U	1 U
	Sep-02	NS	NS
	Apr-03	1 U	1 U
	Sep-04	1 U	1 U
	Mar-05	1 U	1 U
FR-3	May-00	1 U	1 U
	May-01	0.1 U	0.14 U
	Sep-01	0.1 U	0.14 U
	Mar-02	1 U	1 U
	Sep-02	NS	NS
	Apr-03	1 U	1 U
	Sep-04	1 U	1 U
	Mar-05	1 U	1 U
FR-3D	Dec-00	2	1 U
	May-01	0.1 U	0.14 U
	Sep-01	1.6	0.14 U
	Mar-02	2.5	1 U
	Sep-02	0.53 J	0.12 U
	Apr-03	1.4	1 U
	Sep-04	1.5	1 U
	Mar-05	1.6	1 U
FR-6	Apr-03	47	46
	Sep-04	60	100
	Mar-05	68	62
FR-6D	May-00	21	1.9
	Dec-00	17	1 U
	May-01	3.7	0.14 U
	Sep-01	17	2.7
	Mar-02	4.2	1 U
	Sep-02	26	5.7
	Apr-03 ²	3.1	1 U
	Sep-04 ²	7.1	2.9
	Mar-05 ²	1 U	1 U

TABLE 1-7

CUMULATIVE VOC ANALYTICAL DATA
(Page 2 of 2)

GROUNDWATER INCIDENT NO. 518280
MNA CAP IMPLEMENTATION
FORMER ABBOTT LABORATORIES FACILITY
LAURINBURG, NORTH CAROLINA

Location	Sampling Date	Parameter (in ug/L)	
		Benzene ¹	Ethylbenzene ¹
FR-7D	Dec-00	1 U	1 U
	May-01	0.36 J	0.14 U
	Sep-01	0.42 J	0.14 U
	Mar-02	0.40 J	
	Sep-02	1.6	0.12 U
	Apr-03	1 U	1 U
	Sep-04	0.68 J	1 U
	Mar-05	1 U	1 U
FR-8D	Dec-00	1 U	1 U
	May-01	0.1 U	0.14 U
	Sep-01	0.1 U	0.14 U
	Mar-02	1 U	1 U
	Sep-02	0.21 U	0.12 U
	Apr-03	1 U	1 U
	Sep-04	1 U	1 U
	Mar-05	1 U	1 U
MW-20B	May-01	0.1 U	0.14 U
	Sep-01	0.0465 U	0.0469 U
	Mar-02	1 U	1 U
	Sep-02	0.2 U	0.2 U
	Apr-03	1 U	1 U
	Sep-04	1 U	1 U
	Mar-05	1 U	1 U

Key:

ug/L = microgram per liter

U = Constituent not detected at a concentration above the reported value

J = Reported value is estimated

NS = Not sampled due to well being dry

25 = Indicates that the detected concentration exceeds the 2L standard

Notes:

¹ North Carolina 2L standard for Benzene is 1 ug/L and for Ethylbenzene is 550 ug/L.

² Reported concentration is the maximum detected concentration or the minimum detection limit of the sample and its duplicate.

**TABLE 1-6
 BENZENE and ETHYL BENZENE ANALYTICAL RESULTS**

**GROUNDWATER INCIDENT NO. 518280
 MNA CAP IMPLEMENTATION
 FORMER ABBOTT LABORATORIES FACILITY
 LAURINBURG, NORTH CAROLINA**

Parameter (in μ g/L)	2L Groundwater Standard ¹	FR-1		FR-3		FR-3D		FR-6		FR-6D		FR-6D DUP	
		9/9/04	3/8/05	9/9/04	3/8/05	9/9/04	3/8/05	9/9/04	3/8/05	9/9/04	3/8/05	9/9/04	3/8/05
Benzene	1	1 U	1 U	1 U	1 U	1.5	1.6	60	68	6.9	1 U	7.1	1 U
Ethylbenzene	550	1 U	1 U	1 U	1 U	1 U	1 U	100	62	2.9	1 U	2.9	1 U

Parameter (in μ g/L)	2L Groundwater Standard ¹	FR-7D		FR-8D		MW-20B		Trip Blank	Field Blank
		9/9/04	3/8/05	9/9/04	3/8/05	9/9/04	3/8/05	9/9/04	3/8/05
Benzene	1	0.68 J	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Ethylbenzene	550	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U

Key:

ug/L = microgram per liter

U = Constituent not detected at a concentration above the reported value

J = Reported value is estimated

25 = Indicates that the detected concentration exceeds the 2L standard

Notes:

¹ North Carolina 2L standards taken from 15A NCAC 2L .0202 effective 1 April 2005

**TABLE 2-1
FREE PRODUCT OBSERVATIONS IN MONITORING WELL FR-6**

**GROUNDWATER INCIDENT NO. 518280
MNA CAP IMPLEMENTATION
FORMER ABBOTT LABORATORIES FACILITY
LAURINBURG, NORTH CAROLINA**

<i>Observation Date</i>	<i>Observed Depth to Water (in feet)</i>	<i>Observed Depth to Free Product (in feet)</i>	<i>Apparent Free Product Thickness (in feet)</i>	<i>Apparent Free Product Thickness (in inches)</i>
9/9/2004	4.54	4.53	0.01	0.12
10/5/2004	6.60	6.58	0.02	0.24
11/12/2004	7.99	7.96	0.03	0.36
12/2/2004	8.12	8.10	0.02	0.24
1/12/2005	7.49	7.41	0.08	0.96
2/2/2005	7.91	7.87	0.04	0.48
3/8/2005	4.54	4.54	0.00	0.00

APPENDIX A

WELL SAMPLING FORMS

ABBOTT LAURINBURG Ground Water Sampling Form

Contracted Company: NBWC Environmental
 Project: Phase I DRG Groundwater Monitoring
 Facility: Abbott Laboratories Laurinburg

Location: Laurinburg, North Carolina
 Date: 9/9/04
 Sample(s): MW 20B

Sample Information

Sample ID: MW 20B
 Screen/Depth: 17-27 Collection Date: 9/9/04 Collection Time(24:00): 1235
 QA/QC Sample Collected: yes/no Type: _____ QA/QC ID: _____

Sampling Data

Sample collection based on: Purge Volume Parameter Stabilization other: _____
 Sampling Method: _____ Low Flow

Field Parameters

Time	Purge Volume (gallons)	Stabilization			Other Parameters		
		pH	Conductivity (µmhos/cm)	Resistivity (N/D)	DO (mg/L)	ORP (mV)	Temp (°C)
<i>INITIAL</i>		4.3	46	151	2.2	141	26.3
	4	4.4	46	150	2.2	136	21.3
	5	4.4	46	155	2.2	141	21.3
	6	4.4	46	149	2.2	140	21.3
<i>FINAL</i>		4.4	46	110	2.3	121	21.4

Purge Volume Calculations

Total Well Depth: 27 ft
 Water Level: 1.5 ft
 Water Column = 25.5 ft
 Gallons per ft: x 0.163 gal
 Well Volume = 415 gal

Well Volumes

To be Removed: 1 x 0 = 415 gallons to be purged prior to sampling

Well casing Volume (gallons per foot)	1.0" = 0.121	1.5" = 0.267
1.0" = 0.092	2.3" = 0.235	4" = 0.553

Stabilization Requirements	pH	DO (mg/L)
	Conductivity	1.5%
	Temp	±10%

Remarks: _____

Sample Description

Comments: DTB 27.0'

ABBOTT LAURINBURG Ground Water Sampling Form

Consultant Company: ADRIX Environmental

Project: Final HRC Groundwater Monitoring

Facility: Abbott Laboratories (Laurinburg)

Location: Laurinburg, North Carolina

Date: 9/9/04

Number: ML00050

Sample Info section

Sample ID: FR-1

Screen/Depth: 3-8'

Collection Date: 9/9/04

Collection Time(24:00): 1145

QA/QC Sample Collected: yes

Type: _____

QA/QC ID: _____

Sampling Data

Sample collection based on: Purge Volume

Parameter Stabilization

other: _____

Sampling Method: _____ Low Flow _____

Field Parameters

INITIAL

Time	Purge Volume (gallons)	Stabilization			Other Parameters		
		pH (units)	Conductivity (µmhos/cm)	Temperature (NTU)	DO (mg/L)	ORP (mV)	Temp (Celsius)
<u>1130</u>		<u>5.6</u>	<u>50.5</u>	<u>210</u>	<u>3.8</u>	<u>76</u>	<u>27.1</u>
<u>1140</u>	<u>1.2</u>	<u>5.6</u>	<u>50.7</u>	<u>190</u>	<u>3.1</u>	<u>75</u>	<u>27.2</u>
<u>1142</u>	<u>1.9</u>	<u>5.6</u>	<u>50.7</u>	<u>190</u>	<u>3.1</u>	<u>75</u>	<u>27.2</u>
<u>1145</u>	<u>2.5</u>	<u>5.6</u>	<u>50.7</u>	<u>185</u>	<u>3.1</u>	<u>75</u>	<u>27.2</u>
<i>FINAL</i>		<u>5.6</u>	<u>51.2</u>	<u>210</u>	<u>3.0</u>	<u>72</u>	<u>27.2</u>

Purge Volume Calculations

Total Well Depth: 8 ft

Water Level: 6.50 ft

Water Column = 7.5 ft

Gallons per ft: x 0.163 gal

Well Volume = 1.2 gal

Well Volumes

To be Removed: 1 x 0 = 1.2 gallons to be purged prior to sampling

Well Casing Volumes (gallons per foot)		
1.0" = 0.031	2.0" = 0.125	3.0" = 0.280
1.5" = 0.052	2.5" = 0.215	4" = 0.433

Stabilization Requirements	
pH	± 0.1 units
Conductivity	± 5%
Temperature	± 1.0%

Remarks: _____

Sample Description

Comments: DTB 8.0'

ABBOTT LAURINBURG Ground Water Sampling Form

Client/Company: Matrix Environmental
 Project: Phase 1 PFC Groundwater Remediation
 Facility: Abbott Laboratories Laurinburg

Location: Laurinburg, North Carolina
 Date: 9/9/04
 Sample ID: FR-6

Sample Information

Sample ID: FR-6

Screen/Depth: 3-8'

Collection Date: 9/9/04

Collection Time(24:00): 11:00

QA/QC Sample Collected: yes

Type: _____

QA/QC ID: _____

Sampling Data

Sample collection based on: Purge Volume

Parameter Stabilization

other: _____

Sampling Method: _____

Low Flow

Field Parameters

INITIAL

Time	Purge Volume (gallons)	Stabilization			Other Parameters		
		pH (unitless)	Conductivity (microhm/cm)	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Temp (C/deg)
		6.5	80	300	1.5	78	27.1
1045	0.56	6.2	75	290	1.8	76	27.1
1050	1.0	6.2	75	288	1.7	78	27.2
1100	1.5	6.2	78	270	1.6	78	27.2
<i>FINAL</i>		6.3	78	260	2.1	76	27.0

Purge Volume Calculations

Total Well Depth: 8 ft
 Water Level: 4.54 ft
 Water Column = 3.46 ft
 Gallons per ft: 0.193 gal
 Well Volume = 0.563 gal

Well Volumes

To be Removed: 1 x 0 = 0 gallons to be purged prior to sampling

Well Casing Volume (gallons per foot)	1" = 0.11	2" = 0.16	3" = 0.27
1.5" = 0.092	0.07	0.11	0.16

Stabilization Requirements	pH	± 0.1 unit
Conductivity	± 5%	
Turbidity	± 10%	

Remarks: _____

Sample Description

Comments: DTB 8.0'

ABBOTT LAURINBURG Ground Water Sampling Form

Location: Abbott Laurinburg
 Project: DTB
 Facility: Abbott Laurinburg

Sample Information

Sample ID: FR 70
 Screen/Depth: 35' Collection Date: 9/9/04 Collection Time(24:00): 1120
 QA/QC Sample Collected: yes Type: _____ QA/QC ID: _____

Sampling Data

Sample collection based on: Purge Volume Parameter Stabilization other: _____
 Sampling Method: _____ Low Flow

Field Parameters

INITIAL

Time	Purge Volume (gallons)	pH	Conductivity (umhos/cm)	Temperature (°C)	DO (mg/L)	ORP (mV)	Total Solids (mg/L)
		5.4	53	600	4.4	91	24
1115	0.78	5.2	52	260	4.2	95	24
1117	1.0	5.2	52	265	4.1	98	24
1120	1.5	5.2	52	261	4.1	98	24
FINAL		5.2	53	307	4.1	99	24

Purge Volume Calculations

Total Well Depth: 35 ft
 Water Level: 30.19 ft
 Water Column = 4.81 ft
 Gallons per ft: x 0.163 gal
 Well Volume = 0.784 gal

Well Volumes

To be Removed: 1 x 0 = 0.784 gallons to be purged prior to sampling

Well Screen Volume (gallons per foot)	2.0 - 2.5	2.5 - 3.0	3.0 - 3.5
1.0 - 1.5	1.5 - 2.0	2.0 - 2.5	2.5 - 3.0
0.5 - 1.0	1.0 - 1.5	1.5 - 2.0	2.0 - 2.5

Well Screen Depth (ft)	10 - 15	15 - 20	20 - 25
10 - 15	15 - 20	20 - 25	25 - 30
10 - 15	15 - 20	20 - 25	25 - 30

Remarks: _____

Sample Description

Comments: DTB 35.0'

ABBOTT LAURINBURG Ground Water Sampling Form

Client: Abbott Environmental Project: Abbott Environmental
 Location: Abbott Environmental Date: 9/9/04
 Operator: AL/MSD

Sample Information

Sample ID: FR-6D
 Screen Depth: 19.5-19.5 Collection Date: 9/9/04 Collection Time(24:00): 0955
 QA/QC Sample Collected: yes/no MS-MSD Type: _____ QA/QC ID: _____
FIELD DUPLICATE

Sampling Data

Sample collection based on: Purge Volume Parameter Stabilization other: _____
 Sampling Method: _____ Low Flow

Field Parameters

INITIAL

Time	Purge Volume (gallons)	Flow Rate (gpm)	Flow Rate (L/min)	Pressure (PSI)	Flow Rate (gpm)	Flow Rate (L/min)	Time (min)
		6.0	64	150	4.7	46	22
	2.3	5.8	64	250	2.4	66	21.8
	3.10	5.8	64	250	2.4	66	21.8
	4.0	5.8	64	255	2.4	66	21.8
FINAL		5.8	64	199	2.1	65	21.6

Purge Volume Calculations
 Total Well Depth: 19.5 ft
 Water Level: 5.35 ft
 Water Column = 14.15 ft
 Gallons per ft: x 0.163 gal
 Well Volume = 2.3 gal

Well Volumes
 To be Removed: 1 x 0 = 2.3 gallons to be purged prior to sampling

Well Screen Volume (gallons per foot)	Flow Rate (gpm)	Flow Rate (L/min)
1.5" x 1.5"	2.5	23.8
1.5" x 2.0"	2.5	23.8
1.5" x 2.5"	2.5	23.8

Well Screen Requirements	Flow Rate (gpm)	Flow Rate (L/min)
1.5" x 1.5"	2.5	23.8
1.5" x 2.0"	2.5	23.8
1.5" x 2.5"	2.5	23.8

Remarks: _____

Sample Information

Comments: DTB 19.5'

ABBOTT LAURINBURG Ground Water Sampling Form

Client Name: Abbott Laboratories
 Project Name: Abbott Laboratories
 Facility Name: Abbott Laboratories
 Location: Abbott Park

Sample Information

Sample ID: FR 3
 Screen/Depth: 3-8 Collection Date: 9/9/04 Collection Time(24:00): 1017
 QA/QC Sample Collected: yes/no Type: _____ QA/QC ID: _____

Sampling Data

Sample collection based on: Purge Volume Parameter Stabilization other: _____
 Sampling Method: Low Flow

Field Parameters

Time	Purge Volume (gallons)	pH	Temperature (Celsius)	Temperature (F)	Specific Conductance (µmhos/cm)	ORP (mV)	Flow Rate (gpm)
<i>INITIAL</i>		5.2	35	350	4.9	99	22.5
1010	0.73	5.2	35	290	4.5	100	22.5
1015	1	5.1	35	260	4.5	100	22.5
1017	1.5	5.1	35	251	4.5	100	22.5
<i>FINAL</i>		5.2	35	301	4.5	100	22.5

Purge Volume Calculations

Total Well Depth: 8 ft
 Water Level: 3.5 ft
 Water Column = 4.5 ft
 Gallons per ft: x 0.165 gal
 Well Volume = 0.73 gal

Well Volumes

To be Removed: 1 x 0 = 0.73 gallons to be purged prior to sampling

Analytical Methods (List one per field) _____ _____ _____
 Analytical Parameters _____ _____ _____

Remarks: _____

Sample Description

Comments: DTB 8'

ABBOTT LAURINBURG Ground Water Sampling Form

Client/Agency: Abbott Laboratories Location: Abbott Laboratories
 Project Name: Abbott Laboratories Date: 9/9/04
 Facility Name: Abbott Laboratories City: Abbott Park

Sample Information

Sample ID: FR-3D
 Screen/Depth: 35 Collection Date: 9/9/04 Collection Time(24:00): 1030
 QA/QC Sample Collected: yes/no Type: _____ QA/QC ID: _____

Sampling Parameters

Sample collection based on: Purge Volume Parameter Stabilization other: _____
 Sampling Method: _____ Low Flow

Field Parameters

INITIAL

Time	Purge Volume (gallons)	WT (ppm)	Temperature (°C)	Specific Gravity	pH	ORP	Redox
1020		4.6	22		2.9	130	23.5
1025	0.4	4.5	22		2.6	133	23.9
1027	1	4.5	22		2.6	133	23.9
1030	1.5	4.6	22		2.6	133	23.9
<i>FINAL</i>		4.6	24		2.5	130	23.9

Purge Volume Calculations

Total Well Depth: 35 ft
 Water Level: 32.3 ft
 Water Column = 2.7 ft
 Gallons per ft: x 0.153 gal
 Well Volume = 0.44 gal

Well Volumes
 To be Removed: 1 x 0 = 0.44 gallons to be purged prior to sampling

Flow Control Volumes (gallons per foot)

100-150	0.153	0.153
150-200	0.153	0.153

Stabilization Parameters

WT	2.0
Temperature	2.0
Specific Gravity	2.0

Remarks: _____

Sample Description

Comments: DTB 35.0'

ABBOTT LAURINBURG Ground Water Sampling Form

Consultant Company Matrix Environmental
 Project Fuel Oil Monitoring & Southern Boundary Capture Zone - 3.05
 Facility Abbott Laboratories Laurinburg

Location Laurinburg, North Carolina
 Date 3/8/05
 Sampler(s) JM JM

Sample Information

Sample ID: FR-1

Screen/Depth 3-8

Collection Date: 3/8/05

Collection Time(24:00): 946

QA/QC Sample Collected: yes/no

Type: _____

QA/QC ID: _____

Sampling Data

Sample collection based on Purge Volume Parameter Stabilization other: _____

Sampling Method: Low Flow

Field Parameters

Time	Purge Volume (gallons)	Stabilization			Other Parameters		
		pH (pH units)	Conductivity (µmhos/cm)	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Temp (Ceat)
<u>930</u>	<u>—</u>	<u>6.93</u>	<u>0.042</u>	<u>19.8</u>	<u>8.02</u>	<u>153</u>	<u>19.1</u>
<u>938</u>	<u>1.0</u>	<u>6.14</u>	<u>0.035</u>	<u>18.2</u>	<u>2.36</u>	<u>196</u>	<u>18.8</u>
<u>942</u>	<u>1.0</u>	<u>6.12</u>	<u>0.035</u>	<u>18.6</u>	<u>2.32</u>	<u>199</u>	<u>18.6</u>
<u>946</u>	<u>1.0</u>	<u>6.10</u>	<u>0.036</u>	<u>18.4</u>	<u>2.30</u>	<u>198</u>	<u>18.6</u>

Initial

Purge Volume Calculations

Total Well Depth 8 ft
 Water Level: 3.20 ft
 Water Column = 4.80 ft
 Gallons per ft. x 0.163 gal
 Well Volume = 0.780 gal

Well Volumes

To be Removed: 1 x 0 = 0.780 gallons to be purged prior to sampling

Well Casing Volumes (gallons per foot)		
1.0" = 0.041	2.0" = 0.163	3.0" = 0.367
1.5" = 0.092	2.5" = 0.255	4" = 0.653

Stabilization Requirements:	
pH:	± 0.1 unit
Conductivity:	± 5%
Turbidity:	± 10%

Remarks _____

Sample Description

Comments * Conductivity shown in µmhos/cm

ABBOTT LAURINBURG Ground Water Sampling Form

Consultant Company: Metric Environmental
 Project: Fuel Oil Monitoring & Southern Boundary Capture Zone - 3.05
 Facility: Abbott Laboratories Laurinburg

Location: Laurinburg, North Carolina
 Date: 3/8/05
 Sampler(s): LM JM

Sample Information

Sample ID: FR-3

Screen/Depth: 3-8

Collection Date: 3/8/05

Collection Time(24:00): 1013

QA/QC Sample Collected: yes/no

Type: _____

QA/QC ID: _____

Sampling Data

Sample collection based on: Purge Volume

Parameter Stabilization

other: _____

Sampling Method: Low Flow

Field Parameters

Time	Purge Volume (gallons)	Stabilization			Other Parameters		
		pH (pH units)	Conductivity (umhos/cm)	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Temp (Cent)
<u>1000</u>	<u>---</u>	<u>5.34</u>	<u>0.025</u>	<u>16.4</u>	<u>7.02</u>	<u>173</u>	<u>16.8</u>
<u>1005</u>	<u>0.5</u>	<u>5.35</u>	<u>0.012</u>	<u>10.2</u>	<u>1.02</u>	<u>175</u>	<u>11.8</u>
<u>1009</u>	<u>1.0</u>	<u>5.35</u>	<u>0.012</u>	<u>8.3</u>	<u>1.01</u>	<u>178</u>	<u>11.9</u>
<u>1013</u>	<u>1.0</u>	<u>5.35</u>	<u>0.012</u>	<u>8.2</u>	<u>0.98</u>	<u>179</u>	<u>16.9</u>

Initial

Purge Volume Calculations

Total Well Depth: 8 ft
 Water Level: 6.30 ft
 Water Column = 1.7 ft
 Gallons per ft. x: 0.163 gal
 Well Volume = 0.27 gal

Well Volumes

To be Removed: 1 x 0 = 0.27 gallons to be purged prior to sampling

Well Casing Volumes (gallons per foot)		
1.0" = 0.041	2.0" = 0.163	3.0" = 0.367
1.5" = 0.092	2.5" = 0.255	4" = 0.653

Stabilization Requirements:	
pH:	± 0.1 unit
Conductivity:	± 5%
Turbidity:	± 10%

Remarks: _____

Sample Description

Comments: * Conductivity shown in mhos/cm

ABBOTT LAURINBURG Ground Water Sampling Form

Consultant Company: MWH Environmental
 Project: Final Oil Monitoring & Spill Response Capable Zone - 3.05
 Facility: Abbott Laboratories, Laurinburg

Location: Laurinburg, North Carolina
 Date: 3/8/05
 Sampler(s): LM JMA

Sample Information

Sample ID: PR-6

Screen/Depth: 3-8'

Collection Date: 3/8/05

Collection Time(24:00): 11:12

QA/QC Sample Collected: yes/no

Type: _____

QA/QC ID: _____

Sampling Data

Sample collection based on: Purge Volume

Parameter Stabilization

other: _____

Sampling Method: _____ Low Flow

Field Parameters

Time	Purge Volume (gallons)	Stabilization			Other Parameters		
		pH (pH units)	Conductivity (µmhos/cm)	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Temp (Cent)
<u>11:00</u>	<u>—</u>	<u>5.79</u>	<u>0.369</u>	<u>23.6</u>	<u>7.46</u>	<u>26</u>	<u>16.7</u>
<u>11:04</u>	<u>0.25</u>	<u>6.12</u>	<u>0.391</u>	<u>18.2</u>	<u>3.20</u>	<u>-18</u>	<u>16.1</u>
<u>11:08</u>	<u>1.25</u>	<u>6.11</u>	<u>0.391</u>	<u>18.1</u>	<u>3.19</u>	<u>-18</u>	<u>16.2</u>
<u>11:12</u>	<u>2.25</u>	<u>6.11</u>	<u>0.391</u>	<u>18.1</u>	<u>3.19</u>	<u>-18</u>	<u>16.1</u>

initial

Purge Volume Calculations

Total Well Depth: 8.0 ft
 Water Level: 6.02 ft
 Water Column = 1.98 ft
 Gallons per ft. x 0.163 gal
 Well Volume = 0.240 gal

Well Volumes

To be Removed: 1 x 0 = 0.240 gallons to be purged prior to sampling

Well Casing Volumes (gallons per foot)		
1.0" = 0.041	2.0" = 0.163	3.0" = 0.367
1.5" = 0.092	2.5" = 0.255	4" = 0.653

Stabilization Requirements:	
pH:	± 0.1 unit
Conductivity:	± 5%
Turbidity:	± 10%

Remarks: _____

Sample Description

Comments: * Conductivity shown in µhos/cm

ABBOTT LAURINBURG Ground Water Sampling Form

Consultant Company: Metric Environmental
 Project: Post Oil Monitoring & Seepage Boundary Capture Zone - 3.05
 Facility: Abbott Laboratories Laurinburg

Location: Laurinburg, North Carolina
 Date: 3/8/05
 Sampler(s): LMA JAA

Sample Information

Sample ID: FR-6D
 Screen/Depth: 19.5-19.5 Collection Date: 3/8/05 Collection Time(24:00): 1051
 QA/QC Sample Collected: yes/no Type: _____ QA/QC ID: _____
 FD 1054

Sampling Data

Sample collection based on: Purge Volume Parameter Stabilization other: _____
 Sampling Method: _____ Low Flow

Field Parameters

Time	Purge Volume (gallons)	Stabilization			Other Parameters		
		pH (pH units)	Conductivity (umhos/cm)	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Temp (Cent)
<i>Initial</i> 1035	—	5.58	0.040	14.3	7.12	146	12.3
1045	2.0	5.71	0.047	12.5	3.06	70	12.4
1047	3.0	5.72	0.047	10.2	3.07	71	12.5
1051	4.0	5.72	0.047	9.6	3.07	72	12.6

Purge Volume Calculations

Total Well Depth: 19.5 ft
 Water Level: 8.03 ft
 Water Column = 11.47 ft
 Gallons per ft: x 0.163 gal
 Well Volume = 1.86 gal

Well Volumes
 To be Removed: 1 x 0 = 1.86 gallons to be purged prior to sampling

Well Casing Volumes (gallons per foot)		
1.0" = 0.041	2.0" = 0.163	3.0" = 0.367
1.5" = 0.092	2.5" = 0.255	4" = 0.653

Stabilization Requirements:	
pH:	± 0.1 unit
Conductivity:	± 5%
Turbidity:	± 10%

Remarks: _____

Sample Description

Comments: * Conductivity shown in umhos/cm

ABBOTT LAURINBURG Ground Water Sampling Form

Consultant Company Matrix Environmental

Location Laurinburg, North Carolina

Project Fuel Oil Maintenance & Southern Boundary Capture Zone - 305

Date 3/8/05

Facility Abbeir Laboratories Laurinburg

Sampler(s) LMA JVA

Sample Information

Sample ID: FR-30

Screen/Depth 29-35

Collection Date: 3/8/05

Collection Time(24.00) 950

QA/QC Sample Collected: yes/no

Type: _____

QA/QC ID: _____

Sampling Data

Sample collection based on: Purge Volume

Parameter Stabilization

other: _____

Sampling Method: _____

Low Flow

Field Parameters

Time	Purge Volume (gallons)	Stabilization			Other Parameters		
		pH (pH units)	Conductivity (µmhos/cm)	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Temp (Cent)
<i>Initial</i> 930	—	5.28	0.045	747	3.14	182	12.6
935	0.05	5.22	0.035	999	1.70	187	15.0
939	0.75	5.22	0.035	999	1.70	189	15.0
943	0.10	5.22	0.035	999	1.71	189	15.0
947	0.15	5.22	0.035	999	1.71	189	15.0

Purge Volume Calculations

Total Well Depth 35 ft
 Water Level 32.38 ft
 Water Column = 2.62 ft
 Gallons per ft: x 0.02 gal
 Well Volume = 0.05 gal

Well Volumes

To be Removed: 1 x 0 = 0.05 gallons to be purged prior to sampling

Well Casing Volumes (gallons per foot)		
1.0" = 0.041	2.0" = 0.163	3.0" = 0.367
1.5" = 0.092	2.5" = 0.255	4" = 0.653

Stabilization Requirements:	
pH	± 0.1 unit
Conductivity	± 5%
Turbidity	± 10%

Remarks: _____

Sample Description

Comments: * Conductivity shown in µmhos/cm

ABBOTT LAURINBURG Ground Water Sampling Form

Consultant Company: Matrix Environmental
 Project: Fuel Oil Maintenance & Southern Boundary Capture Zone - 3.05
 Facility: Abbott Laboratories Laurinburg

Location: Laurinburg, North Carolina
 Date: 3/8/05
 Sampler(s): LJM JLM

Sample Information

Sample ID: FR-7D

Screen/Depth: 29-35

Collection Date: 3/8/05

Collection Time(24:00): 925

QA/QC Sample Collected: yes/no

Type: _____

QA/QC ID: _____

Sampling Data

Sample collection based on: Purge Volume

Parameter Stabilization

other: _____

Sampling Method: _____ Low Flow

Field Parameters

Time	Purge Volume (gallons)	Stabilization			Other Parameters		
		pH (pH units)	Conductivity (µmhos/cm)	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Temp (Cent)
<i>Initial</i> 900	—	5.48	662	534	4.50	188	12.9
910	0.115	5.82	0.047	799	6.99	190	12.0
914	0.175	5.23	0.048	819	2.60	205	11.9
918	0.225	5.22	0.048	810	2.60	205	11.9
922	0.275	5.22	0.048	810	2.60	205	11.9

Purge Volume Calculations

Total Well Depth: 35 ft
 Water Level: 29.25 ft
 Water Column = 5.75 ft
 Gallons per ft. x 0.02016 gal
 Well Volume = 0.115 gal

Well Volumes

To be Removed: 1 x 0 = 0.115 gallons to be purged prior to sampling

Well Casing Volumes (gallons per foot)		
1.0" = 0.041	2.0" = 0.163	3.0" = 0.367
1.5" = 0.092	2.5" = 0.255	4" = 0.653

Stabilization Requirements:	
pH:	± 0.1 unit
Conductivity:	± 5%
Turbidity:	± 10%

Remarks: _____

Sample Description

Comments: * Conductivity shown in µmhos/cm

ABBOTT LAURINBURG Ground Water Sampling Form

Consultant Company: Mann Environmental

Location: Laurinburg, North Carolina

Project: Fuel Oil Monitoring & Southern Boundary Capture Zone - 105

Date: 3/8/05

Facility: Abbott Laboratories Laurinburg

Sampler(s): LM JMM

Sample Information

Sample ID: FR-8D

Screen/Depth: 29-35

Collection Date: 3/8/05

Collection Time(24.00): 1026

QA/QC Sample Collected: yes/no

Type: _____

QA/QC ID: _____

Sampling Data

Sample collection based on: Purge Volume

Parameter Stabilization

other: _____

Sampling Method: _____

Low Flow

Field Parameters

Time	Purge Volume (gallons)	Stabilization			Other Parameters		
		pH (pH units)	Conductivity (µmhos/cm)	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Temp (Cent)
<i>Initial</i> 1000	—	5.24	0.035	36.6	3.39	172	12.0
1010	0.50	5.67	0.038	999	3.29	181	12.2
1014	0.75	5.67	0.038	999	3.29	181	12.2
1018	1.0	5.67	0.038	999	3.29	181	12.2
1022	1.25	5.67	0.038	999	3.29	180	12.2
1026	1.50	5.66	0.038	999	3.29	181	12.2

Purge Volume Calculations

Total Well Depth: 35 ft
 Water Level: 32.64 ft
 Water Column = 2.360 ft
 Gallons per ft. x 0.02069 gal
 Well Volume = 0.0470 gal

Well Volumes

To be Removed: 1 x 0 = 0.0470 gallons to be purged prior to sampling

Well Casing Volumes (gallons per foot)		
1.0" = 0.041	2.0" = 0.163	3.0" = 0.367
1.5" = 0.092	2.5" = 0.255	4" = 0.653

Stabilization Requirements:	
pH:	± 0.1 unit
Conductivity:	± 5%
Turbidity:	± 10%

Remarks: _____

Sample Description

Comments: * Conductivity shows in µmhos/cm

ABBOTT LAURINBURG Ground Water Sampling Form

Consultant Company: Metcamp Environmental
 Project: Final O&M Monitoring & Sampling Boundary Capture Zone - 3.05
 Facility: Abbott Laboratories Laboratory

Location: Laurinburg, North Carolina
 Date: 3/18/05
 Sampler(s): LM JIM

Sample Information

Sample ID: MW-20B

Screen/Depth: 17-27'

Collection Date: 3/18/05

Collection Time(24:00): 1148

QA/QC Sample Collected: yes/no

Type: _____

QA/QC ID: _____

Sampling Data

Sample collection based on: Purge Volume

Parameter Stabilization

other: _____

Sampling Method: _____ Low Flow

Field Parameters

Time	Purge Volume (gallons)	Stabilization			Other Parameters		
		pH (pH units)	Conductivity (µmhos/cm)	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Temp (Cent)
<u>1125</u>	<u>—</u>	<u>5.36</u>	<u>0.054</u>	<u>17.7</u>	<u>4.07</u>	<u>107</u>	<u>15.9</u>
<u>1140</u>	<u>3.75</u>	<u>4.98</u>	<u>0.055</u>	<u>9.0</u>	<u>2.50</u>	<u>151</u>	<u>17.2</u>
<u>1144</u>	<u>4.75</u>	<u>4.87</u>	<u>0.056</u>	<u>8.6</u>	<u>1.46</u>	<u>151</u>	<u>17.1</u>
<u>1148</u>	<u>5.75</u>	<u>4.87</u>	<u>0.055</u>	<u>8.4</u>	<u>1.35</u>	<u>151</u>	<u>17.2</u>

Purge Volume Calculations

Total Well Depth: 27 ft
 Water Level: 4.70 ft
 Water Column = 22.3 ft
 Gallons per ft: x 0.163 gal
 Well Volume = 3.63 gal

Well Volumes

To be Removed: 1 x 0 = 3.63 gallons to be purged prior to sampling

Well Casing Volumes (gallons per foot)		
1.0" = 0.041	2.0" = 0.163	3.0" = 0.367
1.5" = 0.092	2.5" = 0.255	4" = 0.653

Stabilization Requirements:	
pH:	± 0.1 unit
Conductivity:	± 5%
Turbidity:	± 10%

Remarks: _____

Sample Description

Comments: * Conductivity shown in mhos/cm

ABBOTT LAURINBURG Ground Water Sampling Form

Contract Company: Abbott Environmental
 Project: Phase 1 Remediation & Groundwater Boundary Capture Phase - 3.05
 Facility: Abbott Environmental Laboratory

Location: Laurinburg, North Carolina
 Date: 3/18/05
 Sampler(s): LM

Sample Information

Sample ID: FR-4
 Screen/Depth: 3-3 Collection Date: 3/18/05 Collection Time(24:00):
 QA/QC Sample Collected: yes/no Type: QA/QC ID:

Sampling Data

Sample collection based on: Purge Volume Parameter Stabilization other:
 Sampling Method: Low Flow

Field Parameters

Time	Purge Volume (gallons)	Stabilization			Other Parameters		
		pH (pH units)	Conductivity (umhos/cm)	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Temp (Cent)
1230	0	/	/	/	5.27	/	/
1232	0.25	/	/	/	5.36	/	/
1236	0.5	/	/	/	5.35	/	/
1240	0.75	/	/	/	5.36	/	/

Purge Volume Calculations
 Total Well Depth: 8.0 ft
 Water Level: 6.85 ft
 Water Column = 1.15 ft
 Gallons per ft: x 0.163 gal
 Well Volume = 0.2 gal

Well Volumes
 To be Removed: 1 x 0.2 = 0.2 gallons to be purged prior to sampling = 0.75 hrs
1.51 min

Well Casing Volumes (gallons per foot)		
1.0" = 0.041	2.0" = 0.163	3.0" = 0.367
1.5" = 0.092	2.5" = 0.255	4" = 0.853

Stabilization Requirements:	
pH:	± 0.1 unit
Conductivity:	± 5%
Turbidity:	± 10%

Remarks:

Sample Description

Comments: Purged + analyzed for DO only

ABBOTT LAURINBURG Ground Water Sampling Form

Client: Abbott Laboratories
 Project: Abbott Laboratories & Partners Remedial Action Plan - 3.05
 Facility: Abbott Laboratories

Location: Laurinburg, North Carolina
 Date: 3/9/05
 Sample(s): LM

Sample Information

Sample ID: FR-90
 Screen/Depth: 29-35 Collection Date: Collection Time(24:00):
 QA/QC Sample Collected: yes/no Type: QA/QC ID:

Sampling Data

Sample collection based on: Purge Volume Parameter Stabilization other:
 Sampling Method: Low Flow

Field Parameters

Time	Purge Volume (gallons)	Stabilization			Other Parameters		
		pH (pH units)	Conductivity (µmhos/cm)	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Temp (Cent)
1030	0	/	/	/	3.06	/	/
1031	0.1	/	/	/	2.99	/	/
1035	0.5	/	/	/	2.99	/	/
1039	1.0	/	/	/	3.09	/	/

Purge Volume Calculations

Total Well Depth: 35.0 ft
 Water Level: 31.98 ft
 Water Column = 3.00 ft
 Gallons per ft: x 0.020163 gal
 Well Volume = 0.10 gal

Well Volumes
 To be Removed: 1 x 0.1 = 0.1 gallons to be purged prior to sampling = 0.4 hrs
 = 0.8 min

Well Casing Volumes (gallons per foot)

1.0" = 0.041	2.0" = 0.163	3.0" = 0.367
1.5" = 0.092	2.5" = 0.255	4" = 0.653

Stabilization Requirements:

pH	± 0.1 unit
Conductivity	± 5%
Turbidity	± 10%

Remarks:

Sample Description

Comments: Purged + analyzed for DO only.

APPENDIX B

LABORATORY ANALYTICAL DATA