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GROUNDWATER MONITORING AT FUEL FACILITY BUILDING 376 FACILITY ID # 0-791673
MILLINGTON SUPPACT TN
4/1/1997
RUST ENVIRONMENT AND INFRASTRUCTURE

GROUND-WATER MONITORING
at
FUEL FACILITY, BUILDING 376
NAVAL SUPPORT ACTIVITY MEMPHIS
Millington, TN
Facility # 0-791673

Southern Division
Naval Facilities Engineering Command
Contract N62467-93-D-0662

REI Project 33201.10000
April 1997

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803/572-5600

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EXECUTIVE SUMMARY

Southern Division Naval Facilities Engineering Command (SOUTHDIV) has contracted Rust Environment and Infrastructure (REI) to perform ground-water monitoring at the Fuel Facility, Building 376 at Naval Support Activity Memphis, Millington, Tennessee (NSA Memphis) in accordance with the Tennessee Department of Environment and Conservation (TDEC) Underground Storage Tank Division regulations.

On March 17, 1997, REI personnel sampled two (2) monitoring wells, MW-2 and MW-4 and measured ground-water elevations at all four wells on-site. Samples were analyzed for concentrations of benzene, toluene, ethylbenzene, and total xylenes (BTEX), as well as total petroleum hydrocarbons-gasoline range organics (TPH-GRO). TDEC has established cleanup levels for only benzene (0.070 mg/l) and TPH (1.00 mg/l).

The findings of the "monitoring only" phase performed by REI are:

- In the two wells sampled, benzene was below detection limits; TPH concentrations were below TDEC cleanup levels in monitoring well MW-4, and in monitoring well MW-2 TPH concentrations were below detection limits.
- The ground-water flow direction at the site is westerly, and the average calculated hydraulic gradient at the site is 0.023 ft/ft.
- The depth to static water table at the site ranges from 4.20 feet to 5.92 feet below grade.
- Free product was not detected in any of the facility wells.
- Natural biodegradation of the BTEX compounds appears to be occurring and historically, TPH compound concentrations have generally shown a downward trend. The TPH concentration decreased in MW-4 from 3.88 mg/l in March 1995 to 1.23 mg/l in March 1996. The TPH concentration increased from 1.23 mg/l in March 1996 to 1.67 mg/l in August 1996; the TPH concentration decreased from 1.67 mg/l in August 1996 to 0.372 mg/l in March 1997.

1.0 INTRODUCTION

1.1 Project Objective

The objective of this project is to provide ground-water monitoring at the Fuel Facility, Building 376, Naval Support Activity Memphis, (NSA Memphis) Millington, Tennessee. The program shall be in accordance with the Tennessee Department of Environment and Conservation (TDEC) Technical Guidance Document (TGD) -007 provided as Appendix A.

1.2 Project Background

The Fuel Facility had an active 4,250 gallon gasoline underground storage tank (UST) 1249. Free product was detected in the leak detection wells surrounding Tank 1249 in December 1991. The release was reported to TDEC on December 24, 1991. Tank 1249 was removed in April 1996.

A second tank, UST 1482, at this facility was removed in October 1993. Analytical data obtained during the tank closure assessment did not find any petroleum contaminated soil above the TDEC action levels.

Tank tightness testing performed on January 23, 1993 indicated that tank 1482 system passed the tightness test and that the tank 1249 system failed due to a leak in the piping.

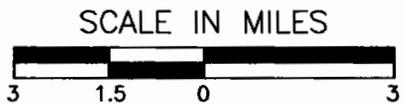
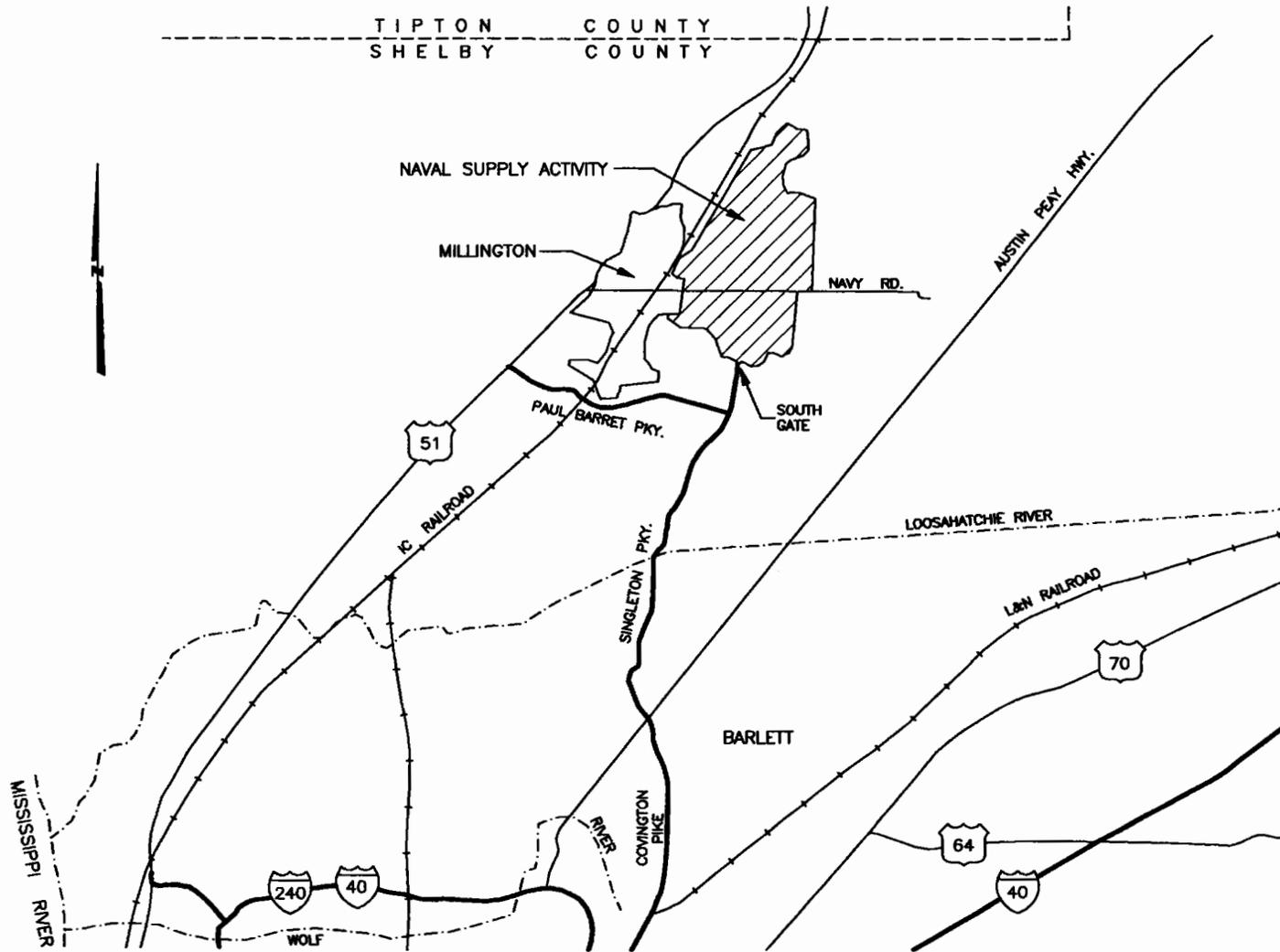
Per TDEC request, NSA Memphis contracted a consultant to perform a contamination assessment at this site on July 1992. Assessment activities indicated that the ground-water in the vicinity of Tank 1482 was contaminated with petroleum products above TDEC non-drinking water action levels.

TDEC, Division of Underground Storage Tanks requested a Site Ranking for this site. The site ranking was completed on July 28, 1994 and submitted to TDEC for review. The Site Ranking is shown as Appendix B. Based on the submitted data, TDEC approved the Site Ranking Request and recommended the implementation of a "Monitoring Only" program.

2.0 SITE SETTING

Building 376 is located on D Street on NSA Memphis in Millington, Shelby County, Tennessee. Figure 2-1 is a general vicinity map; additionally, a topographic map is presented as Figure 2-2. Based on this USGS, Millington 7.5 Minute Quadrangle map, there exists approximately 2 feet of relief across the site, north to south. A low lying grassy area south of the site accepts drainage from the general vicinity.

The site is shown on Figure 2-3, and it is located on the south side of D Street. The site is covered entirely by either asphalt or concrete (EnSafe, 1992).



RUST ENVIRONMENT &
INFRASTRUCTURE

FIGURE 2-1
VICINITY MAP
NSA MEMPHIS
MEMPHIS, TENNESSEE
RUST Project No. 33201

APRIL 1997

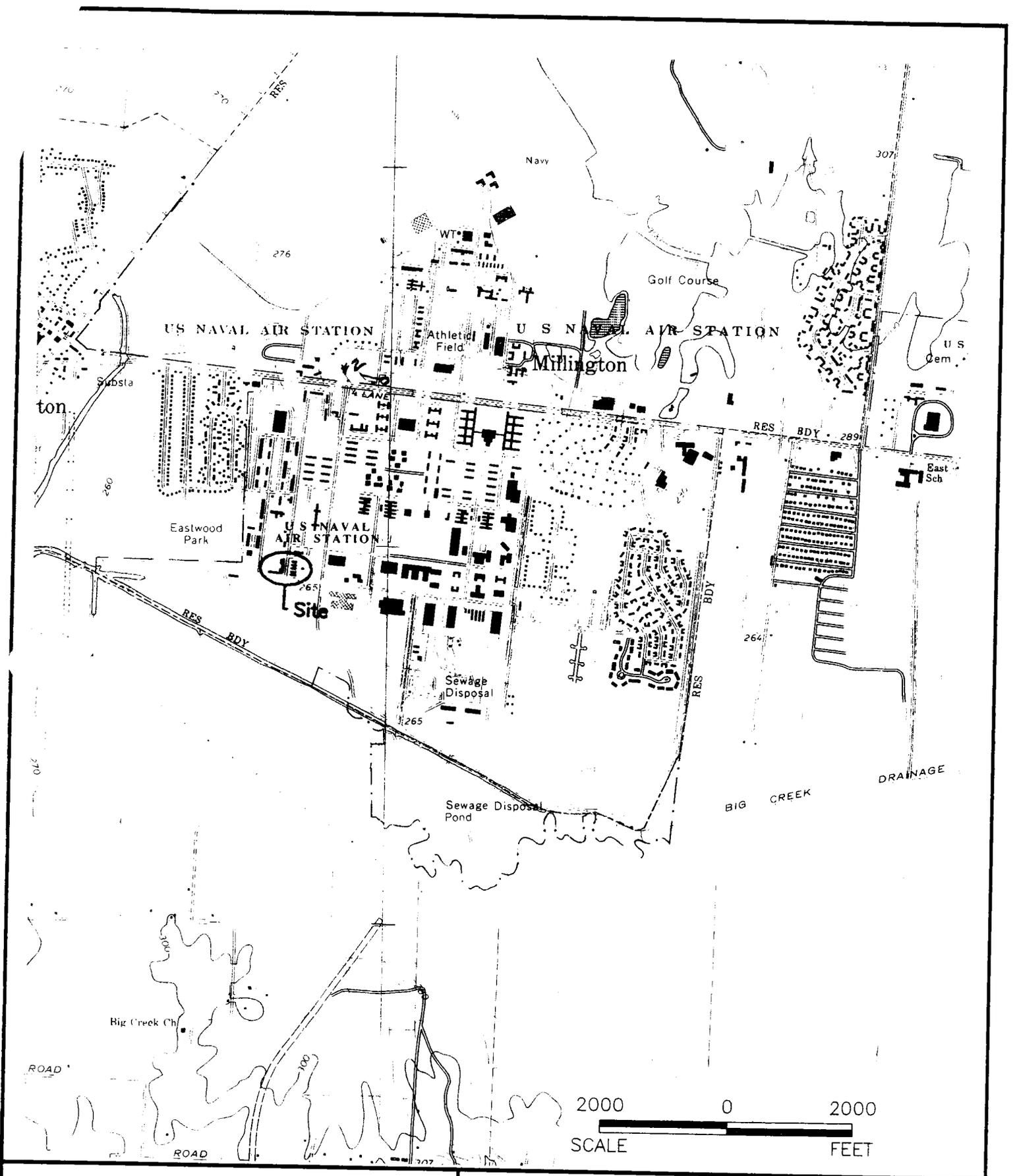
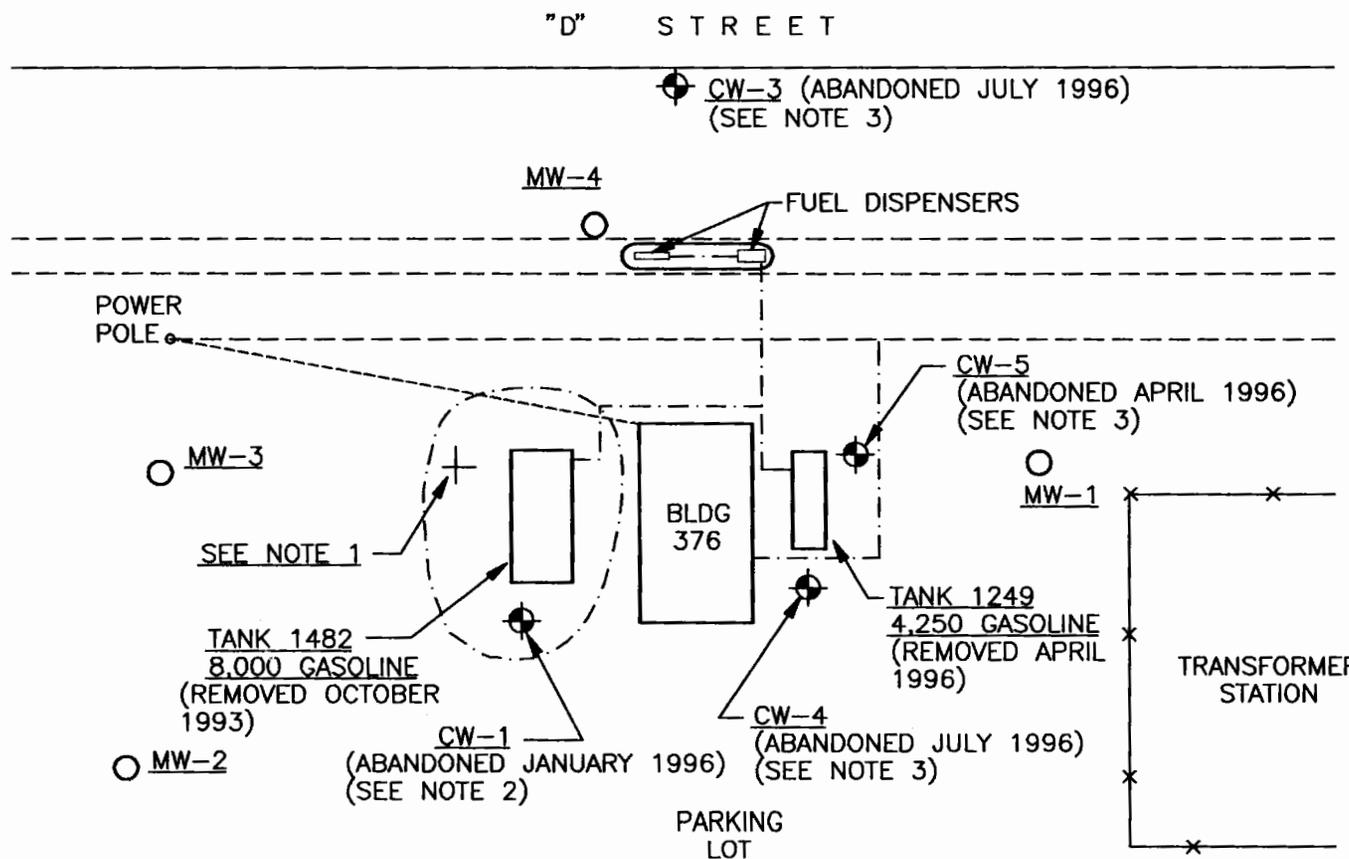


FIGURE 2-2
TOPOGRAPHIC MAP
NSA - MEMPHIS
 SOURCE: USGS Millington and Brunswick, TN Quads
 RUST Project No. 33201.000

RUST ENVIRONMENT &
 INFRASTRUCTURE



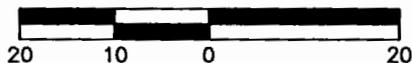
NOTES:

1. RELEASE DETECTION WELL, CW-2, WAS REMOVED DURING UST 1482 CLOSURE IN OCTOBER, 1993.
2. RELEASE DETECTION WELL, CW-1, WAS ABANDONED DURING BASE-WIDE ABANDONMENT PROJECT IN JANUARY, 1996.
3. RELEASE DETECTION WELLS, CW-3, CW-4 AND CW-5, WERE CLOSED OR ABANDONED ASSOCIATED WITH CLOSURE OF UST 1249 IN APRIL, 1996, CW-3 AND CW-4 IN JULY, 1996 AND CW-5 IN APRIL, 1996.

LEGEND

- MW-4 MONITORING WELL LOCATION
- [Dashed Box] APPROXIMATE EXTENT OF TPH PLUME
- [Circle with Crosshair] EXISTING LEAK DETECTION/OBSERVATION WELL
- [Circle] MONITORING WELL

SCALE IN FEET



RUST ENVIRONMENT & INFRASTRUCTURE

FIGURE 2-3

SITE MAP

NSA MEMPHIS, BUILDING 376

RUST Project No. 33201

APRIL 1997

3.0 WORK PERFORMED

The duration of this "monitoring only" phase will be for one year. The site was sampled semi-annually in 1996. The Navy opted to renew the "monitoring only" phase for this year and this is the first sampling event scheduled for 1997. The Navy has the option to renew the "monitoring only" phase for the next year, plus an additional year of closure monitoring. This could make the maximum length of the contract five years. Ground-water sampling events have taken place semi-annually (approximately six months apart). The first sampling event of 1997 took place on March 17; the results of which are presented herein. The prior sampling event took place on August 26, 1996; the results of which are presented below. The ground-water "monitoring only" will be in accordance with TDEC TGD-007.

3.1 Previous Investigations

The conclusions of the report dated September 1996 were as follows:

- In the two wells sampled, benzene was below detection limits; TPH concentrations exceeded TDEC cleanup levels in monitoring well MW-4, but in monitoring well MW-2 TPH concentrations were below detection limits.
- The ground-water flow direction at the site is westerly, and the average calculated hydraulic gradient at the site is 0.045 ft/ft.
- The depth to static water table at the site ranges from 6.65 feet to 9.80 feet below grade.
- Free product was not detected in any of the facility wells.
- Natural biodegradation of the BTEX compounds appears to be occurring and historically, TPH compound concentrations have generally shown a downward trend. The TPH concentration decreased in MW-4 from 3.88 mg/l in March 1995 to 1.23 mg/l in March 1996. The TPH concentration increased from 1.23 mg/l in March 1996 to 1.67 mg/l in August 1996; it is likely this slight increase in TPH concentration could be attributable to the increase in average rainfall during this period which raised the ground-water table and allowed for dissolution of organic material from the vadose zone.

3.2 Water Level Measurements

Static water levels were measured during this sampling event using an electronic water level indicator prior to sampling. All water level measurements, including total well depth measurements, were referenced from an established and documented point on the top of the well casing. Measurements were correlated with mean sea level datum and measured to the nearest 0.01 foot.

Water level measurements taken on August 26, 1996 and March 17, 1997 are shown in Table 3-1, and piezometric surface maps for these same dates are presented as Figures 3-1 and 3-2, respectively. The ground-water flow direction at the site has remained westerly; and the hydraulic gradient at the site ranged from 0.04 to 0.05 ft/ft in August 1996 and averaged 0.023 ft/ft in March 1997.

3.3 Ground-Water Sampling

The ground-water samples were taken from monitoring wells MW-2 and MW-4 and analytical results are discussed in Section 4.0. The analytical data are presented in Appendix C. Monitoring well MW-4 and release detection well CW-1 were originally the wells chosen to be sampled. However, release detection well CW-1 was inadvertently abandoned during a base-wide well abandonment project reportedly in January 1996. Mr. Randy Wilson of NSA Memphis Public Works contacted Mr. Ghattas El-Murr of TDEC and explained the situation. Mr. El-Murr granted NSA Memphis permission to sample monitoring well MW-2 in place of the abandoned release detection well CW-1. Additionally, release detection well CW-5 was abandoned during the closure of UST 1249 in April 1996. Release detection well CW-4 was abandoned in July 1996 after the closure of UST 1249 was completed. These site developments are shown on Figures 2-3, 3-1, 3-2 and 4-1.

3.3.1 Purging

After determining the static water level of the well, but prior to collecting a sample, the total volume of water standing in the well was calculated as follows:

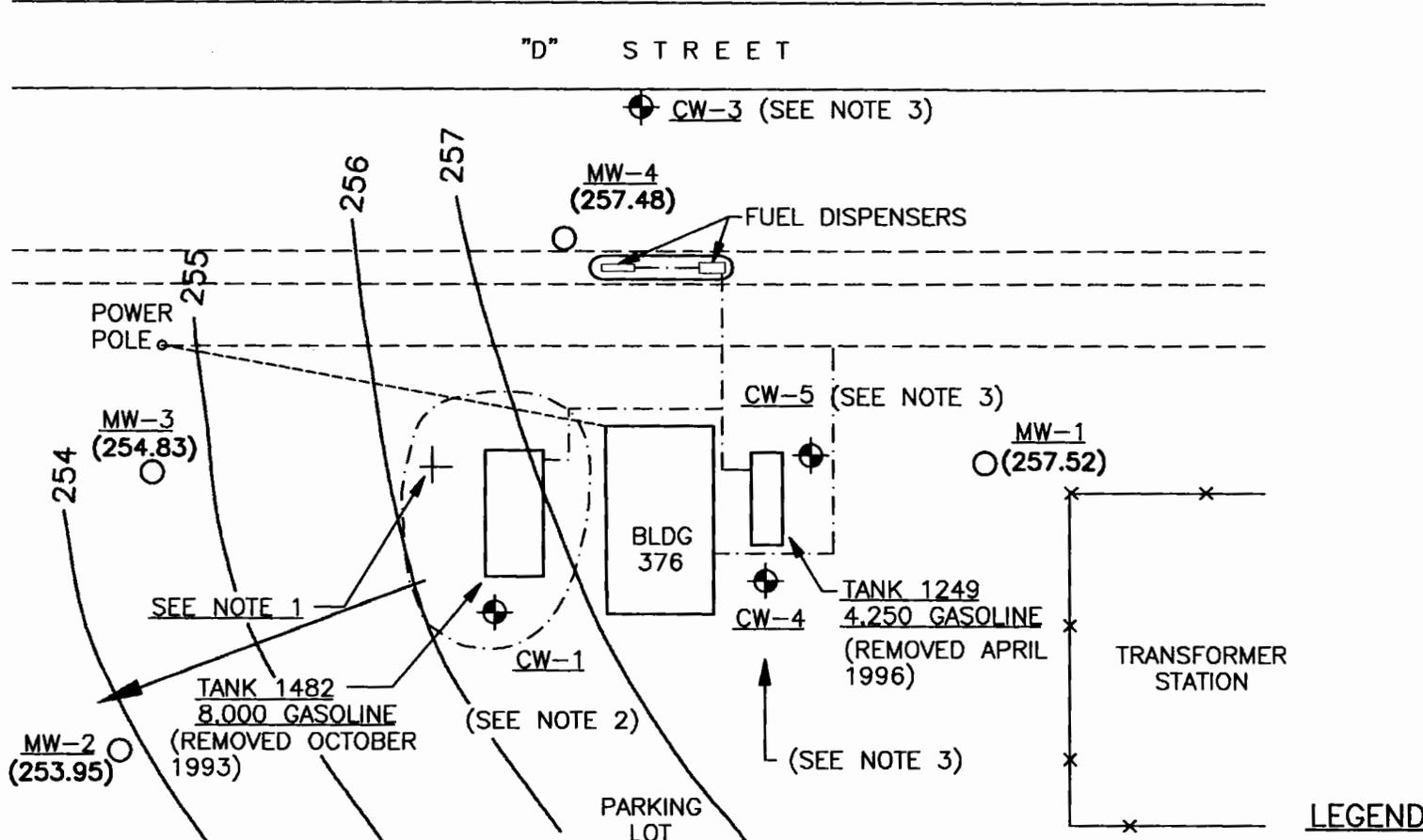
- subtract depth to water (DTW) value from total depth to determine height of water column.
- determine cross-sectional surface area of well bore using the equation:

TABLE 3-1
WATER TABLE ELEVATIONS
Fuel Facility, Building 376
NSA Memphis
Facility #0-791673
REI Project No. 33201.000

Monitoring Well	Total Depth (ft/btoc)*	Top of Casing Elevation	DATE OF MEASUREMENTS			
			August 26, 1996		March 17, 1997	
			Depth to Water (ft/btoc)*	Water Level Elevation	Depth to Water (ft/btoc)*	Water Level Elevation
MW-1	14.80	264.17	6.65	257.52	4.20	259.97
MW-2	13.50	263.75	9.80	253.95	5.92	257.83
MW-3	16.00	264.02	9.19	254.83	5.82	258.20
MW-4	16.50	264.29	6.81	257.48	5.55	258.74
CW-1	14.81	263.93	+	+	+	+
CW-4	14.97	264.15	+	+	+	+
CW-5	14.93	264.28	+	+	+	+

NOTE: Reference datum for elevations is Mean Sea Level.

- * ft/btoc = feet below top of casing
- + CW-1 abandoned in January 1996
- + CW-4 abandoned in July 1996
- + CW-5 abandoned in April 1996

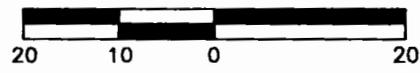


NOTES:

1. RELEASE DETECTION WELL, CW-2, WAS REMOVED DURING UST 1482 CLOSURE IN OCTOBER, 1993.
2. RELEASE DETECTION WELL, CW-1, WAS ABANDONED DURING BASE-WIDE ABANDONMENT PROJECT IN JANUARY, 1996.
3. RELEASE DETECTION WELLS, CW-3, CW-4 AND CW-5, WERE CLOSED OR ABANDONED ASSOCIATED WITH CLOSURE OF UST 1249 IN APRIL, 1996, CW-3 AND CW-4 IN JULY, 1996 AND CW-5 IN APRIL, 1996.

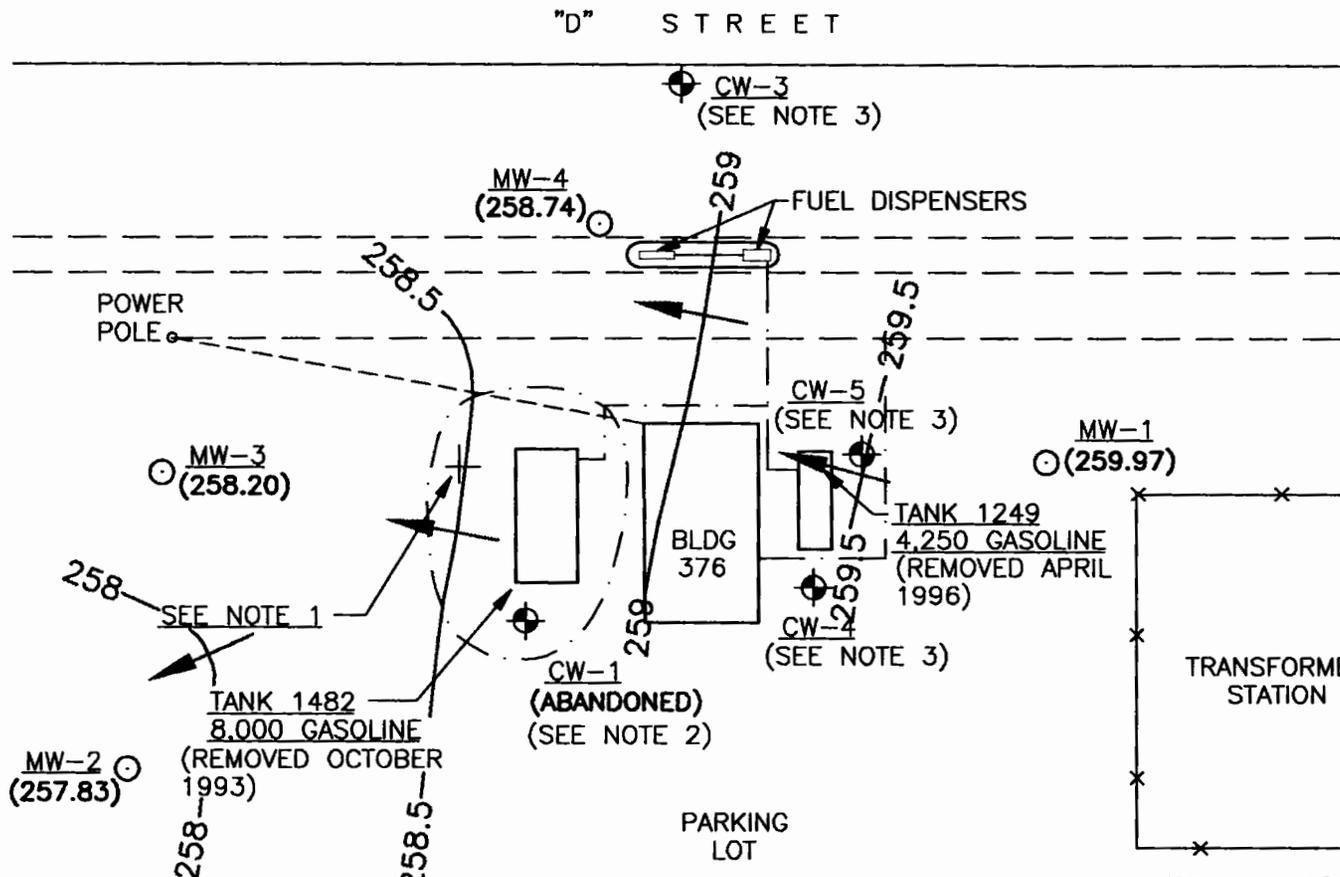
- LEGEND**
- MW-4 MONITORING WELL LOCATION
 - 255- GROUND-WATER CONTOUR LINE
 - ← GROUND-WATER FLOW DIRECTION
 - ⊕ EXISTING LEAK DETECTION OBSERVATION WELL
 - MONITORING WELL

SCALE IN FEET



RUST ENVIRONMENT & INFRASTRUCTURE

FIGURE 3-1
 PIEZOMETRIC SURFACE MAP
 (AUGUST 26, 1996)
 NSA MEMPHIS, BUILDING 376
 RUST Project No. 33201

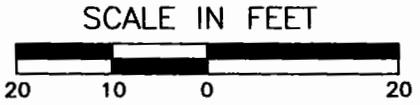


NOTES:

1. RELEASE DETECTION WELL, CW-2, WAS REMOVED DURING UST 1482 CLOSURE IN OCTOBER, 1993.
2. RELEASE DETECTION WELL, CW-1, WAS ABANDONED DURING BASE-WIDE ABANDONMENT PROJECT IN JANUARY, 1996.
3. RELEASE DETECTION WELLS, CW-3, CW-4, AND CW-5, WERE CLOSED OR ABANDONED ASSOCIATED WITH CLOSURE OF UST 1249 IN APRIL, 1996, CW-3 & CW-4 IN JULY, 1996 AND CW-5 IN APRIL, 1996.

LEGEND

<u>MW-4</u>	MONITORING WELL LOCATION
—259—	GROUND-WATER CONTOUR LINE
←	GROUND-WATER FLOW DIRECTION
(259.97)	GROUND-WATER ELEVATION
⊕	EXISTING LEAK DETECTION OBSERVATION WELL
○	MONITORING WELL



RUST ENVIRONMENT & INFRASTRUCTURE

FIGURE 3-2
 PIEZOMETRIC SURFACE MAP
 (MARCH 17, 1997)
 NSA MEMPHIS, BUILDING 376
 RUST Project No. 33201

$$A = \pi r^2$$

where:

- A = cross-sectional area (ft²)
- π = 3.14 (dimensionless)
- r = radius of well bore (in feet)

- multiply value of A by height of water column to determine well volume in cubic feet.
- multiply volume (cubic feet) by 7.48 gallons/ft³ to determine gallons of water per well volume.
- multiply well volume (gallons) by three to determine total water volume to be purged.

A minimum of three (3) well volumes was then purged from the well. Purging was accomplished using PVC, disposable, bottom entry bailers. A disposable bailer was dedicated to each monitoring well thereby reducing the potential for cross-contamination. If the well was purged to dryness before three (3) well volumes were obtained, no further purging was required. During purging and prior to sample collection, standard field parameters, pH, specific conductance and temperature were measured.

3.3.2 Sample Containers and Preservation

Sample containers were as follows:

TABLE 3-2

Sample Containers and Preservatives		
Parameter	Container	Preservative
BTEX	40 ml amber glass vial with Teflon lined septa	four (4) drops of 1:1 hydrochloric acid
TPH, Gasoline Range Organics	40 ml amber glass vial with Teflon lined septa	200 uL of 50% hydrochloric acid

All sample containers were pre-cleaned and sealed by the distributor or laboratory. Each sample

bottle was preserved with the proper preservative (e.g. HCL) prior to sample collection.

3.4 Collection Method

All samples from ground-water monitoring wells were collected with a new, disposable bailer. In order to keep agitation of the sample to a minimum, the bailer was slowly lowered into the water column. When collecting volatile organic samples, the sample container was completely filled so that no air bubbles were trapped inside. Care was also taken to have minimal overflow so that the preservative is not lost.

Upon collection, samples were immediately labeled, placed in a cooler, and chilled to approximately 4°C. The samples were maintained at 4°C until they were delivered to a state approved laboratory.

3.5 Chain of Custody

A chain of custody form was completed for each ground-water sample event. This form was signed by the person collecting the sample, the laboratory receiving the sample, and all intermediary persons with possession of the sample. Sample security was maintained during all phases of transport.

3.6 Disposal of Purge Water

All purge water was containerized in a container large enough to hold three (3) well volumes. The purge water was then transported to the Oil/Water Separator on base.

3.7 Analytical Methods

The ground-water samples were analyzed for BTEX by EPA Method 8020 and Total Petroleum Hydrocarbon Gasoline Range Organics (TPH-GRO) by EPA Method 8015.

3.8 Decontamination Procedures

All sampling and monitoring equipment which was not pre-cleaned or disposable was properly decontaminated before and after each use by the following procedure:

1. Cleaned with a non-phosphatic laboratory grade detergent wash;
2. Triple rinsed with distilled water; and
3. Allowed to air dry.

3.9 Quality Assurance and Quality Control (QA/QC)

The following procedures were conducted for QA/QC:

1. All equipment used for purging monitoring wells and collecting ground-water samples was properly decontaminated.
2. Sampling personnel wore new disposable sampling gloves while collecting all samples. Gloves were changed between sampling points.
3. Sampling containers were laboratory prepared glass bottles or vials.
4. Ground-water samples were immediately placed in the laboratory bottles or vials in a manner to minimize headspace.
5. All ground-water samples collected for laboratory analyses were immediately labeled and stored at 4°C or less.
6. Chain of custody forms were completed for each sampling event.
7. Sampling began at the location where contamination is least likely to exist (background) and end at the location where the highest levels of contamination were most likely to exist (near the release).
8. When sampling monitoring wells, one (1) duplicate sample and one (1) field blank sample were collected. A duplicate sample was prepared by splitting the sample into two separate aliquots and submitting the samples to the laboratory for analyses. Field blanks were prepared by running deionized water through the sampling equipment (bailer) and transferring the water into sample containers identical to those used for ground-water sampling. In order to maintain unbiased analytical results, the identity of duplicate samples and field blanks were not revealed to the laboratory. A trip blank accompanied the sample cooler(s) from the laboratory to the field and back to the laboratory. The trip blanks were analyzed for BTEX by Method 8020 as a check on potential laboratory contaminants.

4.0 ANALYTICAL RESULTS

As mentioned in Section 3.7, ground-water samples were analyzed for BTEX by EPA Method 8020 and TPH-GRO by EPA Method 8015 in MW-2 and MW-4. A duplicate sample was collected from MW-4.

Benzene was below instrument detection limits (BDL) in both of these wells. MW-2 sample showed TPH-GRO was BDL. MW-4 and MW-4 duplicate sample reported a TPH-GRO concentration of 0.372 milligrams per liter (mg/l) and 0.336 mg/l which is below the TDEC cleanup level for a non-drinking water aquifer of 1.0 mg/l. Free product was not encountered in any of the facility wells. The analytical results are summarized in Table 4-1, and the analytical data are contained in Appendix C.

Also, shown in Table 4-1 are the analytical results from a sampling event performed on August 26, 1996. A comparison of the data on the March 17, 1997 and August 26, 1996 sampling events shows a decrease in concentrations of contaminants of concern, which is also reflected in Figure 4-1.

As previously mentioned, CW-1 was inadvertently abandoned, and TDEC agreed to allow MW-2 to be sampled instead of CW-1. In monitoring well MW-2 the benzene concentration was BDL. In the EAR performed in July 1992, the benzene concentration was BDL. The TPH concentration has also remained BDL from July 1992 to March 1997.

In monitoring well MW-4, the benzene concentration remained below detection limits. The TPH concentration decreased from 1.67 mg/l to 0.372 mg/l on these same dates.

TABLE 4-1
GROUND-WATER ANALYTICAL RESULTS
Building 376, Fuel Facility
NSA Memphis
Facility # 0-791673
REI Project No. 33201.000

Monitoring Well ID/Sample ID	Benzene (mg/l)	Toluene (mg/l)	Ethylbenzene (mg/l)	Total Xylenes (mg/l)	TPH-GRO (mg/l)
MW-2	BDL	BDL	BDL	BDL	BDL
REI CHAS 5015	BDL	BDL	BDL	BDL	BDL
MW-4	BDL	BDL	BDL	0.004	0.372
REI CHAS 5016	BDL	BDL	BDL	0.005	1.67
MW-4 (Dup)	BDL	BDL	BDL	0.004	0.336
REI CHAS 5017	N/A	N/A	N/A	N/A	N/A
Field Blank	BDL	BDL	BDL	BDL	BDL
REI CHAS 5014					

NOTE: The first entry in each block is from the March 1997 sampling event. The second entry is from August 1996 event.

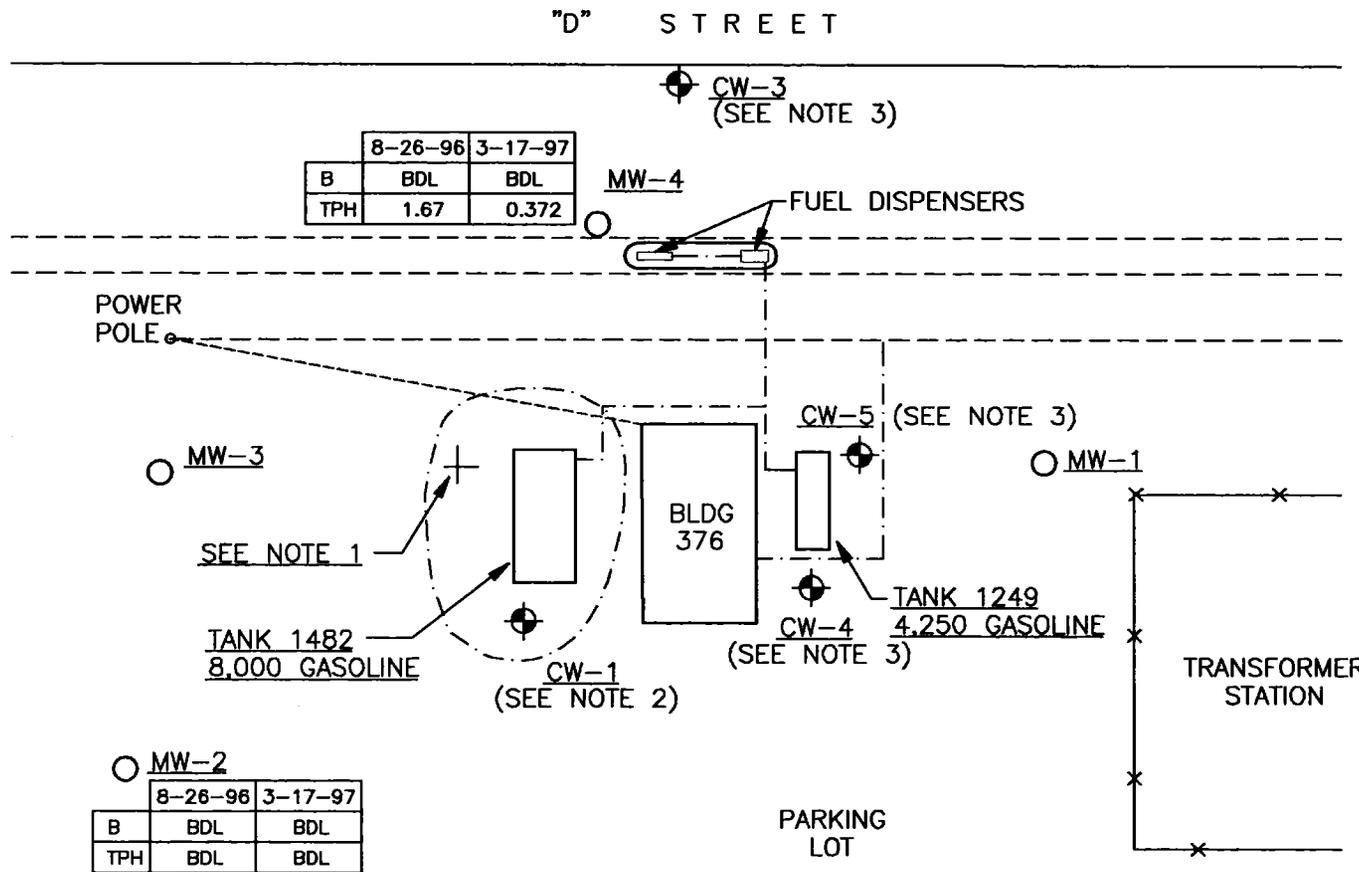
N/A Not Analyzed

BDL Below Detection Limits

BDL Indicates exceedances of TDEC's cleanup levels for a non-drinking water aquifer.

Applicable TDEC clean-up levels: Benzene 0.070 mg/l

TPH 1.00 mg/l



	8-26-96	3-17-97
B	BDL	BDL
TPH	1.67	0.372

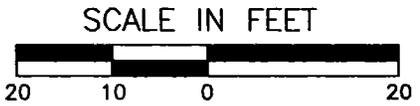
	8-26-96	3-17-97
B	BDL	BDL
TPH	BDL	BDL

NOTES:

1. RELEASE DETECTION WELL, CW-2, WAS REMOVED DURING UST 1482 CLOSURE IN OCTOBER, 1993.
2. RELEASE DETECTION WELL, CW-1, WAS ABANDONED DURING BASE-WIDE ABANDONMENT PROJECT IN JANUARY, 1996.
3. RELEASE DETECTION WELLS, CW-3, CW-4 AND C-5, WERE CLOSED OR ABANDONED ASSOCIATED WITH CLOSURE OF UST 1249 IN APRIL, 1996, CW-3 AND CW-4 IN JULY, 1996 AND CW-5 IN APRIL, 1996.

LEGEND

- B BENZENE CONCENTRATION (mg/L)
- BDL BELOW DETECTION LIMITS
- TPH TOTAL PETROLEUM HYDROCARBON CONCENTRATION (mg/L)
- MW-4 MONITORING WELL LOCATION
- APPROXIMATE EXTENT OF TPH PLUME
- EXISTING LEAK DETECTION/OBSERVATION WELL
- MONITORING WELL



RUST ENVIRONMENT & INFRASTRUCTURE

FIGURE 4-1
 BENZENE AND TPH CONCENTRATIONS
 AUGUST 26, 1996 AND MARCH 17, 1997
 NSA MEMPHIS, BUILDING 376
 RUST Project No. 33201

5.0 CONCLUSIONS AND RECOMMENDATIONS

- In the two wells sampled, benzene was below detection limits; TPH concentrations were below TDEC cleanup levels in monitoring well MW-4, and in monitoring well MW-2, TPH concentrations were below detection limits.
- The ground-water flow direction at the site is westerly, and the calculated average hydraulic gradient at the site is 0.023 ft/ft.
- The depth to static water table at the site ranges from 4.20 feet to 5.92 feet below grade.
- Free product was not detected in any of the facility wells.
- Natural biodegradation of the BTEX compounds appears to be occurring and historically, TPH compound concentrations have generally shown a downward trend. The TPH concentration decreased in MW-4 from 3.88 mg/l in March 1995 to 1.23 mg/l in March 1996. The TPH concentration increased from 1.23 mg/l in March 1996 to 1.67 mg/l in August 1996; the TPH concentration decreased from 1.67 mg/l in August 1996 to 0.372 mg/l in March 1997.

REI recommends comparison of data among past sampling events and the next one (approximately six months from now) to determine trends in petroleum hydrocarbon concentrations over time.

6.0 CERTIFICATION

Signature Page

I certify that under penalty of law, including but not limited to penalties for perjury, that the information contained in this report and on any attachments, is true, accurate and complete to the best of my knowledge, information, and belief. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for intentional violations.

_____	_____	_____
Owner/Operator (Print)	Signature	Date
<u>Ronald P. Pauling</u>	<u>Ronald P. Pauling / TN 3683</u>	<u>April 1, 1997</u>
P.E. or P.G. (Print)	Signature TN Lic./Reg. #	Date

If a P.E. signs the report, please indicate the area of expertise.

(Print or Type)

All signatures above must be notarized.

STATE OF South Carolina



Sworn to and subscribed before me by Ronald P. Pauling on this date April 1, 1997

My commission expires 11-25-97

CHARLES L. FANNING

Notary Public - Print Name

Charles L. Fanning

Signature

6.0 CERTIFICATION

Signature Page

I certify that under penalty of law, including but not limited to penalties for perjury, that the information contained in this report and on any attachments, is true, accurate and complete to the best of my knowledge, information, and belief. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for intentional violations.

DARRYL K. CREASY, LCDR, USN
Owner/Operator (Print)


Signature

8 APR 97
Date

P.E. or P.G. (Print)

Signature TN Lic./Reg. #

Date

If a P.E. signs the report, please indicate the area of expertise.

(Print or Type)

Stamp/Seal

All signatures above must be notarized.

STATE OF TENNESSEE

Sworn to and subscribed before me by Darryl Creasy on this date 8 APR 97

My commission expires 11/30/97

ERIC M. HURT
LT. JAGC, USNR

Notary Public - Print Name


Signature

APPENDIX A

TDEC - Technical Guidance Document - 007



STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION

Division of Underground Storage Tanks

Technical Guidance Document - 007

Effective Date - January 1, 1994

RE: Monitoring at UST Sites

The purpose of this Technical Guidance Document (TGD) is to assist the regulated community in determining the requirements for periodic monitoring and reporting at UST sites.

All work associated with this TGD shall be conducted in accordance with the applicable sections of the Environmental Assessment Guidelines.

I. Monitoring Program Components

A. Comprehensive

Comprehensive Monitoring shall consist of the following activities in sequence:

1. Water
 - a. Obtaining water level measurements from all monitoring wells;
 - b. Sampling all monitoring wells and recovery wells; and,
 - c. Sampling all springs and water supplies approved by the Division
2. Vapor monitoring of all subsurface structures (i.e. basements, utility vaults, sewers, etc.) within the contaminant plume(s). All structures which have been previously impacted by petroleum vapors, shall also be monitored.

B. Site Status

Site Status Monitoring shall consist of the following activities:

1. Water
 - a. Obtaining water level measurements from all monitoring wells;
 - b. Sampling all monitoring wells approved by the Division;

ENCLOSURE (1)

- c. Sampling all springs and water supplies approved by the Division; and,
 - d. Sampling the influent and effluent of the ground water treatment system, if applicable.
2. Vapor Monitoring of all subsurface structures (i.e. basements, utility vaults, sewers, etc.) within the contaminant plume(s). All structures which have been previously impacted by petroleum vapors, shall also be monitored.
 3. Emissions Monitoring from the soil vapor extraction system, if applicable. At a minimum, measurements of the total volatiles as measured by an organic vapor detector, O₂, and CO₂ shall be taken.

C. Soil

Soil Monitoring shall consist of the installation of one boring in the location where the highest level of soil contamination is known to exist through previous site assessment activities.

II. Monitoring Programs

A. Corrective Action

Corrective Action Monitoring shall be performed upon approval of the Corrective Action Plan by the Division, and consist of the following:

1. Comprehensive Monitoring shall be conducted prior to the start-up of the ground water corrective action system.
2. Site Status Monitoring shall be conducted semiannually (twice a year) thereafter until the ground water contaminant concentrations decrease below the applicable cleanup levels. Closure Monitoring shall commence 20 to 30 days after the Division approves the termination of the ground water corrective action system in accordance with Item C. below.
3. Soil Monitoring shall commence two years after the soil corrective action system becomes operational. It shall continue every two years until the soil contaminant concentrations decrease below the applicable cleanup levels.

B. Monitoring Only

A monitoring only program shall be implemented upon the Division's approval and consist of the following:

1. Based upon the readings taken during routine O & M visits to the site, what is the average flow rate and the estimated total gallons of water treated for the reporting period. (Report this amount in Table 1)
2. Based upon the last analytical results obtained during the reporting period, estimate the total pounds of Benzene and TPH removed via ground water treatment during the reporting period and the total pounds removed to date. Include all calculations. (Report this amount in Table 1)
3. Provide in Table 1 the monthly O & M costs incurred at the site and the total O & M costs to date. O & M costs shall include but not be limited to the following: all personnel time on and off site, report preparation, analytical costs, equipment rental, supplies, capital equipment, repairs, utilities, fees, per diem and mileage. If modifications are made to the system, briefly explain the modifications and why they were necessary.

B. Problems

Briefly describe any problems which have been encountered with the corrective action system(s) since the previous report and the actions taken to resolve the problem. Report the percent of time the treatment system was out of operation during the reporting period due to system failure. (Report this amount in Table 1)

C. Water Monitoring

1. Potentiometric Data

- a. Provide a table, prepared in accordance with Section D.1.c. of the Environmental Assessment Report Guidelines (EARG), from the data collected during the last two monitoring periods.
- b. Provide two potentiometric maps, prepared in accordance with Section D.1.d of the EARG, from the data collected during the last two monitoring periods.

2. Analytical Data

- a. Provide a table, prepared in accordance with Section D.5 of the EARG, for the water analytical results from the last four (4) monitoring periods.

Include in an appendix the laboratory analysis sheets from the most recent sampling event.

- b. If Comprehensive Monitoring was conducted during the current monitoring period provide a plume map(s) prepared in accordance with Section D.7.a. of the EARG.

1. Comprehensive Monitoring shall be conducted 20 to 30 days after the Division approves a monitoring only request.
2. Site Status Monitoring shall be conducted semiannually (twice a year) thereafter until:
 - a. Contaminant concentrations are below the applicable cleanup levels; or,
 - b. The Division requires additional activities.

If the analytical results indicate contaminant concentrations have decreased below the applicable cleanup levels, Closure Monitoring shall commence the next quarter in accordance with Item C. below and upon approval of the Division.

3. Soil Monitoring shall be performed every two years, until the soil contaminant concentrations are below the applicable cleanup levels or the Division requires additional activities.

C. Closure

Closure Monitoring is to determine that the ground water contaminant concentrations remain below the applicable cleanup levels for one year and consist of four (4) consecutive quarters of sampling using the following procedures:

1. Comprehensive Monitoring shall be conducted 20 to 30 days after the Division approves the start of a Closure Monitoring Program.
2. Site Status Monitoring shall be performed the second and third quarters.
3. Comprehensive Monitoring shall be conducted the fourth quarter.

If contaminant concentrations are detected above the applicable cleanup levels during closure program, additional activities associated with corrective action shall be required.

The Division reserves the right to modify these monitoring requirements at any time.

III. Report Preparation

Within thirty (30) days after sample collection, a report shall be prepared and submitted containing the following information:

A. Progress

If any corrective action has taken place since the last report, briefly describe the progress of the corrective action system(s) to date.

D. Vapor Monitoring Results

Describe the results of the vapor monitoring. Provide a map showing the locations of the sampling points and a table indicating the results of the sampling.

E. Emissions Monitoring Results

Describe the results obtained from the monitoring of any soil vapor extraction systems and provide a table with the results of the last four sampling events.

F. Soil Monitoring Results

Describe the results of any soil sampling if it was conducted during the reporting period. Provide a table with all soil analytical results obtained in accordance with this TGD.

G. Additional Information

Provide any additional information which was included in the approved CAP or required by the Division. If applicable, provide this additional information in tables or maps, in an appropriate format.

Signature Page

I certify under penalty of law, including but not limited to penalties for perjury, that the information contained in this report and on any attachments, is true, accurate and complete to the best of my knowledge, information, and belief. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for intentional violations.

Owner/Operator (Print)

Signature

Date

P.E. or P.G. (Print)

Signature TN Lic./Reg. #

Date

If a P.E. signs the report, please indicate the area of expertise.

(Print or Type)

Stamp/Seal

All signatures above must be notarized.

STATE OF _____

Sworn to and subscribed before me by _____ on this date

My commission expires _____

Notary Public - Print Name

Signature

MONITORING REPORT

Table 1

TN UST FACILITY ID NUMBER: _____

Reporting Period	From:	From:	From:	From:
	To:	To:	To:	To:
Avg. Flow Rate GPM				
Total Gallons Pumped Per Period				
Cumulative Total-Gallons Pumped				
% Time System Was Down				
Pounds of Benzene Removed-H2O Phase				
Cumulative Pounds of Benzene Removed-H2O				
Pounds of TPH Removed-H2O Phase				
Cumulative Pounds of TPH Removed-H2O Phase				

The Reporting Period described above shall be a six month interval.

Month						
# of Site Visits/Mo.						
O & M Costs per Month						
O&M Costs To Date						

The Reporting Period for O & M costs is monthly.

APPENDIX B

TDEC UST Site Ranking

UST SITE RANKING FORM

Facility ID Number: 0 - 7 9 1 6 7 3

Facility Name: NAVAL AIR STATION FUEL FACILITY

Facility Address: "D" STREET, BUILDING 376

Geologic and Hydrogeologic Factors

1 Minimum depth to the water table			
< 5.0 Feet		X	50
5.1 to 10.0 Feet			45
10.1 to 15.0 Feet			40
15.1 to 30.0 Feet			35
30.1 to 50.0 Feet			25
50.1 to 75.0 Feet			15
75.1 to 100.0 Feet			10
> 100.0 Feet			5
		Score	50

2 Minimum distance between water table and contaminated soil			
< 5.0 Feet		X	50
5.1 to 10.0 Feet			45
10.1 to 15.0 Feet			40
15.1 to 30.0 Feet			35
30.1 to 50.0 Feet			25
50.1 to 75.0 Feet			15
75.1 to 100.0 Feet			10
> 100.0 Feet			5
		Score	50

3 Soil Permeability			
> 10 ⁻⁴ cm/sec			30
10 ⁻⁴ to 10 ⁻⁶ cm/sec			20
< 10 ⁻⁶ cm/sec		X	10
		Score	10

4 Calculated Ground Water Flow Rate			
< 10 feet/day		X	3
10 to 40 feet/day			6
40 to 90 feet/day			12
90 to 130 feet/day			18
130 to 260 feet/day			24
> 260 feet/day			30
Karst			30
		Score	3

Receptor Factors

5	Basements		
	< 50.0 feet from known contamination		150
	50.1 to 100.0 feet from known contamination		75
	100.1 to 200.0 feet from known contamination		50
	200.1 to 300.0 feet from known contamination		25
	> 300.1 feet	X	0
		Score	0

6	Sanitary sewers		
	< 50.0 feet from known contamination	X	75
	50.1 to 100.0 feet from known contamination		40
	100.1 to 200.0 feet from known contamination		20
	200.1 to 300.0 feet from known contamination		10
	> 300.1 feet		0
		Score	75

7	Storm water sewers		
	< 50.0 feet from known contamination		50
	50.1 to 100.0 feet from known contamination		30
	100.1 to 200.0 feet from known contamination	X	10
	200.1 to 300.0 feet from known contamination		5
	> 300.1 feet		0
		Score	10

8	Other subsurface utilities		
	< 50.0 feet from known contamination	X	30
	50.1 to 100.0 feet from known contamination		20
	100.1 to 200.0 feet from known contamination		10
	200.1 to 300.0 feet from known contamination		5
	> 300.1 feet		0
		Score	30

9	Public water supply source		
	< .1 miles		300
	.1 to .25 miles		200
	.25 to .5 miles	X	100
	> .51 miles		0
		Score	100

10	Private water supply source		
	< .1 miles		200
	.1 to .25 miles		150
	.25 to .5 miles		100
	> .51 miles	X	0
		Score	0

11	Distance to surface water		
	< .1 miles		25
	.1 to .25 miles	X	15
	.25 to .5 miles		5
	> .51 miles		0
	Visibly impacted surface water from a petroleum product		200
		Score	15

Contaminant Factors

	A. Max. Contam. Levels	B. App. Cleanup Levels	C. Cont. Conc. Ratio A/B
12	Contaminant Concentration		
	Benzene in ground water	13 ^{ppm}	0.07 ^{ppm} 1.85
	TPH in ground water	1.8	1.0 ^{ppm} 1.8
	BTX in soil	.8	500 ^{ppm} .0016
	TPH in soil	17	1000 ^{ppm} 0.017

13	Benzene in ground water		
	< 1.0		0
	1.1 to 10.0	X	25
	10.1 to 50.0		50
	50.1 to 100.0		100
	100.1 to 500.0		200
	> 500.1		300
		Score	25

14	TPH in ground water		
	< 1.0		0
	1.1 to 10.0	X	20
	10.1 to 50.0		40
	50.1 to 100.0		80
	100.1 to 500.0		120
	> 500.1		200
		Score	20

15	BTX in soil		
	< 1.0	X	0
	1.1 to 5.0		25
	5.1 to 10.0		50
	10.1 to 50.0		100
	> 50.1		200
		Score	0

16	TPH in soil		
	< 1.0	X	0
	1.1 to 5.0		20
	5.1 to 10.0		40
	10.1 to 50.0		80
	> 50.1		100
		Score	0

17	Total site score		388
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APPENDIX C

ANALYTICAL RESULTS



ENVIRONMENTAL TESTING & CONSULTING, INC.

2924 Walnut Grove Road • Memphis, TN 38111 • (901) 327-2750 • FAX (901) 327-6334

Founded 1972

March 24, 1997

Mr. Ron Paulling
Rust Environment &
Infrastructure
2694 Lake Park Drive
North Charleston, SC 29406

Ref: Analytical Testing
ETC Order # 9703492
Project Description Building 376 NSA Memphis

The above referenced project has been analyzed per your instructions. The analyses were performed in our laboratory in accordance with Standard Methods 17th/18th Edition; The Solid Waste Manual SW-846; EPA Methods for the Analysis of Water and Wastes and/or 40 CFR part 136.

The results are shown on the attached analysis sheet(s).

Please do not hesitate to contact our office if you have any questions.

Sincerely,

A handwritten signature in black ink, appearing to read 'Nathan A. Pera, IV', written over a horizontal line.

Nathan A. Pera, IV
Chief Executive Officer

rt
Attachment

RUSTCHARLES

Environmental Testing & Consulting, Inc.
Data Qualifiers for Organic Reporting

Within the attached report, some analytical data may be reported as "Qualified Data" as indicated by a "Data Qualifier" next to the result. This table summarizes the possible "Data Qualifiers" that may be associated with this report.

Q	Surrogate Recovery Outside QC Limits
J	Estimated Value. Presence of the compound was confirmed but less than the reported detection limit.
E	Concentration exceeds the established method calibration range but is within the working range of the instrument.
B	Analyte detected in the associated Method Blank.
U	Reported result was unconfirmed. Refer to Case Narrative.
N	Non-Compliance Report associated with this sample or project.
C	Result reported from GC/MS confirmation analysis.
*	QC Data (percent recovery/RPD for a particular analyte was outside QC Limits)

ENVIRONMENTAL TESTING & CONSULTING, INC.

2924 Walnut Grove Road - Memphis, TN 38111 - (901)327-2750

ORGANIC ANALYSIS DATA SHEET

Client Name **Rust Environment &
Infrastructure
Infrastructure
2694 Lake Park Drive
North Charleston, SC 29406**
Site ID **Building 376 NSA Memphis**

Project # **33201.10000**
FID #

Date Arrived **03/18/97**
ETC Order Number **9703492**

ETC Lab ID **9703492-01**
Sample ID: REI CHAS 5014

Matrix **:AQUEOUS**
Sample Date **:03/17/97**

TEST	RESULT	UNITS	DETECTION LIMIT	DATE ANALYZED	BY	METHOD
BTEX/TPH GRO						8020/GRO
Benzene	ND	mg/L	0.001	03/20/97	RR	
Toluene	ND	mg/L	0.002	03/20/97	RR	
Ethyl Benzene	ND	mg/L	0.001	03/20/97	RR	
Xylenes (Total)	ND	mg/L	0.001	03/20/97	RR	
Gasoline Range Organics	ND	mg/L	0.100	03/20/97	RR	
MTBE	ND	mg/L	0.005	03/20/97	RR	

Lab ID **9703492-02**
Sample ID: REI CHAS 5015

Matrix **:AQUEOUS**
Sample Date **:03/17/97**

TEST	RESULT	UNITS	DETECTION LIMIT	DATE ANALYZED	BY	METHOD
BTEX/TPH GRO						8020/GRO
Benzene	ND	mg/L	0.001	03/20/97	RR	
Toluene	ND	mg/L	0.002	03/20/97	RR	
Ethyl Benzene	ND	mg/L	0.001	03/20/97	RR	
Xylenes (Total)	ND	mg/L	0.001	03/20/97	RR	
Gasoline Range Organics	ND	mg/L	0.100	03/20/97	RR	
MTBE	0.027	mg/L	0.005	03/20/97	RR	


LABORATORY MANAGER

ND - Not Detected

ENVIRONMENTAL TESTING & CONSULTING, INC.

2924 Walnut Grove Road - Memphis, TN 38111 - (901)327-2750

ORGANIC ANALYSIS DATA SHEET

Client Name **Rust Environment &
Infrastructure
Infrastructure
2694 Lake Park Drive
North Charleston, SC 29406**
Site ID **Building 376 NSA Memphis**

Project # **33201.10000**
FID #

Date Arrived **03/18/97**
ETC Order Number **9703492**

ETC Lab ID **9703492-03**
Sample ID: REI CHAS 5016

Matrix **:AQUEOUS**
Sample Date **:03/17/97**

TEST	RESULT	UNITS	DETECTION LIMIT	DATE ANALYZED	BY	METHOD
BTEX/TPH GRO						8020/GRO
Benzene	ND	mg/L	0.001	03/20/97	RR	
Toluene	ND	mg/L	0.002	03/20/97	RR	
Ethyl Benzene	ND	mg/L	0.001	03/20/97	RR	
Xylenes (Total)	0.004	mg/L	0.001	03/20/97	RR	
Gasoline Range Organics	0.372	mg/L	0.100	03/20/97	RR	
MTBE	0.050	mg/L	0.005	03/20/97	RR	

Lab ID **9703492-04**
Sample ID: REI CHAS 5017

Matrix **:AQUEOUS**
Sample Date **:03/17/97**

TEST	RESULT	UNITS	DETECTION LIMIT	DATE ANALYZED	BY	METHOD
BTEX/TPH GRO						8020/GRO
Benzene	ND	mg/L	0.001	03/20/97	RR	
Toluene	ND	mg/L	0.002	03/20/97	RR	
Ethyl Benzene	ND	mg/L	0.001	03/20/97	RR	
Xylenes (Total)	0.004	mg/L	0.001	03/20/97	RR	
Gasoline Range Organics	0.336	mg/L	0.100	03/20/97	RR	
MTBE	0.049	mg/L	0.005	03/20/97	RR	


LABORATORY MANAGER

ND - Not Detected

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ORGANIC ANALYSIS DATA SHEET

Client Name **Rust Environment &
Infrastructure
Infrastructure
2694 Lake Park Drive
North Charleston, SC 29406**

Site ID **Building 376 NSA Memphis**

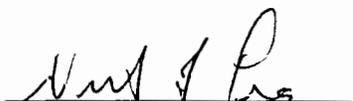
Project # **33201.10000**
FID #

Date Arrived **03/18/97**
ETC Order Number **9703492**

ETC Lab ID **9703492-05**
Sample ID: Trip Blank

Matrix **:AQUEOUS**
Sample Date **:03/17/97**

TEST	RESULT	UNITS	DETECTION LIMIT	DATE ANALYZED	BY	METHOD
BTEX/TPH GRO						8020/GRO
Benzene	ND	mg/L	0.001	03/20/97	RR	
Toluene	ND	mg/L	0.002	03/20/97	RR	
Ethyl Benzene	ND	mg/L	0.001	03/20/97	RR	
Xylenes (Total)	ND	mg/L	0.001	03/20/97	RR	
Gasoline Range Organics	ND	mg/L	0.100	03/20/97	RR	
MTBE	ND	mg/L	0.005	03/20/97	RR	


LABORATORY MANAGER

ND - Not Detected

ENVIRONMENTAL TESTING & CONSULTING, INC.

2924 Walnut Grove Road - Memphis, TN 38111 - (901)327-2750

ORGANIC ANALYSIS DATA SHEET

Client Name **Rust Environment &
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2694 Lake Park Drive
North Charleston, SC 29406**

Site ID **Building 376 NSA Memphis**

Project # **33201.10000**
FID #

Date Arrived **03/18/97**
ETC Order Number **9703492**

ETC Lab ID **9703492-01**
Sample ID: REI CHAS 5014

Matrix : **AQUEOUS**
Sample Date : **03/17/97**

TEST	RESULT	UNITS	DETECTION LIMIT	DATE ANALYZED	BY	METHOD
BTEX/TPH GRO						8020/GRO
Benzene	ND	mg/L	0.001	03/20/97	RR	
Toluene	ND	mg/L	0.002	03/20/97	RR	
Ethyl Benzene	ND	mg/L	0.001	03/20/97	RR	
Xylenes (Total)	ND	mg/L	0.001	03/20/97	RR	
Gasoline Range Organics	ND	mg/L	0.100	03/20/97	RR	
MTBE	ND	mg/L	0.005	03/20/97	RR	

ETC Lab ID **9703492-02**
Sample ID: REI CHAS 5015

Matrix : **AQUEOUS**
Sample Date : **03/17/97**

TEST	RESULT	UNITS	DETECTION LIMIT	DATE ANALYZED	BY	METHOD
BTEX/TPH GRO						8020/GRO
Benzene	ND	mg/L	0.001	03/20/97	RR	
Toluene	ND	mg/L	0.002	03/20/97	RR	
Ethyl Benzene	ND	mg/L	0.001	03/20/97	RR	
Xylenes (Total)	ND	mg/L	0.001	03/20/97	RR	
Gasoline Range Organics	ND	mg/L	0.100	03/20/97	RR	
MTBE	0.027	mg/L	0.005	03/20/97	RR	


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ORGANIC ANALYSIS DATA SHEET

Client Name **Rust Environment &
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North Charleston, SC 29406**

Site ID **Building 376 NSA Memphis**

Project # **33201.10000**
FID #

Date Arrived **03/18/97**
ETC Order Number **9703492**

ETC Lab ID **9703492-03**
Sample ID: REI CHAS 5016

Matrix : **AQUEOUS**
Sample Date : **03/17/97**

TEST	RESULT	UNITS	DETECTION LIMIT	DATE ANALYZED	BY	METHOD
BTEX/TPH GRO						8020/GRO
Benzene	ND	mg/L	0.001	03/20/97	RR	
Toluene	ND	mg/L	0.002	03/20/97	RR	
Ethyl Benzene	ND	mg/L	0.001	03/20/97	RR	
Xylenes (Total)	0.004	mg/L	0.001	03/20/97	RR	
Gasoline Range Organics	0.372	mg/L	0.100	03/20/97	RR	
MTBE	0.050	mg/L	0.005	03/20/97	RR	

ETC Lab ID **9703492-04**
Sample ID: REI CHAS 5017

Matrix : **AQUEOUS**
Sample Date : **03/17/97**

TEST	RESULT	UNITS	DETECTION LIMIT	DATE ANALYZED	BY	METHOD
BTEX/TPH GRO						8020/GRO
Benzene	ND	mg/L	0.001	03/20/97	RR	
Toluene	ND	mg/L	0.002	03/20/97	RR	
Ethyl Benzene	ND	mg/L	0.001	03/20/97	RR	
Xylenes (Total)	0.004	mg/L	0.001	03/20/97	RR	
Gasoline Range Organics	0.336	mg/L	0.100	03/20/97	RR	
MTBE	0.049	mg/L	0.005	03/20/97	RR	


LABORATORY MANAGER

ND - Not Detected

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ORGANIC ANALYSIS DATA SHEET

Client Name **Rust Environment &
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Infrastructure
2694 Lake Park Drive
North Charleston, SC 29406**
Site ID **Building 376 NSA Memphis**

Project # **33201.10000**
FID #

Date Arrived **03/18/97**
ETC Order Number **9703492**

ETC Lab ID **9703492-05**
Sample ID: Trip Blank

Matrix : **AQUEOUS**
Sample Date : **03/17/97**

TEST	RESULT	UNITS	DETECTION LIMIT	DATE ANALYZED	BY	METHOD
BTEX/TPH GRO						8020/GRO
Benzene	ND	mg/L	0.001	03/20/97	RR	
Toluene	ND	mg/L	0.002	03/20/97	RR	
Ethyl Benzene	ND	mg/L	0.001	03/20/97	RR	
Xylenes (Total)	ND	mg/L	0.001	03/20/97	RR	
Gasoline Range Organics	ND	mg/L	0.100	03/20/97	RR	
MTBE	ND	mg/L	0.005	03/20/97	RR	


LABORATORY MANAGER

ND - Not Detected

ENVIRONMENTAL TESTING & CONSULTING, INC.

2924 Walnut Grove Road - Memphis, TN 38111 - (901)327-2750

Surrogate Summary Report

Client Name **Rust Environment & Infrastructure**
Site ID **Building 376 NSA Memphis**

Project # **33201.10000**
FID #

ETC Lab ID : **9703492-01**
Sample ID : **REI CHAS 5014**

Matrix : **AQUEOUS**
Sample Date : **03/17/97**

	<u>Surrogate</u>	<u>Recovery</u>	<u>QC Low</u>	<u>QC High</u>
BTEX/TPH GRO	S1 - BFB	88	50	150
BTEX/TPH GRO	S2 - BFB	87	50	150

ETC Lab ID : **9703492-02**
Sample ID : **REI CHAS 5015**

Matrix : **AQUEOUS**
Sample Date : **03/17/97**

	<u>Surrogate</u>	<u>Recovery</u>	<u>QC Low</u>	<u>QC High</u>
BTEX/TPH GRO	S1 - BFB	89	50	150
BTEX/TPH GRO	S2 - BFB	87	50	150

ETC Lab ID : **9703492-03**
Sample ID : **REI CHAS 5016**

Matrix : **AQUEOUS**
Sample Date : **03/17/97**

	<u>Surrogate</u>	<u>Recovery</u>	<u>QC Low</u>	<u>QC High</u>
BTEX/TPH GRO	S1 - BFB	93	50	150
BTEX/TPH GRO	S2 - BFB	91	50	150

ETC Lab ID : **9703492-04**
Sample ID : **REI CHAS 5017**

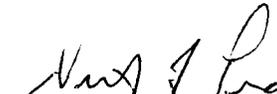
Matrix : **AQUEOUS**
Sample Date : **03/17/97**

	<u>Surrogate</u>	<u>Recovery</u>	<u>QC Low</u>	<u>QC High</u>
BTEX/TPH GRO	S1 - BFB	95	50	150
BTEX/TPH GRO	S2 - BFB	96	50	150

ETC Lab ID : **9703492-05**
Sample ID : **Trip Blank**

Matrix : **AQUEOUS**
Sample Date : **03/17/97**

	<u>Surrogate</u>	<u>Recovery</u>	<u>QC Low</u>	<u>QC High</u>
BTEX/TPH GRO	S1 - BFB	89	50	150
BTEX/TPH GRO	S2 - BFB	87	50	150


LABORATORY MANAGER

Q - Surrogate Recovery Outside QC Limits

ENVIRONMENTAL TESTING & CONSULTING, INC.

2924 Walnut Grove Road - Memphis, TN 38111 - (901)327-2750

Surrogate Summary Report

Client Name **Rust Environment & Infrastructure**
Site ID Building 376 NSA Memphis

Project # 33201.10000
FID #

ETC Lab ID : 9703492-01
Sample ID : REI CHAS 5014

Matrix :AQUEOUS
Sample Date :03/17/97

	<u>Surrogate</u>	<u>Recovery</u>	<u>QC Low</u>	<u>QC High</u>
BTEX/TPH GRO	S1 - BFB	88	50	150
BTEX/TPH GRO	S2 - BFB	87	50	150

ETC Lab ID : 9703492-02
Sample ID : REI CHAS 5015

Matrix :AQUEOUS
Sample Date :03/17/97

	<u>Surrogate</u>	<u>Recovery</u>	<u>QC Low</u>	<u>QC High</u>
BTEX/TPH GRO	S1 - BFB	89	50	150
BTEX/TPH GRO	S2 - BFB	87	50	150

ETC Lab ID : 9703492-03
Sample ID : REI CHAS 5016

Matrix :AQUEOUS
Sample Date :03/17/97

	<u>Surrogate</u>	<u>Recovery</u>	<u>QC Low</u>	<u>QC High</u>
X/TPH GRO	S1 - BFB	93	50	150
BTEX/TPH GRO	S2 - BFB	91	50	150

ETC Lab ID : 9703492-04
Sample ID : REI CHAS 5017

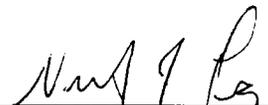
Matrix :AQUEOUS
Sample Date :03/17/97

	<u>Surrogate</u>	<u>Recovery</u>	<u>QC Low</u>	<u>QC High</u>
BTEX/TPH GRO	S1 - BFB	95	50	150
BTEX/TPH GRO	S2 - BFB	96	50	150

ETC Lab ID : 9703492-05
Sample ID : Trip Blank

Matrix :AQUEOUS
Sample Date :03/17/97

	<u>Surrogate</u>	<u>Recovery</u>	<u>QC Low</u>	<u>QC High</u>
BTEX/TPH GRO	S1 - BFB	89	50	150
BTEX/TPH GRO	S2 - BFB	87	50	150


LABORATORY MANAGER

Q - Surrogate Recovery Outside QC Limits