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RESOURCE CONSERVATION AND RECOVERY ACT FACILITY INVESTIGATION REPORT ADDENDUM AREA OF CONCERN 609 (AOC 609) ZONE F CNC CHARLESTON SC

10/26/2001

CH2M HILL

RFI REPORT ADDENDUM

Area of Concern 609, Zone F

Charleston Naval Complex
North Charleston, South Carolina

SUBMITTED TO
U.S. Navy Southern Division
Naval Facilities Engineering Command

CH2M-Jones

November 2001

Revision 1
Contract N62467-99-C-0960

CH2MHILL TRANSMITTAL

To: Jo Cherie Overcash, SCDHEC
Jamelle Ellis, SCDHEC
Cc: David Scaturo, SCDHEC
Joe Bowers, SCDHEC
Stacey French, SCDHEC

From: Louise Palmer, CH2M-Jones

Date: October 26, 2001

Re: Preliminary Responses to Comments on the AOC 609, Zone F RFI Report Addendum (Revision 0)

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Preliminary Responses to SCDHEC Comments on the AOC 609 RFI Report Addendum (Revision 0)

PREPARED FOR: Jo Cherie Overcash, SCDHEC
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CC: David Scaturo, SCDHEC
Joe Bowers, SCDHEC
Stacey French, SCDHEC

PREPARED BY: Louise Palmer, CH2M-Jones
Dean Williamson, CH2M-Jones

DATE: October 26, 2001

This memorandum provides preliminary responses to SCDHEC comments received regarding the RFI Report Addendum for AOC 609, Zone F, prepared by CH2M-Jones and issued in July 2001. After SCDHEC has reviewed these draft responses, we suggest that a conference call be held to address the most appropriate pathway forward for the site.

Jamelle Ellis and Jo Cherie Overcash have both recommended that this site not be approved for No Further Action (NFA), due to the presence of a hydrocarbon groundwater plume at Site 25 that is currently being addressed under the State of South Carolina Petroleum Program (Subtitle I under RCRA). After reviewing the concerns presented by the SCDHEC reviewers, CH2M-Jones has reviewed the site information and provided herein additional discussion, which we believe clarifies the issues. We believe that the technical issues raised by SCDHEC reviewers can be adequately addressed without requiring AOC 609 to remain open, and we are interested in working with the Department to identify a pathway forward that avoids an unnecessary linkage between the closeout of AOC 609 and further work at Site 25.

CH2M-Jones' draft responses to specific SCDHEC comments are presented below.

Jamelle Ellis General Comments:

SCDHEC Comment 1:
Section 7.0 Recommendations, p. 7-1
Lines 4-6, p. 7-1, recommend No Further Action (NFA) for AOC 609. The Department does not concur with the No Further Action Recommendation for the following reason:

Site 24. addressing petroleum products under the Department's RCRA Subtitle I program (UST Program), has been NFA'd. Site 25 is also being handled by the UST Program and is an open/active site. There is currently monitoring being conducted on Site 25. The Department cannot fully assess AOC 609 until investigations and subsequent recommendations regarding Site 25 have been made. The Department generally defers an

NFA determination for this type of site until after the investigation under RCRA Subtitle I program is complete. The *Recommendations* section of the document should be revised to state that the final corrective action for AOC 609 will be selected subsequent to selection of remedial action at Site 25.

All references to NFA with the released document should be removed.

CH2M-Jones Response 1:
AOC 609 encompasses Building 1346 service station activities, evaluated under RCRA Subtitle C. The building activities included management of virgin petroleum products (Site 25), which are covered under the RCRA Subtitle I (UST) program; these substances are not considered hazardous waste. Virgin petroleum products are excluded from RCRA Subtitle C regulations. An additional building activity involved collecting waste oil in a UST (Site 24) in an area removed from Site 25. Site 24 has been investigated under the Department's UST program, and the SCDHEC Bureau of Water Groundwater Quality Section has ruled it for NFA. However, potential releases from Site 24 (a waste product) are appropriately considered under the RCRA Subtitle C program, and therefore it is appropriate to include Site 24 in AOC 609. We do not believe that it is appropriate to include Site 25 (virgin petroleum products) in AOC 609, this site is being adequately addressed under the State of South Carolina's petroleum program.

Therefore, selection of NFA for AOC 609 should be independent of selection of corrective action for Site 25. The COPC evaluation concluded that no COCs are present at AOC 609 and an NFA ruling is recommended. The Department has agreed with these risk conclusions; see review comments by Susan Byrd.

Jo Cherie Overcash Comments:

SCDHEC Comment 1a:
Groundwater Flow
The Division of Hydrogeology is concerned that the Navy has not adequately determined the direction of groundwater flow at AOC 609, Site 24 and Site 25. In Appendix A and B of this RFI Addendum, portions of three other documents have been provided. Each of these documents gives a different direction for groundwater flow from southeast, southwest to northwest. Moreover, the Navy states that seasonal factors may influence the direction of groundwater flow. The Navy does not provide substantiating evidence. Due to the uncertainty of the direction of groundwater flow and the uncertainty of whether a seasonal fluctuation exists, it is unclear as to whether the existing groundwater monitoring wells are appropriately located to distinguish a contaminant plume emanating from Site 24 [R.61 – 79.264.97(a)].

CH2M-Jones Response 1a:
Numerous groundwater measurements have been conducted at AOC 609. Overall, the data at the site strongly confirm that the general direction of groundwater flow at the site is toward the southwest. This evidence includes the following:

1. *Of the flow direction measurements reviewed, only the maps presented in the Zone F RFI Report, Revision 0 (EnSafe, 1997) suggest anything other than a southwest flow direction (see discussion below and attached figures).*

2. *The dissolved phase plume resulting from the release of gasoline from the USTs at Site 25 has migrated in a southwesterly direction from the USTs, as described in the Site 25 Corrective Action Plan. The migration of dissolved phase gasoline components in a southwesterly direction provides confirmation that the predominant direction of groundwater flow at the site is towards the southwest.*

Further, because the only groundwater contamination present at the site is related to the USTs at Site 25, any further concerns about confirming groundwater flow direction is appropriately addressed under the petroleum program work for Site 25.

A further discussion of each groundwater flow direction monitoring event under review is provided below:

i. *EnSafe prepared groundwater flow maps from 1996 with measurements from five wells (SME wells 3, 4, 5, 7, and 8). These maps show groundwater flow in a southeast direction. It is unclear what data were used to prepare the maps presented in the Zone F RFI Report, Revision 0. However, groundwater depths measured during EnSafe's May, September, and November 1997 sampling events all indicate a flow pattern in a west-to-southwest direction. For the first sampling event in November 1996, the wells were sampled over a two-week time interval; groundwater flow patterns cannot be reliably estimated over this period of time. Note that this sampling event was not used to prepare the maps in the Zone F RFI Report, Revision 0.*

ii. *On September 8, 1999, Tetra Tech NUS, Inc. (TtNUS) measured groundwater elevations from four wells all clustered within only a 30-ft radius and centered approximately 100 ft northwest of the former waste oil UST location. It was concluded that the localized flow direction was west-northwest. The well locations are shown in the Initial Groundwater Assessment Report for Site 24, which is included in Appendix B of the AOC 609 RFI Report Addendum. Because the measuring area was so small, and this measurement did not include the area-wide groundwater elevations around AOC 609, it should not be considered applicable to the entire AOC 609, but only to the specific area measured.*

iii. *Groundwater measured for the Site 25 Rapid Assessment, on September 11, 1999 shows a southwest flow direction. These measurements included seven SME monitoring wells that surround AOC 609 and cover the waste oil UST area.*

iv. *Groundwater elevations measured on March 26, 2001 for the Site 25 Corrective Action Plan are mapped as Figure 4-4 in the RFI Report Addendum. This map also shows groundwater flow in a southwestern direction.*

v. *Groundwater measured by CH2M-Jones on October 19, 2001 confirms the groundwater flow direction to the southwest.*

It is common to expect some seasonal influence in groundwater gradient and flow, but evidence at AOC 609 indicates only minor variation. Groundwater flow maps from six different measurements over the period 1997 through 2001 are attached to these comment responses.

In conclusion, the overall weight of evidence strongly confirms a predominant southwesterly groundwater flow direction. Recent measurements confirm that the groundwater flow direction continues in this southwestern direction. FSMEGW004 is located correctly to

monitor any impacts to groundwater caused by potential releases from the waste oil UST. Any minor uncertainty about the degree of seasonal variations at AOC 609 is, in our opinion, an insufficient basis for delaying a regulatory decision for the site.

SCDHEC Comment 1b:

Groundwater Flow

Moreover, in Section 7.0, Recommendations, the Navy has concluded that the hazardous constituents detected in groundwater at AOC 609 are associated with the fuel product USTs designated as Site 25. According to Section VI of the *Department's Underground Storage Tank Assessment Guidelines for Permanent Closure, Change-in-Owner and Change-in-Service (June 1995)*, the contaminants detected at AOC 609 can also be associated with "Used Oil". Inherent in the Navy's conclusion is the assumption that the existing monitoring well system is adequately located.

CH2M-Jones Response 1b:

The weight of evidence and analytical data for the site adequately and convincingly demonstrate that the source of the dissolved phase BTEX plume at the site originated from the gasoline USTs at site 25. This weight of evidence includes the following:

1. *It is documented that the USTs at Site 25 failed a tank-tightness test, confirming that these tanks leaked fuel.*
2. *The subsequent identification of product in soil and groundwater at the location of these Site 25 USTs confirmed that the tanks were leaking.*
3. *The absence of BTEX parameters in soil and groundwater collected in the excavation from which the waste oil tank was removed (Site 24) confirms that the waste oil tank could not have been the source of the BTEX plume in Site 25 groundwater.*

Thus, the speculation that the waste oil tank could have been the source of the BTEX plume in this area, simply because BTEX parameters are on a list of suggested analytes for waste oil tank sampling, is disproved by the actual data and documented site conditions.

SCDHEC Comment 1c:

Groundwater Flow

Furthermore, in Appendix B, the *UST Assessment Report for UST NS1346* includes one groundwater sample collected during the 1996 closure of the 560 gallon Waste Oil Tank and piping (Site 24). The groundwater sample was collected from a depth of 7 feet at the south end of the excavation pit. Analysis of this groundwater sample detected the following constituents in concentrations greater than their corresponding maximum contaminant level (MCL) or action level (AL) as established by Federal Drinking Water Standards and Health Advisories, as amended:

Mercury at 2.69 micrograms per liter (ug/L);
Arsenic at 191 ug/L;
Chromium at 534 ug/L; and
Lead at 4550 ug/L.

CH2M-Jones Response 1c:
As noted above, BTEX parameters are noticeably absent from the list of parameters detected in the groundwater sample collected when the waste oil tank was removed, confirming that the BTEX plume did not originate at the waste oil tank. The only parameters detected above maximum contaminant levels (MCLs) or action levels were metals. The presence of these metals at elevated concentrations is most likely due to the conditions under which the groundwater sample was collected.

The groundwater sample collected during UST closure was scooped from the excavation pit at a 7-ft depth. The typical procedure during UST closure assessments is to dig with the excavator bucket several feet below the tank pit until groundwater is encountered, and collect a sample as soon as it is visible. This sample is collected quickly to reduce loss of potential volatile constituents, and therefore contains many particulates (i.e., it is usually muddy). Metals that are generally encountered in background soil samples at the CNC, such as mercury, arsenic, chromium, and lead, are to be expected in this groundwater sample. Naturally occurring metals in an unscreened groundwater sample collected from the excavation cannot be considered representative of site groundwater or evaluated similar to those from a monitoring well that has been properly screened and developed.

SCDHEC Comment 1d:
Groundwater Flow
Although the Navy has included groundwater data generated from monitoring well FSMEGW004 during the RFI (Appendix A, Table 10.5.8) and during the RFI Addendum activities (Appendix D), there is concern regarding the direction of groundwater flow and the location of the monitoring wells at the Waste Oil Tank, Site 24. For example, FSMEGW004 is approximate 30 feet southwest of Site 24, while FSMEGW005 is approximately 135 feet southeast of Site 24. Note that there are no monitoring wells located northwest of Site 24.

CH2M-Jones Response 1d:
See CH2M-Jones Response to SCDHEC Comment 1a regarding groundwater flow direction. As shown in the February 2000 Site 24 Assessment Report, five groundwater monitoring wells are located northwest of the former UST. The closest one, CNC24-MW04, is approximately 75 ft northwest of the former waste oil UST. Data from these wells have been used for the Subtitle I UST assessment. The data indicate only very low concentrations of toluene and naphthalene (below MCLs), and no other BTEX or PAHs associated with fuel products. In addition, metals were not detected in the groundwater above their method detection limits or background levels. Therefore, these monitoring wells located northwest of the waste oil UST indicate that contamination above regulatory standards is not present at Site 24.

SCDHEC Comment 1e:
Groundwater Flow
In conclusion, the Navy has not definitively established that the groundwater plume at AOC 609 is not from Site 24 Waste Oil Tank. However, the facility's RCRA Hazardous Waste Permit does not distinguish Site 24 Waste Oil Tank from Site 25 USTs but lists AOC 609 as Building 1346 Gas Station. Under the RCRA Permit, a decision regarding groundwater will be made for AOC 609 and will not distinguish between the Sites.

However, the Navy further states that the documented fuel release at Site 25 is being addressed under the Department's UST program.

CH2M-Jones Response 1e:
As previously discussed in CH2M-Jones' Response to SCDHEC Comment 1b, the site data and documented conditions conclusively indicate that the dissolved BTEX plume originated with the documented leaks in the gasoline USTs at Site 25, and not at Site 24. No data support SCDHEC's speculation that the waste oil tank is the source of this release; in fact, the data directly contradict this hypothesis.

Because Site 25 is being addressed under the state's petroleum program and because no COCs related to releases from other areas of AOC 609 have been identified, there is no reason not to move forward with closing out AOC 609 while keeping Site 25 under corrective action.

SCDHEC Comment 1f:
Groundwater Flow
Therefore, it is recommended that the Navy monitor groundwater elevation at AOC 609 to determine the direction of groundwater flow and to determine whether there is a seasonal fluctuation in the flow direction. It is also recommended that the Navy address AOC 609 in its entirety such that all concerns regarding the presence of arsenic, volatile organic compounds, and semi-volatile organic compounds are included whether from Site 24 or from Site 25.

CH2M-Jones Response 1f:
As previously indicated, the direction of groundwater flow is adequately known. Groundwater elevations have been measured at least six times. A measurement on October 19, 2001 confirms the previously known direction. In addition, measurements taken during the past four years indicate negligible seasonal variation in flow direction.

We disagree with the suggestion that Site 25 be transferred to the RCRA Corrective Action program. We believe this is contrary to the intent of both the RCRA Corrective Action and RCRA Subtitle I regulations. All constituents relating to a potential release from Building 1346 operations have been addressed either through this AOC 609 RFI or are being addressed through Subtitle I work at Site 25. All data indicate that arsenic has not been released to the groundwater through any Building 1346 operations, whether from Site 24 or Site 25, and that it has been addressed in the AOC 609 RFI Addendum. Groundwater COPCs encountered at Site 25 are related to fuel products and are managed under the Subtitle I program.

SCDHEC Comment 2:
Section 4, Summary of Additional Investigation
The Navy states that monitoring wells F609GW001 and F609GW002 were installed in response to the Department's initial comments regarding *the Zone F-RFI Report, Revision 0.* In Appendix C, the SCDHEC reply to Comment 5 (Eric Cathcart) states that in the April 1999 meeting, the Team agreed to install these two wells and to sample for the Appendix IX at DQO Level IV for at least two rounds. The Navy states that the May 1999 groundwater samples from these wells were analyzed for volatile organic compounds, semi-volatile organic compounds, metals, pesticides and polychlorinated biphenyls (arochlor). The Navy

further states that in October 1999 the analysis was reduced to metals and volatile organic compounds. No chain of custody forms have been included. The Navy should explain the lack of Appendix IX analysis of groundwater samples collected from E609GW001 and F609GW002.

CH2M-Jones Response 2:
The first sampling event for these two wells included SW846 pesticides, PCBs, VOCs, and SVOCs, and CLP-TAL metals; no PCBs, SVOCs, or pesticides were detected. Neither these three chemical groups nor cyanide would be expected in the perimeter wells, due to either their low solubility or lack of contaminant source at AOC 609. With the exception of 4-methylphenol (an anaerobic biodegradation breakdown product of toluene), there have been no SVOCs consistently identified in any AOC 609 or Site 25 groundwater monitoring wells that have exceeded MCLs or RBCs. Therefore, in the second sampling event, only metals and VOCs were monitored. Because the expanded list of constituents was not detected in the first sampling event and they are not expected to be at the well locations, it was not considered essential to analyze for compounds that were determined to be absent.

SCDHEC Comment 3:
Section 4, Summary of Additional Investigation
No chain of custody forms have been included for the soil and/or groundwater samples collected during the RFI Addendum activities. The Navy must provide the chain of custody forms for all the additional samples.

CH2M-Jones Response 3:
CH2M-Jones and the Navy will try to locate the chain of custody forms for the additional samples collected by EnSafe. It should be noted that no chain of custody forms have been submitted as part of previous Zone RFI reports. Although it is feasible to provide these forms for sampling performed by CH2M-Jones, it may not be possible to locate them from previous sampling efforts.

SCDHEC Comment 4:
Figure 4-4 Groundwater Potentiometric Surface Map
Groundwater monitoring well FSMEGW002 is depicted on Figure 4-4 but is not mentioned in the text. No analysis from this well is included in the data. The Navy should give the history and present condition of this well and clarify its purpose. If this well has been damaged, replaced and/or abandoned, the text should clearly state its condition.

CH2M-Jones Response 4:
Groundwater monitoring well FSMEGW002 is damaged and full of sediment. It has not been sampled and should not be used for groundwater level measurements. The text and groundwater level maps in the RFI Report Addendum will be adjusted.

SCDHEC Comment 5:
Figure 4-4 Groundwater Potentiometric Surface Map
The following two concerns regarding Figure 4-4 entitled Groundwater Potentiometric Surface Map should be addressed:

a. No date is given for the groundwater elevation data.

b. The contours are incorrect at the FSMEGW002 location.

CH2M-Jones Response 5:
The figure will be revised with measurement date and removal of information regarding the damaged well. Please see CH2M-Jones Response to SCDHEC Comment 4.

SCDEHC Comment 6:
Appendix B
In this Appendix, the Navy has included portions of documents that have been submitted to the Department's Bureau of Water. Specifically, the appendices to the *Initial Groundwater Assessment Report for Site 24, Building NS1346*, dated February 2000, and the appendices to the *Rapid Assessment Report for Site 25, Building 1346*, dated November 1999, have not been included. The Navy should provide these appendices.

CH2M-Jones Response 6:
Appendices will be provided for the referenced reports.

SCDHEC Comment 7:
Appendix D
The tables included in Appendix D are entitled "Data Summary". This document is an "Addendum" to the RFI Report and a complete set of data should be provided. All historical and new data for each monitoring well (soil location) should be presented on tables to include the date of sample collection. The organization of the table should be such that the reviewer can readily determine groundwater quality at each location and whether trends are present. Although a portion of the RFI Report is reproduced in this Addendum, the Navy should incorporate old and new data for ease of review.

CH2M-Jones Response 7:
Because of the volume of data generated for the RFI, the reader is requested to refer to the Zone F RFI Report, Revision 0, for a complete summary of historical data. A summary of all analyses for newer data is provided in Appendix D, along with date of sampling. All detected analytes from normal samples (not field duplicates) of the more recent field efforts are further presented in Section 4.0. The BRAC Cleanup Team (BCT) has previously agreed that complete summary tables of all data are not required in the RFI Report Addenda. Where appropriate, we will provide comprehensive data tables for selected parameters. The attached comprehensive table of groundwater COPCs will be added to Section 5.0. Figures showing all groundwater data for a specific COPC are provided in the report where appropriate.

Susan Byrd Comments:

After review of the above referenced document, no revisions or corrections are requested in regards to risk assessment issues. However, the Department has questions/concerns regarding the utilization of the August 2001 Technical Memorandum regarding inorganic background values. Although I agree with the risk conclusions drawn in the SWMU 609 RFI Addendum, I do not concur with the overall approach for the elimination of COPCs utilizing the background data. CH2M-Jones should note that the approach outlined in the

August 2001 Background Tech Memo has not yet been approved by the Department. Based on the Department's review of the Background Tech Memo, application of the background data in regards to the elimination of COPCs has not clearly been provided. It is recommended that the CNC Team discuss the application of background in the next Team meeting so that COPC selection or elimination can be technically defensible and consistent in future documents. This will assist the Department in the expedited review/approval of the approach for using background values at CNC.

CH2M-Jones Response:
Comment noted. This item will be discussed at the BCT meeting. CH2M-Jones is willing to revise Section 5.0 as necessary to be compatible with recent discussions regarding the evaluation of COCs.

TABLE 5-2
Groundwater COPCs; Inorganic Compounds
RFI Report Addendum, AOC 609, Zone F, Charleston Naval Complex

Parameter	Location	Sample Date	Concentration (µg/L)	Qualifier	MCL/*RBC*[a]	BRC[b]
Aluminum	F609GW001	05/20/1999	7,440	J	*37,000*	224
		10/12/1999	153	J		
	F609GW002	05/20/1999	308	J		
		10/12/1999	58.7	UJ		
	FSMEGW001	11/21/1996	4,450	=		
		05/12/1997	394	=		
		09/10/1997	70.6	U		
		11/21/1997	661	=		
	FSMEGW003	11/13/1996	127	J		
		05/12/1997	734	=		
		09/05/1997	761	=		
		11/21/1997	1,540	=		
	FSMEGW004	11/21/1996	116	J		
		05/13/1997	41.4	U		
		09/05/1997	27.4	U		
		11/21/1997	59.6	U		
	FSMEGW005	11/13/1996	458	J		
		05/13/1997	87.2	J		
		09/08/1997	90.9	J		
		11/20/1997	124	U		
	FSMEGW006	11/13/1996	18.0	U		
		05/14/1997	11.5	U		
		09/09/1997	9.0	U		
		11/20/1997	14.3	U		
	FSMEGW007	11/13/1996	5,660	J		
		05/14/1997	99.2	J		
		09/09/1997	5,860	=		
		11/20/1997	1,420	J		
	FSMEGW008	11/21/1996	142	=		
		05/13/1997	29.3	U		
		09/09/1997	49.3	U		
		11/19/1997	58.6	J		
Antimony	F609GW001	05/20/1999	5.0	U	6	NL
		10/12/1999	2.4	U		
	F609GW002	05/20/1999	5.0	U		
		10/12/1999	2.4	U		
	FSMEGW001	11/21/1996	2.1	U		
		05/12/1997	4.0	J		
		09/10/1997	2.7	U		
		11/21/1997	6.7	J		

TABLE 5-2
Groundwater COPCs; Inorganic Compounds
RFI Report Addendum, AOC 609, Zone F, Charleston Naval Complex

Parameter	Location	Sample Date	Concentration (µg/L)	Qualifier	MCL/*RBC*[a]	BRC[b]
Antimony	FSMEGW003	11/13/1996	2.1	U	6	NL
		05/12/1997	2.7	J		
		09/05/1997	2.7	U		
		11/21/1997	1.6	UJ		
	FSMEGW004	11/21/1996	3.2	U		
		05/13/1997	3.2	U		
		09/05/1997	2.7	U		
		11/21/1997	1.6	UJ		
	FSMEGW005	11/13/1996	2.1	U		
		05/13/1997	3.3	U		
		09/08/1997	2.7	U		
		11/20/1997	1.6	UJ		
	FSMEGW006	11/13/1996	2.1	U		
		05/14/1997	2.9	U		
		09/09/1997	1.6	U		
		11/20/1997	1.6	UJ		
	FSMEGW007	11/13/1996	2.1	U		
		05/14/1997	4.6	U		
		09/09/1997	1.6	U		
		11/20/1997	1.6	UJ		
	FSMEGW008	11/21/1996	3.2	U		
		05/13/1997	1.6	U		
		09/09/1997	2.9	U		
		11/19/1997	1.6	UJ		
Arsenic	F609GW001	05/20/1999	7.5	J	50	16.7
		10/12/1999	47.3	=		
	F609GW002	05/20/1999	**105**	=		
		10/12/1999	30.1	=		
	FSMEGW001	11/21/1996	**65.2**	=		
		05/12/1997	**50.6**	=		
		09/10/1997	37.7	=		
		11/21/1997	36.0	=		
	FSMEGW003	11/13/1996	6.5	J		
		05/12/1997	8.0	J		
		09/05/1997	3.6	J		
		11/21/1997	5.2	J		
	FSMEGW004	11/21/1996	15.9	=		
		05/13/1997	20.4	=		
		09/05/1997	16.6	=		
		11/21/1997	19.2	=		

TABLE 5-2
Groundwater COPCs; Inorganic Compounds
RFI Report Addendum, AOC 609, Zone F, Charleston Naval Complex

Parameter	Location	Sample Date	Concentration (µg/L)	Qualifier	MCL/*RBC*[a]	BRC[b]
Arsenic	FSMEGW005	11/13/1996	41.6	J	50	16.7
		05/13/1997	48.7	=		
		09/08/1997	**58.5**	=		
		11/20/1997	42.2	=		
	FSMEGW006	11/13/1996	38.7	J		16.2
		05/14/1997	33.6	=		
		09/09/1997	**52.2**	=		
		11/20/1997	**56.1**	=		
	FSMEGW007	11/13/1996	5.2	J		16.7
		05/14/1997	2.1	U		
		09/09/1997	2.1	U		
		11/20/1997	2.5	J		
	FSMEGW008	11/21/1996	18.4	=		
		05/13/1997	21.6	=		
		09/09/1997	31.2	=		
		11/19/1997	31.5	=		

Concentrations in bolded and outlined text indicate exceedance of MCLs.

[a]RBCs are listed in italics where no primary MCL exists. Tap water RBCs are listed in the EPA Region III RBC table (October 2000).

[b]BRCs are taken from the *Zone F RFI Report, Revision 0* (EnSafe, 1997).

= Analyte is detected at concentration shown

J Analyte is presented at an estimated concentration

U Analyte not detected; value is reporting limit

UJ Analyte not detected; value is estimated reporting limit

TABLE 5-3
COPCs in Groundwater; Organic Compounds
RFI Report Addendum, AOC 609, Zone F, Charleston Naval Complex

Parameter	Location	Sample Date	Concentration (µg/L)	Qualifier	MCL/*RBC*[a]
Benzene	F609GW001	05/20/1999	5	U	5
		10/12/1999	3	U	
	F609GW002	05/20/1999	5	U	
		10/12/1999	3	U	
	FSMEGW001	11/21/1996	5	U	
		05/12/1997	5	U	
		09/10/1997	5	U	
		11/21/1997	5	U	
	FSMEGW003	11/13/1996	5	U	
		05/12/1997	5	U	
		09/05/1997	5	U	
		11/21/1997	5	U	
	FSMEGW004	11/21/1996	5	U	
		05/13/1997	5	U	
		09/05/1997	5	U	
		11/21/1997	5	U	
	FSMEGW005	11/13/1996	**34,000**	=	
		05/13/1997	**18,000**	=	
		09/08/1997	**14,000**	=	
		11/20/1997	**23,000**	=	
	FSMEGW006	11/13/1996	5	U	
		05/14/1997	5	U	
		09/09/1997	5	U	
		11/20/1997	5	U	
	FSMEGW007	11/13/1996	5	U	
		05/14/1997	5	U	
		09/09/1997	5	U	
		11/20/1997	5	U	
	FSMEGW008	11/21/1996	5	U	
		05/13/1997	5	U	
		09/09/1997	5	U	
		11/19/1997	5	U	
Ethylbenzene	F609GW001	05/20/1999	5	U	700
		10/12/1999	3	U	
	F609GW002	05/20/1999	5	U	
		10/12/1999	3	U	
	FSMEGW001	11/21/1996	5	U	
		05/12/1997	5	U	
		09/10/1997	5	U	
		11/21/1997	5	U	

TABLE 5-3
COPCs in Groundwater; Organic Compounds
RFI Report Addendum, AOC 609, Zone F, Charleston Naval Complex

Parameter	Location	Sample Date	Concentration (µg/L)	Qualifier	MCL/*RBC*[a]
Ethylbenzene	FSMEGW003	11/13/1996	5	U	700
		05/12/1997	5	U	
		09/05/1997	5	U	
		11/21/1997	5	U	
	FSMEGW004	11/21/1996	5	U	
		05/13/1997	5	U	
		09/05/1997	5	U	
		11/21/1997	5	U	
	FSMEGW005	11/13/1996	**2,400**	J	
		05/13/1997	**1,700**	=	
		09/08/1997	**1,000**	=	
		11/20/1997	**2,600**	=	
	FSMEGW006	11/13/1996	5	U	
		05/14/1997	5	U	
		09/09/1997	5	U	
		11/20/1997	5	U	
	FSMEGW007	11/13/1996	5	U	
		05/14/1997	5	U	
		09/09/1997	5	U	
		11/20/1997	5	U	
	FSMEGW008	11/21/1996	5	U	
		05/13/1997	5	U	
		09/09/1997	5	U	
		11/19/1997	5	U	
Naphthalene	F609GW001	05/20/1999	10	U	*6.5*
	F609GW002	05/20/1999	10	U	
	FSMEGW001	11/21/1996	10	U	
		05/12/1997	10	U	
		09/10/1997	10	U	
		11/21/1997	10	U	
	FSMEGW003	11/13/1996	10	U	
		05/12/1997	10	U	
		09/05/1997	10	U	
		11/21/1997	10	U	
	FSMEGW004	11/21/1996	10	U	
		05/13/1997	10	U	
		09/05/1997	10	U	
		11/21/1997	10	U	
	FSMEGW005	11/13/1996	**540**	=	

TABLE 5-3
COPCs in Groundwater; Organic Compounds
RFI Report Addendum, AOC 609, Zone F, Charleston Naval Complex

Parameter	Location	Sample Date	Concentration (µg/L)	Qualifier	MCL/*RBC*[a]
Naphthalene	FSMEGW005	05/13/1997	**240**	=	*6.5*
		09/08/1997	**330**	=	
		11/20/1997	**370**	=	
	FSMEGW006	11/13/1996	10	U	
		05/14/1997	10	U	
		09/09/1997	10	U	
		11/20/1997	10	U	
	FSMEGW007	11/13/1996	10	U	
		05/14/1997	10	U	
		09/09/1997	10	U	
		11/20/1997	10	U	
	FSMEGW008	11/21/1996	10	U	
		05/13/1997	10	U	
		09/09/1997	10	U	
		11/19/1997	10	U	
Toluene	F609GW001	05/20/1999	5	U	1,000
		10/12/1999	3	U	
	F609GW002	05/20/1999	5	U	
		10/12/1999	3	U	
	FSMEGW001	11/21/1996	5	U	
		05/12/1997	5	U	
		09/10/1997	5	U	
		11/21/1997	5	U	
	FSMEGW003	11/13/1996	5	U	
		05/12/1997	5	U	
		09/05/1997	5	U	
		11/21/1997	5	U	
	FSMEGW004	11/21/1996	5	U	
		05/13/1997	5	U	
		09/05/1997	5	U	
		11/21/1997	5	U	
	FSMEGW005	11/13/1996	**56,000**	=	
		05/13/1997	**24,000**	=	
		09/08/1997	**17,000**	=	
		11/20/1997	**34,000**	=	
	FSMEGW006	11/13/1996	5	U	
		05/14/1997	5	U	
		09/09/1997	5	U	
		11/20/1997	5	U	

TABLE 5-3
COPCs in Groundwater; Organic Compounds
RFI Report Addendum, AOC 609, Zone F, Charleston Naval Complex

Parameter	Location	Sample Date	Concentration (µg/L)	Qualifier	MCL/*RBC*[a]
Toluene	FSMEGW007	11/13/1996	5	U	1,000
		05/14/1997	5	U	
		09/09/1997	5	U	
		11/20/1997	5	U	
	FSMEGW008	11/21/1996	5	U	
		05/13/1997	5	U	
		09/09/1997	5	U	
		11/19/1997	5	U	
Xylenes, Total	F609GW001	05/20/1999	5	U	10,000
		10/12/1999	3	U	
	F609GW002	05/20/1999	5	U	
		10/12/1999	3	U	
	FSMEGW001	11/21/1996	5	U	
		05/12/1997	5	U	
		09/10/1997	5	U	
		11/21/1997	5	U	
	FSMEGW003	11/13/1996	5	U	
		05/12/1997	5	U	
		09/05/1997	5	U	
		11/21/1997	5	U	
	FSMEGW004	11/21/1996	5	U	
		05/13/1997	5	U	
		09/05/1997	5	U	
		11/21/1997	5	U	
	FSMEGW005	11/13/1996	**15,000**	=	
		05/13/1997	8,600	=	
		09/08/1997	4,800	=	
		11/20/1997	**12,000**	=	
	FSMEGW006	11/13/1996	5	U	
		05/14/1997	5	U	
		09/09/1997	5	U	
		11/20/1997	5	U	
	FSMEGW007	11/13/1996	5	U	
		05/14/1997	5	U	
		09/09/1997	5	U	
		11/20/1997	5	U	
	FSMEGW008	11/21/1996	5	U	
		05/13/1997	5	U	
		09/09/1997	5	U	
		11/19/1997	4	J	

TABLE 5-3
COPCs in Groundwater; Organic Compounds
RFI Report Addendum, AOC 609, Zone F, Charleston Naval Complex

Parameter	Location	Sample Date	Concentration (µg/L)	Qualifier	MCL/*RBC*[a]
2,4-Dimethylphenol	F609GW001	05/20/1999	10	U	*730*
	F609GW002	05/20/1999	10	U	
	FSMEGW001	11/21/1996	10	U	
		05/12/1997	10	U	
		09/10/1997	10	U	
		11/21/1997	10	U	
	FSMEGW003	11/13/1996	10	U	
		05/12/1997	10	U	
		09/05/1997	10	U	
		11/21/1997	10	U	
	FSMEGW004	11/21/1996	10	U	
		05/13/1997	10	U	
		09/05/1997	10	U	
		11/21/1997	10	U	
	FSMEGW005	11/13/1996	380	=	
		05/13/1997	120	=	
		09/08/1997	110	=	
		11/20/1997	140	=	
	FSMEGW006	11/13/1996	10	U	
		05/14/1997	10	U	
		09/09/1997	10	U	
		11/20/1997	10	U	
	FSMEGW007	11/13/1996	10	U	
		05/14/1997	10	U	
		09/09/1997	10	U	
		11/20/1997	10	U	
	FSMEGW008	11/21/1996	10	U	
		05/13/1997	10	U	
		09/09/1997	10	U	
		11/19/1997	10	U	
2-Methylnaphthalene	F609GW001	05/20/1999	10	U	*122*
	F609GW002	05/20/1999	10	U	
	FSMEGW001	11/21/1996	10	U	
		05/12/1997	10	U	
		09/10/1997	10	U	
		11/21/1997	10	U	
	FSMEGW003	11/13/1996	10	U	
		05/12/1997	10	U	
		09/05/1997	10	U	
		11/21/1997	10	U	

TABLE 5-3
COPCs in Groundwater; Organic Compounds
RFI Report Addendum, AOC 609, Zone F, Charleston Naval Complex

Parameter	Location	Sample Date	Concentration (µg/L)	Qualifier	MCL/*RBC*[a]
2-Methylnaphthalene	FSMEGW004	11/21/1996	10	U	*122*
		05/13/1997	10	U	
		09/05/1997	10	U	
		11/21/1997	10	U	
	FSMEGW005	11/13/1996	48	=	
		05/13/1997	110	=	
		09/08/1997	64	=	
		11/20/1997	100	=	
	FSMEGW006	11/13/1996	10	U	
		05/14/1997	10	U	
		09/09/1997	10	U	
		11/20/1997	10	U	
	FSMEGW007	11/13/1996	10	U	
		05/14/1997	10	U	
		09/09/1997	10	U	
		11/20/1997	10	U	
	FSMEGW008	11/21/1996	10	U	
		05/13/1997	10	U	
		09/09/1997	10	U	
		11/19/1997	10	U	
2-Methylphenol (o-Cresol)	F609GW001	05/20/1999	10	U	*1,830*
	F609GW002	05/20/1999	10	U	
	FSMEGW001	11/21/1996	10	U	
		05/12/1997	10	U	
		09/10/1997	10	U	
		11/21/1997	10	U	
	FSMEGW003	11/13/1996	10	U	
		05/12/1997	10	U	
		09/05/1997	10	U	
		11/21/1997	10	U	
	FSMEGW004	11/21/1996	10	U	
		05/13/1997	10	U	
		09/05/1997	10	U	
		11/21/1997	10	U	
	FSMEGW005	11/13/1996	1,000	=	
		05/13/1997	220	=	
		09/08/1997	290	=	
		11/20/1997	340	=	

TABLE 5-3
COPCs in Groundwater; Organic Compounds
RFI Report Addendum, AOC 609, Zone F, Charleston Naval Complex

Parameter	Location	Sample Date	Concentration (µg/L)	Qualifier	MCL/*RBC*[a]
2-Methylphenol (o-Cresol)	FSMEGW006	11/13/1996	10	U	*1,830*
		05/14/1997	10	U	
		09/09/1997	10	U	
		11/20/1997	10	U	
	FSMEGW007	11/13/1996	10	U	
		05/14/1997	10	U	
		09/09/1997	10	U	
		11/20/1997	10	U	
	FSMEGW008	11/21/1996	10	U	
		05/13/1997	10	U	
		09/09/1997	10	U	
		11/19/1997	10	U	
4-Methylphenol (p-Cresol)	F609GW001	05/20/1999	10	U	*183*
	F609GW002	05/20/1999	10	U	
	FSMEGW001	11/21/1996	10	U	
		05/12/1997	10	U	
		09/10/1997	10	U	
		11/21/1997	1	J	
	FSMEGW003	11/13/1996	10	U	
		05/12/1997	10	U	
		09/05/1997	10	U	
		11/21/1997	10	U	
	FSMEGW004	11/21/1996	10	U	
		05/13/1997	10	U	
		09/05/1997	10	U	
		11/21/1997	10	U	
	FSMEGW005	11/13/1996	**970**	=	
		05/13/1997	**260**	=	
		09/08/1997	**290**	=	
		11/20/1997	**310**	=	
	FSMEGW006	11/13/1996	10	U	
		05/14/1997	10	U	
		09/09/1997	10	U	
		11/20/1997	10	U	
	FSMEGW007	11/13/1996	10	U	
		05/14/1997	10	U	
		09/09/1997	10	U	
		11/20/1997	10	U	

TABLE 5-3
COPCs in Groundwater; Organic Compounds
RFI Report Addendum, AOC 609, Zone F, Charleston Naval Complex

Parameter	Location	Sample Date	Concentration (µg/L)	Qualifier	MCL/*RBC*[a]
4-Methylphenol (p-Cresol)	FSMEGW008	11/21/1996	10	U	*183*
		05/13/1997	10	U	
		09/09/1997	10	U	
		11/19/1997	10	U	

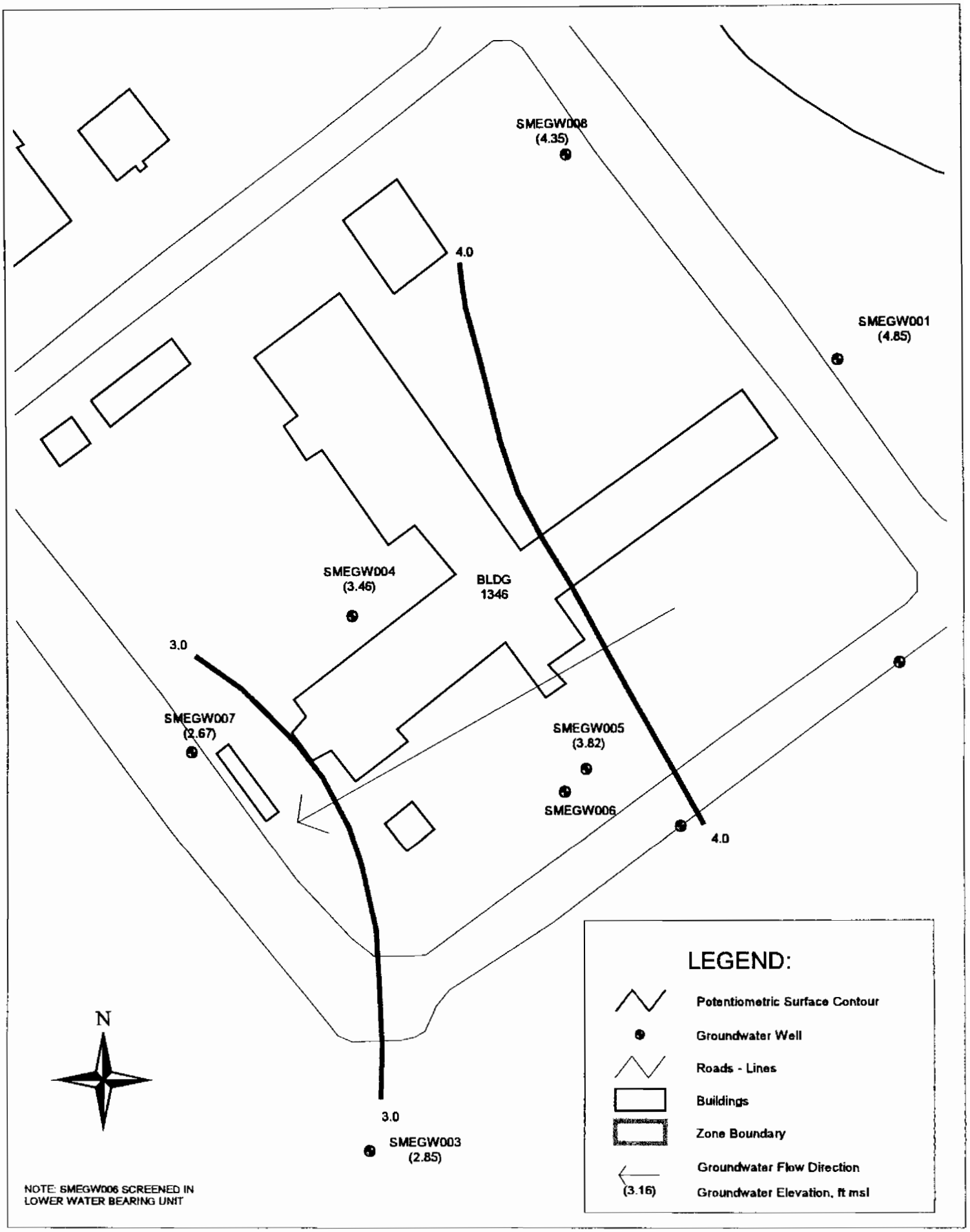
Concentrations in bolded and outlined text indicate exceedance of MCLs.

[a]RBCs are listed in italics where no primary MCL exists. Tap water RBCs are listed in the EPA Region III RBC table (October 2000).

U Analyte not detected; value is reporting limit

J Analyte is presented at an estimated concentration

= Analyte is detected at concentration shown



CH2MHILL

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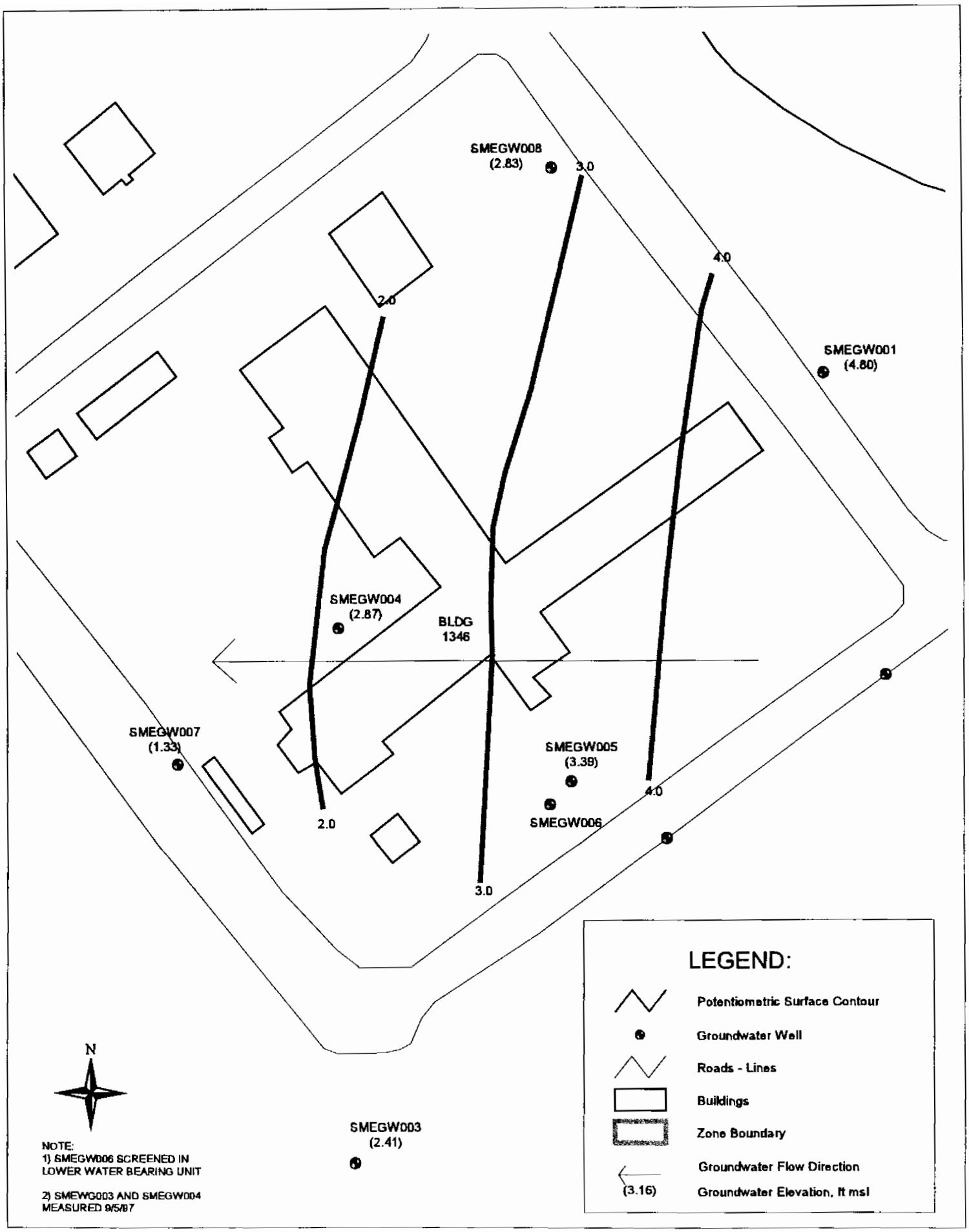
AOC609
GROUNDWATER POTENTIOMETRIC SURFACE MAP



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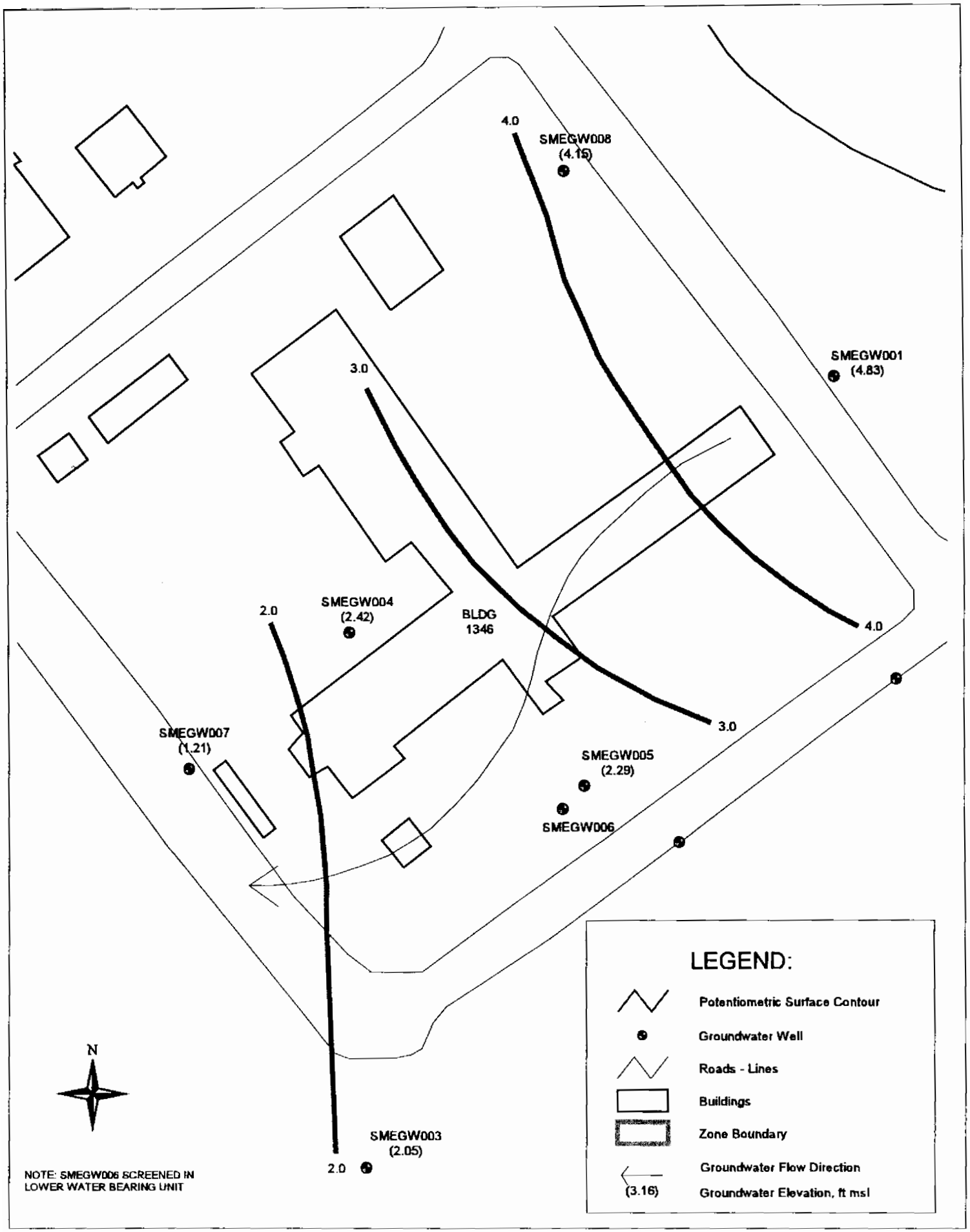
60 0 60 Feet

AOC609
GROUNDWATER POTENTIOMETRIC SURFACE MAP
SEPTEMBER 8-9,1997



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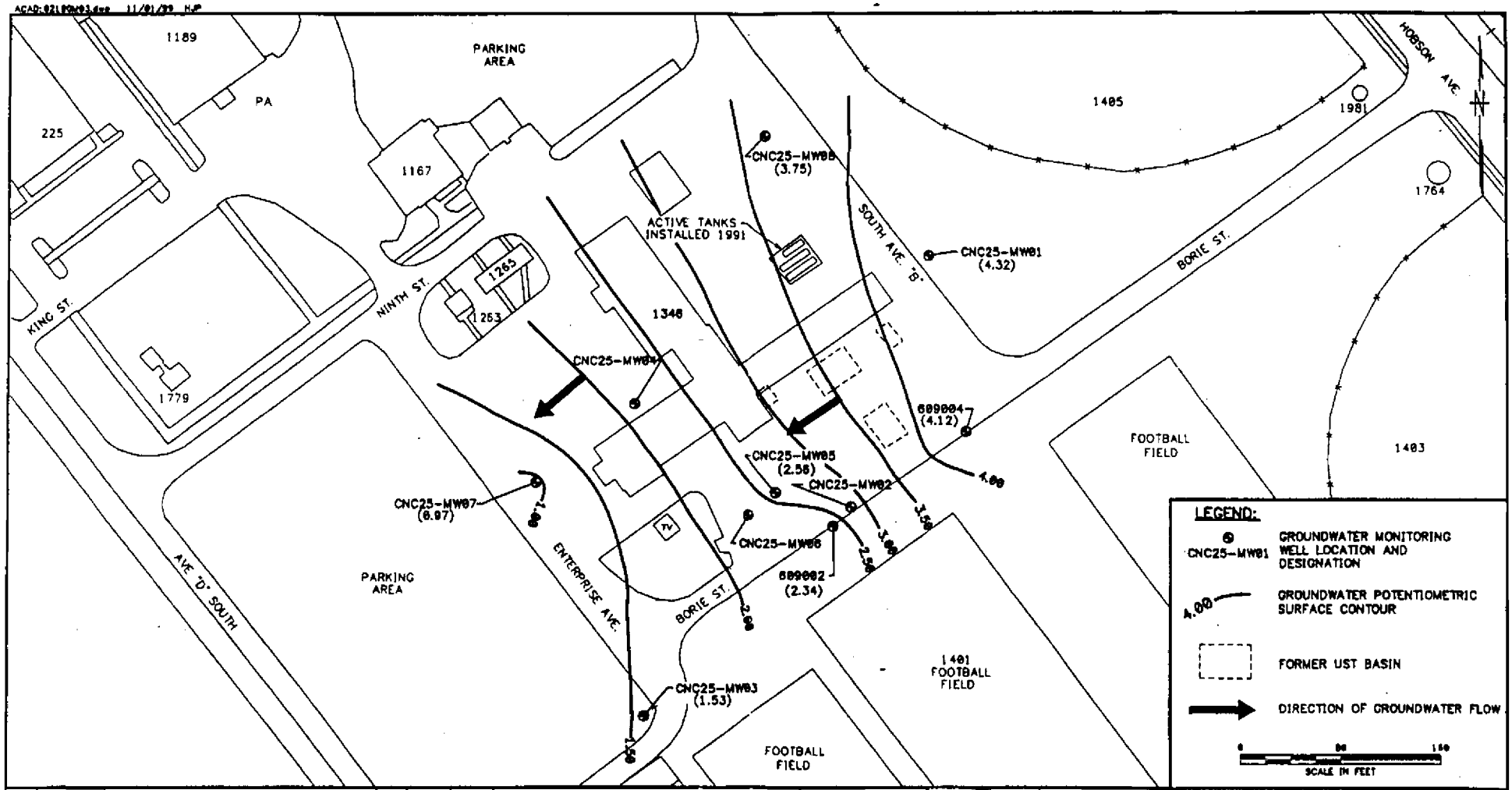
60 0 60 Feet

AOC609
GROUNDWATER POTENTIOMETRIC SURFACE MAP



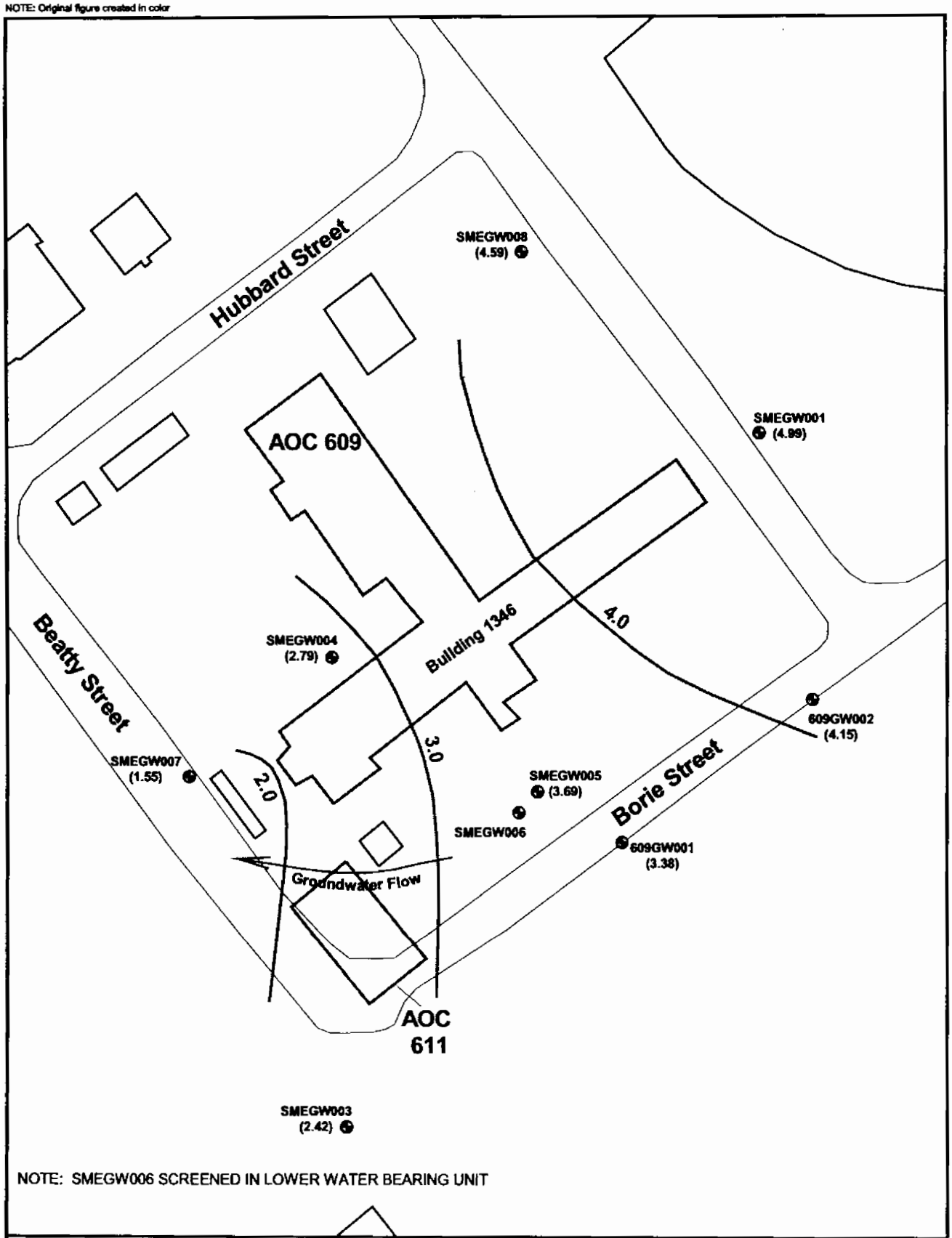
NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

DRAWN BY HJP DATE 11/1/99
CHECKED BY DATE
COST/SCHED-AREA
SCALE AS NOTED

GROUNDWATER POTENTIOMETRIC SURFACE MAP
(SEPTEMBER 11, 1999)
SITE 25, BUILDING 1346
ZONE F, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

CONTRACT NO. 0219
APPROVED BY DATE
APPROVED BY DATE
DRAWING NO. FIGURE 6
REV. 0

NOTE: Original figure created in color



NOTE: SMEGW006 SCREENED IN LOWER WATER BEARING UNIT

Groundwater Well
Potentiometric Surface Contours
Groundwater Flow Direction
Roads
AOC Boundary
Buildings
(3.16) Groundwater Elevation, ft msl

N

0 60 120 Feet

Figure 4-4
AOC 609
Groundwater Potentiometric Surface Map, March 26, 2001
Charleston Naval Complex

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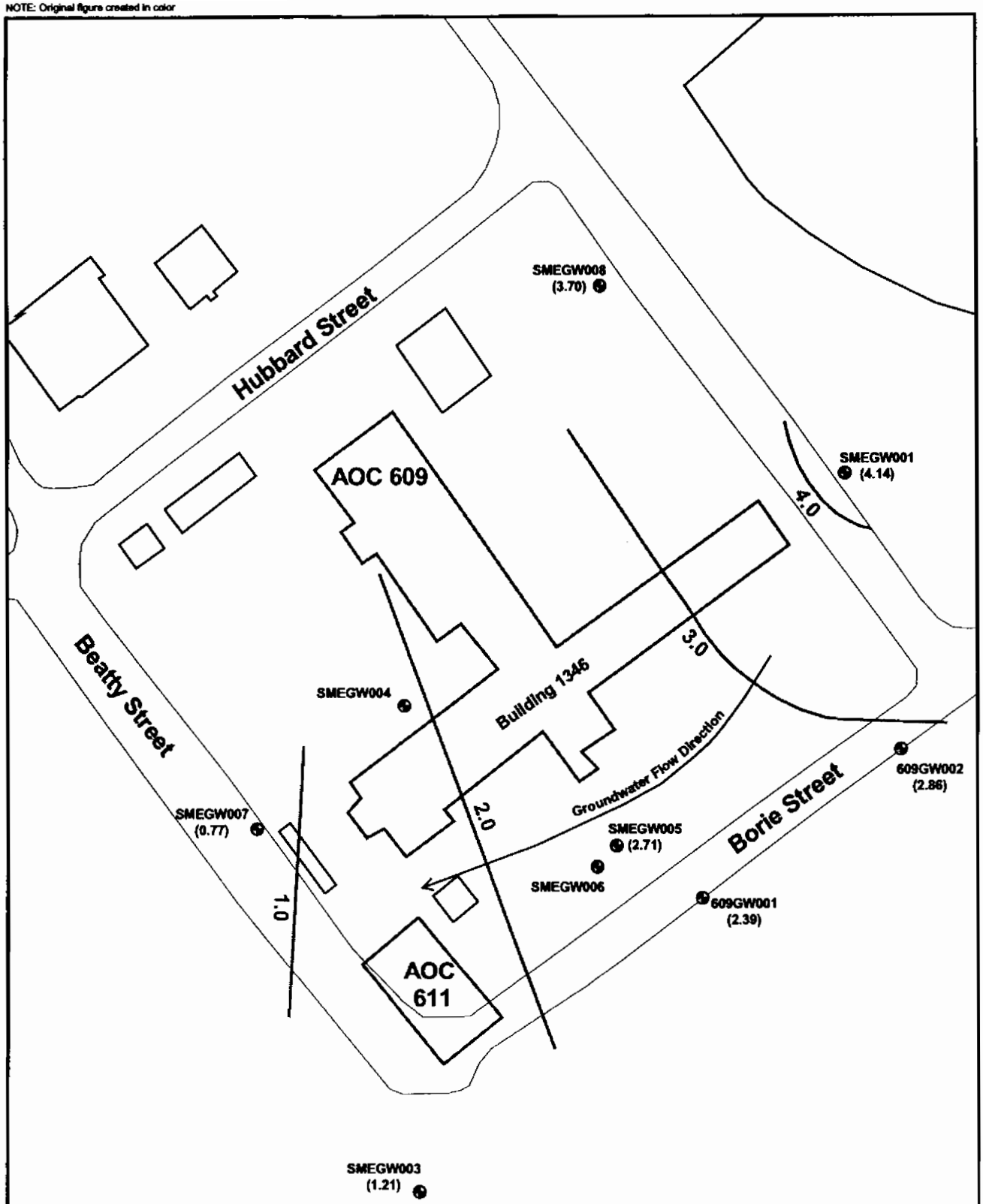
File Path: C:\18gis\Projects\Zone_F\aoc_609\aprs\aoc_609.apr, Date: 24 Oct 2001 14:09, User: ASWINFOR, Figure 4 - Figure 4-4 AOC 609

NOTE: Original figure created in color



NOTE:
1) SMEGW006 SCREENED IN LOWER WATER BEARING UNIT
2) SMEGW004 NOT ACCESSIBLE

- Groundwater Well
- Potentiometric Surface Contours
- Groundwater Flow Direction
- Roads
- AOC Boundary
- Buildings
- (3.16) Groundwater Elevation, ft msl

N

90 0 90 Feet

Figure 5
AOC 609
October 19, 2001 Groundwater Potentiometric Surface Map
Charleston Naval Complex

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File Path: C:\18gis\Projects\Zone_F\aoc_609\aprs\aoc_609.apr, Date: 24 Oct 2001 11:32, User: ASWINFOR, EGIS: Charleston Naval Complex - Figure 5 AOC 609

CH2MHILL TRANSMITTAL

To: Mr. David Scaturo
Division of Hazardous and Infectious Wastes
South Carolina Department of Health and Environmental Control

From: Louise Palmer
(704) 329-0072, ext. 296

Date: November 15, 2001

Re: RFI Report Addendum for AOC 609, Zone F – Revision 1

Quantity	Description
4	Four (4) copies of Revision 1 of the RFI Report Addendum for AOC 609 in Zone F of the Charleston Naval Complex

The attached material serves as Revision 1 to the RFI Report Addendum for AOC 609, Zone F (CH2M-Jones, July 2001). This includes:

- Revised Text (Including Revised Figure 4-4 and Table 5-1; new Tables 5-2 and 5-3)
- New Appendix H (CH2M-Jones Responses to SCDHEC Comments)
- New Material to be appended to Appendix B of the RFI Report Addendum (Instructions for insertion are also provided)
- Revised Covers and Spines (to reflect Revision 1 status)

Please insert this material, which has been 3-hole drilled for your convenience, into the original binder sent to you in July 2001.

If material received is not as listed, please notify us at once.

Remarks:

Copy To:

Rob Harrell/Navy, w/att
Gary Foster/CH2M HILL, w/att

CH2M HILL
3011 S.W. Williston Road
Gainesville, FL
32608-3928
Mailing address:
P.O. Box 147009
Gainesville, FL
32614-7009
Tel 352.335.7991
Fax 352.335.2959

CH2MHILL

July 20, 2001

Mr. David Scaturo
Division of Hazardous and Infectious Wastes
South Carolina Department of Health and
Environmental Control
Bureau of Land and Waste Management
2600 Bull Street
Columbia, SC 29201

Re: RFI Report Addendum (Revision 0) — AOC 609, Zone F

Dear Mr. Scaturo:

Enclosed please find four copies of the RFI Report Addendum (Revision 0) —AOC 609, Zone F of the Charleston Naval Complex (CNC). This report has been prepared pursuant to agreements by the CNC BRAC Cleanup Team for completing the RCRA Corrective Action process.

Please contact me if you have any questions or comments.

Sincerely,

CH2M HILL

Dean Williamson, P.E.

cc: ✓Rob Harrell/Navy, w/att
Gary Foster/CH2M HILL, w/att

RFI REPORT ADDENDUM

Area of Concern 609, Zone F

Charleston Naval Complex
North Charleston, South Carolina

SUBMITTED TO
U.S. Navy Southern Division
Naval Facilities Engineering Command

PREPARED BY
CH2M-Jones

November 2001

Revision 1
Contract N62467-99-C-0960
158814.ZF.PR.01

Certification Page for RFI Report Addendum (Revision 0) – AOC 609, Zone F

I, Dean Williamson, certify that this report has been prepared under my direct supervision. The data and information are, to the best of my knowledge, accurate and correct, and the report has been prepared in accordance with current standards of practice for engineering.

South Carolina

Temporary Permit No. T2000342

Dean Williamson, P.E.

7/5/2004

Date

SOUTH CAROLINA
CH2M HILL, INC.
No. C00201
CERTIFICATE OF AUTHORIZATION

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C Responses to SCDHEC Comments
D Analytical Data from EnSafe RFI Investigation (1997 and 1999)
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F Monitoring Well Construction Diagrams
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H Responses to SCDHEC Comments Regarding the RFI Report Addendum for AOC 609, Zone F, Revision 0 (CH2M-Jones, 2001)

Acronyms and Abbreviations

AOC	area of concern
AST	aboveground storage tank
BCT	BRAC Cleanup Team
BEQ	benzo(a)pyrene equivalent
BRAC	Base Realignment and Closure Act
BRC	background reference concentration
BTEX	benzene, toluene, ethyl benzene, and xylenes
CA	corrective action
CMS	corrective measures study
CNC	Charleston Naval Complex
COC	chemical of concern
COPC	chemical of potential concern
DAF	dilution attenuation factor
EnSafe	EnSafe Inc.
EPA	U.S. Environmental Protection Agency
EPC	exposure point concentration
ft/bls	feet below land surface
ft/d	feet per day
ft/ft	feet per foot
HHRA	human health risk assessment
HI	hazard index
IEUBK	Integrated Exposures and Uptake Biokinetic (Model)
ILCR	Incremental Lifetime Cancer Risk
MCL	maximum contaminant level
µg/kg	micrograms per kilogram
µg/L	micrograms per liter
mg/kg	milligrams per kilogram
MTBE	methyl-tert-butyl-ether
NAVBASE	Naval Base

NFA	no further action
NFI	no further investigation
OWS	oil/water separator
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PCP	pentachlorophenol
ppm	parts per million
RBC	risk-based concentration
RBSL	risk-based screening level
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
SCDHEC	South Carolina Department of Health and Environmental Control
SPLP	synthetic precipitation leaching procedure
SPORTENV-DETCHASN	Supervisor of Ship Building, Conservation and Repair, United States Navy, Portsmouth Virginia, Environmental Detachment Charleston
SSL	soil screening level
SWMU	solid waste management unit
SVOC	semivolatile organic compound
TtNUS	Tetra Tech NUS, Inc.
UCL_{95}	95-percent Upper Confidence Limit
UST	underground storage tank
UTL	upper target level
VOC	volatile organic compound

Section 1.0

1.0 Introduction

In 1993, Naval Base (NAVBASE) Charleston was added to the list of bases scheduled for closure as part of the Defense Base Realignment and Closure Act (BRAC), which regulates closure and transition of property to the community. The Charleston Naval Complex (CNC) was formed as a result of the dis-establishment of the Charleston Naval Shipyard and NAVBASE on April 1, 1996.

Corrective Action (CA) activities are being conducted under the Resource Conservation and Recovery Act (RCRA), with the South Carolina Department of Health and Environmental Control (SCDHEC) as the lead agency for CA activities at the CNC. All RCRA CA activities are performed in accordance with the Final Permit (Permit No. SC0 170 022 560).

In April 2000, CH2M-Jones was awarded a contract to provide environmental investigation and remediation services at the CNC. This submittal has been prepared by CH2M-Jones to complete the RCRA Facility Investigation (RFI) for Area of Concern (AOC) 609 in Zone F of the CNC. Figure 1-1 presents the location of Zone F within the CNC.

1.1 Background

AOC 609 is the site of Building 1346, a former automotive maintenance facility and gasoline station. The focus of the RFI is a 560-gallon waste oil underground storage tank (UST) and associated fill piping, which was removed in 1996. Historical service station activities in the AOC 609 area include those of Building 1262, the Navy Exchange Service Station, which was constructed during the early 1950s and is located southeast of Building 1346. Based on a review of aerial photographs, a series of aboveground storage tanks (ASTs) were installed adjacent to Building 1262, and were apparently used for storage of fuels, oils, and other materials. Building 1262 was later dismantled to provide space for the construction of Building 1346 in 1962. Figure 1-2 shows an aerial photograph of the AOC 609 area.

A series of five USTs, all constructed of steel and used to store motor fuel, were installed east of Building 1346 in the early 1960s. These tanks consisted of one 10,000-gallon and four 4,000-gallon tanks. The tanks were removed in 1978 and replaced with three new 10,000-gallon steel tanks. In 1978, a 560-gallon waste oil UST was also added near the west side of Building 1346. The motor fuel USTs were removed from service in 1991 after a tank tightness test revealed a leak(s) in the system. Three 10,000-gallon fiberglass USTs were

installed in 1991 and remain in service. The USTs are currently used by the South Carolina Gas and Electric Company.

Releases associated with the motor fuel USTs located southeast of Building 1346 are designated "Site 25." These releases have been investigated in conjunction with the SCDHEC UST program. Furthermore, a corrective action plan for Site 25 is under development by CH2M-Jones; therefore, Site 25 issues do not pertain to the subject discussion of AOC 609.

Release(s) associated with the 560-gallon waste oil tank and piping are designated "Site 24," and are the sole investigative sources for AOC 609. The waste oil tank and fill pipes were removed in 1996. The UST received waste oil from a series of drains inside the maintenance garage of Building 1346. The tank was inspected upon removal and observed to be in good condition. However, a loose connection and stained soil were noted in the conveyance piping from maintenance garage drains, approximately four feet from the tank. Soil and groundwater samples taken at the time of the waste oil tank removal revealed the presence of inorganics, total recoverable petroleum hydrocarbons, and volatile constituents.

As part of the RFI, EnSafe Inc. (EnSafe) advanced six soil borings to assess the presence of soil contamination in the vicinity of the UST and related fill piping. In addition, EnSafe performed three groundwater sampling events in late 1996 and early-to-mid 1997 from seven existing monitor wells surrounding the AOC 609 area. The findings were reported in the *Zone F RFI Report, Revision 0* (EnSafe, 1997). The chemicals of concern (COCs) that were identified included benzo(a)pyrene equivalents (BEQs) and metals (arsenic, beryllium, antimony, and manganese) in surface soil; and benzene, toluene, ethyl benzene, and xylenes (BTEX), semivolatile organic compounds (SVOCs) (mainly polycyclic aromatic hydrocarbons [PAHs]), aluminum, and arsenic in groundwater. These chemicals were identified as COCs, assuming that risk levels above 1 in a million and a hazard index (HI) above 1.0 are unacceptable.

Additional investigations were made by EnSafe as presented in the *Zone F RFI Work Plan Addendum* (EnSafe, 1999) to delineate the extent of inorganic chemicals in surface soil, subsurface soil, and groundwater. The results of these additional investigations are presented in this RFI Report Addendum.

1.2 Purpose of the RFI Report Addendum

This report provides information about AOC 609 that documents the conclusions from the RFI report, provides the results of additional sampling performed after the RFI, evaluates the additional data, and provides conclusions regarding site closure.

The results of additional investigations subsequent to the *Zone F RFI Report, Revision 0* are presented to complete the nature and extent investigation for chemicals of potential concern (COPCs) identified in surface soil, subsurface soil, and groundwater.

Prior to changing the status of any site in the CNC RCRA CA permit, the BRAC Cleanup Team (BCT) agreed that the following issues should be considered:

- Status of the RFI
- Presence of metals (inorganics) in groundwater
- Potential linkage to Solid Waste Management Unit (SWMU) 37, Investigated Sanitary Sewers at the CNC
- Potential linkage to AOC 699, Investigated Storm Sewers at the CNC
- Potential linkage of AOC 504, Investigated Railroad Lines at the CNC
- Potential linkage to surface water bodies (Zone J)
- Potential contamination associated with oil/water separators (OWSs)
- Relevance or need for land use controls at the site

Information regarding these issues is provided in this report addendum to expedite evaluation of the site.

1.3 Report Organization

This RFI Report Addendum consists of the following sections, including this introductory section:

1.0 Introduction — Presents the purpose of the report and background information relating to the RFI Report Addendum.

2.0 Summary of RFI Conclusions for AOC 609 — Summarizes the conclusions from the RFI investigations and risk evaluations for AOC 609.

3.0 Summary of UST Removal and Subsurface Assessment Reports – Summarizes the activities and conclusions from the UST removal and subsequent investigations at Sites 24 and 25.

4.0 Summary of Additional Investigations — Summarizes information collected after completion of the RFI report.

5.0 COPC/COC Refinement —Provides further evaluation of COPCs based on RFI and additional data to assess them as COCs.

6.0 Summary of Information Related to Site Closeout Issues—Discusses the various site closeout issues that the BCT agreed to evaluate prior to site closeout.

7.0 Recommendations—Provides recommendations for proceeding with site closure.

8.0 References — Lists the references used in this document.

Appendix A contains excerpts from the *Zone F RFI Report, Revision 0* (EnSafe, 1997).

Appendix B contains the *Initial Groundwater Assessment Report for Site 24, Building NS1346* (Tetra Tech NUS, Inc. [TtNUS], 2000), the *Rapid Assessment Report for Site 25, Building NS1346* (TtNUS, 1999), and the *UST Assessment Report for UST 1346* (SPORTENVDETCHASN, 1996).

Appendix C contains responses to SCDHEC comments concerning the *Zone F RFI Report, Revision 0* for AOC 609.

Appendix D contains analytical data from sampling subsequent to the RFI report.

Appendix E contains validation reports from the data from sampling subsequent to the RFI report.

Appendix F contains the monitor well construction diagrams of wells installed subsequent to the RFI report.

Appendix G contains the results of the synthetic precipitation leaching procedure (SPLP) tests conducted at AOC 609, as well as the data relevant to the development of site-specific soil screening levels (SSLs).

Appendix H contains CH2M-Jones' Responses to SCDHEC Comments concerning the RFI Report Addendum (Revision 0) for AOC 609, Zone F (CH2M-Jones, 2001).

All tables and figures appear at the end of their respective sections.

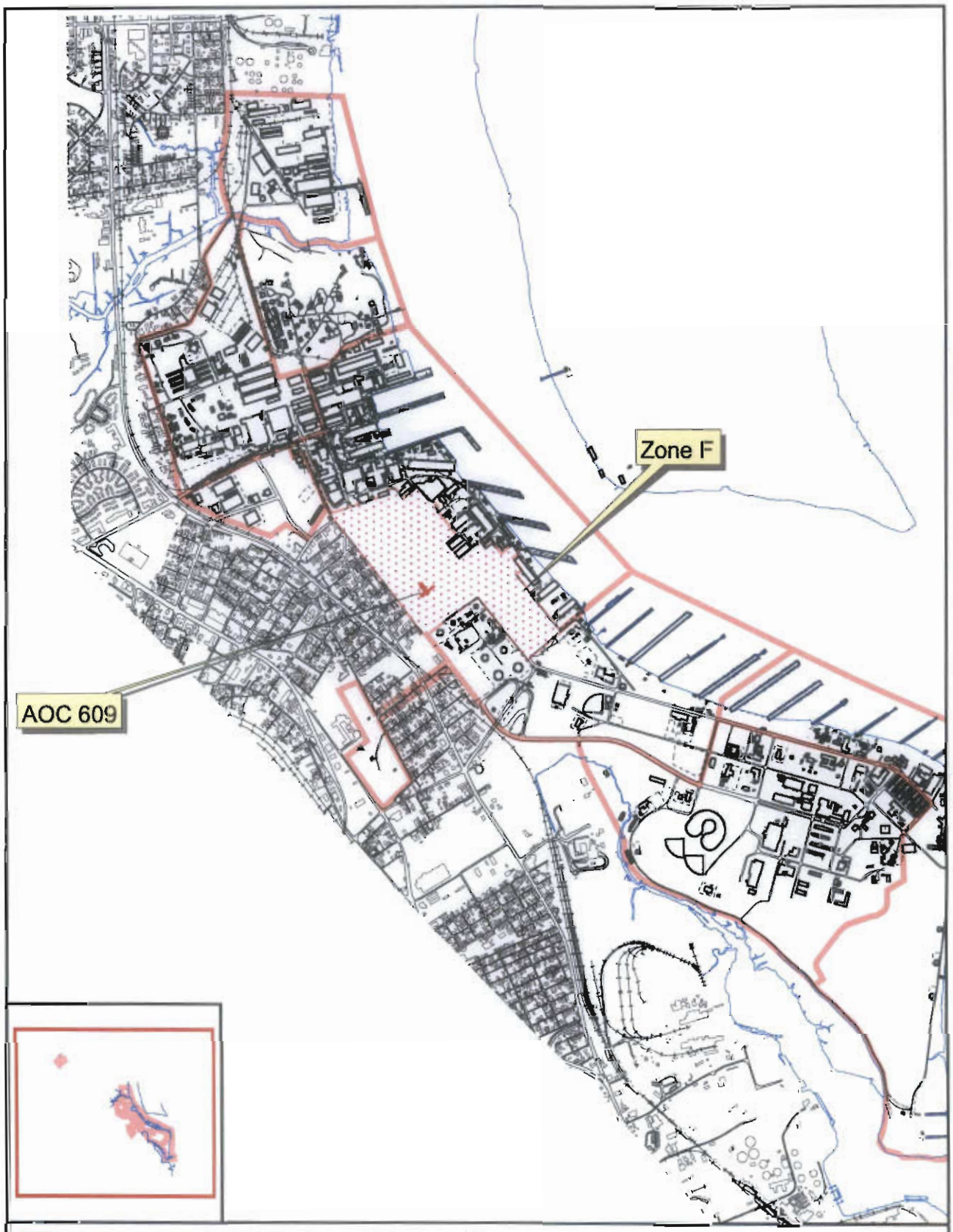
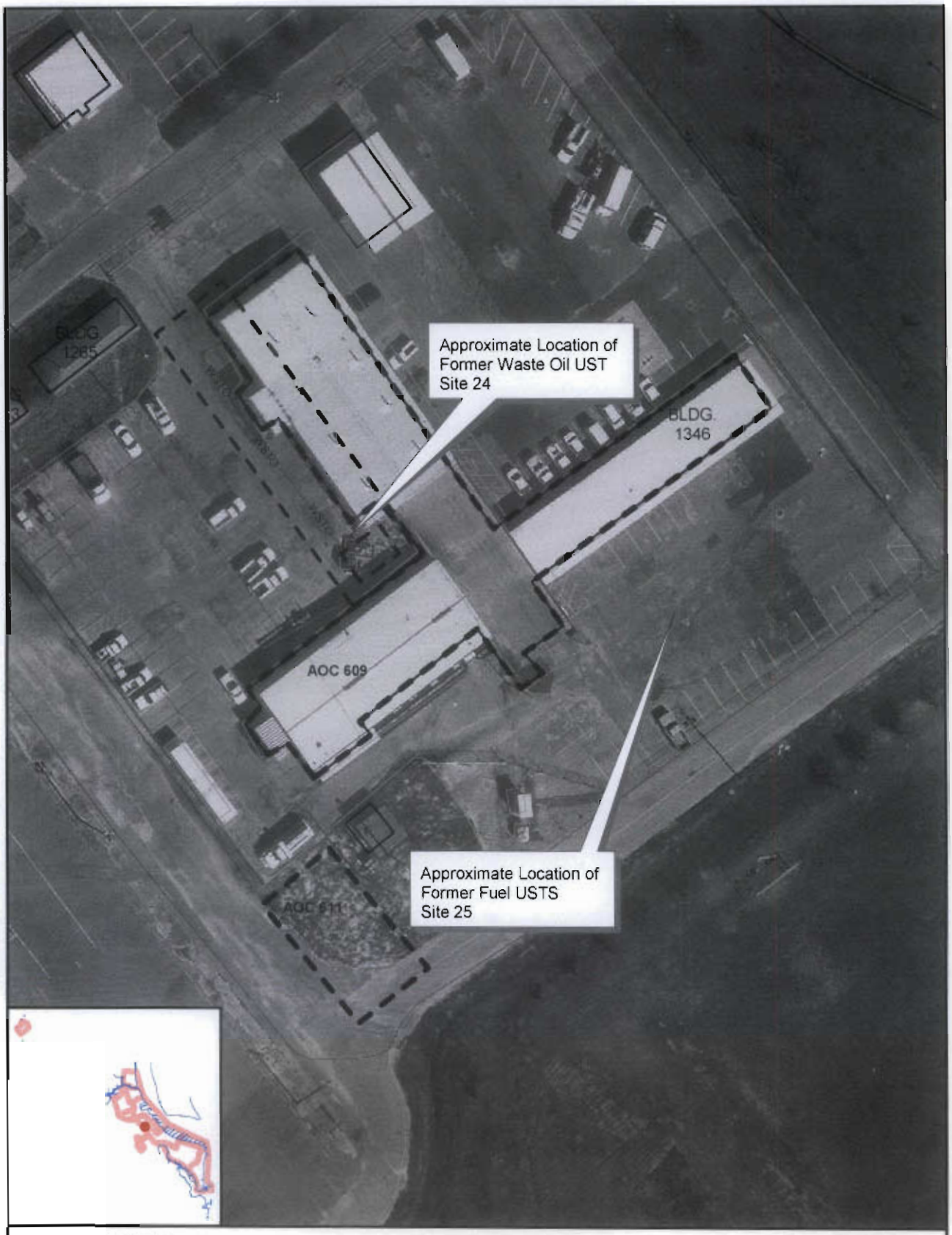


Figure 1-1
Zone F and AOC 609
Location Map
Charleston Naval Complex

CH2MHILL



AOC/SWMU Boundary
Zone Boundary

N

0 50 100 Feet

Figure 1-2
AOC 609
Aerial Photo
Charleston Naval Complex

CH2MHILL

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Section 2.0

2.0 Summary of RFI Conclusions for AOC 609

As part of the Zone F RFI, soil and groundwater investigations were conducted at AOC 609. During the RFI, six soil borings were advanced for the collection and analysis of surface and subsurface soils in the vicinity of the former waste oil UST and associated fill pipeline. Analytes included metals, cyanide, SVOCs, volatile organic compounds (VOCs), polychlorinated biphenyls (PCBs), pesticides, and dioxin from soil borings 609SB001, 609SB002, and 609SB003. Metals, SVOCs, and VOCs were sampled from soil borings 609SB004, 609SB005, and 609SB006. PCBs, pesticides, and dioxins were analyzed from duplicate samples at surface soil borings 609SB001, 609SB002, and 609SB003. Figure 2-1 presents the site and the RFI sampling locations.

Groundwater monitor wells previously installed to investigate the release(s) from the fuel UST system at Building 1346 were sampled during the RFI. Monitor wells were labeled SMEGW001 through SMEGW008. Well number SMEGW002 was damaged and full of sediment, and was not used for the RFI. This well is scheduled to be abandoned. Groundwater was sampled three consecutive times between November 1996 and September 1997 from seven monitor wells and analyzed for metals, SVOCs, and VOCs. Groundwater samples collected during the first sampling event were also analyzed for cyanide, PCBs, and pesticides.

During the RFI, EnSafe stated that groundwater flow was to the east-southeast at a rate of 8.7E-4 feet per day (ft/d), with a hydraulic gradient of 3.5E-3 feet per foot (ft/ft). Figures 10.5-2 and 10.5-3 from the *Zone F RFI Report, Revision 0* (EnSafe, 1997), depicting groundwater elevations and flow direction, are presented in Appendix A.

The *Zone F RFI Report, Revision 0* presented the results of these soil and groundwater tests, including conclusions concerning contamination and risk. Soil borings F609SB007 through F609SB012, including groundwater monitor wells F609GW001 and F609GW002, were installed subsequent to the RFI report and are discussed in Section 4.0 of this RFI Report Addendum. Conclusions from the *Zone F RFI Report, Revision 0* are summarized below.

2.1 Surface Soil Results

No VOCs, PCBs, or pesticides were detected at concentrations above the U.S. Environmental Protection Agency (EPA) Region III residential risk-based concentrations (RBCs) at HI=0.1 in the surface soil samples. One SVOC, benzo(a)pyrene, was detected at a

concentration (160 micrograms per kilogram [µg/kg]) exceeding its RBC at soil boring 609SB001. Dioxins were detected in the three duplicate surface samples collected from boring locations 609SB001, 609SB002, and 609SB003; however, concentrations did not exceed the RBCs.

Antimony (12.2 milligrams per kilogram [mg/kg]), arsenic (113.8 mg/kg), and chromium (37.8 mg/kg) concentrations in the soil sample collected from 609SB002 exceeded EnSafe's background reference concentrations (BRCs) for Zone F surface soil and their respective RBCs. This location was re-sampled in later investigations. Iron concentrations detected in all surface soil samples also exceeded the RBC at HI=0.1. However, EnSafe's surface soil BRC for iron was higher than the RBC, and none of the iron concentrations exceeded the surface soil BRC.

Cyanide was not detected in the surface soil samples at concentrations exceeding the BRC or its RBC. Section 10.5.3.1 and Table 10.5.4 in Appendix A present the excerpts for the nature of the contamination detected in the surface soils for the initial RFI.

EnSafe identified BEQs, antimony, arsenic, beryllium, and manganese as COPCs in the surface soil at AOC 609. Section 10.5.6.2 in Appendix A presents the COPCs identified in the *Zone F RFI Report, Revision 0*. Since then, beryllium has been re-classified as a non-carcinogen, and its maximum detected surface soil concentration of 1.45 mg/kg is well below the current RBC of 16 mg/kg (HI=0.1).

2.2 Subsurface Soil Results

No SVOCs or VOCs exceeded their respective SSLs in subsurface soil samples. SSLs from the *EPA Soil Screening Guidance: Technical Background Document* (1996) with dilution attenuation factor (DAF)=20 and the subsurface soil BRC were used for comparison. VOCs detected in subsurface soil were re-evaluated by comparing them with SSLs (DAF=1.0) in this evaluation; none were above the revised SSL. No inorganics were detected exceeding the BRC and SSLs in subsurface soil samples.

EnSafe did not identify any COPCs in the subsurface soil at AOC 609. Section 10.5.3.1 and Table 10.5.4 in Appendix A of this report addendum present the excerpts for the nature of contamination detected in the subsurface soils during the initial RFI.

2.3 Groundwater Results

Six shallow groundwater monitor wells, SMEGW001, SMEGW003, SMEGW004, SMEGW005, SMEGW007, and SMEGW008 (installed to an approximate depth of 13 feet below land surface [ft bls]), and one deep groundwater monitor well, SMEGW006 (installed to an approximate depth of 26 ft bls), were sampled three times between November 1996 and September 1997. EnSafe's groundwater screening criteria were the greater of the Zone F BRC, EPA Region III tap water RBCs (noncarcinogens at HI=0.1), and maximum contaminant levels (MCLs).

VOCs, consisting of benzene, ethylbenzene, and toluene, were consistently detected above their respective tap water RBCs and MCLs at groundwater monitor well SMEGW005. Xylene was also detected at SMEGW005 at concentrations above its respective tap water RBC and MCL during the first sampling event, but decreased to below the MCL during the second and third sampling events. These detections are likely related to past fuel releases from the former leaking fuel USTs at the site. These fuel releases are being remediated by CH2M-Jones under the UST program.

Chlorobenzene was detected at a concentration equal to the tap water RBC (11 micrograms per liter [μg/L]) during the first sampling event only at well location SMEGW004. No detections of chlorobenzene were noted in any of the subsequent sampling events. Also, none of the common gasoline contaminants, such as benzene, ethyl benzene, toluene, or xylene, were detected in groundwater samples from well SMEGW004, which is closest to the former waste oil tank location.

1,2-dichlorethane was detected at deep groundwater monitor well SMEGW006 at concentrations above the tap water RBC, but below the MCL in the groundwater samples collected during the second- and third-quarter events. 1,2-dichloroethane was not detected in any of the shallow groundwater sampling locations at AOC 609. 1,2-dichloroethane is a common gasoline additive and its presence at these very low concentrations is most likely related to the motor vehicle fuel release being remediated as part of the UST program.

SVOCs consisting of 2,4-dimethylphenol, 2-methylnaphthalene, 2-methylphenol, 4-methylphenol, and naphthalene exceeded their respective tap water RBCs in all three sampling events at groundwater monitor well SMEGW005. It is also likely that these constituents are associated with the petroleum hydrocarbons that are part of the UST operations, and were not detected in the well near the waste oil tank (SWMEGW004). During the third sampling event, Pentachlorophenol (PCP) (2 μg/L) exceeded tap water RBCs and MCLs only at SMEGW005.

Aluminum was detected in all wells sampled during the RFI with concentrations ranging from 87 µg/L to 7,745 µg/L. Aluminum concentrations exceeded the tap water RBC (3,700 µg/L, HI=0.1) at SMEGW001 and SMEGW007 during the first sampling event, and at SMEGW007 during the third sampling event. No MCL was specified for aluminum in the *Zone F RFI Report, Revision 0*; thus, screening of aluminum in the groundwater was compared to the tap water RBC.

Arsenic was detected in all sampling events at all locations with concentrations ranging from 3.1 µg/L to 65.2 µg/L. Arsenic concentrations exceeded the MCL (50 µg/L) at well SMEGW001 during the first two sampling events, and at wells SMEGW005 and SMEGW006 during the third event. Arsenic concentrations detected in the samples collected from SMEGW004 and SMEGW008 exceeded the tap water RBC, but were less than the MCL.

Iron concentrations also exceeded tap water RBCs (HI=0.1) at all wells sampled, however were within the background levels detected in Zone F. These background concentrations were not reported as part of RFI but can be extracted from the analytical database.

Lead was detected above the MCL of 15 µg/L at SMEGW003 during the second sampling event only, and was near or below background in the third and fourth sampling events.

Manganese concentrations were detected above EnSafe's shallow groundwater BRC (2,010 µg/L) in one sample collected from SMEGW001 (3,310 µg/L) during the third sampling event. Manganese was also detected above EnSafe's deep groundwater BRC (1,256 µg/L) during the first two sampling events at SMEGW006, with concentrations of 1,300 µg/L and 1,740 µg/L, respectively.

Thallium was detected above its MCL in the sample collected from deep groundwater monitor well SMEGW006 (9.3 µg/L) during the second sampling event only. Thallium was not detected in the other two sampling events, nor was it detected in any of the shallow groundwater sampling locations.

PCBs and pesticides were not detected in the groundwater at AOC 609. Section 10.5.4.1 and Table 10.5.8 in Appendix A present the nature of the contamination detected in the groundwater during the initial RFI.

EnSafe identified aluminum, arsenic, benzene, chlorobenzene, toluene, xylenes, 2,4-dimethylphenol, ethylbenzene, 2-methyphenol, 4-methylphenol, and naphthalene as COPCs in groundwater. Section 10.5.6.2 in Appendix A presents the COPCs identified in the groundwater for the initial RFI.

2.4 Human Health Risk Assessment

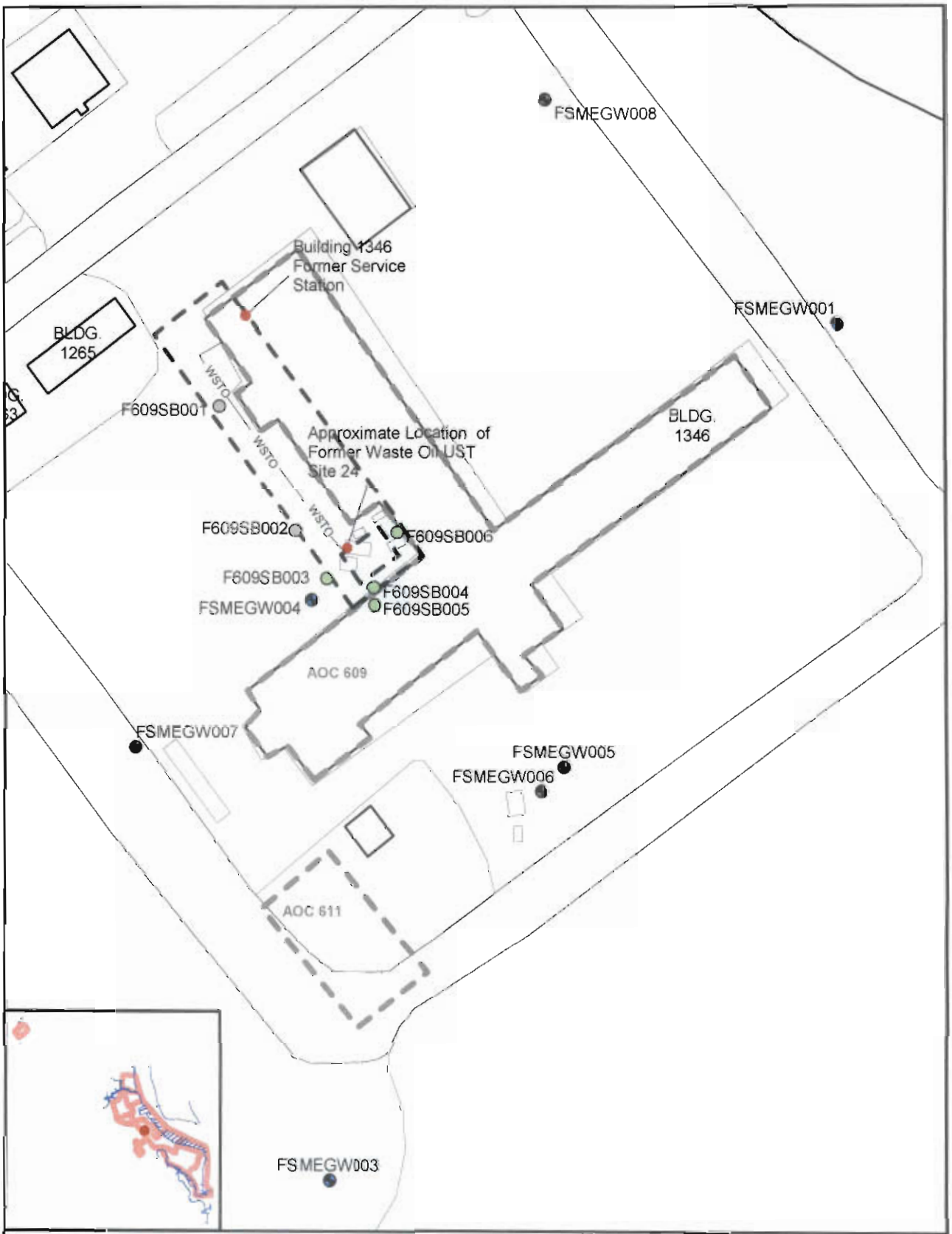
As part of the RFI, EnSafe conducted a human health risk assessment (HHRA) for the COPCs identified in the surface soil (BEQs, antimony, arsenic, beryllium, and manganese). Maximum detected concentrations were used as the exposure point concentrations (EPCs). Approximately 95 percent of the Incremental Lifetime Cancer Risk (ILCR), calculated at 3×10^{-4} for a resident, were from soil ingestion exposures to arsenic at 113. 8 mg/kg. The remaining five percent of the risk was from exposure to ingestion of beryllium and BEQs. The HIs for adult and child residents were below 1.0.

Similarly, the majority of risks to future workers are estimated using the maximum detected arsenic concentration in soil. The ILCR based on this calculation is 3×10^{-5}, with beryllium as a minor contributor to the overall risks. Beryllium has since been re-classified by the EPA to a non-carcinogenic status; thus its contributions can be deleted from these RFI risk estimates.

Groundwater had several metals and petroleum hydrocarbons identified as COPCs, mostly in well SMEGW005, away from waste oil storage operations at AOC 609. The groundwater COPCs identified during the RFI are aluminum, arsenic, benzene, chlorobenzene, toluene, xylenes, 2,4-dimethylphenol, ethylbenzene, 2-methyphenol, 4-methylphenol, and naphthalene, based on detections in various wells, including UST- related contamination. The majority of the groundwater ingestion risk to a future residential receptor is from benzene, which is related to fuel UST releases at the site, and arsenic (ILCR = 2×10^{-2}). The calculated non-carcinogenic HI is 21 for an adult and 50 for a child. The COPCs which contribute significantly to both residential and industrial receptors' non-carcinogenic risk (HI >>1.0) are arsenic, 4-methylnaphthalene, and toluene. The industrial worker ingestion exposure-based ILCR is at 4×10^{-3}, and the calculated HI is 8.0. The COPCs are the same as those for a residential receptor for both ILCR and HI. All COPCs which contribute risks at or above a 1 in a million (10^{-6}) level were included as COCs in the *Zone F RFI Report, Revision 0*.

2.5 Conclusions and Recommendations

Based on the analytical and HHRA results, the *Zone F RFI Report, Revision 0* concluded that a CMS should be conducted for the surface soil and shallow groundwater COCs identified at AOC 609.



AOC/SWMU Boundary
Surface Soil
Groundwater Well
Zone Boundary

N

0 50 100 Feet

Figure2-1
AOC 609
Originally Reported RFI Sample Locations
Charleston Naval Complex

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Section 3.0

3.0 Summary of UST Removal and Subsurface Assessment Reports

3.1 Waste Oil Tank Removal

In May 1996, the Supervisor of Ship Building, Conservation and Repair, United States Navy, Portsmouth Virginia, Environmental Detachment Charleston (SPORTENVDETCHASN), removed the 560-gallon waste oil UST, including the associated piping line(s). At the time of removal, the waste oil UST was found to be in good condition with no visible holes or leaks; however, a joint in the piping located approximately four feet from the north end of the UST was found to be loose and showed signs that it had leaked. Ten confirmation soil samples were taken from the native soils beneath the UST and associated piping and analyzed for VOCs (BTEX and naphthalene), SVOCs (PAH compounds), and metals. One confirmation groundwater sample was also collected at the location of the UST and analyzed for BTEX, naphthalene, PAHs, and metals. A *UST Assessment Report for UST NS1346* was prepared by SPORTENVDETCHASN (1996) summarizing the UST removal and confirmation sampling results. This UST assessment report, which is included in Appendix B of this report addendum, was also presented and discussed in the *Zone F RFI Report, Revision 0* (EnSafe, 1997).

In 1999, TtNUS performed a subsurface investigation to delineate the nature and extent of suspected soil and groundwater impacts from the UST system (Site 24). As part of the TtNUS investigation, soil and groundwater samples were collected from 16 direct-push borings. Four shallow permanent groundwater monitor wells were installed to monitor groundwater quality and flow direction, and one deep monitor well was installed for vertical groundwater quality delineation. The groundwater samples were analyzed at a fixed-based laboratory for VOCs (BTEX, naphthalene, methyl-tert-butyl-ether [MTBE], and ethylene dibromide), SVOCs (PAH compounds), and metals. Six soil samples were selected for fixed-base laboratory analysis for VOCs (BTEX and naphthalene) and SVOCs (PAH compounds). Conclusions from the TtNUS investigation for Site 24 are as follows:

- Groundwater flow at the site is in a west to northwesterly direction.
- No free product was detected in any of the monitor wells at the site.
- Toluene was the only compound detected in the soil sampled at the site. Toluene was detected in three of the six samples submitted for fixed-base laboratory analysis.

- Barium was detected above risk-based screening levels (RBSLs) in four of the five groundwater wells sampled.
- A request for NFA was made for Site 24 based on soil and groundwater samples not exceeding RBSLs, other than barium. It was concluded in the *Initial Groundwater Assessment Report for Site 24, Building NS1346* (TtNUS, 2000), that barium is not associated with past petroleum products or waste oil storage at the site.

On March 9, 2000, SCDHEC issued an NFA letter for Site 24, Building NS1346. A copy of the SCDHEC NFA letter and the *Initial Groundwater Assessment Report* is included in Appendix B of this RFI Report Addendum.

3.2 Former UST Fuel Release Investigation

In 1999, TtNUS also performed a subsurface investigation to evaluate soil and groundwater impacts resulting from the suspected petroleum release(s) from the UST system (Site 25), which is separate from the waste oil tank being investigated as AOC 609. Conclusions from the TtNUS investigation of Site 25, as reported in the *Rapid Assessment Report for Site 25, Building NS1346* (TtNUS, 1999), are as follows:

- Groundwater flow was determined to be in a southwesterly direction
- Benzene and naphthalene concentrations in soil exceeded UST Program RBSLs
- VOCs were detected above RBSLs in one monitor well (SMEGW005) and MTBE exceeded RBSLs at SMEGW006 and 609GW001
- Corrective actions are required at Site 25

The *Rapid Assessment Report* is also included in Appendix B of this RFI Report Addendum.

Section 4.0

4.0 Summary of Additional Investigations

During the latter part of 1997 and 1999, EnSafe continued the RFI investigations with soil sampling, groundwater monitor well installation, and groundwater sampling. These planned investigations were to address comments received from SCDHEC on the *Zone F RFI Report, Revision 0* (EnSafe, 1997), and intended to resolve data gaps for delineating the extent of metals in surface and subsurface soils near 609SB002, as well as further monitoring for metals and VOCs previously detected in groundwater. The responses to SCDHEC's comments on the RFI Report are presented as Appendix C. The data from the additional investigations are summarized in this section; the analytical data, data validation reports, and monitor well construction diagrams are provided as Appendices D, E, and F, respectively. Soil boring and monitor well locations from the additional investigation are presented in Figure 4-1.

4.1 Soil Sampling and Analyses

During the additional investigation of AOC 609, EnSafe installed six borings in 1999 (609SB007 through 609SB012) in the area of the former waste oil UST in an attempt to delineate metals in the shallow soil. These sampling locations are depicted in Figure 4-1. Surface and subsurface soil samples were collected from each of these sampling locations and analyzed for metals.

EnSafe also installed two additional soil borings, one in each area of the previously installed soil boring locations 609SB001 and 609SB002 (see Figure 4-1). Note that these sample locations use the same nomenclature as in the previous sampling event. Surface and subsurface soil samples were collected from these borings and analyzed for total metals, SPLP metals, PCBs, SPLP PCBs, pesticides, SPLP pesticides, SVOCs, SPLP SVOCs, VOCs, and SPLP VOCs. These soil sampling events were conducted on October 15, 1999. The SPLP analytical data are summarized in Appendix G of this RFI Report Addendum.

4.1.1 Surface Soil

The laboratory analytical results for detected inorganic concentrations in the surface soil were screened against Zones F and G combined background (grid-based) range values. Because the Zone F grid-based sample population is fewer than 10, Zones F and G background data were combined in order to screen against a greater population of data points. For the screening of inorganic compounds in the soils at AOC 609, inorganics that

were detected at concentrations within grid-based range were eliminated from further consideration. If the inorganic compound was outside this range, it was screened against the October 2000 EPA Region III residential RBCs (HI=0.1 for non-carcinogenic compounds) and the AOC 609 site-specific SSLs (using a site-specific DAF = 8.6, as calculated by CH2M-Jones). These SSLs were developed by EnSafe after submittal of the *Zone F RFI Report, Revision 0.* Since these incorporate site-specific conditions for leachability assessment, these values were retained in this investigation. Organic analytes were screened against the RBCs and SSLs. SSLs for organic analytes were determined from the October 2000 EPA Region III RBC tables and adjusted for the site-specific DAF of 8.6. The detected analytes in the surface soil samples from the additional investigations are presented in Table 4-1.

The maximum detected concentrations of lead (511 mg/kg), copper (480 mg/kg), zinc (2,650 mg/kg), and antimony (18.5 mg/kg) in one sample, F609SB007, exceeded the background concentrations range and their respective RBCs. In addition, antimony and lead levels also exceeded SSLs at this sample location. Antimony and lead in the subsurface soil sample at the same location (F609SB007) reported concentrations of 0.21 mg/kg and 4.1 mg/kg respectively, which are well within naturally occurring levels, indicating that leaching to subsurface is not occurring.

Arsenic (30.8 mg/kg) exceeded the combined Zones F and G background (grid-based) range and its RBC at 609SB001. Concentrations of iron (38,800 mg/kg), aluminum (36,000 mg/kg), and vanadium (88.7 mg/kg) exceeded the combined Zones F and G background (grid-based) range and RBCs (HI=0.1) at 609SB002.

Figure 4-2 presents the distribution of lead, arsenic, copper, and antimony. Figure 4-3 presents the distribution of aluminum, vanadium, and zinc detected in the surface soil samples at AOC 609.

No pesticides, VOCs, or SVOCs were detected at concentrations that exceeded their respective RBCs or SSLs. No PCBs were detected in the surface soil samples collected from the borings at AOC 609.

Carcinogenic PAH compounds were screened against the base-wide BRC (twice the adjusted mean) for BEQs of 1.304 parts per million (ppm) for surface soils, as determined in the *Background PAHs Study Report: Technical Information for the Development of Background BEQ Values* (CH2M-Jones, 2001). None of the surface boring locations had a BEQ concentration exceeding this reference concentration.

In summary, no organic COPCs were reported for surface soil at AOC 609. The inorganic chemicals aluminum, antimony, arsenic, copper, lead, vanadium, and zinc were retained for further evaluation as presented in Section 5.0 of this report.

4.1.2 Subsurface Soil

Subsurface soil organic and inorganic results were screened by comparing them against SSLs and background values. The subsurface BEQs were screened against the BEQ BRC of 1.4 ppm for subsurface soils (CH2M-Jones, 2001). Inorganic results were screened against the range of subsurface soil background grid sample results from Zones F and G. The results of the subsurface soil samples from the additional investigations are presented in Table 4-2.

None of the organic and inorganic compounds detected in subsurface soil samples during the additional investigations exceeded the screening criteria at AOC 609. Therefore, no COPCs were identified for subsurface soil at AOC 609.

4.2 Groundwater Sampling and Analyses

Groundwater monitor wells SMEGW001, SMEGW003, SMEGW004, SMEGW005, SMEGW006, SMEGW007, and SMEGW008 were sampled in November 1997 and analyzed for metals, VOCs, and SVOCs. In addition, EnSafe installed two shallow groundwater monitor wells (609GW001 and 609GW002) in May 1999 at the southern periphery of AOC 609 (see Figure 4-1) to an approximate depth of 12 ft bls to further delineate VOC impacts adjacent to SMEGW005. The well construction diagrams are provided in Appendix F of this RFI Report Addendum. Both wells were sampled in May 1999 and analyzed for metals, pesticides/PCBs, SVOCs, and VOCs. These wells were re-sampled in October 1999 for metals and VOCs only. Depth-to-groundwater measurements were also conducted to further assess the groundwater flow direction.

4.2.1 Groundwater Flow

Groundwater elevations measured during the May, September, and November 1997 RFI sampling events all indicated groundwater flow in a west to southwest direction. Groundwater elevations measured by CH2M-Jones in March and October 2001 revealed a groundwater flow direction to the southwest at AOC 609. Data presented in the Site 25 *Initial Groundwater Assessment* and *Rapid Assessment Reports* by TtNUS also concluded that groundwater flow is in a west to southwesterly direction, although information from the Site 24 Subtitle I investigation indicated a localized flow direction of west to northwest. Figure 4-4 illustrates the groundwater potentiometric surface from groundwater elevations

measured on March 26, 2001. Although it is possible that groundwater flow direction may change slightly due to seasonal factors, measurements at AOC 609 have been consistently in a west to southwest direction.

4.2.2 Groundwater Sampling Results

All parameters in groundwater samples were compared with MCLs (if available) or EPA Region III tap water RBCs if no MCL was available. Inorganic parameters were also compared with either the Zones F and G background groundwater upper target level (UTL) values or the range of inorganics in background wells in Zones F and G. EnSafe did not report a background screening UTL value for iron; therefore, CH2M-Jones developed a background (grid-based) value using twice the mean for iron for Zones F and G combined. The groundwater sampling results detected from the additional investigations are presented in Table 4-3.

The concentration of aluminum in the groundwater sample collected from F609GW001, located southwest of the site at the property boundary during the May 1999 sampling event (7,440 µg/L) exceeded the RBC of 3700 µg/L (HI=0.1). No background aluminum levels were reported for Zones F and G.

Antimony was detected in the sample collected from FSMEGW001 at a concentration of 6.7 µg/L, which exceeds its MCL.

The concentration of arsenic in the groundwater sample collected from 609GW002 in May 1999 (105 µg/L) exceeded the arsenic MCL. The arsenic concentration in this well re-sampled in October 1999 was 30 µg/L. Arsenic concentrations in groundwater samples from SMEGW006 during four sampling periods ranged from 33.6 to 56.1 µg/L, which is above the background value of 16.7 mg/L reported for Zone F from the RFI report. Figure 4-5 presents the distribution of arsenic in the shallow groundwater samples at AOC 609 for all monitoring events since 1996 to 1999.

VOCs and SVOCs consisting of total xylenes, ethylbenzene, benzene, toluene, 2,4-dimethylphenol, naphthalene, 2-methylnaphthalene, 2-methylphenol (o-cresol), and 4-methylphenol (p-cresol) were detected in the groundwater at SMEGW005 at concentrations exceeding applicable screening criteria. The concentrations of these compounds have been consistently detected during previous sampling events at SMEGW005. This contamination appears to be associated with the previous fuel release from the USTs that is being remediated under the UST program.

4.3 Summary of COPCs Identified

Inorganic analytes detected in the surface and subsurface soils above the background (grid-based) range for Zones F and G combined were not considered COPCs if their detected concentrations were less than the RBCs and SSLs. Inorganic analytes detected in the groundwater above the background (grid-based) UTL for Zones F and G combined were not considered COPCs if their concentrations were less than the EPA Region III tap water RBCs or MCLs. Based on these screening criteria, the following COPCs were identified from the additional investigations at AOC 609.

4.3.1 Surface Soil

Aluminum, antimony, arsenic, copper, iron, lead, vanadium, and zinc were identified as COPCs requiring further evaluation in the surface soil at AOC 609.

4.3.2 Subsurface Soil

No COPCs were identified in the subsurface soils at AOC 609.

4.3.3 Groundwater

Aluminum, antimony, and arsenic were identified as COPCs for wells in the vicinity of AOC 609. Several petroleum hydrocarbon constituents, particularly benzene, were identified in well FSMEGW005. Fuel-related hydrocarbons (total xylenes, ethylbenzene, benzene, toluene, 2,4-dimethylphenol, naphthalene, 2-methylnaphthalene, 2-methylphenol [o-cresol], and 4-methylphenol [p-cresol]) are further discussed as COPCs in Section 5.0, but are not believed to be related to releases from the waste oil tank at AOC 609. These parameters are related to the previous release of fuel from the USTs being remediated under the UST program.

TABLE 4-1
Analytes Detected in Surface Soil
RFI Report Addendum, AOC 609, Zone F, CNC

Parameter	Location	Sample Concentration and Qualifier	Units	Calculated Soil-to-Groundwater SSL[a] (DAF=8.6)	EPA Region III Residential Soil RBC[b]	Surface Soil Background (Grid-based) Concentration Range[c]
		Inorganics				
Aluminum	F609SB001	4,080 =	mg/kg	220,000	7,800	2,190 to 19,400
	F609SB002	**36,000 =**				
	F609SB007	8,460 =				
	F609SB008	7,730 =				
	F609SB009	6,840 =				
	F609SB010	11,600 J				
	F609SB011	9,100 J				
	F609SB012	5,090 J				
Antimony	F609SB001	2.80 J	mg/kg	12	3.1	0.50 to 5.9
	F609SB002	1.40 J				
	F609SB007	**18.50 J**				
	F609SB008	0.91 J				
	F609SB009	0.33 J				
	F609SB010	0.73 J				
	F609SB012	0.69 J				
Arsenic	F609SB001	**30.8 J**	mg/kg	220	0.43	3.0 to 30
	F609SB002	18.7 J				
	F609SB007	14.1 =				
	F609SB008	11.4 J				
	F609SB009	2.2 =				
	F609SB010	9.1 J				
	F609SB011	2.4 J				
	F609SB012	3.3 J				
Barium	F609SB001	116.0 =	mg/kg	930	550	11 to 129
	F609SB002	50.3 =				
	F609SB007	172.0 =				
	F609SB008	117.0 =				
	F609SB009	13.9 J				
	F609SB010	24.1 J				
	F609SB011	27.1 J				
	F609SB012	20.6 J				
Beryllium	F609SB001	0.57 J	mg/kg	3.6	16	0.19 to 1.3
	F609SB002	1.60 =				
	F609SB007	2.10 =				
	F609SB008	0.59 =				
	F609SB009	0.18 J				

TABLE 4-1
Analytes Detected in Surface Soil
RFI Report Addendum, AOC 609, Zone F, CNC

Parameter	Location	Sample Concentration and Qualifier	Units	Calculated Soil-to-Groundwater SSL[a] (DAF=8.6)	EPA Region III Residential Soil RBC[b]	Surface Soil Background (Grid-based) Concentration Range[c]
	F609SB010	0.47 J				
	F609SB011	1.10 =				
	F609SB012	0.44 J				
Cadmium	F609SB001	0.320 J	mg/kg	40	7.8	0.12 to 1.7
Calcium	F609SB001	2,390 J	mg/kg	NL	NL	2,080 to 52,300
	F609SB002	4,400 J				
	F609SB007	3,040 =				
	F609SB008	1,090 J				
	F609SB009	1,210 =				
	F609SB010	27,400 J				
	F609SB011	517 J				
	F609SB012	432 J				
Chromium, Total	F609SB001	20.3 J	mg/kg	1,100	12,000	6.3 to 39
	F609SB002	54.7 J				
	F609SB007	50.6 =				
	F609SB008	12.3 J				
	F609SB009	8.0 =				
	F609SB010	21.7 J				
	F609SB011	6.3 J				
	F609SB012	7.8 J				
Cobalt	F609SB001	22.4 =	mg/kg	20,000	470	0.94 to 36
	F609SB002	11.9 =				
	F609SB007	49.7 =				
	F609SB008	9.2 =				
	F609SB009	1.4 J				
	F609SB010	5.3 =				
	F609SB011	2.7 J				
	F609SB012	13.7 =				
Copper	F609SB001	65.0 =	mg/kg	8,400	310	5.7 to 431
	F609SB002	42.0 =				
	F609SB007	**480.0 =**				
	F609SB008	26.8 =				
	F609SB009	3.5 =				
	F609SB010	15.2 J				
	F609SB011	0.9 J				
	F609SB012	8.9 J				

TABLE 4-1
Analytes Detected in Surface Soil
RFI Report Addendum, AOC 609, Zone F, CNC

Parameter	Location	Sample Concentration and Qualifier	Units	Calculated Soil-to-Groundwater SSL[a] (DAF=8.6)	EPA Region III Residential Soil RBC[b]	Surface Soil Background (Grid-based) Concentration Range[c]
Iron	F609SB001	11,500 =	mg/kg	380,000	2,300	3,570 to 32,700
	F609SB002	**38,800 =**				
	F609SB007	23,800 =	mg/kg			
	F609SB008	8,830 =				
	F609SB009	5,360 =				
	F609SB010	17,100 J				
	F609SB011	4,180 J				
	F609SB012	6,150 J				
Lead	F609SB001	184 =	mg/kg	400	400	3.5 to 275
	F609SB002	62.9 =				
	F609SB007	**511.0 =**				
	F609SB008	35.0 =				
	F609SB009	9.0 =				
	F609SB010	22.7 J				
	F609SB011	3.8 J				
	F609SB012	19.1 J				
Magnesium	F609SB001	425 J	mg/kg	NL	NL	323 to 5,280
	F609SB002	4,560 J				
	F609SB007	1,050 =				
	F609SB008	815 J				
	F609SB009	499 J				
	F609SB010	1,490 J				
	F609SB011	446 J				
	F609SB012	373 J				
Manganese	F609SB001	122.0 =	mg/kg	17,000	1,100	32 to 436
	F609SB002	389.0 =				
	F609SB007	234.0 =				
	F609SB008	115.0 =				
	F609SB009	48.3 =				
	F609SB010	133.0 J				
	F609SB011	46.8 J				
	F609SB012	28.7 J				
Mercury	F609SB001	1.30 =	mg/kg	25	2.3	0.060 to 2.0
	F609SB002	0.81 =				
	F609SB007	1.00 J				
	F609SB008	0.12 =				
	F609SB009	0.07 J				
	F609SB010	0.06 J				

TABLE 4-1
Analytes Detected in Surface Soil
RFI Report Addendum, AOC 609, Zone F, CNC

Parameter	Location	Sample Concentration and Qualifier	Units	Calculated Soil-to-Groundwater SSL[a] (DAF=8.6)	EPA Region III Residential Soil RBC[b]	Surface Soil Background (Grid-based) Concentration Range[c]
	F609SB011	0.55 J				
	F609SB012	0.05 J				
Nickel	F609SB001	17.7 =	mg/kg	480	160	2.0 to 27
	F609SB002	20.6 =				
	F609SB007	68.7 =				
	F609SB008	7.8 =				
	F609SB009	3.0 J				
	F609SB010	6.7 J				
	F609SB011	4.7 J				
	F609SB012	3.8 J				
Potassium	F609SB001	336 J	mg/kg	NL	NL	202 to 1,730
	F609SB002	**2,930 J**				
	F609SB007	550 J				
	F609SB008	457 J				
	F609SB009	257 J				
	F609SB010	787 J				
	F609SB011	191 J				
	F609SB012	189 J				
Selenium	F609SB001	2.00 =	mg/kg	130	39	0.44 to 1.4
	F609SB002	2.60 =				
	F609SB007	2.70 =				
	F609SB008	1.00 J				
	F609SB009	0.91 J				
	F609SB010	1.50 =				
Silver	F609SB001	0.29 J	mg/kg	500	39	5.0
	F609SB010	0.58 J				
	F609SB012	0.96 J				
Sodium	F609SB001	194.0 J	mg/kg	NL	NL	226 to 1,150
	F609SB002	377.0 J				
	F609SB007	426.0 J				
	F609SB008	112.0 J				
	F609SB009	130.0 J				
	F609SB010	174.0 J				
	F609SB011	57.6 J				
	F609SB012	96.8 J				
Tin (Sn)	F609SB001	7.6 J	mg/kg	NA	4,700	2.6 to 26
	F609SB002	7.8 J				

TABLE 4-1
Analytes Detected in Surface Soil
RFI Report Addendum, AOC 609, Zone F, CNC

Parameter	Location	Sample Concentration and Qualifier	Units	Calculated Soil-to-Groundwater SSL[a] (DAF=8.6)	EPA Region III Residential Soil RBC[b]	Surface Soil Background (Grid-based) Concentration Range[c]
	F609SB007	125.0 =				
	F609SB008	8.8 J				
Vanadium	F609SB001	21.4 =	mg/kg	1,700	55	6.8 to 60
	F609SB002	**88.7 =**				
	F609SB007	22.7 =				
	F609SB008	18.7 =				
	F609SB009	12.1 =				
	F609SB010	35.0 J				
	F609SB011	9.4 J				
	F609SB012	11.9 J				
Zinc	F609SB001	338.0 J	mg/kg	13,000	2,300	18 to 1,650
	F609SB002	172.0 J				
	F609SB007	**2,650.0 =**				
	F609SB008	148.0 J				
	F609SB009	15.5 =				
	F609SB010	62.6 J				
	F609SB011	7.0 J				
	F609SB012	53.2 J				
Organics						
Acetone	F609SB001	0.069 J	mg/kg	1.03	780	NA
	F609SB002	0.099 J				
BEQ	F609SB001	0.763	mg/kg	NA	NA	1.304
Benzo(a) Anthracene	F609SB001	0.380 J	mg/kg	0.584	870	0.616
Benzo(a) Pyrene	F609SB001	0.480 =	mg/kg	0.163	0.087	0.598
Benzo(b) Fluoranthene	F609SB001	0.610 =	mg/kg	1.98	0.87	0.608
Benzo(g,h,i) Perylene	F609SB001	0.350 J	mg/kg	NL	NL	NA
Benzo(k) Fluoranthene	F609SB001	0.320 J	mg/kg	19.8	8.7	0.596
Carbon disulfide	F609SB001	0.002 J	mg/kg	8.17	780	NA
	F609SB002	0.002 J				

TABLE 4-1
Analytes Detected in Surface Soil
RFI Report Addendum, AOC 609, Zone F, CNC

Parameter	Location	Sample Concentration and Qualifier	Units	Calculated Soil-to-Groundwater SSL[a] (DAF=8.6)	EPA Region III Residential Soil RBC[b]	Surface Soil Background (Grid-based) Concentration Range[c]
Chrysene	F609SB001	0.51 =		62.8	87	0.620
Dibenz(a,h) Anthracene	F609SB001	0.14 J	mg/kg	0.602	0.087	0.525
Fluoranthene	F609SB001	0.77 =	mg/kg	2,666	310	NA
Indeno(1,2,3-c,d) pyrene	F609SB001	0.40 J	mg/kg	5.50	0.87	0.525
Methyl ethyl ketone (2-butanone)	F609SB001	0.007 =	mg/kg	3.44	4,700	NA
Phenanthrene	F609SB001	0.36 J	mg/kg	NA	NA	NA
Pyrene	F609SB001	0.76 =	mg/kg	292	230	NA
4,4' – DDD	F609SB001 F609SB002	0.066 = 0.005 =	mg/kg mg/kg	4.82	2.7	NA
4,4' – DDE	F609SB001 F609SB002	0.180 = 0.020 =	mg/kg	15.5	1.9	NA
4,4' – DDT	F609SB001	0.026 =	mg/kg	0.499	1.9	NA

Concentrations in bolded and outlined text exceed the RBCs, SSLs, and the zone background screening criteria.

[a] Calculated site-specific Soil-to-Groundwater SSL by SPLP method using site-specific DAF of 8.6 for inorganic compounds. Organic compound SSLs are determined from EPA Region III RBC Table (October 5, 2000) using DAF of 8.6. SSLs for lead default to the residential RBC of 400 mg/kg.

[b] Residential RBCs were obtained from the EPA Region III RBC Table (October 5, 2000) (http://www.epa.gov/epahome/search.html). HI=0.1 is used for non-carcinogenic compounds; HI=1.0 is used for carcinogenic compounds.

[c] Surface soil background (grid-based) concentration ranges are the minimum and maximum detected values in Zone F and Zone G combined. Background concentrations for cPAHs are the 2x adjusted mean value as presented in Table 4.1, *Background PAHs Study Report: Technical Information for the Development of Background BEQ Values* (CH2M-Jones, 2001).

=	Chemical is detected at concentration shown.
DAF	dilution attenuation factor
HI	hazard index
J	Chemical is detected at concentration below the method detection limit; the concentration is not known.
NA	not applicable/not available/not analyzed
NL	no limit
RBC	risk -based concentration
SSL	soil screening level
ThQ	target hazard quotient

TABLE 4-2
Analytes Detected in Subsurface Soil
RFI Report Addendum, AOC 609, Zone F, CNC

Parameter	Location	Sample Concentration and Qualifier	Units	Calculated Soil-to-Groundwater SSL[a] (DAF=8.6)	Subsurface Soil Background (Grid-based) Concentration Range[b]
		Inorganics			
Aluminum	F609SB001	5,740 =	mg/kg	220,000	2,630 to 36,800
	F609SB002	13,900 =			
	F609SB007	7,900 =			
	F609SB008	2,720 =			
	F609SB009	36,400 =			
	F609SB010	3,540 J			
	F609SB011	13,700 J			
	F609SB012	6,920 J			
Antimony	F609SB001	0.30 J	mg/kg	12	1.1 to 2.9
	F609SB002	0.88 J			
	F609SB007	0.21 J			
	F609SB008	0.44 J			
	F609SB009	1.20 J			
	F609SB010	0.26 J			
	F609SB011	1.60 J			
	F609SB012	0.60 J			
Arsenic	F609SB001	3.40 J	mg/kg	220	1.4 to 36
	F609SB002	5.70 J			
	F609SB007	2.10 =			
	F609SB008	0.89 J			
	F609SB009	32.20 =			
	F609SB010	2.50 J			
	F609SB011	15.00 J			
	F609SB012	4.70 J			
Barium	F609SB001	19.3 J	mg/kg	930	7.7 to 63
	F609SB002	23.4 =			
	F609SB007	28.0 =			
	F609SB008	13.2 J			
	F609SB009	48.3 =			
	F609SB010	13.9 J			
	F609SB011	34.2 J			
	F609SB012	13.2 J			
Beryllium	F609SB001	0.52 J	mg/kg	3.6	0.22 to 2.4
	F609SB002	0.29 J			
	F609SB007	0.67 =			
	F609SB008	0.35 J			

TABLE 4-2
Analytes Detected in Subsurface Soil
RFI Report Addendum, AOC 609, Zone F, CNC

Parameter	Location	Sample Concentration and Qualifier	Units	Calculated Soil-to-Groundwater SSL[a] (DAF=8.6)	Subsurface Soil Background (Grid-based) Concentration Range[b]
Beryllium	F609SB009	1.60 =	mg/kg	3.6	0.22 to 2.4
	F609SB010	0.45 J			
	F609SB011	1.30 =			
	F609SB012	0.25 J			
Calcium	F609SB001	640 J	mg/kg	NL	1,040 to 127,000
	F609SB002	1,190 J			
	F609SB007	182 J			
	F609SB008	192 J			
	F609SB009	3,050 =			
	F609SB010	744 J			
	F609SB011	2,240 J			
	F609SB012	682 J			
Chromium, Total	F609SB001	6.7 J	mg/kg	1,100	7.4 to 65
	F609SB002	26.7 J			
	F609SB007	7.1 =			
	F609SB008	3.5 J			
	F609SB009	53.8 =			
	F609SB010	5.5 J			
	F609SB011	26.5 J			
	F609SB012	19.7 J			
Cobalt	F609SB001	1.70 J	mg/kg	20,000	0.90 to 15
	F609SB002	2.20 J			
	F609SB007	2.90 J			
	F609SB008	1.10 J			
	F609SB009	8.90 =			
	F609SB010	0.85 J			
	F609SB011	9.10 =			
	F609SB012	4.90 J			
Copper	F609SB001	13.70 =	mg/kg	8,400	2.5 to 55
	F609SB002	1.30 J			
	F609SB008	0.24 J			
	F609SB009	59.00 =			
	F609SB010	1.10 J			
	F609SB011	34.80 J			
	F609SB012	1.50 J			
Iron	F609SB001	3,680 =	mg/kg	380,000	3,110 to 58,100
	F609SB002	19,000 =			
	F609SB007	5,880 =			

TABLE 4-2
Analytes Detected in Subsurface Soil
RFI Report Addendum, AOC 609, Zone F, CNC

Parameter	Location	Sample Concentration and Qualifier	Units	Calculated Soil-to-Groundwater SSL[a] (DAF=8.6)	Subsurface Soil Background (Grid-based) Concentration Range[b]
Iron	F609SB008	1,710 =	mg/kg	380,000	3,110 to 58,100
	F609SB009	33,300 =			
	F609SB010	3,530 J			
	F609SB011	21,500 J			
	F609SB012	18,400 J			
Lead	F609SB001	17.7 =	mg/kg	400	2.4 to 123
	F609SB002	8.1 =			
	F609SB007	4.1 =			
	F609SB008	2.3 =			
	F609SB009	49.9 =			
	F609SB010	6.2 J			
	F609SB011	50.1 J			
	F609SB012	10.1 J			
Magnesium	F609SB001	430 J	mg/kg	NL	399 to 7,040
	F609SB002	1,110 J			
	F609SB007	363 J			
	F609SB008	216 J			
	F609SB009	4,410 =			
	F609SB010	291 J			
	F609SB011	2,320 J			
	F609SB012	978 J			
Manganese	F609SB001	55.1 =	mg/kg	17,000	20 to 1,120
	F609SB002	51.2 =			
	F609SB007	35.8 =			
	F609SB008	18.9 =			
	F609SB009	398.0 =			
	F609SB010	48.3 J			
	F609SB011	363.0 J			
	F609SB012	40.6 J			
Mercury	F609SB001	0.06 =	mg/kg	25	0.040 to 0.57
	F609SB009	0.38 J			
	F609SB010	0.07 J			
Nickel	F609SB001	2.7 J	mg/kg	480	1.9 to 22
	F609SB002	4.3 J			
	F609SB007	3.6 =			
	F609SB008	1.5 J			
	F609SB009	17.5 =			
	F609SB010	1.6 J			

TABLE 4-2
Analytes Detected in Subsurface Soil
RFI Report Addendum, AOC 609, Zone F, CNC

Parameter	Location	Sample Concentration and Qualifier	Units	Calculated Soil-to-Groundwater SSL[a] (DAF=8.6)	Subsurface Soil Background (Grid-based) Concentration Range[b]
Nickel	F609SB011	12.0 J	mg/kg	480	1.9 to 22
	F609SB012	2.0 J			
Potassium	F609SB001	223 J	mg/kg	NL	195 to 3,790
	F609SB002	763 J			
	F609SB007	213 J			
	F609SB008	103 J			
	F609SB009	2,770 J			
	F609SB010	133 J			
	F609SB011	1,280 J			
	F609SB012	553 J			
Selenium	F609SB001	0.49 J	mg/kg	130	0.40 to 1.7
	F609SB002	1.80 =			
	F609SB007	0.63 J			
	F609SB008	0.24 J			
	F609SB009	3.50 =			
	F609SB011	2.10 =			
	F609SB012	2.30 =			
Sodium	F609SB002	264.0 J	mg/kg	NL	289 to 3,890
	F609SB007	41.2 J			
	F609SB008	49.3 J			
	F609SB009	555.0 J			
	F609SB010	44.8 J			
	F609SB011	147.0 J			
	F609SB012	313.0 J			
Tin (Sn)	F609SB001	4.3 J	mg/kg	NA	1.1 to 2.9
	F609SB002	5.3 J			
	F609SB008	3.7 J			
Vanadium	F609SB001	9.3 =	mg/kg	1,700	5.9 to 112
	F609SB002	36.3 =			
	F609SB007	10.8 =			
	F609SB008	4.7 J			
	F609SB009	86.3 =			
	F609SB010	8.5 J			
	F609SB011	43.1 J			
	F609SB012	26.1J			
Zinc	F609SB001	11.4 J	mg/kg	13,000	9.3 to 198
	F609SB002	13.5 J			

TABLE 4-2
Analytes Detected in Subsurface Soil
RFI Report Addendum, AOC 609, Zone F, CNC

Parameter	Location	Sample Concentration and Qualifier	Units	Calculated Soil-to-Groundwater SSL[a] (DAF=8.6)	Subsurface Soil Background (Grid-based) Concentration Range[b]
Zinc	F609SB007	9.7 =	mg/kg	13,000	9.3 to 198
	F609SB008	4.0 J			
	F609SB009	134.0 =			
	F609SB010	5.7 J			
	F609SB011	143.0 J			
	F609SB012	24.2 J			
Organics					
BEQ	F609SB001	0.326	mg/kg	NA	1.400
	F609SB002	0.485			
Benzo(a) Anthracene	F609SB001	0.09 J	mg/kg	0.584	0.627
Benzo(a)pyrene	F609SB001	0.10 J	mg/kg	0.163	0.623
Benzo(b) Fluoranthene	F609SB001	0.09 J	mg/kg	1.98	0.631
Chrysene	F609SB001	0.13 J	mg/kg	62.8	0.616
Fluoranthene	F609SB001	0.24 J	mg/kg	2,666	NA
Indeno(1,2,3-c,d) pyrene	F609SB001	0.086 J	mg/kg	5.50	0.592
Phenanthrene	F609SB001	0.16 J	mg/kg	NA	NA
Pyrene	F609SB001	0.21 J	mg/kg	292	NA
4,4' - DDE	F609SB001	0.0063 J	mg/kg	15.5	NA

Concentrations in bolded and outlined text exceeded SSLs, and the zone background screening criteria.

[a] Calculated site-specific Soil-to-Groundwater SSL by SPLP method using site-specific DAF of 8.6 for inorganic compounds. Organic compound SSLs are determined from EPA Region III RBC Table (October 5, 2000) using DAF of 8.6. SSLs for lead default to the residential RBC of 400 mg/kg.

[b] Subsurface soil background (grid-based) concentration values are the minimum and maximum detected values in Zone F and Zone G combined. Background concentrations for cPAHs are the 2x adjusted mean value as presented in Table 4.1, *Background PAHs Study Report: Technical Information for the Development of Background BEQ Values* (CH2M-Jones, 2001).

= Chemical is detected at concentration shown.
DAF dilution attenuation factor
HI hazard index
J Chemical is detected at concentration below the method detection limit; the concentration is not known.
NA not applicable/not available/not analyzed
NL no limit
RBC risk-based concentration
SSL soil screening level
ThQ target hazard quotient

TABLE 4-3
Analytes Detected in Groundwater
RFI Report Addendum, AOC 609, Zone F, CNC

Parameter	Location	Sample Concentration and Qualifier	Units	MCL for Drinking Water[a]	EPA Region III Tap Water RBC[c] (ThQ=0.1)	Groundwater BRC[d]
			Inorganics			
Aluminum	F609GW001	**7,440 J**	µg/L	200[b]	3,700	4,320 to 4,941*
	F609GW001	153 J				
	F609GW002	308 J				
	FSMEGW001	661 =				
	FSMEGW003	1,540 =				
	FSMEGW007	1,420 J				
	FSMEGW008	58.6 J				
Antimony	FSMEGW001	**6.7 J**	µg/L	6	0.15	ND to 4.73
Arsenic	F609GW001	7.5 J	µg/L	50	0.045	5.6 to 120.2
	F609GW001	47.3 =				
	F609GW002	**105.0 =**				
	F609GW002	30.1 =				
	FSMEGW001	36.0 =				
	FSMEGW003	5.2 J				
	FSMEGW004	19.2 =				
	FSMEGW005	42.2 =				
	FSMEGW007	2.5 J				
	FSMEGW008	31.5 =				
	FSMEGW006[e]	**56.1 =**		50	0.045	5.4 to 16.2
Barium	F609GW001	79.5 =	µg/L	2,000	260	711
	F609GW001	91.1 J				
	F609GW002	13.4 J				
	F609GW002	21.5 J				
	FSMEGW001	29.3 J				
	FSMEGW003	14.8 J				
	FSMEGW004	22.9 J				
	FSMEGW005	24.6 J				
	FSMEGW007	15.9 J				
	FSMEGW008	35.7 J				
	FSMEGW006[e]	42.6 J		2,000	260	200 to 316
Cadmium	FSMEGW001	0.64 J	µg/L	5	1.8	2.52
	FSMEGW005	1.00 J				
	FSMEGW008	1.00 J				
	FSMEGW006[e]	0.51 J	µg/L	5	1.8	ND to 0.77
Calcium	F609GW001	24,200 J	µg/L	NA	NA	NA
	F609GW001	24,600 =				

TABLE 4-3
Analytes Detected in Groundwater
RFI Report Addendum, AOC 609, Zone F, CNC

Parameter	Location	Sample Concentration and Qualifier	Units	MCL for Drinking Water[a]	EPA Region III Tap Water RBC[c] (ThQ=0.1)	Groundwater BRC[d]
Calcium	F609GW002	28,100 J	µg/L	NA	NA	NA
	F609GW002	84,500 =				
	FSMEGW001	49,800 =				
	FSMEGW003	3,910 =				
	FSMEGW004	24,700 =				
	FSMEGW005	2,290 =				
	FSMEGW007	10,700 J				
	FSMEGW008	10,400 =				
	FSMEGW006[e]	156,000 =		NA	NA	NA
Chromium, Total	F609GW001	13.4 =	µg/L	100	5,500	2.05 to 3.88
	F609GW002	1.5 J				
Cobalt	F609GW001	3.2 J	µg/L	NA	220	1.45 to 10.9
	FSMEGW001	1.0 J				
	FSMEGW003	4.3 J				
	FSMEGW004	1.0 J				
	FSMEGW005	1.3 J				
	FSMEGW007	2.2 J				
	FSMEGW008	2.2 J				
Copper	F609GW001	2.9 J	µg/L	1,000[b]	150	ND to 8.33
	F609GW002	1.5 J				
Iron	F609GW001	12,600 J	µg/L	300[b]	1,100	4,290 to 55,075
	F609GW001	22,900 =				
	F609GW002	6,370 J				
	F609GW002	16,400 =				
	FSMEGW001	9,310 J				
	FSMEGW003	2,870 J				
	FSMEGW004	2,230 J				
	FSMEGW005	14,300 J				
	FSMEGW007	1,570 J				
	FSMEGW008	14,300 J				
	FSMEGW006[e]	6,750 J		300[b]	1,100	12,113[f]
Lead	F609GW001	4.7 =	µg/L	15[b]	NA	ND to 18.7
	F609GW002	2.1 J				
Magnesium	F609GW001	34,900 J	µg/L	NA	NA	NA
	F609GW001	31,200 =				
	F609GW002	49,500 J				
	F609GW002	52,900 =				

TABLE 4-3
Analytes Detected in Groundwater
RFI Report Addendum, AOC 609, Zone F, CNC

Parameter	Location	Sample Concentration and Qualifier	Units	MCL for Drinking Water[a]	EPA Region III Tap Water RBC[c] (ThQ=0.1)	Groundwater BRC[d]
Magnesium	FSMEGW001	62,600 =	µg/L	NA	NA	NA
	FSMEGW003	2,500 =				
	FSMEGW004	6,790 =				
	FSMEGW005	2,670 =				
	FSMEGW007	3,790 =				
	FSMEGW008	22,400 =				
	FSMEGW006[e]	81,900 =				
Manganese	F609GW001	529.0 =	µg/L	50[b]	73	226 to 4,002
	F609GW001	523.0 =				
	F609GW002	330.0 =				
	F609GW002	2,020.0 =				
	FSMEGW001	283.0 =				
	FSMEGW003	36.2 =				
	FSMEGW004	28.3 =				
	FSMEGW005	57.5 =				
	FSMEGW007	102.0 J				
	FSMEGW008	127.0 =				
	FSMEGW006[e]	1,130.0 =		50	73	537 to 1,260
Mercury	F609GW001	0.16 J	µg/L	2	1.1	ND
	F609GW002	0.67 J				
	FSMEGW004	0.18 J				
Nickel	F609GW001	2.9 J	µg/L	100	73	4.08 to 5.55
	F609GW002	1.3 J				
	FSMEGW001	1.7 J				
	FSMEGW003	1.7 J				
	FSMEGW004	1.8 J				
	FSMEGW007	1.5 J				
	FSMEGW008	1.1 J				
	FSMEGW006[e]	15.1 J		100	73	21.7 to 61.1
Potassium	F609GW001	24,500 J	µg/L	NA	NA	NA
	F609GW001	30,000 J				
	F609GW002	52,500 J				
	F609GW002	52,100 J				
	FSMEGW001	45,100 =				
	FSMEGW003	4,450 J				
	FSMEGW004	10,800 =				
	FSMEGW005	1,370 J				
	FSMEGW007	4,680 J				

TABLE 4-3
Analytes Detected in Groundwater
RFI Report Addendum, AOC 609, Zone F, CNC

Parameter	Location	Sample Concentration and Qualifier	Units	MCL for Drinking Water[a]	EPA Region III Tap Water RBC[c] (ThQ=0.1)	Groundwater BRC[d]
Potassium	FSMEGW008	26,200 =	µg/L	NA	NA	NA
	FSMEGW006[e]	17,100 =		NA	NA	NA
Selenium	F609GW001	2.8 J	µg/L	50	18	ND to 4.3
	F609GW002	3.1 J				
	FSMEGW005	7.8 =				
Silver	FSMEGW006[e]	2.9 J	µg/L	100[b]	18	2.7 to 2.9
Sodium	F609GW001	239,000 =	µg/L	NA	NA	NA
	F609GW001	171,000 J				
	F609GW002	775,000 =				
	F609GW002	274,000 J				
	FSMEGW001	829,000 =				
	FSMEGW003	292,000 =				
	FSMEGW004	248,000 =				
	FSMEGW005	1,870,000 =				
	FSMEGW007	143,000 J				
	FSMEGW008	2,360,000 =				
	FSMEGW006[e]	1,030,000 =				
Vanadium	F609GW001	15.4 J	µg/L	NA	26	1.58 to 15.4
	F609GW001	1.2 J				
	F609GW002	3.8 J				
	F609GW002	5.6 J				
	FSMEGW001	9.4 J				
	FSMEGW003	3.3 J				
	FSMEGW004	1.5 J				
	FSMEGW005	1.3 J				
	FSMEGW007	3.3 J				
Organics						
Benzene	FSMEGW005	**23,000**	µg/L	5	0.32	NA
Ethylbenzene	FSMEGW005	**2,600**		700	130	NA
Toluene	FSMEGW005	**34,000**		1,000	75	NA
Xylenes, Total	FSMEGW005	**12,000**		10,000	1,200	NA
	FSMEGW008	4				
2,4-Dimethylphenol	FSMEGW005	**140 =**	µg/L	NA	73	NA

TABLE 4-3
Analytes Detected in Groundwater
RFI Report Addendum, AOC 609, Zone F, CNC

Parameter	Location	Sample Concentration and Qualifier	Units	MCL for Drinking Water[a]	EPA Region III Tap Water RBC[c] (ThQ=0.1)	Groundwater BRC[d]
2-methyl-Naphthalene	FSMEGW005	**100 =**	µg/L	NA	12	NA
2-Methlyphenol (o-cresol)	FSMEGW005	**340 =**	µg/L	NA	180	NA
4-Methylphenol (p-cresol)	FSMEGW001	1 J	µg/L	NA	18	NA
	FSMEGW005	**310 =**	µg/L			
Naphthalene	FSMEGW005	**370 =**	µg/L	NA	0.65	NA
Phenol	FSMEGW005	170 =	µg/L	NA	2,200	NA

Concentrations in bolded and outlined text exceed the MCL, tap water RBC, and the zone background screening criteria.

[a] MCLs are maximum concentration levels as published in the EPA National Primary Drinking Water Standards document # 816-F-01-007 (March, 2001) unless otherwise noted.

[b] MCLs not listed in the EPA National Primary Drinking Water Standards document # 816-F-01-007 (March, 2001) were obtained from the EGIS database.

[c] Tap water RBCs are from the EPA Region III, RBC Table (October 5, 2000). Non-carcinogenic compounds use a ThQ of 0.1.

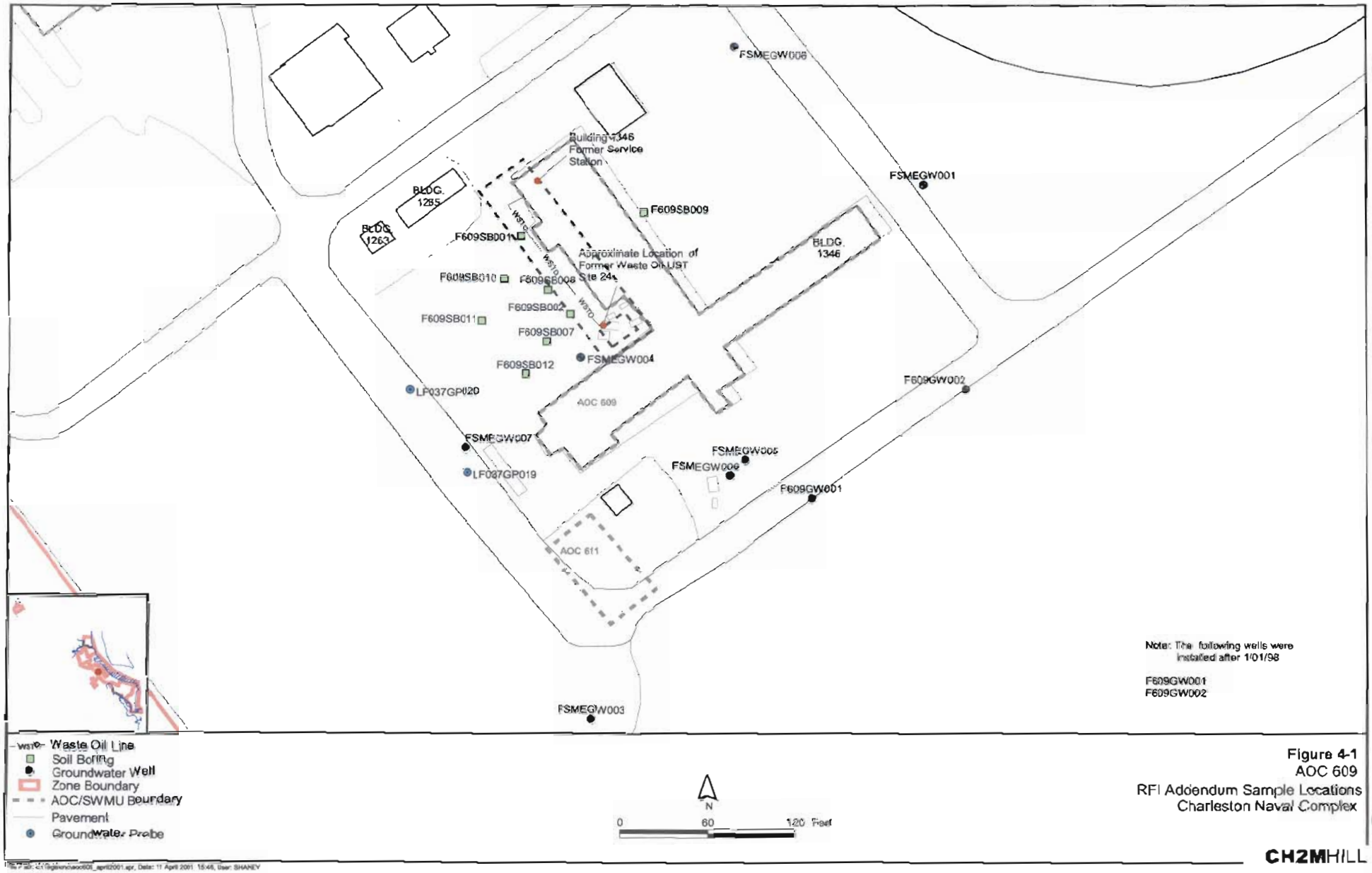
[d] BRCs are the UTL values from EnSafe's RFI report or the range of background values reported per well in the grid wells.

[e] Monitor well FSMEGW006 is screened at 30 feet below groundwater and uses deep groundwater grid-based background concentrations.

[f] Background reference concentrations for iron are twice the mean of the grid-based sample concentrations for Zone F and Zone G combined.

* Aluminum was monitored only in 2 background wells, one in Zone E (EGDEGW026) and one in Zone K (KGDKGW001). The values are the detected concentrations in these two wells.

= Chemical is detected at concentration shown
DAF dilution attenuation factor
HI Hazard Index
J Chemical is detected at a concentration below the method detection limit; the concentration is not known
NA not applicable/not available/not analyzed
ND not detected
NL no limit
RBC risk-based concentration
SSL soil screening level
ThQ target hazard quotient



- Waste Oil Line
- Soil Boring
- Groundwater Well
- Zone Boundary
- AOC/SWMU Boundary
- Pavement
- Groundwater Probe

N

0 60 120 Feet

Figure 4-1
AOC 609
RFI Addendum Sample Locations
Charleston Naval Complex

CH2MHILL

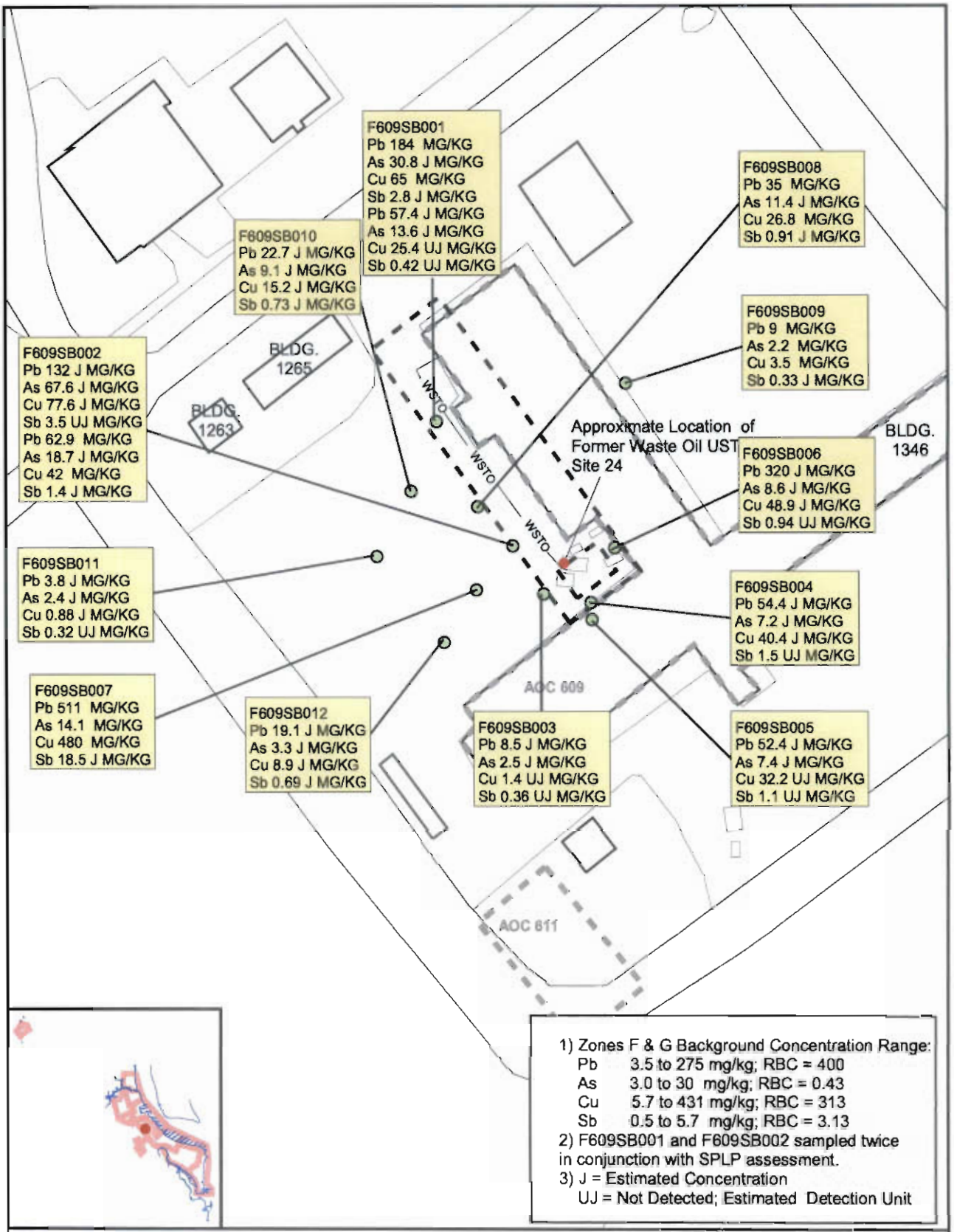


Figure 4-2
AOC 609
Lead, Arsenic, Copper, and Antimony
Results in Surface Soil
Charleston Naval Complex

CH2MHILL

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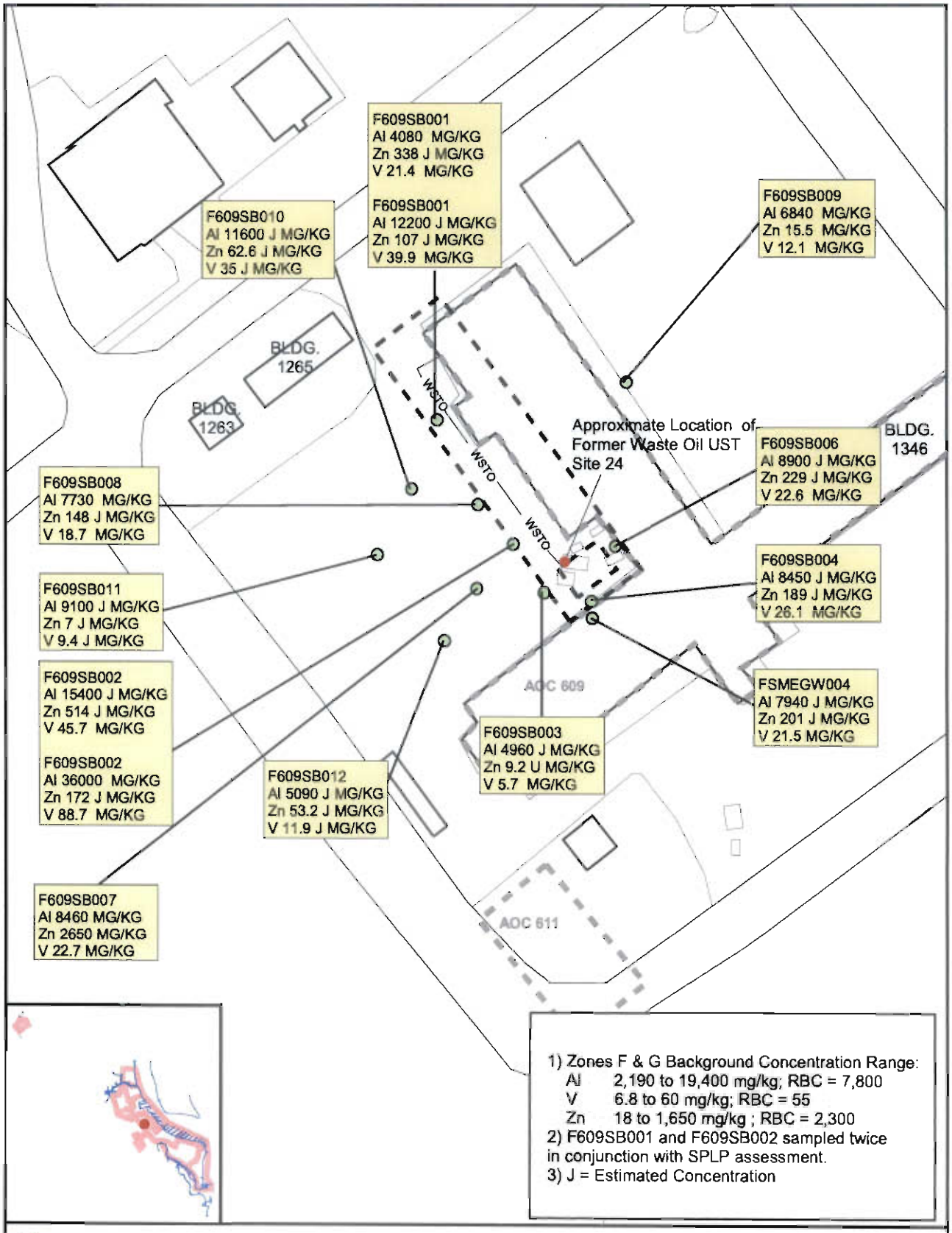

Figure 4-3
AOC 609
Aluminum, Vanadium, and Zinc
Results in Surface Soil
Charleston Naval Complex

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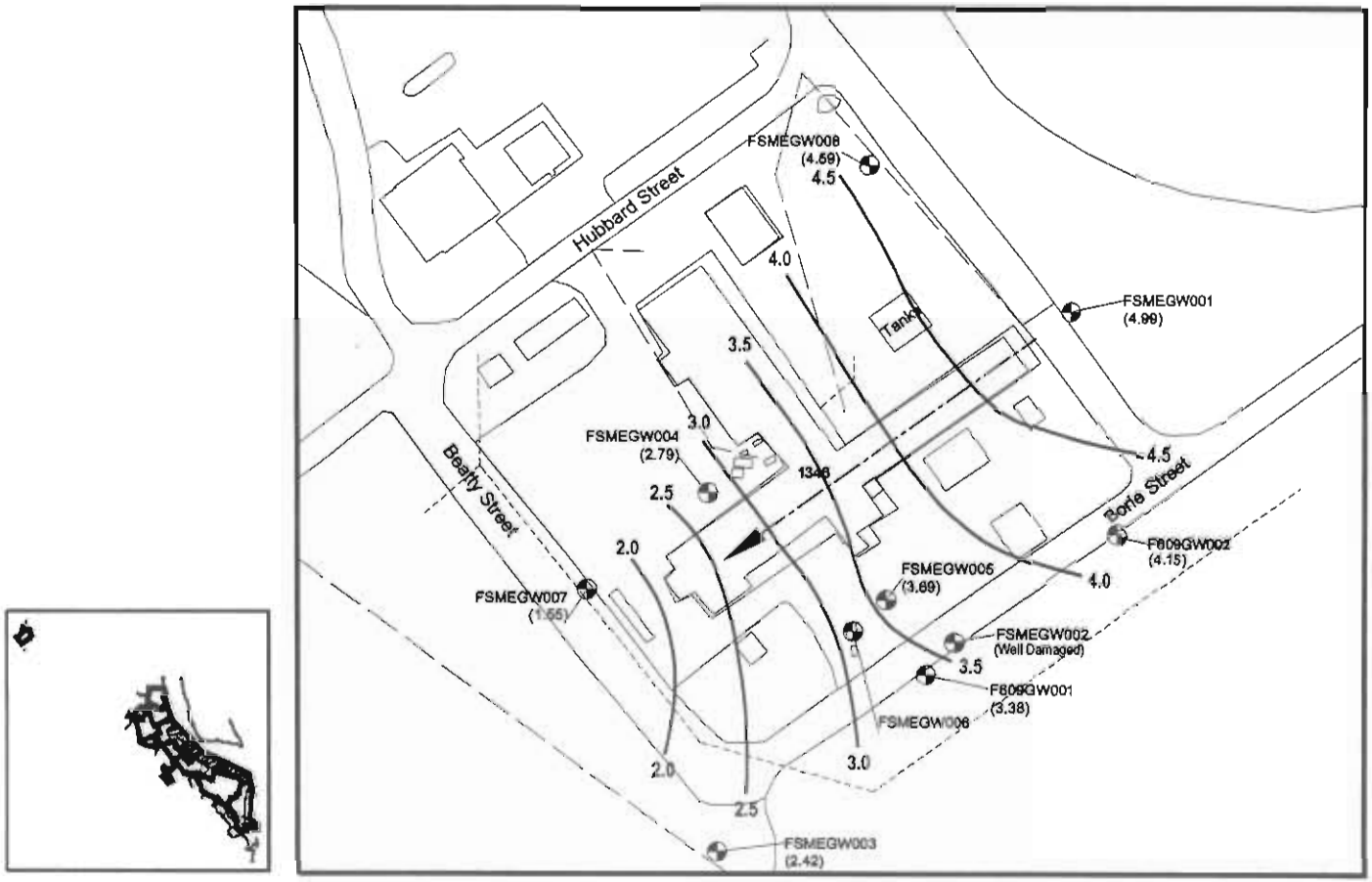


Note:
FSMEGW006 is screened in a lower water-bearing unit.

Samples: Groundwater Samples
Groundwater Well
Road - Line
Text Road - Text
Pavement

Buildings
Sanitary Sewer Line
Storm Drain Utility Line
Water Utility Line
Former UST Location

Groundwater Potentiometric Surface Contour (FT MSL)
Groundwater Flow Direction
(4.15) Groundwater Elevation (FT MSL)
Contour Interval = 0.5 Feet

N

0 120 Feet

Figure 4-4
AOC 609
Groundwater Potentiometric Surface Map
March 26, 2001
Charleston Naval Complex

CH2MHILL

A112001002ATL\CNC 100.fh8

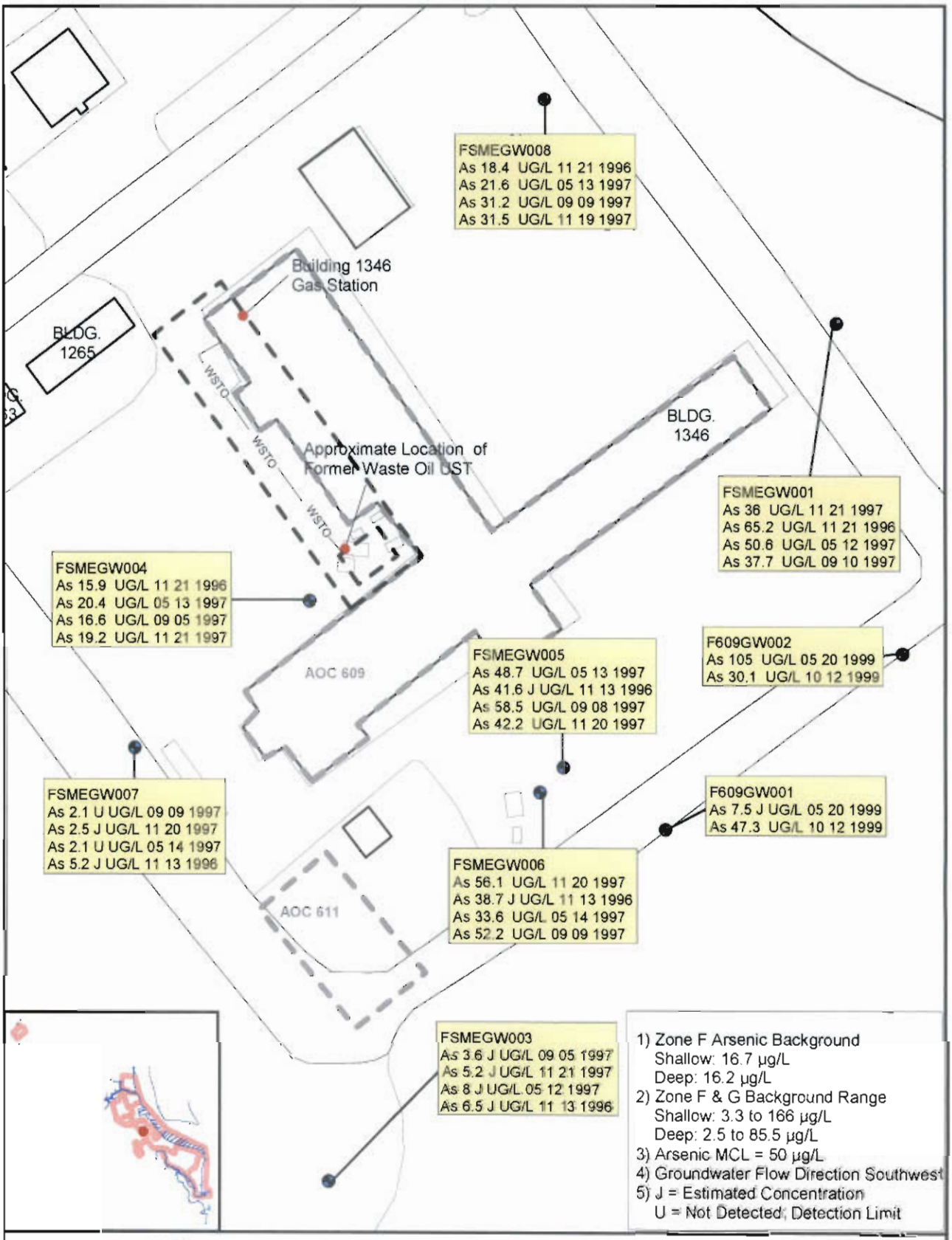


Figure 4-5
AOC 609
Arsenic Results in Groundwater
Charleston Naval Complex

CH2MHILL

File Path: c:\18gis\cnd\aoc609_april2001.apr, Date: 11 Apr 2001 11:36, User: SHANEY

Section 5.0

The base-wide background level for antimony ranged between 2.1 and 6.1 $\mu g/L$. The detected maximum concentration is near the maximum detected background antimony levels. Additionally, of the four sampling events conducted at this well, only the second and fourth sampling events showed antimony detections indicating that antimony detections are sporadic. The laboratory qualifier for both of the detected values from this well indicated that antimony was also detected in the blank samples at similar or higher concentrations. The tap water RBC value for antimony is 15 $\mu g/L$, which was not exceeded by this maximum concentration. Based on these considerations, antimony is not considered attributable to site operations or the UST system, and is not considered a COC in the groundwater at AOC 609.

5.2.3 Arsenic

Concentrations of arsenic that exceeded applicable screening criteria were detected in groundwater at AOC 609. The distribution of arsenic for all groundwater sampling events is presented in Figure 4-5. As shown in Figure 4-5, the groundwater arsenic exceedances are found at locations upgradient and side-gradient of the waste oil system, and are primarily located within the monitor wells adjacent to the Site 25 USTs. Furthermore, groundwater arsenic concentrations nearest to and downgradient from the former waste oil UST are well below applicable screening criteria. The combined background arsenic levels for Zones F and G ranged between 5.6 $\mu g/L$ and 120.2 $\mu g/L$. The base-wide background arsenic levels ranged between 1.6 and 285 $\mu g/L$. As such, the concentrations of arsenic in the groundwater at AOC 609 appear to be naturally occurring and do not appear to be related to the waste oil UST and associated fill pipe release. Therefore, arsenic is not considered a COPC at this site.

The most plausible explanation for the elevated levels of arsenic is their naturally-occurring release into the groundwater in soils due to the action of iron-reducing bacteria. The presence of a readily degradable organic substrate (the fuel released from the USTs) and the presence of elevated levels of iron in groundwater samples at the site, ranging from 1,570 to 22,900 $\mu g/L$, indicate that conditions favorable to bacterially-mediated iron reduction are present, and that iron reduction is likely occurring. Because arsenic in soil is often associated with iron oxyhydroxide minerals, the release of arsenic into solution by iron-reducing bacteria is a potential reason for the elevated arsenic values observed in wells at this site.

5.2.4 VOCs and SVOCs

Chlorobenzene had been identified as a COC in the *Zone F RFI Report, Revision 0*. Chlorobenzene was detected once at AOC 609, at 11 $\mu g/L$ in F609GW004; it was not detected in any other sampling events or at any other site wells. When compared to the current MCL of 100 $\mu g/L$, this compound is not considered a COC at AOC 609.

Several hydrocarbon VOCs and SVOCs (total xylenes, ethylbenzene, benzene, toluene, 2,4-dimethylphenol, naphthalene, 2-methylnaphthalene, 2-methylphenol [o-cresol], and 4-methylphenol [p-cresol]) have been consistently detected at concentrations exceeding the applicable current or historical screening criteria at well location SMEGW005. These compounds are associated with the apparent VOC/SVOC plume associated with the documented fuel release(s) at Site 25. There is no evidence to suggest that they are related to the waste oil UST system that is the subject of this RCRA investigation. Currently, the fuel releases identified at Site 25 are being addressed in accordance with the SCDHEC UST program. Further investigation of these hydrocarbons under the RFI is not considered relevant to the AOC 609 investigation.

TABLE 5-1
Surface Soil COPCs -Base-wide BRC Screening and Exposure Area Concentrations
RFI Report Addendum, AOC 609, Zone F, Charleston Naval Complex

Parameter	Sample Date	Location	Sample Concentration and Qualifier	Concentration (showing ½ U and ½ UJ values)	Units	Surface Soil Background Concentration (Zones F and G Combined)	Surface Soil Background (Grid-based) Concentration[a]	RBC (Risk =10^{-6} and HI =1.0)
Aluminum	9/27/96	F609SB001	4,080 =	4,080	mg/kg	2,190 - 19,400	1,090 - 55,500	78,000
	10/15/99	F609SB001	12,200 J	12,200				
	9/27/96	F609SB002	15,400 J	15,400				
	10/15/99	F609SB002	36,000 =	36,000				
	9/27/96	F609SB003	4,960 J	4,960				
	9/30/96	F609SB004	8,450 J	8,450				
	9/30/96	F609SB005	7,940 J	7,940				
	9/30/96	F609SB006	8,900 J	8,900				
	10/16/99	F609SB007	8,460 =	8,460				
	10/15/99	F609SB008	7,730 =	7,730				
	10/16/99	F609SB009	6,840 =	6,840				
	10/15/99	F609SB010	11,600 J	11,600				
	10/15/99	F609SB011	9,100 J	9,100				
	10/15/99	F609SB012	5,090 J	5,090				
Antimony	9/27/96	F609SB001	2.8 J	2.8	mg/kg	0.50 - 5.9	ND - 13	31
	10/15/99	F609SB001	0.42 UJ	0.2				
	9/27/96	F609SB002	3.5 UJ	1.8				
	10/15/99	F609SB002	1.4 J	1.4				
	9/27/96	F609SB003	0.36 UJ	0.2				
	9/30/96	F609SB004	1.5 UJ	0.8				
	9/30/96	F609SB005	1.1 UJ	0.6				
	9/30/96	F609SB006	0.94 UJ	0.5				
	10/16/99	F609SB007	**18.5 J**	**18.5**				
	10/15/99	F609SB008	0.91 J	0.9				

TABLE 5-1
Surface Soil COPCs -Base-wide BRC Screening and Exposure Area Concentrations
RFI Report Addendum, AOC 609, Zone F, Charleston Naval Complex

Parameter	Sample Date	Location	Sample Concentration and Qualifier	Concentration (showing ½ U and ½ UJ values)	Units	Surface Soil Background Concentration (Zones F and G Combined)	Surface Soil Background (Grid-based) Concentration[a]	RBC (Risk =10^{-6} and HI =1.0)
Antimony	10/16/99	F609SB009	0.33 J	0.3	mg/kg	0.50 - 5.9	ND - 13	31
	10/15/99	F609SB010	0.73 J	0.7				
	10/15/99	F609SB011	0.32 UJ	0.2				
	10/15/99	F609SB012	0.69 J	0.7				
			Mean Concentration =	2.1	mg/kg			
			2x Mean Concentration =	**4.2**				
			UCL_{95} Concentration =	4.5				
Arsenic	9/27/96	F609SB001	30.8 J	30.8	mg/kg	3.0 - 30	0.4 - 39	0.43 - 23*
	10/15/99	F609SB001	13.6 J	13.6				
	9/27/96	F609SB002	**67.6 J**	**67.6**				
	10/15/99	F609SB002	18.7 J	18.7				
	9/27/96	F609SB003	2.5 J	2.5				
	9/30/96	F609SB004	7.2 J	7.2				
	9/30/96	F609SB005	7.4 J	7.4				
	9/30/96	F609SB006	8.6 J	8.6				
	10/16/99	F609SB007	14.1 =	14.1				
	10/15/99	F609SB008	11.4 J	11.4				
	10/16/99	F609SB009	2.2 =	2.2				
	10/15/99	F609SB010	9.1 J	9.1				
	10/15/99	F609SB011	2.4 J	2.4				
	10/15/99	F609SB012	3.3 J	3.3				

TABLE 5-1
Surface Soil COPCs -Base-wide BRC Screening and Exposure Area Concentrations
RFI Report Addendum, AOC 609, Zone F, Charleston Naval Complex

Parameter	Sample Date	Location	Sample Concentration and Qualifier	Concentration (showing ½ U and ½ UJ values)	Units	Surface Soil Background Concentration (Zones F and G Combined)	Surface Soil Background (Grid-based) Concentration[a]	RBC (Risk =10^{-6} and HI =1.0)
			Mean Concentration =	14.2	mg/kg	3.0 - 30	0.4 - 39	0.43 - 23*
			2x Mean Concentration =	**28.4**				
			UCL_{95} Concentration =	30.5 (14)				
Copper	9/27/96	F609SB001	65 =	65	mg/kg	5.7 - 431	0.81 - 556	3,100
	10/15/99	F609SB001	25.4 UJ	12.7				
	9/27/96	F609SB002	77.6 J	77.6				
	10/15/99	F609SB002	42 =	42				
	9/27/96	F609SB003	1.4 UJ	0.7				
	9/30/96	F609SB004	40.4 J	40.4				
	9/30/96	F609SB005	32.2 UJ	16.1				
	9/30/96	F609SB006	48.9 J	48.9				
	10/16/99	F609SB007	480 =	480				
	10/15/99	F609SB008	26.8 =	26.8				
	10/16/99	F609SB009	3.5 =	3.5				
	10/15/99	F609SB010	15.2 J	15.2				
	10/15/99	F609SB011	0.9 J	0.9				
	10/15/99	F609SB012	8.9 J	8.9				
Lead	9/27/96	F609SB001	184 =	184	mg/kg	3.5 - 275	1.8 - 588	400
	10/15/99	F609SB001	57.4 J	57.4				
	9/27/96	F609SB002	132 J	132				
	10/15/99	F609SB002	62.9 =	62.9				
	9/27/96	F609SB003	8.5 J	8.5				
	9/30/96	F609SB004	54.4 J	54.4				

TABLE 5-1
Surface Soil COPCs -Base-wide BRC Screening and Exposure Area Concentrations
RFI Report Addendum, AOC 609, Zone F, Charleston Naval Complex

Parameter	Sample Date	Location	Sample Concentration and Qualifier	Concentration (showing ½ U and ½ UJ values)	Units	Surface Soil Background Concentration (Zones F and G Combined)	Surface Soil Background (Grid-based) Concentration[a]	RBC (Risk =10^{-6} and HI =1.0)
Lead	9/30/96	F609SB005	52.4 J	52.4	mg/kg	3.5 - 275	1.8 - 588	400
	9/30/96	F609SB006	320 J	320				
	10/16/99	F609SB007	511 =	511				
	10/15/99	F609SB008	35 =	35				
	10/16/99	F609SB009	9 =	9				
	10/15/99	F609SB010	22.7 J	22.7				
	10/15/99	F609SB011	3.8 J	3.8				
	10/15/99	F609SB012	19.1 J	19.1				
			Mean Concentration =	**105.2**	mg/kg			
Vanadium	9/27/96	F609SB001	21.4 =	21.4	mg/kg	6.8 - 60	2.2 - 101	550
	10/15/99	F609SB001	39.9 =	39.9				
	9/27/96	F609SB002	45.7 =	45.7				
	10/15/99	F609SB002	88.7 =	88.7				
	9/27/96	F609SB003	5.7 =	5.7				
	9/30/96	F609SB004	26.1 =	26.1				
	9/30/96	F609SB005	21.5 =	21.5				
	9/30/96	F609SB006	22.6 =	22.6				
	10/16/99	F609SB007	22.7 =	22.7				
	10/15/99	F609SB008	18.7 =	18.7				
	10/16/99	F609SB009	12.1 =	12.1				
	10/15/99	F609SB010	35 J	35				
	10/15/99	F609SB011	9.4 J	9.4				
	10/15/99	F609SB012	11.9 J	11.9				

TABLE 5-1
Surface Soil COPCs -Base-wide BRC Screening and Exposure Area Concentrations
RFI Report Addendum, AOC 609, Zone F, Charleston Naval Complex

Parameter	Sample Date	Location	Sample Concentration and Qualifier	Concentration (showing ½ U and ½ UJ values)	Units	Surface Soil Background Concentration (Zones F and G Combined)	Surface Soil Background (Grid-based) Concentration[a]	RBC (Risk =10^{-6} and HI =1.0)
Zinc	9/27/96	F609SB001	338 J	338	mg/kg	18 - 1,650	3.4 - 1,650	23,000
	10/15/99	F609SB001	107 J	107				
	9/27/96	F609SB002	514 J	514				
	10/15/99	F609SB002	172 J	172				
	9/27/96	F609SB003	9.2 U	4.6				
	9/30/96	F609SB004	189 J	189				
	9/30/96	F609SB005	201 J	201				
	9/30/96	F609SB006	229 J	229				
	10/16/99	F609SB007	**2,650 =**	**2,650**				
	10/15/99	F609SB008	148 J	148				
	10/16/99	F609SB009	15.5 =	15.5				
	10/15/99	F609SB010	62.6 J	62.6				
	10/15/99	F609SB011	7 J	7				
	10/15/99	F609SB012	53.2 J	53.2				
			Mean Concentration =	335.1	mg/kg			
			2x Mean Concentration =	**670.2**				

Concentrations in bolded and outlined text exceed the base-wide background concentration.

[a] The surface soil background (grid-based) concentration is the base-wide upper bound value of the range for all zones combined excluding Zone E.

* Arsenic RBC is based on carcinogenic and non-carcinogenic RBCs. EPA Region IV recommends use of non-carcinogenicity-based value for soils.

TABLE 5-2
Groundwater COPCs – Inorganic Compounds
RFI Report Addendum, AOC 609, Zone F, Charleston Naval Complex

Parameter	Location	Sample Date	Concentration (µg/L)	Qualifier	MCL/*RBC*[a]	BRC[b]
Aluminum	F609GW001	05/20/1999	7,440	J	*37,000*	224
		10/12/1999	153	J		
	F609GW002	05/20/1999	308	J		
		10/12/1999	58.7	UJ		
	FSMEGW001	11/21/1996	4,450	=		
		05/12/1997	394	=		
		09/10/1997	70.6	U		
		11/21/1997	661	=		
	FSMEGW003	11/13/1996	127	J		
		05/12/1997	734	=		
		09/05/1997	761	=		
		11/21/1997	1,540	=		
	FSMEGW004	11/21/1996	116	J		
		05/13/1997	41.4	U		
		09/05/1997	27.4	U		
		11/21/1997	59.6	U		
	FSMEGW005	11/13/1996	458	J		
		05/13/1997	87.2	J		
		09/08/1997	90.9	J		
		11/20/1997	124	U		
	FSMEGW006	11/13/1996	18.0	U		
		05/14/1997	11.5	U		
		09/09/1997	9.0	U		
		11/20/1997	14.3	U		
	FSMEGW007	11/13/1996	5,660	J		
		05/14/1997	99.2	J		
		09/09/1997	5,860	=		
		11/20/1997	1,420	J		
	FSMEGW008	11/21/1996	142	=		
		05/13/1997	29.3	U		
		09/09/1997	49.3	U		
		11/19/1997	58.6	J		
Antimony	F609GW001	05/20/1999	5.0	U	6	NL
		10/12/1999	2.4	U		
	F609GW002	05/20/1999	5.0	U		
		10/12/1999	2.4	U		
	FSMEGW001	11/21/1996	2.1	U		
		05/12/1997	4.0	J		
		09/10/1997	2.7	U		
		11/21/1997	**6.7**	J		

TABLE 5-2
Groundwater COPCs – Inorganic Compounds
RFI Report Addendum, AOC 609, Zone F, Charleston Naval Complex

Parameter	Location	Sample Date	Concentration (µg/L)	Qualifier	MCL/*RBC*[a]	BRC[b]
Antimony	FSMEGW003	11/13/1996	2.1	U	6	NL
		05/12/1997	2.7	J		
		09/05/1997	2.7	U		
		11/21/1997	1.6	UJ		
	FSMEGW004	11/21/1996	3.2	U		
		05/13/1997	3.2	U		
		09/05/1997	2.7	U		
		11/21/1997	1.6	UJ		
	FSMEGW005	11/13/1996	2.1	U		
		05/13/1997	3.3	U		
		09/08/1997	2.7	U		
		11/20/1997	1.6	UJ		
	FSMEGW006	11/13/1996	2.1	U		
		05/14/1997	2.9	U		
		09/09/1997	1.6	U		
		11/20/1997	1.6	UJ		
	FSMEGW007	11/13/1996	2.1	U		
		05/14/1997	4.6	U		
		09/09/1997	1.6	U		
		11/20/1997	1.6	UJ		
	FSMEGW008	11/21/1996	3.2	U		
		05/13/1997	1.6	U		
		09/09/1997	2.9	U		
		11/19/1997	1.6	UJ		
Arsenic	F609GW001	05/20/1999	7.5	J	50	16.7
		10/12/1999	47.3	=		
	F609GW002	05/20/1999	**105**	=		
		10/12/1999	30.1	=		
	FSMEGW001	11/21/1996	**65.2**	=		
		05/12/1997	**50.6**	=		
		09/10/1997	37.7	=		
		11/21/1997	36.0	=		
	FSMEGW003	11/13/1996	6.5	J		
		05/12/1997	8.0	J		
		09/05/1997	3.6	J		
		11/21/1997	5.2	J		
	FSMEGW004	11/21/1996	15.9	=		
		05/13/1997	20.4	=		
		09/05/1997	16.6	=		
		11/21/1997	19.2	=		

TABLE 5-2
Groundwater COPCs – Inorganic Compounds
RFI Report Addendum, AOC 609, Zone F, Charleston Naval Complex

Parameter	Location	Sample Date	Concentration (µg/L)	Qualifier	MCL/*RBC*[a]	BRC[b]
Arsenic	FSMEGW005	11/13/1996	41.6	J	50	16.7
		05/13/1997	48.7	=		
		09/08/1997	**58.5**	=		
		11/20/1997	42.2	=		
	FSMEGW006	11/13/1996	38.7	J		16.2
		05/14/1997	33.6	=		
		09/09/1997	**52.2**	=		
		11/20/1997	**56.1**	=		
	FSMEGW007	11/13/1996	5.2	J		16.7
		05/14/1997	2.1	U		
		09/09/1997	2.1	U		
		11/20/1997	2.5	J		
	FSMEGW008	11/21/1996	18.4	=		
		05/13/1997	21.6	=		
		09/09/1997	31.2	=		
		11/19/1997	31.5	=		

Concentrations in bolded and outlined text indicate exceedance of MCLs.

[a]RBCs are listed in italics where no primary MCL exists. Tap water RBCs are listed in the EPA Region III RBC table (October 2000).

[b]BRCs are taken from the *Zone F RFI Report, Revision 0* (EnSafe, 1997).

= Analyte is detected at concentration shown

J Analyte is presented at an estimated concentration

U Analyte not detected; value is reporting limit

UJ Analyte not detected; value is estimated reporting limit

TABLE 5-3
Groundwater COPCs – Organic Compounds
RFI Report Addendum, AOC 609, Zone F, Charleston Naval Complex

Parameter	Location	Sample Date	Concentration (µg/L)	Qualifier	MCL/*RBC*[a]
Benzene	F609GW001	05/20/1999	5	U	5
		10/12/1999	3	U	
	F609GW002	05/20/1999	5	U	
		10/12/1999	3	U	
	FSMEGW001	11/21/1996	5	U	
		05/12/1997	5	U	
		09/10/1997	5	U	
		11/21/1997	5	U	
	FSMEGW003	11/13/1996	5	U	
		05/12/1997	5	U	
		09/05/1997	5	U	
		11/21/1997	5	U	
	FSMEGW004	11/21/1996	5	U	
		05/13/1997	5	U	
		09/05/1997	5	U	
		11/21/1997	5	U	
	FSMEGW005	11/13/1996	**34,000**	=	
		05/13/1997	**18,000**	=	
		09/08/1997	**14,000**	=	
		11/20/1997	**23,000**	=	
	FSMEGW006	11/13/1996	5	U	
		05/14/1997	5	U	
		09/09/1997	5	U	
		11/20/1997	5	U	
	FSMEGW007	11/13/1996	5	U	
		05/14/1997	5	U	
		09/09/1997	5	U	
		11/20/1997	5	U	
	FSMEGW008	11/21/1996	5	U	
		05/13/1997	5	U	
		09/09/1997	5	U	
		11/19/1997	5	U	
Chlorobenzene	F609GW001	05/20/1999	5	U	100
		10/12/1999	3	U	
	F609GW002	05/20/1999	5	U	
		10/12/1999	3	U	
	FSMEGW001	11/21/1996	5	U	
		05/12/1997	5	U	

TABLE 5-3
Groundwater COPCs – Organic Compounds
RFI Report Addendum, AOC 609, Zone F, Charleston Naval Complex

Parameter	Location	Sample Date	Concentration (µg/L)	Qualifier	MCL/*RBC*[a]
Chlorobenzene		09/10/1997	5	U	100
		11/21/1997	5	U	
	FSMEGW003	11/13/1996	5	U	
		05/12/1997	5	U	
		09/05/1997	5	U	
		11/21/1997	5	U	
	FSMEGW004	11/21/1996	11	=	
		05/13/1997	5	U	
		09/05/1997	5	U	
		11/21/1997	5	U	
	FSMEGW005	11/13/1996	2,500	U	
		05/13/1997	5	U	
		09/08/1997	5	U	
		11/20/1997	5	UJ	
	FSMEGW006	11/13/1996	5	U	
		05/14/1997	5	U	
		09/09/1997	5	U	
		11/20/1997	5	U	
	FSMEGW007	11/13/1996	5	U	
		05/14/1997	5	U	
		09/09/1997	5	U	
		11/20/1997	5	U	
	FSMEGW008	11/21/1996	5	U	
		05/13/1997	5	U	
		09/09/1997	5	U	
		11/19/1997	5	U	
Ethylbenzene	F609GW001	05/20/1999	5	U	700
		10/12/1999	3	U	
	F609GW002	05/20/1999	5	U	
		10/12/1999	3	U	
	FSMEGW001	11/21/1996	5	U	
		05/12/1997	5	U	
		09/10/1997	5	U	
		11/21/1997	5	U	
	FSMEGW003	11/13/1996	5	U	
		05/12/1997	5	U	
		09/05/1997	5	U	
		11/21/1997	5	U	
	FSMEGW004	11/21/1996	5	U	
		05/13/1997	5	U	

TABLE 5-3
Groundwater COPCs – Organic Compounds
RFI Report Addendum, AOC 609, Zone F, Charleston Naval Complex

Parameter	Location	Sample Date	Concentration (µg/L)	Qualifier	MCL/*RBC*[a]
Ethylbenzene	FSMEGW004	09/05/1997	5	U	700
		11/21/1997	5	U	
	FSMEGW005	11/13/1996	**2,400**	J	
		05/13/1997	**1,700**	=	
		09/08/1997	**1,000**	=	
		11/20/1997	**2,600**	=	
	FSMEGW006	11/13/1996	5	U	
		05/14/1997	5	U	
		09/09/1997	5	U	
		11/20/1997	5	U	
	FSMEGW007	11/13/1996	5	U	
		05/14/1997	5	U	
		09/09/1997	5	U	
		11/20/1997	5	U	
	FSMEGW008	11/21/1996	5	U	
		05/13/1997	5	U	
		09/09/1997	5	U	
		11/19/1997	5	U	
Naphthalene	F609GW001	05/20/1999	10	U	*6.5*
	F609GW002	05/20/1999	10	U	
	FSMEGW001	11/21/1996	10	U	
		05/12/1997	10	U	
		09/10/1997	10	U	
		11/21/1997	10	U	
	FSMEGW003	11/13/1996	10	U	
		05/12/1997	10	U	
		09/05/1997	10	U	
		11/21/1997	10	U	
	FSMEGW004	11/21/1996	10	U	
		05/13/1997	10	U	
		09/05/1997	10	U	
		11/21/1997	10	U	
	FSMEGW005	11/13/1996	**540**	=	
		05/13/1997	**240**	=	
		09/08/1997	**330**	=	
		11/20/1997	**370**	=	
	FSMEGW006	11/13/1996	10	U	
		05/14/1997	10	U	
		09/09/1997	10	U	
		11/20/1997	10	U	

TABLE 5-3
Groundwater COPCs – Organic Compounds
RFI Report Addendum, AOC 609, Zone F, Charleston Naval Complex

Parameter	Location	Sample Date	Concentration (µg/L)	Qualifier	MCL/*RBC*[a]
Naphthalene	FSMEGW007	11/13/1996	10	U	*6.5*
		05/14/1997	10	U	
		09/09/1997	10	U	
		11/20/1997	10	U	
	FSMEGW008	11/21/1996	10	U	
		05/13/1997	10	U	
		09/09/1997	10	U	
		11/19/1997	10	U	
Toluene	F609GW001	05/20/1999	5	U	1,000
		10/12/1999	3	U	
	F609GW002	05/20/1999	5	U	
		10/12/1999	3	U	
	FSMEGW001	11/21/1996	5	U	
		05/12/1997	5	U	
		09/10/1997	5	U	
		11/21/1997	5	U	
	FSMEGW003	11/13/1996	5	U	
		05/12/1997	5	U	
		09/05/1997	5	U	
		11/21/1997	5	U	
	FSMEGW004	11/21/1996	5	U	
		05/13/1997	5	U	
		09/05/1997	5	U	
		11/21/1997	5	U	
	FSMEGW005	11/13/1996	**56,000**	=	
		05/13/1997	**24,000**	=	
		09/08/1997	**17,000**	=	
		11/20/1997	**34,000**	=	
	FSMEGW006	11/13/1996	5	U	
		05/14/1997	5	U	
		09/09/1997	5	U	
		11/20/1997	5	U	
Toluene	FSMEGW007	11/13/1996	5	U	1,000
		05/14/1997	5	U	
		09/09/1997	5	U	
		11/20/1997	5	U	
	FSMEGW008	11/21/1996	5	U	
		05/13/1997	5	U	
		09/09/1997	5	U	
		11/19/1997	5	U	

TABLE 5-3
Groundwater COPCs – Organic Compounds
RFI Report Addendum, AOC 609, Zone F, Charleston Naval Complex

Parameter	Location	Sample Date	Concentration (µg/L)	Qualifier	MCL/*RBC*[a]
Xylenes, Total	F609GW001	05/20/1999	5	U	10,000
		10/12/1999	3	U	
	F609GW002	05/20/1999	5	U	
		10/12/1999	3	U	
	FSMEGW001	11/21/1996	5	U	
		05/12/1997	5	U	
		09/10/1997	5	U	
		11/21/1997	5	U	
	FSMEGW003	11/13/1996	5	U	
		05/12/1997	5	U	
		09/05/1997	5	U	
		11/21/1997	5	U	
	FSMEGW004	11/21/1996	5	U	
		05/13/1997	5	U	
		09/05/1997	5	U	
		11/21/1997	5	U	
	FSMEGW005	11/13/1996	**15,000**	=	
		05/13/1997	8,600	=	
		09/08/1997	4,800	=	
		11/20/1997	**12,000**	=	
	FSMEGW006	11/13/1996	5	U	
		05/14/1997	5	U	
		09/09/1997	5	U	
		11/20/1997	5	U	
	FSMEGW007	11/13/1996	5	U	
		05/14/1997	5	U	
		09/09/1997	5	U	
		11/20/1997	5	U	
	FSMEGW008	11/21/1996	5	U	
		05/13/1997	5	U	
		09/09/1997	5	U	
		11/19/1997	4	J	
2,4-Dimethylphenol	F609GW001	05/20/1999	10	U	*730*
	F609GW002	05/20/1999	10	U	
	FSMEGW001	11/21/1996	10	U	
		05/12/1997	10	U	
		09/10/1997	10	U	
		11/21/1997	10	U	
	FSMEGW003	11/13/1996	10	U	
		05/12/1997	10	U	

TABLE 5-3
Groundwater COPCs – Organic Compounds
RFI Report Addendum, AOC 609, Zone F, Charleston Naval Complex

Parameter	Location	Sample Date	Concentration (µg/L)	Qualifier	MCL/*RBC*[a]
	FSMEGW003	09/05/1997	10	U	*730*
		11/21/1997	10	U	
	FSMEGW004	11/21/1996	10	U	
		05/13/1997	10	U	
		09/05/1997	10	U	
		11/21/1997	10	U	
	FSMEGW005	11/13/1996	380	=	
		05/13/1997	120	=	
		09/08/1997	110	=	
		11/20/1997	140	=	
	FSMEGW006	11/13/1996	10	U	
		05/14/1997	10	U	
		09/09/1997	10	U	
		11/20/1997	10	U	
	FSMEGW007	11/13/1996	10	U	
		05/14/1997	10	U	
		09/09/1997	10	U	
		11/20/1997	10	U	
	FSMEGW008	11/21/1996	10	U	
		05/13/1997	10	U	
		09/09/1997	10	U	
		11/19/1997	10	U	
2-Methylnaphthalene	F609GW001	05/20/1999	10	U	*122*
	F609GW002	05/20/1999	10	U	
	FSMEGW001	11/21/1996	10	U	
		05/12/1997	10	U	
		09/10/1997	10	U	
		11/21/1997	10	U	
	FSMEGW003	11/13/1996	10	U	
		05/12/1997	10	U	
		09/05/1997	10	U	
		11/21/1997	10	U	
	FSMEGW004	11/21/1996	10	U	
		05/13/1997	10	U	
		09/05/1997	10	U	
		11/21/1997	10	U	
	FSMEGW005	11/13/1996	48	=	
		05/13/1997	110	=	
		09/08/1997	64	=	
		11/20/1997	100	=	

TABLE 5-3
Groundwater COPCs – Organic Compounds
RFI Report Addendum, AOC 609, Zone F, Charleston Naval Complex

Parameter	Location	Sample Date	Concentration (µg/L)	Qualifier	MCL/*RBC*[a]
2-Methylnaphthalene	FSMEGW006	11/13/1996	10	U	*122*
		05/14/1997	10	U	
		09/09/1997	10	U	
		11/20/1997	10	U	
	FSMEGW007	11/13/1996	10	U	
		05/14/1997	10	U	
		09/09/1997	10	U	
		11/20/1997	10	U	
	FSMEGW008	11/21/1996	10	U	
		05/13/1997	10	U	
		09/09/1997	10	U	
		11/19/1997	10	U	
2-Methylphenol (o-Cresol)	F609GW001	05/20/1999	10	U	*1,830*
	F609GW002	05/20/1999	10	U	
	FSMEGW001	11/21/1996	10	U	
		05/12/1997	10	U	
		09/10/1997	10	U	
		11/21/1997	10	U	
	FSMEGW003	11/13/1996	10	U	
		05/12/1997	10	U	
		09/05/1997	10	U	
		11/21/1997	10	U	
	FSMEGW004	11/21/1996	10	U	
		05/13/1997	10	U	
		09/05/1997	10	U	
		11/21/1997	10	U	
	FSMEGW005	11/13/1996	1,000	=	
		05/13/1997	220	=	
		09/08/1997	290	=	
		11/20/1997	340	=	
	FSMEGW006	11/13/1996	10	U	
		05/14/1997	10	U	
		09/09/1997	10	U	
		11/20/1997	10	U	
	FSMEGW007	11/13/1996	10	U	
		05/14/1997	10	U	
		09/09/1997	10	U	
		11/20/1997	10	U	

TABLE 5-3
Groundwater COPCs – Organic Compounds
RFI Report Addendum, AOC 609, Zone F, Charleston Naval Complex

Parameter	Location	Sample Date	Concentration (µg/L)	Qualifier	MCL/*RBC*[a]
2-Methylphenol (o-Cresol)	FSMEGW008	11/21/1996	10	U	*1,830*
		05/13/1997	10	U	
		09/09/1997	10	U	
		11/19/1997	10	U	
4-Methylphenol (p-Cresol)	F609GW001	05/20/1999	10	U	*183*
	F609GW002	05/20/1999	10	U	
	FSMEGW001	11/21/1996	10	U	
		05/12/1997	10	U	
		09/10/1997	10	U	
		11/21/1997	1	J	
	FSMEGW003	11/13/1996	10	U	
		05/12/1997	10	U	
		09/05/1997	10	U	
		11/21/1997	10	U	
	FSMEGW004	11/21/1996	10	U	
		05/13/1997	10	U	
		09/05/1997	10	U	
		11/21/1997	10	U	
	FSMEGW005	11/13/1996	**970**	=	
		05/13/1997	**260**	=	
		09/08/1997	**290**	=	
		11/20/1997	**310**	=	
	FSMEGW006	11/13/1996	10	U	
		05/14/1997	10	U	
		09/09/1997	10	U	
		11/20/1997	10	U	
	FSMEGW007	11/13/1996	10	U	
		05/14/1997	10	U	
		09/09/1997	10	U	
		11/20/1997	10	U	
	FSMEGW008	11/21/1996	10	U	
		05/13/1997	10	U	
		09/09/1997	10	U	
		11/19/1997	10	U	

Concentrations in bolded and outlined text indicate exceedance of MCLs.

[a]RBCs are listed in italics where no primary MCL exists. Tap water RBCs are listed in the EPA Region III RBC table (October 2000).

U Analyte not detected; value is reporting limit

J Analyte is presented at an estimated concentration

= Analyte is detected at concentration shown

6.0 Summary of Information Related to Site Closeout Issues

6.1 RFI Status

The *Zone F RFI Report, Revision 0* (EnSafe, 1997) addressed SWMUs/AOCs within the CNC, including AOC 609. The subsequent *Zone F RFI Work Plan Addendum* (EnSafe, 1999) presented planned sampling and testing to address data gaps at AOC 609. The additional sampling was performed in late 1997 and in 1999, and the results are reported in Section 4.0 of this RFI Report Addendum. These data and responses to SCDHEC comments confirm that additional soil or groundwater samples are not required. A copy of the responses to SCDHEC comments on the *Zone F RFI Report, Revision 0* for this site are provided as Appendix C.

In accordance with the RFI completion process, if a determination of No Further Investigation (NFI) is made upon completion of the RFI, then a site may proceed to either NFA status or to a CMS. The additional investigations have concluded that no COCs are present in the soils, and that the presence of arsenic in the groundwater is not attributed to the former waste oil UST at AOC 609.

The remaining sections address the issues that the BCT agreed to evaluate prior to site closeout.

6.2 Presence of Inorganics in Groundwater

For the purpose of site closeout documentation, the inorganics in groundwater issue refers to the occasional or intermittent detection of several metals (primarily arsenic, thallium, and antimony) in groundwater at concentrations above the applicable MCL, preceded or followed by detections of these same metals below the MCL or below the practicable quantitation limit.

Groundwater samples collected in the vicinity of AOC 609 were analyzed for arsenic, thallium, and antimony. Concentrations of arsenic exceeding applicable screening criteria were detected in groundwater at AOC 609. The highest concentrations of inorganics were generally detected upgradient or sidegradient of the former waste oil UST; thus, the

Although the RFI report concluded that a CMS is appropriate for AOC 609, further evaluation of COPCs as presented in this RFI Report Addendum concludes that corrective action is not necessary and that this RCRA site is suitable for unrestricted land use. Therefore, this site is recommended for NFA under RCRA Subtitle C. However, the RCRA permit may be modified only after remedial action at Site 25 is completed.

Section 6.0

6.0 Summary of Information Related to Site Closeout Issues

6.1 RFI Status

The *Zone F RFI Report, Revision 0* (EnSafe, 1997) addressed SWMUs/AOCs within the CNC, including AOC 609. The subsequent *Zone F RFI Work Plan Addendum* (EnSafe, 1999) presented planned sampling and testing to address data gaps at AOC 609. The additional sampling was performed in late 1997 and in 1999, and the results are reported in Section 4.0 of this RFI Report Addendum. These data and responses to SCDHEC comments confirm that additional soil or groundwater samples are not required. A copy of the responses to SCDHEC comments on the *Zone F RFI Report, Revision 0* for this site are provided as Appendix C.

In accordance with the RFI completion process, if a determination of No Further Investigation (NFI) is made upon completion of the RFI, then a site may proceed to either NFA status or to a CMS. The additional investigations have concluded that no COCs are present in the soils, and that the presence of arsenic in the groundwater is not attributed to the former waste oil UST at AOC 609; therefore, CH2M-Jones recommends this site for NFA.

The remaining sections address the issues that the BCT agreed to evaluate prior to site closeout.

6.2 Presence of Inorganics in Groundwater

For the purpose of site closeout documentation, the inorganics in groundwater issue refers to the occasional or intermittent detection of several metals (primarily arsenic, thallium, and antimony) in groundwater at concentrations above the applicable MCL, preceded or followed by detections of these same metals below the MCL or below the practicable quantitation limit.

Groundwater samples collected in the vicinity of AOC 609 were analyzed for arsenic, thallium, and antimony. Concentrations of arsenic exceeding applicable screening criteria were detected in groundwater at AOC 609. The highest concentrations of inorganics were generally detected upgradient or sidegradient of the former waste oil UST; thus, the

distribution of arsenic exceedances is inconsistent with the waste oil UST as the primary source of inorganics in the groundwater at AOC 609.

Thallium was detected above MCLs during one sampling event at well SMEGW006. This well is screened in the deep groundwater. No MCL exceedances are present in the shallow groundwater; therefore, this single thallium occurrence is not related to the UST source at AOC 609.

Antimony was detected above MCLs during one sampling event at well SMEGW001. Well SMEGW001 is located upgradient of the former waste oil UST; thus, the waste oil UST is not the source of this single occurrence of antimony in the groundwater at AOC 609.

6.3. Potential Linkage to SWMU 37, Investigated Sanitary Sewers at the CNC

There is no evidence or reasons to believe that the waste oil tank at AOC 609 was connected to the sanitary sewer. Therefore, further evaluation of this issue is not warranted.

6.4 Potential Linkage to AOC 699, Investigated Storm Sewers at the CNC

There is no evidence or other reasons to believe that the waste oil tank at AOC 609, was ever connected to the storm sewers. The sections of the storm water sewer system in the vicinity of the site were not investigated as part of the AOC 699 investigations. There is no evidence of past site uses or the presence of contamination near the storm water sewer system near the site that could have potentially impacted the storm water sewer system. Since the waste oil UST system is the focus of the RFI at AOC 609, it is not believed that this source could have been linked to any contamination in the storm sewer or catch basins at the site. Figure 6-1 illustrates the location of the sewers at AOC 609. Based on these findings, further evaluation of this linkage is not warranted.

6.5 Potential Linkage to AOC 504, Investigated Railroad Lines at the CNC

The nearest investigated railroad line to AOC 609 is more than 700 feet to the northeast. There is no known linkage between AOC 609 and the investigated railroad lines of AOC 504; thus, further evaluation of this issue is not warranted.

6.6 Potential Migration Pathways to Surface Water Bodies at the CNC

The nearest surface water body to AOC 609 is the Cooper River, which lies approximately 1,800 feet to the northeast. Two potential migration pathways from the site to surface water are overland flow via storm water runoff, and subsurface flow via groundwater. Since the entire site is covered with buildings and pavement, which eliminates contact of surface soil with stormwater, further evaluation of a potential pathway for contaminant migration via stormwater runoff is not warranted. Similarly, runoff directed to the storm sewer system, which discharges to the Cooper River, does not contact the surface soil.

The groundwater flow direction in the vicinity of AOC 609 flows to the west-southwest; consequently, the potential for contaminated groundwater to enter this surface water body is not likely. Therefore, further evaluation of potential migration of contaminated groundwater to a surface water body is not warranted.

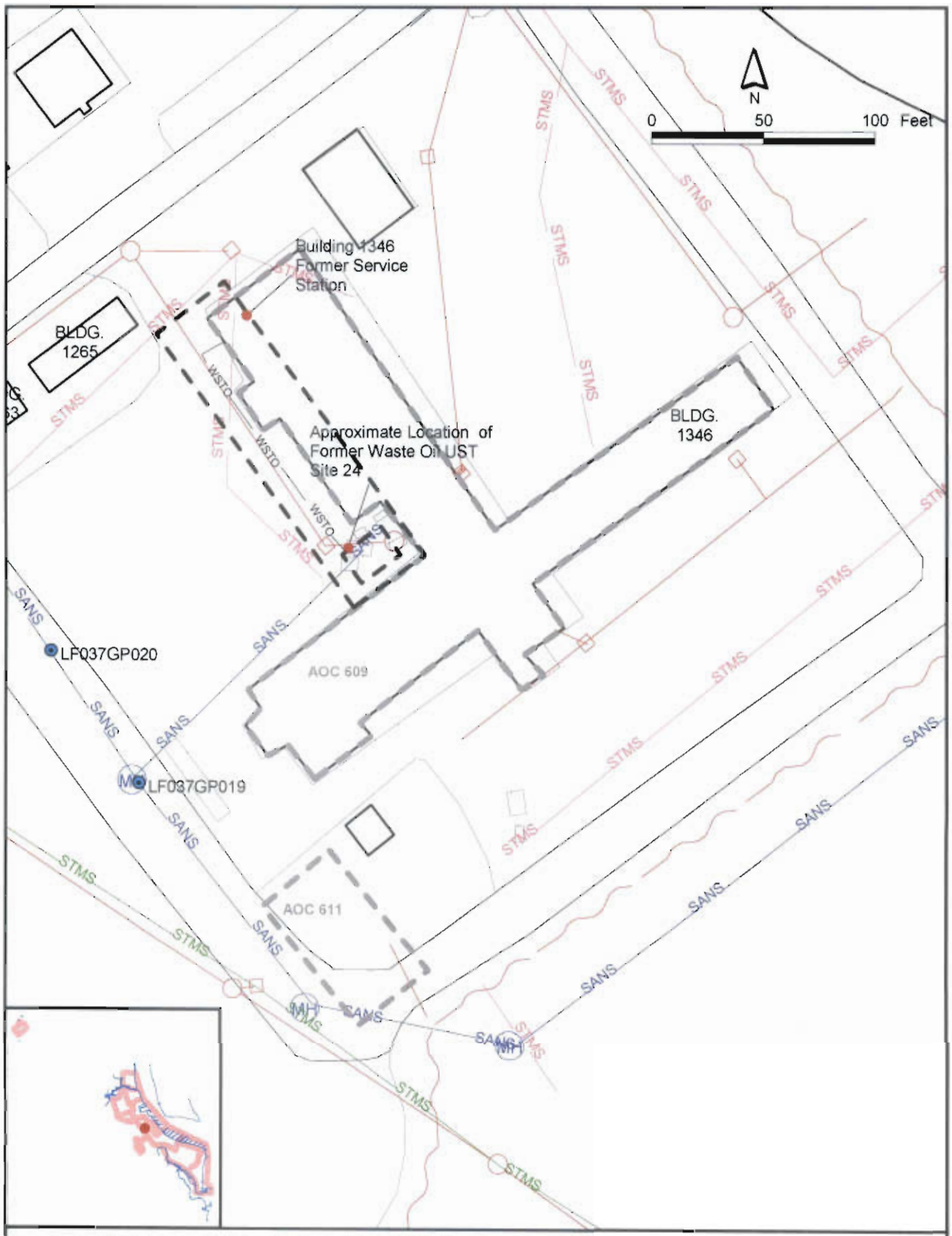
6.7 Potential Contamination in Oil/Water Separators (OWSs)

The issue of potential contamination of OWSs refers to the possible presence of an OWS that has not yet been investigated at a SWMU or AOC as part of the RCRA or UST process.

Neither the RFA nor the RFI refer to the presence or possible presence of an OWS at AOC 609. There is no visual evidence of an OWS at this site, and there is no reference made to an OWS at this facility in the *Oil Water Separator Data* (Navy, 2000). Therefore, further evaluation of this issue at AOC 609 is not warranted.

6.8 Land Use Control Management Plan

The RFI Addendum screening did not identify any COCs in soil or groundwater at AOC 609. This evaluation was based on an unrestricted land use classification, which is considered conservative. Therefore, land use controls are not necessary.



AOC/SWMU Boundary
Railroads
DRAIN-LABEL
DRAIN-BASIN
DRAIN-LINE
STORM-OUTFALL-ID
STORM-LINE/MANHOLE
STORM-LINE/MANHOLE-NS
STORM-FLOW-ARROW
Zone Boundary

Figure 6-1
AOC 609
Sewer Lines
Charleston Naval Complex

CH2MHILL

File Path: c:\18gis\cnctaoc609_april2001.apr, Date: 03 May 2001 10:18, User: SHANEY

Section 7.0

7.0 Recommendations

The focus of the RFI is a 560-gallon waste oil UST and associated fill piping, which was removed in 1996; these are the sole investigative sources for AOC 609. The UST received waste oil from a series of drains inside the maintenance garage of Building 1346. The tank was inspected upon removal and observed to be in good condition. However, a loose connection and stained soil was noted in the conveyance piping from maintenance garage drains, about four feet from the tank. Soil and groundwater samples taken at the time of the waste oil tank removal revealed the presence of inorganic, total recoverable petroleum hydrocarbons, and volatile constituents. Subsequent RFI activities have defined the nature and extent of these identified impacts.

Evaluation of the surface condition at the site reveals that the area of the former UST and associated fill pipe was paved at the time of the UST removal. This evaluation is supported by newer pavement being visible where the UST and fill piping were excavated. This evidence indicates that any soil excavated at the time of the UST removal was not spread on surface soils at the site. The UST was based approximately seven feet below grade, and the leaking joint in the fill pipe was three to four feet below grade. Thus, surface soil contaminants identified at AOC 609 are not likely due to a release from the UST system.

According to the *Zone F RFI Report, Revision 0* (EnSafe, 1997), COCs were identified in surface soil and shallow groundwater at AOC 609. Additional soil and groundwater testing subsequent to the RFI have shown that no COPCs are present above the current screening criteria except arsenic, VOCs, and SVOCs in groundwater. Based on an evaluation of the UST location in relation to the groundwater arsenic concentrations, including the observed groundwater flow direction at AOC 609, arsenic is not believed to have originated from the waste oil UST. VOCs and SVOCs have been consistently detected at concentrations exceeding the applicable screening criteria at well location SMEGW005. These compounds are associated with the apparent VOC/SVOC plume associated with the documented fuel release(s) at Site 25, and do not appear to be related to the waste oil UST system located on the north side of Building 1346. This VOC/SVOC plume is being addressed under the SCDHEC UST program.

Although the RFI report concluded that a CMS is appropriate for AOC 609, further evaluation of COPCs as presented in this RFI Report Addendum concludes that corrective action is not necessary and that this RCRA site is suitable for unrestricted land use. Therefore, this site is recommended for NFA.

This site is recommended for NFA, and a Statement of Basis will be prepared upon receipt of BCT concurrence. This Statement of Basis will then be made available for public comment in accordance with SCDHEC policy. This will allow for public participation in the final remedy selection.

Section 8.0

8.0 References

CH2M-Jones. *Background PAHs Study Report: Technical Information for the Development of Background BEQ Values*. February 2001.

EnSafe Inc. *Zone F RFI Report, NAVBASE Charleston*. Revision 0. December 31, 1997.

EnSafe, Inc. *Zone F RFI Report Work Plan Addendum, NAVBASE Charleston*. 1999.

SPORTENVDETCHASN. *UST Assessment Report for UST NS1346*. September 3, 1996.

Tetra Tech NUS, Inc. *Rapid Assessment Report for Site 25, Building NS1346*. November 1999.

Tetra Tech NUS, Inc. *Initial Groundwater Assessment Report for Site 24, Building NS1346*. February 2000.

U.S. Environmental Protection Agency. *EPA Soil Screening Guidance: Technical Background Document* (Table A-1), EPA/540/R-95/128. May 1996.

U.S. Navy. *Oil Water Separator Data*. September 2000.

Appendix A

10.5 AOC 609, Service Station, Building 1346

AOC 609 is the former gasoline station, automotive repair and maintenance shop at Building 1346, which was built in 1962. The focus of the RFI is the waste oil UST at Building 1346. Materials released, stored or disposed of at the site included gasoline, diesel fuel, motor/lubricating oils, degreasing solvents, antifreeze and various automotive products.

This site contained USTs which contained gasoline and diesel fuel. Three of the original nine steel USTs were found to be leaking in 1991 and were removed. They were replaced with fiberglass tanks in 1992. Subsequently, six monitoring wells were installed by S&ME, Inc., to define the horizontal and vertical extent of groundwater contamination. The assessment report submitted to SCDHEC in February, 1993 resulted in the installation of two additional perimeter wells near the site. All site wells were resampled in November, 1994, with the results confirming previous findings. A source well near the site exhibited concentrations of benzene (36,100 μg/L), toluene (47,800 μg/L), ethylbenzene (3,620 μg/L), xylene (16,800 μg/L) and methyl tertiary butyl ether (62,200 μg/L). All perimeter wells were below detection limits for the same parameters. A free-product recovery system installed in 1995 is still in operation. This investigation activity was reported in the *Assessment Report Addendum Building No. 1346, Charleston Naval Base, Charleston, SC* (S&ME, March 29, 1995), prepared for the Navy Public Works Center Jacksonville, Charleston Zone.

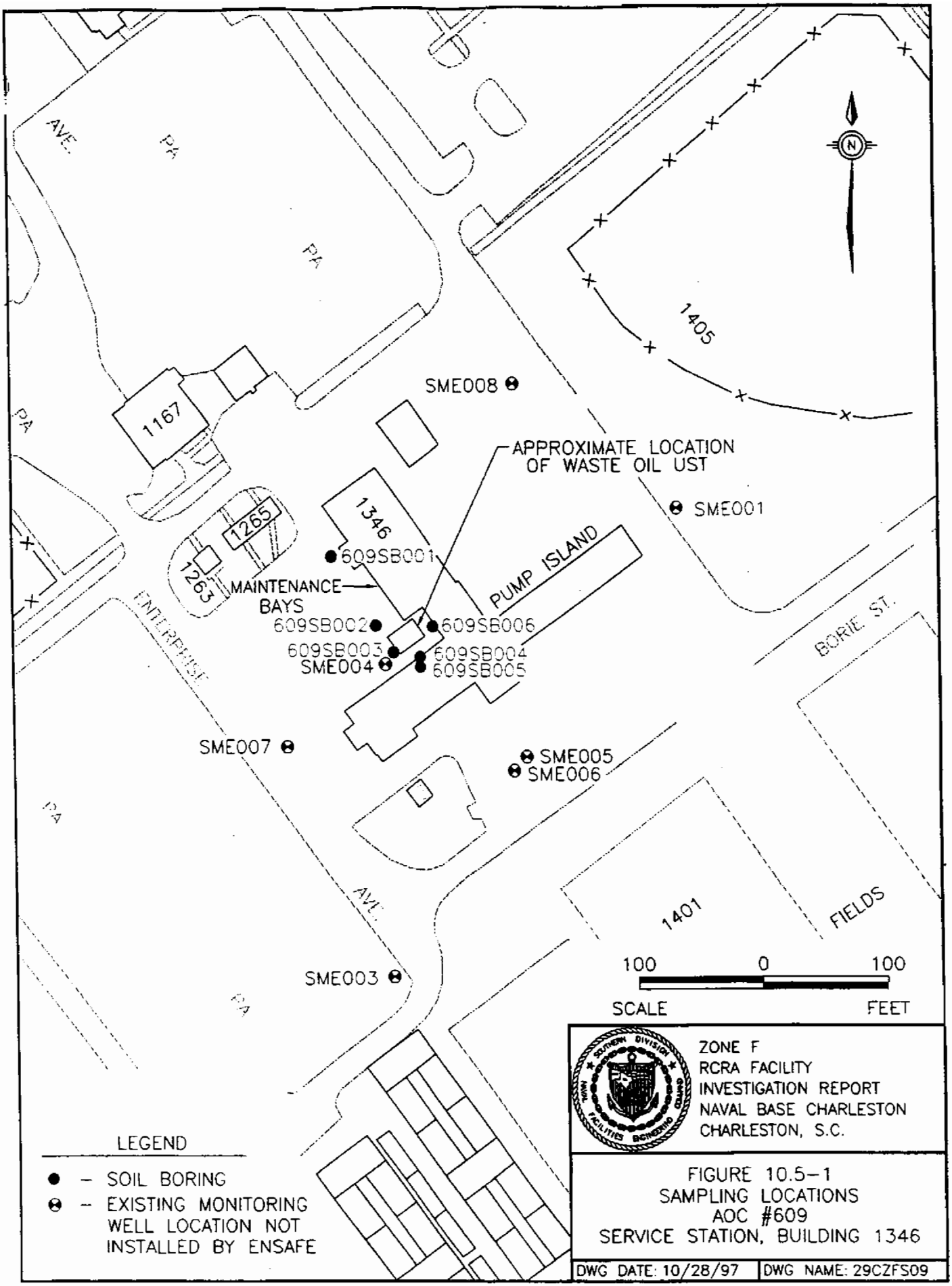
The 560 gallon steel waste oil UST on the west side of the building being assessed in this RFI was removed in 1996. This tank received waste oil from floor drains in the maintenance garage, and was periodically emptied by suctioning to a waste oil truck. This removal was performed by the Supervisor of Shipbuilding, Conversion and Repair, USN, Portsmouth Detachment Environmental, Charleston, SC (SPORTENVDETCHASN). The *UST Assessment Report, UST 1346, Naval Base Charleston, Charleston, SC* (SPORTENVDETCHASN,

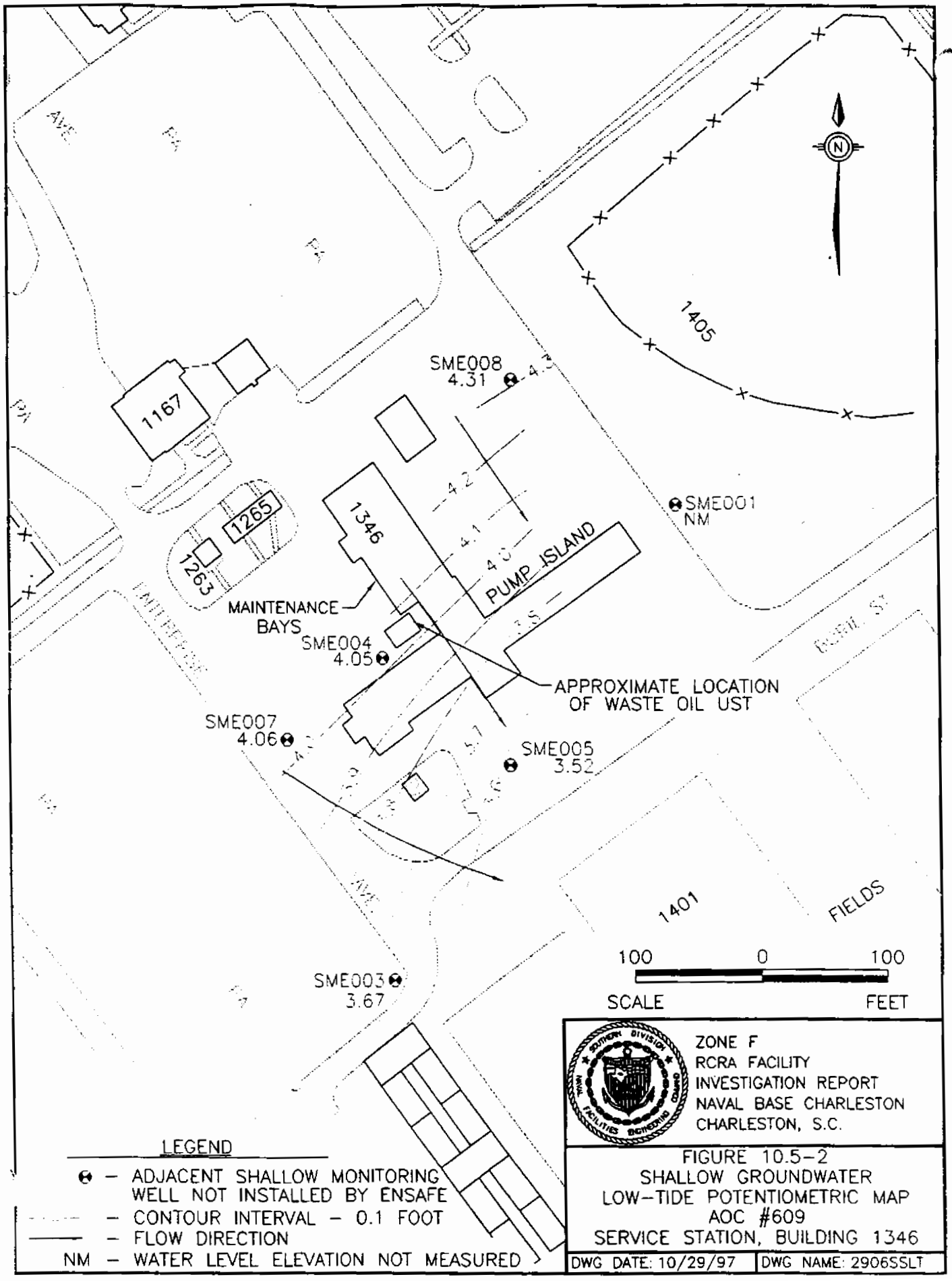
September 3, 1996), prepared for the Department of the Navy, Southern Division, Naval Facilities Engineering Command, stated the UST was in good condition upon removal, having no holes or leaks, with its protective coating intact. However, a loose mechanical joint along the drain pipe leading to the tank was responsible for some leakage to soil about four feet from the tank. The north half of the removal excavation contained petroleum soils. Both tank and drain piping were removed. Ten soil samples were collected during this removal, along with one groundwater sample. Sample results for both soil and groundwater revealed the presence of inorganic, total recoverable petroleum hydrocarbon, and volatile constituents.

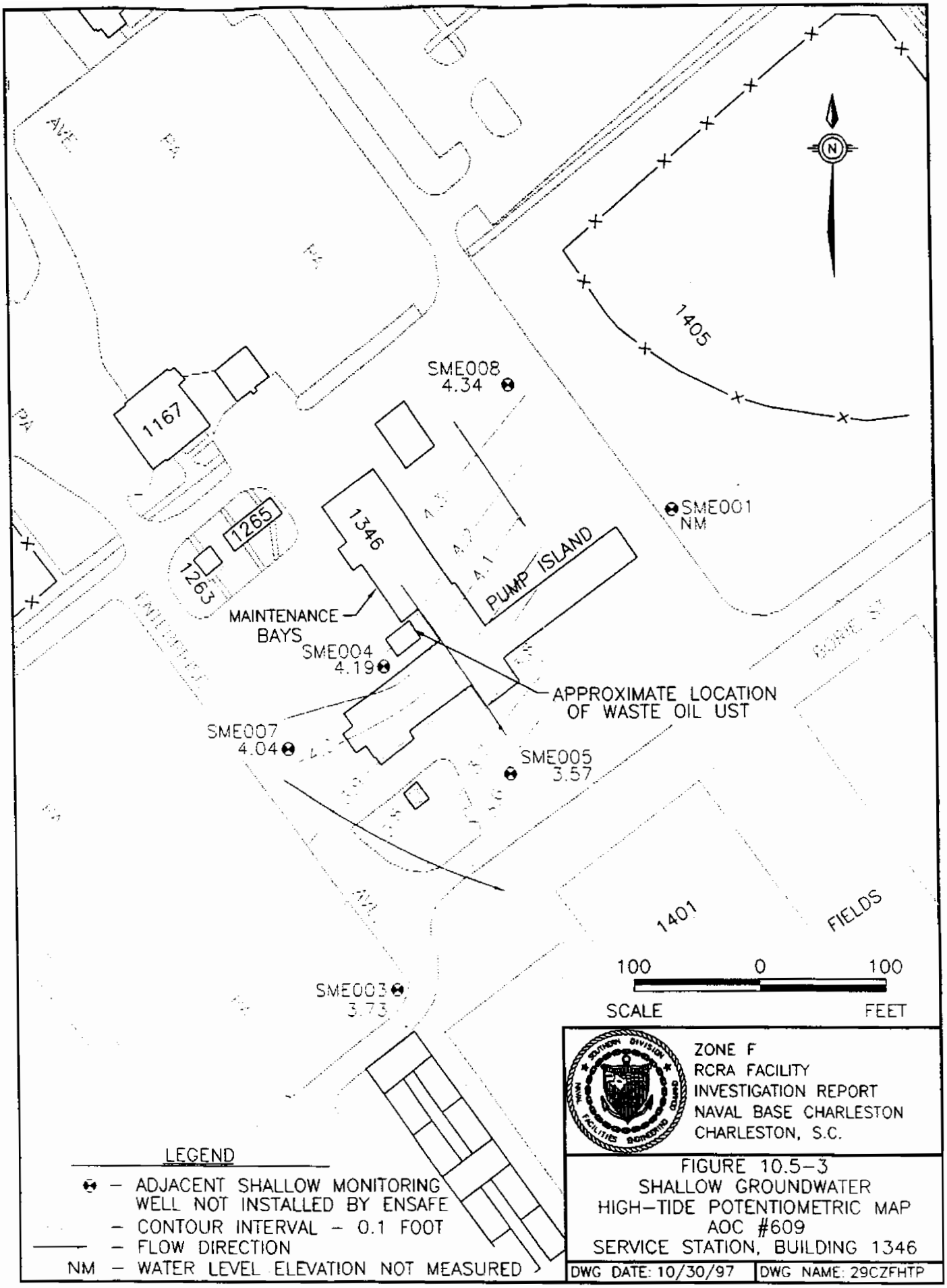
10.5.1 Site Geology and Hydrogeology

The soil boring and groundwater monitoring well locations associated with the AOC 609 RFI are shown in Figure 10.5-1. The general stratigraphy at AOC 609 was described based on two soil boring logs submitted by S&ME. Appendix A contains the construction logs for these two wells (SME007 and SME008; logs for the remaining S&ME wells were not available). No well borings were advanced during the RFI at AOC 609. The surface of AOC 609 is asphalt paved. The subsurface stratigraphy consists of approximately two feet of silty sand and overlying silty clay.

Figures 10.5-2 and 10.5-3 depict the shallow groundwater potentiometric surface and inferred flow direction during low and high tide, respectively. Flow is generally to the east-southeast during both tides. The geometric mean hydraulic conductivity measured in well SME004 was 0.089 ft/day. The horizontal gradient, based on Figure 10.5-2 is 3.5E-03. The horizontal flow velocity was calculated at 8.7E-04 ft/day in the shallow aquifer at AOC 609.


AVE.
PA
PA
PA
PA
PA
1167
1265
1263
1346
1405
1401
SME008
APPROXIMATE LOCATION
OF WASTE OIL UST
SME001
609SB001
MAINTENANCE
BAYS
PUMP ISLAND
609SB002
609SB006
609SB003
609SB004
SME004
609SB005
ENTERPRISE
BORIE ST.
SME007
SME005
SME006
AVE.
FIELDS
SME003
N
100
0
100
SCALE
FEET
LEGEND
● – SOIL BORING
– EXISTING MONITORING
WELL LOCATION NOT
INSTALLED BY ENSAFE
ZONE F
RCRA FACILITY
INVESTIGATION REPORT
NAVAL BASE CHARLESTON
CHARLESTON, S.C.
FIGURE 10.5-1
SAMPLING LOCATIONS
AOC #609
SERVICE STATION, BUILDING 1346
DWG DATE: 10/28/97
DWG NAME: 29CZFS09


1167
1265
1263
1346
1405
1401
SME008
4.31
SME001
NM
PUMP ISLAND
MAINTENANCE
BAYS
SME004
4.05
APPROXIMATE LOCATION
OF WASTE OIL UST
SME007
4.06
SME005
3.52
SME003
3.67
FIELDS
100 0 100
SCALE FEET
ZONE F
RCRA FACILITY
INVESTIGATION REPORT
NAVAL BASE CHARLESTON
CHARLESTON, S.C.
LEGEND
– ADJACENT SHALLOW MONITORING WELL NOT INSTALLED BY ENSAFE
– CONTOUR INTERVAL – 0.1 FOOT
– FLOW DIRECTION
NM – WATER LEVEL ELEVATION NOT MEASURED
FIGURE 10.5-2
SHALLOW GROUNDWATER
LOW-TIDE POTENTIOMETRIC MAP
AOC #609
SERVICE STATION, BUILDING 1346
DWG DATE: 10/29/97
DWG NAME: 2906SSLT


1405
SME008
4.34
1167
SME001
NM
1265
1346
1263
PUMP ISLAND
MAINTENANCE
BAYS
SME004
4.19
APPROXIMATE LOCATION
OF WASTE OIL UST
SME007
4.04
SME005
3.57
1401
FIELDS
SME003
3.73
100
0
100
SCALE
FEET
LEGEND
– ADJACENT SHALLOW MONITORING WELL NOT INSTALLED BY ENSAFE
– CONTOUR INTERVAL – 0.1 FOOT
– FLOW DIRECTION
NM – WATER LEVEL ELEVATION NOT MEASURED
ZONE F
RCRA FACILITY
INVESTIGATION REPORT
NAVAL BASE CHARLESTON
CHARLESTON, S.C.
FIGURE 10.5–3
SHALLOW GROUNDWATER
HIGH–TIDE POTENTIOMETRIC MAP
AOC #609
SERVICE STATION, BUILDING 1346
DWG DATE: 10/30/97
DWG NAME: 29CZFHTP

10.5.2 Field Investigation Approach

The objectives of the field investigation at AOC 609 were to: (1) confirm the presence or absence of contamination related to the waste oil UST in the site area; (2) delineate any contamination found; and (3) provide sufficient data to support a detailed evaluation of treatment alternatives, if required. Media sampled within the investigation area included soil and groundwater. Section 3 of this report details the methods used during the field investigation. Included in this section are descriptions of the hand-auger procedures used for soil sampling; groundwater sampling procedures; and miscellaneous procedures used during the field investigation. Also discussed are the analytical protocols for sample analyses. Appendix A included the construction diagrams for monitoring wells installed by S&ME. Please note, not all well construction diagrams were available.

10.5.3 Soil Sampling and Analyses

The approved final RFI work plan proposed advancing four soil borings within the AOC 609 area to assess the presence of any soil contamination from this site. Upper and lower interval soil samples were proposed from each boring. Six soil borings were advanced during the field investigation, as shown in Figure 10.5-1. The two additional soil sample locations were needed based on the results of the UST investigation (SPORTENVDETCHASN, September 3, 1996). Upper and lower interval samples were collected from four borings, while the two additional borings were sampled from the upper interval only. Where not collected, the lower interval sample was deleted due to obstructions in the borehole, or because of a shallow water table. In accordance with the approved final RFI work plan, soil samples were analyzed for metals, SVOAs, and VOAs at DQO Level III. Three upper interval duplicate soil samples were also collected for Appendix IX analyses at DQO Level IV. Table 10.5.1 summarizes the AOC 609 soil samples and analyses.

Table 10.5.1
AOC 609
Soil Samples and Analyses

Boring Location	Sample Identifier	Sample Interval	Date Collected	Analyses	Remarks
609SB001	609SB00101	Upper	9/27/96	Notes 1/2	
	609CB00101*				*Duplicate sample
	609SB00102	Lower			
609SB002	609SB00201	Upper	9/27/96	Notes 1/2	
	609CB00201*				*Duplicate sample
	609SB00202	Lower			
609SB003	609SB00301	Upper	9/27/96	Notes 1/2	
	609CB00310*				*Duplicate sample
	609SB00302	Lower			
609SB004	609SB00401	Upper	9/30/96	Note 1	Lower interval not sampled because of obstruction
609SB005	609SB00501	Upper	9/30/96	Note 1	
	609SB00502	Lower			
609SB006	609SB00601	Upper	9/30/96	Note 1	Lower interval not sampled because of obstruction

Notes:
1 = SW-846 (metals, SVOAs, and VOAs)at DQO Level III
2 = Appendix IX suite: Appendix IX (pesticides/PCBs, herbicides, SVOAs, VOAs); SW-846 (metals, dioxins, OP-pesticides); cyanide; hex-chrome at DQO Level IV
* = Duplicate sample collected

10.5.3.1 Nature of Contamination in Soil

Organic compound analytical results for soil are summarized in Table 10.5.2. Inorganic analytical results for soil are summarized in Table 10.5.3. Table 10.5.4 summarizes all analytes detected in soil at AOC 609. Appendix D contains a complete analytical data report for all Zone F samples collected.

Volatile Organic Compounds in Soil

Six VOCs were detected in surface soil samples; all were below their respective RBCs. Two VOCs were detected in subsurface soil. All subsurface detections were also below their respective SSLs.

Table 10.5.4
AOC 609
Analytes Detected in Surface and Subsurface Soil

Parameters	Location	Surface Conc.	Residential RBC* (THQ=0.1)	Surface Background	Subsurface Conc.	Soil to Groundwater SSL* (DAF=20)	Subsurface Background
Volatile Organic Compounds (µg/kg)							
1,1-Dichloroethene	609SB001	4	1100	NA	ND	60	NA
2-Butanone (MEK)	609SB001	ND	4700000	NA	7.0	7900	NA
	609SB002	7			4.0		
	609SB003	ND			4.0		
	609SB004	8			NT		
Acetone	609SB001	860	780000	NA	ND	16000	NA
	609SB002	62			ND		
Acrolein	609SB001	48	160000	NA	ND	2940	NA
	609SB003	89			ND		
Carbon disulfide	609SB001	3	780000	NA	ND	52000	NA
	609SB002	2			ND		
	609SB003	2			ND		
Trichloroethene	609SB001	4	58000	NA	ND	60	NA
	609SB002	2			ND		
	609SB003	ND			7		
Semivolatile Organic Compounds (µg/kg)							
BEQ[1]	609SB001	261.9	88.0	NA	NA	NA	NA
	609SB002	44.1			NA		
	609SB003	49			NA		
2-Methylnaphthalene	609SB002	55	310000	NA	ND	126000	NA
Benzo(a)anthracene	609SB001	150	880.0	NA	ND	2000	NA

Table 10.5.4
AOC 609
Analytes Detected in Surface and Subsurface Soil

Parameters	Location	Surface Conc.	Residential RBC[a] (THQ=0.1)	Surface Background	Subsurface Conc.	Soil to Groundwater SSL[a] (DAF=20)	Subsurface Background
Semivolatile Organic Compounds (µg/kg)							
Benzo(a)pyrene	609SB001	160	88.0	NA	81	8000	NA
	609SB002	44			ND		
	609SB004	49			NT		
Benzo(b)fluoranthene	609SB001	150	880	NA	ND	5000[b]	NA
Benzo(g,h,i)perylene	609SB001	123.5	230000.0	NA	ND	4.66E+08	NA
	609SB006	44.0			NT		
Benzo(k)fluoranthene	609SB001	135	8800.0	NA	ND	49000[b]	NA
Benzoic acid	609SB002	52	31000000	NA	ND	400000[a,c]	NA
Butylbenzylphthalate	609SB005	ND	1600000	NA	56	930000[a]	NA
Chrysene	609SB001	180	88000.0	NA	ND	160000[b]	NA
	609SB002	51.5			ND		
Di-n-butylphthalate	609SB001	ND	780000	NA	40	2300000[a]	NA
	609SB002	40			ND		
	609SB003	ND			42		
Dibenz(a,h)anthracene	609SB001	60	88	NA	ND	2000[b]	NA
Fluoranthene	609SB001	340	310000.0	NA	ND	4300000[a]	NA
	609SB002	54			ND		
Indeno(1,2,3-cd)pyrene	609SB001	103.5	880	NA	ND	14000[b]	NA
Phenanthrene	609SB001	160	230000.0	NA	ND	1380000	NA
	609SB002	59.5			ND		

Table 10.5.4
AOC 609
Analytes Detected in Surface and Subsurface Soil

Parameters	Location	Surface Conc.	Residential RBC* (THQ=0.1)	Surface Background	Subsurface Conc.	Soil to Groundwater SSL* (DAF=20)	Subsurface Background
Semivolatile Organic Compounds (µg/kg)							
Pyrene	609SB001	300	230000.0	NA	ND	4200000[a]	NA
	609SB002	52.5			ND		
bis(2-ethylhexyl)phthalate	609SB001	ND	46000	NA	58	3600000	NA
	609SB002	84			47		
	609SB003	ND			51		
	609SB005	43			ND		
	609SB006	63			ND		
Pesticides and PCBs (µg/kg)							
4,4'-DDD	609SB001	3.9	2700	NA	NA	6000[b]	NA
	609SB002	29.0					
4,4'-DDE	609SB001	15.0	1900.0	NA	NA	54000[b]	NA
	609SB002	84.0					
	609SB003	4.4					
Dioxins (ng/kg)							
Dioxin (2,3,7,8-TCDD TEQs)[1]	609SB001	0.6856	1000	NA	NA	1900	NA
	609SB002	0.4397			NA		
	609SB003	0.0648			NA		

Table 10.5.4
AOC 609
Analytes Detected in Surface and Subsurface Soil

Parameters	Location	Surface Conc.	Residential RBC[a] (THQ=0.1)	Surface Background	Subsurface Conc.	Soil to Groundwater SSL[b] (DAF=20)	Subsurface Background
Inorganics (mg/kg)							
Aluminum (Al)	609SB001	16650	7800.0	18500	3890	1000000	17100
	609SB002	11930			7180		
	609SB003	4620			7440		
	609SB004	8450			NT		
	609SB005	7940			9880		
	609SB006	8900			NT		
Antimony (Sb)	609SB002	12.2	3.1	0.79	ND	5	NL
Arsenic (As)	609SB001	14.5	0.43	19.9	[illegible]	[illegible]	18.2
	609SB002	113.8			[illegible]		
	609SB003	2.9			[illegible]		
	609SB004	7.2			NT		
	609SB005	7.4			[illegible]		
	609SB006	8.6			NT		
Barium (Ba)	609SB001	43.85	550.0	61.5	15.8	1600[c]	51.8
	609SB002	88.85			24.5		
	609SB003	16.4			17.5		
	609SB004	31.5			NT		
	609SB005	23.0			22.7		
	609SB006	51.3			NT		
Beryllium (Be)	609SB001	0.94	0.15	1.05	ND	63[d]	1.20
	609SB002	1.45			ND		
	609SB004	0.58			NT		
	609SB006	0.72			NT		

Table 10.5.4
AOC 609
Analytes Detected in Surface and Subsurface Soil

Parameters	Location	Surface Conc.	Residential RBC[a] (THQ=0.1)	Surface Background	Subsurface Conc.	Soil to Groundwater SSL[a] (DAF=20)	Subsurface Background
Inorganics (mg/kg)							
Cadmium (Cd)	609SB001	0.08	3.9	0.26	0.12	[illegible]	0.09
	609SB002	0.47			ND		
	609SB004	0.13			NT		
	609SB006	0.35			NT		
Calcium (Ca)	609SB001	4085	NL	NL	764	NL	NL
	609SB002	2480			672		
	609SB003	673.4			582		
	609SB004	14700			NT		
	609SB005	10100			1480		
	609SB006	33900			NT		
Chromium (Cr)	609SB001	27.6	39 VI 7800 III	[illegible]	[illegible]	[illegible]	32.2
	609SB002	37.8			[illegible]		
	609SB003	4.1			[illegible]		
	609SB004	14.4			NT		
	609SB005	17.8			20.		
	609SB006	22.9			NT		
Cobalt (Co)	609SB001	18.5	470.0	15.1	ND	2000	6.85
	609SB002	13.45			ND		
	609SB004	3.8			NT		
	609SB005	3.5			2.0		
	609SB006	8.7			NT		
Copper (Cu)	609SB002	119.8	310.0	48.2	ND	920	30.4
	609SB004	40.4			NT		
	609SB006	48.9			NT		

Table 10.5.4
AOC 609
Analytes Detected in Surface and Subsurface Soil

Parameters	Location	Surface Conc.	Residential RBC* (THQ=0.1)	Surface Background	Subsurface Conc.	Soil to Groundwater SSL* (DAF=20)	Subsurface Background
Inorganics (mg/kg)							
Cyanide (CN)	609SB001	0.27	160.0	0.29	NA	40 (Amenable)	0.24
	609SB002	0.13			NA		
Iron (Fe)	609SB001	21100	2300.0	NL	3310	NL	NL
	609SB002	22050			7150		
	609SB003	3120			13600		
	609SB004	11300			NT		
	609SB005	11500			15100		
	609SB006	11000			NT		
Lead(Pb)	609SB001	61.05	400.0	180	10	400	21.5
	609SB002	161.50			4.2		
	609SB003	10.5			12.4		
	609SB004	54.4			NT		
	609SB005	52.4			14.2		
	609SB006	320.0			NT		
Magnesium (Mg)	609SB001	2490	NL	NL	322	NL	NL
	609SB002	1665			588		
	609SB003	303.5			885		
	609SB004	1860			NT		
	609SB005	810			897		
	609SB006	1680			NT		

Table 10.5.4
AOC 609
Analytes Detected in Surface and Subsurface Soil

Parameters	Location	Surface Conc.	Residential RBC[a] (THQ=0.1)	Surface Background	Subsurface Conc.	Soil to Groundwater SSL[b] (DAF=20)	Subsurface Background
Inorganics (mg/kg)							
Manganese (Mn)	609SB001	392.5	180.0	307	48.9	1100	469
	609SB002	305			38.9		
	609SB003	146.5			60.2		
	609SB004	181			NT		
	609SB005	65.8			76.1		
	609SB006	133			NT		
Mercury (Hg)	609SB001	0.45	2.3	0.62	0.05	2.1	0.23
	609SB002	0.4			ND		
	609SB003	0.11			ND		
	609SB004	0.1			NT		
	609SB005	ND			0.05		
	609SB006	0.06			NT		
Nickel (Ni)	609SB001	10.65	160.0	12.6	2.0	130[c]	8.85
	609SB002	28.4			3.2		
	609SB003	2.4			ND		
	609SB004	6.4			NT		
	609SB005	6.1			3.4		
	609SB006	22.6			NT		
Potassium (K)	609SB001	1390	NL	NL	ND	NL	NL
	609SB002	1089			366		
	609SB003	ND			573		
	609SB004	556			NT		
	609SB005	445			659		
	609SB006	607			NT		

Table 10.5.4
AOC 609
Analytes Detected in Surface and Subsurface Soil

Parameters	Location	Surface Conc.	Residential RBC[a] (THQ=0.1)	Surface Background	Subsurface Conc.	Soil to Groundwater SSL[a] (DAF=20)	Subsurface Background
Inorganics (mg/kg)							
Tin (Sn)	609SB002	19.25	4700	9.38	ND	11000	NL
	609SB006	25			NT		
Vanadium (V)	609SB001	44	55.0	48.9	6.6	6000[d]	49.4
	609SB002	42.8			14.5		
	609SB003	6.15			22.9		
	609SB004	26.1			NT		
	609SB005	21.5			28.4		
	609SB006	22.6			NT		
Zinc (Zn)	609SB001	120	2300.0	198	ND	12000[e]	84.2
	609SB002	715.5			ND		
	609SB004	189			NT		
	609SB005	201			NT		
	609SB006	229			NT		

Notes:

[a] = Calculated values correspond to a noncancer hazard quotient of 1.
[b] = Calculated values correspond to a cancer risk level of 1 in 1,000,000.
[c] = SSL for pH of 6.8.
[d] = A screening level of 400 mg/kg has been set for lead based on *Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities* (USEPA, 1994a).
[e] = Soil saturation concentration (C_{sat}).
[f] = Residential RBCs (THQ=0.1) were used as a reference concentration for upper interval samples. Generic soil to groundwater SSLs (DAF=20) from the *Soil Screening Guidance: Technical Background Document* (USEPA, 1996c) were used as a reference concentration for lower interval samples.
[g] = Calculated from methods described in USEPA Interim *Supplemental Guidance to RAGS: Human Health Risk Assessment*, Bulletin 2 (USEPA, 1995b).
ND = Not detected
NT = Not taken
NL = Not listed
NA = Not applicable
µg/kg = Micrograms per kilogram
mg/kg = Milligrams per kilogram
ng/kg = Nanograms per kilogram
Bolded concentrations exceed both the reference concentration (RBC or SSL) and the zone background.
All background values for Zone F are based on twice the means of the grid sample concentrations. One grid sample from Zone E is included in each group.

Table 10.5.8
AOC 609
Analytes Detected in Groundwater

Parameters	Location	1st Quarter Conc.	2nd Quarter Conc.	3rd Quarter Conc.	Tap Water RBC* (µg/L)	MCL/SMCL* (µg/L)	Background
Volatile Organic Compounds (µg/L)							
1,2-Dichloroethane	SME005	ND	4.0	ND	0.12	5	NA
	SME006	ND	ND	3.0			NA
2-Butanone	SME005	ND	100	ND	190	NL	NA
Benzene	SME005	34000	18000	14000	.36	5	NA
Chlorobenzene	SME004	11	ND	ND	3.9	NL	NA
Chloroform	SME005	ND	8.0	ND	0.15	100	NA
Ethylbenzene	SME005	2400	1700	1000	130	700	NA
Toluene	SME005	56000	24000	17000	75	1000	NA
Xylene	SME005	15000	8600	4800	1200	10000	NA
Semivolatile Organic Compounds (µg/L)							
2,4-Dimethylphenol	SME005	380	120	110	73	NL	NA
2-Methylnaphthalene	SME005	48	110	64	150	NL	NA
2-Methylphenol	SME005	1000	220	290	180	NL	NA
4-Methylphenol	SME005	970	260	290	18	NL	NA
4-Nitrophenol	SME003	ND	ND	3.0	230	NL	NA

Table 10.5.8
AOC 609
Analytes Detected in Groundwater

Parameters	Location	1st Quarter Conc.	2nd Quarter Conc.	3rd Quarter Conc.	Tap Water RBC* (µg/L)	MCL/SMCL* (µg/L)	Background
Semivolatile Organic Compounds (µg/L)							
Benzoic Acid	SME001	1.0	ND	ND	15000	NL	NA
	SME004	ND	ND	4.0			
	SME005	420	ND	ND			
	SME006	ND	ND	4.0			NA
	SME007	ND	ND	4.0			
Naphthalene	SME005	540	240	330	150	NL	NA
Pentachlorophenol	SME005	ND	ND	2.0	0.56	NL	NA
Phenol	SME005	810	140	160	2200	NL	NA
Butylbenzylphthalate	SME008	ND	5	ND	730	NL	NL
Inorganics (µg/L)							
Aluminum (Al)	SME001	4450	394	ND	5700	50	224
	SME003	127	734	761			
	SME004	116	ND	ND			
	SME005	458	87.2	90.9			
	SME007	7745	105.1	6070			
	SME008	142	ND	ND			
Antimony (Sb)	SME001	ND	4.0	ND	1.5	6	NL
	SME003	ND	2.7	ND			

Table 10.5.8
AOC 609
Analytes Detected in Groundwater

Parameters	Location	1st Quarter Conc.	2nd Quarter Conc.	3rd Quarter Conc.	Tap Water RBC* (µg/L)	MCL/SMCL* (µg/L)	Background
Inorganics (µg/L)							
Arsenic (As)	SME001	65.2	50.6	37.7	0.045	50	16.7
	SME003	6.5	8.0	3.6			
	SME004	15.9	20.4	16.6			
	SME005	41.6	48.7	58.5			
	SME006	38.7	33.6	52.2			16.2
	SME007	5.2	ND	3.1			
	SME008	18.4	21.6	31.2			
Barium (Ba)	SME001	35.5	46.9	77	260	2000	94.3
	SME003	7.0	28.9	11.8			
	SME004	5.9	5.7	12.2			
	SME005	36.4	25.4	21.1			
	SME006	64.6	45.1	42.9			200
	SME007	61.9	12.1	25.6			
	SME008	45.9	42.5	36.9			
Beryllium (Be)	SME001	ND	0.27	ND	0.016	4	0.66
	SME003	ND	1.0	ND			
	SME006	ND	0.31	ND			0.46
	SME007	ND	0.24	ND			
Cadmium (Cd)	SME003	ND	0.47	ND	1.8	5	0.82
	SME005	ND	0.41	ND			
	SME008	ND	ND	0.72			

Table 10.5.8
AOC 609
Analytes Detected in Groundwater

Parameters	Location	1st Quarter Conc.	2nd Quarter Conc.	3rd Quarter Conc.	Tap Water RBC* (µg/L)	MCL/SMCL* (µg/L)	Background
Inorganics (µg/L)							
Calcium (Ca)	SME001	69800	71400	91200	NL	NL	NL
	SME003	4510	9640	8730			
	SME004	2300	1490	8040			
	SME005	1720	2210	2240			
	SME006	246000	154000	165000			NL
	SME007	18500	6530	7980			
	SME008	10500	10900	9680			
Chromium (Cr)	SME001	14.3	4.2	2.1	18	100	2.05
	SME003	ND	1.7	1.3			
	SME007	12.65	ND	12.15			
Cobalt (Co)	SME001	2.0	2.1	ND	220	NL	[illegible]
	SME003	ND	8.2	2.5			
	SME004	1.1	0.81	1.0			
	SME005	ND	1.8	1.15			
	SME006	1.0	9.0	6.7			[illegible]
	SME007	2.8	1.35	2.16			
	SME008	1.9	2.1	1.9			
Copper (Cu)	SME001	6.6	3.5	ND	150	1000	NL
	SME003	ND	4.1	ND			
	SME006	ND	ND	2.4			NL
	SME007	ND	ND	3.0			
Cyanide (Cn)	SME003	2.9	NT	NT	73	200	3.3
	SME004	8.8	NT	NT			
	SME005	2.3	NT	NT			
	SME007	2.0	NT	NT			
	SME008	2.8	NT				

Table 10.5.8
AOC 609
Analytes Detected in Groundwater

Parameters	Location	1st Quarter Conc.	2nd Quarter Conc.	3rd Quarter Conc.	Tap Water RBC* (µg/L)	MCL/SMCL* (µg/L)	Background
Inorganics (µg/L)							
Iron (Fe)	SME001	27300	7340	5270	1100	300	NL
	SME003	1090	6280	1330			
	SME004	1500	2780	2000			
	SME005	7310	19800	17000			
	SME006	9020	6080	7030			NL
	SME007	8095	408	4870			
	SME008	18000	16100	16000			
Lead (Pb)	SME001	6.2	ND	ND	15	15	NL
	SME003	ND	18.7	ND			
	SME005	8.8	5.4	ND			
	SME007	6.35	ND	ND			
Magnesium (Mg)	SME001	136000	58900	47500	NL	NL	NL
	SME003	3410	5140	4320			
	SME004	1570	1530	2980			
	SME005	1990	2960	2790			
	SME006	133000	87500	86000			NL
	SME007	7320	2630	3290			
	SME008	20300	24500	20500			
Manganese (Mn)	SME001	647	823	3310	84	50	2010
	SME003	45.6	113	66.1			
	SME004	29.2	36.4	33.5			
	SME005	38.0	64.3	58.4			
	SME006	1300	1740	1150			1260
	SME007	186.5	61.2	78.95			
	SME008	195	139	121			

Table 10.5.8
AOC 609
Analytes Detected in Groundwater

Parameters	Location	1st Quarter Conc.	2nd Quarter Conc.	3rd Quarter Conc.	Tap Water RBC* (µg/L)	MCL/SMCL* (µg/L)	Background
Inorganics (µg/L)							
Mercury (Hg)	SME001	ND	ND	0.61			NL
	SME003	0.22	ND	ND			
	SME005	0.17	0.12	ND			
	SME007	0.17	ND	ND			
Nickel (Ni)	SME001	5.6	3.1	ND	73	100	5.55
	SME003	1.4	3.5	ND			
	SME004	2.1	1.9	ND			
	SME006	9.3	16.2	18.7			61.1
	SME007	3.9	0.775	ND			
	SME008	0.93	ND	ND			
Potassium (K)	SME001	65300	42200	28000	NL	NL	NL
	SME003	5310	4330	5800			
	SME004	7310	6560	9220			
	SME005	ND	1430	1730			
	SME006	21300	14900	10900			NL
	SME007	6135	4320	4555			
	SME008	22200	24300	20000			
Selenium (Se)	SME003	4.1	ND	ND	18	50	NL
	SME005	13.5	10.8	8.2			
	SME007	ND	4.4	ND			
Silver (Ag)	SME001	ND	1.8	ND	18	100	NL
	SME007	2.7	ND	ND			

Table 10.5.8
AOC 609
Analytes Detected in Groundwater

Parameters	Location	1st Quarter Conc.	2nd Quarter Conc.	3rd Quarter Conc.	Tap Water RBC* (µg/L)	MCL/SMCL* (µg/L)	Background
Inorganics (µg/L)							
Sodium (Na)	SME001	1410000	585000	234000	NL	NL	NL
	SME003	314000	308000	251000			
	SME004	246000	246000	246000			
	SME005	68000	83000	78000			
	SME006	1220000	1060000	1070000			NL
	SME007	241500	115000	114000			
	SME008	470000	545000	510000			
Thallium (Tl)	SME006	ND	9.3	ND	0.29	2	8.18
Vanadium (V)	SME001	19.3	8.9	9.5	26	ND	1.58
	SME003	2.4	2.1	2.2			
	SME004	1.2	ND	1.3			
	SME005	1.4	ND	1.7			
	SME007	12.6	1.25	10.35			
Zinc (Zn)	SME003	13.6	ND	22.5	1100	5000	NL
	SME006	6.2	ND	ND			NL
	SME007	20.65	86.3	ND			

Notes:
NL = Not listed
NA = Not applicable
MCL = Maximum Contaminant Level
SMCL = Secondary Maximum Contaminant Level
µg/L = Micrograms per liter
* = Tap water RBCs (THQ=0.1) from *Risk-Based Concentration Table, January-June 1996* (USEPA, 1996b). MCLs/SMCLs from *Drinking Water Regulations and Health Advisories* (USEPA, 1996e) were used as reference concentrations.
Bolded concentrations exceed both the RBC and the zone background.
All background values for Zone F are based on twice the means of the grid sample concentrations. One grid sample from Zone E is included in each group. Background values for groundwater are based on two sampling rounds in two wells at each depth.
Well SME006 is complete in the lower portion of the surficial aquifer.

the groundwater in the surficial aquifer is not currently used for consumption, nor is it anticipated to be used in the future, thus invalidating the risk-based exposure pathway. Additionally, the nearest surface water body is the Cooper River, which lies approximately 1,800 feet to the northeast, while groundwater at AOC 609 flows to the southeast (see Section 2). Consequently, there is no likelihood of site groundwater discharging to surface water within reasonable proximity at concentrations deleterious to ecological receptors.

10.5.5.3 AOC 609 — Soil-to-Air Cross-Media Transport

Table 10.5.10 lists the VOCs detected in surface soil samples collected at AOC 609, along with corresponding soil-to-air volatilization screening levels. Acrolein and 2-Butanone were present at levels exceeding volatilization criteria; however, the entire site is covered with pavement and/or structures which overly surface soil. Consequently, the soil-to-air migration pathway is insignificant at AOC 609.

10.5.5.4 AOC 609 — Fate and Transport Summary

No organic compounds were detected above applicable SSLs in either surface or subsurface soil. Further, two metals (arsenic and antimony) were present above SSLs in surface soil, but were below SSLs in subsurface soil. The lack of any constituents in subsurface soil above SSLs provide evidence that the soil-to-groundwater pathway at AOC 609 is invalid. Additionally, the entire site area is covered with buildings or asphalt, which eliminates precipitation as a leaching agent. Several organics were detected in groundwater above applicable RBCs and/or surface water protection values; these were restricted to one location (the furthest downgradient) and to shallow groundwater. In general, these constituents showed a decrease in concentration over three quarters of sampling, indicating the presence of a dynamic attenuation mechanism coupled with probable source diminishment. Four metals were detected in shallow groundwater and one (arsenic) was

present above screening criteria in both the shallow and deep groundwater. With the exception of one (lead), no clear temporal trends are notable. Given the lack of a source, and in particular the persistent occurrence of arsenic, consideration should be given that these concentrations are within the ambient range. The surficial groundwater pathway for risk-based exposure is invalid due to the non-use of groundwater. The nearest surface water is a significant distance away and is inconsistent groundwater flow direction from the site, and is therefore not considered significant with respect to this AOC.

10.5.6 Human Health Risk Assessment

10.5.6.1 Site Background and Investigative Approach

AOC 609 is the former gasoline station and automotive repair and maintenance shop at Building 1346. Nearly all of the site area is covered by the building and surrounding asphalt pavement. Materials released, stored, or disposed of at the site include gasoline, diesel fuel, motor/lubricating oils, degreasing solvents, antifreeze, and various automotive products.

Six soil samples were collected from each of the upper and lower intervals to identify potential impacts resulting from the activities listed above. Surface soil samples from all six boring locations were used to quantitatively assess soil exposure pathways. Six existing shallow and one deep monitoring well were sampled, and data from the first quarter sampling event were used to quantitatively assess groundwater exposure pathways. Sections 10.5.3 and 10.5.4 summarizes the sampling effort for AOC 609 soil and groundwater.

10.5.6.2 COPC Identification

Soil

Based on the screening comparisons described in Section 7 of this CSI and presented in Table 10.5.11, BEQs, antimony, arsenic, beryllium, and manganese were identified as COPCs in surface soil.

Groundwater

As shown in Table 10.5.12, aluminum, arsenic, benzene, chlorobenzene, toluene, and xylene (total), 2,4-dimethylphenol, ethylbenzene, 2-methylphenol, 4-methylphenol, and naphthalene were identified as a COPCs for shallow groundwater at AOC 609.

10.5.6.3 Exposure Assessment

Exposure Setting

AOC 609 is in an urban setting on the former naval base, near the western boundary of the installation. The site is surrounded by a large asphalt parking lot to the west, grass-covered open fields to the south and east, and buildings to the north. Nearly 100 percent of the site area is covered by the building and surrounding pavement.

Potentially Exposed Populations

Potentially exposed populations are current and future site workers. Additional potentially exposed populations are hypothetical future site residents, adolescent site trespassers, or future recreational users. Future site resident and worker exposure scenarios were addressed quantitatively in this risk assessment. The future site resident scenario was built on the premise that existing features would be removed and replaced with dwellings. Current exposure to workers is discussed qualitatively in relation to the future workers; future recreational users are addressed qualitatively in relation to future residents; and current adolescent trespassers are addressed qualitatively in relation to future site child residents. The hypothetical future site worker scenario assumes continuous exposure to surface soil conditions. Current site workers' exposure would be less than that assumed for the hypothetical future site worker scenario because of their limited soil contact (the paved surfacing would prevent direct contact to a portion of the site). Therefore, future worker assessment is considered to be conservatively representative of current site users. Similarly, the future site residential scenario is considered conservatively representative of the current trespasser and the future recreational scenarios.

The projected site worker HI for the groundwater ingestion pathway is 8. Arsenic, 4-methylphenol, and toluene were primary contributors to projected HIs for the groundwater ingestion pathway, and 2,4-dimethylphenol, 2-methylphenol, naphthalene, and ethylbenzene were secondary contributors to the ingestion pathway. The projected site worker HI for the inhalation pathway is 199. Benzene was the primary contributor to the inhalation pathway, accounting for approximately 98% of the projected pathway estimate.

Current Site Workers

Groundwater is not currently used as a source for potable or process water at AOC 609 or other areas of Zone F. In the absence of a completed exposure pathway, no threat to human health is posed by reported shallow groundwater contamination.

COCs Identified

COCs were identified based on cumulative (all pathway) risk and hazard projected for this site on a medium-specific basis. USEPA has established a generally acceptable risk range of 1E-04 to 1E-06, and a hazard index threshold of 1.0 (unity). As recommended by SCDHEC, a COC was considered to be any chemical contributing to a cumulative risk level of 1E-06 or greater and/or a cumulative hazard index above 1.0, and whose individual ILCR exceeds 1E-06 or whose hazard quotient exceeds 0.1. For carcinogens, this approach is relatively conservative, because a cumulative risk level of 1E-04 (and individual ILCR of 1E-06) is recommended by USEPA Region IV as the trigger for establishing COCs. The COC selection method presented was used in order to provide a more comprehensive evaluation of chemicals contributing to carcinogenic risk or noncarcinogenic hazard during the RGOs development process. Table 10.5.22 presents the COCs identified for AOC 609 surface soil and groundwater.

Surface Soils

Future Site Residents

BEQs, arsenic, and beryllium were identified as soil pathway COCs based on their contribution to cumulative residential ILCR projections. Antimony, arsenic, and manganese were identified as COCs based on their contribution to cumulative residential HI projections.

Future Site Workers

BEQs, arsenic, and beryllium were identified as soil pathway COCs based on their contribution to cumulative industrial ILCR projections.

The extent of the COCs identified in surface soil is briefly discussed below. To facilitate this discussion, residential soil RBCs and background concentrations were compared to each reported COC concentration. BEQs were detected in one of six surface soil exceeding its residential RBC (88 μg/kg). Arsenic was detected above its RBC (0.43 mg/kg) in all six surface soil samples; however, arsenic exceeded its background value (19.9 mg/kg) in one surface soil sample. Beryllium exceeded its RBC (0.15 mg/kg) in four of six surface soil samples. Beryllium exceeded its background value (1.05 mg/kg) in one surface soil sample. Antimony was detected in one of six surface soil samples exceeding its RBC (3.1 mg/kg). Manganese exceeded its RBC (180 mg/kg) in three of six surface soil samples, and exceeded its background value (307 mg/kg) in only one surface soil sample.

First Quarter Groundwater

Future Site Residents

Arsenic and benzene were identified as COCs based on their contribution to cumulative groundwater pathway risk projections. Aluminum, arsenic, benzene, chlorobenzene, 2,4-dimethylphenol, ethylbenzene, 2-methylphenol, 4-methylphenol, naphthalene, toluene, and xylene were identified as COCs based on their contribution to cumulative HI projections.

Table 10.5.22
Summary of Risk and Hazard-based COCs
AOC 609
NAVBASE - Charleston, Zone F
Charleston, South Carolina

Medium	Exposure Pathway		Future Resident Adult Hazard Quotient	Future Resident Child Hazard Quotient	Future Resident Iwa ILCR	Future Site Worker Hazard Quotient	Future Site Worker ILCR	Identification of COCs
Surface Soil	Incidental Ingestion	**Inorganics**						
		Antimony	0.042	0.39	ND	0.015	ND	1
		Arsenic	0.52	4.8	2.7E-04	0.19	3.0E-05	1 2 4
		Beryllium	0.00040	0.0037	9.8E-06	0.00014	1.1E-06	2 4
		Manganese	0.011	0.11	ND	0.0041	ND	1
		Semivolatile Organics						
		Benzo(a)pyrene Equivalents	ND	ND	3.0E-06	ND	3.3E-07	2
	Dermal Contact	**Inorganics**						
		Antimony	0.0086	0.028	ND	0.0061	ND	
		Arsenic	0.11	0.35	3.0E-05	0.076	1.2E-05	1 2 4
		Beryllium	0.000081	0.00027	1.1E-06	0.000058	4.5E-07	2
		Manganese	0.0023	0.0077	ND	0.0017	ND	
		Semivolatile Organics						
		Benzo(a)pyrene Equivalents	ND	ND	1.3E-06	ND	5.4E-07	2
Surface Soil Pathway Sum			0.7	6	3E-04	0.3	4E-05	
Groundwater Pathways	Ingestion	**Inorganics**						
		Aluminum (Al)	0.21	0.50	ND	0.076	ND	1
		Arsenic (As)	6.0	14	1.5E-03	2.1	3.4E-04	1 2 3 4
		Semivolatile Organics						
		2,4-Dimethylphenol	0.52	1.2	ND	0.19	ND	1 3
		2-Methylphenol	0.55	1.3	ND	0.20	ND	1 3
		4-Methylphenol	5.3	12.4	ND	1.9	ND	1 3
		Naphthalene	0.37	0.86	ND	0.13	ND	1 3
		Volatile Organics						
		Benzene	ND	ND	1.5E-02	ND	3.4E-03	2 4
		Chlorobenzene	0.015	0.035	ND	0.0054	ND	
		Ethylbenzene	0.66	1.5	ND	0.23	ND	1 3
		Toluene	7.7	18	ND	2.7	ND	1 3
		Xylene (total)	0.21	0.48	ND	0.073	ND	1
	Inhalation	**Volatile Organics**						
		Benzene	545	1271	1.5E-02	195	3.4E-03	1 2 3 4
		Chlorobenzene	0.053	0.12	ND	0.019	ND	1
		Ethylbenzene	0.25	0.57	ND	0.088	ND	1
		Toluene	13	31	ND	5	ND	1 3
		Xylene (total)	ND	ND	ND	ND	ND	
Groundwater Pathway Sum			580	1353	3E-02	207	7E-03	
Sum of All Pathways			581	1359	3E-02	207	7E-03	

Notes:
ND Indicates not determined due to the lack of available risk information.
NA Not applicable
ILCR Indicates incremental excess lifetime cancer risk
HI Indicates hazard index
1- Chemical is a COC by virtue of projected child residence non-carcinogenic hazard.
2- Chemical is a COC by virtue of projected future resident lifetime ILCR.
3- Chemical is a COC by virtue of projected site worker non-carcinogenic hazard.
4- Chemical is a COC by virtue of projected site worker ILCR.

Future Site Workers

Arsenic and benzene were identified as COCs based on their contribution to cumulative risk projections. Arsenic, benzene, 2,4-dimethylphenol, ethylbenzene, 2-methylphenol, 4-methylphenol, naphthalene, and toluene were identified as COC based on their contribution to cumulative HI projections.

Arsenic exceeded its tap water RBC in all seven first quarter groundwater samples and exceeded its background concentration in four of seven first quarter groundwater samples. Aluminum was detected in two of seven first quarter groundwater samples at concentrations above its RBC. Except for chlorobenzene, all of the organic COCs detections (benzene, 2,4-dimethylphenol, ethylbenzene, 2-methylphenol, 4-methylphenol, naphthalene, toluene, and xylene) were reported in the first quarter groundwater sample collected from monitoring well SME005 only. Chlorobenzene was reported in the first quarter groundwater sample collected from monitoring well SME004.

10.5.6.6 Risk Uncertainty

Characterization of Exposure Setting and Identification of Exposure Pathways

The potential for high bias is introduced through the exposure setting and pathway selection due to the highly conservative assumptions (i.e., future residential use) recommended by USEPA Region IV when assessing potential future and current exposure. The exposure assumptions made in the site worker scenario are highly protective and would tend to overestimate exposure.

Residential use of the site would not be expected, based on current site uses and the nature of surrounding buildings. If this area were to be used as a residential site, the surface soil conditions would likely change — the soils could be covered with landscaping soil and/or a house. Consequently, exposure to surface soil conditions as represented by samples collected during the CSI would not be likely under a true future residential scenario. These factors indicate that

10.5.6.8 RGOs

Soil

Risk-based RGOs were based on the lifetime weighted average site resident or site worker as presented in Table 10.5.27 for surface soils. Hazard-based RGOs were calculated based on the hypothetical child resident or site worker, as noted in the table.

Groundwater

Groundwater risk and hazard based RGOs for the site resident and site worker scenarios are shown in Table 10.5.28.

10.5.7 Corrective Measures Considerations

For AOC 609, the upper and lower soil intervals and shallow groundwater were investigated. A total of six soil samples each were collected from the upper and lower intervals. Seven groundwater monitoring wells previously installed in the shallow aquifer were sampled. Based on the analytical results and the human health risk assessment, COCs requiring further evaluation through the CMS process were identified for the upper soil interval and shallow groundwater. However, residential use of the site is not expected, based on current site uses and the nature of surrounding buildings. Current reuse plans call for continued commercial/industrial use. The site is mostly paved with asphalt or concrete.

BEQs, antimony, arsenic, beryllium, and manganese were identified as COCs in the upper soil interval. The soil pathway cumulative residential exposure risk is 3E-04 and the cumulative HI is 6 (resident child). The cumulative residential exposure risk is above USEPA's acceptable lowest risk level of 1E-04 and the HI is above USEPA's acceptable HI of 3 (Table 10.5.22).

Table 10.5.27
Remedial Goal Options Surface Soil
AOC 609
NAVBASE - Charleston, Zone F
Charleston, South Carolina

Residential-Based Remedial Goal Options

Chemical	Slope Factor (mg/kg-day)-1	Reference Dose (mg/kg-day)	EPC mg/kg	Hazard-Based Remedial Goal Options 3 mg/kg	1 mg/kg	0.1 mg/kg	Risk-Based Remedial Goal Options 1E-06 mg/kg	1E-05 mg/kg	1E-04 mg/kg	Background Concentration mg/kg
Inorganics										
Antimony	NA	0.0004	12.2	88	29	2.9	ND	ND	ND	0.79
Arsenic	1.5	0.0003	113.8	66	22	2.2	0.38	3.8	38	19.9
Beryllium	4.3	0.005	1.45	1094	365	36	0.13	1.3	13	1.05
Manganese	NA	0.047	392.5	10283	3428	343	ND	ND	ND	307
Semivolatile Organics										
Benzo(a)pyrene Equivalent	7.3	NA	0.26	ND	ND	ND	0.060	0.60	6.0	NA

Worker-Based Remedial Goal Options

Chemical	Slope Factor (mg/kg-day)-1	Reference Dose (mg/kg-day)	EPC mg/kg	Hazard-Based Remedial Goal Options 3 mg/kg	1 mg/kg	0.1 mg/kg	Risk-Based Remedial Goal Options 1E-06 mg/kg	1E-05 mg/kg	1E-04 mg/kg	Background Concentration mg/kg
Arsenic	1.5	0.0003	113.8	1305	435	43	2.7	27	271	19.9
Beryllium	4.3	0.005	1.5	21745	7248	725	0.94	9.4	94	1.05

NOTES:

EPC Exposure point concentration
NA Not applicable
ND Not determined
- Remedial goal options were based on the residential lifetime weighted average for carcinogens and the child resident or site worker for noncarcinogens

Table 10.5.28
Remedial Goal Options Groundwater
AOC 609
NAVBASE - Charleston, Zone F
Charleston, South Carolina

Residential-Based Remedial Goal Options

Chemical	Oral SF (mg/kg-day)-	Oral RfD (mg/kg-day)	EPC mg/l	Hazard-Based Remedial Goal Options 0.1 mg/l	1.0 mg/l	3 mg/l	Risk-Based Remedial Goal Options 1E-06 mg/l	1E-05 mg/l	1E-04 mg/l	Background Concentratio mg/l	MCL mg/l
Inorganics											
Aluminum (Al)	NA	1	7.745	1.6	16	47	ND	ND	ND	0.224	NA
Arsenic (As)	1.5	0.0003	0.0652	0.00047	0.0047	0.014	0.000044	0.00044	0.0044	0.167	0.05
Semivolatile Organics											
2,4-Dimethylphenol	NA	0.02	0.38	0.031	0.31	0.94	ND	ND	ND	NA	NA
2-Methylphenol	NA	0.05	1	0.078	0.78	2.3	ND	ND	ND	NA	NA
4-Methylphenol	NA	0.005	0.97	0.0078	0.078	0.23	ND	ND	ND	NA	NA
Naphthalene	NA	0.04	0.54	0.063	0.63	1.9	ND	ND	ND	NA	NA
Volatile Organics											
Benzene	0.029	NA	34	0.0027	0.027	0.08	0.0011	0.011	0.11	NA	0.005
Chlorobenzene	NA	0.02	0.011	0.0069	0.069	0.21	ND	ND	ND	NA	NA
Ethylbenzene	NA	0.1	2.4	0.11	1.1	3.4	ND	ND	ND	NA	0.7
Toluene	NA	0.2	56	0.11	1.1	3.4	ND	ND	ND	NA	1
Xylene (total)	NA	2	15	3.1	31	94	ND	ND	ND	NA	10

Worker-Based Remedial Goal Options

Chemical	Oral SF (mg/kg-day)-	Oral RfD (mg/kg-day)	EPC mg/l	Hazard-Based Remedial Goal Options 0.1 mg/l	1.0 mg/l	3 mg/l	Risk-Based Remedial Goal Options 1E-06 mg/l	1E-05 mg/l	1E-04 mg/l	Background Concentration mg/l	MCL mg/l
Inorganics											
Arsenic (As)	1.5	0.0003	0.0652	0.0031	0.031	0.092	0.00019	0.0019	0.019	0.167	0.05
Semivolatile Organics											
2,4-Dimethylphenol	NA	0.02	0.38	0.20	2.0	6.1	ND	ND	ND	NA	NA
2-Methylphenol	NA	0.05	1	0.51	5.1	15	ND	ND	ND	NA	NA
4-Methylphenol	NA	0.005	0.97	0.051	0.51	1.5	ND	ND	ND	NA	NA
Naphthalene	NA	0.04	0.54	0.41	4.1	12	ND	ND	ND	NA	NA
Volatile Organics											
Benzene	0.029	NA	34	0.0027	0.027	0.080	0.0049	0.049	0.49	NA	0.005
Chlorobenzene	NA	0.02	0.011	0.0069	0.069	0.21	ND	ND	ND	NA	NA
Ethylbenzene	NA	0.1	2.4	0.11	1.1	3.4	ND	ND	ND	NA	0.7
Toluene	NA	0.2	56	0.11	1.1	3.4	ND	ND	ND	NA	1
Xylene (total)	NA	2	15	3.1	31	94	ND	ND	ND	NA	10

NOTES:

EPC Exposure point concentration
NA Not applicable
ND Not determined
\- Remedial goal options were based on the residential lifetime weighted average for carcinogens and the child resident or site worker for noncarcinogens

Residential risk-based RGOs applicable to surface soil for arsenic, beryllium and BEQs are 0.38, 0.13, and 0.06 mg/kg, respectively, based on a target risk of 1E-06. Hazard-based RGOs for surface soil for antimony and manganese are 29 and 3,428 mg/kg, respectively, based on a target HI of 1. Potential corrective measures, in addition to no further action for soil and respective COCs, are presented in Table 10.5.29.

Aluminum, arsenic, 2,4-dimethylphenol, 2-methylphenol, 4-methylphenol, naphthalene, benzene, chlorobenzene, ethylbenzene, toluene, and xylene (total) were identified as residential groundwater COCs in the shallow groundwater at AOC 609. Arsenic and benzene have a calculated risk of 3E-02 associated with the present concentrations in the shallow groundwater at SME005. This risk is above USEPA's acceptable risk of 1E-04 (Table 10.5.22).

Table 10.5.29
Potential Corrective Measures for AOC 609

Medium	Compounds of Concern	Potential Corrective Measures
Soil	Antimony, arsenic, beryllium, manganese, and BEQs	a) No Action b) Intrinsic remediation and monitoring c) Containment by capping d) Excavation and landfill, if RCRA-nonhazardous waste e) In-situ, chemical and physical treatment f) Ex-situ, chemical and physical treatment
Shallow Groundwater	Aluminum, arsenic, 2,4-dimethylphenol, 2-methylphenol, 4-methylphenol, naphthalene, benzene, chlorobenzene, ethylbenzene, toluene, and xylene	a) No Action b) Intrinsic remediation and monitoring c) In-situ, biological, chemical and physical treatment d) Ex-situ, biological, chemical and physical treatment

Aluminum, arsenic, 2,4-dimethylphenol, 2-methylphenol, 4-methylphenol, naphthalene, benzene, chlorobenzene, ethylbenzene, toluene, and xylene (total) have a calculated HI of 1,353 associated with their present concentrations. This HI is above USEPA's acceptable HI of 1. The risk-based RGOs for arsenic and benzene are 0.000044 and 0.0011 mg/L, respectively, based on a target of 1E-06. The hazard-based RGOs for aluminum, 2,4-dimethylphenol, 2-methylphenol,

4-methylphenol, naphthalene, chlorobenzene, ethylbenzene, toluene, and xylene (total) are 16, 0.31, 0.78, 0.078, 0.63, 0.069, 1.1, 1.1, and 31 mg/L, respectively, based on a target HI of 1 (Table 10.5.22).

Potential corrective measures for the shallow groundwater and respective COCs are presented in Table 10.5.29. Corrective measures for AOC 609 are detailed in Section 9.

Appendix B

Initial Groundwater Assessment Report for Site 24,
Building NS 1346

D H E C
HOTE PERTECT PROSPER
2600 Bull Street
Columbia, SC 29201-1708

COMMISSIONER:
les E. Bryant

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Larry R. Chewning, Jr., DMD

9 March 2000

Department of the Navy
Southern Division NFEC
P.O. Box 190010
North Charleston, SC 29419-9010
Attention: Mr. Gabriel Magwood

Re: Final Assessment Report dated 07 February 2000
Zone F/Site 24-Building NS 1346 (Site Identification # 01782)
Charleston Naval Complex/Charleston Naval Base
Charleston, SC
Charleston County

Dear Mr. Magwood:

The author has completed technical review of the referenced document. As submitted, the report provides a narrative describing previous assessment activities and analytical results from additional sampling conducted to determine the environmental fate of suspected contamination at the subject property. The analytical results provided indicate that reportable concentrations of BTEX, PAH and metal compounds were detected above established method detection limits in soil and/or groundwater samples obtained at the subject site. The reported compounds are at a concentration(s) which is at or below the RBSL (Risk-Based Screening Levels, SCDHEC *Risk-Based Corrective Action for Petroleum Releases*, 5 January 1998), proposed RBC (Risk-Based Concentrations for Residential Soils, EPA Region III Risk-Based Concentrations Table, 12 April 1999) and established groundwater MCLs (maximum contaminant levels). Based on the analytical results presented and description of site specific geology/hydrogeology, potential releases, if any, from previous activities at the subject site do not appear to present a significant threat to human health and/or the environment at the present time. In this regard, the employed assessment activities and sampling results appear to indicate that no additional endeavors for remedial actions and/or contaminant characterization is warranted for the Zone F/Site 24-Building NS 1346 area at this time.

With consideration to the above comments, the Department has reviewed the referenced environmental data. Based on the information and analytical data submitted, the Department recognizes that the Department of the Navy and Charleston Naval Complex has adequately addressed the known environmental contamination identified on the property to date in accordance with the approved scope of work. Please note, this statement pertains only to the portion of the site addressed in the referenced report and does not apply to other areas of the site and/or any other potential regulatory violations. Further, the Department retains the right to request further investigation if deemed necessary.

Should you have any questions please contact me at (803) 898-3559.

Sincerely,

Paul L. Bristol, Hydrogeologist
Groundwater Quality Section
Bureau of Water

Tom Knight, Manager
Groundwater Quality Section
Bureau of Water

cc: Trident District EQC

Rev.1
02/03/00

Initial Ground-Water Assessment Report for Site 24, Building NS1346

Zone F
Charleston Naval Complex
North Charleston, South Carolina

Southern Division
Naval Facilities Engineering Command
Contract Number N62467-94-D-0888
Contract Task Order 0097

February, 2000

Rev.1
02/03/00

INITIAL GROUND-WATER ASSESSMENT REPORT FOR SITE 24, BUILDING NS1346

ZONE F, CHARLESTON NAVAL COMPLEX NORTH CHARLESTON, SOUTH CAROLINA

COMPREHENSIVE LONG-TERM ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT

Submitted to:
Southern Division
Naval Facilities Engineering Command
2155 Eagle Drive
North Charleston, South Carolina 29406

Submitted by:
Tetra Tech NUS
661 Andersen Drive
Foster Plaza 7
Pittsburgh, Pennsylvania 15220

CONTRACT NUMBER N62467-94-D-0888
CONTRACT TASK ORDER 0097

FEBRUARY 2000

PREPARED UNDER THE SUPERVISION OF:

PAUL CALLIGAN, P.G.
TASK ORDER MANAGER
TETRA TECH NUS, INC.
TALLAHASSEE, FLORIDA

APPROVED FOR SUBMITTAL BY:

DEBBIE WROBLEWSKI
PROGRAM MANAGER
TETRA TECH NUS, INC.
PITTSBURGH, PENNSYLVANIA

CERTIFICATION PAGE

I certify 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.

Approved By:

Mark W. Darrington, P.G., C.W.D.
S.C. Professional Geologist License No. 995
S.C. Certified Well Driller License No. 1324
S.C. UST Contractor Certification No. 25

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APPENDICES

A WELL CONSTRUCTION AND SOIL BORING LOGS
B LABORATORY DATA
C TOPOGRAPHIC MAP WITH SITE LOCATION
D SITE BASE MAP

EXECUTIVE SUMMARY

Tetra Tech NUS, Inc. (TtNUS) has completed a Rapid Assessment (RA) for Site 24 which formerly contained an underground storage tank (UST) system for Building NS1346 at Charleston Naval Complex (CNC) Zone F, in North Charleston, South Carolina. The UST (UST-NS1346), a 560-gallon tank, was used to store waste oil as part of the automobile service station and mini-market formerly located at this site. The RA was performed under the direction of the South Carolina Department of Health and Environmental Control's (SCDHEC's) Rapid Assessment Plan and approval letter dated November 4, 1998. After determining all laboratory analytical results were below the SCDHEC risk-based screening levels (RBSLs), the reporting format was reduced from a Rapid Assessment Report (RAR) to an Initial Ground-Water Assessment (IGWA) Report. The IGWA reporting format is also being used to provide SCDHEC the assessment data in a more simplified format.

TtNUS performed the following actions during this assessment:

- Reviewed available Navy documents to identify potential sources and receptors for petroleum hydrocarbons in the vicinity, to evaluate public and private potable wells, to locate utilities line areas, to locate nearby surface water bodies, and to determine surface hydrology and drainage;
- Reviewed the previously prepared Underground Storage Tank Assessment Report for UST NS1346 to determine boring locations and monitoring well placements;
- Conducted site survey to identify utilities and to construct a site plan;
- Performed direct push technology investigation; collected soil and groundwater samples for field screening of petroleum hydrocarbon constituents using an organic vapor analyzer (OVA);
- Collected groundwater samples from direct push borings for mobile lab screening analysis for benzene, toluene, ethylbenzene, total xylenes (BTEX), naphthalene, and diesel range organics (DRO);
- Installed three temporary piezometers at selected soil borings;
- Installed four shallow permanent monitoring wells to depths of approximately 12.5 feet below land surface (bls) and one deep, vertical delineation monitoring well to a depth of approximately 30 feet bls;
- Collected groundwater samples from the five newly installed permanent monitoring wells for fixed-base laboratory analysis for BTEX, methyl tert-butyl ether (MTBE), ethylene dibromide (EDB), and naphthalene using U.S. Environmental Protection Agency (USEPA) Method 8260, polynuclear aromatic hydrocarbons (PAHs) using USEPA Method 8270, eight heavy metals using USEPA Method 3050B and 7470A ;

- Collected six soil samples for fixed-base laboratory analysis for BTEX and naphthalene using USEPA Method 8260, PAHs using USEPA Method 8270,
- Collected one soil sample for fixed-base laboratory analysis for total organic carbon (TOC) using USEPA Method 9060, total recoverable petroleum hydrocarbon (TRPH) using USEPA Method 9071A, and grain size analysis using American Society of Testing and Materials (ASTM) Method D-422; and
- Surveyed monitoring well and piezometer top of casing elevations and collected depth to groundwater measurements to evaluate the groundwater flow direction.

Conclusion

On September 8, 1999, depth to groundwater measurements were obtained from each permanent monitoring well. Based on the groundwater elevation data, the localized groundwater flow direction at the site is towards the west-northwest. No free product was detected in any temporary or permanent monitoring well at the site.

On August 13, 16 and September 8, 1999, groundwater samples were collected from five monitoring wells. Barium was detected above the RBSL for metals in four of the five wells sampled. Since the elevated levels of barium are not associated with any metals it is not believed to be associated with past petroleum products or waste oil storage at this site.

On August 19 and 23, 1999, soil samples were collected from confirmation soil borings and analyzed for BTEX and PAHs by a fixed-base laboratory. Toluene was the only CoC detected in the soil sampled.

Other than barium, no soil or groundwater RBSLs were exceeded based on laboratory analysis of samples collected during the RA field effort. Because it is believed that barium is an isolated contaminant and no RBSLs were exceeded, a site conceptual model or a Tier 2 evaluation was not required, thereby greatly reducing the reporting requirements. As a result, the IGWA report was chosen as the method for reporting the findings of the RA field effort. This report format allows the necessary presentation of assessment data for a site with no CoC concentrations in soil and groundwater exceeding the RBSLs.

Recommendation

No further action (NFA) is requested for Site 24, Building NS1346, of Zone F, CNC because no CoCs were detected in the soil and only barium was detected in groundwater samples analyzed by a fixed-base laboratory. The results of the Rapid Assessment are reported in the following IGWA report.

INITIAL GROUND-WATER ASSESSMENT REPORT

Facility Name: Charleston Naval Base, Zone F, Site 24, UST NS1346, Building NS1346

Site ID Number: 01782

UST Owner or Operator's Name: U.S. Navy Southern Division (SouthDiv) Naval Facilities Engineering Command (NAVFAC)

Address: 2155 Eagle Drive, North Charleston, South Carolina 29406

Phone Number: 843-820-7307

Contractor: Tetra Tech NUS, Inc., Mark W. Darrington, P.G. Cert. # 25

Address: 900 Trail Ridge Road, Aiken, South Carolina 29803

Phone Number: (803) 649-7963

Well Driller: Rod Fuller, Custom Drilling - Hollow Stem Auger. Cert. # 1240
R. Brand and B. Lewis, Columbia Technologies - Direct Push. Cert. # 1485

Receptor and Site Data
Please place a check in the appropriate answer block for each question:

Receptor Survey Questions	No	Yes*
Is there a drinking water supply well (public or private) or surface water supply intake within 1,000 feet of the UST?	X	
Are irrigation or other non-drinking water wells located within 1,000 feet of the UST?		X
Are there other potential receptors (i.e., utilities, surface waters, wetlands) less than 500 feet from the UST?		X

* If "yes" provide additional information:

There are groundwater monitoring wells at additional sites within 1,000 feet of the former UST location

Initial Ground-Water Assessment Report SCDHEC Site ID # 01782

Underground utilities within 250 feet of the site can be seen on the Site Vicinity Map provided in Appendix D. Water, electricity, natural gas, storm drain, and sanitary sewer lines are the utilities adjacent to the site. The compressed air and steam lines are aboveground. Utility lines are located on all sides of the site. The Cooper River is approximately 1,750 feet northeast from the site.

Were any water wells within 250 feet radius sampled? _____ Yes __X__ No

Is the current use of the site and surrounding properties commercial, residential, Agricultural, or industrial?

Site: Commercial & Industrial Adjacent Properties: Commercial & Industrial

Soil and Monitoring Well Data

Primary Soil Type: Sand with gravel, medium sand, silty sand, sandy clay, clayey sand

Well Installation Method and Date: Hollow-stem auger (HSA); August 6-7, 1999
HSA and mud-rotary; August 9 &10, 1999

Development Method: Surge and pump

Soil Samples Obtained at 1-2, 2-3, 3-4, 4-5 feet (for fixed lab analysis)

NOTE: ***Six soil samples were collected from five soil borings. A duplicate sample was collected from one of the borings. Two samples from separate borings were collected from the same depth interval (1-2 ft.). The laboratory report for the borings is provided in Appendix B.***

SOIL ANALYTICAL DATA

Sample	Benzene (µg/kg)	Toluene (µg/kg)	Ethyl-benzene (µg/kg)	Xylenes (total) (µg/kg)	Naphthalene (µg/kg)
CNC24-B02/ 24SLB020203	<8	<8	<8	<8	<8
CNC24-B04/ 24SLB040304	<5	<5	<5	<5	<5
CNC24-B04/ 24SLB040304D*	<5	3 (J)	<5	<5	<5
CNC24-B07/ 24SLB070405	<6	<6	<6	<6	<6
CNC24-B11/ 24SLB120102	<7	3 (J)	<7	<7	<7
CNC24-B12/ 24SLB120102	<5	4 (J)	<5	<5	<5

Sample	Benzo(a)-anthracene (µg/kg)	Benzo(b)-fluoranthene (µg/kg)	Benzo(k)-fluoranthene (µg/kg)	Chrysene (µg/kg)	Dibenzo(a,h-anthracene (µg/kg)
CNC24-B02/ 24SLB020203	<500	<500	<500	<500	<500
CNC24-B04/ 24SLB040304	<400	<400	<400	<400	<400
CNC24-B04/ 24SLB040304D*	<400	<400	<400	<400	<400
CNC24-B07/ 24SLB070405	<430	<430	<430	<430	<430
CNC24-B11/ 24SLB120102	<500	<500	<500	<500	<500
CNC24-B12/ 24SLB120102	<430	<430	<430	<430	<430

NOTES
* Duplicate sample
(J) = Estimated value (analyte detected at a concentration less than the reporting limit but greater than the detection limit).

Ground-Water Data

Depth to Ground Water: 3.91 feet to 4.88 feet below land surface

Well Purging/Sampling Method: Peristaltic pump/low flow purge and sample method

Date Sampled: August 13, 1999 and September 8, 1999

Initial Ground-Water Assessment Report SCDHEC Site ID # 01782

Free Product Thickness: None

Soil/Water Disposal Method: All soil cuttings and purge water were containerized, labeled, and moved to a staging area for final disposal by Charleston Naval Complex.

GROUND-WATER ANALYTICAL DATA

Sample	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Xylenes (total) (µg/L)	Naphthalene (µg/L)
CNC24M-01/ 24GLM0101	<5	<5	<5	<5	<5
CNC24M-02/ 24GLM0201	<5	<5	<5	<5	<5
CNC24M-03/ 24GLM0301	<5	<5	<5	<5	<5
CNC24M-03/ 24GLM0301D*	<5	<5	<5	<5	<5
CNC24M-04/ 20GLM0101	<5	<5	<5	<5	<5
CNC24M-05/ 20GLM0101	<5	<5	<5	<5	<5
CNC24TL/ 20GLM0101	<5	<5	<5	<5	<5

Sample	Benzo(a)-anthracene (µg/L)	Benzo(b)-fluoranthene (µg/L)	Benzo(k)-fluoranthene (µg/L)	Chrysene (µg/L)	Dibenzo(a,h)-anthracene (µg/L)
CNC24M-01/ 24GLM0101	<10	<10	<10	<10	<10
CNC24M-02/ 24GLM0201	<10	<10	<10	<10	<10
CNC24M-03/ 24GLM0301	<10	<10	<10	<10	<10
CNC24M-03/ 24GLM0301D*	<10	<10	<10	<10	<10
CNC24M-04/ 20GLM0101	<10	<10	<10	<10	<10
CNC24M-05/ 20GLM0101	<10	<10	<10	<10	<10
CNC24TL**/ 20GLM0101	NA	NA	NA	NA	NA

NOTES
* Duplicate sample
** Trip Blank
NA = Not Analyzed

GROUND-WATER ANALYTICAL DATA (continued)

Sample	Arsenic (µg/L)	Barium (µg/L)	Cadmium (µg/L)	Total Chromium (µg/L)	Mercury (µg/L)
CNC24M-01/ 24GLM0101	<2.07	<4.1	<1.94	<4.31	<0.02
CNC24M-02/ 24GLM0201	<2.07	31.4	<1.94	<4.31	<0.04
CNC24M-03/ 24GLM0301	<2.07	17.8	<1.94	<4.31	<0.02
CNC24M-04/ 20GLM0101	<2.07	9.8	<1.94	<4.31	<0.02
CNC24M-05/ 20GLM0101	<7.1	71.8	<0.26	<1.6	<0.02

Sample	Selenium (µg/L)	Silver (µg/L)	Lead (µg/L)	EDB (µg/L)	MTBE (µg/L)
CNC24M-01/ 24GLM0101	<3.0	<2.54	<1.09	<5	<5
CNC24M-02/ 24GLM0201	<2.57	<2.54	<1.09	<5	<5
CNC24M-03/ 24GLM0301	<2.57	<2.54	<1.6	<5	<5
CNC24M-04/ 20GLM0101	<2.57	<2.54	<1.7	<5	<5
CNC24M-05/ 20GLM0101	<2.57	<2.5	<1.09	<5	<5

NOTES
* Duplicate sample
** Trip Blank
NA = Not Analyzed
EDB =Ethylene dibromide or 1,2-dibromoethane
MTBE = Methyl tertiary butyl ether

Appendices

The appendices required for this report are as follows:

Appendix A. Well Construction and Soil Boring Logs

Appendix B. Laboratory Data

Appendix C. Topographic Map With Site Location

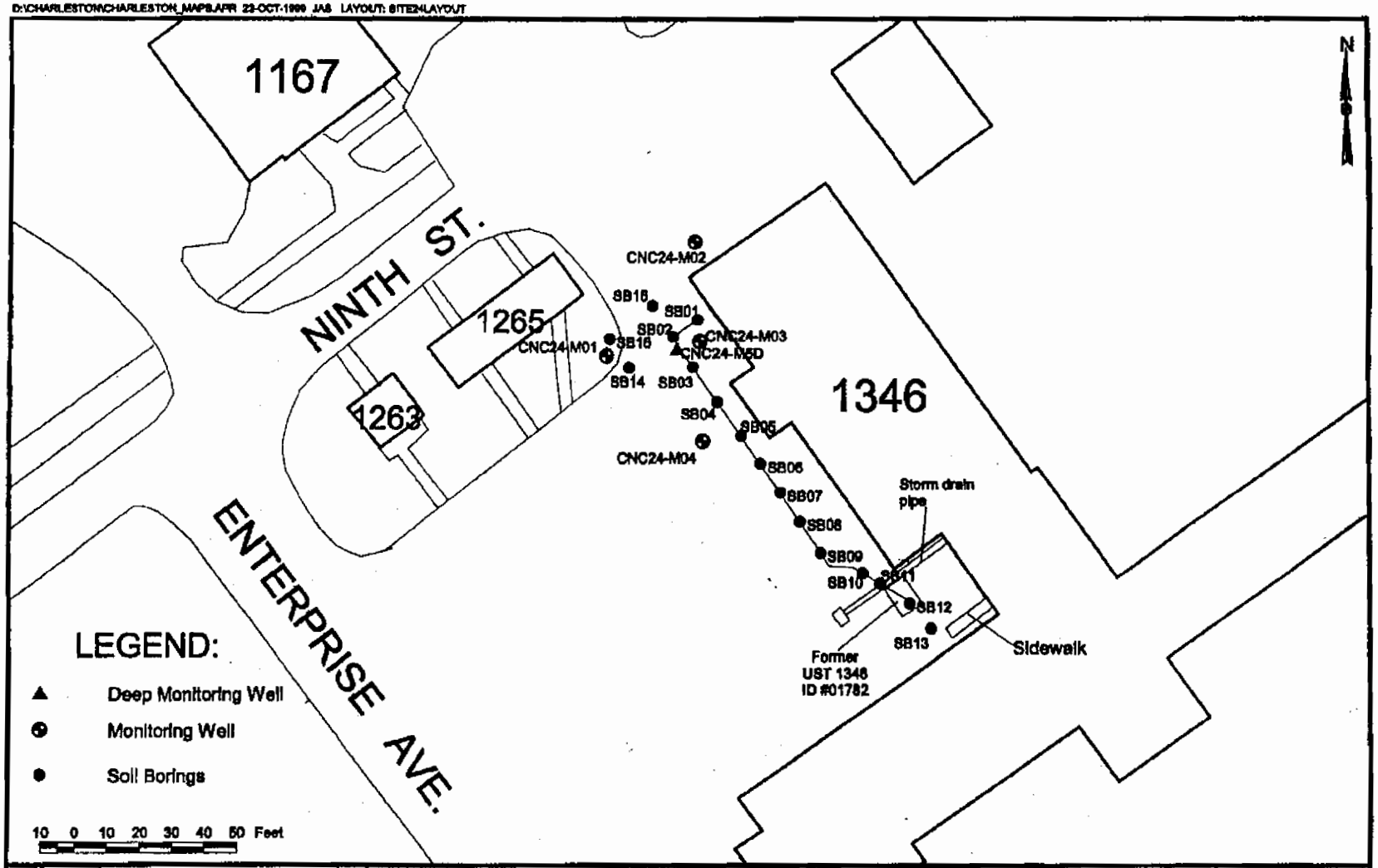
Appendix D. Site Base Map

NOTE: ***Because they are not needed, Appendices E, F, and G are not included.***

Report Completed By: _____ (signature) Cert. # 25

Date: 11/1/99

D:\CHARLESTON\CHARLESTON_MAPS.APR 22-OCT-1999 JAS LAYOUT: SITE24LAYOUT



NO.	DATE	REVISIONS	BY	DWKD	APV'D	REFERENCES

DRAWN BY JAS DATE 14/22/1999
CHECKED BY DATE
CONTRACTED AREA
SCALE AS NOTED

SITE VICINTY MAP
SITE 24, BUILD 1346
ZONE F, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

CONTRACT NO. 0410
APPROVED BY DATE
APPROVED BY DATE
DRAWING NO. REV. 0

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29 February 2000

Department of the Navy
Southern Division NFEC
P.O. Box 190010
North Charleston, SC 29419-9010
Attention: Mr. Gabriel Magwood

Re: Final Assessment Report dated 25 January 2000
Zone F/Site 25-Building 1346 (Site Identification # 14067)
Charleston Naval Complex/Charleston Naval Base
Charleston, SC
Charleston County

Dear Mr. Magwood:

The author has completed technical review of the referenced document. As submitted, the report provides a narrative and summary of previous assessment activities and analytical results from additional sampling conducted to establish the environmental fate of suspected contamination at the subject property. Analytical results provided indicate that concentrations of PAH and VOC compound(s) were reported in soil and groundwater samples obtained at the subject site. The reported concentrations exceed the RBSL (Risk-Based Screening Levels, SCDHEC *Risk-Based Corrective Action for Petroleum Releases*, 5 January 1998), proposed RBC (Risk-Based Concentrations for Residential Soils, EPA Region III Risk-Based Concentrations Table, 12 April 1999) and established groundwater MCLs (maximum contaminant levels) and/or established health advisories. Available analytical data and applied interpretations appear to indicate that a reasonable delineation and characterization of the extent and severity of soil and groundwater contamination have been developed for the Building 1346 site. This information and data were then utilized to develop SSTL (site specific target levels) for CoC (contaminants of concern) in evidential discussion(s) for consideration of employing active remediation (groundwater) at the subject site.

With consideration to the above, the author concurs with the proposal for corrective actions at the referenced site. The facility should develop an appropriate CAP (corrective action plan), including proposed sampling and reporting schedule. A schedule for development of the requested CAP should be submitted to my attention by 31 March 2000. Should you have any questions please contact me at (803) 898-3559.

Sincerely,

Paul H. Bristol, Hydrogeologist
Groundwater Quality Section
Bureau of Water

cc: Trident District EQC

Rapid Assessment Report for Site 25, Building 1346

Zone F
Charleston Naval Complex
North Charleston, South Carolina

Southern Division
Naval Facilities Engineering Command

Contract Number N62467-94-D-0888
Contract Task Order 0097

November 1999

Rapid Assessment Report for Site 25, Building 1346

Zone F
Charleston Naval Complex
North Charleston, South Carolina

Southern Division
Naval Facilities Engineering Command

Contract Number N62467-94-D-0888
Contract Task Order 0097

November 1999

RAPID ASSESSMENT REPORT

AT

SITE 25, BUILDING 1346
ZONE F, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT

Submitted to:
Southern Division
Naval Facilities Engineering Command
2155 Eagle Drive
North Charleston, South Carolina 29406

Submitted by:
Tetra Tech NUS
661 Andersen Drive
Foster Plaza 7
Pittsburgh, Pennsylvania 15220

CONTRACT NUMBER N62467-94-D-0888
CONTRACT TASK ORDER 0097

NOVEMBER 1999

PREPARED UNDER THE SUPERVISION OF:

PAUL CALLIGAN, P.G.
TASK ORDER MANAGER
TETRA TECH NUS
TALLAHASSEE, FLORIDA

APPROVED FOR SUBMITTAL BY:

DEBBIE WROBLEWSKI
PROGRAM MANAGER
TETRA TECH NUS
PITTSBURGH, PENNSYLVANIA

CERTIFICATION PAGE

I certify 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.

Approved By: _____

Gregory D. Swanson, P.E.
South Carolina Registration No. 17132
SCDHEC UST Site Rehabilitation Contractor Class I & II No. 24

ACRONYMS

AFVR	Aggressive Fluid - Vapor Recovery
bls	below land surface
BTEX	benzene, toluene, ethylbenzene and xylenes
BRAC	Defense Base Realignment and Closure Act
CAP	Corrective Action Plan
CNC	Charleston Naval Complex
CoC	Chemical of Concern
CSAP	Comprehensive Sampling and Analysis Plan
DOT	Department of Transportation
EISOPQAM	Environmental Investigations Standard Operating Procedures and Quality Assurance Manual
EPA	Environmental Protection Agency
ft bls	feet below land surface
mg/kg	microgram per kilogram
mg/L	microgram per liter
OVA	Organic Vapor Analyzer
PAHs	Polyaromatic Hydrocarbons
PCB	Polychlorinated Biphenyls
PVC	polyvinyl chloride
QA	Quality Assurance
QC	Quality Control
RA	Rapid Assessment
RAR	Rapid Assessment Report
RBSL	Risk-Based Screening Level
RCRA	Resource Conservation Recovery Act
SCDHEC	South Carolina Department of Health and Environmental Control
SOUTHDIV	Southern Division Naval Facilities Engineering Command
SSTL	Site-Specific Target Level
SWMU	Solid Waste Management Unit
TTNUS	Tetra Tech NUS
UST	Underground Storage Tank

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A GEOLOGIC BORING LOGS
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B ANALYTICAL LABORATORY DATA
SOIL AND GROUNDWATER
C AQUIFER CHARACTERIZATION DATA
D RBCA CALCULATIONS

EXECUTIVE SUMMARY

Tetra Tech NUS, Inc. (TtNUS) has completed additional assessment activities requested by the South Carolina Department of Health and Environmental Control (SCDHEC) for Site 25 (Site Identification Number 01782) of Zone F, at the former Charleston Naval Complex (CNC), located in North Charleston, South Carolina. The site includes eight abandoned underground storage tanks (UST) located at Building 1346. The USTs provided retail gasoline to vehicles on-base since the mid-1960s and were abandoned in place from 1976 to 1991. Three new fiberglass tanks, installed in 1991, are currently being used at the site. The assessment was performed under the direction of SCDHEC Rapid Assessment (RA) guidance dated June 20, 1997, and Rapid Assessment Plan approval letter dated May 5, 1998.

In addition, SCDHEC reviewed the *Report of Findings, Vacuum Truck Extraction, Interim Corrective Action Pilot Test*, prepared by S&ME, Inc., dated May 21, 1998, and recommended "additional assessment activities to evaluate intrinsic remediation as the corrective action alternative for this site."

TtNUS has completed the additional assessment activities and has used the RA reporting format to describe the results. In addition, a Tier 1 and Tier 2 Evaluation was performed for the chemicals of concern (CoC) in soil and groundwater detected at the site in excess of the Risk-Based Screening Levels (RBSL). The risk evaluations followed the guidance set forth in the *SCDHEC Risk-Based Corrective Action (RBCA) for Petroleum Releases*, dated January 5, 1998.

TtNUS performed the following actions during the assessment:

- Reviewed *Zone F, RCRA Facility Investigation Report, Charleston Naval Complex*, (E&A/H, 1996) to identify potential sources and receptors for petroleum hydrocarbons in the vicinity, to evaluate public and private potable wells, to locate utility line areas, to locate nearby surface water bodies, and to determine surface hydrology and drainage.
- Reviewed previously prepared reports by Westinghouse Environmental and Geotechnical Services, Inc., and S&ME, Inc., on site activities dating from August 1991 to May 1998.
- Conducted site survey to identify utilities and to construct a site plan.
- Installed 28 soil borings to depths ranging from 4 to 12 feet below land surface (bls) using direct push technology (DPT).
- Collected soil samples for field screening using an organic vapor analyzer.

- Installed five temporary piezometers.
- Collected soil and groundwater samples from DPT borings for on-site mobile laboratory screening analysis for benzene, toluene, ethylbenzene, and total xylenes (BTEX); naphthalene; and diesel range organics.
- Collected and analyzed nine confirmation soil samples at a fixed-base analytical laboratory for BTEX and naphthalene using U.S. Environmental Protection Agency (USEPA) Method 8260, and polynuclear aromatic hydrocarbons (PAHs) using USEPA Method 8270.
- Collected and analyzed one soil sample from one soil boring for total organic carbon using USEPA Method 415.1 and total recoverable petroleum hydrocarbons using USEPA Method 9071.
- Collected and analyzed two soil samples from one soil boring for grain size analysis using sieve and hydrometer methods.
- Collected groundwater samples from nine existing permanent monitoring wells for laboratory analysis at a fixed-base analytical laboratory.
- Collected groundwater samples from three wells for natural attenuation parameters.
- Analyzed groundwater samples for BTEX, methyl tert-butyl ether (MTBE) and naphthalene using USEPA Method 8260; PAHs using USEPA Method 8270; and lead using USEPA Method 3030.
- Collected depth to groundwater measurements to evaluate the groundwater flow direction.

Conclusions

Nine soil samples were collected on July 7, 1999, and were analyzed for BTEX and PAHs by a fixed-base laboratory. Benzene concentrations exceeded RBSLs for sandy soils where groundwater depths are less than 5 feet below ground surface in all site borings except one; concentrations ranged from 6 parts per billion (ppb) to 120,000 ppb. Total naphthalene concentrations were detected above RBSL in four boring locations; concentrations ranged from 18, 000 ppb to 217, 900 ppb.

One groundwater sampling event was conducted in September 1999. Nine existing monitoring wells were sampled. BTEX, naphthalene, and MTBE constituents were detected above RBSLs in one monitoring well (CNC25-M05). In addition, the concentration of MTBE exceeded the RBSL at wells CNC25-M06 and 609004.

Tier 1 Evaluation

A site conceptual model identified one possible receptor with five pathways present for Site 25:

1. A construction worker in a utility trench ingesting subsurface soil and/or having dermal contact with impacted subsurface soil.
2. A construction worker in a utility trench who might ingest, have dermal contact with contaminated groundwater, and/or inhale petroleum hydrocarbon vapors emitted from groundwater.

Tier 2 Evaluation

The maximum soil concentrations of all CoCs were compared against the RBSL values for the construction worker exposed by dermal contact or incidental ingestion. Soil concentrations do not exceed the RBSLs for any of the CoCs; therefore, the construction worker ingesting or contacting impacted soil was not considered further.

The soil leachability model was used to calculate site-specific target levels (SSTLs) for the establishment of soil cleanup criteria. Benzene and naphthalene concentrations in the onsite, subsurface soil exceeded the calculated SSTLs for a construction worker in a utility trench.

Groundwater RBSLs were calculated for the additional pathways of dermal contact, incidental ingestion, and inhalation of volatiles by a construction worker in contact with shallow groundwater. The minimum RBSL for each CoC (regardless of the pathway) was used to compare to site groundwater data. Concentrations of benzene, toluene, and MTBE from MW-05 exceeded the selected minimum RBSLs. Therefore, remedial action is required at the site to protect the construction worker in the utility trench.

Recommendations for Further Action

Corrective action is required at Site 25. The representative concentrations of CoCs in groundwater are above the selected minimum RBSLs calculated for a construction worker. In addition, the SSTLs for soil leaching to groundwater are exceeded. Therefore corrective action is necessary. The goal of corrective action is to prevent an impact to the identified potential receptor (the construction worker in an onsite utility trench).

1.0 INTRODUCTION

Site 25 is located adjacent to Building 1346 at the intersection of Enterprise Avenue and Borie Street on the former Charleston Naval Complex (CNC), Zone F in North Charleston, South Carolina. The site functioned as a gasoline station since the mid-1960s providing gasoline for private and government vehicles. Initial evidence that a release occurred at the site was discovered in 1991 during the closure of an underground storage tank (UST) system on-site.

This Rapid Assessment (RA) was performed by Tetra Tech NUS, Inc. (TtNUS) located at 1401 Oven Park Drive, Suite 102, Tallahassee, Florida, 32308 (telephone number 850-385-9899). The assessment was performed on behalf of the U.S. Navy Southern Division (SOUTHDIV) Naval Facilities Engineering Command (NAVFAC), 2155 Eagle Drive, North Charleston, South Carolina 29406 (telephone number 843-820-7307). Authorization to conduct the assessment for the site was issued by NAVFAC under Contract Task Order (CTO) 0097. The assessment was performed under the direction of the South Carolina Department of Health and Environmental Control (SCDHEC) Rapid Assessment Plan approval letter dated May 5, 1998. Fieldwork necessary to complete the assessment was performed June 5, 1999, through September 21, 1999, by TtNUS.

1.1 SITE DESCRIPTION

The CNC is in the city of North Charleston, on the western bank of the Cooper River in Charleston County, South Carolina (Figure 1). The installation consists of two major areas: an undeveloped dredge materials area on the eastern bank of the Cooper River on Daniel Island in Berkley County and a developed area on the western bank of the Cooper River. The developed portion of the base is on a peninsula bounded to the west by the Ashley River and to the east by the Cooper River. The site is located within the developed portion of the base.

The area surrounding CNC is "mature urban," having been developed with commercial, industrial, and residential land use for many years. Commercial areas are primarily west of CNC; industrial areas are primarily to the north of the base along Shipyard Creek. A site vicinity map, which exhibits adjacent properties and structures, vicinity roads, current utilities, and vicinity surface drainage, is included as Figure 2. The subject site was a former naval exchange retail gasoline facility that had eight USTs buried onsite and later abandoned in place.

Presently the site contains eight abandoned in place USTs, three active USTs, one structure (Building 1346), and a canopy covering the current and former dispensing locations (Figure 3). Recreational baseball and football fields are located immediately adjacent to the site on the northeast, east, and south sides, a school (unknown building number) is located to the southwest (approximately 300 feet away from the tank area), and buildings to the northwest. A second school is located approximately 600 feet to the northeast (Building 199).

According to the Initial Site Characterization prepared in 1991 by Westinghouse Environmental Services, the first USTs installed consisted of four 4,000-gallon steel USTs with steel piping located within the same tank basin and one 10,000-gallon steel UST located separately. The tanks, all used for gasoline, were listed as 1346-D, -E, -F, -G, and -H. The tanks were abandoned in place around 1978.

The site was retrofitted with three 10,000-gallon steel tanks (1346-A, -B, and -C), during the period 1977 to 1981. These tanks were taken out of operation in February 1991 following a failed tank tightness test. As a result, three new 10,000-gallon fiberglass tanks with single-walled fiberglass piping were installed in 1991 (Tanks 1346-I, -J, and -K). These tanks are currently being used by SEG Fleet Maintenance, a trucking company. The USTs at the site contained various grades of unleaded gasoline, regular unleaded, unleaded plus, and super unleaded. The site is currently active. The following table summarizes the USTs at Site 25.

UST I.D.	Installed Date	Taken Out of Service Date	Type	Size (gallons)	Contents
1346-D	1960s	~1978	Steel	4,000	Gasoline
1346-E	1960s	~1978	Steel	4,000	Gasoline
1346-F	1960s	~1978	Steel	4,000	Gasoline
1346-G	1960s	~1978	Steel	4,000	Gasoline
1346-H	1960s	~1978	Steel	10,000	Gasoline
1346-A	1970s	1991	Steel	10,000	Gasoline
1346-B	1970s	1991	Steel	10,000	Gasoline
1346-C	1970s	1991	Steel	10,000	Gasoline
1346-I	1991	Active	Fiberglass	10,000	Gasoline
1346-J	1991	Active	Fiberglass	10,000	Gasoline
1346-K	1991	Active	Fiberglass	10,000	Gasoline

1.2 SITE HISTORY

In 1901, the U.S. Navy acquired 2,250 acres near Charleston to build a shipyard and the first naval officer was assigned duty in early 1902. Subsequently, buildings and a dry dock were constructed in the Naval Yard. The dry dock was completed in 1909 along with several other brick buildings and the main power plant, which is still in operation today. The first ship was placed in dry dock and work began on fleet vessels in 1910. World War I brought about an expansion of the yards, facilities, land area, and work force. The yard built two gunboats, several submarine chasers, and tugs in addition to performing repairs and other services to the fleet. In 1933, building activity had increased principally in construction of several Coast Guard tugs, a Coast Guard cutter, and a Navy gunboat, creating the need for more facilities and a much larger work force. In 1943 civilian work force peaked with almost 26,000 employees divided among three daily shifts. In 1956, construction began on piers, barracks, and buildings for mine warfare ships and personnel. Later in the decade, the facility became a major home port for combat ships and submarines of the U.S. Atlantic Fleet [EnSafe/Allan & Hoshall, Inc.(E/A&H), 1996].

In 1993, major cuts in defense spending, as a result in part to the end of the Cold War, caused CNC to be added to the list of bases scheduled for closure under the Defense Base Realignment and Closure Act (BRAC). BRAC regulates the closure and transition of property back to the community (E/A&H, 1996). With the scheduled closure of the base, operations were scaled back and environmental cleanup proceeded to make the property available for redevelopment after closure.

1.3 RECEPTOR SURVEY RESULTS

A survey of the site vicinity was conducted by TtNUS personnel to identify potential receptors for petroleum hydrocarbon contamination. The site plan (Figure 2) depicts all known utilities located within 250 feet of the Building 1346 location. According to facility personnel, utility lines are typically located 2 to 6 feet below land surface (bls) (SPORTENVDETCHASN, 1999). The following utility receptors were located within a 250-foot radius of Building 1346.

- A water line is located at the northeast boundary of the site along South Avenue B and along the southeast side along Borie Street. The water line located between the canopy and Borie Street is approximately 50 feet southeast of the canopy and divides the area where UST basins are located. In addition, the line transects the free product interception trench located on-site near the corner of Borie Street and Enterprise Avenue.

- An 8-inch sanitary sewer line enters Building 1346 on the southwest side and extends southwesterly toward Enterprise Avenue. A sanitary sewer manhole is located approximately 30 feet south of the building. Four sanitary sewer manholes are located on Enterprise Avenue to the southwest.
- Three storm drainage catch basins are located on the north side of Building 1346. The storm drainage line originates near the canopy and extends northward toward a storm drain manhole located approximately 225 feet to the north at the corner of 9th Street and South Avenue B. Another storm drain manhole is located approximately 20 feet from the northwest corner of the canopy. A second storm utility line originates at a storm catch basin and storm manhole located approximately 20 feet from the south side of Building 1346 traversing the site northwesterly toward a storm manhole and catch basin along 9th Street.

Utilities on-site, and adjacent to the site within a 250-foot radius, that could serve as exposure points or as preferential pathways are shown in the following summary table.

Utility	On-site or Distance/Direction from site	Depth to Utility
Water Supply	On-site; ~20 feet	2 to 6 feet bls
Sanitary Sewer	On-site; ~100 feet west	2 to 6 feet bls
Storm Drainage	On-site; ~150 feet north	2 to 6 feet bls
Natural Gas	~300 feet to the northwest	2 to 6 feet bls

Potential receptors and preferential pathways within a 1000-foot radius of the site are summarized in the following table.

Description of Potential Receptor	Distance/Direction from Site
Construction workers in water supply utility trench.	~20 feet northwest of MW-05 and MW-06.
Commercial workers.	On-site. No complete pathways.
Trespassers.	Not applicable. Area is fenced.
Recreational visitors and/or residents.	Not applicable. Current and future site use is commercial.
Students/teachers/visitors at active school (located at Ave. D South & Borie St.).	~225 feet south/southwest of MW-06 (downgradient). No complete pathways.
Recreational visitors to football and baseball fields (east of Borie St. and north of South Ave. B).	~75 to 250 feet northeast, east, southeast, and south (upgradient, crossgradient, and downgradient). No complete pathways.

Description of Potential Receptor	Distance/Direction from Site
Students/teachers/visitors at active school (Building 199).	~600 feet northeast of Bldg. 1346 (upgradient). No complete pathways.
Groundwater at inactive industrial cooling water well (pump house Building 716).	~750 feet to the east of UST area (upgradient). No complete pathways.

A survey of groundwater users within a 7-mile radius of CNC was performed for the *Final RCRA Facility Investigation Report for Zone F* (E/A&H, 1996). According to this report, a survey of groundwater users within a 7-mile radius of CNC was conducted by the South Carolina Water Resources Commission to ascertain the extent of any shallow groundwater usage. Results of the water use investigation revealed that no drinking water wells, which utilize the shallow aquifer, are located within a 4-mile radius of CNC.

An industrial well, located approximately 750 feet east of the site and upgradient, supplied water to a compressor house for cooling tower operations. A recent visit to the site by TtNUS (October 1999) revealed an abandoned pump house for the well (Building 716). The industrial well is therefore believed to be inactive. Irrigation wells were not identified within 1,000 feet of the site. Numerous monitoring wells are located within 1,000 feet of the site. The nearest surface water body to Building 1346 is the Cooper River, located approximately 1,700 feet to the northeast.

There are no city, county, or state zoning ordinances as the property (CNC) is currently owned by the federal government. Information concerning zoning ordinances was obtained from the SOUTHDIV Remedial Project Manager located at 2155 Eagle Drive, North Charleston, South Carolina 29406 (telephone number 843-820-7307).

1.4 REGIONAL GEOLOGY AND HYDROGEOLOGY

CNC is located in Charleston County, South Carolina, in the Lower South Carolina Coastal Plain Physiographic Province on the Cooper River side of the Charleston Peninsula. The peninsula is formed by the confluence of the Cooper and Ashley Rivers. Topography in the area is typical of the South Carolina lower coastal plain and is characterized by having low-relief plains broken by the meandering streams and rivers, flowing toward the coast past occasional marine terrace escarpments (E/A&H, 1996).

The geology of the Charleston area is typical of the southern Atlantic Coastal Plain. Cretaceous-age and younger sediments thicken seaward and are underlain by older igneous and metamorphic basement rock. Surface exposures consist of Recent or Pleistocene sands, silts, and clays of high organic content

referred to as the Wando Formation (E/A&H, 1996). Underlying the Wando Formation, increasing with age, are the Oligocene-age Cooper Group and the Eocene-age Santee Limestone. The Cooper Group is comprised of the Parkers Ferry, Ashley, and Harleyville Formations. The formation of particular importance in the Cooper Group is the Ashley Formation, which was formerly referred to as the Cooper Marl in most regional geologic literature. In more recent geologic nomenclature, the name "Cooper" has been given to a group of formations which includes the Ashley Formation, a pale green to olive-brown, sandy phosphoric limestone or marl, which is locally muddy and/or sandy. The Ashley Formation in the vicinity of Charleston is encountered at a depth of approximately 30 to 70 feet bls. The top of the Ashley Formation has been reported to be associated with an erosional basin and the entire Cooper Unit, including the Ashley Formation, is indicated to be approximately 300 feet thick (E/A&H, 1996).

Groundwater occurs under water table or poorly confined conditions within the Recent or Pleistocene deposits overlying the Ashley Formation of the Cooper Group. Transmissivity in the Pleistocene aquifer is generally less than 1,000 feet per day and well yields are variable, ranging from 0 to 200 gallons per minute (gpm). This groundwater contains high concentrations of iron and is commonly acidic at shallow depths (E/A&H, 1996).

The Cooper Group is hydrogeologically significant mainly because of its low permeability. In most locales, its sandy, finely granular limestone produces little or no water, but instead acts as confining material causing artesian conditions in the underlying Santee Limestone. Yields from wells in the Santee are usually less than 300 gpm (E/A&H, 1996).

1.5 SITE GEOLOGY AND HYDROGEOLOGY

The Hydrogeologic Assessment prepared by S&ME, Inc., of Mount Pleasant, South Carolina, February 1993, stated that lagoonal sediments, which include surficial fill material of black to gray-green silty clays characteristic of back barrier island sequences, are present at the site. Soft gray-green clays are generally encountered down to the Cooper Formation. The Cooper Marl was encountered at the site at a depth of 29 feet bls.

Traversing east to west across the site, the surficial soils (upper 8 feet) graded to dense red clays with a slight increase in silt content (when compared to the eastern end of the site). Below 8 feet the dense gray-green clays were again encountered. Groundwater was generally encountered at depths of 4 to 6 feet bls. The groundwater flow direction was determined to be from the east to the west across the site.

The *RCRA Facility Investigation Report* (E/A&H, 1996) described the Zone F geologic unit immediately beneath the surficial lagoonal sediments and artificial fill as the Quaternary sand (Qs) unit. It is typically a very fine to medium-grained silty sand, well to moderately well sorted, with little clay. Coloration varies between gray, orange, and brown. Occasional laminae of brown to black silt, as well as small shell fragments, are often present. Qs deposits exhibit an average distribution of 73 percent sand, 5 percent silt, and 21 percent clay with an average porosity of 38 percent. The Qs sedimentary deposits range from depths of 5 feet to 35 feet in Zone F (E/A&H, 1996).

2.0 ASSESSMENT INFORMATION

2.1 SITE-SPECIFIC GEOLOGY AND HYDROGEOLOGY

2.1.1 Site Geology

Twenty-eight soil borings were advanced at Site 25 under the supervision of a TtNUS geologist between June 5 and August 3, 1999 (Figure 3). Each of the borings was completed using direct push technology (DPT). Each DPT boring was advanced to a depth ranging from 4 to 12 feet bls providing soil samples to characterize the subsurface lithology. The majority of the soil borings terminated at a depth of 8 feet below land surface. In addition, five shallow piezometers were installed between July 27, 1999, and August 2, 1999, to depths of 12 feet below land surface to confirm the site's groundwater flow direction.

Based on lithologic descriptions from the soil borings and monitoring wells, the subsurface soil generally consist of interlayers of orange to red, tan, and gray to olive-green-gray, sandy clay, silty clay and sand near the surface to the borings' terminal depth. Generally, sandy clay was encountered in the soil samples submitted for field screening. These samples were collected from 2 to 7 feet below land surface with the majority of the field screening sample collection being performed at the 3- to 5-foot interval. Boring logs are presented in Appendix A.

2.1.2 Site Hydrogeology

Five temporary, small diameter, polyvinyl chloride (PVC) piezometers, P01, P02, P03, P04, and P05 were installed on the south side of Building 1346. The piezometers were constructed of 1-1/4-inch-diameter Schedule 80 PVC casing and well screen 10 to 15 feet in length. The screen section of the piezometer was installed to bracket the water table. The piezometers were used to confirm the groundwater depth and flow direction at the site.

Six existing permanent monitoring wells installed by S&ME, and two recently installed permanent monitoring wells installed by EnSafe were used to collect groundwater samples (and to re-confirm groundwater flow direction and gradient). The recorded water-level data collected from these wells during the investigation are presented in Table 1. Groundwater elevation measurements were recorded from the site monitoring wells on September 11, 1999. The potentiometric surface map depicts a distinct southwesterly groundwater flow direction away from the Cooper River.

As part of the *Final RCRA Facility Investigation Report for Zone F* (E/A&H, 1996), a tidal survey was conducted in selected shallow wells at low and high tide, respectively. Groundwater flow patterns occur between low and high tide events with little change. Surficial aquifer groundwater flow is highly variable in gradient and direction. A narrow groundwater divide trends east to northeast from the tank farm area in nearby Zone G. Groundwater flow south of this divide is generally in an easterly direction toward the Cooper River. A groundwater depression north of this divide is associated with well SME005. Groundwater movement north of Ninth Street is from the south and west toward the north across Hobson Avenue.

2.2 ASSESSMENT RESULTS

Twenty-eight soil borings were completed as part of the screening portion of the soil investigation at Site 25 between June 5 and August 3, 1999. The borings were completed using DPT, and samples were collected for screening. Screening samples were collected to evaluate subsurface soil and groundwater contaminant concentrations via an onsite mobile laboratory. The soil samples were collected from depths ranging from 2 to 7 feet bls. The soil and groundwater samples collected for mobile laboratory screening were analyzed for benzene, toluene, ethylbenzene, and xylenes (BTEX) and naphthalene and diesel range organics (DRO).

Eight soil borings (SB-09 to SB-17) were completed, and samples were collected for analysis at a fixed-base laboratory to confirm the results of the onsite mobile screening laboratory. The confirmation soil samples were collected at depths ranging from 1 to 4 feet bls on July 7, 1999. The chemicals of concern (CoCs) evaluated and analyzed were BTEX, methyl tert-butyl ether (MTBE), and naphthalene using U.S. Environmental Protection Agency (USEPA) Method 8260; polynuclear aromatic hydrocarbons (PAHs) using USEPA Method 8270; and lead using USEPA Method 3030. Two samples from one soil boring (SB-12 at depths of 2-3 feet and 7-8 feet bls) were collected for grain-size analysis using sieve and hydrometer analysis. A soil sample collected from SB-15 at a depth of 3 to 4 feet bls was analyzed for total organic carbon (TOC) analysis using USEPA Method 415.1 and total recoverable petroleum hydrocarbons (TRPH) using USEPA Method 9071. All sample collection was conducted in accordance with the SCDHEC *South Carolina Risk-Based Corrective Action for Petroleum Releases* dated January 5, 1998. Lithologic logs for each soil boring are presented in Appendix A. The soil boring locations are shown on Figure 3.

Groundwater monitoring well purging and sampling were conducted on September 12, 13, and 21, 1999. Groundwater sampling was conducted using a peristaltic pump and low flow, quiescent techniques. The monitoring wells were sampled in accordance with SCDHEC *South Carolina Risk-Based Corrective*

Action for Petroleum Releases dated January 5, 1998. Each well was purged of three well casing volumes until water quality parameters of pH, temperature, and conductivity stabilized. The field data sheets are included in Appendix A. A summary of the field parameter measurements is presented in Table 2. Groundwater samples were analyzed for BTEX, MTBE, ethylene dibromide (EDB), and naphthalene using USEPA Method 8260 and PAHs using USEPA Method 8270. Three of the groundwater samples were also analyzed for the following natural attenuation parameters: dissolved oxygen, alkalinity, carbon dioxide, sulfide, ferrous iron, nitrite, manganese, nitrogen/nitrate, sulfate and methane. Groundwater natural attenuation data are summarized in Table 3.

2.3 FIELD SCREENING ASSESSMENT

2.3.1 Soil Vapor Assessment

Twenty-eight soil borings were completed to evaluate for soil vapors as part of the soil screening assessment at Site 25. Organic vapor analyzer (OVA) headspace measurements were recorded at 1-foot intervals from ground surface to the top of the water table. Table 4 summarizes all soil borings installed and provides the maximum soil vapor screening results. Figure 3 presents the soil boring locations.

Soil vapor concentrations ranged from non-detectable to 4,900 parts per million (ppm). Vapor concentrations exceeding 1,000 ppm were detected from eight soil boring locations. The highest soil vapor concentration of 4,900 ppm occurred from CNC25-B17 at a sample depth of 3 to 4 feet bls. Most soil vapor detection occurred from soil depths of 2 to 5 feet bls.

The soil vapor assessment was used as a screening method to assist in identifying locations for collection of confirmation soil samples analyzed at a fixed-base laboratory. Soil sample locations were determined, in part, based on these data.

2.3.2 Soil Mobile Laboratory Results

One soil sample collected from each soil boring was analyzed in a mobile laboratory for BTEX and diesel range organics using USEPA Method 8260. The soil samples were selected based upon the soil vapor screening results with the additional criterion that the samples originate in the vadose zone above the water table. Table 5 presents a summary of the analytical soil data from the mobile laboratory.

As indicated in Table 5, BTEX constituents were detected in the mobile laboratory soil screening for borings CNC25-SB-01, -05, -07, -19, -20, -21, and -25. Diesel range organics were detected in two borings, SB-01 and SB-20.

The mobile laboratory soil analysis was used as a screening method to assist in identifying locations for collection of soil samples for fixed-base laboratory analyses and to aid in delineating the extent of contamination in soil. Confirmation soil sample locations were determined, in part, based on these data.

2.3.3 Groundwater Mobile Laboratory Results

A groundwater sample was collected from soil boring locations near the former UST systems around Building 1346. Each groundwater sample was analyzed by a mobile laboratory for BTEX and diesel range organics using USEPA Method 8260. Table 6 presents a summary of the analytical groundwater data from the mobile laboratory.

BTEX constituents were reported in groundwater samples from CNC25-SB-01, -05, -07, -19, -20, -21, -22 and -27. Diesel range organics were detected above the laboratory reporting limits in SB-05, -07, -19, -20, and -21.

The mobile laboratory groundwater analysis was used as a screening method to assist in delineating the extent of groundwater contamination.

2.4 CHEMICALS OF CONCERN IN SOIL AND GROUNDWATER

2.4.1 Chemicals of Concern in Soil

Nine subsurface soil samples were collected from the Site 25 area for determination of CoCs. The soil boring locations are shown on Figure 3. Table 7 summarizes the CoCs detected in the soil samples. BTEX concentrations exceeded the risk-based screening level (RBSL) for sandy soils where groundwater is less than 5 feet bls, in all but one soil sample collected at the site (CNC25-B15). Benzene concentrations ranged from an estimated 6 parts per billion (ppb) to 120,000 ppb.

Total naphthalene concentrations (naphthalene and 2-methylnaphthalene combined) were detected above RBSL in four boring locations. Concentrations ranged from 18,000 ppb to 217,900 ppb in CNC25-B10, -12, -13, and -17. The RBSL for naphthalenes in sandy soils where depth to groundwater is less than 5 feet bls is 210 µg/kg. The RBSL for soil was selected based upon a grain-size analysis completed

on sample CNC25-B12 at depths of 2 to 3 feet and 7 to 8 feet bls. Both samples confirmed the presence of a sandy soil matrix at the site. Soil analytical data sheets and grain size analysis reports are provided in Appendix B.

2.4.2 Chemicals of Concern in Groundwater

The analytical results for CoCs detected in groundwater samples are presented in Table 8. BTEX, naphthalene, and MTBE constituents were detected above RBSL at CNC25-M05 and in the duplicate sample. MTBE concentrations exceeded the RBSL at CNC25-M05, -M06, and 609004.

2.5 ANALYTICAL DATA

Soil analytical data generated during this RA are summarized and compared to the RBSLs in Table 7. Groundwater analytical data generated during this RA are summarized and compared to the RBSLs in Table 8. The soil and groundwater laboratory analytical data for this RA are included in Appendix B.

2.6 AQUIFER CHARACTERISTICS AND EVALUATION

Groundwater levels were measured from the site monitoring wells on September 11, 1999. The groundwater flow direction across the site was determined to be southwesterly toward Enterprise Avenue as illustrated on Figure 6.

As part of the *Final RCRA Facility Investigation Report for Zone F*, rising and falling head slug tests were conducted on several shallow monitoring wells located throughout the Zone F Quaternary sand unit to determine the hydraulic conductivity of the surficial aquifer (E/A&H, 1996). Slug tests were conducted by instantaneously adding (falling head) or removing (rising head) a volume (slug) of water from the well and measuring the recovering water level with a data logger. A hydraulic conductivity value was then calculated for the rising head test and for the falling head test. The average hydraulic conductivity for each well was determined by calculating the geometric mean of the rising and falling head values. Because hydraulic conductivity data are lognormally distributed, the geometric mean was determined to be the most representative measure of central tendency.

The well construction details and boring logs for each well tested during the RCRA investigation were reviewed to determine which wells were most representative of the conditions present at Site 25. To make this determination, the screened interval and proximity to the site were evaluated. Based on this

evaluation, monitoring wells 613004, 620002, 607001, and 613001 were selected as the most representative wells (see Appendix C for slug test data).

Potential movement of groundwater at the site may be described in terms of transportation by natural flow system in the saturated zone, assuming groundwater flow follows Darcy's Law. Using Darcy's Law the average linear groundwater velocity may be expressed as:

$$V = \left(\frac{K}{n}\right) x\, i$$

where:

V = average velocity
K = hydraulic conductivity = 0.7 ft/day
n = volumetric porosity = 0.36
(based on analyses of Qs samples in the *Zone F RFI Report*)
i = most recent hydraulic gradient measurement = 0.0096 ft/ft

therefore:

$$V = \left(\frac{0.7\ \text{ft/day}}{0.36}\right) x\ 0.0096\ \text{ft/ft}$$

$$V = 0.0187\ \text{ft/day}\ \text{ or } 6.8\ \text{ft/year}$$

In summary, the seepage velocity of the surficial aquifer was calculated to be approximately 6.8 feet per year based on a hydraulic conductivity of 0.7 feet per day, a hydraulic gradient of 0.0096 feet per foot, and a porosity of 36 percent for sandy soil.

2.7 FATE AND TRANSPORT MODELING

Soil and groundwater concentrations exceed the RBSL; therefore, evaluation of Site 25 will continue beyond Tier I. Fate and transport modeling is not required because both the source of contamination and the potential receptor are located onsite, however modeling was performed because of the high concentrations onsite.

The Domenico model was the fate and transport model used to determine groundwater site-specific target levels (SSTLs) in the risk analysis. The Domenico dilution/attenuation model is presented in the SCDHEC guidance document, *South Carolina Risk-Based Corrective Action for Petroleum Releases* (SCDHEC 1998). This model is very conservative in that it assumes an infinite mass, areal source

2.8 PREDICTED MIGRATION AND ATTENUATION OF CHEMICALS OF CONCERN

The Domenico model was used to predict the distance at which the leading edge of the plume is attenuated to SCDHEC RBSLs in 10 and 20 years without using degradation due to biological decay. This was done by adjusting the time to 10 years (3.15×10^8 sec) and 20 years (6.31×10^8 sec) and solving for distance (x) by trial and error. The source was assumed to be the impacted area onsite. The distance was changed until the required distance that is necessary for the concentration to attenuate to the RBSLs was determined. Model estimates for 10 and 20 years are provided in the following table:

Domenico Model Time Period	Chemical of Concern	Estimated Distance Traveled (feet)
10 year	Benzene	202
	Toluene	108
	Ethylbenzene	56
	Xylenes	26
	MTBE	287
	Naphthalene	25.5
20 year	Benzene	355
	Toluene	159
	Ethylbenzene	77
	Xylenes	36.5
	MTBE	507
	Naphthalene	34

The Domenico 10-year and 20-year simulation spreadsheets are presented in Appendix D.

condition through which groundwater flows. The model incorporates biological decay effects through a first-order decay process; however, this mechanism was ignored because SCDHEC guidance specifies that the decay rate must be assumed to be zero if site-specific decay rates have not been determined.

The impacted groundwater source area was modeled as 50 feet (15.00 meters) wide and 6.56 feet (2.0 meters) deep; these values are conservative defaults suggested by the American Society for Testing Materials (ASTM) *Standard Guide for Risk-Based Corrective Action Applied at Petroleum Release Sites* (ASTM, 1997). The maximum source concentrations are assumed to exist throughout the source area, further compounding the conservatism of the estimate.

Site-specific data were used for saturated hydraulic conductivity, hydraulic gradient, porosity, and fraction of organic carbon in soil (2.47E-06 m/sec, 0.0096 ft/ft, 0.36 cm^3/cm^3, and 6.16E-4 g-C/g-soil, respectively). The soil bulk density (1.73 g/cm^3) was determined using a porosity of 0.36 and assuming that the specific gravity of the soil particles is 2.7.

However, because free product was previously detected in monitoring well MW05, the theoretical groundwater concentration in equilibrium with unleaded gasoline based on Raoult's Law (see Appendix D) was calculated for each of the potential CoCs. These calculated values were used for the source concentration in predicting the 10- and 20-year plume migration. This analysis showed that the theoretical concentrations of benzene (59.8 mg/L), toluene (96.8 mg/L), ethylbenzene (3.2 mg/L), xylene (24.9 mg/L), MTBE (5289 mg/L), and naphthalene (0.22 mg/L) each exceed the groundwater RBSLs; therefore, these CoCs were modeled. The concentration of naphthalene (i.e., 0.848 mg/L) detected in well MW05 exceeds the theoretical calculated concentration for gasoline (0.22 mg/L) indicating that free product may have contaminated the well at the time it was sampled and that a different petroleum product (e.g., diesel fuel) may have been released during the site's history.

The following estimates of dispersivity were used in the Domenico model as given in SCDHEC (1998):

Parameter	Estimate
Longitudinal Dispersivity, α_x	x/10, where x= distance between the point of exposure and the source or compliance point
Transverse Dispersivity, α_y	$\alpha_x/3$
Vertical Dispersivity, α_z	$\alpha_x/20$

Site 25, BIDG 1346

3.0 RISK EVALUATION

3.1 TIER 1 EVALUATION

Performance of a Site Conceptual Model is required because the RBSLs for soil and groundwater were exceeded. Maximum concentrations of benzene, toluene, ethylbenzene, xylene, and naphthalene exceeded the RBSLs for sandy soil where depths to groundwater are 5 feet bls or less (table 7). Maximum concentrations of benzene, ethylbenzene, toluene, xylene, naphthalene, and MTBE exceeded the RBSLs for groundwater (Table 8). Exceeding the soil RBSL requires identification of current and future potential receptors and human exposure pathways.

3.1.1 Exposure Pathway Analysis

This section presents the receptor characterizations of the potentially exposed populations in the vicinity of the site and identifies the potentially complete exposure pathways for those receptors. SCDHEC requires that only those exposure pathways with CoC concentrations exceeding Tier 1 RBSL concentrations are examined in a Tier 2 risk-based corrective action report. Tables 9 and 10 present the exposure pathway assessments for current and future use scenarios.

3.1.2 On-Site Commercial/ Industrial Worker

An on-site commercial or industrial worker is defined as a business employee who works in a commercial/ industrial capacity at the site. The future use of the property is expected to be industrial or commercial for the foreseeable future; therefore, an on-site worker was considered as a potential receptor. Incidental ingestion and dermal contact with impacted soil are expected to be negligible for commercial/industrial workers because they are located inside a building. Drinking water at this site is provided by the city; therefore, ingestion of groundwater is not a complete exposure pathway. Building foundations are assumed sufficient to prevent volatilization from both soil and groundwater into a commercial building, and there is no history of vapors in the commercial building. It is unlikely that any additional exposure pathways will exist for future on-site workers; therefore, no complete pathways exist for either current or future commercial/ industrial workers.

3.1.3 On-Site Visitor

An on-site visitor is defined as any person other than a worker who might come on site. On-site visitors would have the same exposure pathways as commercial workers, but their exposure duration would be much shorter. This receptor does not have to be quantified because a potential on-site visitor's chemical intake would not determine risk or cleanup levels at the site.

3.1.4 On-Site Construction Worker

An on-site construction worker is defined as a laborer who would be involved in intrusive activities on or around the site, particularly in the area of subsurface utilities. On-site construction workers could be exposed to constituents in soil by the following pathways: inhalation of volatiles from soil, dermal contact with soil, and incidental ingestion of soil. On-site construction workers could be exposed to constituents in groundwater by the following pathways: inhalation of volatiles from groundwater, dermal contact with groundwater, and incidental ingestion of groundwater. A fresh water distribution line runs through the site; therefore, the point of exposure location for the on-site construction worker was considered to be at the source.

3.1.5 On-Site Resident

An on-site resident is defined as any person making his or her home at the site. This site is expected to remain a commercial/industrial facility; therefore, the on-site resident receptor was not considered further.

3.1.6 Off-Site Resident

An off-site resident is defined as any person making his or her home near the site. This receptor's location is either an actual current residence near the site or is a vacant lot or property on which a residence could be built. The site is located in an area that will likely remain commercial/industrial. Therefore, this potential receptor was not considered further.

3.1.7 Surface Water

The Cooper River is located approximately 1,700 feet upgradient and to the northeast of the site. Because of the distance to the river, this exposure pathway was not considered for ingestion of surface water.

Note: All concentrations in mg/kg. Concentrations which exceed RBSL are bolded.
* RBSLs for ingestion or dermal contact with surficial soil (RBCA, Table B6).
(1) A commercial worker has a typically assumed exposure duration of 25 years and an exposure frequency of 250 days/year. A construction worker would be expected to have a much lower exposure duration and exposure frequency based on the nature of utility or construction work. The exposure frequency can be assumed to be 90 days/year and the exposure duration can be assumed to be 1 year. These assumptions are based on the nature of utility work. Therefore, the RBSLs for construction workers are expected to be higher than those for commercial workers.
(2) Naphthalene (Total) combines Naphthalene (8260 value) and 2-Methylnaphthalene (8270 value).

As shown in the above table, maximum soil concentrations of constituents do not exceed the RBSLs for any CoC except dibenzo(a,h) anthracene. The concentrations for dibenzo(a,h) anthracene exceed the Commercial RBSL for ingestion or dermal contact with surficial soil. However, the RBSLs provided in the RBCA Guidance assume that a commercial worker will have an exposure duration for 25 years having an exposure frequency of 250 days per year. A construction worker would be expected to have a much lower exposure duration and exposure frequency based on the nature of utility, construction, or remediation work. The exposure frequency can be assumed to be 90 days/year or less and the exposure duration can be assumed to be 1 year or less. These assumptions are based on the nature of typical utility-type work. Furthermore, the maximum source concentrations of dibenzo(a,h)anthracene detected in soils barely exceed the above RBSLs (probably occurring because the laboratory reporting limit, or practical quantitation limit, slightly exceeds the RBSL). Therefore, dibenzo(a,h)anthracene is not considered a threat to a construction worker in a utility trench. A construction worker ingesting or contacting impacted soil is not considered at-risk and the dermal/ingestion pathway is not considered for further analysis.

3.2.2 Ingestion, Dermal Contact, or Inhalation of Vapors from Groundwater for a Construction Worker in a Utility Trench

An additional completed pathway for construction workers is BTEX, naphthalene, and MTBE in the groundwater possibly exposing the workers to CoCs while working in a utility trench. The construction worker's potential exposure to groundwater containing any of these CoCs was assumed to consist of three pathways: dermal contact, incidental ingestion, and inhalation of volatiles.

3.2.3 Calculation of Groundwater RBSLs Protective of a Construction Worker in a Utility Trench

Groundwater RBSLs provided by SCDHEC are for ingestion only; therefore, RBSLs were calculated for the additional pathways of dermal contact, incidental ingestion, and inhalation of volatiles.

Groundwater RBSLs for the construction worker were calculated for three pathways: dermal contact, incidental ingestion, and inhalation of volatiles. A target cancer risk of 1×10^{-6} and a target hazard quotient of 1 were used in the calculations. Standard defaults were used when available and applicable

to a construction worker. When no standard parameters were available, conservative assumptions were used. Where possible, site-specific parameters were used for site conditions. For all pathways, the exposure frequency was assumed to be 90 days/year and the exposure duration was assumed to be 1 year. These assumptions were considered conservative based on the nature of utility work.

The dermal contact RBSLs were calculated using procedures in *Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual, Supplemental Guidance, Dermal Risk Assessment, Interim Guidance* (USEPA Peer Consultation Workshop Draft, 1998). Based on expected limited contact with groundwater, the event frequency was assumed to be one event/day and the event duration was assumed to be 1 hour/event. The skin surface area available for contact was 4500 cm^2, based on one-fourth the skin surface area given in the risk assessment guidance document for a swimming adult.

The incidental ingestion RBSLs were calculated using the equation given in *Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual (Interim Final)*, EPA/540/1-89/002 (EPA 1989). An incidental ingestion rate of 0.01 L/day was assumed based on a fraction (12.5 percent) of the incidental ingestion rate for a wading adult (0.01 L/hr), considered for an 8-hour work day. The incidental ingestion rate for wading adults is given in *Supplemental Guidance to RAGS: Region 4 Bulletins, Human Health Risk Assessment* (USEPA Region 4, 1995).

The inhalation RBSLs were calculated using equations given in the ASTM *Standard Guide for Risk-Based Corrective Action Applied to Petroleum Release Sites, Designation E 1739-95e1* (1997).

The following table summarizes the calculated RBSLs for the analyzed pathways and shows the minimum RBSL, regardless of the pathway (see calculations in Appendix D).

	Dermal RBSL (mg/L)	Incidental Ingestion RBSL (mg/L)	Inhalation RBSL (mg/L)	Selected Minimum Ground-water RBSL (mg/L)	Maximum Onsite Groundwater Conc. (mg/L)	Greater than the RBSL?
Benzene	0.85	68.52	0.15	0.15	**26**	Yes
Toluene	23.98	5677.78	5.38	5.38	**38**	Yes
Ethylbenzene	6.05	2838.89	14.50	6.05	3.2	No
Xylenes	102.33	56777.78	NA*	102.33	13	No
Naphthalenes	1.63	1135.56	2.63	1.63	0.848	No
MTBE	25.92	141.94	293.44	25.92	**33**	Yes

Note:* No inhalation reference dose is available for xylenes; therefore, no inhalation RBSL can be calculated.

Based on the above table of calculated RBSLs, benzene, toluene, and MTBE in the groundwater pose a risk to a construction worker exposed to groundwater. Ethylbenzene, xylene, and naphthalene concentrations in groundwater do not pose a threat to the construction worker.

3.2.4 Risk From Soil Leaching to Groundwater for a Construction Worker in a Utility Trench

The Soil Leachability Model was used to calculate SSTLs for the establishment of soil cleanup criteria for benzene, toluene, ethylbenzene, xylenes, and naphthalene in soil. Site-specific parameters were used when available; otherwise, values were estimated from the charts on pages C2 through C5 of the SCDHEC guidance document, *Risk-Based Corrective Action for Petroleum Releases*, January 5, 1998. Grain size analysis of a representative vadose soil sample (SB-12 from 2 to 3 feet bls), showed that the soil contained 88 percent sand and 7 percent clay. The calculated RBSLs for a construction worker possibly ingesting, coming in contact with, or inhaling volatiles from the groundwater were used for calculating the SSTLs shown below. Appendix D presents the calculations for the model.

Chemical of Concern	Soil Leaching SSTL (mg/kg)	Maximum Onsite Soil Concentration (mg/kg)	Greater than the SSTL
Benzene	0.2	120	Yes
Ethylbenzene	14.5	560	Yes
Toluene	11	360	Yes
Xylenes	686	2200	Yes
Naphthalenes	24	217	Yes

Because the maximum soil concentration of benzene, ethylbenzene, toluene, xylene, and naphthalene found during the site assessment exceeds the calculated SSTLs for these CoCs, the construction worker is considered at-risk if exposed to groundwater leached through the impacted soil.

3.2.5 Inhalation of Volatiles from Soil for a Construction Worker in a Utility Trench

RBSLs for a construction worker in a trench inhaling volatile vapors from soil were calculated. The calculations are provided in Appendix D. The inhalation RBSLs were calculated using equations given in the ASTM *Standard Guide for Risk-Based Corrective Action Applied to Petroleum Release Sites, Designation E 1739-95E1* (1997).

The following table summarizes the calculated RBSLs for the analyzed pathway:

Chemical of Concern	Inhalation SSTL (mg/kg)	Maximum Onsite Soil Concentration (mg/kg)	Greater than the SSTL
Benzene	7,853	120	No
Ethylbenzene	226,430	360	No
Toluene	85,887	560	No
Xylenes*	NA	2200	NA
Naphthalenes	3,123	218	No

Note: * No inhalation reference dose is available for xylenes; therefore, no inhalation RBSL can be calculated.

Based on the above table, the construction worker exposed to subsurface soil is not at risk if inhaling benzene, toluene, ethylbenzene, xylenes, or naphthalenes volatilizing from the soil.

3.3 SUMMARY AND COMPARISON OF THE SELECTED SSTLs

The following table summarizes the calculated SSTLs according to media (for exposure) and exposure pathway for the CoCs that may be a threat to the identified receptor construction worker in an onsite utility trench.

Media (for exposure)	Exposure Pathway	CoC	Unit	SSTL	Maximum Onsite Concentration	Greater than SSTL?
Groundwater	Dermal contact, inhalation, or ingestion	Benzene	mg/L	0.15	26	Yes
		Toluene ~~Ethylbenzene~~	mg/L	5.38	38	Yes
		MTBE	mg/L	25.92	33	Yes
Soil (leaching from groundwater)	Dermal or incidental ingestion	Benzene	mg/kg	0.2	120	Yes
		Ethylbenzene	mg/kg	14.5	560	Yes
		Toluene	mg/kg	11	360	Yes
		Xylenes	mg/kg	686	2200	Yes
		Naphthalenes	mg/kg	24	218	Yes
Soil (leaching from groundwater)	Volatilization or inhalation	Benzene	mg/kg	0.2	120	No
		Ethylbenzene	mg/kg	14.5	560	No
		Toluene	mg/kg	11	360	No
		Xylenes	mg/kg	686	2200	No
		Naphthalenes	mg/kg	24	218	No

The above SSTLs should be used for establishing cleanup levels at the site.

3.4 RECOMMENDATIONS FOR FURTHER ACTION

Corrective action is required at Site 25. The benzene, ~~ethylbenzene~~ toluene, and MTBE in groundwater are above the selected minimum SSTLs calculated for a construction worker. In addition, the SSTLs for soil leaching to groundwater are exceeded for benzene, toluene, ethylbenzene, xylenes, and naphthalenes; therefore, corrective action is necessary. The goal of corrective action is to prevent an impact to the identified potential receptor (the construction worker in an onsite utility trench).

4.0 REFERENCES

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TABLES

TABLE 1

WATER LEVEL AND SURVEY DATA
SITE 25, BUILDING 1346
ZONE F, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Monitoring Well	Northing	Easting	TOCeL (feet)	Well Total Depth (feet)	Well Sceen Depth (feet)	Water Level BTOC (feet)	Groundwater Elevation (feet)
609002	373661.0421	2318340.847	7.83	12.0	1-11	5.49	2.34
609004	373737.5122	2318446.267	7.54	13.0	2-12	3.42	4.12
CNC25-MW01	373880.8929	2318417.096	7.90	12.0	1-11	3.58	4.32
CNC25-MW03	373506.6288	2318190.059	7.40	13.0	2-12	5.87	1.53
CNC24-MW04*	373760.4013	2318182.343	8.00	13.0	2-12	n/m	n/m
CNC25-MW05	373687.9653	2318295.297	8.02	13.0	2-12	5.46	2.56
CNC25-MW06	373677.0889	2318284.952	7.92	27.0	16-26	5.98	1.94
CNC25-MW07	373696.3178	2318103.999	7.41	13.0	2-12	6.44	0.97
CNC25-MW08	373978.0111	2318287.141	7.60	13.0	2-12	3.85	3.75

Notes:

Water level measurements were taken on September 11, 1999, and are tide-synchronous (MW06 is a deep well).

CNC25-MW02 not sampled (full of sediment)

TOCeL -- top of casing elevation

BTOC -- below top of casing

* Site 24

n/m-- not measured

TABLE 2

GROUNDWATER FIELD MEASUREMENTS
SITE 25, BUILDING 1346
ZONE F, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Well I.D.	Date Sampled	Purge method	Volume (gallons)	Temp. (° C)	pH	Conductivity (umhos/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)
CNC25-M01	09/21/99	PP	4.5	25.9	6.50	1.04	*	0.21
CNC25-M03	09/12/99	PP	4.0	29.9	5.08	1.23	25	1.43
CNC25-M04	09/13/99	PP	3.5	28.6	6.00	2.03	< 1	1.22
CNC25-M05	09/21/99	PP	6.0	29.7	5.33	0.269	< 1	5.45
CNC25-M06	09/12/99	PP	10.0	25.7	6.47	5.72	27	1.67
CNC25-M07	09/21/99	PP	4.0	29.2	5.33	0.686	< 1	5.88
CNC25-M08	09/12/99	PP	4.0	28.7	5.36	2.40	35	1.53
609002	09/21/99	PP	4.0	26.0	6.70	4.09	3	0.11
609004	09/21/99	PP	5.0	26.6	6.45	0.98	75	1.77

Notes:

PP - Peristaltic pump, low flow technique

umhos/cm - micro mhos per centimeter

NTU - Nephelometric turbidity units

mg/L - milligrams per liter

* -- instrument malfunction; water visually clear

TABLE 3

GROUNDWATER NATURAL ATTENUATION FIELD MEASUREMENTS
SITE 25, BUILDING 1346
ZONE F, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Well I.D.	Date Sampled	Dissolved Oxygen (mg/L)	Alkalinity (mg/L)	Carbon Dioxide (mg/L)	Sulfide (mg/L)	Ferrous Iron (mg/L)	Nitrite (mg/L)	Manganese (mg/L)	Nitrogen/ Nitrate (mg/L)*	Sulfate (mg/L)*	Methane (ug/L)*
CNC25-MW01	09/21/99	0.30	552	300	0.00	3.30	0.126	0.0	0.29	160	4400 6000 (D)
CNC25-MW05	09/21/99	0.60	136	388	0.11	3.30	0.000	0.4	<0.050	40	3500 4400 (D)
CNC25-MW07	09/21/99	0.30	63	204	0.00	0.17	0.047	0.1	0.16	160	6.5

Notes:
mg/L - milligrams per liter
ug/L - micrograms per liter
* fixed-base laboratory analysis
D - laboratory duplicate

TABLE 4

SUMMARY OF SOIL BORINGS AND SOIL VAPOR SCREENING
SITE 25, BUILDING 1346
ZONE F, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA
[PAGE 1 of 2]

Soil Boring Location	Sample Identification	Sample Lithology	Soil Sample Condition	Soil Sample Depth (feet)	Total Boring Depth (feet)	Sample Interval Maximum OVA Reading (PPM)
CNC25-B01	25SFB010506	Sandy Clay	Moist	05-06	12	3,000
CNC25-B02	25SFB020203	Sandy Clay	Moist	02-03	12	5
CNC25-B03	25SFB030405	Silty Clay	Moist	04-05	11	19
CNC25-B04	25SFB040203	Sandy Clay	Moist	02-03	8	0
CNC25-B05	25SFB050405	Sandy Clay	Moist	04-05	11	80
CNC25-B06	25SFB060405	Silty Clay	Moist	04-05	12	1,120
CNC25-B07	25SFB070607	Sandy Clay	Moist	06-07	12	260
CNC25-B08	25SFB080304	Silty Clay	Moist	03-04	11	140
CNC25-B09	25SLB090304	Sandy Silty Clay	Moist	03-04	8	106
CNC25-B10	25SLB100102	Silty Clay	Moist	01-02	8	4,860
CNC25-B11	25SLB110203	Clayey Sand	Moist	02-03	8	1,610
CNC25-B12	25SLB120203	Silty Sandy Clay	Moist	02-03	8	4,790
CNC25-B13	25SLB130203	Clayey Sand	Moist	02-03	8	4,300
CNC25-B14	25SLB140304	Sand	Moist	03-04	8	820
CNC25-B15	25SLB150304	Sand	Moist	03-04	4	150
CNC25-B16	25SLB160304	Sandy Clay	Moist	03-04	4	250
CNC25-B17	25SLB170304	Sandy Clay	Moist	03-04	4	4,900
CNC25-B18	25SFB180405	Silty Clay	Moist	04-05	12	110
CNC25-B19	25SFB190304	Silty Clay	Dry	03-04	8	0

TABLE 4

SUMMARY OF SOIL BORINGS AND SOIL VAPOR SCREENING
SITE 25, BUILDING 1346
ZONE F, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA
[PAGE 2 of 2]

Soil Boring Location	Sample Identification	Sample Lithology	Soil Sample Condition	Soil Sample Depth (feet)	Total Boring Depth (feet)	Sample Interval Maximum OVA Reading (PPM)
CNC25-B20	25SFB200405	Sandy Clay	Dry to Moist	04-05	8	2,410
CNC25-B21	25SFB210506	Sandy Clay	Moist	05-06	8	60
CNC25-B22	25SFB220607	Clayey Sand	Moist	06-07	8	0
CNC25-B23	25SFB230607	Silty Clay	Moist	06-07	12	7
CNC25-B24	25SFB240607	Sandy Clay	Moist	06-07	8	0
CNC25-B25	25SFB250506	Sandy Clay	Moist	05-06	8	0
CNC25-B26	25SFB260405	Clayey Sand	Moist	04-05	8	0
CNC25-B27	25SFB270304	Sandy Clay	Moist	03-04	8	190
CNC25-B28	25SFB280304	Clayey Sand	Moist	03-04	8	0

Notes:

Soil Borings B09 – B17 were completed for fixed-base laboratory analysis.
OVA - organic vapor analyzer equipped with a flame ionization detector
PPM - parts per million

TABLE 5

SUMMARY OF MOBILE LABORATORY SCREENING RESULTS FOR SOIL
SITE 25, BUILDING 1346
ZONE F, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Sample I.D.	Benzene (ug/kg)	Toluene (ug/kg)	Ethylbenzene (ug/kg)	m&p-Xylene (ug/kg)	o-Xylene (ug/kg)	Naphthalene (ug/kg)	DRO (mg/kg)
25SFB010506	4786 E	14787 E	4368 E	15960 E	6605 E	1515 E	290
25SFB020203	ND	ND	ND	ND	ND	ND	ND
25SFB030405	ND	ND	ND	ND	ND	ND	ND
25SFB040203	ND	ND	ND	ND	ND	ND	ND
25SFB050405	80.0	ND	40.5 J	ND	ND	54.0 J	ND
25SFB060405	ND	ND	ND	ND	ND	ND	ND
25SFB070607	175	82.5	ND	ND	ND	ND	ND
25SFB080304	ND	ND	ND	ND	ND	ND	ND
25SFB180405	ND	ND	ND	ND	ND	ND	ND
25SFB190304	3025**	54000 E**	23400 E**	96800 E**	40200 E**	5620**	ND
25SFB200405	768 E	3620 E	1240 E	3950 E	1490 E	64.8	51.5
25SFB210506	234	203	156	320	99.6	29.7 J	ND
25SFB220506	ND	ND	ND	ND	ND	ND	ND
25SFB230607	ND	ND	ND	ND	ND	ND	ND
25SFB240607	ND	ND	ND	ND	ND	ND	ND
25SFB250506	ND	ND	5.03 J	20.3 J	7.72 J	ND	ND
25SFB260405	ND	ND	ND	ND	ND	ND	ND
25SFB270304	ND	ND	ND	ND	ND	ND	ND
25SFB280304	ND	ND	ND	ND	ND	ND	ND

(**10X Dilution)

TABLE 6

SUMMARY OF MOBILE LABORATORY SCREENING RESULTS FOR GROUNDWATER
SITE 25, BUILDING 1346
ZONE F, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Sample I.D.	Benzene (ug/L)	Toluene (ug/L)	Ethylbenzene (ug/L)	m&p-Xylene (ug/L)	o-Xylene (ug/L)	Naphthalene (ug/L)	DRO (mg/L)
25GFB010912	44.7	56.8	9.63 J	29.0	15.3	ND	ND
25GFB020811	ND	ND	ND	ND	ND	ND	ND
25GFB030811	ND	ND	ND	ND	ND	ND	ND
25GFB040508	ND	ND	ND	ND	ND	ND	ND
25GFB050811	631 E	27.6	251 E	141	52.2	180	4.0*
25GFB060811	ND	ND	ND	ND	ND	ND	ND
25GFB070912	2503 E	185	523 E	ND	50.8	30.9	3.0*
25GFB080407	ND	ND	ND	ND	ND	ND	ND
25GFB180512	ND	ND	ND	ND	ND	ND	ND
25GFB190408	46500 E**	33500 E**	5620 E**	17900 E**	6770 E**	3420**	17.3 *
25GFB200508	2780 E	455 E	183	440 E	228	251	2.0*
25GFB210608	5360 E	156	1420 E	877 E	272	295	4.20
25GFB220708	11.8	ND	ND	ND	ND	ND	ND
25GFB230912	ND	ND	ND	ND	ND	ND	ND
25GFB240708	ND	ND	ND	ND	ND	ND	1.34 J
25GFB250708	ND	ND	ND	ND	ND	ND	ND
25GFB260508	ND	ND	ND	ND	ND	ND	ND
25GFB270508	6.29 J	ND	ND	ND	8.90 J	ND	ND
25GFB280508	ND	ND	ND	ND	ND	ND	ND

* Gasoline signature
** 10X dilution

TABLE 7

SUMMARY OF FIXED-BASE LABORATORY ANALYTICAL RESULTS FOR CHEMICALS OF CONCERN IN SOIL
SITE 25, BUILDING 1346
ZONE F, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Soil Boring / Sample No.	MTBE (ug/kg)	Benzene (ug/kg)	Toluene (ug/kg)	Ethyl-benzene (ug/kg)	Xylenes (total) (ug/kg)	Benzo(a) anthracene (ug/kg)	Benzo(b) fluoranthene (ug/kg)	Benzo(k) fluoranthene (ug/kg)	Chrysene (ug/kg)	Dibenzo(a,h) anthracene (ug/kg)	Naphthalene* (ug/kg)	Lead (mg/kg)
RBSL [1]	**None**	**5**	**1,622**	**1,260**	**42,471**	**73,084**	**29,097**	**2.3E+05**	**12,998**	**87,899**	**210**	**None**
CNC25-B09 / 25SLB090304	< 6	**52**	15	< 6	< 6	< 400	< 400	< 400	< 400	< 400	4 [J]	10.5
CNC25-B10 / 25SLB100102	< 800	**9,100**	< 1600	**63,000**	3,000	< 460	< 460	< 460	< 460	< 460	**31,600**	34.7
CNC25-B11 / 25SLB110203	< 6	6 [J]	< 6	14	19	< 360	< 360	< 360	< 360	< 360	66	125
CNC25-B12 / 25SLB120203	< 750	**120,000**	**360,000**	**560,000**	**2.2E+06**	< 430	< 430	< 430	< 430	< 430	**217,900**	26.2
CNC25-B13 / 25SLB130203	< 600	**5,000**	**8,400**	**73,000**	**160,000**	< 400	< 400	< 400	< 400	< 400	**80,000**	6.2
CNC25-B13 / 25SLB130203D	< 550	**10,000**	**18,000**	**130,000**	**300,000**	240 [J]	< 400	< 400	< 400	< 400	**155,000**	10.4
CNC25-B14 / 25SLB140304	< 5	7	12	13	12	< 400	< 400	< 400	< 400	< 400	60	4.9
CNC25-B15 / 25SLB150304	< 6	< 6	< 6	< 6	< 6	< 360	< 360	< 360	< 360	< 360	< 6	5.9
CNC25-B16 / 25SLB160304	< 5	8	< 5	< 5	< 5	< 400	< 400	< 400	< 400	< 400	4 [J]	6.5
CNC25-B17 / 25SLB170304	4,300	**32,000**	**240,000**	**49,000**	**250,000**	< 400	< 400	< 400	< 400	< 400	**18,000**	7.4

Notes:

Sample Collection Date: June 10, 1999.

[1] SCDHEC Risk-Based Screening Levels for sandy soil; depth to groundwater less than 5 feet.

[J] Indicates the presence of an analyte at a concentration less than the reporting limit and greater than the detection limit.

D Indicates a duplicate sample.

* Naphthalene includes Naphthalene (8260 value) and 2-Methylnaphthalene (8270 value) for values in bold.

TABLE 8

SUMMARY OF FIXED-BASE LABORATORY ANALYTICAL RESULTS FOR CHEMICALS OF CONCERN IN GROUNDWATER
SITE 25, BUILDING 1346
ZONE F, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Monitoring Well Sample No.	Date Sampled	Benzene (ug/L)	Ethyl-benzene (ug/L)	Toluene (ug/L)	Xylenes (total) (ug/L)	Naphthalene (ug/L)	Benzo(a) anthracene (ug/L)	Benzo(b) fluoranthene (ug/L)	Benzo(k) fluoranthene (ug/L)	Chrysene (ug/L)	Dibenzo(a,h) anthracene (ug/L)	MTBE (ug/L)	EDB (ug/L)	Lead (ug/L)
RBSL[1]		**5**	**700**	**1000**	**10000**	**10 [2]**	**10 [2]**	**10 [2]**	**10 [2]**	**10 [2]**	**10 [2]**	**40**	**5**	**15**
CNC25M-01 25GLM0101	09/21/99	< 5	< 5	< 5	< 5	< 5	< 10	< 10	< 10	< 10	< 10	< 5	< 5	3.9
CNC25M-03 25GLM0301	09/12/99	< 5	< 5	< 5	< 5	< 5	< 10	< 10	< 10	< 10	< 10	< 5	< 5	< 1.4
CNC25M-04 25GLM0401	09/13/99	< 5	< 5	< 5	< 5	< 5	< 10	< 10	< 10	< 10	< 10	< 5	< 5	< 1.09
CNC25M-05 25GLM0501	09/21/99	**25000**	**3000**	**35000**	**12000**	**760 [3]**	< 10	< 10	< 10	< 10	< 10	**33000**	**< 250**	7.3
CNC25M-05 25GLM0501D	09/21/99	**26000**	**3200**	**38000**	**13000**	**848 [3]**	< 10	< 10	< 10	< 10	< 10	**33000**	**< 250**	7
CNC25M-06 25GLM0601	09/12/99	< 5	< 5	< 5	< 5	< 5	< 10	< 10	< 10	< 10	< 10	**220**	< 5	< 1.09
CNC25M-07 25GLM0701	09/13/99	< 5	< 5	< 5	< 5	< 5	< 10	< 10	< 10	< 10	< 10	< 5	< 5	< 1.09
CNC25M-08 25GLM0801	09/12/99	< 5	< 5	< 5	< 5	< 5	< 12	< 12	< 12	< 12	< 12	< 5	< 5	< 1.3
609002 25GLX0201	09/21/99	< 5	< 5	< 5	< 5	< 5	< 10	< 10	< 10	< 10	< 10	< 5	< 5	1.6
609004 25GLX0401	09/21/99	< 5	< 5	< 5	< 5	< 5	< 12	< 12	< 12	< 12	< 12	**130**	< 5	5.5

Notes:

[1] South Carolina Department of Health and Environmental Control Risk-Based Screening Levels for groundwater.

[2] The RBSL for individual PAH CoC is 10 ug/L or 25 ug/L for total PAHs.

[3] Value represents Total Naphthalene (Method 8260 value for naphthalene *plus* Method 8270 value for 2-methylnaphthalene).

Concentrations exceeding RBSL are in bold.

TABLE 9

CURRENT LAND USE - POTENTIAL RECEPTORS AND PATHWAYS WITHIN 1,000-FOOT RADIUS
SITE 25, BUILDING 1346
ZONE F, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

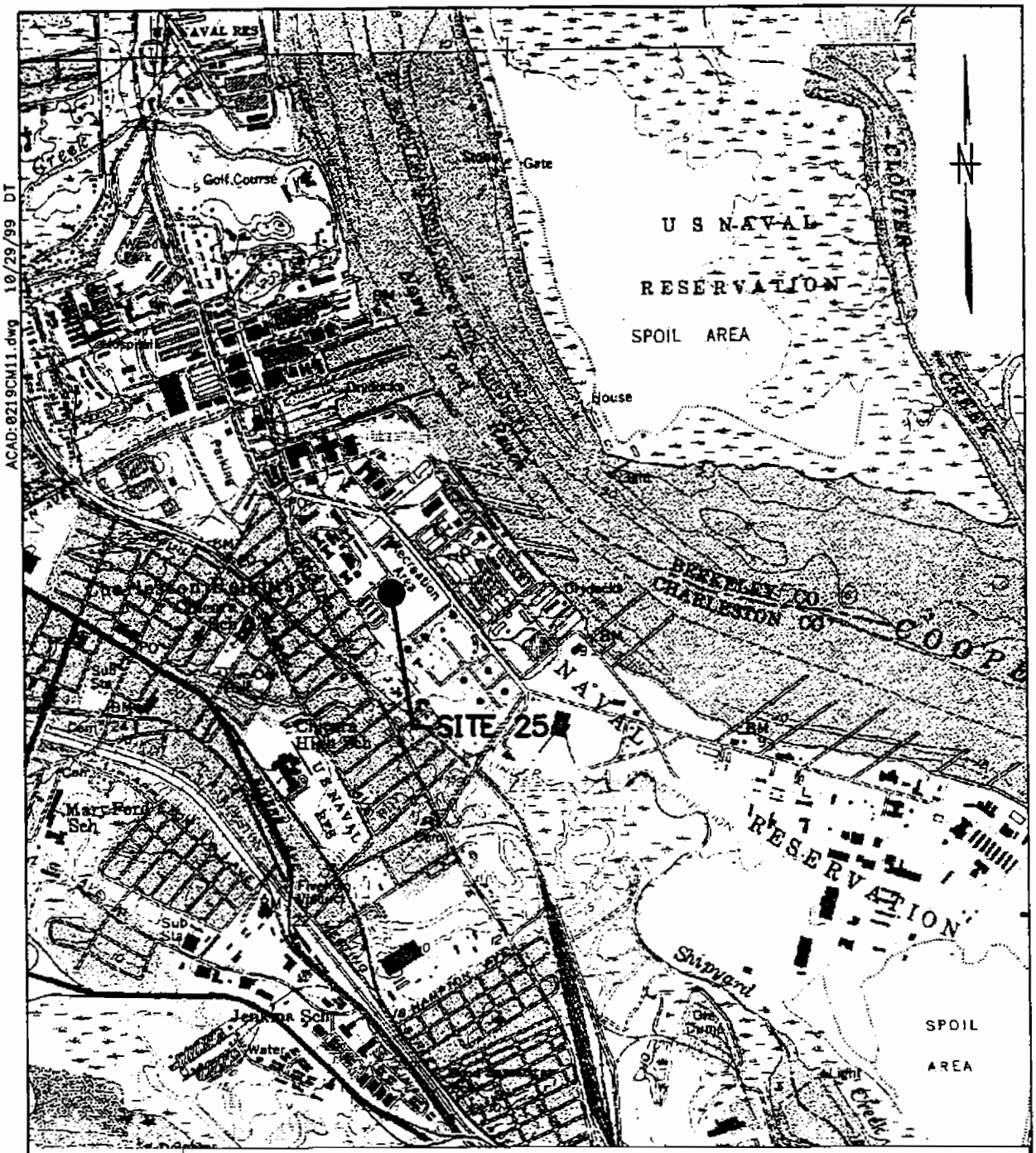
Media (for exposure)	Exposure Route	Pathway Selected for Evaluation? (Yes or No)	Exposure point or Reason for Non-Selection	Data Requirements (If pathway selected)
Air	Inhalation	No	No volatilization to enclosed space.	
	Explosion Hazard	No	No explosion hazard.	
Ground-Water	Ingestion	No	No water supply well downgradient.	RBSLs for construction worker exposed to groundwater.
	Dermal Contact	No	All water is supplied by city. However, construction worker could be exposed to groundwater in utility trench.	
	Volatile Inhalation	No		
Surface Water	Ingestion	No	Cooper River is 1700 feet to the east (upgradient).	
	Dermal Contact	No		
	Volatile Inhalation	No	No complete pathway.	
Surficial Soil	Ingestion	No	No impacted surface soil. Asphalt and concrete cover impacted soil.	
	Dermal Contact	No		
	Volatile Inhalation	No		
	Leaching to Groundwater	No		
Subsurface Soil	Ingestion	No	Construction worker in a utility trench could be exposed to contaminated soil and soil vapors.	
	Dermal Contact	No		
	Volatile Inhalation	No		
	Leaching to Groundwater	No	Sandy soils; groundwater is shallow: ~5 feet bls.	

TABLE 12

FUTURE LAND USE - POTENTIAL RECEPTORS AND PATHWAYS WITHIN 1,000-FOOT RADIUS
SITE 25, BUILDING 1346
ZONE F, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Media (for exposure)	Exposure Route	Pathway Selected for Evaluation? (Yes or No)	Exposure point or Reason for Non-Selection	Data Requirements (If pathway selected)
Air	Inhalation	No	No volatilization to enclosed space.	
	Explosion Hazard	No	No explosion hazard.	
Ground-water	Ingestion	Yes	No water supply well downgradient.	RBSLs for construction worker exposed to groundwater.
	Dermal Contact	Yes	All water is supplied by city.	
	Volatile Inhalation	Yes	However, construction worker could be exposed to groundwater in utility trench.	
Surface Water	Ingestion	No	Cooper River is 1700 feet to the east (upgradient).	
	Dermal Contact	No		
	Volatile Inhalation	No	No complete pathway.	
Surficial Soil	Ingestion	No	No impacted surface soil. Asphalt and concrete cover impacted soil.	
	Dermal Contact	No		
	Volatile Inhalation	No		
	Leaching to Groundwater	No		
Subsurface Soil	Ingestion	Yes	Construction worker in a utility trench could be exposed to contaminated soil and soil vapors.	
	Dermal Contact	Yes		
	Volatile Inhalation	Yes	Sandy soils; groundwater is shallow: ~5 feet bls.	
	Leaching to Groundwater	Yes		

FIGURES



SOURCE: QUADRANGLE MAP SOUTH CAROLINA, REVISED 1979
QUADRANGLE MAP NORTH CHARLESTON REVISED, 1979

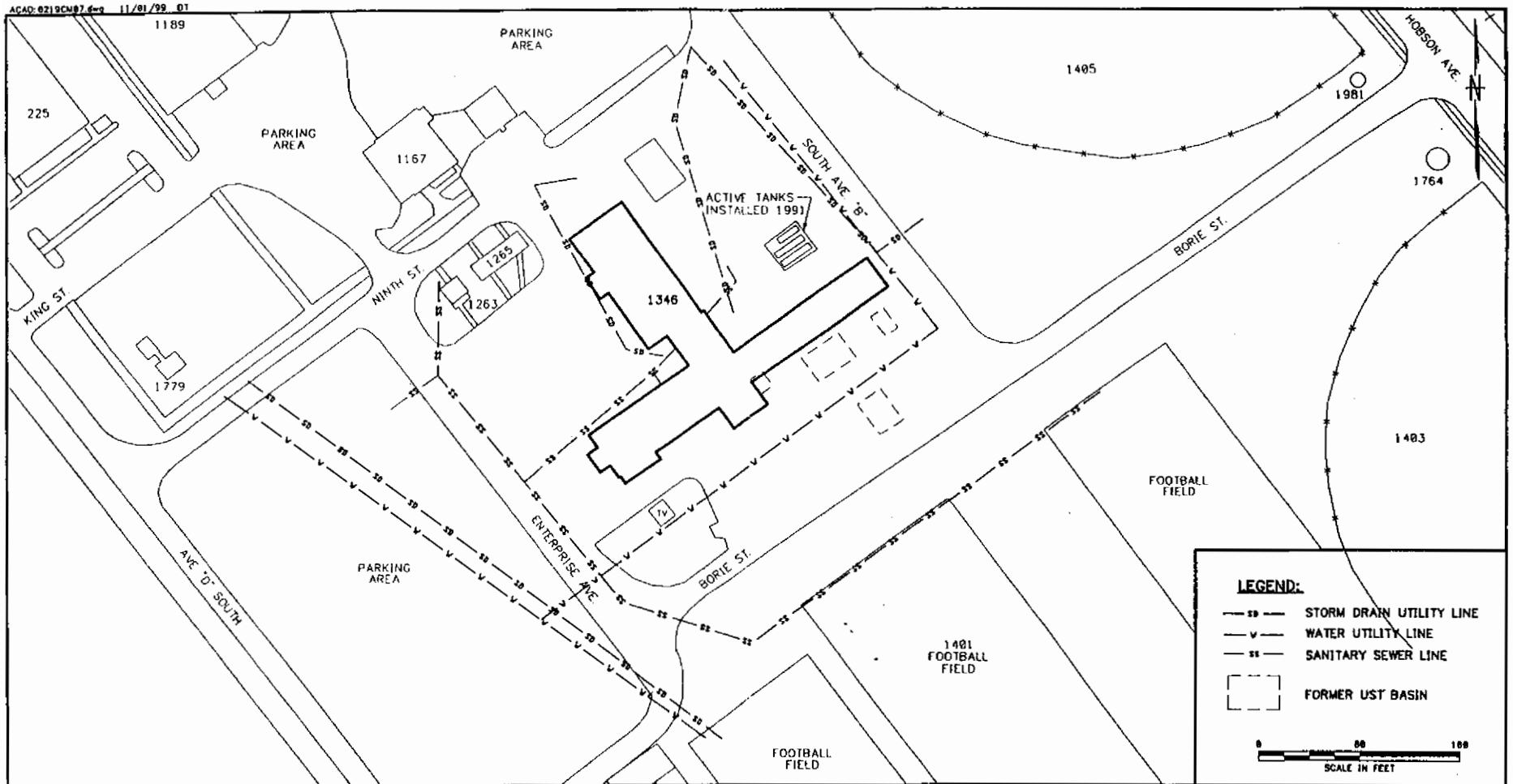
0 2000 4000
SCALE IN FEET

DRAWN BY DATE DLT 10/29/99	DEPARTMENT OF THE NAVY SOUTHERN DIV FACILITIES ENGINEERING COMD	SITE LOCATION MAP SITE 25, BUILDING 1346 ZONE F, CHARLESTON NAVAL COMPLEX NORTH CHARLESTON, SOUTH CAROLINA	CONTRACT NO. 0219
CHECKED BY DATE			APPROVED BY DATE
COST/SCHED-AREA			APPROVED BY DATE
SCALE AS NOTED			DRAWING NO. FIGURE 1 / REV. 0

FORM CADD NO. SDIV_AV.DWG - REV 0 - 1/20/98

ACAD:0219CM11.dwg 10/29/99 DT

ACAD: 0219CM07.dwg 11/01/99 DT



NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

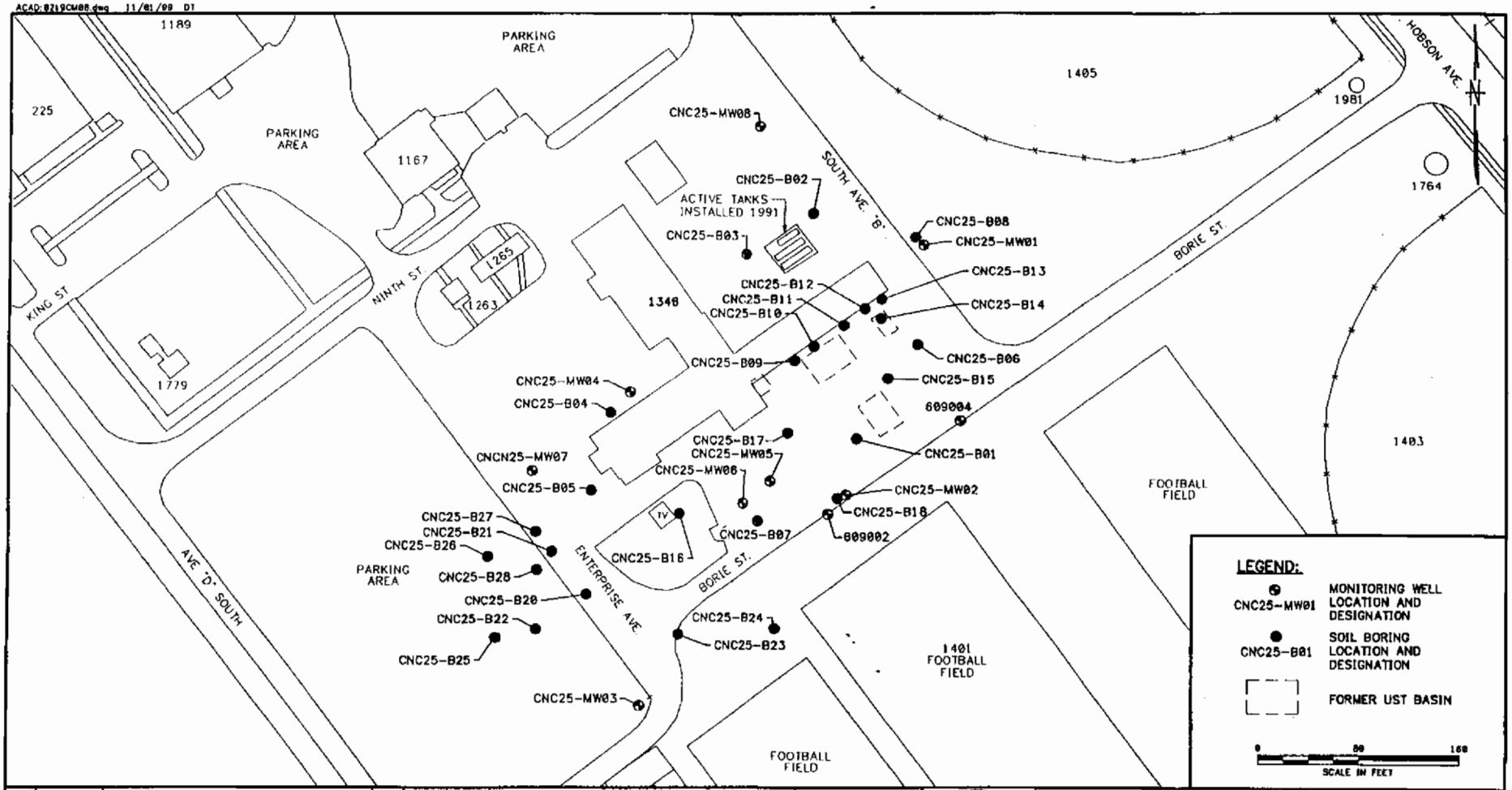
DRAWN BY DATE DLT 10/29/99
CHECKED BY DATE
COST/SCHED-AREA
SCALE AS NOTED

SITE VICINITY MAP
SITE 25, BUILDING 1346
ZONE F, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

CONTRACT NO. 0219
APPROVED BY DATE
APPROVED BY DATE
DRAWING NO. FIGURE 2
REV. 0

FORM CADD NO. SDIV_BHDWG - REV 0 - 1/20/98

ACAD:0219CM08.dwg 11/01/99 DT



NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

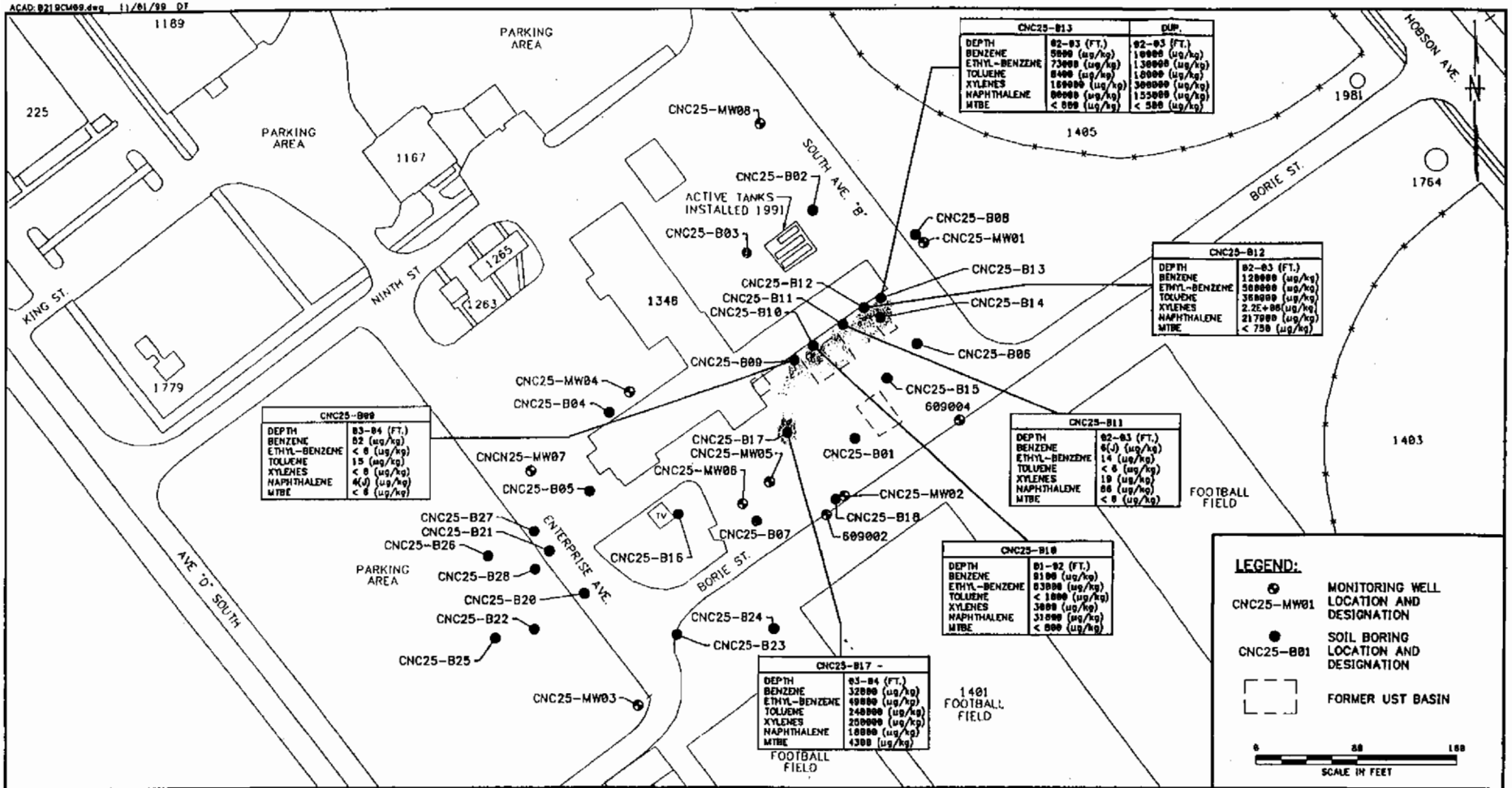
DRAWN BY DLT DATE 10/29/99
CHECKED BY DATE
COST/SCHED-AREA
SCALE AS NOTED

SITE MAP AND SAMPLING LOCATIONS
SITE 25, BUILDING 1348
ZONE F, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

CONTRACT NO. 0219
APPROVED BY DATE
APPROVED BY DATE
DRAWING NO. FIGURE 3
REV. 0

FORM CADD NO. 3DIV_BH.DWG - REV 0 - 1/20/98

ACAD: 0219CM09.dwg 11/01/99 DT



CNC25-B09	
DEPTH	03-04 (FT.)
BENZENE	82 (ug/kg)
ETHYL-BENZENE	< 6 (ug/kg)
TOLUENE	15 (ug/kg)
XYLENES	< 6 (ug/kg)
NAPHTHALENE	4(J) (ug/kg)
MTBE	< 6 (ug/kg)

CNC25-B13		DUP.
DEPTH	02-03 (FT.)	02-03 (FT.)
BENZENE	5800 (ug/kg)	10000 (ug/kg)
ETHYL-BENZENE	73000 (ug/kg)	130000 (ug/kg)
TOLUENE	8400 (ug/kg)	18000 (ug/kg)
XYLENES	160000 (ug/kg)	300000 (ug/kg)
NAPHTHALENE	80000 (ug/kg)	155000 (ug/kg)
MTBE	< 800 (ug/kg)	< 500 (ug/kg)

CNC25-B12	
DEPTH	02-03 (FT.)
BENZENE	120000 (ug/kg)
ETHYL-BENZENE	500000 (ug/kg)
TOLUENE	350000 (ug/kg)
XYLENES	2.2E+06 (ug/kg)
NAPHTHALENE	217000 (ug/kg)
MTBE	< 750 (ug/kg)

CNC25-B11	
DEPTH	02-03 (FT.)
BENZENE	6(J) (ug/kg)
ETHYL-BENZENE	14 (ug/kg)
TOLUENE	< 6 (ug/kg)
XYLENES	19 (ug/kg)
NAPHTHALENE	86 (ug/kg)
MTBE	< 6 (ug/kg)

CNC25-B10	
DEPTH	01-02 (FT.)
BENZENE	8100 (ug/kg)
ETHYL-BENZENE	83000 (ug/kg)
TOLUENE	< 1000 (ug/kg)
XYLENES	3000 (ug/kg)
NAPHTHALENE	31000 (ug/kg)
MTBE	< 800 (ug/kg)

CNC25-B17 -	
DEPTH	03-04 (FT.)
BENZENE	32000 (ug/kg)
ETHYL-BENZENE	49000 (ug/kg)
TOLUENE	240000 (ug/kg)
XYLENES	250000 (ug/kg)
NAPHTHALENE	18000 (ug/kg)
MTBE	4300 (ug/kg)

NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

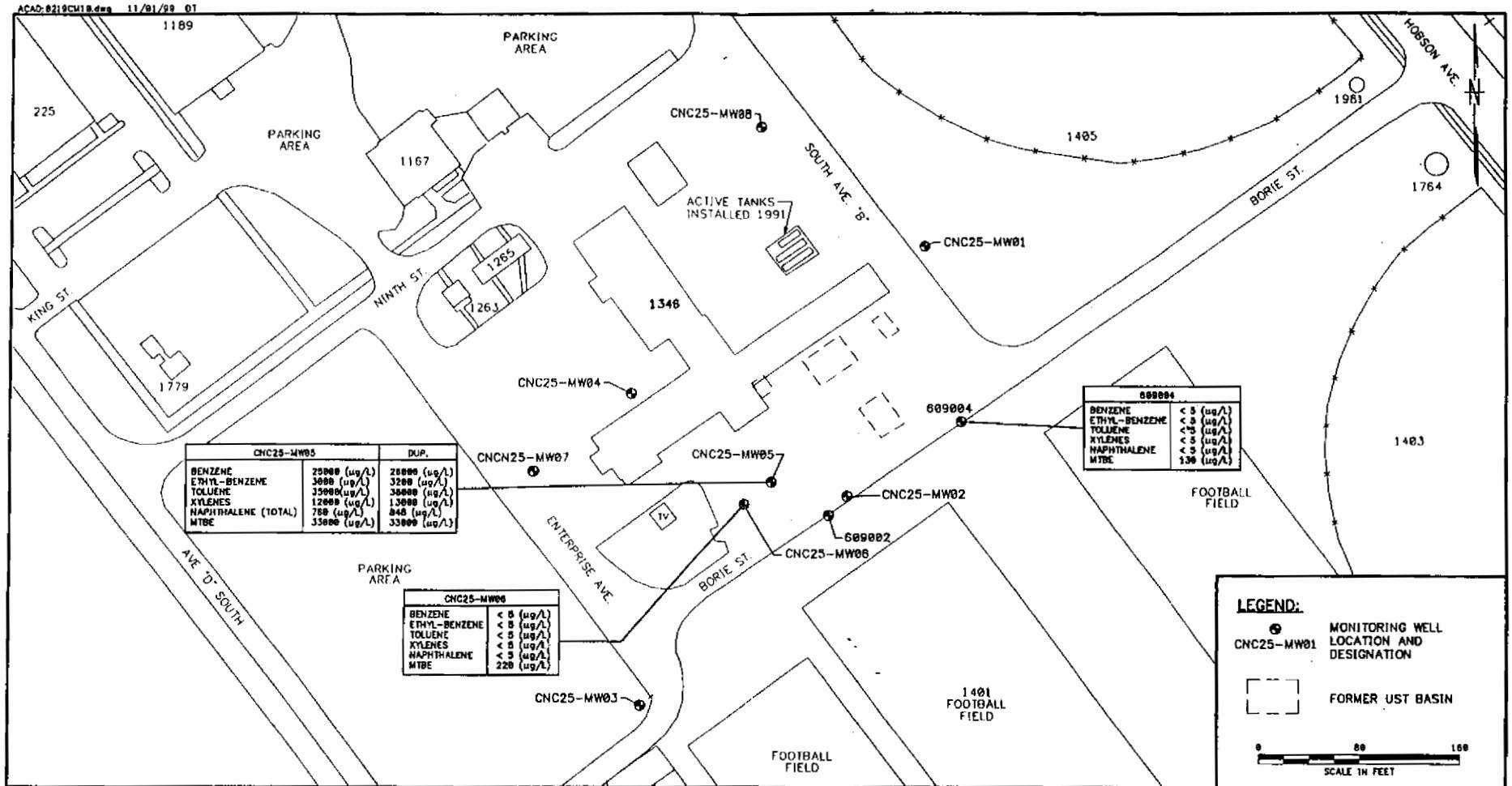
DRAWN BY DLT DATE 10/29/99
CHECKED BY DATE
COST/SCHED-AREA
SCALE AS NOTED

SOIL CoC MAP
SITE 25, BUILDING 1348
ZONE F, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

CONTRACT NO. 0219
APPROVED BY DATE
APPROVED BY DATE
DRAWING NO. FIGURE 4
REV. 0

FORM CADD NO. SBIV_BKLDWG - REV 0 - 1/20/98

ACAD:8219CM18.dwg 11/01/99 DT



CNC25-MW05		DUP.
BENZENE	25000 (ug/L)	28000 (ug/L)
ETHYL-BENZENE	3000 (ug/L)	3200 (ug/L)
TOLUENE	35000(ug/L)	38000 (ug/L)
XYLENES	12000 (ug/L)	13000 (ug/L)
NAPHTHALENE (TOTAL)	780 (ug/L)	848 (ug/L)
MTBE	33000 (ug/L)	33000 (ug/L)

CNC25-MW06	
BENZENE	< 5 (ug/L)
ETHYL-BENZENE	< 5 (ug/L)
TOLUENE	< 5 (ug/L)
XYLENES	< 5 (ug/L)
NAPHTHALENE	< 5 (ug/L)
MTBE	220 (ug/L)

609004	
BENZENE	< 5 (ug/L)
ETHYL-BENZENE	< 5 (ug/L)
TOLUENE	<5 (ug/L)
XYLENES	< 5 (ug/L)
NAPHTHALENE	< 5 (ug/L)
MTBE	136 (ug/L)

NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

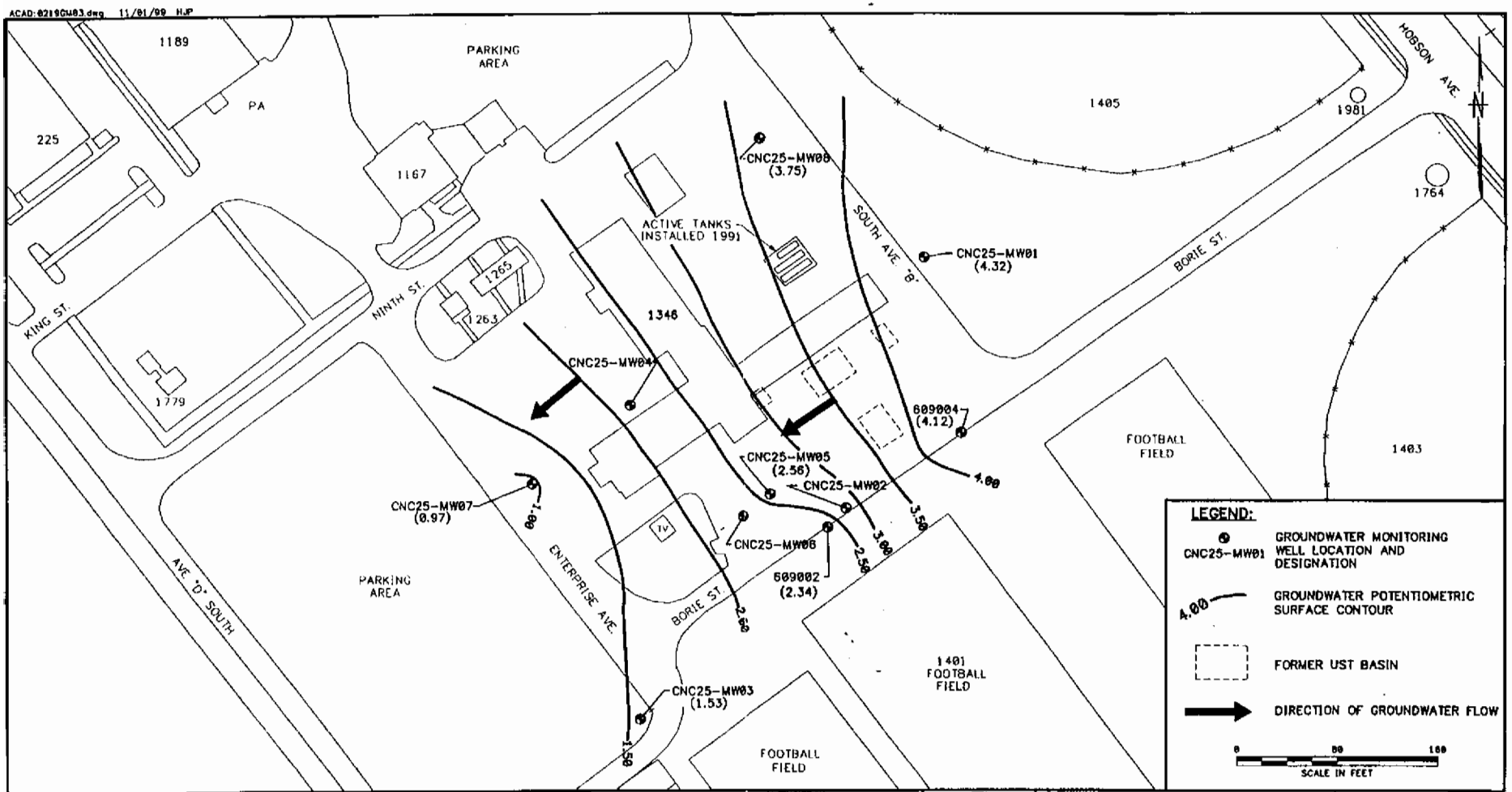
DRAWN BY DLT DATE 10/29/99
CHECKED BY DATE
COST/SCHED-AREA
SCALE AS NOTED

GROUNDWATER CoC MAP
SITE 25, BUILDING 1346
ZONE F, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

CONTRACT NO. 0219
APPROVED BY DATE
APPROVED BY DATE
DRAWING NO. FIGURE 5
REV. 0

FORM CADD NO. ENV_BMDWG - REV 0 - 1/20/98

ACAD:0219GW03.dwg 11/01/99 HJP



NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

DRAWN BY HJP DATE 11/1/99
CHECKED BY DATE
COST/SCHED-AREA
SCALE AS NOTED

GROUNDWATER POTENTIOMETRIC SURFACE MAP
(SEPTEMBER 11, 1999)
SITE 25, BUILDING 1346
ZONE F, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

CONTRACT NO. 0219
APPROVED BY DATE
APPROVED BY DATE
DRAWING NO. FIGURE 6
REV. 0

FORM CADD NO. SDIV_BK.DWG - REV 0 - 1/20/98

UST Assessment Report for UST NS1346

UST ASSESSMENT REPORT
UST 1346
NAVAL BASE CHARLESTON
CHARLESTON SC

Prepared for:

DEPARTMENT OF THE NAVY
SOUTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
CHARLESTON SC

Prepared by:

SUPERVISOR OF SHIPBUILDING, CONVERSION
AND REPAIR, USN, PORTSMOUTH DETACHMENT
ENVIROMENTAL CHARLESTON, SC
1899 NORTH HOBSON AVE.
NORTH CHARLESTON SC 29405-2106

September 3, 1996

South Carolina Department of Health and Environmental Control (S.C.D.H.E.C.)
Underground Storage Tank (UST) Assessment Report

Date Received
State Use Only

Submit Completed Form to:
UST Regulatory Section
SCDHEC
2600 Bull Street
Columbia, South Carolina 29201
Telephone (803) 734-5331

I OWNERSHIP OF UST(S)

Agency/Owner: Southern Division, Naval Facilities Engineering Command, Caretaker Site Office

Mailing Address: P.O. Box 190010

City: N. Charleston State: SC Zip Code: 29419-9010

Area Code: 803 Telephone Number: 743-9985 Contact Person: LCDR Paul Rose

II SITE IDENTIFICATION AND LOCATION

Site I.D. #: 01782

Facility Name: Charleston Naval Base, NS 1346

Street Address: South Hobson Avenue

City: North Charleston, 29405-2413 County: Charleston

III CLOSURE INFORMATION

Closure Started: 8 May 1996 Closure Completed: 21 May 1996

Number of USTs Closed: 1

N/A
Consultant

SPORTENVDETCHASN
UST Removal Contractor

IV. CERTIFICATION (Read and Sign after completing entire submittal)

I certify that I have personally examined and am familiar with the information submitted in this and all attached documents; and that based on my inquiry of those individuals responsible for obtaining this information, I believe that the submitted information is true, accurate and complete.

Name (Type or Print)

Signature

V. UST INFORMATION

		Tank 1	Tank 2	Tank 3	Tank 4	Tank 5	Tank 6
A.	Product.....	Waste Oil					
B.	Capacity.....	560 gal.					
C.	Age.....	> 20 years					
D.	Construction Material.....	Steel					
E.	Month/Year of Last Use.....	Unknown					
F.	Depth (ft.) To Base of Tank.....	9'					
G.	Spill Prevention Equipment Y/N.....	N					
H.	Overfill Prevention Equipment Y/N.....	N					
I.	Method of Closure Removed/Filled.....	R					
J.	Visible Corrosion or Pitting Y/N.....	N					
K.	Visible Holes Y/N.....	N					

L. Method of disposal for any USTs removed from the ground (attach disposal manifests)

UST NS 1346 was removed, drained and cleaned. It was then cut up for recycling as scrap metal (see Attachment III). Asphalt removed during excavation was disposed of as construction debris.

M. Method of disposal for any liquid petroleum, sludges, or waste waters removed from the USTs (attach disposal manifests)

Residual waste oil was pumped into 55 gallon drums and disposed of by Tri-State Steel Drum, Inc., P.O. Box 9, Graysville, GA 30726. See Attachment III, manifest number 13107, paragraph 28d.

N. If any corrosion, pitting, or holes were observed, describe the location and extent for each UST

UST NS 1346 was found in good condition. It had no visible holes or leaks. Its exterior surface covered with a protective coating.

VI. PIPING INFORMATION

		Tank 1	Tank 2	Tank 3	Tank 4	Tank 5	Tank 6
A.	Construction Material.....	Steel					
B.	Distance from UST to Dispenser.....	N/A*					
C.	Number of Dispensers.....	N/A*					
D.	Type of System P/S.....	N/A*					
E.	Was Piping Removed from the Ground? Y/N....	Y					
F.	Visible Corrosion or Pitting Y/N.....	N					
G.	Visible Holes Y/N.....	N					
H.	Age.....	< 20 years					

*UST 1346 was a waste oil tank. Two pipe runs of 9' and 110' delivered waste oil from floor drains in the maintenance garage to the tank via gravity flow. The tank was emptied periodically by suctioning into a waste oil collection truck.

I. If any corrosion, pitting, or holes were observed, describe the location and extent for each line.

The mechanical joint above sample UST 1346-6 was found to be loose. This loose connection was responsible for leakage and the mild petroleum odor noted on Site Map 2 of Attachment I.

VII. BRIEF SITE DESCRIPTION AND HISTORY

Building 1346 was formerly an automobile service station and mini-market. UST 1346 was a 560 gallon regulated waste oil tank, # 01782. It was located under the asphalt parking lot on the west side of the building, adjacent to the service bay doors. There are other tanks on the east side of Building 1346, but they are to be worked at a later date.

The waste oil tank was fed by two drain pipe runs from the garage area. For explanation purposes these have been denoted as "A" and "B." Pipe run A was three inches in diameter and approximately nine feet long. Pipe run B was two inches in diameter and approximately 110 feet long.

VIII. SITE CONDITIONS

		Yes	No	Unk
A.	Were any petroleum-stained or contaminated soils found in the UST excavation, soil borings, trenches, or monitoring wells? If yes, indicate depth and location on the site map. [* North half of tank excavation]	X*		
B.	Were any petroleum odors detected in the excavation, soil borings, trenches, or monitoring wells? If yes, indicate location on site map and describe the odor (strong, mild, etc.)	X		
C.	Was water present in the UST excavation, soil borings, or trenches? If yes, how far below land surface (indicate location and depth)? 78" below GSL, 6" deep	X		
D.	Did contaminated soils remain stockpiled on site after closure? If yes, indicate the stockpile location on the site map. Name of DHEC representative authorizing soil removal: See Note 1.	X		
E.	Was a petroleum sheen or free product detected on any excavation or boring waters? If yes, indicate location and thickness.		X	

Note 1: The contaiminated soil is located at Bldg 1346. Per conversation with DHEC, Mr. Tim Mettlen, and Mr. Gabriel Magwood of SouthDiv, the entire naval complex is considered the site.

IX. SAMPLE INFORMATION

S.C.D.H.E.C. Lab Certification Number 10582

Sample #	Location	Sample Type (Soil/Water)	Depth*	Date/Time of Collection	Collected By	OVA#
UST 1346-1.	South end of pit, at tank end.	Soil	7'	5/10/96 @ 11:10AM	Bruce Murray	Not taken.
UST 1346-2.	North end of pit, at tank end.	Soil	7'	5/10/96 @ 11:20AM	Bruce Murray	Not taken.
UST 1346-3.	South end of pit, under tank	Water	7'	5/10/96 @ 11:30AM	Bruce Murray	Not taken.
UST 1346-6.	Pipe B, 18" below coupling.	Soil	5'	5/13/96 @ 2:45 PM	Bruce Murray	Not taken.
UST 1346-7.	Pipe A, 18" below elbow.	Soil	5'	5/14/96 @ 2:35 PM	Bruce Murray	Not taken.
UST 1346-8.	Pipe B, 18" below coupling.	Soil	5'	5/15/96 @ 10:45AM	Bruce Murray	Not taken.
UST 1346-9.	Pipe B, below pipe coupling	Soil	5'	5/16/96 @ 12:15 PM	Dennis Hall	Not taken.
UST 1346-10.	Pipe B, below pipe coupling	Soil	4'4"	5/16/96 @ 2:00 PM	Dennis Hall	Not taken.
UST 1346-11.	Pipe B, below pipe coupling	Soil	4'	5/17/96 @ 11:00 AM	Dennis Hall	Not taken.
UST 1346-12.	Pipe B, below Y coupling	Soil	4'	5/20/96 @ 11:10AM	William Nesbit	Not taken.
UST 1346-13.	Pipe B, below pipe coupling	Soil	4'	5/20/96 @ 12:45 PM	William Nesbit	Not taken.

* = Depth Below the Surrounding Land Surface

X. SAMPLING METHODOLOGY

Provide a detailed description of the methods used to collect <u>and</u> store (preserve) the samples.

After the removal of UST 1346, soil and ground water samples were taken. Soil samples from the tank pit were taken from native soils at the bottom of the excavation, 84 inches below land surface, as shown in Site Map Numbers 2 and 3. Soil samples from the two drain pipe runs (identified as A and B) were taken from beneath the pipe couplings in the locations indicated on Site Maps 2 and 3. The depths of these samples are documented in section IX of this report.

Sampling was performed in accordance with SC DHEC R.61-92 Part 280 and SC DHEC UST Assessment Guidelines.

The samples are identified as follows:

	Detachment Charleston		General Engineering Labs
Soil	UST 1346-1	=	SPORT - 0033-1
Soil	UST 1346-2	=	SPORT - 0033-2
Ground Water	UST 1346-3	=	SPORT - 0033-3
Soil	UST 1346-6	=	SPORT - 0036-1
Soil	UST 1346-7	=	SPORT - 0036-2
Soil	UST 1346-8	=	SPORT - 0037-1
Soil	UST 1346-9	=	SPORT - 0041-1
Soil	UST 1346-10	=	SPORT - 0041-3
Soil	UST 1346-11	=	SPORT - 0043-1
Soil	UST 1346-12	=	SPORT - 0048-1
Soil	UST 1346-13	=	SPORT - 0048-2

Sample containers were prepared by the testing laboratory. The grab method was utilized to fill the sample containers leaving as little head space as possible. The samples were marked, logged, and immediately placed in coolers packed with ice to maintain an approximate temperature of 4° C.

The samples remained in the custody of SPORTENVDETCHASN until they were transferred to General Engineering Laboratories for analysis as documented in the attached Chain-of-Custody Record.

XI. RECEPTORS

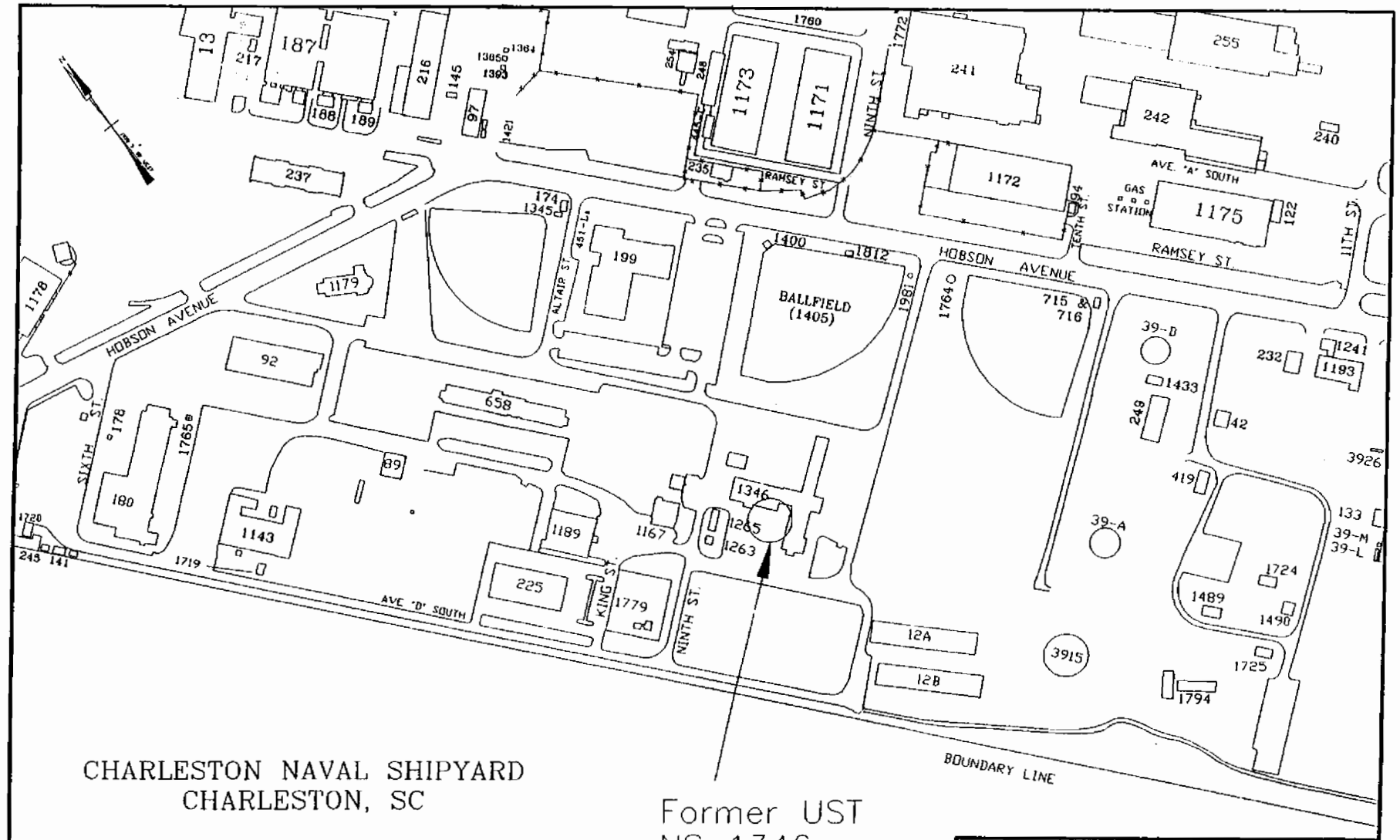
		Yes	No
A.	Are there any lakes, ponds, streams, or wetlands located within 1000 feet of the UST system? If yes, indicate type of receptor, distance, and direction on site map.		X
B.	Are there any public, private, or irrigation water supply wells within 1000 feet of the UST system? If yes, indicate type of well, distance, and direction on site map.		X
C.	Are there any underground structures (e.g., basements) located within 100 feet of the UST system? If yes, indicate the type of structure, distance, and direction on site map.		X
D.	Are there any underground utilities (e.g., telephone, electricity, gas, water, sewer, storm drain) located within 100 feet of the UST system that could potentially come in contact with the contamination? [*sewer] If yes, indicate the type of utility, distance, and direction on the site map.	X*	
E.	Has contaminated soil been identified at a depth of less than 3 feet below land surface in an area that is not capped by asphalt or concrete? If yes, indicate the area of contaminated soil on the site map.		X

Attachment I

SITE MAP

You must supply a scaled site map. It should include all buildings, road names, utilities, tank and pump island locations, sample locations, extent of excavation, and any other pertinent information.

Site Maps 1, 2, and 3
Photograph



CHARLESTON NAVAL SHIPYARD
CHARLESTON, SC

Former UST
NS 1346

300 0 300 600 900

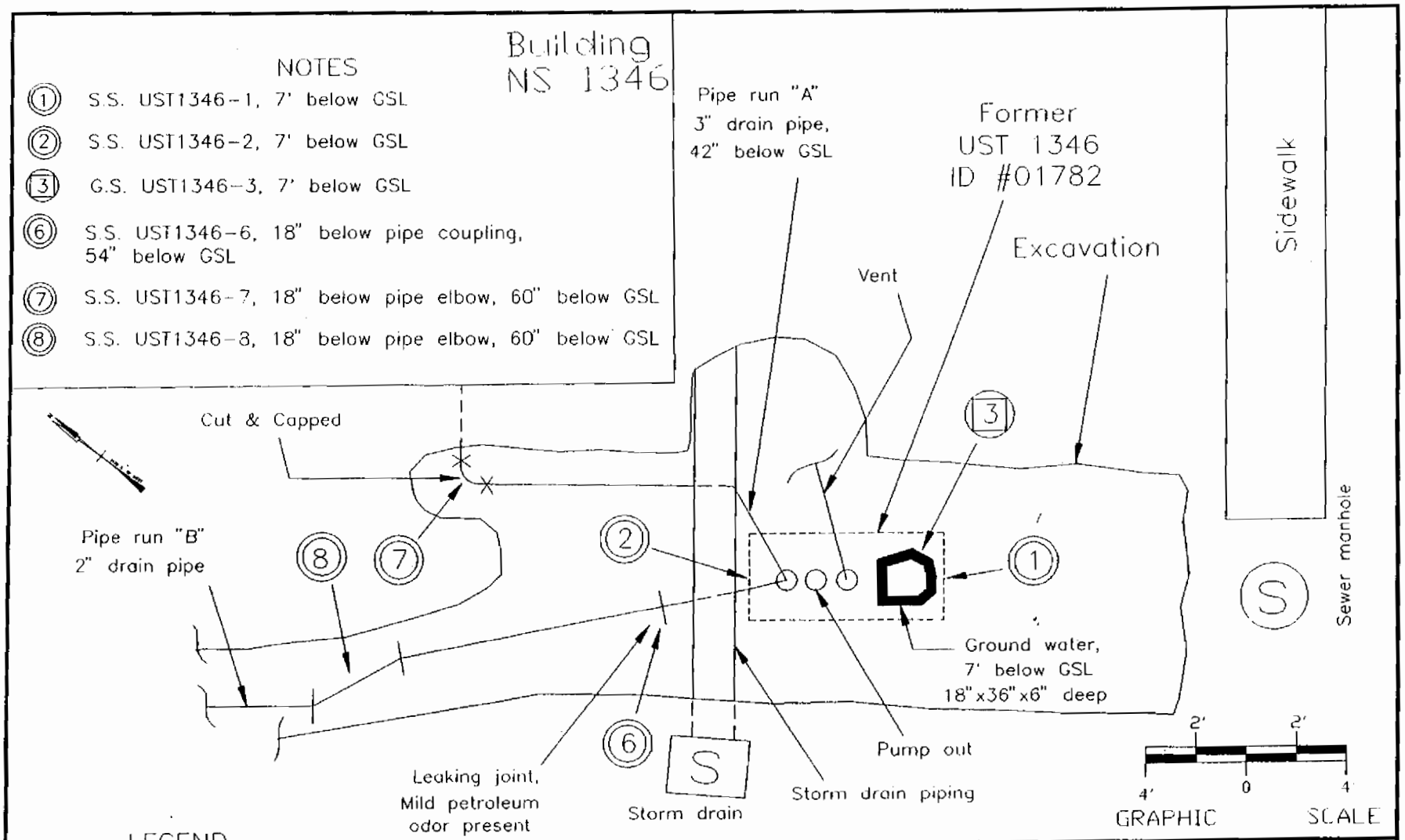
GRAPHIC SCALE

Figure: Site Map 1
UST NS 1346
Charleston Naval Shipyard
Charleston, SC

SPORTENVDETCHASN
1899 North Hobson Avenue
North Charleston, SC 29405-2106

DWG DATE: 3 June 96

DWG NAME: NS1346_1



LEGEND

1 Soil Sample (S.S.)

1 Ground Water Sample (G.S.)

Screwed pipe joint

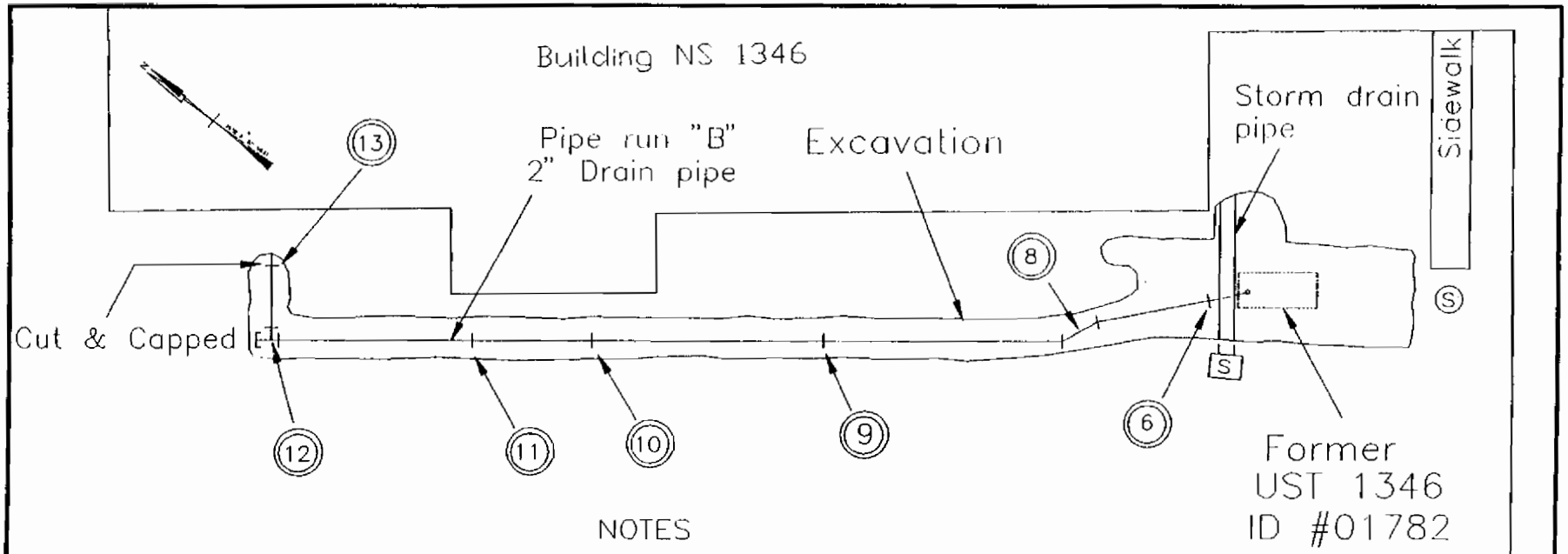
Welded pipe joint

Figure: Site Map 2
UST NS 1346
Charleston Naval Shipyard
Charleston, SC

SPORTENVDETCHASN
1899 North Hobson Avenue
North Charleston, SC 29405-2106

DWG DATE: 12 Aug 1996

DWG NAME: NS1346_2



NOTES

6 S.S. UST1346-6, 18" below pipe coupling, 60" below GSL

8 S.S. UST1346-8, 18" below pipe coupling, 60" below GSL

9 S.S. UST1346-9, below pipe coupling, 60" below GSL

10 S.S. UST1346-10, below pipe coupling, 52" below GSL

11 S.S. UST1346-11, below pipe coupling, 48" below GSL

12 S.S. UST1346-12, below Y coupling, 48" below GSL

13 S.S. UST1346-13, below pipe coupling, 48" below GSL

LEGEND

(s) Sewer manhole

[s] Storm drain

(1) Soil Sample (S.S.)

Screwed pipe joint

Fill/clean-out cap

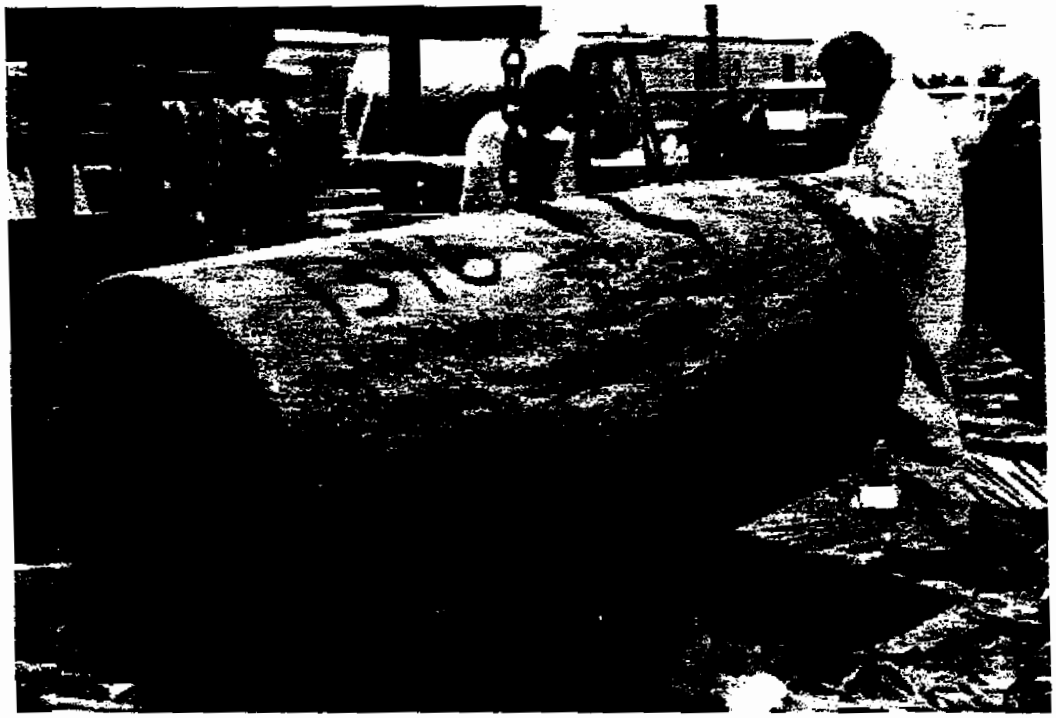
5' 5'
10' 0 10'
GRAPHIC SCALE

SPORTENVDETCHASN
1899 North Hobson Avenue
North Charleston, SC 29405-2106

Figure: Site Map 3
UST NS 1346
Charleston Naval Shipyard
Charleston, SC

DWG DATE: 13 June 96

DWG NAME: NS1346_2



UST 1346 INSPECTION AND CLEANING

Attachment II

ANALYTICAL RESULTS

You must submit the laboratory report and chain-of-custody form for the samples. These samples must be analyzed by a South Carolina certified laboratory.

Certified Analytical Results
Chain-of-Custody

GENERAL ENGINEERING LABORATORIES

Meeting today's needs with a vision for tomorrow.

CERTIFICATE OF ANALYSIS

Client: Supervisor of Ship Building & Conversion
SUPSHIP-Portsmouth Detachment-Env.
1899 North Hobson Ave.
North Charleston, South Carolina 29405-2106
Contact: Mr. Bill Hiers
Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00196 Report Date: May 21, 1996

Sample ID : SPORT-0033-1
Lab ID : 9605183-01
Matrix : Soil
Date Collected : 05/10/96
Date Received : 05/10/96
Priority : Routine
Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
BTEX - 4 items											
Benzene	U	0.00	1.00	2.00	ug/kg	1.0	RMB	05/13/96	1851	84449	1
Ethylbenzene	U	0.00	1.00	2.00	ug/kg	1.0					
Toluene	U	0.00	1.00	2.00	ug/kg	1.0					
Xylenes (TOTAL)	U	0.00	1.00	4.00	ug/kg	1.0					
Naphthalene	U	0.00	1.00	2.00	ug/kg	1.0					
Extractable Organics											
Polynuclear Aromatic Hydrocarbons - 16 items											
Acenaphthene	U	0.00	664	1330	ug/kg	4.0	BDG	05/15/96	1923	84649	2
Acenaphthylene	U	0.00	664	1330	ug/kg	4.0					
Anthracene	U	0.00	664	1330	ug/kg	4.0					
Benzo(a)anthracene	U	0.00	664	1330	ug/kg	4.0					
Benzo(a)pyrene	U	0.00	664	1330	ug/kg	4.0					
Benzo(b)fluoranthene	U	0.00	664	1330	ug/kg	4.0					
Benzo(ghi)perylene	U	0.00	664	1330	ug/kg	4.0					
Benzo(k)fluoranthene	U	0.00	664	1330	ug/kg	4.0					
Chrysene	U	0.00	664	1330	ug/kg	4.0					
Dibenzo(a,h)anthracene	U	0.00	664	1330	ug/kg	4.0					
Fluoranthene	U	0.00	664	1330	ug/kg	4.0					
Fluorene	U	0.00	664	1330	ug/kg	4.0					
Indeno(1,2,3-c,d)pyrene	U	0.00	664	1330	ug/kg	4.0					
Naphthalene	U	0.00	664	1330	ug/kg	4.0					
Phenanthrene	U	0.00	664	1330	ug/kg	4.0					
Pyrene	U	0.00	664	1330	ug/kg	4.0					
Metals Analysis											
Mercury	J	0.0692	0.00206	0.200	mg/kg	1.0	RMJ	05/15/96	2122	84618	N
Silver	J	136	123	500	ug/kg	1.0	NRM	05/17/96	1934	84697	3
Arsenic		3230	92.1	500	ug/kg	1.0					

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CERTIFICATE OF ANALYSIS

Client: Supervisor of Ship Building & Conversion
SUPSHIP-Portsmouth Detachment-Env.
1899 North Hobson Ave.
North Charleston, South Carolina 29405-2106
Contact: Mr. Bill Hiers
Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00196 Report Date: May 21, 1996

Sample ID : SPORT-0033-1

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Barium		24400	3.28	500	ug/kg	1.0					
Cadmium	J	195	4.80	250	ug/kg	1.0	NRM	05/17/96	1934	84697	3
Chromium		13400	29.5	500	ug/kg	1.0					
Lead		72000	55.9	250	ug/kg	1.0					
Selenium		777	70.8	250	ug/kg	1.0					
General Chemistry											
Total Rec. Petro. Hydrocarbons		560	10.0	50.0	mg/kg	1.0	SDW	05/16/96	0900	84767	4

The following prep procedures were performed:

GC/MS Base/Neutral Compounds	TMK	05/14/96	1330	84649	5
Mercury	RMJ	05/14/96	1500	84618	6
TRACE	FGD	05/15/96	1530	84697	7

Comments:
A dilution was required for Extractable Organics due to matrix interference. As a result, the detection limits are elevated.

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorobiphenyl	M610	90.5	(30.0 - 115.)
Nitrobenzene-d5	M610	80.1	(23.0 - 120.)
p-Terphenyl-d14	M610	106.	(37.3 - 128.)
Bromofluorobenzene	BTEX-8260	120.	(59.7 - 159.)
Dibromofluoromethane	BTEX-8260	92.0	(74.0 - 128.)
Toluene-d8	BTEX-8260	113.	(53.4 - 163.)
Bromofluorobenzene	NAP-8260	120.	(59.7 - 159.)
Dibromofluoromethane	NAP-8260	92.0	(74.0 - 128.)
Toluene-d8	NAP-8260	113.	(53.4 - 163.)

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CERTIFICATE OF ANALYSIS

Client:	Supervisor of Ship Building & Conversion SUPSHIP-Portsmouth Detachment-Env. 1899 North Hobson Ave. North Charleston, South Carolina 29405-2106
Contact:	Mr. Bill Hiers
Project Description:	SUPSHIP-Portsmouth Detachment

cc: NPWC00196 Report Date: May 21, 1996

Sample ID : SPORT-0033-1

M = Method	Method-Description
M 1	EPA 8260
M 2	EPA 8270
M 3	EPA 6010A
M 4	EPA 9071
M 5	EPA 3550
M 6	EPA 7471
M 7	EPA 3050

Notes:
The qualifiers in this report are defined as follows:
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicate that a quality control analyte recovery is outside of specified acceptance criteria.

GEL Laboratory Certifications		EPI Laboratory Certifications	
AL - 41040	AZ - AZ0514	AL - 41050	AZ - AZ0514
CA - 2089	CT - PH-0169	CA - I-1023/2056	CT - PH-0175
DE - SC012	FL - E87156/87294	FL - E87472/87458	MS - 29417
ME - SC012	MS - 10120	NY - 11502	RI - 138
NC - 233	NY - 11501	SC - 10582	TN - 02934
RI - 135	SC - 10120	UT - E-227	VA - 00111
TN - 02934	UT - E-251	WA - C225	NJ - 79002

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Contact:	Mr. Bill Hiers
Project Description:	SUPSHIP-Portsmouth Detachment

cc: NPWC00196 Report Date: May 21, 1996

Sample ID : SPORT-0033-1

GEL Laboratory Certifications		EPI Laboratory Certifications	
VA - 00151	WA - C223	PA - 68-485	WV - 235
WI - 999887790			

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Karen Blakeney at (803) 769-7386.

Karen Blakeney

Analytical Report Specialist

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Client: Supervisor of Ship Building & Conversion
SUPSHIP-Portsmouth Detachment-Env.
1899 North Hobson Ave.
North Charleston, South Carolina 29405-2106
Contact: Mr. Bill Hiers
Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00196 Report Date: May 21, 1996

Sample ID : SPORT-0033-2
Lab ID : 9605183-02
Matrix : Soil
Date Collected : 05/10/96
Date Received : 05/10/96
Priority : Routine
Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
BTEX - 4 items											
Benzene	U	0.00	2.00	4.00	ug/kg	2.0	RMB	05/14/96	1330	84449	1
Ethylbenzene	U	0.00	2.00	4.00	ug/kg	2.0					
Toluene	U	0.00	2.00	4.00	ug/kg	2.0					
Xylenes (TOTAL)	U	0.00	2.00	4.00	ug/kg	2.0					
Naphthalene		15.0	2.00	4.00	ug/kg	2.0					
Extractable Organics											
Polynuclear Aromatic Hydrocarbons - 16 items											
Acenaphthene	U	0.00	660	1320	ug/kg	4.0	BDG	05/15/96	2030	84649	2
Acenaphthylene	U	0.00	660	1320	ug/kg	4.0					
Anthracene	U	0.00	660	1320	ug/kg	4.0					
Benzo(a)anthracene	U	0.00	660	1320	ug/kg	4.0					
Benzo(a)pyrene	U	0.00	660	1320	ug/kg	4.0					
Benzo(b)fluoranthene	U	0.00	660	1320	ug/kg	4.0					
Benzo(ghi)perylene	U	0.00	660	1320	ug/kg	4.0					
Benzo(k)fluoranthene	U	0.00	660	1320	ug/kg	4.0					
Chrysene	U	0.00	660	1320	ug/kg	4.0					
Dibenzo(a,h)anthracene	U	0.00	660	1320	ug/kg	4.0					
Fluoranthene	U	0.00	660	1320	ug/kg	4.0					
Fluorene	U	0.00	660	1320	ug/kg	4.0					
Indeno(1,2,3-c,d)pyrene	U	0.00	660	1320	ug/kg	4.0					
Naphthalene	U	0.00	660	1320	ug/kg	4.0					
Phenanthrene	U	0.00	660	1320	ug/kg	4.0					
Pyrene	U	0.00	660	1320	ug/kg	4.0					
Metals Analysis											
Mercury	J	0.0456	0.00247	0.200	mg/kg	1.0	RMJ	05/15/96	2124	84618	
Silver	J	329	125	500	ug/kg	1.0	NRM	05/17/96	1938	84697	3
Arsenic		3160	93.0	500	ug/kg	1.0					

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1899 North Hobson Ave.
North Charleston, South Carolina 29405-2106
Contact: Mr. Bill Hiers
Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00196 Report Date: May 21, 1996

Sample ID : SPORT-0033-2

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Barium		25500	3.32	500	ug/kg	1.0					
Cadmium	J	71.8	4.85	250	ug/kg	1.0	NRM	05/17/96	1938	84697	3
Chromium		11600	29.8	500	ug/kg	1.0					
Lead		60700	56.5	250	ug/kg	1.0					
Selenium		605	71.5	250	ug/kg	1.0					
General Chemistry											
Total Rec. Petro. Hydrocarbons		1100	10.0	50.0	mg/kg	1.0	SDW	05/16/96	0900	84767	4

The following prep procedures were performed:

GC/MS Base/Neutral Compounds	TMK	05/14/96	1330	84649	5
Mercury	RMJ	05/14/96	1500	84618	6
TRACE	FGD	05/15/96	1530	84697	7

Comments:
A dilution was required for Extractable Organics due to matrix interference. As a result, the detection limits are elevated.

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorobiphenyl	M610	90.4	(30.0 - 115.)
Nitrobenzene-d5	M610	70.4	(23.0 - 120.)
p-Terphenyl-d14	M610	106.	(37.3 - 128.)
Bromofluorobenzene	BTEX-8260	98.4	(59.7 - 159.)
Dibromofluoromethane	BTEX-8260	92.4	(74.0 - 128.)
Toluene-d8	BTEX-8260	96.0	(53.4 - 163.)
Bromofluorobenzene	NAP-8260	98.4	(59.7 - 159.)
Dibromofluoromethane	NAP-8260	92.4	(74.0 - 128.)
Toluene-d8	NAP-8260	96.0	(53.4 - 163.)

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Contact:	Mr. Bill Hiers
Project Description:	SUPSHIP-Portsmouth Detachment

cc: NPWC00196 Report Date: May 21, 1996

Sample ID : SPORT-0033-2

M = Method	Method-Description
M 1	EPA 8260
M 2	EPA 8270
M 3	EPA 6010A
M 4	EPA 9071
M 5	EPA 3550
M 6	EPA 7471
M 7	EPA 3050

Notes:
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U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicate that a quality control analyte recovery is outside of specified acceptance criteria.

GEL Laboratory Certifications		EPI Laboratory Certifications	
AL - 41040	AZ - AZ0514	AL - 41050	AZ - AZ0514
CA - 2089	CT - PH-0169	CA - I-1023/2056	CT - PH-0175
DE - SC012	FL - E87156/87294	FL - E87472/87458	MS - 29417
ME - SC012	MS - 10120	NY - 11502	RI - 138
NC - 233	NY - 11501	SC - 10582	TN - 02934
RI - 135	SC - 10120	UT - E-227	VA - 00111
TN - 02934	UT - E-251	WA - C225	NJ - 79002

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Contact:	Mr. Bill Hiers
Project Description:	SUPSHIP-Portsmouth Detachment

cc: NPWC00196 Report Date: May 21, 1996

Sample ID : SPORT-0033-2

GEL Laboratory Certifications		EPI Laboratory Certifications	
VA - 00151	WA - C223	PA - 68-485	WV - 235
WI - 999887790			

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Karen Blakeney

Analytical Report Specialist

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SUPSHIP-Portsmouth Detachment-Env.
1899 North Hobson Ave.
North Charleston, South Carolina 29405-2106
Contact: Mr. Bill Hiers
Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00196 Report Date: May 21, 1996

Sample ID	: SPORT-0033-3
Lab ID	: 9605183-03
Matrix	: GroundH2O
Date Collected	: 05/10/96
Date Received	: 05/10/96
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
BTEX - 4 items											
Benzene	U	0.00	1.00	2.00	ug/l	1.0	JAC	05/14/96	1047	84612	1
Ethylbenzene	U	0.00	1.00	2.00	ug/l	1.0					
Toluene	U	0.00	1.00	2.00	ug/l	1.0					
Xylenes (TOTAL)	U	0.00	1.00	4.00	ug/l	1.0					
Naphthalene	U	0.00	1.00	2.00	ug/l	1.0					
Extractable Organics											
Polynuclear Aromatic Hydrocarbons - 16 items											
Acenaphthene	U	0.00	20.0	40.0	ug/l	4.0	BDG	05/15/96	2216	84576	2
Acenaphthylene	U	0.00	20.0	40.0	ug/l	4.0					
Anthracene	U	0.00	20.0	40.0	ug/l	4.0					
Benzo(a)anthracene	U	0.00	20.0	40.0	ug/l	4.0					
Benzo(a)pyrene	U	0.00	20.0	40.0	ug/l	4.0					
Benzo(b)fluoranthene	U	0.00	20.0	40.0	ug/l	4.0					
Benzo(ghi)perylene	U	0.00	20.0	40.0	ug/l	4.0					
Benzo(k)fluoranthene	U	0.00	20.0	40.0	ug/l	4.0					
Chrysene	U	0.00	20.0	40.0	ug/l	4.0					
Dibenzo(a,h)anthracene	U	0.00	20.0	40.0	ug/l	4.0					
Fluoranthene	U	0.00	20.0	40.0	ug/l	4.0					
Fluorene	U	0.00	20.0	40.0	ug/l	4.0					
Indeno(1,2,3-c,d)pyrene	U	0.00	20.0	40.0	ug/l	4.0					
Naphthalene	U	0.00	20.0	40.0	ug/l	4.0					
Phenanthrene	U	0.00	20.0	40.0	ug/l	4.0					
Pyrene	U	0.00	20.0	40.0	ug/l	4.0					
Metals Analysis											
Mercury		2.69	0.0148	0.500	ug/l	1.0	RMJ	05/14/96	1718	84619	1
Silver	J	6.04	2.49	10.0	ug/l	1.0	NRM	05/17/96	0333	84755	3
Arsenic		191	1.86	10.0	ug/l	1.0					

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1899 North Hobson Ave.
North Charleston, South Carolina 29405-2106
Contact: Mr. Bill Hiers
Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00196 Report Date: May 21, 1996

Sample ID : SPORT-0033-3

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Barium		1190	0.0663	10.0	ug/l	1.0					
Cadmium		9.25	0.0970	5.00	ug/l	1.0	NRM	05/17/96	0333	84755	3
Chromium		534	0.596	10.0	ug/l	1.0					
Lead		4550	1.13	5.00	ug/l	1.0					
Selenium		26.6	1.43	5.00	ug/l	1.0					
General Chemistry											
Total Rec. Petro. Hydrocarbons		21.0	2.00	2.00	mg/l	1.0	SDW	05/17/96	1330	84840	4

The following prep procedures were performed:

GC/MS Base/Neutral Compounds	TNF	05/13/96	1100	84576	5
Mercury	RMJ	05/13/96	1900	84619	6
TRACE	FGD	05/16/96	1330	84755	7

Comments:
A dilution was required for Extractable Organics due to matrix interference. As a result, the detection limits are elevated.

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorobiphenyl	M610	101.	(43.0 - 108.)
Nitrobenzene-d5	M610	112.*	(35.0 - 111.)
p-Terphenyl-d14	M610	88.0	(33.0 - 125.)
Bromofluorobenzene	BTEX-8260	98.4	(80.0 - 128.)
Dibromofluoromethane	BTEX-8260	90.0	(67.7 - 135.)
Toluene-d8	BTEX-8260	98.0	(76.8 - 122.)
Bromofluorobenzene	NAP-8260	98.4	(80.0 - 128.)
Dibromofluoromethane	NAP-8260	90.0	(67.7 - 135.)
Toluene-d8	NAP-8260	98.0	(76.8 - 122.)

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Contact:	Mr. Bill Hiers
Project Description:	SUPSHIP-Portsmouth Detachment

cc: NPWC00196 Report Date: May 21, 1996

Sample ID : SPORT-0033-3

M = Method	Method-Description
M 1	EPA 8260
M 2	EPA 8270
M 3	EPA 6010A
M 4	EPA 9070A
M 5	EPA 3510
M 6	EPA 7470
M 7	EPA 3005

Notes:
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* indicate that a quality control analyte recovery is outside of specified acceptance criteria.

GEL Laboratory Certifications		EPI Laboratory Certifications	
AL - 41040	AZ - AZ0514	AL - 41050	AZ - AZ0514
CA - 2089	CT - PH-0169	CA - I-1023/2056	CT - PH-0175
DE - SC012	FL - E87156/87294	FL - E87472/87458	MS - 29417
ME - SC012	MS - 10120	NY - 11502	RI - 138
NC - 233	NY - 11501	SC - 10582	TN - 02934
RI - 135	SC - 10120	UT - E-227	VA - 00111
TN - 02934	UT - E-251	WA - C225	NJ - 79002

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Contact:	Mr. Bill Hiers
Project Description:	SUPSHIP-Portsmouth Detachment

cc: NPWC00196 Report Date: May 21, 1996

Sample ID : SPORT-0033-3

GEL Laboratory Certifications		EPI Laboratory Certifications	
VA - 00151	WA - C223	PA - 68-485	WV - 235
WI - 999887790			

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Karen Blakeney at (803) 769-7386.

Karen Blakeney

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SUPSHIP-Portsmouth Detachment-Env.
1899 North Hobson Ave.
North Charleston, South Carolina 29405-2106
Contact: Mr. Bill Hiers
Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00196 Report Date: May 23, 1996

Sample ID	: SPORT-0036-1
Lab ID	: 9605271-01
Matrix	: Soil
Date Collected	: 05/13/96
Date Received	: 05/15/96
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
BTEX - 4 items											
Benzene	U	0.00	1.00	2.00	ug/kg	1.0	RLC	05/20/96	1751	84833	
Ethylbenzene	U	0.00	1.00	2.00	ug/kg	1.0					
Toluene	U	0.00	1.00	2.00	ug/kg	1.0					
Xylenes (TOTAL)	U	0.00	1.00	4.00	ug/kg	1.0					
Naphthalene		13.0	1.00	2.00	ug/kg	1.0					
Extractable Organics											
Polynuclear Aromatic Hydrocarbons - 16 items											
Acenaphthene	U	0.00	166	331	ug/kg	1.0	BDG	05/20/96	2033	84824	2
Acenaphthylene	U	0.00	166	331	ug/kg	1.0					
Anthracene	U	0.00	166	331	ug/kg	1.0					
Benzo(a)anthracene	U	0.00	166	331	ug/kg	1.0					
Benzo(a)pyrene	U	0.00	166	331	ug/kg	1.0					
Benzo(b)fluoranthene	U	0.00	166	331	ug/kg	1.0					
Benzo(ghi)perylene	U	0.00	166	331	ug/kg	1.0					
Benzo(k)fluoranthene	U	0.00	166	331	ug/kg	1.0					
Chrysene	U	0.00	166	331	ug/kg	1.0					
Dibenzo(a,h)anthracene	U	0.00	166	331	ug/kg	1.0					
Fluoranthene	U	0.00	166	331	ug/kg	1.0					
Fluorene	U	0.00	166	331	ug/kg	1.0					
Indeno(1,2,3-c,d)pyrene	U	0.00	166	331	ug/kg	1.0					
Naphthalene	U	0.00	166	331	ug/kg	1.0					
Phenanthrene	U	0.00	166	331	ug/kg	1.0					
Pyrene	U	0.00	166	331	ug/kg	1.0					
Metals Analysis											
Mercury	U	-0.00156	0.00210	0.200	mg/kg	1.0	RMJ	05/17/96	1840	84834	
Silver	U	45.3	237	952	ug/kg	2.0	WCC	05/20/96	0944	84815	
Arsenic		2720	177	952	ug/kg	2.0					

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CERTIFICATE OF ANALYSIS

Client: Supervisor of Ship Building & Conversion
SUPSHIP-Portsmouth Detachment-Env.
1899 North Hobson Ave.
North Charleston, South Carolina 29405-2106
Contact: Mr. Bill Hiers
Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00196 Report Date: May 23, 1996

Sample ID : SPORT-0036-1

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Barium		9140	6.31	952	ug/kg	2.0					
Cadmium	J	109	9.23	476	ug/kg	2.0	WCC	05/20/96	0944	84815	3
Chromium		8060	56.7	952	ug/kg	2.0					
Lead		10200	108	476	ug/kg	2.0					
Selenium		795	136	476	ug/kg	2.0					
General Chemistry											
Total Rec. Petro. Hydrocarbons		140	10.0	50.0	mg/kg	1.0	SDW	05/16/96	0900	84767	4

The following prep procedures were performed:

GC/MS Base/Neutral Compounds	TMK	05/17/96	1230	84824	5
Mercury	RMJ	05/17/96	1200	84834	6
TRACE	DVW	05/17/96	2145	84815	7

Comments:
A dilution was required for Metals Analysis due to high concentration(s).
As a result, the detection limits are elevated.

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorobiphenyl	M610	62.2	(30.0 - 115.)
Nitrobenzene-d5	M610	58.2	(23.0 - 120.)
p-Terphenyl-d14	M610	91.8	(37.3 - 128.)
Bromofluorobenzene	BTEX-8260	93.8	(59.7 - 159.)
Dibromofluoromethane	BTEX-8260	111.	(74.0 - 128.)
Toluene-d8	BTEX-8260	93.1	(53.4 - 163.)
Bromofluorobenzene	NAP-8260	93.8	(59.7 - 159.)
Dibromofluoromethane	NAP-8260	111.	(74.0 - 128.)
Toluene-d8	NAP-8260	93.1	(53.4 - 163.)

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GENERAL ENGINEERING LABORATORIES

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CERTIFICATE OF ANALYSIS

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Contact:	Mr. Bill Hiers
Project Description:	SUPSHIP-Portsmouth Detachment

cc: NPWC00196 Report Date: May 23, 1996

Sample ID : SPORT-0036-1

M = Method	Method-Description
M 1	EPA 8260
M 2	EPA 8270
M 3	EPA 6010A
M 4	EPA 9071
M 5	EPA 3550
M 6	EPA 7471
M 7	EPA 3050

Notes:
The qualifiers in this report are defined as follows:
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicate that a quality control analyte recovery is outside of specified acceptance criteria.

GEL Laboratory Certifications		EPI Laboratory Certifications	
AL - 41040	AZ - AZ0514	AL - 41050	AZ - AZ0514
CA - 2089	CT - PH-0169	CA - I-1023/2056	CT - PH-0175
DE - SC012	FL - E87156/87294	FL - E87472/87458	MS - 29417
ME - SC012	MS - 10120	NY - 11502	RI - 138
NC - 233	NY - 11501	SC - 10582	TN - 02934
RI - 135	SC - 10120	UT - E-227	VA - 00111
TN - 02934	UT - E-251	WA - C225	NJ - 79002

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Contact:	Mr. Bill Hiers
Project Description:	SUPSHIP-Portsmouth Detachment

cc: NPWC00196 Report Date: May 23, 1996

Sample ID : SPORT-0036-1

GEL Laboratory Certifications		EPI Laboratory Certifications	
VA - 00151	WA - C223	PA - 68-485	WV - 235
WI - 999887790			

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Karen Blakeney at (803) 769-7386.

Analytical Report Specialist

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CERTIFICATE OF ANALYSIS

Client: Supervisor of Ship Building & Conversion
SUPSHIP-Portsmouth Detachment-Env.
1899 North Hobson Ave.
North Charleston, South Carolina 29405-2106
Contact: Mr. Bill Hiers
Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00196

Report Date: May 24, 1996

Sample ID : SPORT-0036-2
Lab ID : 9605271-02
Matrix : Soil
Date Collected : 05/14/96
Date Received : 05/15/96
Priority : Routine
Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
BTEX - 4 items											
Benzene	U	0.00	1.00	2.00	ug/kg	1.0	RLC	05/20/96	1821	84833	
Ethylbenzene	U	0.00	1.00	2.00	ug/kg	1.0					
Toluene	U	0.00	1.00	2.00	ug/kg	1.0					
Xylenes (TOTAL)	U	0.00	1.00	4.00	ug/kg	1.0					
Naphthalene	U	0.00	1.00	2.00	ug/kg	1.0					
Extractable Organics											
Polynuclear Aromatic Hydrocarbons - 16 items											
Acenaphthene	U	0.00	162	330	ug/kg	1.0	BDG	05/20/96	2106	84824	2
Acenaphthylene	U	0.00	162	330	ug/kg	1.0					
Anthracene	U	0.00	162	330	ug/kg	1.0					
Benzo(a)anthracene	U	0.00	162	330	ug/kg	1.0					
Benzo(a)pyrene	U	0.00	162	330	ug/kg	1.0					
Benzo(b)fluoranthene	U	0.00	162	330	ug/kg	1.0					
Benzo(ghi)perylene	U	0.00	162	330	ug/kg	1.0					
Benzo(k)fluoranthene	U	0.00	162	330	ug/kg	1.0					
Chrysene	U	0.00	162	330	ug/kg	1.0					
Dibenzo(a,h)anthracene	U	0.00	162	330	ug/kg	1.0					
Fluoranthene	U	0.00	162	330	ug/kg	1.0					
Fluorene	U	0.00	162	330	ug/kg	1.0					
Indeno(1,2,3-c,d)pyrene	U	0.00	162	330	ug/kg	1.0					
Naphthalene	U	0.00	162	330	ug/kg	1.0					
Phenanthrene	U	0.00	162	330	ug/kg	1.0					
Pyrene	U	0.00	162	330	ug/kg	1.0					
Metals Analysis											
Mercury	J	0.00599	0.00240	0.200	mg/kg	1.0	RMJ	05/17/96	1843	84834	1
Silver	U	37.1	242	970	ug/kg	2.0	WCC	05/20/96	0949	84815	3
Arsenic		4140	180	970	ug/kg	2.0					

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Client: Supervisor of Ship Building & Conversion
SUPSHIP-Portsmouth Detachment-Env.
1899 North Hobson Ave.
North Charleston, South Carolina 29405-2106
Contact: Mr. Bill Hiers
Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00196 Report Date: May 24, 1996

Sample ID : SPORT-0036-2

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Barium		14200	6.43	970	ug/kg	2.0					
Cadmium	J	108	9.41	485	ug/kg	2.0	WCC	05/20/96	0949	84815	3
Chromium		15700	57.8	970	ug/kg	2.0					
Lead		6110	110	485	ug/kg	2.0					
Selenium		686	139	485	ug/kg	2.0					
General Chemistry											
Total Rec. Petro. Hydrocarbons		160	10.0	50.0	mg/kg	1.0	SDW	05/16/96	0900	84767	4

The following prep procedures were performed:

GC/MS Base/Neutral Compounds	TMK	05/17/96	1230	84824	5
Mercury	RMJ	05/17/96	1200	84834	6
TRACE	DVW	05/17/96	2145	84815	7

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorobiphenyl	M610	74.0	(30.0 - 115.)
Nitrobenzene-d5	M610	71.2	(23.0 - 120.)
p-Terphenyl-d14	M610	93.9	(37.3 - 128.)
Bromofluorobenzene	BTEX-8260	94.5	(59.7 - 159.)
Dibromofluoromethane	BTEX-8260	114.	(74.0 - 128.)
Toluene-d8	BTEX-8260	92.1	(53.4 - 163.)
Bromofluorobenzene	NAP-8260	94.5	(59.7 - 159.)
Dibromofluoromethane	NAP-8260	114.	(74.0 - 128.)
Toluene-d8	NAP-8260	92.1	(53.4 - 163.)

M = Method	Method-Description
M 1	EPA 8260
M 2	EPA 8270
M 3	EPA 6010A
M 4	EPA 9071
M 5	EPA 3550

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Client:	Supervisor of Ship Building & Conversion SUPSHIP-Portsmouth Detachment-Env. 1899 North Hobson Ave. North Charleston, South Carolina 29405-2106
Contact:	Mr. Bill Hiers
Project Description:	SUPSHIP-Portsmouth Detachment

cc: NPWC00196 Report Date: May 24, 1996

Sample ID : SPORT-0036-2

M = Method	Method-Description
M 6	EPA 7471
M 7	EPA 3050

Notes:
The qualifiers in this report are defined as follows:
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
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* indicate that a quality control analyte recovery is outside of specified acceptance criteria.

GEL Laboratory Certifications		EPI Laboratory Certifications	
AL - 41040	AZ - AZ0514	AL - 41050	AZ - AZ0514
CA - 2089	CT - PH-0169	CA - I-1023/2056	CT - PH-0175
DE - SC012	FL - E87156/87294	FL - E87472/87458	MS - 29417
ME - SC012	MS - 10120	NY - 11502	RI - 138
NC - 233	NY - 11501	SC - 10582	TN - 02934
RI - 135	SC - 10120	UT - E-227	VA - 00111
TN - 02934	UT - E-251	WA - C225	NJ - 79002
VA - 00151	WA - C223	PA - 68-485	WV - 235
WI - 999887790			

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Contact:	Mr. Bill Hiers
Project Description:	SUPSHIP-Portsmouth Detachment

cc: NPWC00196 Report Date: May 24, 1996

Sample ID : SPORT-0036-2

GEL Laboratory Certifications **EPI Laboratory Certifications**

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Karen Blakeney

Analytical Report Specialist

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SUPSHIP-Portsmouth Detachment-Env.
1899 North Hobson Ave.
North Charleston, South Carolina 29405-2106
Contact: Mr. Bill Hiers
Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00196 Report Date: May 23, 1996

Sample ID : SPORT-0037-1
Lab ID : 9605272-01
Matrix : Soil
Date Collected : 05/15/96
Date Received : 05/15/96
Priority : Routine
Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
BTEX - 4 items											
Benzene	U	0.00	1.00	2.00	ug/kg	1.0	RLC	05/20/96	1851	84833	1
Ethylbenzene	U	0.00	1.00	2.00	ug/kg	1.0					
Toluene	U	0.00	1.00	2.00	ug/kg	1.0					
Xylenes (TOTAL)	U	0.00	1.00	4.00	ug/kg	1.0					
Naphthalene	U	0.00	1.00	2.00	ug/kg	1.0					
Extractable Organics											
Polynuclear Aromatic Hydrocarbons - 16 items											
Acenaphthene	U	0.00	162	330	ug/kg	1.0	BDG	05/22/96	0110	84824	2
Acenaphthylene	U	0.00	162	330	ug/kg	1.0					
Anthracene	U	0.00	162	330	ug/kg	1.0					
Benzo(a)anthracene	U	0.00	162	330	ug/kg	1.0					
Benzo(a)pyrene	U	0.00	162	330	ug/kg	1.0					
Benzo(b)fluoranthene	U	0.00	162	330	ug/kg	1.0					
Benzo(ghi)perylene	U	0.00	162	330	ug/kg	1.0					
Benzo(k)fluoranthene	U	0.00	162	330	ug/kg	1.0					
Chrysene	U	0.00	162	330	ug/kg	1.0					
Dibenzo(a,h)anthracene	U	0.00	162	330	ug/kg	1.0					
Fluoranthene	U	0.00	162	330	ug/kg	1.0					
Fluorene	U	0.00	162	330	ug/kg	1.0					
Indeno(1,2,3-c,d)pyrene	U	0.00	162	330	ug/kg	1.0					
Naphthalene	U	0.00	162	330	ug/kg	1.0					
Phenanthrene	U	0.00	162	330	ug/kg	1.0					
Pyrene	U	0.00	162	330	ug/kg	1.0					
Metals Analysis											
Mercury	J	0.0145	0.00223	0.200	mg/kg	1.0	RMJ	05/17/96	1845	84834	
Silver	U	59.1	244	980	ug/kg	2.0	WCC	05/20/96	0954	84815	3
Arsenic		6430	182	980	ug/kg	2.0					

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1899 North Hobson Ave.
North Charleston, South Carolina 29405-2106
Contact: Mr. Bill Hiers
Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00196 Report Date: May 23, 1996

Sample ID : SPORT-0037-1

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Barium		17100	6.50	980	ug/kg	2.0					
Cadmium	J	132	9.51	490	ug/kg	2.0	WCC	05/20/96	0954	84815	3
Chromium		15500	58.4	980	ug/kg	2.0					
Lead		12800	111	490	ug/kg	2.0					
Selenium		1020	140	490	ug/kg	2.0					
General Chemistry											
Total Rec. Petro. Hydrocarbons		260	10.0	50.0	mg/kg	1.0	SDW	05/16/96	0900	84767	4

The following prep procedures were performed:

GC/MS Base/Neutral Compounds	TMK	05/17/96	1230	84824	5
Mercury	RMJ	05/17/96	1200	84834	6
TRACE	DVW	05/17/96	2145	84815	7

Comments:
A dilution was required for Metals Analysis due to high concentration(s).
As a result, the detection limits are elevated.

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorobiphenyl	M610	78.8	(30.0 - 115.)
Nitrobenzene-d5	M610	61.9	(23.0 - 120.)
p-Terphenyl-d14	M610	80.6	(37.3 - 128.)
Bromofluorobenzene	BTEX-8260	92.4	(59.7 - 159.)
Dibromofluoromethane	BTEX-8260	109.	(74.0 - 128.)
Toluene-d8	BTEX-8260	91.4	(53.4 - 163.)
Bromofluorobenzene	NAP-8260	92.4	(59.7 - 159.)
Dibromofluoromethane	NAP-8260	109.	(74.0 - 128.)
Toluene-d8	NAP-8260	91.4	(53.4 - 163.)

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Contact:	Mr. Bill Hiers
Project Description:	SUPSHIP-Portsmouth Detachment

cc: NPWC00196 Report Date: May 23, 1996

Sample ID : SPORT-0037-1

M = Method	Method-Description
M 1	EPA 8260
M 2	EPA 8270
M 3	EPA 6010A
M 4	EPA 9071
M 5	EPA 3550
M 6	EPA 7471
M 7	EPA 3050

Notes:

The qualifiers in this report are defined as follows:

J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).

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* indicate that a quality control analyte recovery is outside of specified acceptance criteria.

GEL Laboratory Certifications		EPI Laboratory Certifications	
AL - 41040	AZ - AZ0514	AL - 41050	AZ - AZ0514
CA - 2089	CT - PH-0169	CA - I-1023/2056	CT - PH-0175
DE - SC012	FL - E87156/87294	FL - E87472/87458	MS - 29417
ME - SC012	MS - 10120	NY - 11502	RI - 138
NC - 233	NY - 11501	SC - 10582	TN - 02934
RI - 135	SC - 10120	UT - E-227	VA - 00111
TN - 02934	UT - E-251	WA - C225	NJ - 79002

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GEL Laboratory Certifications		EPI Laboratory Certifications	
VA - 00151	WA - C223	PA - 68-485	WV - 235
WI - 999887790			

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1899 North Hobson Ave.
North Charleston, South Carolina 29405-2106
Contact: Mr. Bill Hiers
Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00196 Report Date: May 28, 1996

Sample ID	: SPORT-0041-1
Lab ID	: 9605297-01
Matrix	: Soil
Date Collected	: 05/16/96
Date Received	: 05/16/96
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
BTEX - 4 items											
Benzene	U	0.00	1.00	2.00	ug/kg	1.0	THL	05/22/96	1911	85006	.
Ethylbenzene	U	0.00	1.00	2.00	ug/kg	1.0					
Toluene	U	0.00	1.00	2.00	ug/kg	1.0					
Xylenes (TOTAL)	U	0.00	1.00	4.00	ug/kg	1.0					
Naphthalene	U	0.00	1.00	2.00	ug/kg	1.0					
Extractable Organics											
Polynuclear Aromatic Hydrocarbons - 16 items											
Acenaphthene	U	0.00	166	332	ug/kg	1.0	BDG	05/20/96	2210	84824	2
Acenaphthylene	U	0.00	166	332	ug/kg	1.0					
Anthracene	U	0.00	166	332	ug/kg	1.0					
Benzo(a)anthracene	U	0.00	166	332	ug/kg	1.0					
Benzo(a)pyrene	U	0.00	166	332	ug/kg	1.0					
Benzo(b)fluoranthene	U	0.00	166	332	ug/kg	1.0					
Benzo(ghi)perylene	U	0.00	166	332	ug/kg	1.0					
Benzo(k)fluoranthene	U	0.00	166	332	ug/kg	1.0					
Chrysene	U	0.00	166	332	ug/kg	1.0					
Dibenzo(a,h)anthracene	U	0.00	166	332	ug/kg	1.0					
Fluoranthene	U	0.00	166	332	ug/kg	1.0					
Fluorene	U	0.00	166	332	ug/kg	1.0					
Indeno(1,2,3-c,d)pyrene	U	0.00	166	332	ug/kg	1.0					
Naphthalene	U	0.00	166	332	ug/kg	1.0					
Phenanthrene	U	0.00	166	332	ug/kg	1.0					
Pyrene	U	0.00	166	332	ug/kg	1.0					
Metals Analysis											
Mercury	J	0.0343	0.00240	0.200	mg/kg	1.0	RMJ	05/17/96	1847	84834	N
Silver	U	-47.1	240	962	ug/kg	2.0	WCC	05/20/96	1008	84815	3
Arsenic		3110	179	962	ug/kg	2.0					

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SUPSHIP-Portsmouth Detachment-Env.
1899 North Hobson Ave.
North Charleston, South Carolina 29405-2106
Contact: Mr. Bill Hiers
Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00196 Report Date: May 28, 1996

Sample ID : SPORT-0041-1

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Barium		21300	6.38	962	ug/kg	2.0					
Cadmium	J	60.3	9.33	481	ug/kg	2.0	WCC	05/20/96	1008	84815	3
Chromium		9040	57.3	962	ug/kg	2.0					
Lead		8030	109	481	ug/kg	2.0					
Selenium	J	378	138	481	ug/kg	2.0					
General Chemistry											
Total Rec. Petro. Hydrocarbons		60.0	10.0	50.0	mg/kg	1.0	SDW	05/21/96	0930	84942	4

The following prep procedures were performed:

GC/MS Base/Neutral Compounds	TMK	05/17/96	1230	84824	5
Mercury	RMJ	05/17/96	1200	84834	6
TRACE	DVW	05/17/96	2145	84815	7

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorobiphenyl	M610	65.8	(30.0 - 115.)
Nitrobenzene-d5	M610	71.4	(23.0 - 120.)
p-Terphenyl-d14	M610	65.8	(37.3 - 128.)
Bromofluorobenzene	BTEX-8260	90.7	(59.7 - 159.)
Dibromofluoromethane	BTEX-8260	112.	(74.0 - 128.)
Toluene-d8	BTEX-8260	93.3	(53.4 - 163.)
Bromofluorobenzene	NAP-8260	90.7	(59.7 - 159.)
Dibromofluoromethane	NAP-8260	112.	(74.0 - 128.)
Toluene-d8	NAP-8260	93.3	(53.4 - 163.)

M = Method	Method-Description
M 1	EPA 8260
M 2	EPA 8270
M 3	EPA 6010A
M 4	EPA 9071
M 5	EPA 3550

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CERTIFICATE OF ANALYSIS

Client:	Supervisor of Ship Building & Conversion SUPSHIP-Portsmouth Detachment-Env. 1899 North Hobson Ave. North Charleston, South Carolina 29405-2106
Contact:	Mr. Bill Hiers
Project Description:	SUPSHIP-Portsmouth Detachment

cc: NPWC00196 Report Date: May 28, 1996

Sample ID : SPORT-0041-1

M = Method	Method-Description
M 6	EPA 7471
M 7	EPA 3050

Notes:
The qualifiers in this report are defined as follows:
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicate that a quality control analyte recovery is outside of specified acceptance criteria.

GEL Laboratory Certifications		EPI Laboratory Certifications	
AL - 41040	AZ - AZ0514	AL - 41050	AZ - AZ0514
CA - 2089	CT - PH-0169	CA - I-1023/2056	CT - PH-0175
DE - SC012	FL - E87156/87294	FL - E87472/87458	MS - 29417
ME - SC012	MS - 10120	NY - 11502	RI - 138
NC - 233	NY - 11501	SC - 10582	TN - 02934
RI - 135	SC - 10120	UT - E-227	VA - 00111
TN - 02934	UT - E-251	WA - C225	NJ - 79002
VA - 00151	WA - C223	PA - 68-485	WV - 235
WI - 999887790			

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Contact:	Mr. Bill Hiers
Project Description:	SUPSHIP-Portsmouth Detachment

cc: NPWC00196 Report Date: May 28, 1996

Sample ID : SPORT-0041-1

GEL Laboratory Certifications **EPI Laboratory Certifications**

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1899 North Hobson Ave.
North Charleston, South Carolina 29405-2106
Contact: Mr. Bill Hiers
Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00196 Report Date: May 28, 1996

Sample ID	: SPORT-0041-3
Lab ID	: 9605297-03
Matrix	: Soil
Date Collected	: 05/16/96
Date Received	: 05/16/96
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
BTEX - 4 items											
Benzene	U	0.00	1.00	2.00	ug/kg	1.0	THL	05/22/96	1941	85006	
Ethylbenzene	U	0.00	1.00	2.00	ug/kg	1.0					
Toluene	U	0.00	1.00	2.00	ug/kg	1.0					
Xylenes (TOTAL)	U	0.00	1.00	4.00	ug/kg	1.0					
Naphthalene	U	0.00	1.00	2.00	ug/kg	1.0					
Extractable Organics											
Polynuclear Aromatic Hydrocarbons - 16 items											
Acenaphthene	U	0.00	1630	3260	ug/kg	10.	BDG	05/20/96	2243	84824	2
Acenaphthylene	U	0.00	1630	3260	ug/kg	10.					
Anthracene	U	0.00	1630	3260	ug/kg	10.					
Benzo(a)anthracene	U	0.00	1630	3260	ug/kg	10.					
Benzo(a)pyrene	U	0.00	1630	3260	ug/kg	10.					
Benzo(b)fluoranthene	U	0.00	1630	3260	ug/kg	10.					
Benzo(ghi)perylene	U	0.00	1630	3260	ug/kg	10.					
Benzo(k)fluoranthene	U	0.00	1630	3260	ug/kg	10.					
Chrysene	U	0.00	1630	3260	ug/kg	10.					
Dibenzo(a,h)anthracene	U	0.00	1630	3260	ug/kg	10.					
Fluoranthene	U	0.00	1630	3260	ug/kg	10.					
Fluorene	U	0.00	1630	3260	ug/kg	10.					
Indeno(1,2,3-c,d)pyrene	U	0.00	1630	3260	ug/kg	10.					
Naphthalene	U	0.00	1630	3260	ug/kg	10.					
Phenanthrene	U	0.00	1630	3260	ug/kg	10.					
Pyrene	U	0.00	1630	3260	ug/kg	10.					
Metals Analysis											
Mercury	J	0.0298	0.00243	0.200	mg/kg	1.0	RMJ	05/17/96	1850	84834	1
Silver	U	-19.5	247	990	ug/kg	2.0	WCC	05/20/96	1033	84815	3
Arsenic		3150	184	990	ug/kg	2.0					

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North Charleston, South Carolina 29405-2106
Contact: Mr. Bill Hiers
Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00196 Report Date: May 28, 1996

Sample ID : SPORT-0041-3

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Barium		2640	6.56	990	ug/kg	2.0					
Cadmium	J	22.1	9.60	495	ug/kg	2.0	WCC	05/20/96	1033	84815	3
Chromium		13300	59.0	990	ug/kg	2.0					
Lead		1350	112	495	ug/kg	2.0					
Selenium	J	214	142	495	ug/kg	2.0					
General Chemistry											
Total Rec. Petro. Hydrocarbons		130	10.0	50.0	mg/kg	1.0	SDW	05/21/96	0930	84942	4

The following prep procedures were performed:

GC/MS Base/Neutral Compounds	TMK	05/17/96	1230	84824	5
Mercury	RMJ	05/17/96	1200	84834	6
TRACE	DVW	05/17/96	2145	84815	7

Comments:
A dilution was required for Extractable Organics, due to matrix interference.
As a result,the detection limits are elevated.

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorobiphenyl	M610	0.00*	(30.0 - 115.)
Nitrobenzene-d5	M610	0.00*	(23.0 - 120.)
p-Terphenyl-d14	M610	0.00*	(37.3 - 128.)
Bromofluorobenzene	BTEX-8260	90.1	(59.7 - 159.)
Dibromofluoromethane	BTEX-8260	112.	(74.0 - 128.)
Toluene-d8	BTEX-8260	95.1	(53.4 - 163.)
Bromofluorobenzene	NAP-8260	90.1	(59.7 - 159.)
Dibromofluoromethane	NAP-8260	112.	(74.0 - 128.)
Toluene-d8	NAP-8260	95.1	(53.4 - 163.)

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Contact:	Mr. Bill Hiers
Project Description:	SUPSHIP-Portsmouth Detachment

cc: NPWC00196 Report Date: May 28, 1996

Sample ID : SPORT-0041-3

M = Method	Method-Description
M 1	EPA 8260
M 2	EPA 8270
M 3	EPA 6010A
M 4	EPA 9071
M 5	EPA 3550
M 6	EPA 7471
M 7	EPA 3050

Notes:
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ME - SC012	MS - 10120	NY - 11502	RI - 138
NC - 233	NY - 11501	SC - 10582	TN - 02934
RI - 135	SC - 10120	UT - E-227	VA - 00111
TN - 02934	UT - E-251	WA - C225	NJ - 79002

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Contact:	Mr. Bill Hiers
Project Description:	SUPSHIP-Portsmouth Detachment

cc: NPWC00196 Report Date: May 28, 1996

Sample ID : SPORT-0041-3

GEL Laboratory Certifications		EPI Laboratory Certifications	
VA - 00151	WA - C223	PA - 68-485	WV - 235
WI - 999887790			

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North Charleston, South Carolina 29405-2106
Contact: Mr. Bill Hiers
Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00196 Report Date: May 28, 1996

Sample ID	: SPORT-0043-1
Lab ID	: 9605313-01
Matrix	: Soil
Date Collected	: 05/17/96
Date Received	: 05/17/96
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
BTEX - 4 items											
Benzene	U	0.00	1.00	2.00	ug/kg	1.0	RLC	05/20/96	1921	84833	
Ethylbenzene	U	0.00	1.00	2.00	ug/kg	1.0					
Toluene	U	0.00	1.00	2.00	ug/kg	1.0					
Xylenes (TOTAL)	U	0.00	1.00	4.00	ug/kg	1.0					
Naphthalene	U	0.00	1.00	2.00	ug/kg	1.0					
Extractable Organics											
Polynuclear Aromatic Hydrocarbons - 16 items											
Acenaphthene	U	0.00	167	333	ug/kg	1.0	BDG	05/24/96	1349	85096	2
Acenaphthylene	U	0.00	167	333	ug/kg	1.0					
Anthracene	U	0.00	167	333	ug/kg	1.0					
Benzo(a)anthracene	U	0.00	167	333	ug/kg	1.0					
Benzo(a)pyrene	U	0.00	167	333	ug/kg	1.0					
Benzo(b)fluoranthene	U	0.00	167	333	ug/kg	1.0					
Benzo(ghi)perylene	U	0.00	167	333	ug/kg	1.0					
Benzo(k)fluoranthene	U	0.00	167	333	ug/kg	1.0					
Chrysene	U	0.00	167	333	ug/kg	1.0					
Dibenzo(a,h)anthracene	U	0.00	167	333	ug/kg	1.0					
Fluoranthene	U	0.00	167	333	ug/kg	1.0					
Fluorene	U	0.00	167	333	ug/kg	1.0					
Indeno(1,2,3-c,d)pyrene	U	0.00	167	333	ug/kg	1.0					
Naphthalene	U	0.00	167	333	ug/kg	1.0					
Phenanthrene	U	0.00	167	333	ug/kg	1.0					
Pyrene	U	0.00	167	333	ug/kg	1.0					
Metals Analysis											
Mercury	J	0.0654	0.00238	0.200	mg/kg	1.0	RMJ	05/20/96	1843	84891	N
Silver	U	98.2	237	952	ug/kg	2.0	NRM	05/21/96	2309	84854	
Arsenic		4100	177	952	ug/kg	2.0					

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North Charleston, South Carolina 29405-2106
Contact: Mr. Bill Hiers
Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00196 Report Date: May 28, 1996

Sample ID : SPORT-0043-1

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Barium		12200	6.31	952	ug/kg	2.0					
Cadmium	J	57.9	9.23	476	ug/kg	2.0	NRM	05/21/96	2309	84854	3
Chromium		8520	56.7	952	ug/kg	2.0					
Lead		21100	108	476	ug/kg	2.0					
Selenium	U	-57.9	136	476	ug/kg	2.0					
General Chemistry											
Total Rec. Petro. Hydrocarbons		290	10.0	50.0	mg/kg	1.0	SDW	05/22/96	1000	85008	4

The following prep procedures were performed:

GC/MS Base/Neutral Compounds	GWL	05/23/96	2345	85096	5
Mercury	RMJ	05/20/96	1400	84891	6
TRACE	DVW	05/20/96	2035	84854	7

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorobiphenyl	M610	97.8	(30.0 - 115.)
Nitrobenzene-d5	M610	106.	(23.0 - 120.)
p-Terphenyl-d14	M610	89.0	(37.3 - 128.)
Bromofluorobenzene	BTEX-8260	88.3	(59.7 - 159.)
Dibromofluoromethane	BTEX-8260	105.	(74.0 - 128.)
Toluene-d8	BTEX-8260	96.9	(53.4 - 163.)
Bromofluorobenzene	NAP-8260	88.3	(59.7 - 159.)
Dibromofluoromethane	NAP-8260	105.	(74.0 - 128.)
Toluene-d8	NAP-8260	96.9	(53.4 - 163.)

M = Method	Method-Description
M 1	EPA 8260
M 2	EPA 8270
M 3	EPA 6010A
M 4	EPA 9071
M 5	EPA 3550

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Contact:	Mr. Bill Hiers
Project Description:	SUPSHIP-Portsmouth Detachment

cc: NPWC00196 Report Date: May 28, 1996

Sample ID : SPORT-0043-1

M = Method	Method-Description
M 6	EPA 7471
M 7	EPA 3050

Notes:
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NC - 233	NY - 11501	SC - 10582	TN - 02934
RI - 135	SC - 10120	UT - E-227	VA - 00111
TN - 02934	UT - E-251	WA - C225	NJ - 79002
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cc: NPWC00196 Report Date: May 28, 1996

Sample ID : SPORT-0043-1

GEL Laboratory Certifications **EPI Laboratory Certifications**

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1899 North Hobson Ave.
North Charleston, South Carolina 29405-2106
Contact: Mr. Bill Hiers
Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00196 Report Date: May 28, 1996

Sample ID : SPORT0048-1
Lab ID : 9605360-01
Matrix : Soil
Date Collected : 05/20/96
Date Received : 05/21/96
Priority : Routine
Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
BTEX - 4 items											
Benzene	U	0.00	1.00	2.00	ug/kg	1.0	THL	05/22/96	1710	85006	
Ethylbenzene	U	0.00	1.00	2.00	ug/kg	1.0					
Toluene	U	0.00	1.00	2.00	ug/kg	1.0					
Xylenes (TOTAL)	U	0.00	1.00	4.00	ug/kg	1.0					
Naphthalene	U	0.840	1.00	2.00	ug/kg	1.0					
Extractable Organics											
Polynuclear Aromatic Hydrocarbons - 16 items											
Acenaphthene	U	0.00	164	330	ug/kg	1.0	BDG	05/24/96	1528	85096	2
Acenaphthylene	U	0.00	164	330	ug/kg	1.0					
Anthracene	U	0.00	164	330	ug/kg	1.0					
Benzo(a)anthracene	U	0.00	164	330	ug/kg	1.0					
Benzo(a)pyrene	U	0.00	164	330	ug/kg	1.0					
Benzo(b)fluoranthene	U	0.00	164	330	ug/kg	1.0					
Benzo(ghi)perylene	U	0.00	164	330	ug/kg	1.0					
Benzo(k)fluoranthene	U	0.00	164	330	ug/kg	1.0					
Chrysene	U	0.00	164	330	ug/kg	1.0					
Dibenzo(a,h)anthracene	U	0.00	164	330	ug/kg	1.0					
Fluoranthene	U	0.00	164	330	ug/kg	1.0					
Fluorene	U	0.00	164	330	ug/kg	1.0					
Indeno(1,2,3-c,d)pyrene	U	0.00	164	330	ug/kg	1.0					
Naphthalene	U	0.00	164	330	ug/kg	1.0					
Phenanthrene	U	0.00	164	330	ug/kg	1.0					
Pyrene	U	0.00	164	330	ug/kg	1.0					
Metals Analysis											
Mercury	J	0.0186	0.00244	0.200	mg/kg	1.0	RMJ	05/23/96	2052	85021	N
Silver	U	7.18	237	952	ug/kg	2.0	NRM	05/24/96	2155	85046	
Arsenic		1660	177	952	ug/kg	2.0					

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1899 North Hobson Ave.
North Charleston, South Carolina 29405-2106
Contact: Mr. Bill Hiers
Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00196 Report Date: May 28, 1996

Sample ID : SPORT0048-1

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Barium		3530	6.31	952	ug/kg	2.0					
Cadmium	J	14.5	9.23	476	ug/kg	2.0	NRM	05/24/96	2155	85046	3
Chromium		4490	56.7	952	ug/kg	2.0					
Lead		1710	108	476	ug/kg	2.0					
Selenium	U	-39.7	136	476	ug/kg	2.0					
General Chemistry											
Total Rec. Petro. Hydrocarbons	J	20.0	10.0	50.0	mg/kg	1.0	SDW	05/23/96	1100	85043	4

The following prep procedures were performed:

GC/MS Base/Neutral Compounds	GWL	05/23/96	2345	85096	5
Mercury	RMJ	05/22/96	1700	85021	6
TRACE	DVW	05/23/96	2040	85046	7

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorobiphenyl	M610	99.4	(30.0 - 115.)
Nitrobenzene-d5	M610	107.	(23.0 - 120.)
p-Terphenyl-d14	M610	89.0	(37.3 - 128.)
Bromofluorobenzene	BTEX-8260	90.9	(59.7 - 159.)
Dibromofluoromethane	BTEX-8260	113.	(74.0 - 128.)
Toluene-d8	BTEX-8260	94.0	(53.4 - 163.)
Bromofluorobenzene	NAP-8260	90.9	(59.7 - 159.)
Dibromofluoromethane	NAP-8260	113.	(74.0 - 128.)
Toluene-d8	NAP-8260	94.0	(53.4 - 163.)

M = Method	Method-Description
M 1	EPA 8260
M 2	EPA 8270
M 3	EPA 6010A
M 4	EPA 9071
M 5	EPA 3550

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Contact:	Mr. Bill Hiers
Project Description:	SUPSHIP-Portsmouth Detachment

cc: NPWC00196 Report Date: May 28, 1996

Sample ID : SPORT0048-1

M = Method	Method-Description
M 6	EPA 7471
M 7	EPA 3050

Notes:
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ME - SC012	MS - 10120	NY - 11502	RI - 138
NC - 233	NY - 11501	SC - 10582	TN - 02934
RI - 135	SC - 10120	UT - E-227	VA - 00111
TN - 02934	UT - E-251	WA - C225	NJ - 79002
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WI - 999887790			

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CERTIFICATE OF ANALYSIS

Client:	Supervisor of Ship Building & Conversion SUPSHIP-Portsmouth Detachment-Env. 1899 North Hobson Ave. North Charleston, South Carolina 29405-2106
Contact:	Mr. Bill Hiers
Project Description:	SUPSHIP-Portsmouth Detachment

cc: NPWC00196 Report Date: May 28, 1996

Sample ID : SPORT0048-1

GEL Laboratory Certifications **EPI Laboratory Certifications**

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Karen Blakeney at (803) 769-7386.

Analytical Report Specialist

P O Box 30712 • Charleston, SC 29417 • (803) 556-8171 • Fax (803) 766-1178

Printed on recycled paper.

GENERAL ENGINEERING LABORATORIES

Meeting today's needs with a vision for tomorrow.

CERTIFICATE OF ANALYSIS

Client: Supervisor of Ship Building & Conversion
SUPSHIP-Portsmouth Detachment-Env.
1899 North Hobson Ave.
North Charleston, South Carolina 29405-2106
Contact: Mr. Bill Hiers
Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00196 Report Date: May 28, 1996

Sample ID : SPORT0048-2
Lab ID : 9605360-02
Matrix : Soil
Date Collected : 05/20/96
Date Received : 05/21/96
Priority : Routine
Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
BTEX - 4 items											
Benzene	U	0.00	1.00	2.00	ug/kg	1.0	THL	05/22/96	1840	85006	
Ethylbenzene	U	0.00	1.00	2.00	ug/kg	1.0					
Toluene	U	0.00	1.00	2.00	ug/kg	1.0					
Xylenes (TOTAL)	U	0.500	1.00	4.00	ug/kg	1.0					
Naphthalene	J	1.02	1.00	2.00	ug/kg	1.0					
Extractable Organics											
Polynuclear Aromatic Hydrocarbons - 16 items											
Acenaphthene	U	0.00	165	330	ug/kg	1.0	BDG	05/24/96	1601	85096	2
Acenaphthylene	U	0.00	165	330	ug/kg	1.0					
Anthracene	U	0.00	165	330	ug/kg	1.0					
Benzo(a)anthracene	U	0.00	165	330	ug/kg	1.0					
Benzo(a)pyrene	U	0.00	165	330	ug/kg	1.0					
Benzo(b)fluoranthene	U	0.00	165	330	ug/kg	1.0					
Benzo(ghi)perylene	U	0.00	165	330	ug/kg	1.0					
Benzo(k)fluoranthene	U	0.00	165	330	ug/kg	1.0					
Chrysene	U	0.00	165	330	ug/kg	1.0					
Dibenzo(a,h)anthracene	U	0.00	165	330	ug/kg	1.0					
Fluoranthene	U	0.00	165	330	ug/kg	1.0					
Fluorene	U	0.00	165	330	ug/kg	1.0					
Indeno(1,2,3-c,d)pyrene	U	0.00	165	330	ug/kg	1.0					
Naphthalene	U	0.00	165	330	ug/kg	1.0					
Phenanthrene	U	0.00	165	330	ug/kg	1.0					
Pyrene	U	0.00	165	330	ug/kg	1.0					
Metals Analysis											
Mercury	J	0.0406	0.00206	0.200	mg/kg	1.0	RMJ	05/23/96	2054	85021	N
Silver	U	63.6	242	970	ug/kg	2.0	NRM	05/24/96	2200	85046	
Arsenic		1300	180	970	ug/kg	2.0					

GENERAL ENGINEERING LABORATORIES

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CERTIFICATE OF ANALYSIS

Client: Supervisor of Ship Building & Conversion
SUPSHIP-Portsmouth Detachment-Env.
1899 North Hobson Ave.
North Charleston, South Carolina 29405-2106
Contact: Mr. Bill Hiers
Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00196 Report Date: May 28, 1996

Sample ID : SPORT0048-2

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Barium		7930	6.43	970	ug/kg	2.0					
Cadmium	J	32.8	9.41	485	ug/kg	2.0	NRM	05/24/96	2200	85046	3
Chromium		5150	57.8	970	ug/kg	2.0					
Lead		6490	110	485	ug/kg	2.0					
Selenium	J	390	139	485	ug/kg	2.0					
General Chemistry											
Total Rec. Petro. Hydrocarbons		120	10.0	50.0	mg/kg	1.0	SDW	05/23/96	1100	85043	4

The following prep procedures were performed:

GC/MS Base/Neutral Compounds	GWL	05/23/96	2345	85096	5
Mercury	RMJ	05/22/96	1700	85021	6
TRACE	DVW	05/23/96	2040	85046	7

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorobiphenyl	M610	91.6	(30.0 - 115.)
Nitrobenzene-d5	M610	101.	(23.0 - 120.)
p-Terphenyl-d14	M610	87.6	(37.3 - 128.)
Bromofluorobenzene	BTEX-8260	90.8	(59.7 - 159.)
Dibromofluoromethane	BTEX-8260	112.	(74.0 - 128.)
Toluene-d8	BTEX-8260	93.4	(53.4 - 163.)
Bromofluorobenzene	NAP-8260	90.8	(59.7 - 159.)
Dibromofluoromethane	NAP-8260	112.	(74.0 - 128.)
Toluene-d8	NAP-8260	93.4	(53.4 - 163.)

M = Method	Method-Description
M 1	EPA 8260
M 2	EPA 8270
M 3	EPA 6010A
M 4	EPA 9071
M 5	EPA 3550

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CERTIFICATE OF ANALYSIS

Client:	Supervisor of Ship Building & Conversion SUPSHIP-Portsmouth Detachment-Env. 1899 North Hobson Ave. North Charleston, South Carolina 29405-2106
Contact:	Mr. Bill Hiers
Project Description:	SUPSHIP-Portsmouth Detachment

cc: NPWC00196 Report Date: May 28, 1996

Sample ID : SPORT0048-2

M = Method	Method-Description
M 6	EPA 7471
M 7	EPA 3050

Notes:
The qualifiers in this report are defined as follows:
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicate that a quality control analyte recovery is outside of specified acceptance criteria.

GEL Laboratory Certifications		EPI Laboratory Certifications	
AL - 41040	AZ - AZ0514	AL - 41050	AZ - AZ0514
CA - 2089	CT - PH-0169	CA - I-1023/2056	CT - PH-0175
DE - SC012	FL - E87156/87294	FL - E87472/87458	MS - 29417
ME - SC012	MS - 10120	NY - 11502	RI - 138
NC - 233	NY - 11501	SC - 10582	TN - 02934
RI - 135	SC - 10120	UT - E-227	VA - 00111
TN - 02934	UT - E-251	WA - C225	NJ - 79002
VA - 00151	WA - C223	PA - 68-485	WV - 235
WI - 999887790			

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GENERAL ENGINEERING LABORATORIES

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CERTIFICATE OF ANALYSIS

Client:	Supervisor of Ship Building & Conversion SUPSHIP-Portsmouth Detachment-Env. 1899 North Hobson Ave. North Charleston, South Carolina 29405-2106
Contact:	Mr. Bill Hiers
Project Description:	SUPSHIP-Portsmouth Detachment

cc: NPWC00196 Report Date: May 28, 1996

Sample ID : SPORT0048-2

GEL Laboratory Certifications **EPI Laboratory Certifications**

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Karen Blakeney at (803) 769-7386.

Analytical Report Specialist

9605360-02

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PWC 00196

General Engineerir atories, Inc.
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Charleston, South Carolin 29414
P.O. Box 30712
Charleston, South Carolina 29417
(803) 556-8171

CHAIN OF CUSTODY RECORD

Page 1 of 1 9605183

Client Name/Facility Name: SPORTENVDET CHASN

Collected by/Company: CEERI (MURRAY)

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

CCL 21346

	SAMPLE ID	DATE	TIME	WELL	SOIL	COMP	GRAB	# OF CONTAINERS	pH, conductivity	TOC/DOC	TOX	Chloride, Fluoride, Sulfide	Nitrite/Nitrate	VOC - Specify Method required	RCRA METALS - specify	Pesticide	Herbicide	Total Phenol	Acid Extractables	B/N Extractables	BTEX/TCLP/PCBs	Cyanide	Coliform - specify type	PAH	TPH	Remarks	
01	SPORT0033-1	05/10/96	1110		X			4							X						X			X	X	UST1346-1 soil	.1
02	SPORT0033-2	05/10/96	1120		X			4							X						X			X	X	UST1346-2 soil	.1
03	SPORT0033-3	05/10/96	1130				X	9							X						X			X	X	UST1346-3 GW	.2
04	SPORT 0033-4	05/10/96	1130				X	3													X					VOLATILE TRIP BLANK	.3

Relinquished by:	Date:	Time:	Received by:	Relinquished by:	Date:	Time:	Received by:
[illegible]	[illegible]	1400	[illegible]	[illegible]	5/10/96	1430	[illegible]
[illegible]	5/10/96	1444	[illegible]				

Relinquished by:	Date:	Time:	Received by/lab by:	Date:	Time:	Remarks:
[illegible]	5/10	1450	[illegible]	5/10	1450	

White = sample collector Yellow = file Pink = with report

N: C 00196

CHAIN OF CUSTODY RECORD

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P.O. Box 30712
Charleston, South Carolina 29417
(803) 556-8171

Page 1 of 1 9605271

Client Name/Facility Name: SPORT FUNDETCUMSN

Collected by/Company: B. MURRAY CEERD

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

CCL 21408

SAMPLE ANALYSIS REQUIRED (x) - use remarks area to specify specific compounds or methods

	SAMPLE ID	DATE	TIME	WELL	SOIL	COMP	GRAB	# OF CONTAINERS	pH, conductivity	TOC/DOC	TOX	Chloride, Fluoride, Sulfide	Nitrite/Nitrate	VOC - Specify Method required	RCRA METALS - specify	Pesticide	Herbicide	Total Phenol	Acid Extractables	B/N Extractables	PCB's	Cyanide	Coliform - specify type	TPH/PAH	BTEX & MTBE	Remarks
01	SPRT0036-1	5/13/96	1495		x			4							x									+	x	UST 1346-6
02	SPRT0036-2	5/14/96	1435		x			4							x									+	x	UST 1346-7
03	SPRT0036-3	5/13/96	1445				x	3																	x	VOLATile TRIP BLANK

Relinquished by:	Date:	Time:	Received by:	Relinquished by:	Date:	Time:	Received by:
[illegible]	5/15/96	0800	[illegible]	[illegible]	5/15/96	1549	[illegible]
Relinquished by:	Date:	Time:	Received by lab by: Paige Kinard	Date: 5/15/96	Time: 1630	Remarks:	

White = sample collector Yellow = file Pink = with report

NP-96-00196

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Charleston, South Carolina 29414
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Charleston, South Carolina 29417
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CHAIN OF CUSTODY RECORD

Page 1 of 1 96D5272

Client Name/Facility Name: SPORT ENV DET CHASN

Collected by/Company: SPORT ENV DET CHASN

SAMPLE ANALYSIS REQUIRED (x) - use remarks area to specify specific compounds or methods

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

CCL 21407

	SAMPLE ID	DATE	TIME	WELL	SOIL	COMP	GRAB	# OF CONTAINERS	pH, conductivity	TOC/DOC	~~TOX~~ TPH GRAVIMETRIC	Chloride, Fluoride, Sulfide	Nitrite/Nitrate	VOC - Specify Method Required	METALS - specify ICP/A	Pesticide	Herbicide	Total Phenol	Acid Extractables	B/N Extractables	PCB's	Cyanide	Coliform - specify type	BTEX PLUS NAPTHALENE	PAH	Remarks
01	SPORT-0037-1	5/15/96	1045		X		X	4			X				X									X	X	UST-1346-8

Relinquished by:	Date:	Time:	Received by:	Relinquished by:	Date:	Time:	Received by:
Ben Nelson	5/15/96	1114	W. R. Hiers, Jr.	W. R. Hiers, Jr.	5/15/96	1549	Catharine H.
Relinquished by:	Date:	Time:	Received by lab by:	Date:	Time:	Remarks:	
			Paige Howard	5/15/96	1630		

White = sample collector Yellow = file Pink = with report

JPWC 00196

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Charleston, South Carolina 29414
P.O. Box 30712
Charleston, South Carolina 29417
(803) 556-8171

CHAIN OF CUSTODY RECORD

Page 1 of 1 9605297

Client Name/Facility Name: SPORTENV DET CHASN

Collected by/Company: SPORTENV DET CHASN

SAMPLE ANALYSIS REQUIRED (x) - use remarks area to specify specific compounds or methods

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

CCL 21429

	SAMPLE ID	DATE	TIME	WELL	SOIL	COMP	GRAB	# OF CONTAINERS	pH, conductivity	TOC/DOC	~~TOX~~ TPH GRAVIMETRIC	Chloride, Fluoride, Sulfide	Nitrite/Nitrate	VOC - Specify Method required	METALS - specify (CR H)	Pesticide	Herbicide	Total Phenol	Acid Extractables	B/N Extractables	PCB's	Cyanide	Coliform - specify type	BTEX PLUS NAPHTHALENE	PAH	Remarks	
01	SPORT-0041-1	5/16/96	1215		X		X	4			X				X									X	X	UST-1346-9	.1
02	SPORT-0041-2	5/16/96	1215				X	3																X		TRIP BLANK (VOA)	.2
03	SPORT-004-3	5/16/96	1400		X		X	4			X				X									X	X	UST-1346-10	.1

Relinquished by:	Date:	Time:	Received by:	Relinquished by:	Date:	Time:	Received by:
[illegible]	5/16/96	1300	W. K. Hiers, Jr.	W. K. Hiers, Jr.	5/16/96	1530	Paige Kunard
Relinquished by: Paige Kunard	Date: 5/16/96	Time: 1600	Received by lab by: Paige Kunard	Date: 5/16/96	Time: 1600	Remarks:	

White = sample collector Yellow = file Pink = with report

NPI 00196

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Charleston, South Carc 14
P.O. Box 30712
Charleston, South Carolina 29417
(803) 556-8171

CHAIN OF CUSTODY RECORD

Page 1 of 1 9605313

Client Name/Facility Name: SPORTENVDETCHASN

Collected by/Company: William T. Nesbit SPORTENVDETCHASN

SAMPLE ANALYSIS REQUIRED (x) - use remarks area to specify specific compounds or methods

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

CCL 21445

	SAMPLE ID	DATE	TIME	WELL	SOIL	COMP	GRAB	# OF CONTAINERS	pH, conductivity	TOC/DOC	TPH GRAVIMETRIC	Chloride, Fluoride, Sulfide	Nitrite/Nitrate	VOC - Specify Method required	RCRA METALS - specify	Pesticide	Herbicide	Total Phenol	Acid Extractables	B/N Extractables	PCB's	Cyanide	Coliform - specify type	BTEX Plus NAPTHALENE	PAH	Remarks	
01	SPORT-0043-1	5-17-96	1100		X	X		4			X				X									X	X	UST-1346-11 Soil	.1
02	SPORT0043-2	5-17-96	1100				X	3																X		TRIP BLANK (VOA)	.2

Relinquished by:	Date:	Time:	Received by:	Relinquished by:	Date:	Time:	Received by:
William T. Nesbit	5/17/96	1330	W. R. Hiers Jr.	W. R. Hiers Jr.	5/17/96	1440	Paige Kinard

Relinquished by:	Date:	Time:	Received by lab by:	Date:	Time:	Remarks:
			Paige Kinard	5/17/96	1500	

White = sample collector Yellow = file Pink = with report

NF CC 00196

CHAIN OF CUSTODY RECORD

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Charleston, South Carc 414
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Charleston, South Carolina 29417
(803) 556-8171

Page 1 of 1

9605360

Client Name/Facility Name: SPORT ENV DET CHASN

Collected by/Company: [illegible] SPORT ENV DET CHASN

SAMPLE ANALYSIS REQUIRED (x) - use remarks area to specify specific compounds or methods

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

CCL 21496

SAMPLE ID	DATE	TIME	WELL	SOIL	COMP	GRAB	# OF CONTAINERS	pH, conductivity	TOC/DOC	~~TPH~~ GRAVIMETRIC	Chloride, Fluoride, Sulfide	Nitrite/Nitrate	VOC - Specify Method required	RCRA METALS - specify	Pesticide	Herbicide	Total Phenol	Acid Extractables	B/N Extractables	PCB's	Cyanide	Coliform - specify type	BTEX PLUS NAPHTHALENE	PAH	Remarks
-01 SPORT0048-1	5-20-96	0900		X		X	4			X				X									X	X	UST 1346-12 SO.1
-02 SPORT0048-2	5-20-96	1300		X		X	4			X				X									X	X	UST 1346-13 SO.1

Relinquished by:	Date	Time:	Received by:	Relinquished by:	Date:	Time:	Received by:
[signature]	5/20/96	1500	W. R. Hiers, Jr.	Fred J. [illegible]	5/21/96	1415	[signature]
Relinquished by: [signature]	Date: 5/21/96	Time: 1503	Received by lab by: [signature]	Date: 5/21/96	Time: 1530	Remarks:	

White = sample collector Yellow = file Pink = with report

Attachment III

Certificate of Disposal (tank)
Disposal Manifest (sludge)

UST Certificate of Disposal

CONTRACTOR

Supervisor of Shipbuilding, Conversion and Repair, USN,
Portsmouth, VA
Environmental Detachment Charleston
1899 North Hobson Avenue
North Charleston 29405-2106

Telephone (803) 743-6482

TANK ID & LOCATION

UST 1346, #01782; NS 1364, Navbase Charleston, N. Charleston, SC

DISPOSAL LOCATION

Bldg. 1601 Tank Cleaning
& Disposal Area
Charleston Naval Complex

TYPE OF TANK	SIZE (GAL)
Waste Oil	560 gal.

CLEANING/DISPOSAL METHOD

The tank was cut open on both ends, cleaned with a steam cleaner, and disposed of as recyclable scrap metal.

DISPOSAL CERTIFICATION

I certify that the above tank has been properly cleaned and disposed of as recyclable scrap metal.

O.S. Uthem, 8/12/96
(Name) (Date)

State Department of Health and Environmental Control

Bureau of Solid & Hazardous Waste Mgt
2600 Bull Street, Columbia, SC 29201
Phone- (803) 734-5200
Emergency & Holidays: (803)253-6488

PLEASE PRINT or TYPE (Form designed for use on elite (12-pitch) typewriter) Form Approved. OMB No. 2050-0039 Expires 9-30-91

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's U.S. EPA ID No. SC017002256 Manifest Document No 3107
2. Page 1 of 3

Information in the shaded areas is not required by Federal law, but is by State law.

3. Generator's Name and Mailing Address
SOUTHDIVNAVFACENGCOM
Caretaker Site Office P.O. Box 190010, N.Charleston, SC. 29419-9010

4. Generator's Phone (803) 743-6344 Rick Nielson

A. State Manifest Document Number: 96105
B. State Generator's ID

5. Transporter 1 Company Name: Environmental Transp. Services
6. U.S. EPA ID Number: OKD981605363
C. State Transporter's ID
D. Transporter's Phone: 1-800-677-1772

7. Transporter 2 Company Name
8. U.S. EPA ID Number
E. State Transporter's ID
F. Transporter's Phone

9. Designated Facility Name and Site Address
Tri-State Steel Drum, Inc.
P.O.Box 9
Graysville, GA. 30726
10. U.S. EPA ID Number: GAD033842543
G. State Facility's ID
H. Facility's Phone: 706-891-9726

11. U.S. DOT Description (including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste Number
a. Waste Adhesives, containing a flammable liquid, 3, UN1133, PG III (D001) (Adhesives w/ Asbestos)	001	DF	00010	P	D001
b. Waste Hydrochloric acid solution, 8, UN1789, PG II (D002)	001	DF	00002	P	D002
c. Waste Batteries, wet, filled with acid, 8, UN2794, PG III (D002, D008) (Lead Acid Batteries)	001	DF	00023	P	D002 D008
d. Waste Corrosive solids, n.o.s., 8, UN1759, PG III (D007) (Cleaner w/ Sulfamic Acid, Chromium)	001	DF	00002	P	D007

J. Additional Descriptions for Materials Listed Above
a) ERG# 26 Items# 2,4 1/5
b) ERG# 60 Items# 6 1/5
c) ERG# 60 Items# 7 1/5
d) ERG# 60 Items# 9 1/5

K. Handling Codes for Wastes Listed Above

15. Special Handling Instructions and Additional Information
Forward all invoices and CD' to Tri State Government Services,
24 Hour Emergency # 1-800-673-6604
P.O.C. Michael Johnson
SP4400-95-D-0059, Delivery Order#99
copy to: DRMO Charleston
P.O.Box 5715
N.charleston, SC.29405-0715
ATTN: Joyce Gambrell

Public reporting burden for this collection of information is estimated to average 37 minutes for generators, 15 minutes for transporters and 10 minutes for treatment storage and disposal facilities. This includes time for reviewing instructions, gathering data and completing and reviewing the form. Send comments regarding the burden estimate, including suggestions for reducing this burden to Chief Information Policy Branch PM-223 U.S. Environmental Protection Agency, 401 M St., S.W. Washington, D.C. 20460, and to the Office of Information and Regulatory Affairs, Office of Management and Budget Washington, D.C. 20503

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations and the laws of the State of South Carolina.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford. COR 7/8/96

Printed/Typed Name: Richard G. Nielson
Signature: Richard G. Nielson
Month Day Year: 07 08 96

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: JERRY CAMPBELL
Signature: Jerry Campbell
Month Day Year: 07 08 96

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name
Signature
Month Day Year

FACILITY

19. Discrepancy Indication Space
a ____ lbs. c ____ lbs.
b ____ lbs. d ____ lbs.

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in item 19.
Printed/Typed Name
Signature
Month Day Year

EPA Form 8700 (Rev. 9/88) Previous Editions are Obsolete (DHEC 1988 (Rev. 5/89))

South Carolina Department of Health and Environmental Control

Please print or type. (Form designed for use on elite (12-pitch) typewriter) Form approved OMB No. 2050-0039. Expires 9-30-91

UNIFORM HAZARDOUS WASTE MANIFEST (Continuation Sheet)	21. Generator's U.S. EPA ID No. SC017022560	Manifest Document No. 131	22. Page 2 of 3	Information in the shaded areas is not required by Federal Law, but is by State Law.

23. Generator's Name
S HDIVNAVFACENGCOM
Caretaker Site Office P.O.Box 190010,N.Charleston,SC,29419-9010

L. State Manifest Document Number 96105

M. State Generator's ID

24. Transporter _____ Company Name — 25. U.S. EPA ID Number

N. State Transporter's ID

O. Transporter's Phone

26. Transporter _____ Company Name — 27. U.S. EPA ID Number

P. State Transporter's ID

Q. Transporter's Phone

28. U.S. DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	29. Containers No.	Type	30. Total Quantity	31. Unit Wt/Vol	R. Waste No.
a. (RQ) Waste Paint,3,UN1263,PG II (D001,D007,D008,F003)	001	DM	00220	P	D001,D007 D008,F003
b. ~~Hazardous waste~~, liquids,n.o.s.~~9~~,~~NA3082~~,PG III ~~(D006,D007,D008,D009,F002,F003)~~ (D001) UN1993 (Various Lab Samples w/ Cadmium,Chromium,Lead)	001	DF	00002	P	D006,D007 D008,D009 F002,F003
c. (RQ) Waste Flammable liquids,n.o.s.,3,UN1993,PG II (D001,D022,D035,F002,F003,F004,F005) (Puncture Aerosol Cans Residue w/ Xylene,Toluene)	001	DM	00128	P	D001,D022 D035,F002 F003,F004 F005
d. (RQ) Hazardous waste,liquid,n.o.s.,9,NA3077,PG III. (D005,D006,D007,D008,F002,F003) (Oil Sludge c/w Barium,Cadmium,Lead)	001	DM	00275	P	D005,D006 D007,D008 F002,F003
e. Waste Pesticides,solid,toxic,n.o.s.,6.1,UN2588,PG III (U248) (Rodenticidal w/ Warfarin)	001	DF	00002	P	U248
f. Waste Toxic,liquids,organic,n.o.s.,6.1,UN2810,PG III (U219) (Thiourea)	001	DF	00001	P	U219
g. Waste Flammable liquids,n.o.s.,3,UN1993,PG II (D001D005,D008,D035) D009, D035 (See Lab Pack List # 0099-1)	001	DM	00061	P	D001,D005 D008,D009 D035, D027
h. Corrosive solids,n.o.s.,8,UN1759,PG III (Spill Refuse c/w Sulfuric Acid)	002	DF	00035	P	Non RCRA
i. Non Regulated Material (See Lab Pack List # 0099-2)	001	DF	00010	P	Non RCRA

S. Additional Descriptions for Materials Listed Above

a. d. g.
b. e. h.
c. f. i.

T. Handling Codes for Wastes Listed Above

32. Special Handling Instructions and Additional Information

a) ERG# 26 Items # 13 1/55
b) ERG# 31 Items# 14 1/5
c) ERG# 27, Items# 15 1/55
d) ERG# 31 Items# 16 1/55
e) ERG# 55 Items# 24 1/5
f) ERG# 55 Items# 19 1/5
g) ERG# 27 Items# 1,3,5 1/30
h) ERG# 60 Items# 31 2/5
i) ERG# NA Items# 20,21,22,23,25 1/5

SP4400-95-D-0059,D.O.# 99

TRANSPORTER

33. Transporter _____ Acknowledgement of Receipt of Materials

Printed/Typed Name — Signature — Date: Month Day Year

Transporter _____ Acknowledgement of Receipt of Materials

Printed/Typed Name — Signature — Date: Month Day Year

FACILITY

35. Discrepancy Indication Space

a. ____ lbs. d. ____ lbs. g. ____ lbs.
b. ____ lbs. e. ____ lbs. h. ____ lbs.

South Carolina Department of Health and Environmental Control

Please print or type. (Form designed for use on elite (12-pitch) typewriter) Form approved OMB No. 2050-0039. Expires 9-30-91

UNIFORM HAZARDOUS WASTE MANIFEST (Continuation Sheet)

21. Generator's U.S. EPA ID No. S C 0 1 7 0 0 2 2 5 6 0 — Manifest Document No. 73/017

22. Page 3 of 3

Information in the shaded areas is not required by Federal Law, but is by State Law.

I. Generator's Name
SOUTHDIVNAVFACENGCOM
Caretaker Site Office P.O.Box 190010,N.Charleston,SC,29419-9010

L. State Manifest Document Number 96105

M. State Generator's ID

24. Transporter _____ Company Name — 25. U.S. EPA ID Number

N. State Transporter's ID

O. Transporter's Phone

26. Transporter _____ Company Name — 27. U.S. EPA ID Number

P. State Transporter's ID

Q. Transporter's Phone

28. U.S. DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	29. Containers No.	Type	30. Total Quantity	31. Unit Wt/Vol	R. Waste No.
a. Non Regulated Material (Purge Water)	001	DF	00039	P	Non RCRA
b. Non Regulated Material (Latex Paint)	001	DM	00153	P	Non RCRA
c. Non Regulated Material (Spill Residue)	012	DM	00815	P	Non RCRA
d. Non Regulated Material (Spill Residue)	001	DF	00008	P	Non RCRA
e. Non Regulated Material (Spill Refuse)	001	DF	00018	P	Non RCRA
f.					
g.					
h.					
i.					

S. Additional Descriptions for Materials Listed Above

a. d. g.
b. e. h.
c. f. i.

T. Handling Codes for Wastes Listed Above

32. Special Handling Instructions and Additional Information

a) ERG# NA Items# 26 1/5
b) ERG# NA Items# 27 1/5
c) ERG# NA Items# 28 2/5
d) ERG# NA Items# 29 1/5
e) ERG# NA Items# 30 1/5

SP4400-95-D-0059
Delivery Order# 99

TRANSPORTER

33. Transporter _____ Acknowledgement of Receipt of Materials

Printed/Typed Name — Signature — Date (Month Day Year)

34. Transporter _____ Acknowledgement of Receipt of Materials

Printed/Typed Name — Signature — Date (Month Day Year)

FACILITY

35. Discrepancy Indication Space

a. ____ lbs. d. ____ lbs. g. ____ lbs.
b. ____ lbs. e. ____ lbs. h. ____ lbs.

INSERT THIS MATERIAL AT THE END OF APPENDIX B REPORT:

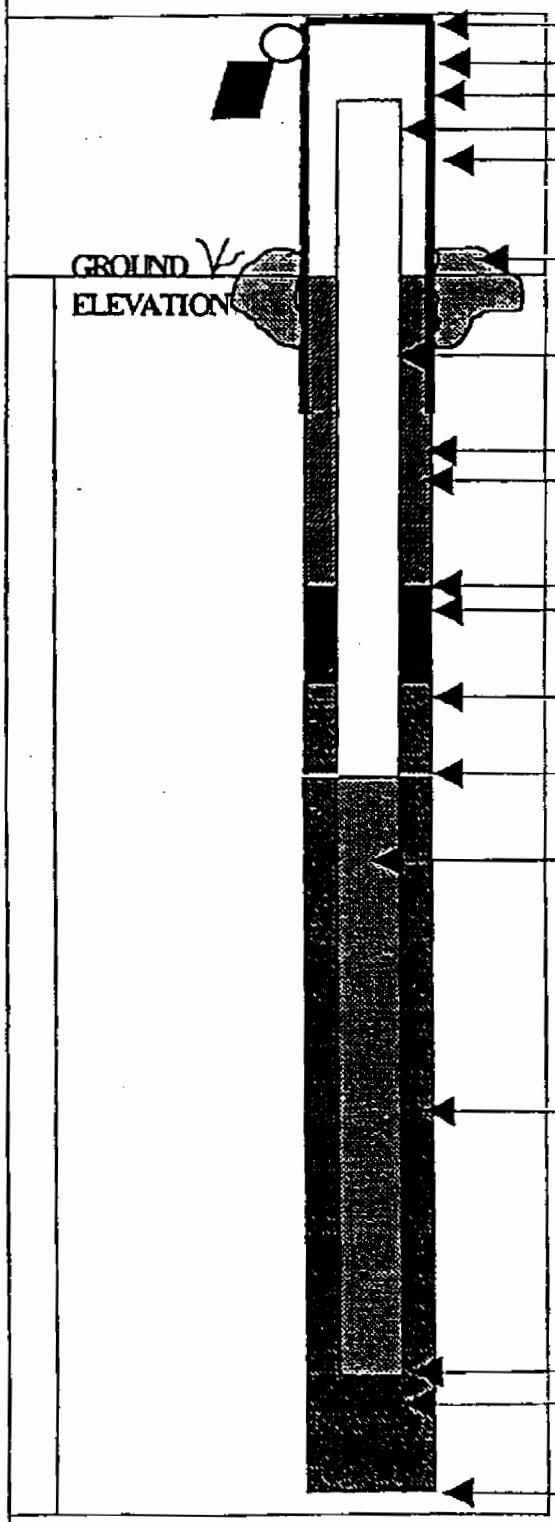
INITIAL GROUNDWATER ASSESSMENT REPORT FOR SITE 24, BUILDING NS1346 (TTNUS, 2000)

APPENDIX A

WELL CONSTRUCTION AND SOIL BORING LOGS

OVERBURDEN MONITORING WELL SHEET

PROJECT	CNC24 MW01	LOCATION:	CNC24-MW01	DRILLER	Rod
PROJECT NO.	CNC24	BORING	CNC24-MW01	METHOD:	~~DPT~~ HSA
ELEVATION		DATE	8/6/99	DRILLING	Custom Drilling
FIELD GEOLOGIST	Marty Ray			DEVELOPMENT:	NA



ELEVATION OF TOP OF SURFACE CASING: Flush

ELEVATION OF TOP OF RISER PIPE:

STICK-UP TOP OF SURFACE CASING:

STICK-UP RISER PIPE:

I.D. OF SURFACE CASING: 8"

TYPE OF SURFACE CASING: Steel man-hole w/cover

TYPE OF SURFACE SEAL: Concrete pad 2'x2'x6"

RISER PIPE I.D.: 2"

TYPE OF RISER PIPE: Sch 40 PVC

BOREHOLE DIAMETER: 4.25"

TYPE OF SEAL: grout to 6"

ELEVATION / DEPTH OF SEAL: 1'0"

TYPE OS SEAL: 30/65 sand

DEPTH TOP OF SAND PACK: 1'6"

ELEVATION / DEPTH TOP OF SCREEN: 2'10"

TYPE OF SCREEN: Sch 40 PVC

SLOT SIZE X LENGTH: 10 slot

I.D. OF SCREEN: 2"

TYPE OF SAND PACK: 20/30 sand

ELEVATION / DEPTHBOTTOM OF SCREEN: 12'0

ELEVATION / DEPTH BOTTOM OF SAND PACK: 12'6"

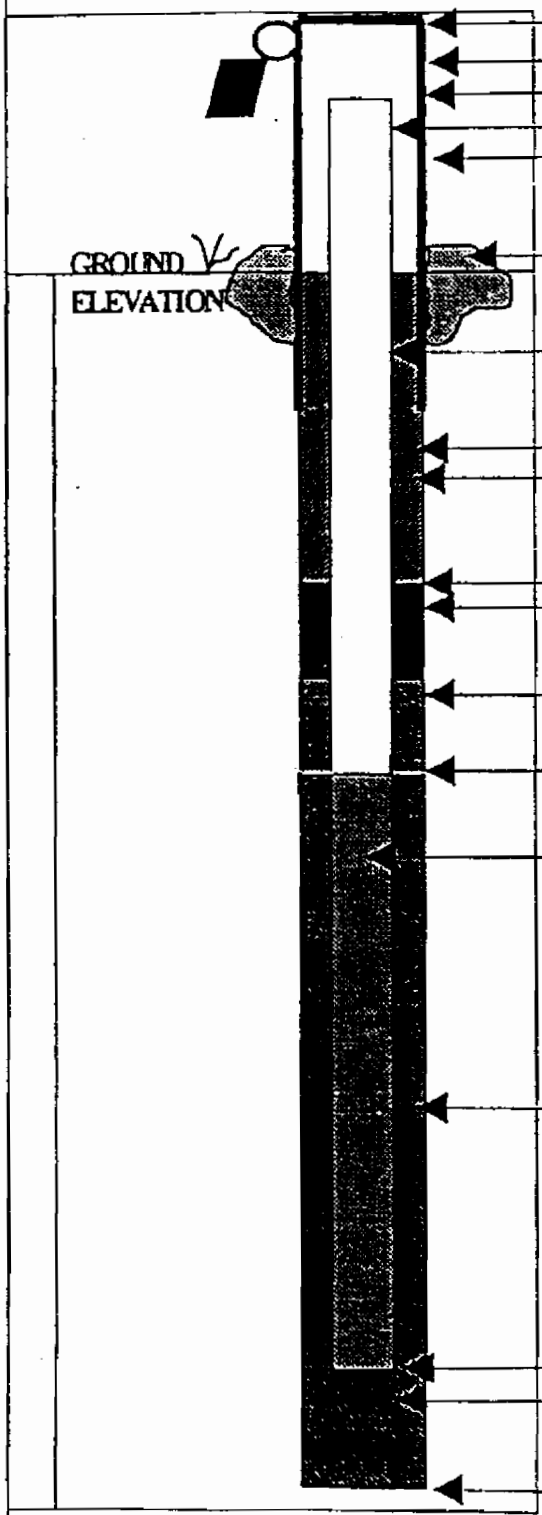
TYPE OF BACKFILL BELOW OBSERVATION WELL: 20/30 sand

ELEVATION / DEPTH OF HOLE: 12'6"

BORING NO.: _____

OVERBURDEN MONITORING WELL SHEET

PROJECT	CNC	LOCATION:	CNC24-MW02	DRILLER	Rod
PROJECT NO.	CNC24	BORING	CNC24-MW02	METHOD:	~~BPT~~ HSA
ELEVATION		DATE	8/6/99	DRILLING	Custom Drilling
FIELD GEOLOGIST	Marty Ray			DEVELOPMENT:	NA



ELEVATION OF TOP OF SURFACE CASING: Flush

ELEVATION OF TOP OF RISER PIPE:

STICK-UP TOP OF SURFACE CASING:

STICK-UP RISER PIPE:

I.D. OF SURFACE CASING: 8"

TYPE OF SURFACE CASING: Steel manhole w/cover

TYPE OF SURFACE SEAL: concrete Pad 2'X2'X6"

RISER PIPE I.D.: 2"

TYPE OF RISER PIPE: Sch40 PVC

BOREHOLE DIAMETER: 4.25"

TYPE OF SEAL: grout to 6" bls

ELEVATION / DEPTH OF SEAL: 1'10"

TYPE OS SEAL: 30/65 sand

DEPTH TOP OF SAND PACK: 1'6"

ELEVATION / DEPTH TOP OF SCREEN: 2'10"

TYPE OF SCREEN: Sch 40 PVC

SLOT SIZE X LENGTH: 10 slot

I.D. OF SCREEN: 2"

TYPE OF SAND PACK: 20/30 sand

ELEVATION / DEPTHBOTTOM OF SCREEN: 12'10"

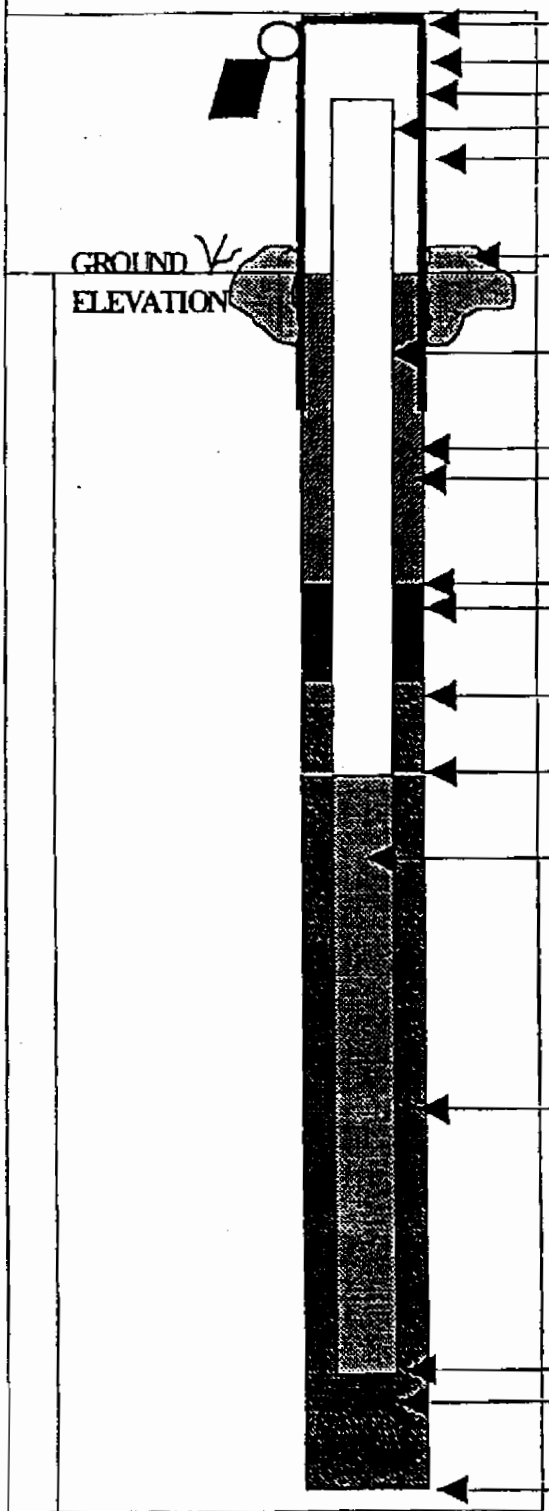
ELEVATION / DEPTH BOTTOM OF SAND PACK: 12'6"

TYPE OF BACKFILL BELOW OBSERVATION WELL: 20/30 sand

ELEVATION / DEPTH OF HOLE: 12'6"

OVERBURDEN MONITORING WELL SHEET

PROJECT	CNC	LOCATION:	CNC24-MW03	DRILLER	Rod
PROJECT NO.	CNC24	BORING	CNC24-MW03	METHOD:	~~BPT~~ HSA
ELEVATION		DATE	8/7/99	DRILLING	Custom Drillin
FIELD GEOLOGIST	Marty Ray			DEVELOPMENT: NA	



ELEVATION OF TOP OF SURFACE CASING: Flush

ELEVATION OF TOP OF RISER PIPE:

STICK-UP TOP OF SURFACE CASING:

STICK-UP RISER PIPE:

I.D. OF SURFACE CASING: 8"

TYPE OF SURFACE CASING: Steel man-hole with cover

TYPE OF SURFACE SEAL: concrete pad 2'x2'x6"

RISER PIPE I.D.: 2"

TYPE OF RISER PIPE: Sch 40 PVC

BOREHOLE DIAMETER: 4.25"

TYPE OF SEAL: grout to 6" bls

ELEVATION / DEPTH OF SEAL: 1'10"

TYPE OS SEAL: 30/65 sand

DEPTH TOP OF SAND PACK: 1'6"

ELEVATION / DEPTH TOP OF SCREEN: 2'10"

TYPE OF SCREEN: Sch 40 PVC

SLOT SIZE X LENGTH: 10 slot

I.D. OF SCREEN: 2"

TYPE OF SAND PACK: 20/30 sand

ELEVATION / DEPTHBOTTOM OF SCREEN: 12'10"

ELEVATION / DEPTH BOTTOM OF SAND PACK: 12'16"

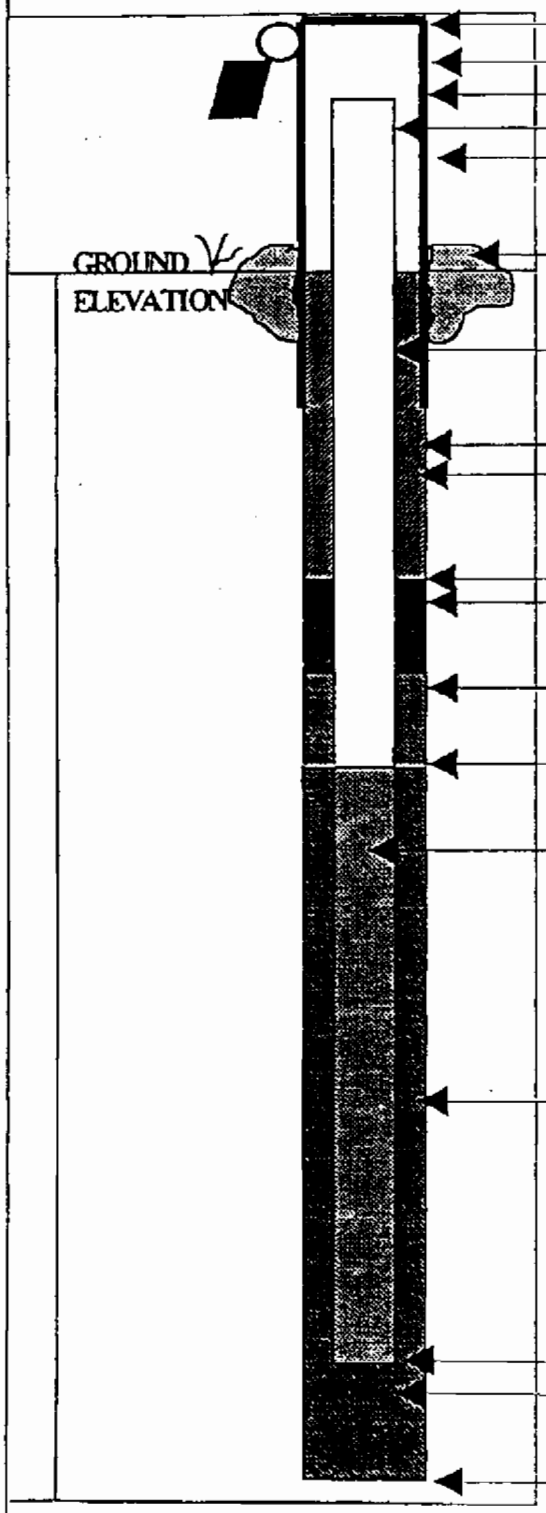
TYPE OF BACKFILL BELOW OBSERVATION WELL: 20/30 sand

ELEVATION / DEPTH OF HOLE: 12'16"

BORING NO.: _____

OVERBURDEN MONITORING WELL SHEET

PROJECT: CNC 24	LOCATION: CNC24-MW04	DRILLER: Rod Fowler
PROJECT NO.: CNC 24	BORING: CNC24-MW04	METHOD: ~~DPT~~ HSA
ELEVATION:	DATE: 8/6/99	DRILLING: Custom Drilling
FIELD GEOLOGIST: Marty Ray		DEVELOPMENT: NA



ELEVATION OF TOP OF SURFACE CASING: Flush

ELEVATION OF TOP OF RISER PIPE: _____

STICK-UP TOP OF SURFACE CASING: _____

STICK-UP RISER PIPE: _____

I.D. OF SURFACE CASING: 8"

TYPE OF SURFACE CASING: steel man-hole w/cover

TYPE OF SURFACE SEAL: concrete pad 2'x2'x6"

RISER PIPE I.D.: 2"

TYPE OF RISER PIPE: Sch-40 PVC

BOREHOLE DIAMETER: 4.25"

TYPE OF SEAL: grout to 6"

ELEVATION / DEPTH OF SEAL: 1'10"

TYPE OS SEAL: 30/65 sand

DEPTH TOP OF SAND PACK: 1' 6"

ELEVATION / DEPTH TOP OF SCREEN: 2'10"

TYPE OF SCREEN: Sch 40 PVC

SLOT SIZE X LENGTH: 10 slot

I.D. OF SCREEN: 2"

TYPE OF SAND PACK: 20/30 sand

ELEVATION / DEPTHBOTTOM OF SCREEN: 12'8"

ELEVATION / DEPTH BOTTOM OF SAND PACK: 12'6"

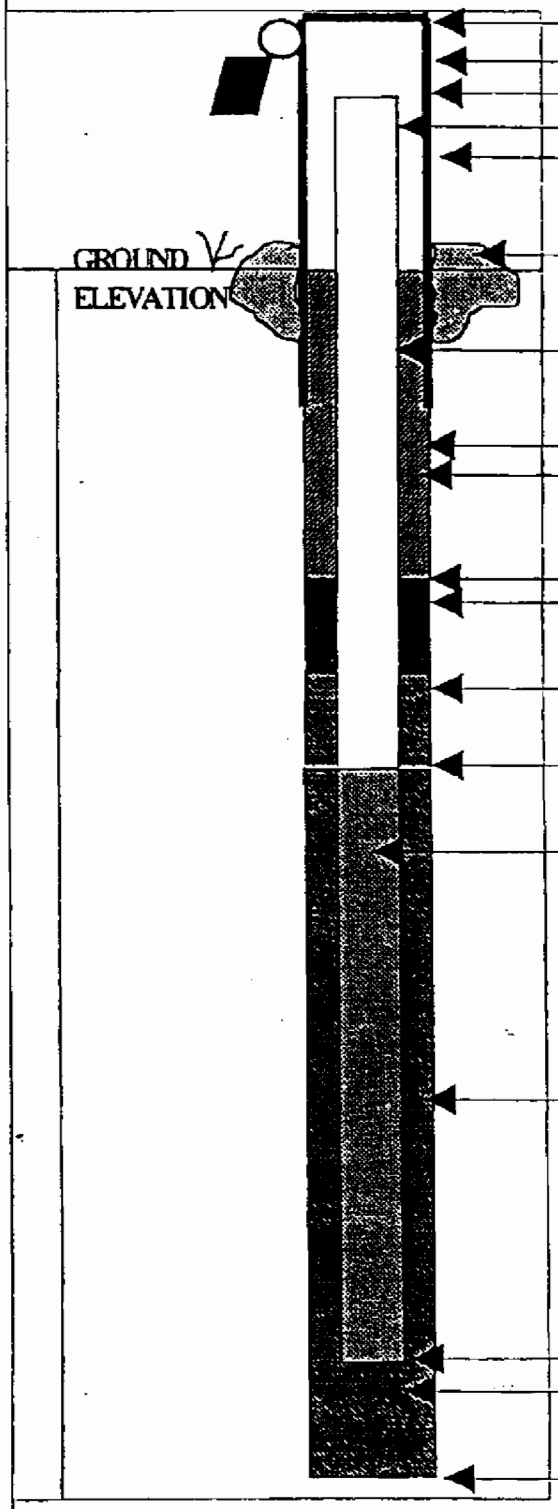
TYPE OF BACKFILL BELOW OBSERVATION WELL: 20/30 sand

ELEVATION / DEPTH OF HOLE: 12'6"

BORING NO.: MW-5D

OVERBURDEN MONITORING WELL SHEET

PROJECT Zone F	LOCATION: Site 24	DRILLER Rod
PROJECT NO.	BORING MW-5D	METHOD: DPT
ELEVATION	DATE 8-10-99	DRILLING Custom Drilling
FIELD ~~GEOLOGIST~~ Tech. R. Hill		DEVELOPMENT: NA



ELEVATION OF TOP OF SURFACE CASING:

ELEVATION OF TOP OF RISER PIPE:

STICK-UP TOP OF SURFACE CASING:

STICK-UP RISER PIPE:

I.D. OF SURFACE CASING: 8"

TYPE OF SURFACE CASING: 8" Manhole

TYPE OF SURFACE SEAL: Concrete

RISER PIPE I.D.: 2"

TYPE OF RISER PIPE: PVC

Outter casing 8" PVC

BOREHOLE DIAMETER: 10¼

TYPE OF SEAL: Grout

ELEVATION / DEPTH OF SEAL: 20.0'

TYPE OS SEAL: Bentonite

DEPTH TOP OF SAND PACK: 22.0'

ELEVATION / DEPTH TOP OF SCREEN: 25.0'

TYPE OF SCREEN: PVC

SLOT SIZE X LENGTH: .010 X 10'

I.D. OF SCREEN: 2"

TYPE OF SAND PACK: 20/30 Silica Sand

ELEVATION / DEPTHBOTTOM OF SCREEN: 30'

ELEVATION / DEPTH BOTTOM OF SAND PACK: 30'

TYPE OF BACKFILL BELOW OBSERVATION WELL:

ELEVATION / DEPTH OF HOLE: 1

BORING LOG

PROJECT NAME: Site 24 Zone F
PROJECT NUMBER:
DRILLING COMPANY: Custom Drilling
DRILLING RIG:
BORING NUMBER: MW-5D
DATE: 8-9-94
GEOLOGIST:
DRILLER:

Sample No. and Type or RQD	Depth (FL) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/FL) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
							Blind Drill						
							down to 15.0'						
	5												
	10												
	15						Gray & orange silty						
	16	3/5					clay Tr. f. sand.		Set casing				
	17	6/9							@ 20.0'				
	18	3/4											
	19	6/7					Gray & Tan sandy						
	20						clay						

* When rock coring, enter rock brokeness.

** Include monitor reading in 5 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm):

Converted to Well: Yes ____ No ____ Well I.D. #: ____

BORING LOG

Page ___ of ___

PROJECT NAME: Site 24 Zone F
PROJECT NUMBER:
DRILLING COMPANY: Custom Drilling
DRILLING RIG:

BORING NUMBER: MW-5D
DATE: 9-10-99
GEOLOGIST:
DRILLER: Rock.

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Breathing Zone	Borehole	Driller Zone
	21												
	22												
	23	3/3					Dark green f. sandy						
	24	4/5					clay w/f. sand lens						
	25	2/4											
	26	6/8					Dark green f. sandy						
	27	0/0					clay						
	28	10/8					Dark green f. clayey						
	29	9/10					sand						
	30												
				B.T.					Set screen from 25.0'-30.0'				

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm):

Remarks:

Converted to Well: Yes ____ No ____ Well I.D. #:

BORING LOG

Page ___ of ___

PROJECT NAME: site 24
PROJECT NUMBER:
DRILLING COMPANY: Columbia
DRILLING RIG: Geoprobe 5400

BORING NUMBER: CNC24B01
DATE: 6-5-94
GEOLOGIST:
DRILLER: R Lewis

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm) Sample	Sampler BZ	Borehole**	Driller BZ**
	1			.3			Asphalt .3		Sampled Soil				
	2						Green silty f. to med		from 3.0'-3.0'				
	3						sand. ~~Trace~~ Tr. of clay		#24SFB01[illegible]				
	4		2.0						Time: 1134				
	5												
	6						Moist						
	7			7.0									
	8		3.7				Red or Gray sandy clay						
							Tr. of Silt.						
									Set Screen				
				12.0			w/L = 6.0'		from 6.0 - 12.0'				
									Sampled Water				
									#24GFB01[illegible]12				
									Time: 1317				

2'-3'
H.S.W/f.i = ~~300~~ 39pp
H.S.W/f.i = ~~32~~ pp ~~250~~

4-8
H.S.W/f.i = 60pp
H.S.W/f.i = 60pp

* When rock coring, enter rock brokeness.

** include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): ____

Remarks: ____

Converted to Well: Yes ____ No ____ Well I.D. #: ____

BORING LOG

Page ___ of ___

PROJECT NAME: Site 24
PROJECT NUMBER:
DRILLING COMPANY: Columbia
DRILLING RIG: Geoprobe 5400

BORING NUMBER: CNC24B02
DATE: 6-5-99
GEOLOGIST:
DRILLER: B. Lewis

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm) Sample	Sampler BZ	Borehole**	Driller BZ**	
				.3			Asphalt .3'		Sampled Soil					
							Lime Rock		from 4.0'-5.0'					
							Brown f. to med Sand		#24GPB02005					
9	4		2.8	4.0			Tr. of gravel		Time: 1330		0		0	HS 4/6 fil = 0 pf
							Red & Grey Sandy clay							HS 4/fil = 0 pf
2	8		0.8								0		0	HS 4/6 fil = 0 ppm
														HS 4/fil = 0 ppm
							Wet							
				11.0			W/L = 8.0'		Set Screen					
				B.F.					From 8.0-11.0					
									Pulled Screen					
									up to 6.0'-9.0'					
									Sampled Water					
									#24GPB02006 09					
									Time: 1410					

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): ____

Remarks: ____

Converted to Well: Yes ____ No ____ Well I.D. #: ____

BORING LOG

Page ___ of ___

PROJECT NAME: Site 24
PROJECT NUMBER:
DRILLING COMPANY: Columbia
DRILLING RIG: Geoprobe 5400

BORING NUMBER: GNC24B03
DATE: 6-5-99
GEOLOGIST:
DRILLER: B. Louis

Sample No. and Type or RQD	Depth (FL) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/FL) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
							Asphalt		Sampled Soil				
							Brown Sand & gravel		from 2.0'-3.0'				
							w/layers of clay & asphalt		#24SFB03020003				
x	4		2.0						Time: 1400				
				6.0			Brown fr to med						
				Δ			sand wet						
x	8												
				8.0									
				B.T.			w/L ≈ 6-8		Set screen				
									from 5.0'-8.0'				
									Sampled water				
									#24GFB03050018				
									Time: 1710				

H.S. % fil = 2 ppm

* When rock coring, enter rock brokeness.

** Include monitor reading in 5 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm):

Converted to Well: Yes ____ No ____ Well I.D. #:

BORING LOG

Page ___ of ___

PROJECT NAME: Site 24
PROJECT NUMBER:
DRILLING COMPANY: Columbia
DRILLING RIG: Geoprobe 5400

BORING NUMBER: CNC24B04
DATE: 6-5-97
GEOLOGIST:
DRILLER: B. Lewis

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
							Asphalt, .3'		Sampled Soil				
							Br. f. to coarse sand		from 3.0'-4.0'				
							w/some gravel & clay layers		#24SFB04B304				
20	4								Time 1427				
				5.5			Wet sand						
	8								Set Screen				
									from 4.0'-7.0'				
									No water				
	12			R.D.			W/L = 10.0'		Set Screen				
				B.T.					from 9.0-12.0				
									Sampled Water				
									#24GFB04B12				
									Time 1409				

3.0'-4.0'
H.S. = 3ppm

* When rock coring, enter rock brokeness.

** Include monitor reading in 5 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): ____

Remarks: ____

Converted to Well: Yes ____ No ____ Well I.D. #: ____

BORING LOG

Page ___ of ___

PROJECT NAME: Site 24
PROJECT NUMBER:
DRILLING COMPANY: Columbia
DRILLING RIG: Geoprobe 5400

BORING NUMBER: CNG24B05
DATE: 6-5-99
GEOLOGIST:
DRILLER: B. Lewis

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Drifter BZ**
				.3			Asphalt .3		Sampled Soil				
							Tan f. to med Sand		from 1.0'-2.0'				
							Tr. of silt		#24SFB05012				
0	4		2.2						Time: 1520		0		0
							Moist to 4.0'						
							Tan-gray sandy Clay						
							wet Lose Sand.						
3	8		3.0				Red & Gray sandy Clay				0		0
									Set Screen				
									From 8.0'-12.0				
				12.0									
				12.0 BT									
									Sampled Water				
									#24GFB05012				
									Time: 1652				

1.0'-2.0' H.S. % fil = 0 ppm

5.0'-6.0' H.S. % fil = 0 ppm

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm):

Remarks:

Converted to Well: Yes ____ No ____ Well I.D. #:

BORING LOG

Page ___ of ___

PROJECT NAME: Site 24
PROJECT NUMBER:
DRILLING COMPANY: Columbia
DRILLING RIG: Geoprobe 5400

BORING NUMBER: CNC24B06
DATE: 6-5-99
GEOLOGIST:
DRILLER: B. Lewis

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm) Sample	Sampler BZ	Borehole**	Driller BZ**
				.3			Asphalt .3'						
							Br. f. to med Sand		Sampled Soil				
									from 3.0'-4.0'				
7	4			4.0					# 24SFB06Ø3Ø4				
	5			moist					Time 1559				
	6			wet			Tan f. to med Sand						
	7						Tr. silt. wet						
2	8		3.8				Orange ~~clay~~ silt						
	9						Sandy clay						
	10												
	11								set Screen				
	12			12.0					from 9.0-12.0'				
							W/L = 10.4						
									Sampled Water				
									# 24GFB06Ø912				
									Time 1622				

7.0' ↓ H.S. 4/0 fil = 7 ppm

8.0'-12.0' ↓ H.S. 4/0 fil = 6 ppm

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm):

Converted to Well: Yes _____ No _____ Well I.D. #:

BORING LOG

Page ___ of ___

PROJECT NAME: site 24
PROJECT NUMBER:
DRILLING COMPANY: Columbia
DRILLING RIG: Geoprobe 5400

BORING NUMBER: CNC24B07
DATE: 6-6-99
GEOLOGIST:
DRILLER: B. Lewis

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**	
							Asphalt .2'							
							Sub Base .3'							
							Tan to Br. silty f. to							3.0-4.0'
2	4		2.5				med. sand Tr. of clay		Sampled Soil		0		0	H2S % fil = 0 ppm
				4.5			Tan & Gray sandy		From 4.0'-5.0'					
							clay		# 24SFB07Ø4Ø5					
				6.0										
				7.0			Gray Clayey f. to med		Time: 0908					4.0'-5.0'
3	8						Sand Tr. silt				0		0	H2S % fil = 0 ppm
							Br. & Gray Sandy							
							clay Tr. silt							
									Set Screen					
	12			12.0			W/L = 6.7'		from 9.0'-12.0'					
				B.T										
									Sampled Water					
									# 24GFB07Ø912					
									Time: 0930					

* When rock coring, enter rock brokeness.

** Include monitor reading in 5 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm):

Converted to Well: Yes ____ No ____ Well I.D. #:

BORING LOG

Page ___ of ___

PROJECT NAME: Site 24
PROJECT NUMBER:
DRILLING COMPANY: Columbia
DRILLING RIG: Geoprobe

BORING NUMBER: CNC 24B08
DATE: 6-6-99
GEOLOGIST:
DRILLER: B. Lewis

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): sample	Sampler BZ	Borehole**	Driller BZ**	
							Asphalt <3							
							Tan f. to med Sand							
				2.5			Br. clayey f. to med. Sand							2'-3'
#1	4		2.1						Sampled Soil		0		0	HS. w/ % Fil = 0ppm
				4.5			Red & Gray Sandy Clay		from 4.0'-5.0'					
				6.6			Tan f. to med Clayey		# 24SFB08408					
							Sand Very Moist		Time: 0944					
#4	8			8.0			Red & Gray Sandy Clay				0		0	4'-5' w/ % Fil. = 0ppm
				12.0			W/L = 8.2		Set Screen					
				13.1					from 9.0-12.0'					
									Sampled Water					
									# 24GFB08912					
									Time: 0955					

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): ____

Remarks: ____

Converted to Well: Yes ____ No ____ Well I.D. #: ____

BORING LOG

Page ___ of ___

PROJECT NAME: Site 24
PROJECT NUMBER:
DRILLING COMPANY: Columbia
DRILLING RIG: Geoprobe 5400

BORING NUMBER: CNG24B09
DATE: 6-6-99
GEOLOGIST:
DRILLER: B. Lewis

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**	
				.6			Asphalt		Sampled Soil					
				2.0			Sub Base		from 1.0'-2.0'					
							Tan f. to med. Sand.		# 24B FB09 0102					1.0'-2.0'
4		4	1.8	4.0			Brown f. to med clay		Time: 1004		0		0	H.S. w/ Fil = 0ppm
				5.0			Sand Moist							
							Red-Gray sandy clay							
				7.0			Tan clay med. to coarse							4.0'-5.0'
7		8	1.0				sand wet							H.S. w/ Fil = 0ppm
							Red-Gray sandy							
							clay Moist							
				12.0			W/L = 6.4		Set Screen					
									from 9.0'-12.0'					
									Sampled Water					
									# 24G FB09 0112					
									Time: 1026					

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm):

Converted to Well: Yes ____ No ____ Well I.D. #:

BORING LOG

Page ___ of ___

PROJECT NAME: Site 24
PROJECT NUMBER:
DRILLING COMPANY: Columbia
DRILLING RIG: Geoprobe 5400

BORING NUMBER: CNC24B1Ø
DATE: 6-6-99
GEOLOGIST:
DRILLER: ~~R. Hall~~ B. Lewis

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
				.8			Asphalt .2'		Sampled Soil				
							Sub Base		# 24SFB1ØØ1Ø2				
				3.0			Tan f. to Med. sand		Time: 1033				
	4		2.5	4.0			Brown f. to med				0		0
							sand Tr. Clay Wet						
							Brown Coarse Sand Wet						
									Set Screen				
	8			8.0			W/L = 5.9		from 5.0'-8.0'		0		0
				B.T.									
									Sampled Water				
									# 24GFB1Ø6SØØ				
									Time: 1138				

1.0'-2.0' H.S. = 0 ppm with air filter

7.0'-8.0' H.S. 4.5% Fil = 0 ppm

* When rock coring, enter rock brokeness.

** Include monitor reading in 5 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm):

Converted to Well: Yes ____ No ____ Well I.D. #:

BORING LOG

Page ___ of ___

PROJECT NAME: Site 24
PROJECT NUMBER:
DRILLING COMPANY: Columbia
DRILLING RIG: Geoprobe

BORING NUMBER: CNC24B11
DATE: 6-6-99
GEOLOGIST:
DRILLER: B. Lewis

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm) Sample	Sampler BZ	Borehole**	Driller BZ**	
				1.0			Asphalt .2'		Sampled Soil					1.0'-2.0'
							Brn f. to med sand		from 1.0-2.0'					H.S.W/ Filter = 0 ppm
				3.0			Dark Gray silty clay		#24SFB11Ø1Ø2					
0	4		2.5				Tr. of sand.		Time 0/100					
				4.0			Gray clayey fi to med							
							sand. Wet							111Ø
							Red & Gray sandy							7.0'-8.0'
2	8		3.0				clay							H.S.W/ Filter = 0
									Set Screen					
									from 9.0'-12.0'					
	12			12.0			W/L = 10.5'		Sampled Water					
				B.T.					#24SFB11Ø912					
									Time 1110					

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm):

Converted to Well: Yes ____ No ____ Well I.D. #:

BORING LOG

Page ___ of ___

PROJECT NAME: Site 24
PROJECT NUMBER:
DRILLING COMPANY: Columbia
DRILLING RIG: Geoprobe

BORING NUMBER: CNC24B12
DATE: 6-6-99
GEOLOGIST:
DRILLER: B. Lewis

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm) Sample	Sampler BZ	Borehole**	Driller BZ**	
							Asphalt .2'		Sampled Soil					
							Brown Sandy Clay		from 1.0'-2.0'					
							w/ some gravel fill		#24SB3120102					1.0'-2.0'
6	4			3.5			Moist		Time:		0		0	H.S. % Fd = 0pf
							Brown clayey							
							sand & Tr. silt. Wet							
				6.5			Red & Gray sandy							
8	8						clay - Moist							4.0'-8.0' H.S. % Fd = 0pf
							↓							
									Set Screen					
									from 9.0-12.0					
	12			12.0			W/L = 10.23							
									Sampled Water					
									#24GB120912					
									Time: 1143					

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): ____

Remarks: ____

Converted to Well: Yes ____ No ____ Well I.D. #: ____

BORING LOG

Page ___ of ___

PROJECT NAME: Site 24
PROJECT NUMBER:
DRILLING COMPANY: Columbia
DRILLING RIG: Geoprobe 5400

BORING NUMBER: GNC24B13
DATE: 6-6-99
GEOLOGIST:
DRILLER: B. Lewis

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
							Asphalt .2'		Sampled Soil				
							Brown fine to med		from 1.0-2.0'				
				3.0			Sand Tr. clay		# 24SFB13Ø1Ø2				
3	1.		2.0				Tan f. to med sand		Time: 1155				
							Moist						
				4.5			Brown fine to med						
							Sand wet						
7	8		2.0										
									Set Screen				
				12.0			W/L = 10.1		from 9.0'-12.0'				
				B.T.					# 24GFB13Ø9Ø2				
									Time: 1210				

1.0'-2.0' 4.5% FI = 0 ppm

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm):

Converted to Well: Yes ____ No ____ Well I.D. #:

BORING LOG

PROJECT NAME: CAC, Site 24
PROJECT NUMBER:
DRILLING COMPANY: Columbia
DRILLING RIG: Stratoprobe

BORING NUMBER: 24B14
DATE: 7/8/99
GEOLOGIST:
DRILLER: R. Brant

Sample No. and Type of RQD	Depth (Ft.) or Run No	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	Panna Reading (ppm): Sample	Sample Air	Borehole	Meter Air
	1			Hand Auger			Asphalt w/base						
	2					Dk Gray	Silty Clay Stiff		Dry				
	3								Moist	82	0	100	0
	4												
	5								Wet				
	6					Brn	Sandy Clay						
	7&8								Saturated				
	8&9												
	9&10		4/4										
	10												

* When rock coring, enter rock hardness

** Include monitor reading in 5 foot intervals @ borehole. Increase reading frequency if elevated response read

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes Temp No Well I.D. #:

BORING LOG

PROJECT NAME: CAC, Site 24
PROJECT NUMBER:
DRILLING COMPANY: Colen Sea
DRILLING RIG: Stratoprobe

BORING NUMBER: 24B15
DATE: 7/8/99
GEOLOGIST:
DRILLER: R. Brand

Sample No. and Type of RQD	Depth (Ft.) or Run No	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	Monitor Reading (ppm): Sample	Sample BZ	Background	Blank BZ
	1						Asphalt w/base						
	2					Lt. Gray	Stiff Silty Clay		Moist				
X	3			Hand Auger						70	0	2.8**	0
	4												
	5												
	6								Wet				
	7					Lt. Brn.	Sandy Clay		Saturated				
	8												
	9		30/4										

* When rock coring, enter rock linalowss

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated repense read

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes Temp No Well I.D. #:

BORING LOG

PROJECT NAME: CNC
PROJECT NUMBER:
DRILLING COMPANY: Columbia
DRILLING RIG: Strataprobe

BORING NUMBER: Z4B16
DATE: 7/8/99
GEOLOGIST:
DRILLER: R. Brand

Sample No. and Type of RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	Sample	Breathing Zone	Borehole	Sample Bag
	1			Hand Auger		blk	silt w/ gravel		dry				
	2						↓		moist				
	3					br.	silty clay		moist	8	0	110	0
	4												
X	5									15	0	100	0
	6												
	7					dk brn	Sandy Clay		Saturated				
	8		3/3										

* When rock coring, enter rock lithologies

** Include monitor reading in 5 foot intervals @ borehole. Increase reading frequency if elevated response read

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes Temp No _____ Well I.D. #:

BORING LOG

PROJECT NAME: CMC
PROJECT NUMBER:
DRILLING COMPANY: Columbia
DRILLING RIG: DPT

BORING NUMBER: 24B17
DATE: 8/5/99
GEOLOGIST:
DRILLER: A. Brand

Sample No. and Type or RQD	Depth (FL) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/FL) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	1						Asphalt w/fill		Dry				
	2					Dk Gray	Clayey Sand						
X	3									85	0	0	0
	4		3.5/4										
	5								Moist				
	6					Gray			Saturated				
	7												
	8		3.5/4			Olive Green							

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes Temp No _____ Well I.D. #: _____

BORING LOG

PROJECT NAME: CUC
PROJECT NUMBER:
DRILLING COMPANY: Columbia
DRILLING RIG: DPT

BORING NUMBER: 24318
DATE: 8/5/99
GEOLOGIST:
DRILLER: R. Brand

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	1						Concrete w/ Rebar						
	2					Brn	Silty Sand		Dry				
	3									39	0	0	0
X	4		4/4						Moist				
	5												
	6												
	7												
	8		4/4	No Recovery									

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes Temp No Well I.D. #:

APPENDIX B

LABORATORY DATA

APPENDIX B

SOIL LABORATORY ANALYTICAL DATA

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: PAUL CALLIGAN
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP3703-25
SDG: WP3703
Report Date: 9/24/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: 66
Method: SW8260
Date Analyzed: 8/30/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
24SLB020203	SL	8/23/99	8/24/99	8/30/99	DJP	5030	DJP

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<8	ug/Kg	1.6	8	5
TOLUENE	<8	ug/Kg	1.6	8	5
1,2-DIBROMOETHANE	<8	ug/Kg	1.6	8	5
ETHYLBENZENE	<8	ug/Kg	1.6	8	5
NAPHTHALENE	<8	ug/Kg	1.6	8	5
MTBE	<8	ug/Kg	1.6	8	5
TOTAL XYLENES	<8	ug/Kg	1.6	8	5
DIBROMOFLUOROMETHANE	106	%	1.6		
1,2-DICHLOROETHANE-D4	108	%	1.6		
TOLUENE-D8	96	%	1.6		
P-BROMOFLUOROBENZENE	80	%	1.6		

Report Notes:

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: PAUL CALLIGAN
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP3703-25
SDG: WP3703
Report Date: 9/24/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: 66
Method: EPA 8270
Date Analyzed: 9/10/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
24SLB020203	SL	8/23/99	8/24/99	8/25/99	DPD	EPA 3550	KRT

Compound	Result	Units	DF	Sample PQL	Method PQL
NAPHTHALENE	<500	ug/Kg	1.5	500	330
2-METHYLNAPHTHALENE	<500	ug/Kg	1.5	500	330
ACENAPHTHYLENE	<500	ug/Kg	1.5	500	330
ACENAPHTHENE	<500	ug/Kg	1.5	500	330
FLUORENE	<500	ug/Kg	1.5	500	330
PHENANTHRENE	<500	ug/Kg	1.5	500	330
ANTHRACENE	<500	ug/Kg	1.5	500	330
FLUORANTHENE	<500	ug/Kg	1.5	500	330
PYRENE	<500	ug/Kg	1.5	500	330
BENZO[A]ANTHRACENE	<500	ug/Kg	1.5	500	330
CHRYSENE	<500	ug/Kg	1.5	500	330
BENZO[B]FLUORANTHENE	<500	ug/Kg	1.5	500	330
BENZO[K]FLUORANTHENE	<500	ug/Kg	1.5	500	330
BENZO[A]PYRENE	<500	ug/Kg	1.5	500	330
INDENO[1,2,3-CD]PYRENE	<500	ug/Kg	1.5	500	330
DIBENZ[A,H]ANTHRACENE	<500	ug/Kg	1.5	500	330
BENZO[G,H,I]PERYLENE	<500	ug/Kg	1.5	500	330
NITROBENZENE-D5	73	%	1.5		
2-FLUOROBIPHENYL	74	%	1.5		
TERPHENYL-D14	83	%	1.5		

Report Notes:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services | **Client Field ID: 24SLB020203**

Matrix: SOIL | **SDG Name: WP3703**

Percent Solids: 65.9 | **Lab Sample ID: WP3703-025**

Concentration Units (ug/L or mg/Kg dry weight): mg/Kg

CAS No.	Analyte	Concentration	C	Q	M	DF
7429-90-5	ALUMINUM	33900			P	1
7440-36-0	ANTIMONY	0.22	U		P	1
7440-38-2	ARSENIC	12.3			P	1
7440-39-3	BARIUM	45.4			P	1
7440-41-7	BERYLLIUM	1.3			P	1
7440-43-9	CADMIUM	0.18	U		P	1
7440-70-2	CALCIUM	3400			P	1
7440-47-3	CHROMIUM	42.4			P	1
7440-48-4	COBALT	8.6			P	1
7440-50-8	COPPER	30.3			P	1
7439-89-6	IRON	21200			P	1
7439-92-1	LEAD	46.0			P	1
7439-95-4	MAGNESIUM	3500			P	1
7439-96-5	MANGANESE	277			P	1
7439-97-6	MERCURY	0.48			CV	1
7440-02-0	NICKEL	15.1			P	1
7440-09-7	POTASSIUM	1920			P	1
7782-49-2	SELENIUM	0.31	U		P	1
7440-22-4	SILVER	0.23	U		P	1
7440-23-5	SODIUM	149			P	1
7440-28-0	THALLIUM	0.56	B		P	1
7440-62-2	VANADIUM	66.3			P	1
7440-66-6	ZINC	138			P	1

Color Before: N/A | Texture: N/A

Color After: N/A | Clarity After: N/A

Comments:

FORM I - IN

Katahdin
ANALYTICAL SERVICES

CLIENT: PAUL CALLIGAN
Tetra Tech NUS
1401 Oven Park Dr., Suite 102
Tallahassee, FL 32308

Lab Number : WP-3703-25
Report Date: 10/01/99
PO No. : N7912-P99264
Project : CTO #68

WIC#: CNC CHARLESTON

REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE	RECEIVED
24SLB020203	Solid	CLIENT	08/23/99	08/24/99

PARAMETER	RESULT	UNITS	DF	*PQL	METHOD	ANALYZED	BY	NOTES
Solids-Total Residue (TS)	66.	wt %	1.0	0.10	CLP/CIP SOW	08/26/99	JF	1

* PQL (Practical Quantitation Level) represents laboratory reporting limits and may not reflect sample-specific reporting limits. Sample-specific limits are indicated by results annotated with '<' values.
(1) Sample Preparation on 08/25/99 by JF

10/01/99

LJO/baeajc(dw)/msm
PH25TSS1
CC: MS. LEE LECK
TETRA TECH NUS
FOSTER PLAZA 7
661 ANDERSEN DR.

340 County Road No. 5
P.O. Box 720, Westbrook, ME 04098
Tel: (207) 874-2400 Fax: (207) 775-4029

http://katahdinlab.com

210 West Road No. 5, Portsmouth, NH 03801
Tel: (603) 431-5777 Fax: (603) 436-3356

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: PAUL CALLIGAN
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP3703-24
SDG: WP3703
Report Date: 9/24/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: 82
Method: SW8260
Date Analyzed: 8/28/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
24SLB040304	SL	8/23/99	8/24/99	8/28/99	JSS	5030	JSS

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<5	ug/Kg	1.0	5	5
TOLUENE	<5	ug/Kg	1.0	5	5
1,2-DIBROMOETHANE	<5	ug/Kg	1.0	5	5
ETHYLBENZENE	<5	ug/Kg	1.0	5	5
NAPHTHALENE	<5	ug/Kg	1.0	5	5
MTBE	<5	ug/Kg	1.0	5	5
TOTAL XYLENES	<5	ug/Kg	1.0	5	5
DIBROMOFLUOROMETHANE	133	%	1.0		
1,2-DICHLOROETHANE-D4	145	%	1.0		
TOLUENE-D8	113	%	1.0		
P-BROMOFLUOROBENZENE	86	%	1.0		

Report Notes:

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: PAUL CALLIGAN
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP3703-24
SDG: WP3703
Report Date: 9/24/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: 82
Method: EPA 8270
Date Analyzed: 9/10/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
24SLB040304	SL	8/23/99	8/24/99	8/25/99	DPD	EPA 3550	KRT

Compound	Result	Units	DF	Sample PQL	Method PQL
NAPHTHALENE	<400	ug/Kg	1.2	400	330
2-METHYLNAPHTHALENE	<400	ug/Kg	1.2	400	330
ACENAPHTHYLENE	<400	ug/Kg	1.2	400	330
ACENAPHTHENE	<400	ug/Kg	1.2	400	330
FLUORENE	<400	ug/Kg	1.2	400	330
PHENANTHRENE	<400	ug/Kg	1.2	400	330
ANTHRACENE	<400	ug/Kg	1.2	400	330
FLUORANTHENE	<400	ug/Kg	1.2	400	330
PYRENE	<400	ug/Kg	1.2	400	330
BENZO[A]ANTHRACENE	<400	ug/Kg	1.2	400	330
CHRYSENE	<400	ug/Kg	1.2	400	330
BENZO[B]FLUORANTHENE	<400	ug/Kg	1.2	400	330
BENZO[K]FLUORANTHENE	<400	ug/Kg	1.2	400	330
BENZO[A]PYRENE	<400	ug/Kg	1.2	400	330
INDENO[1,2,3-CD]PYRENE	<400	ug/Kg	1.2	400	330
DIBENZ[A,H]ANTHRACENE	<400	ug/Kg	1.2	400	330
BENZO[G,H,I]PERYLENE	<400	ug/Kg	1.2	400	330
NITROBENZENE-D5	78	%	1.2		
2-FLUOROBIPHENYL	80	%	1.2		
TERPHENYL-D14	90	%	1.2		

Report Notes:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services | **Client Field ID: 24SLB040304**

Matrix: SOIL | **SDG Name: WP3703**

Percent Solids: 81.7 | **Lab Sample ID: WP3703-024**

Concentration Units (ug/L or mg/Kg dry weight): mg/Kg

CAS No.	Analyte	Concentration	C	Q	M	DF
7429-90-5	ALUMINUM	11700			P	1
7440-36-0	ANTIMONY	0.16	U		P	1
7440-38-2	ARSENIC	4.8			P	1
7440-39-3	BARIUM	27.8			P	1
7440-41-7	BERYLLIUM	0.58			P	1
7440-43-9	CADMIUM	0.17	U		P	1
7440-70-2	CALCIUM	1160			P	1
7440-47-3	CHROMIUM	13.0			P	1
7440-48-4	COBALT	2.2	B		P	1
7440-50-8	COPPER	6.1			P	1
7439-89-6	IRON	6930			P	1
7439-92-1	LEAD	17.0			P	1
7439-95-4	MAGNESIUM	788			P	1
7439-96-5	MANGANESE	96.9			P	1
7439-97-6	MERCURY	0.06			CV	1
7440-02-0	NICKEL	4.6			P	1
7440-09-7	POTASSIUM	519			P	1
7782-49-2	SELENIUM	0.22	U		P	1
7440-22-4	SILVER	0.22	U		P	1
7440-23-5	SODIUM	63.5			P	1
7440-28-0	THALLIUM	0.85	B		P	1
7440-62-2	VANADIUM	17.2			P	1
7440-66-6	ZINC	14.6			P	1

Comments:

Client:	Katahdin Analytical 340 County Road Westbrook, Maine 04092
Contact:	Ms. Andrea Colby
Project Description:	Former Naval Complex

cc: KATA00199 Report Date: September 18, 1999

Sample ID	: 24SLB040304
Lab ID	: 9908879-01
Matrix	: Soil
Date Collected	: 08/23/99
Date Received	: 08/24/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Total Rec. Petro. Hydrocarbons	U	-32.0	128	256	mg/kg	1.0	AAT	08/30/99	1030	157244	1
Evaporative Loss @ 105 C		22.0	1.00	1.00	wt%	1.0	GJ	08/26/99	1650	156926	2
Total Organic Carbon		5760	43.1	100	mg/kg	1.0	LS	09/17/99	1428	158289	3

M = Method	Method-Description
M 1	SW846 9071A
M 2	EPA 3550
M 3	SW846 9060 Modified

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

Data reported in mass/mass units is reported as 'dry weight'.

Katahdin
ANALYTICAL SERVICES

Lab Number : WP-3703-24
Report Date: 10/01/99
PO No. : N7912-P99264
Project : CIO #68

CLIENT: PAUL CALLIGAN
Tetra Tech NUS
1401 Oven Park Dr., Suite 102
Tallahassee, FL 32308

WIC#: CNC CHARLESTON

REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE	RECEIVED
24SLB040304	Solid	CLIENT	08/23/99	08/24/99

PARAMETER	RESULT	UNITS	DF	*PQL	METHOD	ANALYZED	BY	NOTES
Solids-Total Residue (TS)	82.	wt %	1.0	0.10	CLP/CIP SOW	08/30/99	JF	1
Total Combustible Organics	2.6	wt %	1.0	0.1	ASTM D2974-8	08/30/99	JF	1

* PQL (Practical Quantitation Level) represents laboratory reporting limits and may not reflect sample-specific reporting limits. Sample-specific limits are indicated by results annotated with '<' values.
(1) Sample Preparation on 08/27/99 by JF

10/01/99

LJO/baeajc(dw)/msm
PH27TSS1
CC: MS. LEE LECK
TETRA TECH NUS
FOSTER PLAZA 7
661 ANDERSEN DR.

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: PAUL CALLIGAN
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP3703-26
SDG: WP3703
Report Date: 9/24/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: 84
Method: SW8260
Date Analyzed: 8/30/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
24SLB040304D	SL	8/23/99	8/24/99	8/30/99	DJP	5030	DJP

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<5	ug/Kg	0.97	5	5
TOLUENE	J3	ug/Kg	0.97	5	5
1,2-DIBROMOETHANE	<5	ug/Kg	0.97	5	5
ETHYLBENZENE	<5	ug/Kg	0.97	5	5
NAPHTHALENE	<5	ug/Kg	0.97	5	5
MTBE	<5	ug/Kg	0.97	5	5
TOTAL XYLENES	<5	ug/Kg	0.97	5	5
DIBROMOFLUOROMETHANE	114	%	0.97		
1,2-DICHLOROETHANE-D4	128	%	0.97		
TOLUENE-D8	99	%	0.97		
P-BROMOFLUOROBENZENE	83	%	0.97		

Report Notes: J

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: PAUL CALLIGAN
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP3703-26
SDG: WP3703
Report Date: 9/24/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: 84
Method: EPA 8270
Date Analyzed: 9/10/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
24SLB040304D	SL	8/23/99	8/24/99	8/25/99	DPD	EPA 3550	KRT

Compound	Result	Units	DF	Sample PQL	Method PQL
NAPHTHALENE	<400	ug/Kg	1.2	400	330
2-METHYLNAPHTHALENE	<400	ug/Kg	1.2	400	330
ACENAPHTHYLENE	<400	ug/Kg	1.2	400	330
ACENAPHTHENE	<400	ug/Kg	1.2	400	330
FLUORENE	<400	ug/Kg	1.2	400	330
PHENANTHRENE	<400	ug/Kg	1.2	400	330
ANTHRACENE	<400	ug/Kg	1.2	400	330
FLUORANTHENE	<400	ug/Kg	1.2	400	330
PYRENE	<400	ug/Kg	1.2	400	330
BENZO[A]ANTHRACENE	<400	ug/Kg	1.2	400	330
CHRYSENE	<400	ug/Kg	1.2	400	330
BENZO[B]FLUORANTHENE	<400	ug/Kg	1.2	400	330
BENZO[K]FLUORANTHENE	<400	ug/Kg	1.2	400	330
BENZO[A]PYRENE	<400	ug/Kg	1.2	400	330
INDENO[1,2,3-CD]PYRENE	<400	ug/Kg	1.2	400	330
DIBENZ[A,H]ANTHRACENE	<400	ug/Kg	1.2	400	330
BENZO[G,H,I]PERYLENE	<400	ug/Kg	1.2	400	330
NITROBENZENE-D5	78	%	1.2		
2-FLUOROBIPHENYL	81	%	1.2		
TERPHENYL-D14	93	%	1.2		

Report Notes:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services
Client Field ID: 24SLB040304D
Matrix: SOIL
SDG Name: WP3703
Percent Solids: 84.4
Lab Sample ID: WP3703-026

Concentration Units (ug/L or mg/Kg dry weight): mg/Kg

CAS No.	Analyte	Concentration	C	Q	M	DF
7429-90-5	ALUMINUM	8190			P	1
7440-36-0	ANTIMONY	0.15	U		P	1
7440-38-2	ARSENIC	3.9			P	1
7440-39-3	BARIUM	23.0			P	1
7440-41-7	BERYLLIUM	0.45			P	1
7440-43-9	CADMIUM	0.17	U		P	1
7440-70-2	CALCIUM	950			P	1
7440-47-3	CHROMIUM	9.0			P	1
7440-48-4	COBALT	1.4	B		P	1
7440-50-8	COPPER	4.4			P	1
7439-89-6	IRON	5100			P	1
7439-92-1	LEAD	14.2			P	1
7439-95-4	MAGNESIUM	537			P	1
7439-96-5	MANGANESE	74.2			P	1
7439-97-6	MERCURY	0.05			CV	1
7440-02-0	NICKEL	2.4	B		P	1
7440-09-7	POTASSIUM	334			P	1
7782-49-2	SELENIUM	0.22	U		P	1
7440-22-4	SILVER	0.22	U		P	1
7440-23-5	SODIUM	54.5			P	1
7440-28-0	THALLIUM	0.38	U		P	1
7440-62-2	VANADIUM	11.8			P	1
7440-66-6	ZINC	21.7			P	1

Comments:

Katahdin
ANALYTICAL SERVICES

CLIENT: PAUL CALLIGAN
Tetra Tech NUS
1401 Oven Park Dr., Suite 102
Tallahassee, FL 32308

Lab Number : WP-3703-26
Report Date: 10/01/99
PO No. : N7912-P99264
Project : CTO #68

WIC#: CNC CHARLESTON

REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE	RECEIVED
24SLB040304D	Solid	CLIENT	08/23/99	08/24/99

PARAMETER	RESULT	UNITS	DF	*PQL	METHOD	ANALYZED	BY	NOTES
Solids-Total Residue (TS)	84.	wt %	1.0	0.10	CLP/CIP SOW	08/30/99	JF	1
Total Combustible Organics	2.1	wt %	1.0	0.1	ASTM D2974-8	08/30/99	JF	1

* PQL (Practical Quantitation Level) represents laboratory reporting limits and may not reflect sample-specific reporting limits. Sample-specific limits are indicated by results annotated with '<' values.
(1) Sample Preparation on 08/27/99 by JF

10/01/99

LJO/baeajc(dw)/msm
PH27TSS1
CC: MS. LEE LECK
TETRA TECH NUS
FOSTER PLAZA 7
661 ANDERSEN DR.

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: PAUL CALLIGAN
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP3703-23
SDG: WP3703
Report Date: 9/24/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: 78
Method: SW8260
Date Analyzed: 8/28/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
24SLB070405	SL	8/23/99	8/24/99	8/28/99	JSS	5030	JSS

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<6	ug/Kg	1.1	6	5
TOLUENE	<6	ug/Kg	1.1	6	5
1,2-DIBROMOETHANE	<6	ug/Kg	1.1	6	5
ETHYLBENZENE	<6	ug/Kg	1.1	6	5
NAPHTHALENE	<6	ug/Kg	1.1	6	5
MTBE	<6	ug/Kg	1.1	6	5
TOTAL XYLENES	<6	ug/Kg	1.1	6	5
DIBROMOFLUOROMETHANE	112	%	1.1		
1,2-DICHLOROETHANE-D4	118	%	1.1		
TOLUENE-D8	102	%	1.1		
P-BROMOFLUOROBENZENE	89	%	1.1		

Report Notes:

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: PAUL CALLIGAN
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP3703-23
SDG: WP3703
Report Date: 9/24/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: 78
Method: EPA 8270
Date Analyzed: 9/10/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
24SLB070405	SL	8/23/99	8/24/99	8/25/99	DPD	EPA 3550	KRT

Compound	Result	Units	DF	Sample PQL	Method PQL
NAPHTHALENE	<430	ug/Kg	1.3	430	330
2-METHYLNAPHTHALENE	<430	ug/Kg	1.3	430	330
ACENAPHTHYLENE	<430	ug/Kg	1.3	430	330
ACENAPHTHENE	<430	ug/Kg	1.3	430	330
FLUORENE	<430	ug/Kg	1.3	430	330
PHENANTHRENE	<430	ug/Kg	1.3	430	330
ANTHRACENE	<430	ug/Kg	1.3	430	330
FLUORANTHENE	<430	ug/Kg	1.3	430	330
PYRENE	<430	ug/Kg	1.3	430	330
BENZO[A]ANTHRACENE	<430	ug/Kg	1.3	430	330
CHRYSENE	<430	ug/Kg	1.3	430	330
BENZO[B]FLUORANTHENE	<430	ug/Kg	1.3	430	330
BENZO[K]FLUORANTHENE	<430	ug/Kg	1.3	430	330
BENZO[A]PYRENE	<430	ug/Kg	1.3	430	330
INDENO[1,2,3-CD]PYRENE	<430	ug/Kg	1.3	430	330
DIBENZ[A,H]ANTHRACENE	<430	ug/Kg	1.3	430	330
BENZO[G,H,I]PERYLENE	<430	ug/Kg	1.3	430	330
NITROBENZENE-D5	70	%	1.3		
2-FLUOROBIPHENYL	72	%	1.3		
TERPHENYL-D14	88	%	1.3		

Report Notes:

Katahdin
ANALYTICAL SERVICES

Lab Number : WP-3703-23
Report Date: 10/01/99
PO No. : N7912-P99264
Project : CTO #68

CLIENT: PAUL CALLIGAN
Tetra Tech NUS
1401 Oven Park Dr., Suite 102
Tallahassee, FL 32308

WIC#: CNC CHARLESTON

REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE	RECEIVED
24SLB070405	Solid	CLIENT	08/23/99	08/24/99

PARAMETER	RESULT	UNITS	DF	*PQL	METHOD	ANALYZED	BY	NOTES
Solids-Total Residue (TS)	79.	wt %	1.0	0.10	CLP/CIP SOW	08/26/99	JF	1

* PQL (Practical Quantitation Level) represents laboratory reporting limits and may not reflect sample-specific reporting limits. Sample-specific limits are indicated by results annotated with '<' values.
(1) Sample Preparation on 08/25/99 by JF

10/01/99

LJO/baeajc(dw)/msm
PH25TSS1
CC: MS. LEE LECK
TETRA TECH NUS
FOSTER PLAZA 7
661 ANDERSEN DR.

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: PAUL CALLIGAN
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP3683-9
SDG: WP3683
Report Date: 9/23/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: 81
Method: SW8260
Date Analyzed: 8/27/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
24SLB120102	SL	8/19/99	8/20/99	8/27/99	JSS	5030	JSS

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<5	ug/Kg	1.0	5	5
TOLUENE	J3	ug/Kg	1.0	5	5
1,2-DIBROMOETHANE	<5	ug/Kg	1.0	5	5
ETHYLBENZENE	<5	ug/Kg	1.0	5	5
NAPHTHALENE	<5	ug/Kg	1.0	5	5
MTBE	<5	ug/Kg	1.0	5	5
TOTAL XYLENES	<5	ug/Kg	1.0	5	5
DIBROMOFLUOROMETHANE	119	%	1.0		
1,2-DICHLOROETHANE-D4	120	%	1.0		
TOLUENE-D8	111	%	1.0		
P-BROMOFLUOROBENZENE	99	%	1.0		

Report Notes: J

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: PAUL CALLIGAN
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP3683-9
SDG: WP3683
Report Date: 9/23/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: 81
Method: EPA 8270
Date Analyzed: 9/10/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
24SLB120102	SL	8/19/99	8/20/99	8/23/99	LAP	SW3550	KRT

Compound	Result	Units	DF	Sample PQL	Method PQL
NAPHTHALENE	<430	ug/Kg	1.3	430	330
2-METHYLNAPHTHALENE	<430	ug/Kg	1.3	430	330
ACENAPHTHYLENE	<430	ug/Kg	1.3	430	330
ACENAPHTHENE	<430	ug/Kg	1.3	430	330
FLUORENE	<430	ug/Kg	1.3	430	330
PHENANTHRENE	<430	ug/Kg	1.3	430	330
ANTHRACENE	<430	ug/Kg	1.3	430	330
FLUORANTHENE	<430	ug/Kg	1.3	430	330
PYRENE	<430	ug/Kg	1.3	430	330
BENZO[A]ANTHRACENE	<430	ug/Kg	1.3	430	330
CHRYSENE	<430	ug/Kg	1.3	430	330
BENZO[B]FLUORANTHENE	<430	ug/Kg	1.3	430	330
BENZO[K]FLUORANTHENE	<430	ug/Kg	1.3	430	330
BENZO[A]PYRENE	<430	ug/Kg	1.3	430	330
INDENO[1,2,3-CD]PYRENE	<430	ug/Kg	1.3	430	330
DIBENZ[A,H]ANTHRACENE	<430	ug/Kg	1.3	430	330
BENZO[G,H,I]PERYLENE	<430	ug/Kg	1.3	430	330
NITROBENZENE-D5	57	%	1.3		
2-FLUOROBIPHENYL	75	%	1.3		
TERPHENYL-D14	90	%	1.3		

Report Notes:

Katahdin
ANALYTICAL SERVICES

Lab Number : WP-3683-9
Report Date: 09/27/99
PO No. : N7912-P99264
Project : CIO #68

CLIENT: PAUL CALLIGAN
Tetra Tech NUS
1401 Oven Park Dr., Suite 102
Tallahassee, FL 32308

WIC#: CNC CHARLESTON

REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE	RECEIVED
24SLB120102	Solid	CLIENT	08/19/99	08/20/99

PARAMETER	RESULT	UNITS	DF	*PQL	METHOD	ANALYZED	BY	NOTES
Solids-Total Residue (TS)	81.	wt %	1.0	0.10	CLP/CIP SOW	08/25/99	JF	1

* PQL (Practical Quantitation Level) represents laboratory reporting limits and may not reflect sample-specific reporting limits. Sample-specific limits are indicated by results annotated with '<' values.
(1) Sample Preparation on 08/24/99 by JF

09/27/99

LJO/mmajc(dw)
PH24TSS8
CC: MS LEE LECK
TETRA TECH NUS
FOSTER PLAZA 7
661 ANDERSEN DR.

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: PAUL CALLIGAN
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP3683-10RA
SDG: WP3683
Report Date: 9/23/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: 66
Method: SW8260
Date Analyzed: 8/26/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
24SLB110102	SL	8/19/99	8/20/99	8/26/99	JSS	5030	JSS

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<7	ug/Kg	1.5	7	5
TOLUENE	<7	ug/Kg	1.5	7	5
1,2-DIBROMOETHANE	<7	ug/Kg	1.5	7	5
ETHYLBENZENE	<7	ug/Kg	1.5	7	5
NAPHTHALENE	<7	ug/Kg	1.5	7	5
MTBE	<7	ug/Kg	1.5	7	5
TOTAL XYLENES	<7	ug/Kg	1.5	7	5
DIBROMOFLUOROMETHANE	72	%	1.5		
1,2-DICHLOROETHANE-D4	79	%	1.5		
TOLUENE-D8	$58	%	1.5		
P-BROMOFLUOROBENZENE	$36	%	1.5		

Report Notes: $, O-13

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: PAUL CALLIGAN
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP3683-10
SDG: WP3683
Report Date: 9/23/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: 66
Method: SW8260
Date Analyzed: 8/27/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
24SLB110102	SL	8/19/99	8/20/99	8/27/99	JSS	5030	JSS

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<7	ug/Kg	1.5	7	5
TOLUENE	J4	ug/Kg	1.5	7	5
1,2-DIBROMOETHANE	<7	ug/Kg	1.5	7	5
ETHYLBENZENE	<7	ug/Kg	1.5	7	5
NAPHTHALENE	<7	ug/Kg	1.5	7	5
MTBE	<7	ug/Kg	1.5	7	5
TOTAL XYLENES	<7	ug/Kg	1.5	7	5
DIBROMOFLUOROMETHANE	79	%	1.5		
1,2-DICHLOROETHANE-D4	81	%	1.5		
TOLUENE-D8	$64	%	1.5		
P-BROMOFLUOROBENZENE	$36	%	1.5		

Report Notes: J, $

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: PAUL CALLIGAN
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP3683-10
SDG: WP3683
Report Date: 9/23/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: 66
Method: EPA 8270
Date Analyzed: 9/10/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
24SLB110102	SL	8/19/99	8/20/99	8/23/99	LAP	SW3550	KRT

Compound	Result	Units	DF	Sample PQL	Method PQL
NAPHTHALENE	<500	ug/Kg	1.5	500	330
2-METHYLNAPHTHALENE	<500	ug/Kg	1.5	500	330
ACENAPHTHYLENE	<500	ug/Kg	1.5	500	330
ACENAPHTHENE	<500	ug/Kg	1.5	500	330
FLUORENE	<500	ug/Kg	1.5	500	330
PHENANTHRENE	<500	ug/Kg	1.5	500	330
ANTHRACENE	<500	ug/Kg	1.5	500	330
FLUORANTHENE	<500	ug/Kg	1.5	500	330
PYRENE	<500	ug/Kg	1.5	500	330
BENZO[A]ANTHRACENE	<500	ug/Kg	1.5	500	330
CHRYSENE	<500	ug/Kg	1.5	500	330
BENZO[B]FLUORANTHENE	<500	ug/Kg	1.5	500	330
BENZO[K]FLUORANTHENE	<500	ug/Kg	1.5	500	330
BENZO[A]PYRENE	<500	ug/Kg	1.5	500	330
INDENO[1,2,3-CD]PYRENE	<500	ug/Kg	1.5	500	330
DIBENZ[A,H]ANTHRACENE	<500	ug/Kg	1.5	500	330
BENZO[G,H,I]PERYLENE	<500	ug/Kg	1.5	500	330
NITROBENZENE-D5	42	%	1.5		
2-FLUOROBIPHENYL	60	%	1.5		
TERPHENYL-D14	76	%	1.5		

Report Notes:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID: 24SLB110102**

Matrix: SOIL **SDG Name:** WP3683

Percent Solids: 66.5 **Lab Sample ID:** WP3683-010

Concentration Units (ug/L or mg/Kg dry weight): mg/Kg

CAS No.	Analyte	Concentration	C	Q	M	DF
7429-90-5	ALUMINUM	33200			P	1
7440-36-0	ANTIMONY	0.26	U	N	P	1
7440-38-2	ARSENIC	24.7			P	1
7440-39-3	BARIUM	74.2			P	1
7440-41-7	BERYLLIUM	1.5			P	1
7440-43-9	CADMIUM	0.28	U		P	1
7440-70-2	CALCIUM	7100			P	1
7440-47-3	CHROMIUM	48.1			P	1
7440-48-4	COBALT	8.8			P	1
7440-50-8	COPPER	36.0		N*	P	1
7439-89-6	IRON	43200		*	P	5
7439-92-1	LEAD	60.3		N	P	1
7439-95-4	MAGNESIUM	4380		N	P	1
7439-96-5	MANGANESE	544		N*	P	1
7439-97-6	MERCURY	0.38			CV	1
7440-02-0	NICKEL	16.5			P	1
7440-09-7	POTASSIUM	2300			P	1
7782-49-2	SELENIUM	0.75	B		P	1
7440-22-4	SILVER	0.37	U		P	1
7440-23-5	SODIUM	320			P	1
7440-28-0	THALLIUM	0.93	B		P	1
7440-62-2	VANADIUM	81.7			P	1
7440-66-6	ZINC	154		*	P	1

Comments:

Katahdin
ANALYTICAL SERVICES

CLIENT: PAUL CALLIGAN
Tetra Tech NUS
1401 Oven Park Dr., Suite 102
Tallahassee, FL 32308

Lab Number : WP-3683-10
Report Date: 09/27/99
PO No. : N7912-P99264
Project : CTO #68

WIC#: CNC CHARLESTON

REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE	RECEIVED
24SLB110102	Solid	CLIENT	08/19/99	08/20/99

PARAMETER	RESULT	UNITS	DF	*PQL	METHOD	ANALYZED	BY	NOTES
Solids-Total Residue (TS)	67.	wt %	1.0	0.10	CLP/CIP SOW	08/25/99	JF	1

* PQL (Practical Quantitation Level) represents laboratory reporting limits and may not reflect sample-specific reporting limits. Sample-specific limits are indicated by results annotated with '<' values.
(1) Sample Preparation on 08/24/99 by JF

09/27/99

LJO/msmajc(dw)
PH24TSS8
CC: MS LEE LECK
TETRA TECH NUS
FOSTER PLAZA 7
661 ANDERSEN DR.

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: PAUL CALLIGAN
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: VBLKM26B
SDG: WP3683
Report Date: 9/23/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: 100
Method: SW8260
Date Analyzed: 8/26/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
VBLKM26B	SL	-	-	8/26/99	DJP	5030	DJP

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<5	ug/Kg	1.0	5	5
TOLUENE	<5	ug/Kg	1.0	5	5
1,2-DIBROMOETHANE	<5	ug/Kg	1.0	5	5
ETHYLBENZENE	<5	ug/Kg	1.0	5	5
NAPHTHALENE	J3	ug/Kg	1.0	5	5
MTBE	<5	ug/Kg	1.0	5	5
TOTAL XYLENES	<5	ug/Kg	1.0	5	5
DIBROMOFLUOROMETHANE	104	%	1.0		
1,2-DICHLOROETHANE-D4	95	%	1.0		
TOLUENE-D8	116	%	1.0		
P-BROMOFLUOROBENZENE	114	%	1.0		

Report Notes: J

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: PAUL CALLIGAN
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: VBLKU28A
SDG: WP3683
Report Date: 9/23/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: 100
Method: SW8260
Date Analyzed: 8/28/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
VBLKU28A	SL	-	-	8/28/99	JSS	5030	JSS

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<5	ug/Kg	1.0	5	5
TOLUENE	<5	ug/Kg	1.0	5	5
1,2-DIBROMOETHANE	<5	ug/Kg	1.0	5	5
ETHYLBENZENE	<5	ug/Kg	1.0	5	5
NAPHTHALENE	<5	ug/Kg	1.0	5	5
MTBE	<5	ug/Kg	1.0	5	5
TOTAL XYLENES	<5	ug/Kg	1.0	5	5
DIBROMOFLUOROMETHANE	107	%	1.0		
1,2-DICHLOROETHANE-D4	110	%	1.0		
TOLUENE-D8	101	%	1.0		
P-BROMOFLUOROBENZENE	94	%	1.0		

Report Notes:

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: PAUL CALLIGAN
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: SBLK;082399B
SDG: WP3683
Report Date: 9/23/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: 100
Method: EPA 8270
Date Analyzed: 9/10/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
SBLK;082399B	SL	-	-	8/23/99	LAP	SW3550	KRT

Compound	Result	Units	DF	Sample PQL	Method PQL
NAPHTHALENE	<330	ug/Kg	1.0	330	330
2-METHYLNAPHTHALENE	<330	ug/Kg	1.0	330	330
ACENAPHTHYLENE	<330	ug/Kg	1.0	330	330
ACENAPHTHENE	<330	ug/Kg	1.0	330	330
FLUORENE	<330	ug/Kg	1.0	330	330
PHENANTHRENE	<330	ug/Kg	1.0	330	330
ANTHRACENE	<330	ug/Kg	1.0	330	330
FLUORANTHENE	<330	ug/Kg	1.0	330	330
PYRENE	<330	ug/Kg	1.0	330	330
BENZO[A]ANTHRACENE	<330	ug/Kg	1.0	330	330
CHRYSENE	<330	ug/Kg	1.0	330	330
BENZO[B]FLUORANTHENE	<330	ug/Kg	1.0	330	330
BENZO[K]FLUORANTHENE	<330	ug/Kg	1.0	330	330
BENZO[A]PYRENE	<330	ug/Kg	1.0	330	330
INDENO[1,2,3-CD]PYRENE	<330	ug/Kg	1.0	330	330
DIBENZ[A,H]ANTHRACENE	<330	ug/Kg	1.0	330	330
BENZO[G,H,I]PERYLENE	<330	ug/Kg	1.0	330	330
NITROBENZENE-D5	86	%	1.0		
2-FLUOROBIPHENYL	88	%	1.0		
TERPHENYL-D14	109	%	1.0		

Report Notes:

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: PAUL CALLIGAN
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: VBLKU27A
SDG: WP3683
Report Date: 9/23/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: 100
Method: SW8260
Date Analyzed: 8/27/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
VBLKU27A	SL	-	-	8/27/99	JSS	5030	JSS

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<5	ug/Kg	1.0	5	5
TOLUENE	<5	ug/Kg	1.0	5	5
1,2-DIBROMOETHANE	<5	ug/Kg	1.0	5	5
ETHYLBENZENE	<5	ug/Kg	1.0	5	5
NAPHTHALENE	<5	ug/Kg	1.0	5	5
MTBE	<5	ug/Kg	1.0	5	5
TOTAL XYLENES	<5	ug/Kg	1.0	5	5
DIBROMOFLUOROMETHANE	104	%	1.0		
1,2-DICHLOROETHANE-D4	107	%	1.0		
TOLUENE-D8	93	%	1.0		
P-BROMOFLUOROBENZENE	89	%	1.0		

Report Notes:

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: PAUL CALLIGAN
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: VBLKU28A
SDG: WP3703
Report Date: 9/24/99
PO No.: N7912-P99264
Project: CTO #68
% Solids: 100
Method: SW8260
Date Analyzed: 8/28/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
VBLKU28A	SL	-	-	8/28/99	JSS	5030	JSS

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<5	ug/Kg	1.0	5	5
TOLUENE	<5	ug/Kg	1.0	5	5
1,2-DIBROMOETHANE	<5	ug/Kg	1.0	5	5
ETHYLBENZENE	<5	ug/Kg	1.0	5	5
NAPHTHALENE	<5	ug/Kg	1.0	5	5
MTBE	<5	ug/Kg	1.0	5	5
TOTAL XYLENES	<5	ug/Kg	1.0	5	5
DIBROMOFLUOROMETHANE	107	%	1.0		
1,2-DICHLOROETHANE-D4	110	%	1.0		
TOLUENE-D8	101	%	1.0		
P-BROMOFLUOROBENZENE	94	%	1.0		

Report Notes:

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: PAUL CALLIGAN
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: SBLK;082599
SDG: WP3703
Report Date: 9/24/99
PO No.: N7912-P99264
Project: CTO #68
% Solids: 100
Method: EPA 8270
Date Analyzed: 9/1/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
SBLK;082599	SL	-	-	8/25/99	DPD	EPA 3550	KRT

Compound	Result	Units	DF	Sample PQL	Method PQL
NAPHTHALENE	<330	ug/Kg	1.0	330	330
2-METHYLNAPHTHALENE	<330	ug/Kg	1.0	330	330
ACENAPHTHYLENE	<330	ug/Kg	1.0	330	330
ACENAPHTHENE	<330	ug/Kg	1.0	330	330
FLUORENE	<330	ug/Kg	1.0	330	330
PHENANTHRENE	<330	ug/Kg	1.0	330	330
ANTHRACENE	<330	ug/Kg	1.0	330	330
FLUORANTHENE	<330	ug/Kg	1.0	330	330
PYRENE	<330	ug/Kg	1.0	330	330
BENZO[A]ANTHRACENE	<330	ug/Kg	1.0	330	330
CHRYSENE	<330	ug/Kg	1.0	330	330
BENZO[B]FLUORANTHENE	<330	ug/Kg	1.0	330	330
BENZO[K]FLUORANTHENE	<330	ug/Kg	1.0	330	330
BENZO[A]PYRENE	<330	ug/Kg	1.0	330	330
INDENO[1,2,3-CD]PYRENE	<330	ug/Kg	1.0	330	330
DIBENZ[A,H]ANTHRACENE	<330	ug/Kg	1.0	330	330
BENZO[G,H,I]PERYLENE	<330	ug/Kg	1.0	330	330
NITROBENZENE-D5	76	%	1.0		
2-FLUOROBIPHENYL	75	%	1.0		
TERPHENYL-D14	87	%	1.0		

Report Notes:

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: PAUL CALLIGAN
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: VBLKU30A
SDG: WP3703
Report Date: 9/24/99
PO No.: N7912-P99264
Project: CTO #68
% Solids: 100
Method: SW8260
Date Analyzed: 8/30/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
VBLKU30A	SL	-	-	8/30/99	DJP	5030	DJP

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<5	ug/Kg	1.0	5	5
TOLUENE	<5	ug/Kg	1.0	5	5
1,2-DIBROMOETHANE	<5	ug/Kg	1.0	5	5
ETHYLBENZENE	<5	ug/Kg	1.0	5	5
NAPHTHALENE	<5	ug/Kg	1.0	5	5
MTBE	<5	ug/Kg	1.0	5	5
TOTAL XYLENES	<5	ug/Kg	1.0	5	5
DIBROMOFLUOROMETHANE	108	%	1.0		
1,2-DICHLOROETHANE-D4	110	%	1.0		
TOLUENE-D8	101	%	1.0		
P-BROMOFLUOROBENZENE	94	%	1.0		

Report Notes:

Katahdin
340 County Road No. 5
P.O. Box 720
Westbrook, ME 04098
Tel: (207) 874-2400
Fax: (207) 775-4029

CHAIN of CUSTODY

PLEASE PRINT IN PEN

Client: Tetra Tech NUS
Contact: Bryn Howze
Phone #: (843) 554-4925
Fax #: ( )
Address: NH-21 Ave. H
City: N. Charleston
State: SC
Zip Code:
Purchase Order #:
Proj. Name / No.:
Katahdin Quote #:
Bill (if different than above):
Address:
Sampler (Print / Sign):
Copies To:

LAB USE ONLY
WORK ORDER #: WP3703
KATAHDIN PROJECT MANAGER:
REMARKS:
SHIPPING INFO: ☐ FED EX ☐ UPS ☐ CLIENT
AIRBILL NO:
TEMP°C: ☐ TEMP BLANK ☐ INTACT ☐ NOT INTACT

ANALYSIS AND CONTAINER TYPE PRESERVATIVES

*	Sample Description	Date / Time coll'd	Matrix	No. of Cntrs.	BTEX, MTBE, EDB, naph	PAH								
	26GLM08Ø1	8/21/99/1513	aq	5	3	2								
	26GLM1ØDØ1M	8/21/99/1240	aq	5	3	2						MS/MSD		
	26GLM1ØDØ1	8/21/99/1240	aq	5	3	2								
	26GLMØ4Ø1	8/21/99/0945	aq	5	3	2								
	26GLMØ6Ø1	8/21/99/1005	aq	5	3	2								
	26GLMØ5Ø1	8/21/99/0945	aq	5	3	2								
	26GLMØ7Ø1	8/21/99/1155	aq	5	3	2								
	26GLMØ7Ø1D	8/21/99/	aq	5	3	2								
	13GLMØ6Ø1	8/21/99/1140	aq	5	3	2								
	32GLMØ6Ø1	8/21/99/1557	aq	5	3	2								
	21GLMØ3Ø1	8/22/99/1152	aq	5	3	2								
	21GLMØ2Ø1	8/22/99/0955	aq	5	3	2								
	21GLMØ2Ø1D	8/22/99	aq	5	3	2								
	21GLMØ7DØ1	8/22/99/1430	aq	5	3	2								
	21GLMØ8Ø1	8/22/99/1500	aq	5	3	2								
	24SLBØ7Ø4Ø5	8/23/99/0915	soil	5	4	1							4ppm	

COMMENTS

Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)
E. J. Haim	8/22/99 1830	8134Ø2681727		8-24-99 0830	
Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)

Katahdin
340 County Road No. 5
P.O. Box 720
Westbrook, ME 04098
Tel: (207) 874-2400
Fax: (207) 775-4029

CHAIN of CUSTODY

PLEASE PRINT IN PEN

Company: Tetra Tech NUS | Contact: Bryn Howze | Phone #: (843) 554-4925 | Fax #: ( )

Address: NH-24 Ave. H | City: N. Charleston | State: SC | Zip Code:

Purchase Order # | Proj. Name / No. | Katahdin Quote #

Bill (if different than above) | Address

Sampler (Print / Sign) | Copies To:

LAB USE ONLY | WORK ORDER #: WP3703 - | KATAHDIN PROJECT MANAGER

REMARKS:

SHIPPING INFO: ☐ FED EX ☐ UPS ☐ CLIENT

AIRBILL NO:

TEMP°C ☐ TEMP BLANK ☐ INTACT ☐ NOT INTACT

ANALYSIS AND CONTAINER TYPE PRESERVATIVES

*	Sample Description	Date / Time coll'd	Matrix	No. of Cntrs.	BTEX, MTBE, EDB, MPA	PAH	TAL Metals	grain size	Dissolved methane	Anions				FID RdΦ
*	24SLBΦ2Φ2Φ3	8/23/99 1045	soil	5	4	1	1							60ppm
*	24SLBΦ4Φ3Φ4	8/23/99 0950	soil	6	4	1	1	+ X Run Foc from PAH jar						50ppm
*	24SLBΦ4Φ3Φ4D	8/23/99	soil	5	4	1	1	X Run Foc from PAH jar						50ppm
	26GLMΦ9DΦ1	8/23/99 1645	aq	5	3	2								
	26GLMΦ3Φ1	8/23/99 1515	aq	5	3	2								
	26GLMΦ2Φ1	8/23/99 1520	aq	5	3	2								
	30GLMΦ1Φ1	8/22/99 1810	aq	9	3	2			3	1				
	30GLMΦ3Φ1	8/22/99 1610	aq	5	3	2								
	30GLMΦ5Φ1	8/22/99 1225	aq	9	3	2			3	1				
	30GLMΦ7Φ1	8/22/99 1515	aq	5	3	2								
	42SLP200304	8/23/99 1400	soil	5	4	1	← 48 hour turn around							3.2ppm
	42SLP210304	8/23/99 1415	soil	5	4	1	← 48 hour turn around							2.6ppm
	26TLOOIO1	8/23/99	aq	2	2									
		/												
		/												
		/												

COMMENTS
* Do TAL metals analysis from PAH jar.

Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)
	8-24-99 0850				
Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)

General Engineering Laboratories, Inc.
2040 Savage Road
Charleston, South Carolina 29407
P.O. Box 30712
Charleston, South Carolina 29417
(803) 556-8171

CHAIN OF CUSTODY RECORD

Page____ of ____ 99088799

Client Name/Facility Name: Katahdin

Collected by/Company: Tetra Tech NUS

SAMPLE ANALYSIS REQUIRED (x) - use remarks area to specify specific compounds or methods

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

SAMPLE ID	DATE	TIME	WELL	SOIL	COMP	GRAB	# OF CONTAINERS	pH, conductivity	TOC/DOC	TOX	Chloride, Fluoride, Sulfide	Nitrite/Nitrate	VOC - Specify Method required	METALS - specify	Pesticide	Herbicide	Total Phenol	Acid Extractables	BN Extractables	PCB's	Cyanide	Coliform - specify type	TPH	Remarks
24SLB04030	8/23/99	0950		X		X	2		1														1	
24SLB04030D	8/23/99			X		X	2		1														1	
ZFRL0001	8/24/99	1330					2																2	Rinsate blank
ZFFL0001	8/24/99	1630					2																2	Field blank
ZFFL0002	8/24/99	1745					2																2	Field blank (HZ)

Relinquished by:	Date:	Time:	Received by:	Relinquished by:	Date:	Time:	Received by:
[signature]	8/24/99	1835	[signature]				

Relinquished by:	Date:	Time:	Received by lab by:	Date:	Time:	Remarks:
			[signature]	8/24/99	1835	

White = sample collector Yellow = file Pink = with report

8

Katahdin
340 County Road No. 5
P.O. Box 720
Westbrook, ME 04098
Tel: (207) 874-2400
Fax: (207) 775-4029

CHAIN of CUSTODY

PLEASE PRINT IN PEN

Tetra Tech NUS | Contact: Bryn Howell | Phone #: (843) 554-4925 | Fax #: ( )

Address: N1121 Ave. H | City: N. Charleston | State: SC | Zip Code:

Purchase Order #: | Proj. Name / No.: | Katahdin Quote #:

Bill (if different than above): | Address:

Sampler (Print / Sign): | Copies To:

LAB USE ONLY | WORK ORDER #: WP 3683

KATAHDIN PROJECT MANAGER

REMARKS:

SHIPPING INFO: ☐ FED EX ☐ UPS ☐ CLIENT

AIRBILL NO: 813402904473

TEMP°C ☐ TEMP BLANK ☐ INTACT ☐ NOT INTACT

ANALYSIS AND CONTAINER TYPE PRESERVATIVES

*	Sample Description	Date / Time coll'd	Matrix	No. of Cntrs.	BTEX, EDB, Naph. (Filt. O Y O N)	PAH (Filt. O Y O N)	Grain size (Filt. O Y O N)	FOC (Filt. O Y O N)	TAL metals (Filt. O Y O N)	(Filt. O Y O N)	(Filt. O Y O N)	(Filt. O Y O N)	(Filt. O Y O N)	(Filt. O Y O N)
	30SLB330506	8/19/99/0915	soil	5	4	1						402 ppm		
	30SLB210708	8/19/99/1000	soil	5	4	1						1270 ppm		
	30SLB200607	8/19/99/1025	soil	5	4	1						3 ppm		
	28SLB020102	8/19/99/1325	soil	5	4	1						0 ppm		
*	28SLB030102	8/19/99/1410	soil	6	4	1	1	✓				0 ppm		
*	28SLB030102D	8/19/99/	soil	5	4	1		✓				0 ppm		
*	28SLB030102M	8/19/99/1410	soil	5	4	1		✓	-MS/MSD			0 ppm		
	24SLB120102	8/19/99/1545	soil	5	4	1			✓			0 ppm		
	24SLB110102	8/19/99/1600	soil	5	4	1			✓			0 ppm		
	30TL00101	8/19/99/	aq	2	2									
	31GLM0601	8/19/99/1740	aq	5	3	2								
	28SLB050203	8/19/99/1545	soil	5	4	1								
		/												
		/												
		/												
		/												

COMMENTS

* These samples also need to be tested for FOC from the 4oz PAH jar.

Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)
		813402904473		8-20-99 0845	
Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)

KATAHDIN ANALYTICAL SERVICES

Summary of Report Notes

Report Note	Note Text
#	'#' flag denotes surrogate compound recovery is out of criteria.
J	'J' flag denotes an estimated value less than the Laboratory's Practical Quantitation Level.

KATAHDIN ANALYTICAL SERVICES

Summary of Report Notes

Report Note	Note Text
DL	'DL' flag denotes inability to calculate surrogate recovery due to sample dilution.
E	'E' flag indicates an estimated value. The analyte was detected in the sample at a concentration greater than the standard calibration range.
J	'J' flag denotes an estimated value less than the Laboratory's Practical Quantitation Level.
O-1	Sample dilution required due to matrix interference, sample viscosity or other matrix-related problem; therefore, standard laboratory Practical Quantitation Level (PQL) could not be achieved.
O-2	Sample dilution required for quantitation of one or more target analytes; therefore, standard laboratory Practical Quantitation Level (PQL) could not be achieved.

KATAHDIN ANALYTICAL SERVICES

Summary of Report Notes

Report Note	Note Text
$	'$' flag denotes surrogate compound recovery is out of criteria. Re-extraction or re-analysis confirmed matrix interference.
E	'E' flag indicates an estimated value. The analyte was detected in the sample at a concentration greater than the standard calibration range.
J	'J' flag denotes an estimated value less than the Laboratory's Practical Quantitation Level.
O-1	Sample dilution required due to matrix interference, sample viscosity or other matrix-related problem; therefore, standard laboratory Practical Quantitation Level (PQL) could not be achieved.
O-13	Internal standard area(s) are out of criteria. Reanalysis confirmedmatrix interference.
O-2	Sample dilution required for quantitation of one or more target analytes; therefore, standard laboratory Practical Quantitation Level (PQL) could not be achieved.

S.W.COLE
ENGINEERING, INC.

RR 3, Box 7230, China Road, Winslow, ME 04901 TEL (207) 873-4283 FAX (207) 873-4977
Six Liberty Drive, Bangor, ME 04401 TEL (207) 848-5714 FAX (207) 848-2403
Gray Plaza, P. O. Box 378, Gray, ME 04039 TEL (207) 657-2866 FAX (207) 657-2840
91 Water St., P. O. Box 220, Caribou, ME 04736 TEL (207) 496-1511 FAX (207) 496-1501
33 Londonderry Rd., #6, Londonderry, NH 03053 TEL (603) 437-9600 FAX (603) 437-9656

LAB REPORT

September 15,1999
99-812 M

Andrea Colby
Katahdin Analytical Services
P.O. Box 720
Westbrook, Maine 04098

Reference: Laboratory Testing

SWC Sample No.	Material Type	Material Source	Date Received	Date Tested
S-1	Silty Sand	WP-3819-1	9-08-99	9-13-99
S-2	Silty Clay	WP-3703-24	9-08-99	9-13-99

TEST RESULTS

Gradation

The sample was tested in accordance with ASTM C-136, "Sieve Analysis of Fine and Coarse Aggregates".

Sieve Size	Percent Passing Sieve By Weight S-1
1/2"	100
1/4"	99.8
No. 4	99.6
No. 10	98.9
No. 20	95.7
No. 40	91.2
No. 60	82.3
No. 100	55.2
No. 200	16.6

Grain -Size Analysis

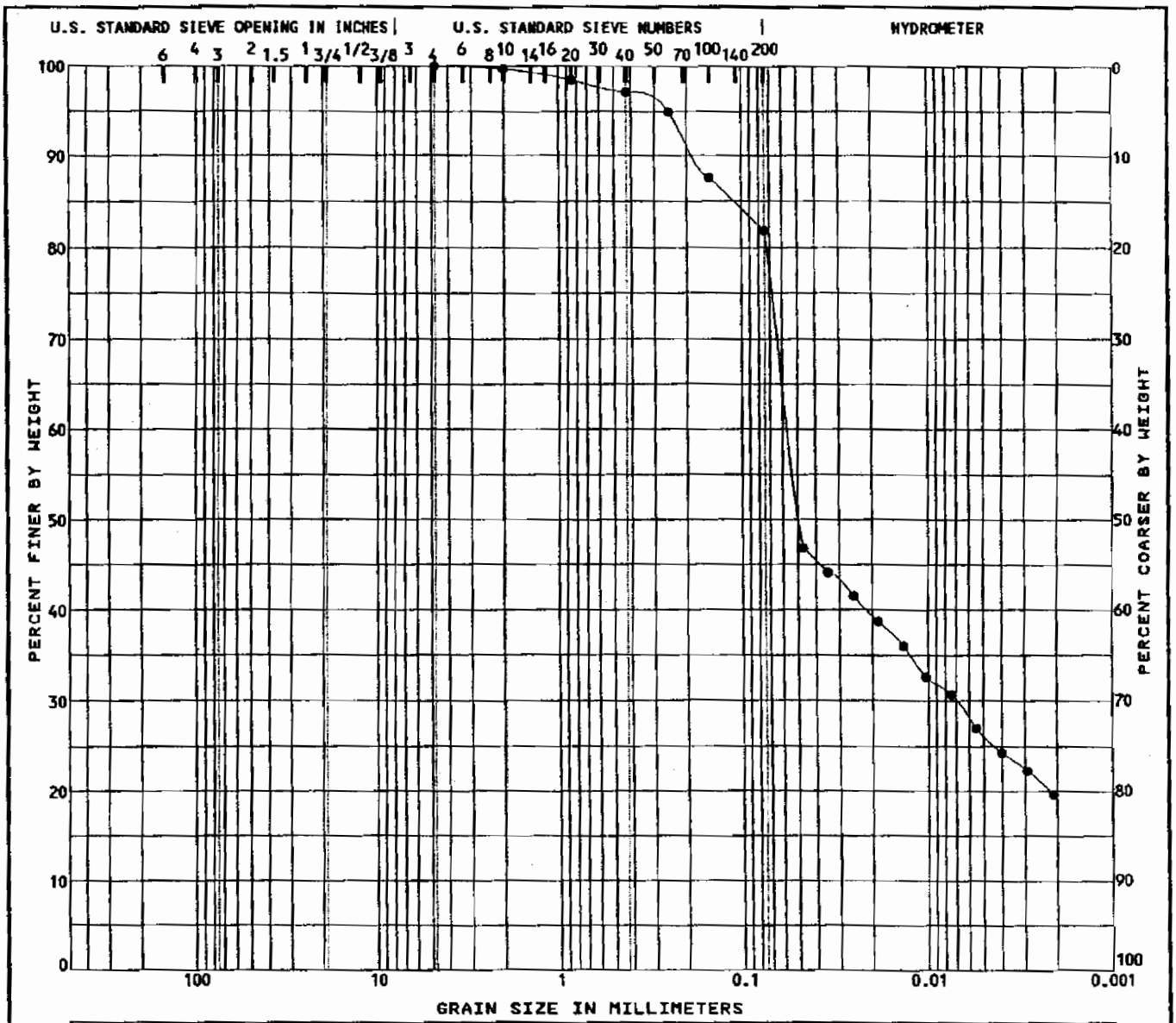
The samples were tested in accordance with ASTM D-422, "Particle-Size Analysis of Soils". After soaking for at least 16 hours, stirring apparatus A (a blender) was used to stir the samples for one minute.

	Percent of Material			
Sample Number	Gravel, 3" to No. 4	Sand, No. 4 to No. 200	Silt 0.074 to 0.005 mm	Clay, Smaller Than 0.005 mm
S-2	0.0	18.2	55.6	26.2

Robert E. Chapnt, Jr.
Robert E. Chapnt, Jr., P.E.
Geotechnical Engineer

REC:rac
Checked By: CDM

P:\Swc-99\99-812\99-812lr.doc



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

● S-2 WP-3703-24								
● S-2 WP-3703-24	4.75	0.06	0.007	0.0013	0.0	18.2	55.6	26.2

S.W.COLE ENGINEERING, INC.	Project Katahdin Analytical Services	Location Westbrook, Maine
	SWC Job No. 99-812	Sheet No. 2
	Date September 15, 1999	**GRADATION CURVES**

APPENDIX B

GROUNDWATER LABORATORY ANALYTICAL DATA

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP3850-15
SDG: WP3850
Report Date: 10/1/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: N/A
Method: SW8260
Date Analyzed: 9/10/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
24GLM0101	AQ	9/8/99	9/9/99	9/10/99	KMC	5030	KMC

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<5	ug/L	1.0	5	5
TOLUENE	<5	ug/L	1.0	5	5
1,2-DIBROMOETHANE	<5	ug/L	1.0	5	5
ETHYLBENZENE	<5	ug/L	1.0	5	5
NAPHTHALENE	<5	ug/L	1.0	5	5
MTBE	<5	ug/L	1.0	5	5
TOTAL XYLENES	<5	ug/L	1.0	5	5
DIBROMOFLUOROMETHANE	99	%	1.0		
1,2-DICHLOROETHANE-D4	93	%	1.0		
TOLUENE-D8	88	%	1.0		
P-BROMOFLUOROBENZENE	89	%	1.0		

Report Notes:

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP3850-15
SDG: WP3850
Report Date: 10/5/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: N/A
Method: EPA 8270
Date Analyzed: 9/16/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
24GLM0101	AQ	9/8/99	9/9/99	9/10/99	DPD	EPA 3510	KRT

Compound	Result	Units	DF	Sample PQL	Method PQL
NAPHTHALENE	<10	ug/L	1.0	10	10
2-METHYLNAPHTHALENE	<10	ug/L	1.0	10	10
ACENAPHTHYLENE	<10	ug/L	1.0	10	10
ACENAPHTHENE	<10	ug/L	1.0	10	10
FLUORENE	<10	ug/L	1.0	10	10
PHENANTHRENE	<10	ug/L	1.0	10	10
ANTHRACENE	<10	ug/L	1.0	10	10
FLUORANTHENE	<10	ug/L	1.0	10	10
PYRENE	<10	ug/L	1.0	10	10
BENZO[A]ANTHRACENE	<10	ug/L	1.0	10	10
CHRYSENE	<10	ug/L	1.0	10	10
BENZO[B]FLUORANTHENE	<10	ug/L	1.0	10	10
BENZO[K]FLUORANTHENE	<10	ug/L	1.0	10	10
BENZO[A]PYRENE	<10	ug/L	1.0	10	10
INDENO[1,2,3-CD]PYRENE	<10	ug/L	1.0	10	10
DIBENZ[A,H]ANTHRACENE	<10	ug/L	1.0	10	10
BENZO[G,H,I]PERYLENE	<10	ug/L	1.0	10	10
NITROBENZENE-D5	56	%	1.0		
2-FLUOROBIPHENYL	57	%	1.0		
TERPHENYL-D14	51	%	1.0		

Report Notes:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services
Client Field ID: 24GLM0101
Matrix: WATER
SDG Name: WP3647
Percent Solids: 0.00
Lab Sample ID: WP3647-001

Concentration Units (ug/L or mg/Kg dry weight): ug/L

CAS No.	Analyte	Concentration	C	Q	M	DF
7429-90-5	ALUMINUM	63.3	B		P	1
7440-36-0	ANTIMONY	1.81	U		P	1
7440-38-2	ARSENIC	2.07	U		P	1
7440-39-3	BARIUM	4.1	B		P	1
7440-41-7	BERYLLIUM	0.33	U		P	1
7440-43-9	CADMIUM	1.94	U		P	1
7440-70-2	CALCIUM	1820			P	1
7440-47-3	CHROMIUM	4.31	U		P	1
7440-48-4	COBALT	4.45	U		P	1
7440-50-8	COPPER	2.8	B		P	1
7439-89-6	IRON	173			P	1
7439-92-1	LEAD	1.09	U		P	1
7439-95-4	MAGNESIUM	509			P	1
7439-96-5	MANGANESE	29.4			P	1
7439-97-6	MERCURY	0.02	U		CV	1
7440-02-0	NICKEL	13.21	U		P	1
7440-09-7	POTASSIUM	1660			P	1
7782-49-2	SELENIUM	3.0	B		P	1
7440-22-4	SILVER	2.54	U		P	1
7440-23-5	SODIUM	42900			P	1
7440-28-0	THALLIUM	4.49	U		P	1
7440-62-2	VANADIUM	4.8	B		P	1
7440-66-6	ZINC	6.7	B		P	1

Comments:

Client:	Katahdin Analytical 340 County Road Westbrook, Maine 04092
Contact:	Ms. Andrea Colby
Project Description:	Former Naval Complex

cc: KATA00199 Report Date: September 01, 1999

Sample ID	: 24GLM0101
Lab ID	: 9908507-01
Matrix	: Water
Date Collected	: 08/13/99
Date Received	: 08/13/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Total Rec. Petro. Hydrocarbons	J	2.32	1.22	5.00	mg/l	1.0	AAT	08/31/99	1030	157243	1

M = Method	Method-Description
M 1	SW846 9070

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

This data report has been prepared and reviewed
in accordance with General Engineering Laboratories
standard operating procedures. Please direct
any questions to your Project Manager, Valerie Davis at (843) 769-7391.

Reviewed By

Katahdin
ANALYTICAL SERVICES

CLIENT: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr., Suite 102
Tallahassee, FL 32308

Lab Number : WP-3850-15
Report Date: 10/06/99
PO No. : N7912-P99264
Project : CIO #68

WIC#: CNC CHARLESTON

REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE	RECEIVED
24GLM0101	Aqueous	P.HALVERSON,JR HEEL,J.KRIEGER,T .THOMPSON	09/08/99	09/09/99

PARAMETER	RESULT	UNITS	DF	*PQL	METHOD	ANALYZED	BY	NOTES
Nitrate as N	0.063	mg/L	1.0	0.050	353.2	09/10/99	KW	
Sulfate	61.	mg/L	4.0	1.0	375.4	09/18/99	VN	

* PQL (Practical Quantitation Level) represents laboratory reporting limits and may not reflect sample-specific reporting limits. Sample-specific limits are indicated by results annotated with '<' values.

10/06/99

LJO/baeajc(dw)/msm
PI10NOW1
CC: MS. LEE LECK
TETRA TECH NUS
FOSTER PLAZA 7
661 ANDERSEN DR.

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP3647-8
SDG: WP3647
Report Date: 9/23/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: N/A
Method: SW8260
Date Analyzed: 8/21/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
24TL00201	AQ	8/16/99	8/17/99	8/21/99	HMP	5030	HMP

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<5	ug/L	1.0	5	5
TOLUENE	<5	ug/L	1.0	5	5
1,2-DIBROMOETHANE	<5	ug/L	1.0	5	5
ETHYLBENZENE	<5	ug/L	1.0	5	5
NAPHTHALENE	<5	ug/L	1.0	5	5
MTBE	<5	ug/L	1.0	5	5
TOTAL XYLENES	<5	ug/L	1.0	5	5
DIBROMOFLUOROMETHANE	100	%	1.0		
1,2-DICHLOROETHANE-D4	94	%	1.0		
TOLUENE-D8	99	%	1.0		
P-BROMOFLUOROBENZENE	104	%	1.0		

Report Notes:

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP3850-16
SDG: WP3850
Report Date: 10/1/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: N/A
Method: SW8260
Date Analyzed: 9/10/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
24GLM0201	AQ	9/8/99	9/9/99	9/10/99	KMC	5030	KMC

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<5	ug/L	1.0	5	5
TOLUENE	<5	ug/L	1.0	5	5
1,2-DIBROMOETHANE	<5	ug/L	1.0	5	5
ETHYLBENZENE	<5	ug/L	1.0	5	5
NAPHTHALENE	<5	ug/L	1.0	5	5
MTBE	<5	ug/L	1.0	5	5
TOTAL XYLENES	<5	ug/L	1.0	5	5
DIBROMOFLUOROMETHANE	98	%	1.0		
1,2-DICHLOROETHANE-D4	93	%	1.0		
TOLUENE-D8	88	%	1.0		
P-BROMOFLUOROBENZENE	88	%	1.0		

Report Notes:

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP3850-16
SDG: WP3850
Report Date: 10/5/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: N/A
Method: EPA 8270
Date Analyzed: 9/16/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
24GLM0201	AQ	9/8/99	9/9/99	9/10/99	DPD	EPA 3510	KRT

Compound	Result	Units	DF	Sample PQL	Method PQL
NAPHTHALENE	<10	ug/L	1.0	10	10
2-METHYLNAPHTHALENE	<10	ug/L	1.0	10	10
ACENAPHTHYLENE	<10	ug/L	1.0	10	10
ACENAPHTHENE	<10	ug/L	1.0	10	10
FLUORENE	<10	ug/L	1.0	10	10
PHENANTHRENE	<10	ug/L	1.0	10	10
ANTHRACENE	<10	ug/L	1.0	10	10
FLUORANTHENE	<10	ug/L	1.0	10	10
PYRENE	<10	ug/L	1.0	10	10
BENZO[A]ANTHRACENE	<10	ug/L	1.0	10	10
CHRYSENE	<10	ug/L	1.0	10	10
BENZO[B]FLUORANTHENE	<10	ug/L	1.0	10	10
BENZO[K]FLUORANTHENE	<10	ug/L	1.0	10	10
BENZO[A]PYRENE	<10	ug/L	1.0	10	10
INDENO[1,2,3-CD]PYRENE	<10	ug/L	1.0	10	10
DIBENZ[A,H]ANTHRACENE	<10	ug/L	1.0	10	10
BENZO[G,H,I]PERYLENE	<10	ug/L	1.0	10	10
NITROBENZENE-D5	52	%	1.0		
2-FLUOROBIPHENYL	52	%	1.0		
TERPHENYL-D14	42	%	1.0		

Report Notes:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services
Client Field ID: 24GLM0201
Matrix: WATER
SDG Name: WP3647
Percent Solids: 0.00
Lab Sample ID: WP3647-002

Concentration Units (ug/L or mg/Kg dry weight): ug/L

CAS No.	Analyte	Concentration	C	Q	M	DF
7429-90-5	ALUMINUM	31.8	B		P	1
7440-36-0	ANTIMONY	2.8	B		P	1
7440-38-2	ARSENIC	2.07	U		P	1
7440-39-3	BARIUM	31.4			P	1
7440-41-7	BERYLLIUM	0.33	U		P	1
7440-43-9	CADMIUM	1.94	U		P	1
7440-70-2	CALCIUM	62300			P	1
7440-47-3	CHROMIUM	4.31	U		P	1
7440-48-4	COBALT	4.45	U		P	1
7440-50-8	COPPER	3.4	B		P	1
7439-89-6	IRON	14800			P	1
7439-92-1	LEAD	1.09	U		P	1
7439-95-4	MAGNESIUM	22800			P	1
7439-96-5	MANGANESE	1060			P	1
7439-97-6	MERCURY	0.04	B		CV	1
7440-02-0	NICKEL	13.21	U		P	1
7440-09-7	POTASSIUM	12100			P	1
7782-49-2	SELENIUM	2.57	U		P	1
7440-22-4	SILVER	2.54	U		P	1
7440-23-5	SODIUM	58600			P	1
7440-28-0	THALLIUM	4.49	U		P	1
7440-62-2	VANADIUM	3.58	U		P	1
7440-66-6	ZINC	3.7	B		P	1

Comments:

Client:	Katahdin Analytical 340 County Road Westbrook, Maine 04092
Contact:	Ms. Andrea Colby
Project Description:	Former Naval Complex

cc: KATA00199 Report Date: September 01, 1999

Sample ID	: 24GLM0201
Lab ID	: 9908507-02
Matrix	: Water
Date Collected	: 08/13/99
Date Received	: 08/13/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Total Rec. Petro. Hydrocarbons		6.57	1.22	5.00	mg/l	1.0	AAT	08/31/99	1030	157243	1

M = Method	Method-Description
M 1	SW846 9070

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

This data report has been prepared and reviewed
in accordance with General Engineering Laboratories
standard operating procedures. Please direct
any questions to your Project Manager, Valerie Davis at (843) 769-7391.

Reviewed By

Katahdin
ANALYTICAL SERVICES

CLIENT: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr., Suite 102
Tallahassee, FL 32308

Lab Number : WP-3850-16
Report Date: 10/06/99
PO No. : N7912-P99264
Project : CIO #68

WIC#: CNC CHARLESTON

REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE	RECEIVED
24GLM0201	Aqueous	P.HALVERSON,JR HEBL,J.KRIEGER,T .THOMPSON	09/08/99	09/09/99

PARAMETER	RESULT	UNITS	DF	*PQL	METHOD	ANALYZED	BY	NOTES
Nitrate as N	0.058	mg/L	1.0	0.050	353.2	09/10/99	KW	
Sulfate	80.	mg/L	4.0	1.0	375.4	09/18/99	VN	

* PQL (Practical Quantitation Level) represents laboratory reporting limits and may not reflect sample-specific reporting limits. Sample-specific limits are indicated by results annotated with '<' values.

10/06/99

LJO/baeajc(dw)/msm
PI10NOW1
CC: MS. LEE LECK
TETRA TECH NUS
FOSTER PLAZA 7
661 ANDERSEN DR.

340 County Road No. 5
P.O. Box 720, Westbrook, ME 04098
Tel: (207) 874-2400 Fax: (207) 775-4029

http://katahdinlab.com

210 West Road No. 5, Portsmouth, NH 03801
Tel: (603) 431-5777 Fax: (603) 436-3356

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP3850-11
SDG: WP3850
Report Date: 10/1/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: N/A
Method: SW8260
Date Analyzed: 9/10/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
24GLM0301	AQ	9/8/99	9/9/99	9/10/99	KMC	5030	KMC

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<5	ug/L	1.0	5	5
TOLUENE	<5	ug/L	1.0	5	5
1,2-DIBROMOETHANE	<5	ug/L	1.0	5	5
ETHYLBENZENE	<5	ug/L	1.0	5	5
NAPHTHALENE	<5	ug/L	1.0	5	5
MTBE	<5	ug/L	1.0	5	5
TOTAL XYLENES	<5	ug/L	1.0	5	5
DIBROMOFLUOROMETHANE	99	%	1.0		
1,2-DICHLOROETHANE-D4	93	%	1.0		
TOLUENE-D8	88	%	1.0		
P-BROMOFLUOROBENZENE	88	%	1.0		

Report Notes:

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP3850-11
SDG: WP3850
Report Date: 10/5/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: N/A
Method: EPA 8270
Date Analyzed: 9/16/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
24GLM0301	AQ	9/8/99	9/9/99	9/10/99	DPD	EPA 3510	KRT

Compound	Result	Units	DF	Sample PQL	Method PQL
NAPHTHALENE	<10	ug/L	1.0	10	10
2-METHYLNAPHTHALENE	<10	ug/L	1.0	10	10
ACENAPHTHYLENE	<10	ug/L	1.0	10	10
ACENAPHTHENE	<10	ug/L	1.0	10	10
FLUORENE	<10	ug/L	1.0	10	10
PHENANTHRENE	<10	ug/L	1.0	10	10
ANTHRACENE	<10	ug/L	1.0	10	10
FLUORANTHENE	<10	ug/L	1.0	10	10
PYRENE	<10	ug/L	1.0	10	10
BENZO[A]ANTHRACENE	<10	ug/L	1.0	10	10
CHRYSENE	<10	ug/L	1.0	10	10
BENZO[B]FLUORANTHENE	<10	ug/L	1.0	10	10
BENZO[K]FLUORANTHENE	<10	ug/L	1.0	10	10
BENZO[A]PYRENE	<10	ug/L	1.0	10	10
INDENO[1,2,3-CD]PYRENE	<10	ug/L	1.0	10	10
DIBENZ[A,H]ANTHRACENE	<10	ug/L	1.0	10	10
BENZO[G,H,I]PERYLENE	<10	ug/L	1.0	10	10
NITROBENZENE-D5	50	%	1.0		
2-FLUOROBIPHENYL	52	%	1.0		
TERPHENYL-D14	46	%	1.0		

Report Notes:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID: 24GLM0301**

Matrix: WATER **SDG Name: WP3647**

Percent Solids: 0.00 **Lab Sample ID: WP3647-003**

Concentration Units (ug/L or mg/Kg dry weight): ug/L

CAS No.	Analyte	Concentration	C	Q	M	DF
7429-90-5	ALUMINUM	56.0	B		P	1
7440-36-0	ANTIMONY	3.0	B		P	1
7440-38-2	ARSENIC	2.07	U		P	1
7440-39-3	BARIUM	17.8			P	1
7440-41-7	BERYLLIUM	0.33	U		P	1
7440-43-9	CADMIUM	1.94	U		P	1
7440-70-2	CALCIUM	32000			P	1
7440-47-3	CHROMIUM	4.31	U		P	1
7440-48-4	COBALT	4.45	U		P	1
7440-50-8	COPPER	2.6	B		P	1
7439-89-6	IRON	2740			P	1
7439-92-1	LEAD	1.6	B		P	1
7439-95-4	MAGNESIUM	14200			P	1
7439-96-5	MANGANESE	613			P	1
7439-97-6	MERCURY	0.02	B		CV	1
7440-02-0	NICKEL	13.21	U		P	1
7440-09-7	POTASSIUM	9930			P	1
7782-49-2	SELENIUM	2.57	U		P	1
7440-22-4	SILVER	2.54	U		P	1
7440-23-5	SODIUM	54700			P	1
7440-28-0	THALLIUM	4.8	B		P	1
7440-62-2	VANADIUM	6.9	B		P	1
7440-66-6	ZINC	5.7	B		P	1

Comments:

Client:	Katahdin Analytical 340 County Road Westbrook, Maine 04092
Contact:	Ms. Andrea Colby
Project Description:	Former Naval Complex

cc: KATA00199 Report Date: September 01, 1999

Sample ID	: 24GLM0301
Lab ID	: 9908507-03
Matrix	: Water
Date Collected	: 08/13/99
Date Received	: 08/13/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Total Rec. Petro. Hydrocarbons	J	2.96	1.22	5.00	mg/l	1.0	AAT	08/31/99	1030	157243	1

M = Method	Method-Description
M 1	SW846 9070

Notes:
The qualifiers in this report are defined as follows:
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U indicates that the analyte was not detected at a concentration greater than the detection limit.
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This data report has been prepared and reviewed
in accordance with General Engineering Laboratories
standard operating procedures. Please direct
any questions to your Project Manager, Valerie Davis at (843) 769-7391.

Reviewed By

Katahdin
ANALYTICAL SERVICES

Lab Number : WP-3850-11
Report Date: 10/06/99
PO No. : N7912-P99264
Project : CTO #68

CLIENT: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr., Suite 102
Tallahassee, FL 32308

WIC#: CNC CHARLESTON

REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE	RECEIVED
24GLMD301	Aqueous	P.HALVERSON,JR HEEL,J.KRIEGER,T .THOMPSON	09/08/99	09/09/99

PARAMETER	RESULT	UNITS	DF	*PQL	METHOD	ANALYZED	BY	NOTES
Nitrate as N	0.19	mg/L	1.0	0.050	353.2	09/10/99	KW	
Sulfate	97.	mg/L	5.0	1.0	375.4	09/18/99	VN	

* PQL (Practical Quantitation Level) represents laboratory reporting limits and may not reflect sample-specific reporting limits. Sample-specific limits are indicated by results annotated with '<' values.

10/06/99

LJO/baeajc(dw)/msm
PI10NOW1
CC: MS. LEE LECK
TETRA TECH NUS
FOSTER PLAZA 7
661 ANDERSEN DR.

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP3850-6
SDG: WP3850
Report Date: 10/1/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: N/A
Method: SW8260
Date Analyzed: 9/9/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
24GLM0301D	AQ	9/8/99	9/9/99	9/9/99	KMC	5030	KMC

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<5	ug/L	1.0	5	5
TOLUENE	<5	ug/L	1.0	5	5
1,2-DIBROMOETHANE	<5	ug/L	1.0	5	5
ETHYLBENZENE	<5	ug/L	1.0	5	5
NAPHTHALENE	<5	ug/L	1.0	5	5
MTBE	<5	ug/L	1.0	5	5
TOTAL XYLENES	<5	ug/L	1.0	5	5
DIBROMOFLUOROMETHANE	99	%	1.0		
1,2-DICHLOROETHANE-D4	92	%	1.0		
TOLUENE-D8	88	%	1.0		
P-BROMOFLUOROBENZENE	86	%	1.0		

Report Notes:

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP3850-6
SDG: WP3850
Report Date: 10/5/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: N/A
Method: EPA 8270
Date Analyzed: 9/16/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
24GLM0301D	AQ	9/8/99	9/9/99	9/10/99	DPD	EPA 3510	KRT

Compound	Result	Units	DF	Sample PQL	Method PQL
NAPHTHALENE	<10	ug/L	1.0	10	10
2-METHYLNAPHTHALENE	<10	ug/L	1.0	10	10
ACENAPHTHYLENE	<10	ug/L	1.0	10	10
ACENAPHTHENE	<10	ug/L	1.0	10	10
FLUORENE	<10	ug/L	1.0	10	10
PHENANTHRENE	<10	ug/L	1.0	10	10
ANTHRACENE	<10	ug/L	1.0	10	10
FLUORANTHENE	<10	ug/L	1.0	10	10
PYRENE	<10	ug/L	1.0	10	10
BENZO[A]ANTHRACENE	<10	ug/L	1.0	10	10
CHRYSENE	<10	ug/L	1.0	10	10
BENZO[B]FLUORANTHENE	<10	ug/L	1.0	10	10
BENZO[K]FLUORANTHENE	<10	ug/L	1.0	10	10
BENZO[A]PYRENE	<10	ug/L	1.0	10	10
INDENO[1,2,3-CD]PYRENE	<10	ug/L	1.0	10	10
DIBENZ[A,H]ANTHRACENE	<10	ug/L	1.0	10	10
BENZO[G,H,I]PERYLENE	<10	ug/L	1.0	10	10
NITROBENZENE-D5	53	%	1.0		
2-FLUOROBIPHENYL	53	%	1.0		
TERPHENYL-D14	38	%	1.0		

Report Notes:

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP3647-4
SDG: WP3647
Report Date: 9/23/99
PO No.: N7912-P99264
Project: CTO #68
% Solids: N/A
Method: SW8260
Date Analyzed: 8/21/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
24GLM0401	AQ	8/13/99	8/17/99	8/21/99	HMP	5030	HMP

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<5	ug/L	1.0	5	5
TOLUENE	<5	ug/L	1.0	5	5
1,2-DIBROMOETHANE	<5	ug/L	1.0	5	5
ETHYLBENZENE	<5	ug/L	1.0	5	5
NAPHTHALENE	<5	ug/L	1.0	5	5
MTBE	<5	ug/L	1.0	5	5
TOTAL XYLENES	<5	ug/L	1.0	5	5
DIBROMOFLUOROMETHANE	89	%	1.0		
1,2-DICHLOROETHANE-D4	80	%	1.0		
TOLUENE-D8	101	%	1.0		
P-BROMOFLUOROBENZENE	102	%	1.0		

Report Notes:

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP3647-4
SDG: WP3647
Report Date: 9/23/99
PO No.: N7912-P99264
Project: CTO #68
% Solids: N/A
Method: EPA 8270
Date Analyzed: 9/2/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
24GLM0401	AQ	8/13/99	8/17/99	8/20/99	DS	SW3510	KRT

Compound	Result	Units	DF	Sample PQL	Method PQL
NAPHTHALENE	<10	ug/L	1.0	10	10
2-METHYLNAPHTHALENE	<10	ug/L	1.0	10	10
ACENAPHTHYLENE	<10	ug/L	1.0	10	10
ACENAPHTHENE	<10	ug/L	1.0	10	10
FLUORENE	<10	ug/L	1.0	10	10
PHENANTHRENE	<10	ug/L	1.0	10	10
ANTHRACENE	<10	ug/L	1.0	10	10
FLUORANTHENE	<10	ug/L	1.0	10	10
PYRENE	<10	ug/L	1.0	10	10
BENZO[A]ANTHRACENE	<10	ug/L	1.0	10	10
CHRYSENE	<10	ug/L	1.0	10	10
BENZO[B]FLUORANTHENE	<10	ug/L	1.0	10	10
BENZO[K]FLUORANTHENE	<10	ug/L	1.0	10	10
BENZO[A]PYRENE	<10	ug/L	1.0	10	10
INDENO[1,2,3-CD]PYRENE	<10	ug/L	1.0	10	10
DIBENZ[A,H]ANTHRACENE	<10	ug/L	1.0	10	10
BENZO[G,H,I]PERYLENE	<10	ug/L	1.0	10	10
NITROBENZENE-D5	76	%	1.0		
2-FLUOROBIPHENYL	86	%	1.0		
TERPHENYL-D14	69	%	1.0		

Report Notes:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services | **Client Field ID:** 24GLM0401

Matrix: WATER | **SDG Name:** WP3647

Percent Solids: 0.00 | **Lab Sample ID:** WP3647-004

Concentration Units (ug/L or mg/Kg dry weight): ug/L

CAS No.	Analyte	Concentration	C	Q	M	DF
7429-90-5	ALUMINUM	74.8	B		P	1
7440-36-0	ANTIMONY	1.81	U		P	1
7440-38-2	ARSENIC	2.07	U		P	1
7440-39-3	BARIUM	9.8			P	1
7440-41-7	BERYLLIUM	0.33	U		P	1
7440-43-9	CADMIUM	1.94	U		P	1
7440-70-2	CALCIUM	6330			P	1
7440-47-3	CHROMIUM	4.31	U		P	1
7440-48-4	COBALT	4.45	U		P	1
7440-50-8	COPPER	3.9	B		P	1
7439-89-6	IRON	109			P	1
7439-92-1	LEAD	1.7	B		P	1
7439-95-4	MAGNESIUM	4720			P	1
7439-96-5	MANGANESE	113			P	1
7439-97-6	MERCURY	0.02	U		CV	1
7440-02-0	NICKEL	13.21	U		P	1
7440-09-7	POTASSIUM	9190			P	1
7782-49-2	SELENIUM	2.57	U		P	1
7440-22-4	SILVER	2.54	U		P	1
7440-23-5	SODIUM	64000			P	1
7440-28-0	THALLIUM	4.49	U		P	1
7440-62-2	VANADIUM	15.5	B		P	1
7440-66-6	ZINC	7.5	B		P	1

Comments:

Client:	Katahdin Analytical 340 County Road Westbrook, Maine 04092
Contact:	Ms. Andrea Colby
Project Description:	Former Naval Complex

cc: KATA00199 Report Date: September 01, 1999

Sample ID	: 24GLM0401
Lab ID	: 9908507-04
Matrix	: Water
Date Collected	: 08/13/99
Date Received	: 08/13/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Total Rec. Petro. Hydrocarbons	J	2.63	1.22	5.00	mg/l	1.0	AAT	08/31/99	1030	157243	1

M = Method	Method-Description
M 1	SW846 9070

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

This data report has been prepared and reviewed
in accordance with General Engineering Laboratories
standard operating procedures. Please direct
any questions to your Project Manager, Valerie Davis at (843) 769-7391.

Reviewed By

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP3850-7
SDG: WP3850
Report Date: 10/1/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: N/A
Method: SW8260
Date Analyzed: 9/9/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
24GLM0501	AQ	9/8/99	9/9/99	9/9/99	KMC	5030	KMC

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<5	ug/L	1.0	5	5
TOLUENE	<5	ug/L	1.0	5	5
1,2-DIBROMOETHANE	<5	ug/L	1.0	5	5
ETHYLBENZENE	<5	ug/L	1.0	5	5
NAPHTHALENE	<5	ug/L	1.0	5	5
MTBE	<5	ug/L	1.0	5	5
TOTAL XYLENES	<5	ug/L	1.0	5	5
DIBROMOFLUOROMETHANE	99	%	1.0		
1,2-DICHLOROETHANE-D4	92	%	1.0		
TOLUENE-D8	88	%	1.0		
P-BROMOFLUOROBENZENE	87	%	1.0		

Report Notes:

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP3850-7
SDG: WP3850
Report Date: 10/5/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: N/A
Method: EPA 8270
Date Analyzed: 9/24/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
24GLM0501	AQ	9/8/99	9/9/99	9/10/99	DPD	EPA 3510	SW

Compound	Result	Units	DF	Sample PQL	Method PQL
NAPHTHALENE	<10	ug/L	1.0	10	10
2-METHYLNAPHTHALENE	<10	ug/L	1.0	10	10
ACENAPHTHYLENE	<10	ug/L	1.0	10	10
ACENAPHTHENE	<10	ug/L	1.0	10	10
FLUORENE	<10	ug/L	1.0	10	10
PHENANTHRENE	<10	ug/L	1.0	10	10
ANTHRACENE	<10	ug/L	1.0	10	10
FLUORANTHENE	<10	ug/L	1.0	10	10
PYRENE	<10	ug/L	1.0	10	10
BENZO[A]ANTHRACENE	<10	ug/L	1.0	10	10
CHRYSENE	<10	ug/L	1.0	10	10
BENZO[B]FLUORANTHENE	<10	ug/L	1.0	10	10
BENZO[K]FLUORANTHENE	<10	ug/L	1.0	10	10
BENZO[A]PYRENE	<10	ug/L	1.0	10	10
INDENO[1,2,3-CD]PYRENE	<10	ug/L	1.0	10	10
DIBENZ[A,H]ANTHRACENE	<10	ug/L	1.0	10	10
BENZO[G,H,I]PERYLENE	<10	ug/L	1.0	10	10
NITROBENZENE-D5	58	%	1.0		
2-FLUOROBIPHENYL	61	%	1.0		
TERPHENYL-D14	36	%	1.0		

Report Notes:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID: 24GLM0501**

Matrix: WATER **SDG Name:** WP3850

Percent Solids: 0.00 **Lab Sample ID:** WP3850-007

Concentration Units (ug/L or mg/Kg dry weight): ug/L

CAS No.	Analyte	Concentration	C	Q	M	DF
7429-90-5	ALUMINUM	58.5	B		P	1
7440-36-0	ANTIMONY	1.81	U		P	1
7440-38-2	ARSENIC	7.1	B		P	1
7440-39-3	BARIUM	71.8			P	1
7440-41-7	BERYLLIUM	0.21	U		P	1
7440-43-9	CADMIUM	0.26	U		P	1
7440-70-2	CALCIUM	224000			P	1
7440-47-3	CHROMIUM	1.6	B		P	1
7440-48-4	COBALT	1.9	B		P	1
7440-50-8	COPPER	2.8	B		P	1
7439-89-6	IRON	996			P	1
7439-92-1	LEAD	1.09	U		P	1
7439-95-4	MAGNESIUM	54700			P	1
7439-96-5	MANGANESE	998			P	1
7439-97-6	MERCURY	0.02	U		CV	1
7440-02-0	NICKEL	1.9	B		P	1
7440-09-7	POTASSIUM	13400			P	1
7782-49-2	SELENIUM	2.57	U		P	1
7440-22-4	SILVER	2.5	B		P	1
7440-23-5	SODIUM	627000			P	5
7440-28-0	THALLIUM	4.49	U		P	1
7440-62-2	VANADIUM	2.3	B		P	1
7440-66-6	ZINC	11.4	B		P	1

Comments:

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP3850-8
SDG: WP3850
Report Date: 10/1/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: N/A
Method: SW8260
Date Analyzed: 9/10/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
24TL00201	AQ	9/8/99	9/9/99	9/10/99	KMC	5030	KMC

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<5	ug/L	1.0	5	5
TOLUENE	<5	ug/L	1.0	5	5
1,2-DIBROMOETHANE	<5	ug/L	1.0	5	5
ETHYLBENZENE	<5	ug/L	1.0	5	5
NAPHTHALENE	<5	ug/L	1.0	5	5
MTBE	<5	ug/L	1.0	5	5
TOTAL XYLENES	<5	ug/L	1.0	5	5
DIBROMOFLUOROMETHANE	99	%	1.0		
1,2-DICHLOROETHANE-D4	92	%	1.0		
TOLUENE-D8	88	%	1.0		
P-BROMOFLUOROBENZENE	87	%	1.0		

Report Notes:

General Engineering Laboratories, Inc.
2040 Savage Road
Charleston, South Carolina 29407
P.O. Box 30712
Charleston, South Carolina 29417
(803) 556-8171

CHAIN OF CUSTODY RECORD

9908507

Page 1 of 1

Client Name/Facility Name: Katahdin Analytical

Collected by/Company: Tetra Tech

SAMPLE ANALYSIS REQUIRED (x) - see remarks area to specify specific compounds or methods

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

	SAMPLE ID	DATE	TIME	WELL	SOIL	COMP	GRAB	# OF CONTAINERS	pH, conductivity	TOC/DOC	TOX	Chloride, Fluoride, Sulfide	Nitrite/Nitrate	VOC - Specify Method Required	METALS - specify	Pesticide	Herbicide	Total Phenol	Acid Extractables	BN Extractables	PCB's	Cyanide	Coliform - specify type	TPH	Remarks
01	24GLM01Ø1	8/13/99	1135	X				2																✓	HCl
02	24GLMØ2Ø1	↓	1136	X				2																✓	↓
03	24GLMØ3Ø1		1137	X				2																✓	
04	24GLMØ4Ø1		1151	X				2																✓	

420 ml

Relinquished by:	Date:	Time:	Received by:	Relinquished by:	Date:	Time:	Received by:
[signature]	8/13/99	1750					

Relinquished by:	Date:	Time:	Received by lab by:	Date:	Time:	Remarks:
[signature]			[signature]	8/13/99	1750	

White = sample collector Yellow = file Pink = with report

Katahdin
340 County Road No. 5
P.O. Box 720
Westbrook, ME 04098
Tel: (207) 874-2400
Fax: (207) 775-4029

CHAIN of CUSTODY

PLEASE PRINT IN PEN Page ____ of ____

Tetra Tech NUS | Contact: Bryan Howze | Phone #: (843) 554 4925 | Fax #: ( )

Address: NH21 Ave H | City: N. Charleston | State: SC | Zip Code: 29405

Purchase Order # | Proj. Name / No. | Katahdin Quote #

Bill (if different than above) | Address

Sampler (Print / Sign) | Copies To:

LAB USE ONLY | WORK ORDER #: WP3647 -

KATAHDIN PROJECT MANAGER

REMARKS:

SHIPPING INFO: ☒ FED EX ☐ UPS ☐ CLIENT

AIRBILL NO: 813402904484

TEMP°C ____ ☐ TEMP BLANK ☐ INTACT ☐ NOT INTACT

ANALYSIS AND CONTAINER TYPE PRESERVATIVES

*	Sample Description	Date / Time coll'd	Matrix	No. of Cntrs.	Filt. ☐Y☐N BTEX/EDB	Filt. ☐Y☐N PAH	Filt. ☐Y☐N TAL Metals	Filt. ☐Y☐N	Filt. ☐Y☐N	Filt. ☐Y☐N	Filt. ☐Y☐N	Filt. ☐Y☐N	Filt. ☐Y☐N	Filt. ☐Y☐N
	24GLM01 01	8/13/99 1135	W	1			1							
	24GLM02 01	/1136	W	1			1							
	24GLM03 01	/1137	W	1			1							
	24GLM04 01	/1151	W	6	3	2	1							
	36GLM01 01	/1752	W	5	3	2								
	36GL680-004	/1754	W	5	3	2								
	21GLM05 01	8/16/99 /1240	W	5	3	2								
	24TL00 2 01	/	W	2	2									
		/												
		/												
		/												
		/												
		/												
		/												
		/												
		/												

COMMENTS

Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)
[signature]	8/16/99	813402904484		8-17-99 1100	Shelby Wilkins
Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)

Katahdin
340 County Road No. 5
P.O. Box 720
Westbrook, ME 04098
Tel: (207) 874-2400
Fax: (207) 775-4029

CHAIN of CUSTODY

PLEASE PRINT IN PEN

Page ____ of ____

Client: TETRA TECH
Contact: Paul Colligan
Phone #: (850) 385-9899
Fax #: (850) 385-9860
Address: 1401 Oven Park Drive, #102
City: Tallahassee
State: FL
Zip Code: 32312
Purchase Order #:
Proj. Name / No.: CNC / N0141
Katahdin Quote #:
Bill (if different than above):
Address:
Sampler (Print / Sign): PAUL HALVERSON
Copies To:

LAB USE ONLY
WORK ORDER #: WP3850
KATAHDIN PROJECT MANAGER:
REMARKS:
SHIPPING INFO: ☐ FED EX ☐ UPS ☐ CLIENT
AIRBILL NO:
TEMP°C: ☐ TEMP BLANK ☐ INTACT ☐ NOT INTACT

ANALYSIS AND CONTAINER TYPE / PRESERVATIVES

*	Sample Description	Date / Time coll'd	Matrix	No. of Cntrs.	Filt. Y N: ANIONS	Filt. Y N: PAH	Filt. Y N: MTBE HCL	Filt. Y N: BETX - HCL	Filt. Y N: DIS. PART.	Filt. Y N: DISSOLVED METALS HCL	Filt. Y N: METALS HNO_3	Filt. Y N	Filt. Y N	Filt. Y N	Filt. Y N
	15GLM0101	9/8/99/1260	GW	1	1	0	0	0		0					
	15GLM0201	9/8/99/1001	GW	9	1	2	3	3		3					
	15GLM0301	9/8/99/1050	GW	9	1	2	3	3		3					
	15GLM0201D	9/8/99/Ø	GW	8	0	2	3	3		0					
	24GLM0501	9/8/99/1700	GW	6	0	2	3	0		0	1				
	24GLM0301	9/8/99/1752	GW	9	1	2	3	3		3					
	24GLM0301D	9/8/99/0000	GW	5		2	3								
	24TL00201	9/8/99/—	W	2			2					TRIP BLANK			
	24GLM0101	9/8/99/1707	GW	9	1	2	3			3					
	24GLM0201	9/8/99/1705	GW	9	1	2	3			3					
		/													
		/													
		/													
		/													
		/													
		/													

COMMENTS: FED EX: 813451738831
PUT ON ICE 4°C

Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)
[signature]	9/8/99 1845	Fedex 813451738831		9-9-99 0920	Shelley Wilkinson
Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)

KATAHDIN ANALYTICAL SERVICES

Summary of Report Notes

Report Note	Note Text
#	'#' flag denotes surrogate compound recovery is out of criteria.
J	'J' flag denotes an estimated value less than the Laboratory's Practical Quantitation Level.

KATAHDIN ANALYTICAL SERVICES

Summary of Report Notes

Report Note	Note Text
DL	'DL' flag denotes inability to calculate surrogate recovery due to sample dilution.
E	'E' flag indicates an estimated value. The analyte was detected in the sample at a concentration greater than the standard calibration range.
J	'J' flag denotes an estimated value less than the Laboratory's Practical Quantitation Level.
O-1	Sample dilution required due to matrix interference, sample viscosity or other matrix-related problem; therefore, standard laboratory Practical Quantitation Level (PQL) could not be achieved.
O-2	Sample dilution required for quantitation of one or more target analytes; therefore, standard laboratory Practical Quantitation Level (PQL) could not be achieved.

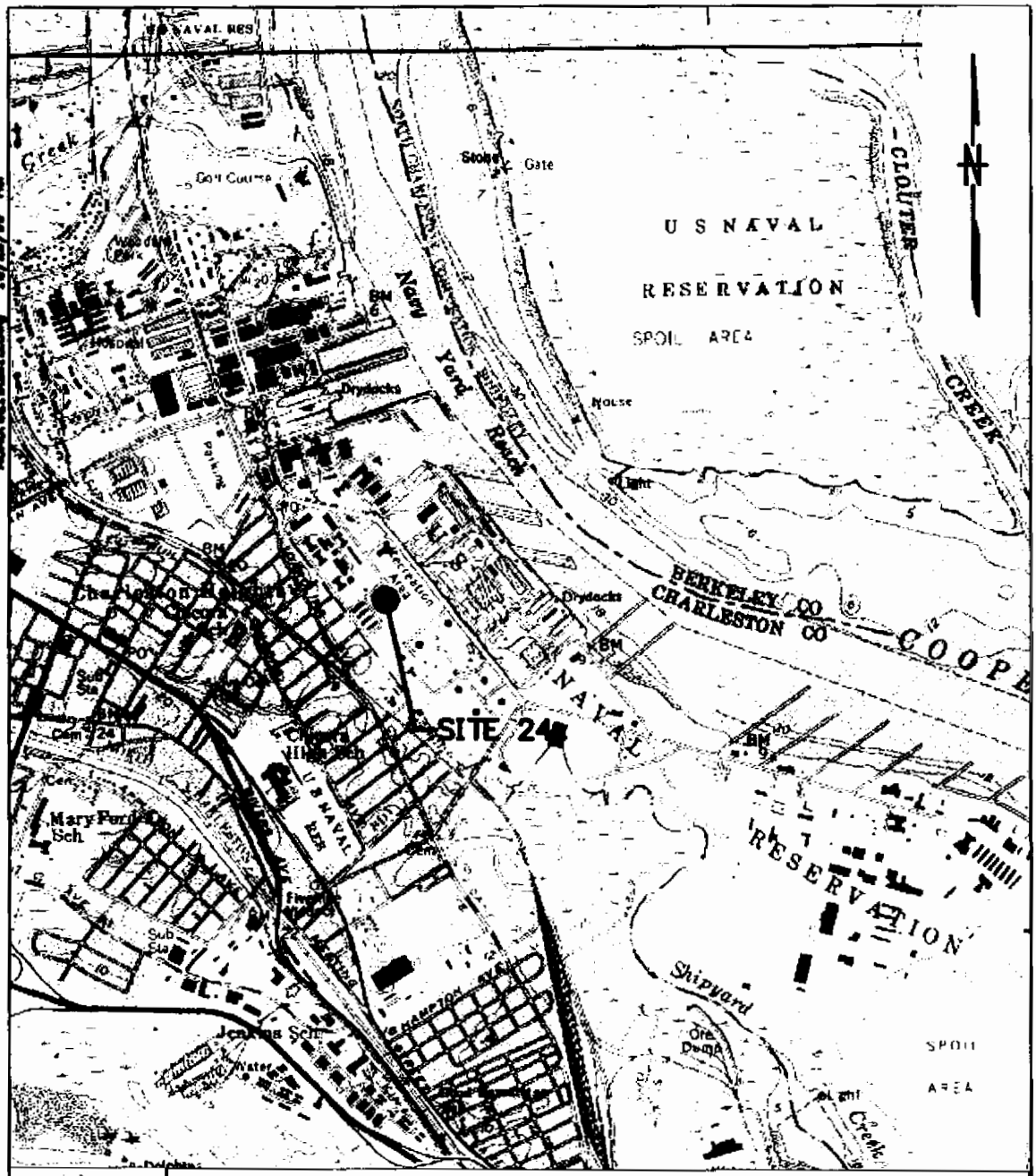
KATAHDIN ANALYTICAL SERVICES

Summary of Report Notes

Report Note	Note Text
$	'$' flag denotes surrogate compound recovery is out of criteria. Re-extraction or re-analysis confirmed matrix interference.
E	'E' flag indicates an estimated value. The analyte was detected in the sample at a concentration greater than the standard calibration range.
J	'J' flag denotes an estimated value less than the Laboratory's Practical Quantitation Level.
O-1	Sample dilution required due to matrix interference, sample viscosity or other matrix-related problem; therefore, standard laboratory Practical Quantitation Level (PQL) could not be achieved.
O-13	Internal standard area(s) are out of criteria. Reanalysis confirmedmatrix interference.
O-2	Sample dilution required for quantitation of one or more target analytes; therefore, standard laboratory Practical Quantitation Level (PQL) could not be achieved.

APPENDIX C

TOPOGRAPHIC MAP WITH SITE LOCATION



SOURCE: QUADRANGLE MAP SOUTH CAROLINA, REVISED 1979
QUADRANGLE MAP NORTH CHARLESTON REVISED, 1979

0 2000 4000
SCALE IN FEET

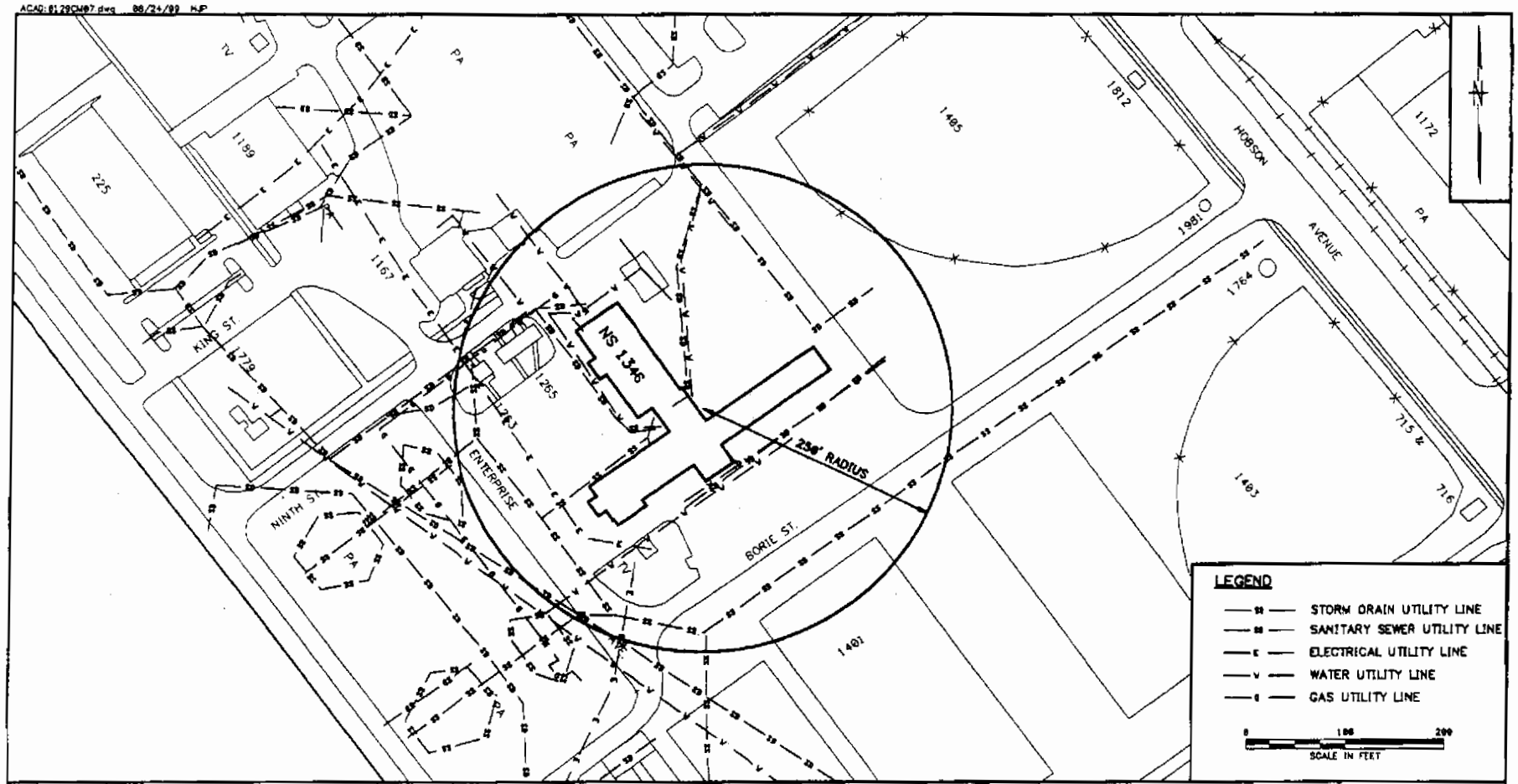
DRAWN BY HJP	DATE 10/29/99	SITE LOCATION MAP SITE 24, BUILDING 1346 ZONE F, CHARLESTON NAVAL COMPLEX NORTH CHARLESTON, SOUTH CAROLINA	CONTRACT NO. 0219
CHECKED BY	DATE		APPROVED BY / DATE
COST/SCHED-AREA			APPROVED BY / DATE
SCALE AS NOTED			DRAWING NO. FIGURE 1 / REV. 0

FORM CADD NO. 2SEV_AVJ2V6 - REV 0 - 1/28/98

APPENDIX D

SITE BASE MAP

ACAD:0129CM07.dwg 08/24/99 HJP



NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

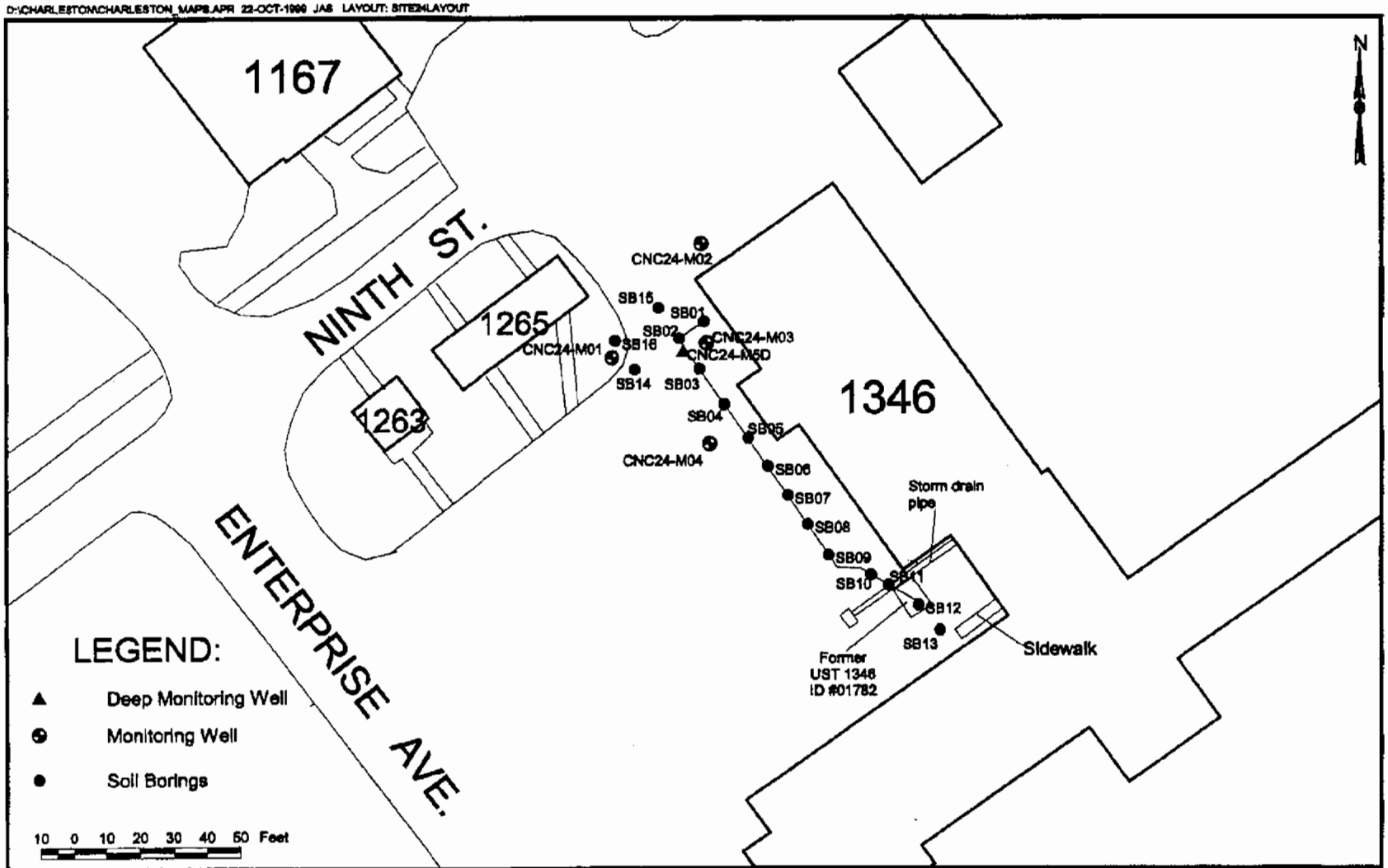
DRAWN BY HJP DATE 8/24/99
CHECKED BY DATE
COST/SCHED-AREA
SCALE AS NOTED

SITE VICINITY MAP
SITE 24, BUILDING NS 1346
ZONE F, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

CONTRACT NO. 0129
APPROVED BY DATE
APPROVED BY DATE
DRAWING NO. FIGURE 2
REV. 0

FORM CADD NO. EDIV_BLDVC - REV 0 - 1/25/96

D:\CHARLESTON\CHARLESTON_MAPS.APR 22-OCT-1999 JAS LAYOUT: SITE24LAYOUT



NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

DRAWN BY JAS DATE 10/22/1999
CHECKED BY DATE
CONTRACTED AREA
SCALE AS NOTED

SITE VICINTY MAP
SITE 24, BUILD 1346
ZONE F, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

CONTRACT NO. 0219
APPROVED BY DATE
APPROVED BY DATE
DRAWING NO. REV. 0

INSERT THIS MATERIAL AT THE END OF APPENDIX B REPORT:

RAPID ASSESSMENT REPORT FOR SITE 25, BUILDING NS1346

(TTNUS, 1999)

APPENDIX A

GEOLOGIC BORING LOGS
FIELD SAMPLING DATA SHEETS

BORING LOG

PROJECT NAME: Zone I
PROJECT NUMBER:
DRILLING COMPANY: Columbia
DRILLING RIG: Geoprobe 5400

BORING NUMBER: CNC25B01
DATE: 6 8 99
GEOLOGIST: RH
DRILLER: Brad Lewis

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**	
	1			1.0			asphalt 3"							
	2						Lime Rock Subb							
	3						Orange & Gray sandy Clay		Product odor	8	5		0	H2S % Fil. = 470
0871	4		3.5'						Sampled Soil from 3.0-4.0					H2S % Fil. = 2800
	5								# 25SFB01050					
	6								Time 80871					
	7			7.0			Greenish Gray f. to med							
0875	8			8.0			sand & clay Moist			8	4		0	H2S % Fil. = >7500
	9						Gray f. Sand Wet		Set Screen					H2S % Fil. = 2000
	10								from 9.0'-12.0'					
	11			11.0			Orange & Gray Sandy		# 25GFB01012					
0828	12			12.0			Clay Moist		Time: 0830					
	13			B.T.										
	14						W/L = 8.9							

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm):

Remarks:

Converted to Well: Yes ____ No ____ Well I.D. #: ____

BORING LOG

Page ___ of ___

PROJECT NAME: Site 25
PROJECT NUMBER:
DRILLING COMPANY: Columbia
DRILLING RIG: Geoprobe 5400

BORING NUMBER: CNC25B002
DATE: 6-5-99
GEOLOGIST:
DRILLER: B. Lewis

	Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm) Sample	Sampler BZ	Borehole**	Driller BZ**	
		1			1.0			Asphalt 3"		Sampled Soil					
		2			2.0			Lime Rock		from 2.0'-3.0'					
		3						Greenish gray sandy clay w/shells		#25SFB002083					
0850		4		2.5				Greenish gray clayey			3	0	.	0	HS w/ soil = 50 ppm
		5						mod. to coarse sand		Moist					HS w/ soil = 45 ppm
		6			6.0			w/shells frag.							
		7			Δ			wet							
0853		8									4	0		0	H.S w/ soil = 38 ppm
		9													HS w/ soil = N/A
		10													
		11						W/L = 3.5		Set Screen					
		12			8.0					From 8.0'-11.0'					
					B.T.										
										Sampled Water					
										from 8.0'-11.0'					
										#25GFD002.0811					
										Time: 0900					

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): ____

Remarks:

Converted to Well: Yes ____ No ____ Well I.D. #: ____

BORING LOG

Page ___ of ___

PROJECT NAME: Site 25
PROJECT NUMBER:
DRILLING COMPANY: Columbia
DRILLING RIG: Geoprobe 5400

BORING NUMBER: CNC25B03
DATE: 6-5-97
GEOLOGIST:
DRILLER: B. Lewis

	Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm) Sample	Sampler BZ	Borehole**	Driller BZ**
					1.0			Asphalt 3"						
								Lime Rock						
								Greenish Gray clayey						
F913		4		1.0	4.0			f. sand-		Sampled Soil				
								Dark Gray Silty		from 4.0'-5.0'				
								clay (moist)		#25SFB03Ø4Ø5				
										Time: 0915				
F915		8		4.0										
					11.0			W/L = 4.1'		Set Screen				
					B.T					from 8.0'-11.0'				
										Sampled Water				
										#25GFB03Ø811				
										Time: 0925				

H.S. W/ f.i = 60ppm
H.S. W/ f.i = 42ppm
H.S. W/ f.i = 15ppm
H.S. W/ f.i = 12ppm

* When rock coring, enter rock brokeness.

* Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): ____

Remarks: ____

Converted to Well: Yes ____ No ____ Well I.D. #: ____

BORING LOG

Page ___ of ___

PROJECT NAME: Site 25
PROJECT NUMBER:
DRILLING COMPANY: Columbia
DRILLING RIG: Geoprobe 54(c)

BORING NUMBER: CNC25B04
DATE: 6-5-99
GEOLOGIST:
DRILLER: B. Lewis

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler B.Z	Borehole**	Driller B.Z**	
				.9			Asphalt		Sampled soil					
							Lime Rock		from 2.0'-3.0'					
							6" layer of Sandy Clay		# 25SFB04020303		0		0	H.S.W/ fil. = 0 pf
0945	4			4.0			3" layer of Asphalt.		Time: 0945					H.S.W/ fil = N/A
				Δ			4" layer of Sandy clay							
							2" " of Asphalt							
						4'	Tan f. to med sand							
947	8			8.0			(wet)				0		0	
				B.I			W/L = 6.7'		Set Screen					
									from 5.0'-8.0'					
									Sampled Water					
									# 25GFB04050808					
									Time: 0955					

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): ____

Remarks: ____

Converted to Well: Yes ____ No ____ Well I.D. #: ____

BORING LOG

Page ___ of ___

PROJECT NAME: Site 25
PROJECT NUMBER:
DRILLING COMPANY: Columbia
DRILLING RIG: Geoprobe 5400

BORING NUMBER: GNC25BØ5
DATE: 6-5-94
GEOLOGIST:
DRILLER: B. Lewis

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**	
				-5			Asphalt 0.5'		s					
							Orange & gray sandy		Product odor					
							clay							
1002	4		2.3						Sampled soil		0		0	H.S.W/ 6 f.i = 170 ppm
									from 4.0'-5.0'					H.S.W/ 8 i.l = 120 ppm
				6.0			Gray sandy Clay. Moist		25SFBØ5Ø4Ø5					
									Time 81007					
1008	8		2.5	7.5			Gray silty/clayey coarse		Product odor		0		0	H.S.W/ 6 i.l = 130 ppm
							sand, Moist							H.S.W/ f.i = 50 ppm
				11.0 B.T.			W/L = 9.3'							
									Set Screen					
									from 8.0'-11.0'					
									Sampled Water					
									25GFBØ5Ø811					
									Time: 1019					

* When rock coring, enter rock brokeness.

* Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): ____

Remarks: ____

Converted to Well: Yes ____ No ____ Well I.D. #: ____

BORING LOG

Page ___ of ___

PROJECT NAME: Site 25
PROJECT NUMBER:
DRILLING COMPANY: Columbia
DRILLING RIG: Geoprobe 5400

BORING NUMBER: CNC25B06
DATE: 6-5-99
GEOLOGIST:
DRILLER: B. Lewis

	Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**	
					.8			Asphalt .3		Sampled Soil					
								Lime Rock		from 4.0-5.0					
								Greenish Gray silty clay		# 25SFB06Ø4Ø5					
1032		4		2.0						Time: 1034					H.S. w/b f.i. = 1400
															H.S. w/f.i. = 280 pp
					5.5			Gray silty/clay coarse		~~Moist~~					
					6.5			sand wet		wet					
1034		8		3.0	7.5			Greenish Gray silty Clay		Moist					H.S. w/b f.i. = 200 pp
								Red & Gray sandy clay							H.S. w/f.i. = 160 pp
								Tr. of Silt (Moist)		Set Screen					
										from 8.0'-11.0'					
					12.0			w/L = 9.2'							
					B.T.					Sampled Water					
										# 25SFB06Ø871					
										Time: 1045					

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm):

Remarks:

Converted to Well: Yes ____ No ____ Well I.D. #:

BORING LOG

Page ___ of ___

PROJECT NAME: Site 25
PROJECT NUMBER:
DRILLING COMPANY: Columbia
DRILLING RIG: Geoprobe 5400

BORING NUMBER: CNC25B07
DATE: 6-5-99
GEOLOGIST:
DRILLER: R. Lewis

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
				.4			Asphalt .4		Sampled Soil				
							Brown sandy Clay		from 6.0'-7.0'				
									Time: 1102				
059	4		2.2				Red & Gray Sandy Clay						
							Tr. of Silt						
				6.5			Greenish gray sandy						
102	8						clay Moist						
	12			12.0'			W/L = 10.0'		Set Screen				
				B.T.					from 9.0'-12.0'				
									Sampled Water				
									from 9.0'-12.0'				
									# 25GFB070912				
									Time: 1118				

1.0'-2.0'
↓
HS.4/fil = 180
HS4/fil =

6.0'-7.0'
HS4/fil = 380
HS4/fil =

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): ____

Remarks: ____

Converted to Well: Yes ____ No ____ Well I.D. #: ____

BORING LOG

Page ___ of ___

PROJECT NAME: Site 25
PROJECT NUMBER:
DRILLING COMPANY: Columbia
DRILLING RIG: Geoprobe 5400

BORING NUMBER: CAS25B08
DATE: 5-5-99
GEOLOGIST:
DRILLER: B. Lewis

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
				1.0			Brown clay fine						
							Sand w/ Roots		sampled Soil				
				2.5			Brown Sand & clay		from 3.0'-4.0'				
1236	4						Greenish Gray silty		# 25SFB0805				
				4.5			clay		Time: 1236				
							No Recovery						
1338	8		0.5										
									Set Screen				
									from 8.0'-11.0'				
				11.0			W.L = 7.4						
				B.T.					9.0'-7.0'				
									Sampled water				
									# 25GFB0804				
									Time: 1525				

3.0'-4.0'
~~7.0'-5.~~
H.S W/ Fil = 300
H.S W/ Fil = 160

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm):

Converted to Well: Yes ____ No ____ Well I.D. #:

BORING LOG

Page ___ of ___

PROJECT NAME: Site 25
PROJECT NUMBER:
DRILLING COMPANY: Columbia
DRILLING RIG:

BORING NUMBER: CNC25B09
DATE: 6-7-99
GEOLOGIST:
DRILLER: R. Brand

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole	Other BZ	
				1.0			Asphalt .3							
							Subbase		sampled soil					
							Predominately silty,		from 3.0'-4.0'					
	4		2.5				sandy clay		# 25SB09030304					H.S.W/FIL=Faint
				5.0					Time 0858					H.S.W/FIL=Neg
				6.0			Moist							
	8			8.0			Gray/brown Clay/sand							
							saturated wet							

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm):

Remarks:

Converted to Well: Yes ____ No ____ Well I.D. #:

BORING LOG

Page ___ of ___

PROJECT NAME: Site 25
PROJECT NUMBER:
DRILLING COMPANY: Columbia
DRILLING RIG:

BORING NUMBER: CAUC25BK0
DATE: 6-7-99
GEOLOGIST:
DRILLER: R. Brand

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole	Drilller BZ
				1.0			Asphalt .3		Sampled Soil				
							Sub base		from 1.0-2.0				
							Tan-Gray silty clay		* 25SLBK0@1.0				
	4		2.5	3.5 Δ			Tr. of Sand		Time: 0915				
							Tan-Gray clay & Sand						
							Very Moist						
	8		2.0	8.0 B.T.									

HSL W/ FID = >500
HSL W/ FID = 140

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm):

Converted to Well: Yes ____ No ____ Well I.D. #:

BORING LOG

Page ___ of ___

PROJECT NAME: Site 25
PROJECT NUMBER:
DRILLING COMPANY:
DRILLING RIG:

BORING NUMBER: CNC 25.B11
DATE: 6-7-99
GEOLOGIST:
DRILLER: R. Brand

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
							Asphalt .3		Sampled Soil				
				1.5			Sub base		from @2.0-3.0				
				2.0			Br. clayey Sand.		# 25SB11@2.0-3				
	4		2.2				Gray coarse Sand.						
				5.0			Wet						
				Δ									
	8		3.0	8.0									
				B.T.									

H.S. 4/6 Fil = 170
H.S. 4/Fil = 90

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm):

Converted to Well: Yes ____ No ____ Well I.D. #:

BORING LOG

Page ___ of ___

PROJECT NAME: Site 25
PROJECT NUMBER:
DRILLING COMPANY: Columbia
DRILLING RIG:

BORING NUMBER: CAIC 25 B12
DATE: 6-7-94
GEOLOGIST:
DRILLER: R. Brand

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**	
				1.0			Asphalt - .2		Sampled Soil					
							Sub. Base		from 2.0-3.0'					
							Gray Silty Clay w/layers		#25SLB12Ø203					
	4		2.5	3.5			of Med. Sand		Time: 1015					H.S.W/F.I = >500
							Gray f. to med Sand							H.S.W/F.I = 210
							Tr clay West							
							↓							
	8		3.0'	8.0										
				B.T.										

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm):

Converted to Well: Yes ____ No ____ Well I.D. #:

BORING LOG

Page ___ of ___

PROJECT NAME: Site 25
PROJECT NUMBER:
DRILLING COMPANY: Columbia
DRILLING RIG:

BORING NUMBER: CAC25B13
DATE: 6-7-94
GEOLOGIST:
DRILLER: R. Brand

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
				1.0			Asphalt .3		Sampled Soil				
							Sub base		from 2.0'-3.0'				
				3.0			Brown clayey Sand		# 25SLB13Ø2Ø3				
	4		2.5	Δ			Tn gravel		Time: 1040				
							Gray f. to med Sand						
							Wet						
	8		2.8										
									Duped				
									# 25SLB13Ø3Ø3				

H.S.% / F.I = >500
H.S.% / F.I = 1700

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm):

Converted to Well: Yes ____ No ____ Well I.D. #:

BORING LOG

Page ___ of ___

PROJECT NAME: Site 25
PROJECT NUMBER:
DRILLING COMPANY: Columbia
DRILLING RIG:

BORING NUMBER: CNC25B14
DATE: 6-2-99
GEOLOGIST:
DRILLER: R. Brand

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sample BZ	Borehole	Borehole BZ	
							Asphalt .2		Sampled Soil					
				1.5			Sub base		from Ø3Ø4					
							Light Gray F. to med		#25LB14Ø3Ø4					H.S.W/ Fil=900
	4		2.8				Sand Moist		Time 1055					H.S.W/ Fil=80
				5.0										
				Δ			wet							
							↓							
	8		2.3	8.0										
				B.T.										

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm):

Remarks:

Converted to Well: Yes ____ No ____ Well I.D. #:

BORING LOG

Page ___ of ___

PROJECT NAME: Site 25
PROJECT NUMBER:
DRILLING COMPANY: Columbia
DRILLING RIG:

BORING NUMBER: 3 SNC25 B15
DATE: 6-7-00
GEOLOGIST:
DRILLER: R. Brand.

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Bumper BZ	Backhole	Drilling Area
				1.0			Asphalt .3		Sampled Soil				
							Sub base		from 3.0'-4.0'				
							Orange & Gray f. to med.		# 25SB3150304				
	4		2.7	4.0			Sand Tr. of gravel		Time: 1115				
				B.T.									

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm):

Converted to Well: Yes ____ No ____ Well I.D. #:

BORING LOG

Page ___ of ___

PROJECT NAME: ~~ENG25~~ Site 25
PROJECT NUMBER:
DRILLING COMPANY: Columbia
DRILLING RIG:

BORING NUMBER: CNC25B16
DATE: 6-7-94
GEOLOGIST:
DRILLER: R. Brown

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole	Driller BZ
							Br. f. to med. Sand.		sampled Soil				
				2.0					from 3.0'-4.0'				
							Orange & Grey sandy		* 25SLB16Ø3Ø4				
1330		4	3.0	4.0			clay tr. of Silt.		Time: 1330				
				B.T.									

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm):

Converted to Well: Yes ____ No ____ Well I.D. #:

BORING LOG

Page ___ of ___

PROJECT NAME: Site 25
PROJECT NUMBER:
DRILLING COMPANY: Columbia
DRILLING RIG:

BORING NUMBER: CNC25B17
DATE: 6-2-99
GEOLOGIST:
DRILLER: R. Bond

Sample No. and Type or RQD	Depth (Ft) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS	Remarks	PID/FID Reading (ppm): Sample	Blowpipe BZ	Mouth/Nose BZ	Driller BZ**
				1.0			Asphalt .2'						
							Sub base						
							Orange & Gray sandy						
1353	4			4.0			clay Tr. of silt.						
				BT.									

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm):

Converted to Well: Yes ____ No ____ Well I.D. #:

BORING LOG

PROJECT NAME: CNC
PROJECT NUMBER:
DRILLING COMPANY: Columbia
DRILLING RIG: Stratopunch
BORING NUMBER: 25B18
DATE: 6/14/99
GEOLOGIST:
DRILLER: L. Brand

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm) Sample	Sampler BZ	Borehole**	Driller BZ**
	1					Brn	Silty Sand		Dry				
	2					Gray	Silty Clay		Stiff-Dry				
	3					↓	↓		Moist	120			
	4		4/4			↓	↓		↓	20			
1237 X	5					Olive Gray	↓		↓				
	6					↓	↓		↓				
	7					↓	Sandy Clay		Saturated				
244	8		4/4			↓	↓		↓				
	9					↓	↓		↓				
	10					Brn	↓		↓				
	11					Red	↓		↓				
	12		4/4			Gray	↓		↓				

* When rock coring, enter rock brokeness

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read

Remarks:

Drilling Area Background (ppm):

Converted to Well: Yes Temp No Well I.D. #:

BORING LOG

PROJECT NAME: CDC
PROJECT NUMBER:
DRILLING COMPANY: Columbia
DRILLING RIG: Stratoprobe
BORING NUMBER: 25B19
DATE: 6/19/99
GEOLOGIST:
DRILLER: R. Brand

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION	USCS*	Remarks	PID/FID Reading (ppm)
	1				Reddish Brown Silty Clay		Dry	
	2							
	3							0
X	4		3/4					
1360	5				Moist		Moist	
	6						Saturated	
	7							75,000
	8		4/4		Gray Clayey Sand - Petro Odor			
1340	9							
	10							
	11							
	12		/4					

* When rock coring, enter rock brokeness.

** Include monitor reading in 5 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm):

Converted to Well: Yes Temp No Well I.D. #:

BORING LOG

PROJECT NAME: CWE
PROJECT NUMBER:
DRILLING COMPANY: Columbia
DRILLING RIG: Stratoprobe

BORING NUMBER: 25 B26
DATE: 6/14/99
GEOLOGIST:
DRILLER: R. Brand

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION			USCS*	Remarks	PID/FID Reading (ppm)
	1						Asphalt w/Base		Dry	
	2					Reddish Brown	Sandy Clay		↓	240
	3									
1772 X	4		2/4							120
	5					↓	↓		Moist	
	6									
	7					Gray	Sandy Clay		Saturated	
	8		4/4			↓	Clayey Sand		↓	
1775	9									
	10									
	11									
	12		4							

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm):

Converted to Well: Yes Temp No Well I.D. #:

BORING LOG

PROJECT NAME: CW
PROJECT NUMBER:
DRILLING COMPANY: Columbia
DRILLING RIG: Stratoprobe
BORING NUMBER: 25B21
DATE: 7/4/90
GEOLOGIST:
DRILLER: R. Brand

Sample No. and Type or RQD	Depth (Ft) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION			USCS*	Remarks	PID/FID Reading (ppm)			
	1						Asphalt 4/6cm						
	2					Brn	Sand		Dry				
	3			Hand Auger		Reddish Brn	Sandy Clay			30	0	1,400	0
	4												
X	5									60	0		0
	6								Moist				
	7					Green			Saturated				
	8		3/3				Still						

* When rock coring, enter rock brokeness.

** Include monitor reading in 5 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes Temp No _____ Well I.D. #:

BORING LOG

PROJECT NAME: CK
PROJECT NUMBER:
DRILLING COMPANY: Columbia
DRILLING RIG: hand auger / Sonic to proj

BORING NUMBER: 25B 22
DATE: 7 8 99
GEOLOGIST: R Franklin
DRILLER: R Brand

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION	USCS*	Remarks	PID/FID Reading (ppm)
	1			Hand Auger	Lr Sand		dry	
	2				red Sandy clay		dry	
	3				Orange			0 0 0 0
	4							
	5				grey mottled			
X	6				clayey sand		mist	0 0 0 0
X	7							
	8		3/3					

* When rock coring, enter rock broken.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes Temp No _____ Well I.D. #:

BORING LOG

PROJECT NAME: Fort F
PROJECT NUMBER: Site 25
DRILLING COMPANY: Columbia
DRILLING RIG: hand auger / Stratop
BORING NUMBER: CNC25B23
DATE: 7 8 96
GEOLOGIST: R Franklin
DRILLER: P Brand

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION		USCS*	Remarks	PID/FID Reading (ppm)			
	1			Hand Auger	br	clay (crumbles)		Dry				
	2											
	3								0	0	0	0
	4											
	5				Gray	Silty Clay - Soft		Moist				
	6											
	7				Blk	Stiff			0	7	0	0
	8		2 3/4									
	9							Saturated				
	10				Olive Brown	Sandy Clay						
	11											
	12		3 3/4									

* When rock coring, enter rock brokenness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes Temp No _____ Well I.D. #: _____

BORING LOG

PROJECT NAME: CNC
PROJECT NUMBER:
DRILLING COMPANY: Columbia
DRILLING RIG: handauger

BORING NUMBER: 25B24
DATE: 7 8 99
GEOLOGIST:
DRILLER: Randy Boyd

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION	USCS*	Remarks	PID/FID Reading (ppm)
	1			brn/gray	br Sand		dry	
	2				br clayey sand		moist	
	3				red/gray mottled clayey sand			0 0 0 0
	4							
	5							
	6				Sandy Clay			0 0 0 0
	7							
	8		3/3				Saturated	

* When rock coring, enter rock brokenness.
** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes Temp No _____ Well I.D. #:

BORING LOG

PROJECT NAME: CUC
PROJECT NUMBER:
DRILLING COMPANY: Columbia
DRILLING RIG: Stratoprobe

BORING NUMBER: ZSBZS
DATE: 7/24/97
GEOLOGIST:
DRILLER: T. Hunt

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistence / or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	1			Hand Auger			Asphalt w/base		Dry				
	2					Brn	Sandy Fill						
	3												
	4					Gray/ Light Brown	Sandy Clay						
	5								Moist	0	0	0	0
	6												
	7					Dirty Gray	Clayey Sand		Saturated				
	8		4H										

* When rock coring, enter rock brokenness.

** Include monitor reading in 5 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes Temp No _____ Well I.D. #: _____

BORING LOG

PROJECT NAME: CWR
PROJECT NUMBER:
DRILLING COMPANY: Columbia
DRILLING RIG: Stratoprobe
BORING NUMBER: 25B26
DATE: 7/29/94
GEOLOGIST: S
DRILLER: T. Brand

Sample No. and Type or RQD	Depth (Ft) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	1						Asphalt/Base f.						
	2					Brn	Clayey Sand		Dry				
	3												
	4								Moist	0	0	0	0
	5												
	6					Red Brn	Silty Clay		Saturated				
	7						~~Silty~~ Clayey Sand						
	8		4/4				C d						

* When rock coring, enter rock brokenness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated repones read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ~~Temp~~ No _____ Well I.D. #: _____

BORING LOG

PROJECT NAME: CWC
PROJECT NUMBER:
DRILLING COMPANY: Columbia
DRILLING RIG: Stratoprobe
BORING NUMBER: 25BZ7
DATE: 8/3/99
GEOLOGIST:
DRILLER: R. Brand

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	1						Asphalt w/ fines						
	2					Red	Clayey Sand		Dry				
	3					L			↓	190	0	25	0
	4					Olive	Sandy Clay - Stiff		↓	70	0	25	0
	5					Red & Olive	Clayey Sand		↓				
	6					↓	↓		Moist				
	7					↓	↓		Saturated				
	8					Brown	Silty Sand		↓				

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

Remarks:

Converted to Well: Yes Temp No _____ Well I.D. #: _____

BORING LOG

PROJECT NAME: CWC
PROJECT NUMBER:
DRILLING COMPANY: Colcum Sin
DRILLING RIG: Stratoprobe

BORING NUMBER: 25 B28
DATE: 8/3/99
GEOLOGIST:
DRILLER: R. Brown

Sample No. and Type or RQD	Depth (FL) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/FL) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	1						Asphalt						
	2					Red	Clayey Sand		Dry				
X	3									0	0	0.	0
	4												
	5												
	6					Red Brown			Saturated				
	7					Brown	Sandy Clay						
	8					Brown	Silty Sand						

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes Temp No _____ Well I.D. #:

SOIL & SEDIMENT SAMPLE LOG SHEET

Page___ of ___

Project Site Name: CNC25
Project No.: 2219

Sample ID No.: 2556B09030 4
Sample Location: B09
Sampled By:
C.O.C. No.:

[] Surface Soil
[✓] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Type of Sample:
[] Low Concentration
[✓] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6-7-99 Time: 0858 Method: DPT Monitor Reading (ppm): 106	3.0'-4.0'	Red & Gray	Red & Gray Sandy, Silty clay Moist

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
6-7-99		0	.3	Asphalt.
Method:		.3	1.0	Sub Base
DPT		1.0	5.0	Red & Gray silty, Sandy Clay,
Monitor Readings		5.0	6.0	" " " " " Moist
(Range in ppm):		6.0	8.0	Gray & Tan clay sand & gravel Wet
w/o F.I. = 120				
w/ F.I. = 14 ppm				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
BTEX / EDB	4 encore	6-7-99	
Lead	1-4 oz jar		
PAH	1-4 oz jar		

OBSERVATIONS / NOTES:

Total Depth = 12.0'

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): J-RH

SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: CNC 25
Project No.: 0219

Sample ID No.: CNC25B1Ø4/02
Sample Location: B1Ø
Sampled By:
C.O.C. No.:

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Type of Sample:
[] Low Concentration
[X] High Concentration

GRAB SAMPLE DATA:

Date: 6-7-99	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 0915	1.0-2.0	Tan & Gray	silty clay Tr. Sand -
Method: DPT			
Monitor Reading (ppm):			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
6-7-99	0908	0	.3	Asphalt
Method:		.3	1.0	Sub base
DPT		1.0	3.5	Tan & Gray Silty clay Tr. Sand
Monitor Readings		3.5	7.0	Tan & Gray Clay & Sand. Very Moist
(Range in ppm):				
4/6 Fil = 75000				
4/7 Fil = 140				Total

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
BTEX / EDB	4- encore	6-7-99	
PAH	1-4oz jar	↓	
Lead	1-4oz jar		

OBSERVATIONS / NOTES:

Total Depth = 8.0'

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: CNC25
Project No.: 0219

Sample ID No.: 25SLB11Ø2Ø3
Sample Location: B11
Sampled By: RF
C.O.C. No.:

[] Surface Soil
[✓] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Type of Sample:
[] Low Concentration
[✓] High Concentration

GRAB SAMPLE DATA:

Date: 6-7-99	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 0933			
Method: DPT	2.0-3.0	Brown	clayey sand.
Monitor Reading (ppm): 1610			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
6-7-99		0	.3	Asphalt
Method:		.3	1.5	Sub Base
DPT		1.5	2.0	Brown Clayey sand
Monitor Readings		2.0	5.0'	Gray Coarse sand Moist
(Range in ppm):		5.0'	8.0'	Wet
w/o Fil=75 ~~1200~~				
w/Fil=90				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
BTEX/EDB	4- Encore	6-7-99	
PAH	1-4 oz jar	↓	
Metals	1-4 oz jar	↓	

OBSERVATIONS / NOTES:

0-4' = 2.2 Rec.
4'-8 = 3.0'

Total Depth 12.0' ~~[illegible]~~

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): J. [illegible]

SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: GNG25
Project No.: 0219

[] Surface Soil
[✓] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 25GLB12Ø3
Sample Location: B12
Sampled By: R.F.
C.O.C. No.:

Type of Sample:
[] Low Concentration
[✓] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6-7-99 Time: 1015 Method: DPT Monitor Reading (ppm):	2.0-3.0	Gray	Silty Clay w/layers of Sand.

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
6-7-99	1013	0	.2	Asphalt
Method: DPT		.2	1.0	Sub base
		1.0-3.5	Gray	Silty clay w/layers of med. Sand
Monitor Readings		3.5-8.0	Gray	f. to Med. sand Tr Clay Wet
(Range in ppm):				
w/o F.I = 75000				
w/F.I = 210				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
BTEX / EDB	4 - Encore	6-7-99	
PAH	1 - 4oz jar	↓	
Lead	1 - 4oz jar		
Grain Size	2 - 32oz jars		

OBSERVATIONS / NOTES:

Rec 0'-4' = 2.5
4'-8 = 3.0
Grain Size from 2.0'-3.0' & 7.0'-8.0'

Total Depth. 12.0'

MAP:

Circle if Applicable:

MS/MSD

Duplicate ID No.:

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: CNC25
Project No.: 6219

[] Surface Soil
[✓] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 25SLB13Ø2Ø3
Sample Location: B13
Sampled By: RF
C.O.C. No.:

Type of Sample:
[] Low Concentration
[✓] High Concentration

GRAB SAMPLE DATA:

Date: 6-2-99	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 1040	2.0-3.0	Brown.	Clayey Sand Tr. Gravel
Method:			
Monitor Reading (ppm):			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
6-7-99	1032	0-.3		Asphalt
Method: DPT		.3-1.0		Sub base
		1.0-3.0	Brown	Clayey Sand Tr. gravel
Monitor Readings (Range in ppm):		3.0-8.0	Gray	Fine to med Sand.
w/o Fil = 75000				
w/ Fil = 700				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
BTEX/EDB	8 - Encors	6-7-99	
PAH	2 - 4 oz. jars	↓	
Lead	2-4 " "		
TPH	2-4 " "		

OBSERVATIONS / NOTES:

Rec 0-4' = 2.5'
4-8' = 2.8

Total Depth = 16.0'

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
	25SLB13Ø2Ø3D

Signature(s): J. McNell

SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: CNC25
Project No.: D219

Sample ID No.: 25SLB140304
Sample Location: BH
Sampled By: RF
C.O.C. No.:

[] Surface Soil
[✓] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Type of Sample:
[] Low Concentration
[✓] High Concentration

GRAB SAMPLE DATA:

Date: 6-7-99	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 1055	3.0'-4.0'	Light Gray	Fine to med. Sand
Method:			
Monitor Reading (ppm):			

COMPOSITE SAMPLE DATA:

Date: 6-7-99	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
		0-.2	Black	Asphalt
Method: DPT		.2-1.5	Gray	Sub base
		1.5-5.0	Light Gray	F. to med Sand. Moist
Monitor Readings		5.0-8.0	" "	" " " Wet
(Range in ppm):				
4/6 Fil = 900				
4/Fil = 80				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
BTEX / EDB	4-Encore	6-7-99	
PAH	1-4oz jar	↓	
Metals	1-4oz jar	↓	

OBSERVATIONS / NOTES:

Rec. 0'-4' = 2.8

Total Depth = 8.0

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: CNC25
Project No.: 0219

Sample ID No.: 25SLB15Ø3Ø4
Sample Location: B15
Sampled By: RF
C.O.C. No.:

[] Surface Soil
[x] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Type of Sample:
[] Low Concentration
[x] High Concentration

GRAB SAMPLE DATA:

Date: 6-7-99	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 1115	3.0-4.0	Orange & Gray	Fine to med. Sand Tr. gravel
Method: DPT			
Monitor Reading (ppm): 150			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
6-7-99		0-.2	Black	Asphalt
Method:		.2-1.0		Sub base
DPT		1.0-4.0	Orange & Gray	Fine to Med Sand - Tr. gravel
Monitor Readings				
(Range in ppm):				
w/o Fil = 190				
w/ Fil = 40				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
BTEX/EDB	4 Encore		
PAH	1-4 oz. jar		
Lead	1-4 oz. jar		
TOC/FOC	2-4 oz. jar		

OBSERVATIONS / NOTES:

Rec 0-4 = 2.7

Total Depth 4.0'

MAP:

Duped The TOC/FOC only

Circle if Applicable:

MS/MSD

Duplicate ID No.: TOC/FOC only 25SLB15Ø3ØHD

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: CNC25
Project No.: 0219

[] Surface Soil
[x] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 25SLB16030Ø4
Sample Location: B16
Sampled By: RP
C.O.C. No.:

Type of Sample:
[] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: 6-7-99	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 1330	3.0'-4.0'	Orange/Gray	Sandy Clay Tr. of Silt
Method: DPT			
Monitor Reading (ppm):			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
6-7-99	1330	0-2.0	Brown	fine To Med Sand
Method: DPT		2.0'-4.0'	Orange/Gray	sandy Clay Tr. of Silt
Monitor Readings (Range in ppm): 4/Fil = 460				
4/Fil = 210				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
BTEX/EDB	4-Encore	6-7-99	
PAH	1-4 OZ Jar	↓	
Lead	1- " " "		

OBSERVATIONS / NOTES:

Rec 0'-4' = 3.0'

Total Depth = 4.0'

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): J. R. [illegible]

SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: CNC 25
Project No.: 0219

Sample ID No.: 25SB17Ø3Ø4
Sample Location: B17
Sampled By: R.E.
C.O.C. No.:

[] Surface Soil
[x] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Type of Sample:
[] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: 6-7-99	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 1355	3.0'-4.0'		
Method: DPT			
Monitor Reading (ppm):			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
6-7-99	1355	0 - .2		Asphalt
Method:		.2-1.0		Sub base
DPT.		1.0 - 4.0		Orange & Gray sandy Clay tr. silt
Monitor Readings				
(Range in ppm):				
c/o Fil = >5000				
w/ Fil = 100				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
BTEX / EDB	4- Encore	6-7-99	
PAH	1-4 oz Jar	↓	
Lead	1-4 oz Jar		

OBSERVATIONS / NOTES:

Rec 0'-4.8 = 3.6'

Total Depth = 4.0'

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): J. [illegible]

GROUNDWATER SAMPLE LOG SHEET

Page___ of___

Project Site Name: Zone F
Project No.: 0019

[] Domestic Well Data
[x] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 25GLMP101
Sample Location: CWC 25MW1
Sampled By: JA/JE
C.O.C. No.:
Type of Sample:
[] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 9-21-99	Color	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Time: 1205	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	%	NA
Method: Peristaltic	clear	6.50	1.04	25.9	-10	0.21	—	

PURGE DATA:

Date: 9 21 99	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: Peristaltic	Initial	6.40	.788	24.9	-10	1.04		
Monitor Reading (ppm): —	1	6.66	.796	25.5	-10	2.54		
Well Casing Diameter & Material	2	6.52	0.94	26.0	-10	0.48		
Type: 2" PVC	3	6.55	0.99	26.3	-10	0.97		
Total Well Depth (TD): 11.02	4	6.50	1.04	25.9	-10	0.21		
Static Water Level (WL): 1.23								
One Casing Volume(gal/L): 1.6								
Start Purge (hrs): 1045								
End Purge (hrs): 1200								
Total Purge Time (min): 75 min								
Total Vol. Purged (gal/L): ~4.5 gal								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL Volatiles	HCl/4°C	(3) 40 mL vials	yes
Dissolved Methane	HCl/4°C	(3) 40 mL vials	
Lead	HNO3/4°C	(1) 250 mL plastic	
PAHs	4°C	(2) 1 L Amber	
Anions	4°C	(1) 500 mL plastic	

OBSERVATIONS / NOTES:

11.02
1.23
9.79

9.79

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

GROUNDWATER SAMPLE LOG SHEET

Page___ of ___

Project Site Name: CNC 25
Project No.:

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 25GLM0301
Sample Location: MW-3
Sampled By: R.M
C.O.C. No.:
Type of Sample:
[] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Date: 9-12-99	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	%	NA
Time: 1310								
Method: Slow Purge	See	Below						

PURGE DATA:

	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Date: 9-12-99								
Method: Slow Purge	Initial	4.87	1.22	29.3	377	1.76		
Monitor Reading (ppm):	1	5.38	1.06	29.7	60	1.69		
Well Casing Diameter & Material	2	5.20	1.14	29.5	28	1.88		
Type:	3	5.08	1.23	29.9	25	1.40		
Total Well Depth (TD): 12.35								
Static Water Level (WL): 5.90								
One Casing Volume(gal/L): 1.06								
Start Purge (hrs): 1145								
End Purge (hrs): 1400	1300							
Total Purge Time (min):								
Total Vol. Purged (gal/L): 4.00	gals							

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected

OBSERVATIONS / NOTES:

Circle if Applicable:		Signature(s):
MS/MSD	Duplicate ID No.:	

GROUNDWATER SAMPLE LOG SHEET

Page___ of ___

Project Site Name: CNC25
Project No.:

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 25GLM0401
Sample Location: MW-4
Sampled By: RN
C.O.C. No.:
Type of Sample:
[] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 9-13-99	Color	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Time: 1140	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	%	NA
Method: Grouping	Clear	6.00	2.06	28.6	Ø	1.22		

PURGE DATA:

Date: 9-13-99	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: Slow Purge	Initial	5.93	2.04	27.4	49	1.40		
Monitor Reading (ppm):	~~1~~	~~5.58~~	~~1.16~~	~~28.3~~	~~4~~	~~1.21~~	~~OVM~~	
Well Casing Diameter & Material	1	5.91	1.40	28.3	Ø	1.20		
Type: 2" PVC.	2	5.95	1.56	28.6	Ø	1.18		
Total Well Depth (TD): 12.16'	3	6.00	2.03	28.6	Ø	1.22		
Static Water Level (WL): 5.95								
One Casing Volume(gal/~~l~~): 1.0								
Start Purge (hrs): 0952								
End Purge (hrs): 1057								
Total Purge Time (min):								
Total Vol. Purged (gal/~~l~~): 3.5								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
BTEX, MTBE, EDB, Naph PAH's.	HCl	3X 40ml Vials	9-13-99
	—	2X 1L amber	"

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD	Duplicate ID No.:	Signature(s):

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Zone F
Project No.: 0017

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 25GLM0701-501
Sample Location: CNC 25 MW-3-5
Sampled By: JA/JE
C.O.C. No.:
Type of Sample:
[] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 9-21-99	Color	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Time: 1705	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	%	NA
Method: Peristaltic	clear	5.35	0.269	29.7	0	5.45	—	—

PURGE DATA:

Date: 9-21-99	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: Peristaltic	Initial	5.11	0.194	29.9	0	0.57		
Monitor Reading (ppm): —	1	5.11	0.198	30.3	0	1.07		
Well Casing Diameter & Material	2	5.31	0.248	29.8	0	0.86		
Type: 4" PVC	3	5.29	0.272	28.8	0	2.92		
Total Well Depth (TD): 12.35	3.5 gal JE	5.33	0.269	29.7	0	3.45		
Static Water Level (WL): 4.54								
One Casing Volume(gal/L): 4.9 gal								
Start Purge (hrs): 1522								
End Purge (hrs): 1716								
Total Purge Time (min): 114 min								
Total Vol. Purged (gal/L): 18 gal								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL Volatiles	HCl/4°C	(3) 40 mL vials	yes
Dissolved Methane	HCl/4°C	(3) 40 mL vials	
Lead	HNO_3/4°C	(1) 250mL ~~[illegible]~~ plastic	
PAHs	4°C	(2) 1 L Amber	
Anions	4°C	(1) 500 mL ~~[illegible]~~ plastic	

OBSERVATIONS / NOTES:

product sheen on the surface of the purge water bucket

Circle if Applicable:

MS/MSD	Duplicate ID No.: ~~25 GLM~~ 25GLM0501D

Signature(s):

GROUNDWATER SAMPLE LOG SHEET

Page___ of ___

Project Site Name: GNC25
Project No.:

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 25GMO601
Sample Location: MW-6
Sampled By: RN
C.O.C. No.:
Type of Sample:
[] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Date: 9-12-99	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	%	NA
Time: 1630								
Method: Sequing	See Below							

PURGE DATA:

Date: 9-12-99	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: Slow Purge	Initial	6.75	1.39	26.8	17	4.35		
Monitor Reading (ppm):	1	6.36	6.89	25.9	12	1.46		
Well Casing Diameter & Material	2	6.33	5.44	25.5	27	1.52		
Type: 2" PVC	3	6.47	5.72	25.7		1.67		
Total Well Depth (TD): 26.15								
Static Water Level (WL): 6.00'								
One Casing Volume(gal/L): 3.3 gal								
Start Purge (hrs): 1140								
End Purge (hrs):								
Total Purge Time (min):								
Total Vol. Purged (gal/L):								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected

OBSERVATIONS / NOTES:

Circle If Applicable:

MS/MSD	Duplicate ID No.:	Signature(s):

GROUNDWATER SAMPLE LOG SHEET

Page___ of ___

Project Site Name: CNC 25
Project No.:

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 25GAM0701
Sample Location: MW-7
Sampled By: RN
C.O.C. No.:
Type of Sample:
[] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 9-13-99	Color	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Time: 1115	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	%	NA
Method: Gopump	Clear	5.56	1.18	28.6	Ø	1.10		

PURGE DATA:

Date: 9-13-99	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: Slow Purge	Initial	5.56	2.56	27.9	418	1.16		
Monitor Reading (ppm):	1	5.58	1.16	28.3	4	1.21		
Well Casing Diameter & Material	2	5.57	1.27	28.5	2	1.07		
Type: 2" PVC	3	5.56	1.18	28.6	2	1.11		
Total Well Depth (TD): 12.30								
Static Water Level (WL): 6.50								
One Casing Volume(gal/L): .98								
Start Purge (hrs): 0949								
End Purge (hrs): 1048								
Total Purge Time (min):								
Total Vol. Purged (gal/L): 3 gal.								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
BTEX, MTBE, EDB, Naph	HCl	3 x 40 ml vials	9-13-99
Dissolved Methane	HCl	" " "	"
PAH	—	2 x 1 L amber	"
Anions	—	1 x 500 ml plastic	"
Total Pb	HNO3	1 - 250 ml "	"

Resampled 9/21/99

OBSERVATIONS / NOTES:

Circle if Applicable:		Signature(s):
MS/MSD	Duplicate ID No.:	

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Cove F
Project No.: 0219

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 25GLM0701
Sample Location: CNC 25 MW7
Sampled By: JA/JE
C.O.C. No.:
Type of Sample:
[] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 9-21-99	Color	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Time: —	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	%	NA
Method: Peristaltic	clear	5.33	0.686	29.2	0	5.88	—	—

PURGE DATA:

Date: 9-21-99	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: Peristaltic	Initial	5.62	2.50	28.4	95	5.03		
Monitor Reading (ppm): —	1	5.33	0.774	29.2	0	4.08		
Well Casing Diameter & Material	2	5.31	0.735	29.2	0	4.62		
Type: 2" PVC	3	5.33	0.686	29.2	0	5.88		
Total Well Depth (TD): 12.36								
Static Water Level (WL): 6.44								
One Casing Volume(gal/L): 1 gal								
Start Purge (hrs): 1513								
End Purge (hrs): 1540								
Total Purge Time (min): ~27 min								
Total Vol. Purged (gal/L): ~4 gal								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL Volatiles	HCl/4°C	(3) 40 ml vials	yes
Dissolved methane	HCl/4°C	(3) 40 ml vials	↓
Lead	HNO_3/4°C	(1) 250 ml Poly plastic	↓
PAHs	4°C	(2) 1 L Amber	↓
Anions	4°C	(1) 500 ml plastic	↓

OBSERVATIONS / NOTES:

Sample Bottles were already taken in the previous session

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

GROUNDWATER SAMPLE LOG SHEET

Page___ of ___

Project Site Name: CNC25
Project No.:

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 25GLM0801
Sample Location: MW-8
Sampled By: R.H
C.O.C. No.:
Type of Sample:
[] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Date: 9-12-99	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	%	NA
Time: 2:55								
Method: Geopump	See	Below						

PURGE DATA:

	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Date: 9-12-99								
Method: Slow Purge	Initial	5.28	2.54	28.6	441	1.59		
Monitor Reading (ppm):	.1	~~5.38~~	~~1.06~~	~~29.2~~	~~60~~	~~1.69~~	1.04	
Well Casing Diameter & Material	1	5.59	2.18	28.7	38	1.59		
Type: 2" PVC.	2	5.41	2.32	28.5	35	1.54		
Total Well Depth (TD): 12.20	3	5.36	2.40	28.7	35	1.53		
Static Water Level (WL): 3.85								
One Casing Volume(gal/L): 1.38								
Start Purge (hrs): 1212								
End Purge (hrs): 1317								
Total Purge Time (min):								
Total Vol. Purged (gal/L): 4.00	Gals.							

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
BTEX, MTBE, EDB, Naph	HCl	3 X 40ml vials	9-12-99
PAH		2 X 1L ambers	"
Total Lead	HNO_3	1 X 250ml plastic	"

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Zone F
Project No.: 0219

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 25GL-X0201
Sample Location: ~~GW25-X02~~ 609002
Sampled By: JA/JE
C.O.C. No.:
Type of Sample:
[] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Date: 9-21-99	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	%	NA
Time: 1615								
Method: Peristaltic	clear orange	6.70	4.09	26.0	3	0.11	—	—

PURGE DATA:

	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Date: 9-21-99								
Method: Peristaltic	Initial	6.43	2.98	26.3	18	0.78	0.14	—
Monitor Reading (ppm): —	1	6.51	2.27	27.3	6	0.30	0.10	—
Well Casing Diameter & Material	2	6.64	3.39	26.5	71	0.45	0.18	turned pump down bl if was drawin down
Type: 2" PVC	~~3~~	stop pump at 1200						
Total Well Depth (TD): 11.59		restart at 1313						
Static Water Level (WL): ~~5.49~~	3.65							
One Casing Volume (gal/L): 1.5 gal	1 3	6.83	3.69	26.4	137	4.23	stop pump at 1334	
Start Purge (hrs): 1040	4	6.70	4.09	26.0	3	0.11	—	—
End Purge (hrs): 1609								
Total Purge Time (min): ~2hrs								
Total Vol. Purged (gal/L): ~4 gal								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL Volatiles	HCl/4°C	(3) 40 ml vials	yes
PNAs	4°C	(2) 1L Amber	yes
Lead	HNO_3/4°C	(1) 250 ml plastic	yes
~~NA Parameters~~			
~~TCL Volatiles~~			
~~Lead~~			

OBSERVATIONS / NOTES:

Well continued to run dry after stopping & restarting the pump 4 times--we sampled

Circle if Applicable:

MS/MSD	Duplicate ID No.:	Signature(s):

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Zone F
Project No.: 0219

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 25GLX04101
Sample Location: ~~EW25MW09~~ 09004
Sampled By: JA/JE
C.O.C. No.:
Type of Sample:
[] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color Visual	pH Standard	S.C. mS/cm	Temp. Degrees C	Turbidity NTU	DO mg/l	Salinity %	Other NA
Date: 9-21-99								
Time: 1210								
Method: Peristaltic	slightly cloudy	6.45	0.98	26.6	75	1.77	0.04	—

PURGE DATA:

	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Date: 9-21-99								
Method: Peristaltic	Initial	6.51	0.91	26.8	0	1.60	0.03	—
Monitor Reading (ppm): —	1	6.49	1.02	26.9	0	0.29	0.04	—
Well Casing Diameter & Material	2	6.48	0.98	26.5	243	1.54	0.04	turned pump down bcs it was drawing down
Type: 2" PVC	3	6.45	0.98	26.6	75	1.77	0.04	
Total Well Depth (TD): 13.07								
Static Water Level (WL): 4.62								
One Casing Volume(gal/L): 5.2L/1.2Gal								
Start Purge (hrs): 1040								
End Purge (hrs): 1200								
Total Purge Time (min): 80 min								
Total Vol. Purged (gal/L): ~5gal								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL Volatiles	HCl/4°C	(3) 40 mL vials	yes
PAHs	4°C	(2) 1 L Amber	yes
Lead	HNO_3/4°C	(1) 250 mL Plastic	yes
~~NA Parameters~~			
~~TCL Volatiles~~ JE	~~HCl/4°C~~	~~(3) 40 mL vials~~	~~yes~~
~~Lead~~	~~HNO_3/4°C~~	~~(1) 250 mL Plastic~~	~~yes~~
~~Anions~~	~~4°C~~	~~(1) mL Plastic~~	~~yes~~

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

APPENDIX B

ANALYTICAL LABORATORY DATA
SOIL AND GROUNDWATER

Katahdin
ANALYTICAL SERVICES

Site 25
GW
MW-03
-04
-06
-07
-08

October 13, 1999

Mr. Paul Calligan
Tetra Tech Nus
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

RE: Katahdin Lab Number: WP3906
Project ID: CNC Charleston
Project Manager: Ms. Andrea J.Colby
Sample Receipt Date(s): 9/14/99

Dear Mr. Calligan:

Please find enclosed the following information:

* Report of Analysis
* Quality Control Data Summary
* Chain of Custody
* Confirmation

Should you have any questions or comments concerning this Report of Analysis, please do not hesitate to contact the project manager listed above. This cover letter is an integral part of the ROA.

We appreciate your continued use of our laboratory and look forward to working with you in the future. The following signature indicates technical review and acceptance of the data.

Sincerely,

KATAHDIN ANALYTICAL SERVICES

Patricia Homey
Authorized Signature

10/13/99
Date

340 County Road No. 5
P.O. Box 720, Westbrook, ME 04098
Tel: (207) 874-2400 Fax: (207) 775-4029

http://katahdinlab.com

210 West Road No. 5, Portsmouth, NH 03801
Tel: (603) 431-5777 Fax: (603) 436-3356

Katahdin
ANALYTICAL SERVICES

SDG NARRATIVE
KATAHDIN ANALYTICAL SERVICES
TETRA TECH NUS
CASE CNC CHARLESTON

Sample Receipt

The following samples were received on September 14, 1999 and were logged in under Katahdin Analytical Services work order number WP3906 for a hardcopy due date of October 14, 1999.

KATAHDIN Sample No.	TTNUS Sample Identification
WP3906-1	36GLM0101
WP3906-2	36GLO680004
WP3906-3	36GLM0701
WP3906-4	36GLM0401
WP3906-5	36GLM0501
WP3906-6	42GLM0401
WP3906-7	42GLM0301
WP3906-8	42GLM0201
WP3906-9	42GLM0501
WP3906-10	42GLM1401
WP3906-11	42GLM1701
WP3906-12	42GLM1501
WP3906-13	42GLM1601
WP3906-14	36GLM0201D
WP3906-15	22GLM0101
WP3906-16	22GLM0201
WP3906-17	22GLM0501
WP3906-18	22GLM0701
WP3906-19	42GLM1001
WP3906-20	42GLM1201
WP3906-21	42GLM0801
WP3906-22	42GLM0601
WP3906-23	42GLM0701D
WP3906-24	42GLM0101D
WP3906-25	42GLM1801
WP3906-26	42TL00101
WP3906-27	23TL00201
WP3906-28	36GLM0601
WP3906-29	36GLM0201
WP3906-30	36GLM0301
WP3906-31	42GLM0701
WP3906-32	42GLM0901
WP3906-33	42GLM1101
WP3906-34	42GLM0101

WP3906-35	42GLM1301
WP3906-36	23GLM0401
WP3906-37	23GLX0301
WP3906-38	23GLX0401
WP3906-39	23GLX0401D
WP3906-40	23GLM05D01
WP3906-41	23GLM0101
WP3906-42	25GLM0301
WP3906-43	25GLM0801
WP3906-44	25GLM0601
WP3906-45	25GLM0401
WP3906-46	25GLM0701
WP3906-47	16GLM7D01
WP3906-48	26GLP1201
WP3906-49	26GLP1301

The samples were logged in for the analyses specified on the chain of custody form. All problems encountered and resolved during sample receipt have been documented on the applicable chain of custody forms.

Sample analyses have been performed by the methods as noted herein.

Volatile Organic Analysis

Forty-seven aqueous samples were received by the Katahdin Analytical Services, Inc. GC/MS laboratory on September 14, 1999 and were specified to be analyzed by USEPA method 8260B for the analytes benzene, toluene, ethylbenzene, xylenes, MTBE, naphthalene, and EDB.

Analyses for this workorder were performed on the 5973-U and 5970-Q instruments. A VSTD050 (50 ppb standard) was used for the continuing calibration standard. Internal standard and surrogate compounds were also spiked at 50 ppb.

Batch QC (VBLK, and LCS) was performed in each twelve-hour window. Results are included in this data package. The LCS QC samples were spiked with the entire list of compounds quantitated for at 50 ppb. Matrix spike/matrix spike duplicate analyses were performed on samples WP3906-5, -17, and -19.

Analyses of samples WP3906-10, -11, and -13 yielded concentrations of 1,2-dichloroethene (cis) over the upper limit of the calibration curve. Since this was not a requested analyte to be reported by the client, no laboratory action was taken.

Analysis of sample WP3906-19 was performed at a 1:5 dilution due to naphthalene concentrations, resulting in elevated reporting limits.

The initial analysis of sample WP3906-30 was performed outside of the twelve hour BFB tuning window. This was recognized during data review, and the subsequent reanalysis was outside of analytical holding times. Only the reanalysis performed outside of holding times is included in this data package.

Initial analyses of samples WP3906-36 and -44 yielded concentrations of target analytes over the upper limit of the calibration curve. Reanalyses occurred at 1:50 and 1:5 dilutions, respectively. Both sets of data for each sample are included in the data package.

Analysis of the QC samples WP3906-19MS/MSD yielded target analyte concentrations over the upper limit of the calibration curve. In accordance with the method, no laboratory action was taken with these samples.

Several manual integrations were performed due to split peaks; all have been flagged with a "M" (software-generated) on the pertinent quantitation reports. All "M" flags have been dated and initialed by the analyst performing the integration. In addition, all "M" flags have been reviewed and approved by the GC/MS supervisor. Copies of each manual integration are included in the pertinent quantitation reports.

No other protocol deviations were noted by the volatile organics staff.

Semivolatile Organic Analysis

Twenty-three aqueous samples were received by Katahdin Analytical Services laboratory on September 14, 1999 for analysis in accordance with 8270C for a client specified PAH list of analytes.

Extraction of samples WP3906 3-12 and 15-18 occurred following USEPA method 3510 on September 16, 1999. A laboratory control spike/laboratory control spike duplicate pair was extracted in the batch. Samples WP3906-13 and -19-25 were extracted following USEPA method 3510 on September 17, 1999. A laboratory control sample, along with a site-specific MS/MSD pair on sample WP3906-19, was extracted in this batch. The remaining sample, WP3906-14, was extracted following USEPA method 3510 on September 20, 1999. A laboratory control sample was also extracted in this batch.

Analysis of sample WP3906-19 yielded a concentration of the analyte naphthalene over the upper limit of the calibration curve. Reanalysis occurred at a 1:2 dilution successfully. Both sets of data for this sample are included in this data package.

Initial analysis of sample WP3906-22 yielded internal standard area recovery deviations. Reanalysis yielded similar results, confirming matrix interference. Both sets of data are included in this data package.

Several manual integrations were performed due to split peaks; all have been flagged with a "M" by the data system. All manual integrations have been dated and initialed by the responsible analyst. Copies of each manual integration are included in the data package. All manual integrations have been reviewed and approved by the GC/MS supervisor.

No other protocol deviations were noted by the semivolatiles organics staff.

Katahdin
ANALYTICAL SERVICES

Metals Analysis

The samples of Katahdin Work Order WP3906 were prepared and analyzed for metals in accordance with the "Test Methods for Evaluating Solid Waste", SW-846, November 1986, Third Edition.

Inductively-Coupled Plasma (ICP) Atomic Emission Spectroscopic Analysis

Aqueous-matrix Katahdin Sample Nos. WP3906- (1-25, 28-46) were digested for ICP analysis on 09/17/99 (QC Batch PI17ICW0), 09/21/99 (QC Batch PI21ICW0), and 09/22/99 (QC Batch PI22ICW0) in accordance with USEPA Method 3010A. Katahdin Sample Nos. WP3906- (19, 46) were prepared with duplicate matrix-spiked aliquots during digestion.

ICP analyses of Katahdin Work Order WP3906 sample digestates were performed in accordance with USEPA Method 6010B, using a Thermo Jarrell Ash (TJA) Trace ICP spectrometer and a TJA 61 ICP spectrometer. All samples were analyzed within holding times and all QC criteria were met with the following comments or exceptions:

Some of the results for run QC samples (ICV, ICB, CCV, CCB, ICSA, and ICSAB) included in the accompanying data package may have exceeded acceptance limits for some elements. Please note that all client samples and batch QC samples associated with out-of-control results for run QC samples were subsequently reanalyzed for the analytes in question.

Analysis of Mercury by Cold Vapor Atomic Absorption (CVAA) Spectrophotometry

Aqueous-matrix Katahdin Sample Nos. WP3906- (1-25, 28-35) were digested for mercury analysis on 09/22/99 (QC Batch PI22HGW0), 09/25/99 (QC Batch PI25HGW0), and 09/27/99 (QC Batch PI27HGW0) in accordance with USEPA Method 7470A. Katahdin Sample No. WP3906-1 was prepared with a single matrix-spiked aliquot, and Katahdin Sample Nos. WP3906- (19, 21) were prepared with duplicate matrix-spiked aliquots during digestion.

Mercury analyses of Katahdin Work Order WP3906 sample digestates were performed using a Leeman Labs PS200 automated mercury analyzer. All samples were analyzed within holding times and all run QC criteria were met.

Wet Chemistry Analysis

Due to IC instrument failure, alternate methods were approved for work order WP3906 by Kelly Johnson-Carper for the analysis of nitrate and sulfate. Nitrate analyses (353.2) and Sulfate analyses (375.4) were performed according to the U.S. EPA, Methods for Analysis of Water and Wastes, EPA 600/4-79-020, 1979, Revised 1983. Nitrate analyses (E300) were performed according to the U.S. EPA "Methods for the Determination of Inorganic Substances in Environmental Samples", EPA 600/R-93/100, August 1993. All samples were analyzed within analytical hold times.

The Wet Chemistry staff noted no protocol deviations.

KATAHDIN ANALYTICAL SERVICES, INC.
SAMPLE RECEIPT CONDITION REPORT
Tel. (207) 874-2400
Fax (207) 775-4029

LAB (WORK ORDER) # WP3906

PAGE: 1 OF 12

COOLER: 1 OF 12

CLIENT: Tetratech NUS

COC# –
SDG# –
DATE / TIME RECEIVED: 09-14-99 ~ 0900
DELIVERED BY: FEDEX
RECEIVED BY: BKR
LIMS ENTRY BY: BEM
LIMS REVIEW BY / PM: ASC

PROJECT: CNC CHARLESTON

	YES	NO	EXCEPTIONS	COMMENTS	RESOLUTION
1. CUSTODY SEALS PRESENT / INTACT?	☑	☐	☐		
2. CHAIN OF CUSTODY PRESENT IN THIS COOLER?	☑	☐	☐		
3. CHAIN OF CUSTODY SIGNED BY CLIENT?	☑	☐	☐		
4. CHAIN OF CUSTODY MATCHES SAMPLES?	☑	☐	☐		
5. TEMPERATURE BLANKS PRESENT?	☑	☐	☐	TEMP BLANK TEMP (°C)= 2.1	
6. SAMPLES RECEIVED AT 4°C +/- 2? (ICE) ICE PACKS PRESENT (Y) or N?	☑	☐	☐	COOLER TEMP (°C)= NA (RECORD COOLER TEMP ONLY IF TEMP BLANK IS NOT PRESENT)	
7. VOLATILES FREE OF HEADSPACE?	☑	☐	☐		
8. TRIP BLANK PRESENT IN THIS COOLER	☑	☐	☐		
9. PROPER SAMPLE CONTAINERS AND VOLUME?	☑	☐	☐		
10. SAMPLES WITHIN HOLD TIME UPON RECEIPT?	☑	☐	☐		
11. SAMPLES PROPERLY PRESERVED[1]?	☐	☑	☐		
12. CORRECTIVE ACTION REPORT FILED?	☐	☑	N/A		

13. ANALYTICAL PROGRAMS (CIRCLE ONE) COMMERCIAL CLP HAZWRAP (NFESC) ACOE AFCEE OTHER (STATE OF ORIGIN):

LOG-IN NOTES[1]: HNO_3 added to metals aliquot to bring pH <2 : 426LM1001, 366LM0301, 426LM0701, 426LM0901, 426LM1101, 366LM0601, 366LM0201, 366LM0701, 366LM0401, 366LM0101, 366L0680004, 426LM0701D

(1) Use this space (and additional sheets if necessary) to document samples that are received broken or compromised, C-O-C discrepancies, radiation checks, residual chlorine check, results of pH check if required. If samples required pH adjustment, record volume and type of preservative added.

00000219

KATAHDIN ANALYTICAL SERVICES, INC.
SAMPLE RECEIPT CONDITION REPORT
Tel. (207) 874-2400
Fax (207) 775-4029

LAB (WORK ORDER) # WD3906

PAGE: 2 OF 12

COOLER: 2 OF 12

COC# –
SDG# –
DATE / TIME RECEIVED: 09-14-99 ~ 0900
DELIVERED BY: FEDEX
RECEIVED BY: BKR
LIMS ENTRY BY: BKR
LIMS REVIEW BY / PM: AJC

CLIENT: Tetratech NUS

PROJECT: CNC CHARLESTON

	YES	NO	EXCEPTIONS	COMMENTS	RESOLUTION
1. CUSTODY SEALS PRESENT / INTACT?	☑	☐	☐		
2. CHAIN OF CUSTODY PRESENT IN THIS COOLER?	☑	☐	☐		
3. CHAIN OF CUSTODY SIGNED BY CLIENT?	☑	☐	☐		
4. CHAIN OF CUSTODY MATCHES SAMPLES?	☐	☑	☐		
5. TEMPERATURE BLANKS PRESENT?	☑	☐	☐	TEMP BLANK TEMP (°C)= 1.3	AJC notified Jeff Alexander 9/14/99
6. SAMPLES RECEIVED AT 4°C +/- 2? ICE ICE PACKS PRESENT Y or N?	BKR ☑	☑	☐	COOLER TEMP (°C)= NA (RECORD COOLER TEMP ONLY IF TEMP BLANK IS NOT PRESENT)	
7. VOLATILES FREE OF HEADSPACE?	☑	☐	☐		
8. TRIP BLANK PRESENT IN THIS COOLER	☐	☑	☐		
9. PROPER SAMPLE CONTAINERS AND VOLUME?	☑	☐	☐		
10. SAMPLES WITHIN HOLD TIME UPON RECEIPT?	☑	☐	☐		
11. SAMPLES PROPERLY PRESERVED[1]?	BKR ☑	☑	☐		
12. CORRECTIVE ACTION REPORT FILED?	☐	☑	N/A		

13. ANALYTICAL PROGRAMS (CIRCLE ONE) COMMERCIAL CLP HAZWRAP NFESC ACOE AFCEE OTHER (STATE OF ORIGIN):

LOG - IN NOTES[1]:
* Sample matching discussed w/ P.M
No containers for 226LM0201D – Jeff Alexander said to cross off COC
Received Pb bottle for 256LM0401 – Jeff Alexander said to add to COC

(1) Use this space (and additional sheets if necessary) to document samples that are received broken or compromised, C-O-C discrepancies, radiation checks, residual chlorine check, results of pH check if required. If samples required pH adjustment, record volume and type of preservative

0000220

KATAHDIN ANALYTICAL SERVICES, INC.
SAMPLE RECEIPT CONDITION REPORT
Tel. (207) 874-2400
Fax (207) 775-4029

LAB (WORK ORDER) # W03906

PAGE: 3 OF 12

COOLER: 3 OF 12

COC# —
SDG# —
DATE / TIME RECEIVED: 09-14-99 ~ 0900
DELIVERED BY: FEDEX
RECEIVED BY: BKR
LIMS ENTRY BY: BEH
LIMS REVIEW BY / PM: KJC

CLIENT: Tetratech NUS

PROJECT: CNC CHARLESTON

	YES	NO	EXCEPTIONS	COMMENTS	RESOLUTION
1. CUSTODY SEALS PRESENT / INTACT?	☑	☐	☐		
2. CHAIN OF CUSTODY PRESENT IN THIS COOLER?	☐	☑	☐		
3. CHAIN OF CUSTODY SIGNED BY CLIENT?	☑	☐	☐		
4. CHAIN OF CUSTODY MATCHES SAMPLES?	☐	☐	☐		
5. TEMPERATURE BLANKS PRESENT?	☑	☐	☐	TEMP BLANK TEMP (°C)= 2.6	
6. SAMPLES RECEIVED AT 4°C +/- 2? ICE ICE PACKS PRESENT Y or N?	☑	☐	☐	COOLER TEMP (°C)= NA (RECORD COOLER TEMP ONLY IF TEMP BLANK IS NOT PRESENT)	
7. VOLATILES FREE OF HEADSPACE?	☑	☐	☐		
8. TRIP BLANK PRESENT IN THIS COOLER	☐	☑	☐		
9. PROPER SAMPLE CONTAINERS AND VOLUME?	☑	☐	☐		
10. SAMPLES WITHIN HOLD TIME UPON RECEIPT?	☑	☐	☐		
11. SAMPLES PROPERLY PRESERVED[1]? BP	☑	☑	☐		
12. CORRECTIVE ACTION REPORT FILED?	☐	☑	N/A		

13. ANALYTICAL PROGRAMS (CIRCLE ONE) COMMERCIAL CLP HAZWRAP NFESC ACOE AFCEE OTHER (STATE OF ORIGIN):

LOG - IN NOTES[1]:

[1] Use this space (and additional sheets if necessary) to document samples that are received broken or compromised, C-O-C discrepancies, radiation checks, residual chlorine check, re of pH check if required. If samples required pH adjustment, record volume and type of preservative a

0000221

KATAH..N ANALYTICAL SERVICES, INC.
SAMPLE RECEIPT CONDITION REPORT
Tel. (207) 874-2400
Fax (207) 775-4029

LAB (WORK ORDER) # WD3906

PAGE: 4 OF 12

COOLER: 4 OF 12

CLIENT: Tetratech NUS

COC# —
SDG#
DATE / TIME RECEIVED: 09-14-99 ~ 0900
DELIVERED BY: FED EX
RECEIVED BY: BKR
LIMS ENTRY BY: BKR
LIMS REVIEW BY / PM: KJC

PROJECT: CNC CHARLESTON

	YES	NO	EXCEPTIONS	COMMENTS	RESOLUTION
1. CUSTODY SEALS PRESENT / INTACT?	☑	☐	☐		
2. CHAIN OF CUSTODY PRESENT IN THIS COOLER?	☐	☑	☐		
3. CHAIN OF CUSTODY SIGNED BY CLIENT?	☑	☐	☐		
4. CHAIN OF CUSTODY MATCHES SAMPLES?	☐	☑	☐		
5. TEMPERATURE BLANKS PRESENT?	☑	☐	☐	TEMP BLANK TEMP (°C)= 2.0	
6. SAMPLES RECEIVED AT 4°C +/- 2? ICE ICE PACKS PRESENT Y or N?	☑	☐	☐	COOLER TEMP (°C)= NA (RECORD COOLER TEMP ONLY IF TEMP BLANK IS NOT PRESENT)	
7. VOLATILES FREE OF HEADSPACE?	☑	☐	☐		
8. TRIP BLANK PRESENT IN THIS COOLER	☑	☐	☐		
9. PROPER SAMPLE CONTAINERS AND VOLUME?	☑	☐	☐		
10. SAMPLES WITHIN HOLD TIME UPON RECEIPT?	☑	☐	☐		
11. SAMPLES PROPERLY PRESERVED[1]?	☐	☑	☐		
12. CORRECTIVE ACTION REPORT FILED?	☑	☑	N/A		

13. ANALYTICAL PROGRAMS (CIRCLE ONE) COMMERCIAL CLP HAZWRAP NFESC ACOE AFCEE OTHER (STATE OF ORIGIN):

LOG - IN NOTES[1]:

(1) Use this space (and additional sheets if necessary) to document samples that are received broken or compromised, C-O-C discrepancies, radiation checks, residual chlorine check, results of pH check if required. If samples required pH adjustment, record volume and type of preservative ad

0000222

KATAHDIN ANALYTICAL SERVICES, INC.
SAMPLE RECEIPT CONDITION REPORT
Tel. (207) 874-2400
Fax (207) 775-4029

LAB (WORK ORDER) # WD3906

PAGE: 5 OF 12

COOLER: 5 OF 12

COC# –
SDG# –
DATE / TIME RECEIVED: 09-14-99 ~ 0900
DELIVERED BY: FED EX
RECEIVED BY: BKR
LIMS ENTRY BY: BKR
LIMS REVIEW BY / PM: AJL

CLIENT: Tetratech NUS

PROJECT: CNC CHARLESTON

	YES	NO	EXCEPTIONS	COMMENTS	RESOLUTION
1. CUSTODY SEALS PRESENT / INTACT?	☑	☐	☐		
2. CHAIN OF CUSTODY PRESENT IN THIS COOLER?	☐	☑	☐		
3. CHAIN OF CUSTODY SIGNED BY CLIENT?	☑	☐	☐		
4. CHAIN OF CUSTODY MATCHES SAMPLES?	☐	☑	☐		
5. TEMPERATURE BLANKS PRESENT?	☑	☐	☐	TEMP BLANK TEMP (°C)= 3.2	
6. SAMPLES RECEIVED AT 4°C +/- 2? ICE / ICE PACKS PRESENT (Y) or N?	☑	☐	☐	COOLER TEMP (°C)= NA (RECORD COOLER TEMP ONLY IF TEMP BLANK IS NOT PRESENT)	
7. VOLATILES FREE OF HEADSPACE?	☑	☐	☐		
8. TRIP BLANK PRESENT IN THIS COOLER	☐	☑	☐		
9. PROPER SAMPLE CONTAINERS AND VOLUME?	☑	☐	☐		
10. SAMPLES WITHIN HOLD TIME UPON RECEIPT?	☑	☐	☐		
11. SAMPLES PROPERLY PRESERVED[1]?	☐	☑	☐		
12. CORRECTIVE ACTION REPORT FILED?	☐	☑	N/A		

13. ANALYTICAL PROGRAMS (CIRCLE ONE) COMMERCIAL CLP HAZWRAP (NFESC) ACOE AFCEE OTHER (STATE OF ORIGIN):

LOG - IN NOTES[1]:

(1) Use this [illegible]ce (and additional sheets if necessary) to document samples that are received bro[illegible] compromised, C-O-C discrepancies, radiation checks, residual chlorine check, re[illegible] of pH check li[illegible]red. If samples required pH adjustment, record volume and type of preservative a[illegible]d.

0000223

KATAHDIN ANALYTICAL SERVICES, INC.
SAMPLE RECEIPT CONDITION REPORT
Tel. (207) 874-2400
Fax (207) 775-4029

LAB (WORK ORDER) # WD3906

PAGE: 6 OF 12

COOLER: 6 OF 12

COC# —
SDG# —
DATE / TIME RECEIVED: 09-14-99 ~ 0900
DELIVERED BY: FEDEX
RECEIVED BY: BKR
LIMS ENTRY BY: BKR
LIMS REVIEW BY / PM: AJC

CLIENT: Tetratech NUS

PROJECT: CNC CHARLESTON

	YES	NO	EXCEPTIONS	COMMENTS	RESOLUTION
1. CUSTODY SEALS PRESENT / INTACT?	☑	☐	☐		
2. CHAIN OF CUSTODY PRESENT IN THIS COOLER?	☐	☑	☐		
3. CHAIN OF CUSTODY SIGNED BY CLIENT?	☑	☐	☐		
4. CHAIN OF CUSTODY MATCHES SAMPLES?	☐	☑	☐		
5. TEMPERATURE BLANKS PRESENT?	☑	☐	☐	TEMP BLANK TEMP (°C)= 3.1	
6. SAMPLES RECEIVED AT 4°C +/- 2? ICE / ICE PACKS PRESENT Y or N?	☑	☐	☐	COOLER TEMP (°C)= NA (RECORD COOLER TEMP ONLY IF TEMP BLANK IS NOT PRESENT)	
7. VOLATILES FREE OF HEADSPACE?	☑	☐	☐		
8. TRIP BLANK PRESENT IN THIS COOLER	☐	☑	☐		
9. PROPER SAMPLE CONTAINERS AND VOLUME?	☑	☐	☐		
10. SAMPLES WITHIN HOLD TIME UPON RECEIPT?	☑	☐	☐		
11. SAMPLES PROPERLY PRESERVED[1]?	☐	☑	☐		
12. CORRECTIVE ACTION REPORT FILED?	☐	☑	N/A		

13. ANALYTICAL PROGRAMS (CIRCLE ONE) COMMERCIAL CLP HAZWRAP NFESC ACOE AFCEE OTHER (STATE OF ORIGIN):

LOG - IN NOTES[1]:

(1) Use this space (and additional sheets if necessary) to document samples that are received broken or compromised, C-O-C discrepancies, radiation checks, residual chlorine check, results of pH check if required. If samples required pH adjustment, record volume and type of preservative added.

0000224

KATAHDIN ANALYTICAL SERVICES, INC.
SAMPLE RECEIPT CONDITION REPORT
Tel. (207) 874-2400
Fax (207) 775-4029

LAB (WORK ORDER) # WP3906

PAGE: 7 OF 12

COOLER: 7 OF 12

COC#: –
SDG#: –
DATE / TIME RECEIVED: 09-14-99 ~ 0900
DELIVERED BY: FEDEX
RECEIVED BY: BKR
LIMS ENTRY BY: BEK
LIMS REVIEW BY / PM: AJC

CLIENT: Tetratech NUS

PROJECT: CNC CHARLESTON

	YES	NO	EXCEPTIONS	COMMENTS	RESOLUTION
1. CUSTODY SEALS PRESENT / INTACT?	☑	☐	☐		
2. CHAIN OF CUSTODY PRESENT IN THIS COOLER?	☐	☑	☐		
3. CHAIN OF CUSTODY SIGNED BY CLIENT?	☑	☐	☐		
4. CHAIN OF CUSTODY MATCHES SAMPLES?	☐	☑	☐		
5. TEMPERATURE BLANKS PRESENT?	☑	☐	☐	TEMP BLANK TEMP (°C)= 3.0	
6. SAMPLES RECEIVED AT 4°C +/- 2? ICE / ICE PACKS PRESENT Y or N?	☑	☐	☐	COOLER TEMP (°C)= NA (RECORD COOLER TEMP ONLY IF TEMP BLANK IS NOT PRESENT)	
7. VOLATILES FREE OF HEADSPACE?	☑	☐	☐		
8. TRIP BLANK PRESENT IN THIS COOLER	☐	☑	☐		
9. PROPER SAMPLE CONTAINERS AND VOLUME?	☑	☐	☐		
10. SAMPLES WITHIN HOLD TIME UPON RECEIPT?	☑	☐	☐		
11. SAMPLES PROPERLY PRESERVED[1]?	☐	☑	☐		
12. CORRECTIVE ACTION REPORT FILED?	☐	☑	N/A		

13. ANALYTICAL PROGRAMS (CIRCLE ONE) COMMERCIAL CLP HAZWRAP NFESC ACOE AFCEE OTHER (STATE OF ORIGIN):

LOG - IN NOTES[1]:

(1) Use th[illegible]ce (and additional sheets if necessary) to document samples that are received br[illegible] or compromised, C-O-C discrepancies, radiation checks, residual chlorine check, re[illegible]s of pH check [illegible]uired. If samples required pH adjustment, record volume and type of preservative added.

0000225

KATAHDIN ANALYTICAL SERVICES, INC.
SAMPLE RECEIPT CONDITION REPORT
Tel. (207) 874-2400
Fax (207) 775-4029

LAB (WORK ORDER) # W03906

PAGE: 8 OF 12

COOLER: 8 OF 12

COC# —
SDG# —
DATE / TIME RECEIVED: 09-14-99 ~ 0900
DELIVERED BY: FEDEX
RECEIVED BY: BKR
LIMS ENTRY BY: BKR
LIMS REVIEW BY / PM: ATC

CLIENT: Tetratech NUS

PROJECT: CNC CHARLESTON

	YES	NO	EXCEPTIONS	COMMENTS	RESOLUTION
1. CUSTODY SEALS PRESENT / INTACT?	☑	☐	☐		
2. CHAIN OF CUSTODY PRESENT IN THIS COOLER?	☐	☑	☐		
3. CHAIN OF CUSTODY SIGNED BY CLIENT?	☑	☐	☐		
4. CHAIN OF CUSTODY MATCHES SAMPLES?	☐	☑	☐		
5. TEMPERATURE BLANKS PRESENT?	☑	☐	☐	TEMP BLANK TEMP (°C)= 2.2	
6. SAMPLES RECEIVED AT 4°C +/- 2? ICE / ICE PACKS PRESENT (Y) or N?	☑	☐	☐	COOLER TEMP (°C)= NA (RECORD COOLER TEMP ONLY IF TEMP BLANK IS NOT PRESENT)	
7. VOLATILES FREE OF HEADSPACE?	☑	☐	☐		
8. TRIP BLANK PRESENT IN THIS COOLER	☐	☑	☐		
9. PROPER SAMPLE CONTAINERS AND VOLUME?	☑	☐	☐		
10. SAMPLES WITHIN HOLD TIME UPON RECEIPT?	☑	☐	☐		
11. SAMPLES PROPERLY PRESERVED[1]?	☐	☑	☐		
12. CORRECTIVE ACTION REPORT FILED?	☐	☑	N/A		

13. ANALYTICAL PROGRAMS (CIRCLE ONE) COMMERCIAL CLP HAZWRAP (NFESC) ACOE AFCEE OTHER (STATE OF ORIGIN):

LOG - IN NOTES[1]:

(1) Use this space (and additional sheets if necessary) to document samples that are received broken or compromised, C-O-C discrepancies, radiation checks, residual chlorine check, results of pH check if required. If samples required pH adjustment, record volume and type of preservative used.

0000226

KATAHDIN ANALYTICAL SERVICES, INC.
SAMPLE RECEIPT CONDITION REPORT
Tel. (207) 874-2400
Fax (207) 775-4029

LAB (WORK ORDER) # WD3906

PAGE: 9 OF 12

COOLER: 9 OF 12

COC# —
SDG# —
DATE / TIME RECEIVED: 09-14-99 ~ 0900
DELIVERED BY: FED EX
RECEIVED BY: BVR
LIMS ENTRY BY: BKR
LIMS REVIEW BY / PM: ASC

CLIENT: Tetratech NUS

PROJECT: CNC CHARLESTON

	YES	NO	EXCEPTIONS	COMMENTS	RESOLUTION
1. CUSTODY SEALS PRESENT / INTACT?	☑	☐	☐		
2. CHAIN OF CUSTODY PRESENT IN THIS COOLER?	☐	☑	☐		
3. CHAIN OF CUSTODY SIGNED BY CLIENT?	☑	☐	☐		
4. CHAIN OF CUSTODY MATCHES SAMPLES?	☐	☑	☐		
5. TEMPERATURE BLANKS PRESENT?	☑	☐	☐	TEMP BLANK TEMP (°C)= 21	
6. SAMPLES RECEIVED AT 4°C +/- 2? ICE / ICE PACKS PRESENT Y or N?	☑	☐	☐	COOLER TEMP (°C)= NA (RECORD COOLER TEMP ONLY IF TEMP BLANK IS NOT PRESENT)	
7. VOLATILES FREE OF HEADSPACE?	☑	☐	☐		
8. TRIP BLANK PRESENT IN THIS COOLER	☐	☑	☐		
9. PROPER SAMPLE CONTAINERS AND VOLUME?	☑	☐	☐		
10. SAMPLES WITHIN HOLD TIME UPON RECEIPT?	☑	☐	☐		
11. SAMPLES PROPERLY PRESERVED[1]?	☐	☑	☐		
12. CORRECTIVE ACTION REPORT FILED?	☐	☑	N/A		

13. ANALYTICAL PROGRAMS (CIRCLE ONE) COMMERCIAL CLP HAZWRAP NFESC ACOE AFCEE OTHER (STATE OF ORIGIN):

LOG - IN NOTES[1]:

(1) Use this space (and additional sheets if necessary) to document samples that are received broken or compromised, C-O-C discrepancies, radiation checks, residual chlorine check, results of pH check if required. If samples required pH adjustment, record volume and type of preservative added.

0000227

KATAHDIN ANALYTICAL SERVICES, INC.
SAMPLE RECEIPT CONDITION REPORT
Tel. (207) 874-2400
Fax (207) 775-4029

LAB (WORK ORDER) # WD3906

PAGE: 10 OF 12

COOLER: 10 OF 12

COC#

SDG#

DATE / TIME RECEIVED: 09-14-99 ~0900

DELIVERED BY: FEDEX

RECEIVED BY: BKR

LIMS ENTRY BY: BKR

LIMS REVIEW BY / PM: KJL

CLIENT: Tetratech NUS

PROJECT: CNC CHARLESTON

	YES	NO	EXCEPTIONS	COMMENTS	RESOLUTION
1. CUSTODY SEALS PRESENT / INTACT?	☑	☐	☐		
2. CHAIN OF CUSTODY PRESENT IN THIS COOLER?	☐	☑	☐		
3. CHAIN OF CUSTODY SIGNED BY CLIENT?	☑	☐	☐		
4. CHAIN OF CUSTODY MATCHES SAMPLES?	☐	☑	☐		
5. TEMPERATURE BLANKS PRESENT?	☑	☐	☐	TEMP BLANK TEMP (°C)= 2.1	
6. SAMPLES RECEIVED AT 4°C +/- 2? ICE / ICE PACKS PRESENT Y / N?	☑	☐	☐	COOLER TEMP (°C)= NA (RECORD COOLER TEMP ONLY IF TEMP BLANK IS NOT PRESENT)	
7. VOLATILES FREE OF HEADSPACE?	☑	☐	☐		
8. TRIP BLANK PRESENT IN THIS COOLER	☐	☑	☐		
9. PROPER SAMPLE CONTAINERS AND VOLUME?	☑	☐	☐		
10. SAMPLES WITHIN HOLD TIME UPON RECEIPT?	☑	☐	☐		
11. SAMPLES PROPERLY PRESERVED[1]?	☐	☑	☐		
12. CORRECTIVE ACTION REPORT FILED?	☐	☑	N/A		

13. ANALYTICAL PROGRAMS (CIRCLE ONE) COMMERCIAL CLP HAZWRAP (NFESC) ACOE AFCEE OTHER (STATE OF ORIGIN):

LOG - IN NOTES[1]:

(1) Use this space (and additional sheets if necessary) to document samples that are received broken or compromised, C-O-C discrepancies, radiation checks, residual chlorine check, resul[illegible] pH check required. If samples required pH adjustment, record volume and type of preservative a[illegible]

0000228

KATAHDIN ANALYTICAL SERVICES, INC.
SAMPLE RECEIPT CONDITION REPORT
Tel. (207) 874-2400
Fax (207) 775-4029

LAB (WORK ORDER) # WD3906

PAGE: 11 OF 12

COOLER: 11 OF 12

COC#

SDG#

DATE / TIME RECEIVED: 09-14-99 ~ 0900

DELIVERED BY: FED EX

RECEIVED BY: BKR

LIMS ENTRY BY: BKU

LIMS REVIEW BY / PM: AJC

CLIENT: Tetratech NUS

PROJECT: CNC CHARLESTON

	YES	NO	EXCEPTIONS	COMMENTS	RESOLUTION
1. CUSTODY SEALS PRESENT / INTACT?	☑	☐	☐		
2. CHAIN OF CUSTODY PRESENT IN THIS COOLER?	☐	☑	☐		
3. CHAIN OF CUSTODY SIGNED BY CLIENT?	☑	☐	☐		
4. CHAIN OF CUSTODY MATCHES SAMPLES?	☐	☑	☐		
5. TEMPERATURE BLANKS PRESENT?	☑	☐	☐	TEMP BLANK TEMP (°C)= 1.7	AJC notified Jeff Alexander 9/14/99
6. SAMPLES RECEIVED AT 4°C +/- 2? ICE / ICE PACKS PRESENT (Y or N)?	BK ☑	☑	☐	COOLER TEMP (°C)= NA (RECORD COOLER TEMP ONLY IF TEMP BLANK IS NOT PRESENT)	
7. VOLATILES FREE OF HEADSPACE?	☑	☐	☐		
8. TRIP BLANK PRESENT IN THIS COOLER	☐	☑	☐		
9. PROPER SAMPLE CONTAINERS AND VOLUME?	☑	☐	☐		
10. SAMPLES WITHIN HOLD TIME UPON RECEIPT?	☑	☐	☐		
11. SAMPLES PROPERLY PRESERVED[1]?	☐	☑	☐		
12. CORRECTIVE ACTION REPORT FILED?	☐	☑	N/A		

13. ANALYTICAL PROGRAMS (CIRCLE ONE) COMMERCIAL CLP HAZWRAP (NFESC) ACOE AFCEE OTHER (STATE OF ORIGIN):

LOG - IN NOTES[1]:

(1) Use this space (and additional sheets if necessary) to document samples that are received broken or compromised, C-O-C discrepancies, radiation checks, residual chlorine check, results of pH check if required. If samples required pH adjustment, record volume and type of preservative added.

0000229

KATAHDIN ANALYTICAL SERVICES, INC.
SAMPLE RECEIPT CONDITION REPORT
Tel. (207) 874-2400
Fax (207) 775-4029

LAB (WORK ORDER) # WP3906

PAGE: 12 OF 12

COOLER: 12 OF 12

COC# —
SDG# —
DATE / TIME RECEIVED: 09-14-99 ~ 0900
DELIVERED BY: FEDEX
RECEIVED BY: BKR
LIMS ENTRY BY: BKR
LIMS REVIEW BY / PM: AJC

CLIENT: Tetratech NUS

PROJECT: CNC CHARLESTON

	YES	NO	EXCEPTIONS	COMMENTS	RESOLUTION
1. CUSTODY SEALS PRESENT / INTACT?	☑	☐	☐		
2. CHAIN OF CUSTODY PRESENT IN THIS COOLER?	☐	☑	☐		
3. CHAIN OF CUSTODY SIGNED BY CLIENT?	☑	☐	☐		
4. CHAIN OF CUSTODY MATCHES SAMPLES?	☐	☑	☐		
5. TEMPERATURE BLANKS PRESENT?	☑	☐	☐	TEMP BLANK TEMP (°C)= 3.1	
6. SAMPLES RECEIVED AT 4°C +/- 2? ICE ICE PACKS PRESENT Y or N?	☑	☐	☐	COOLER TEMP (°C)= NA (RECORD COOLER TEMP ONLY IF TEMP BLANK IS NOT PRESENT)	
7. VOLATILES FREE OF HEADSPACE?	☑	☐	☐		
8. TRIP BLANK PRESENT IN THIS COOLER	☐	☑	☐		
9. PROPER SAMPLE CONTAINERS AND VOLUME?	☑	☐	☐		
10. SAMPLES WITHIN HOLD TIME UPON RECEIPT?	☑	☐	☐		
11. SAMPLES PROPERLY PRESERVED[1]?	☐	☑	☐		
12. CORRECTIVE ACTION REPORT FILED?	☐	☑	N/A		

13. ANALYTICAL PROGRAMS (CIRCLE ONE) COMMERCIAL CLP HAZWRAP NFESC ACOE AFCEE OTHER (STATE OF ORIGIN):

LOG - IN NOTES[1]:

(1) Use this space (and additional sheets if necessary) to document samples that are received broken or compromised, C-O-C discrepancies, radiation checks, residual chlorine check, results of pH check if required. If samples required pH adjustment, record volume and type of preservative a[illegible]

0000230

Katahdin
340 County Road No. 5
P.O. Box 720
Westbrook, ME 04098
Tel: (207) 874-2400
Fax: (207) 775-4029

CHAIN OF CUSTODY

PLEASE PRINT IN PEN

Page ____ of ____

Client: Tetra Tech NUS Inc
Contact: Paul Galligan
Phone #: 843-554-4425
Fax #:
Address: NH 21 AVE H
City: N. Charleston
State: SC
Zip Code:
Purchase Order #:
Proj. Name / No.:
Katahdin Quote #:
Bill (if different than above):
Address:
Sampler (Print / Sign): Jerry Kriga / Jerry Kriga
Copies To:

LAB USE ONLY
WORK ORDER #: WP3906
KATAHDIN PROJECT MANAGER:

REMARKS:

SHIPPING INFO: ☐ FED EX ☐ UPS ☐ CLIENT
AIRBILL NO:
TEMP°C: ☐ TEMP BLANK ☐ INTACT ☐ NOT INTACT

ANALYSIS AND CONTAINER TYPE / PRESERVATIVES

*	Sample Description	Date / Time coll'd	Matrix	No. of Cntrs.	BTEX, MTBE, EDB NAPH	PAH	Total Lead	Anions Nitrate, Sulfate	Propanols Methane					
	23GLM0401	9/10/99/1517	GW	6	3	2	1							
	23GLX0301	9/10/99/1535	GW	6	3	2	1							
	23GLX0401	9/10/99/1540	GW	6	3	2	1							
	23GLX0401D	9/10/99/0000	GW	6	3	2	1							
	23GLM05D01	9/10/99/1600	GW	6	3	2	1							
	23GLM0101	9/10/99/1630	GW	6	3	2	1							
	23TL0020	9/10/99/0800	GW	1	1									
	16GLM7D01	9/12/99/0755	GW	5	3	2								
	25GLM0301	/1510	GW	6	3	2	1							
	25GLM0801	/1555	GW	6	3	2	1							
	25GLM0601	/1620	GW	6	3	2	1							
	25GLM0701	9/13/99/1115	GW	10	3	2	1	1	3					
	25GLM0401	/1140	GW	5	3	2	1							
	26GLP1201	/1345	GW	5	3	2								
	26GLP1301	/1355	GW	5	3	2								
		/												

Cooler 2 of 2

COMMENTS

Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)
J. Kriga	9/13/99 1900	Fedex		9/14/99 0900	
Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)

FORMSOURCE INC. ☎ (207) 782-3311
FORM # CHN-OF-CSTDY

ORIGINAL

0000231

Katahdin ANALYTICAL SERVICES
340 County Road No. 5
P.O. Box 720
Westbrook, ME 04098
Tel: (207) 874-2400
Fax: (207) 775-4029

CHAIN of CUSTODY

PLEASE PRINT IN PEN

Client: TETRA TECH NUS
Contact: PAUL CALLIGAN
Phone #: (850) 385-9899
Fax #: (850) 350-[illegible]

Address: 1401 OVEN PARK DR 102
City: TALLAHASSEE
State: FL
Zip Code: 32308

Purchase Order #:
Proj. Name / No.:
Katahdin Quote #:

Bill (if different than above):
Address:

Sampler (Print / Sign): T. Thompson Thomas Thompson
Copies To:

LAB USE ONLY
WORK ORDER #: WP3906
KATAHDIN PROJECT MANAGER:

REMARKS:

SHIPPING INFO: ☐ FED EX ☐ UPS ☐ CLIENT
AIRBILL NO:
TEMP°C: ☐ TEMP BLANK ☐ INTACT ☐ NOT INTACT

ANALYSIS AND CONTAINER TYPE PRESERVATIVES

*	Sample Description	Date / Time coll'd	Matrix	No. of Cntrs.	BTEX, MTBE, EDB, TOTAL NAPH. (HCL)	PAH (None)	Metals (HNO3)	Dissolved Methane (HCL)	Anions (None)					
	36GLM0601	91399/1015	GW	10	3	2	1	3	1					
	36GLM0201	91399/1055	GW	10	3	2	1	3	1					
	36GLM0301	91399/1131	GW	10	3	2	1	3	1					
	36GLM0201D	91399/0000	GW	6	3	2	1							
	22GLM0101	91099/1130	GW	6	3	2	1							
	22GLM0201	91099/1110	GW	6	3	2	1							
	22GLM0501	91099/1418	GW	6	3	2	1							
	22GLM0701	91099/1420	GW	6	3	2	1							
	~~22GLM0201D~~	~~91099/0000~~	~~GW~~	~~6~~	~~3~~	~~2~~	~~1~~	BR						
		/												
		/												
		/												
		/												
		/												
		/												
		/												

Cooler 1 of 1 BR
CAll Three C.O.C

COMMENTS

Placed on ice.

Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)
[signature]	9/13/99 1700	8134583693 3	9-14-99 0900		[signature]
Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)

FORMSOURCE INC. ☎ (207) 782-3311
FORM # CHN-OF-CSTDY

ORIGINAL

Katahdin
P.O. Box 720
Westbrook, ME 04098
Tel: (207) 874-2400
Fax: (207) 775-4029

CHAIN OF CUSTODY

PLEASE PRINT IN PEN

Client: Tetra Tech NUS
Contact: Paul Calligan
Phone #: (850) 385-9899
Fax #: (850)
Address: 1401 Oven Park Dr 102
City: Tallahassee
State: FL
Zip Code: 32308
Purchase Order #:
Proj. Name / No.:
Katahdin Quote #:
Bill (if different than above):
Address:
Sampler (Print / Sign): P. Halverson
Copies To:

LAB USE ONLY
WORK ORDER #: WP 3906
KATAHDIN PROJECT MANAGER:
REMARKS:
SHIPPING INFO: ☐ FED EX ☐ UPS ☐ CLIENT
AIRBILL NO:
TEMP°C: ☐ TEMP BLANK ☐ INTACT ☐ NOT INTACT

ANALYSIS AND CONTAINER TYPE PRESERVATIVES

★	Sample Description	Date / Time coll'd	Matrix	No. of Cntrs.	Metals (HNO3)	BTEX, EDB, MTBE, Total Naph. (HCl)	PAH (None)	Dissolved Methane (HCl)	Anions (None)					
	42GLM1001	91299/0941	GW	6	1	3	2							
	42GLM0701	91299/1000	GW	9	1	3	2	3						
	42GLM1201	91299/~~1000~~ 1030	GW	6	1	3	2							
	42GLM0901	91299/1030	GW	~~6~~ 9	1	3	2	3						
	42GLM0801	91299/1057	GW	6	1	3	2							
	42GLM1101	91299/1106	GW	9	1	3	2	3						
	42GLM0101	91299/1435	GW	10	1	3	2	3	1					
	42GLM1301	91299/1449	GW	10	1	3	2	3	1					
	42GLM0601	91299/1535	GW	6	1	3	2							
	42GLM0701	91299/1202	GW	1					1					
	42GLM0901	91299/1206	GW	1					1					
	42GLM1101	91299/1204	GW	1					1					
	42GLM0701D	91299/0000	GW	6	1	3	2							
	42GLM0101D	91299/0000	GW	6	1	3	2							
	42GLM1001M	91299/0941	GW	6	1	3	2							
	42GLM1801	91399/0842	GW	6	1	3	2							

COMMENTS

Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)
[signature]	9/18/99 1700	8134583693 3Φ		9-14-99 0900	[signature]
Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)

Katahdin ANALYTICAL SERVICES
P.O. Box 720
Westbrook, ME 04098
Tel: (207) 874-2400
Fax: (207) 775-4029

CHAIN OF CUSTODY

PLEASE PRINT IN PEN

Page 1 of 3

Client: TETRA TECH NUS
Contact: PAUL CALLIGAN
Phone #: (850) 385-9899
Fax #: (850)

Address: 1401 OVEN PARK DR. 102
City: TALLAHASSEE
State: FL.
Zip Code: 32308

Purchase Order #:
Proj. Name / No.:
Katahdin Quote #:

Bill (if different than above):
Address:

Sampler (Print / Sign): P. HALVERSON
Copies To:

LAB USE ONLY
WORK ORDER #: WP3906
KATAHDIN PROJECT MANAGER:

REMARKS:

SHIPPING INFO: ☒ FED EX ☐ UPS ☐ CLIENT
AIRBILL NO:
TEMP°C: ☐ TEMP BLANK ☐ INTACT ☐ NOT INTACT

ANALYSIS AND CONTAINER TYPE PRESERVATIVES

*	Sample Description	Date / Time coll'd	Matrix	No. of Cntrs.	METALS HNO3	Filt. Y N	TOTAL VOCs EDB	Filt. Y N	PAH	Filt. Y N	Filt. Y N	Filt. Y N	Filt. Y N	Filt. Y N	Filt. Y N	Filt. Y N	Filt. Y N
	36GLM0101	91099/1110	GW	1	1												
	36GL0680004	91099/1115	GW	1	1												
	36GLM0701	91099/1120	GW	6	1	3		2									
	36GLM0401	91099/1510	GW	6	1	3		2									
	36GLM0501	91099/1515	GW	6	1	3		2									
	42GLM0401	91199/1055	GW	6	1	3		2									
	42GLM0301	91199/1050	GW	6	1	3		2									
	42GLM0201	91199/1045	GW	6	1	3		2									
	42GLM0501	91199/1035	GW	6	1	3		2									
✓	42GLM1401	91199/1125	GW	6	1	3		2									
✓	42GLM1701	91199/1110	GW	6	1	3		2									
✓	42GLM1501	91199/1110	GW	6	1	3		2									
✓	42GLM1601	91199/1125	GW	6	1	3		2									
	42TL00101	9/13/99	99	2		2											
		/															
		/															

COMMENTS

Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)
[signature]	9/13/99 1700	8134583693 30		9-14-99 0900	[signature]
Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)

FORMSOURCE INC. ☎ (207) 782-3311
FORM # CHN-OF-CSTDY

ORIGINAL

0050234

New England-ME Laboratory (207) 874-2400
CONFIRMATION

ORDER NO WP-3906

Project Manager: Andrea J. Colby
ORDER DATE: 09/14/99
PHONE: 850/385-[illegible]99
FAX: 850/385-[illegible]0
DUE: 14 OCT
FAC.ID: CNC CHARLESTON

REPORT TO: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr., Suite 102
Tallahassee, FL 32308

INVOICE: ACCOUNTS PAYABLE
TETRA TECH NUS, INC.
FOSTER PLAZA 7, 661 ANDERSEN DR.
PITTSBURGH, PA 15220

PHONE: 412/921-7090
PO: N7912-P99264

PROJECT: CTO #68

SAMPLED BY: P.HALVERSON/T.THOMPSON/J.KRIEGERDELIVERED BY: FEDEXDISPOSE: AFTER 13

ITEM	LOG NUMBER	SAMPLE DESCRIPTION	SAMPLED DATE/TIME	RECEIVED	MATRIX
1	WP3906-1	36GLM0101	10 SEP 1110	14 SEP	AQ
	WP3906-2	36GLO680004	10 SEP 1115		

DETERMINATION	METHOD	QTY	PRICE	AMOUNT
Target Analyte List Metals, Total		2	100.00	200.00

LABORATORY ORDER CONTINUED ON PAGE 2

ORDER NO WP-3906

Project Manager: Andrea J. Colby
ORDER DATE: 09/14/
PHONE: 850/385-98
FAX: 850/385-9860
DUE: 14 OCT
FAC.ID: CNC CHARLESTON

REPORT TO: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr., Suite 102
Tallahassee, FL 32308

INVOICE: ACCOUNTS PAYABLE
TETRA TECH NUS, INC.
FOSTER PLAZA 7, 661 ANDERSEN DR.
PITTSBURGH, PA 15220

PHONE: 412/921-7090
PO: N7912-P99264

PROJECT: CTO #68

SAMPLED BY: P.HALVERSON/T.THOMPSON/J.KRIEGERDELIVERED BY: FEDEXDISPOSE: AFTER 13

	LOG NUMBER	SAMPLE DESCRIPTION	SAMPLED DATE/TIME	RECEIVED	MATRIX
2	WP3906-3	36GLM0701	10 SEP 1120	14 SEP	AQ
	WP3906-4	36GLM0401	10 SEP 1510		
	WP3906-5	36GLM0501	10 SEP 1515		
	WP3906-6	42GLM0401	11 SEP 1055		
	WP3906-7	42GLM0301	11 SEP 1050		
	WP3906-8	42GLM0201	11 SEP 1045		
	WP3906-9	42GLM0501	11 SEP 1035		
	WP3906-10	42GLM1401	11 SEP 1125		
	WP3906-11	42GLM1701	11 SEP 1110		
	WP3906-12	42GLM1501	11 SEP 1110		
	WP3906-13	42GLM1601	11 SEP 1125		
	WP3906-14	36GLM0201D	13 SEP		
	WP3906-15	22GLM0101	10 SEP 1130		
	WP3906-16	22GLM0201	10 SEP 1110		
	WP3906-17	22GLM0501	10 SEP 1418		
	WP3906-18	22GLM0701	10 SEP 1420		
	WP3906-19	42GLM1001	12 SEP 0941		
	WP3906-20	42GLM1201	12 SEP 1030		
	WP3906-21	42GLM0801	12 SEP 1057		
	WP3906-22	42GLM0601	12 SEP 1535		
	WP3906-23	42GLM0701D	12 SEP 0000		
	WP3906-24	42GLM0101D	12 SEP 0000		
	WP3906-25	42GLM1801	13 SEP 0842		

DETERMINATION	METHOD	QTY	PRICE	AMOUNT
Target Analyte List Metals, Total		23	100.00	2300.00
Volatile Organics by 8260B	SW8260	23	75.00	1725.00
Polynuclear Aromatic Hydrocarbons	EPA 8270	23	125.00	2875.00
TOTALS		23	300.00	6900.00

LABORATORY ORDER CONTINUED ON PAGE 3

ORDER NO WP-3906

Project Manager: Andrea J. Colby
ORDER DATE: 09/14/99
PHONE: 850/385-0999
FAX: 850/385- 60
DUE: 14 OCT
FAC.ID: CNC CHARLESTON

REPORT TO: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr., Suite 102
Tallahassee, FL 32308

INVOICE: ACCOUNTS PAYABLE
TETRA TECH NUS, INC.
FOSTER PLAZA 7, 661 ANDERSEN DR.
PITTSBURGH, PA 15220

PHONE: 412/921-7090
PO: N7912-P99264

PROJECT: CTO #68

SAMPLED BY: P.HALVERSON/T.THOMPSON/J.KRIEGERDELIVERED BY: FEDEXDISPOSE: AFTER 13

	LOG NUMBER	SAMPLE DESCRIPTION	SAMPLED DATE/TIME	RECEIVED	MATRIX
3	WP3906-26	42TL00101	13 SEP	14 SEP	AQ
	WP3906-27	23TL00201	10 SEP 0800		

DETERMINATION	METHOD	QTY	PRICE	AMOUNT
Volatile Organics by 8260B	SW8260	2	75.00	150.00

	LOG NUMBER	SAMPLE DESCRIPTION	SAMPLED DATE/TIME	RECEIVED	MATRIX
4	WP3906-28	36GLM0601	13 SEP 1015	14 SEP	AQ
	WP3906-29	36GLM0201	13 SEP 1055		
	WP3906-30	36GLM0301	13 SEP 1131		
	WP3906-31	42GLM0701	12 SEP 1202		
	WP3906-32	42GLM0901	12 SEP 1206		
	WP3906-33	42GLM1101	12 SEP 1204		
	WP3906-34	42GLM0101	12 SEP 1435		
	WP3906-35	42GLM1301	12 SEP 1449		

DETERMINATION	METHOD	QTY	PRICE	AMOUNT
Target Analyte List Metals, Total		8	100.00	800.00
Volatile Organics by 8260B	SW8260	8	75.00	600.00
Polynuclear Aromatic Hydrocarbons	EPA 8270	8	125.00	1000.00
Nitrate as N	353.2	8	30.00	240.00
Sulfate	375.4	8	0.00	0.00
Methane Subcontract		8	95.00	760.00
TOTALS		8	425.00	3400.00

LABORATORY ORDER CONTINUED ON PAGE 4

ORDER NO WP-3906

Project Manager: Andrea J. Colby
ORDER DATE: 09/14
PHONE: 850/385-9
FAX: 850/385-9860
DUE: 14 OCT
FAC.ID: CNC CHARLESTON

REPORT TO: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr., Suite 102
Tallahassee, FL 32308

INVOICE: ACCOUNTS PAYABLE
TETRA TECH NUS, INC.
FOSTER PLAZA 7, 661 ANDERSEN DR.
PITTSBURGH, PA 15220

PHONE: 412/921-7090
PO: N7912-P99264

PROJECT: CTO #68

SAMPLED BY: P.HALVERSON/T.THOMPSON/J.KRIEGERDELIVERED BY: FEDEXDISPOSE: AFTER 13

	LOG NUMBER	SAMPLE DESCRIPTION	SAMPLED DATE/TIME	RECEIVED	MATRIX
5	WP3906-36	23GLM0401	10 SEP 1517	14 SEP	AQ
	WP3906-37	23GLX0301	10 SEP 1535		
	WP3906-38	23GLX0401	10 SEP 1540		
	WP3906-39	23GLX0401D	10 SEP		
	WP3906-40	23GLM05D01	10 SEP 1600		
	WP3906-41	23GLM0101	10 SEP 1630		
	WP3906-42	25GLM0301	12 SEP 1510		
	WP3906-43	25GLM0801	12 SEP 1555		
	WP3906-44	25GLM0601	12 SEP 1620		
	WP3906-45	25GLM0401	13 SEP 1140		

DETERMINATION	METHOD	QTY	PRICE	AMOUNT
Volatile Organics by 8260B	SW8260	10	75.00	750.00
Polynuclear Aromatic Hydrocarbons	EPA 8270	10	125.00	1250.0
Lead, Total	200.7/6010	10	20.00	200.00
Elements Sample Preparation		10	0.00	0.00
TOTALS		10	220.00	2200.00

	LOG NUMBER	SAMPLE DESCRIPTION	SAMPLED DATE/TIME	RECEIVED	MATRIX
6	WP3906-46	25GLM0701	13 SEP 1115	14 SEP	AQ

DETERMINATION	METHOD	QTY	PRICE	AMOUNT
Volatile Organics by 8260B	SW8260	1	75.00	75.00
Polynuclear Aromatic Hydrocarbons	EPA 8270	1	125.00	125.00
Lead, Total	200.7/6010	1	20.00	20.00
Elements Sample Preparation		1	0.00	0.00
Nitrate as N	353.2	1	30.00	30.00
Sulfate	375.4	1	0.00	0.00
Methane Subcontract		1	95.00	95.00
TOTALS		1	345.00	345.00

LABORATORY ORDER CONTINUED ON PAGE 5

ORDER NO WP-3906

Project Manager: Andrea J. Colby
ORDER DATE: 09/14/99
PHONE: 850/385-9999
FAX: 850/385- 50
DUE: 14 OCT
FAC.ID: CNC CHARLESTON

REPORT TO: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr., Suite 102
Tallahassee, FL 32308

INVOICE: ACCOUNTS PAYABLE
TETRA TECH NUS, INC.
FOSTER PLAZA 7, 661 ANDERSEN DR.
PITTSBURGH, PA 15220

PHONE: 412/921-7090
PO: N7912-P99264

PROJECT: CTO #68

SAMPLED BY: P.HALVERSON/T.THOMPSON/J.KRIEGERDELIVERED BY: FEDEXDISPOSE: AFTER 13

	LOG NUMBER	SAMPLE DESCRIPTION	SAMPLED DATE/TIME	RECEIVED	MATRIX
7	WP3906-47	16GLM7D01	12 SEP 0755	14 SEP	AQ
	WP3906-48	26GLP1201	13 SEP 1345		
	WP3906-49	26GLP1301	13 SEP 1355		

DETERMINATION	METHOD	QTY	PRICE	AMOUNT
Volatile Organics by 8260B	SW8260	3	75.00	225.00
Polynuclear Aromatic Hydrocarbons	EPA 8270	3	125.00	375.00
TOTALS		3	200.00	600.00

ORDER NOTE: QC-II+ W/NARRATIVE
DD(KAS007QC-DB3)
CNC CHARLESTON

REPORT COPY: MS. LEE LECK
TETRA TECH NUS
FOSTER PLAZA 7
661 ANDERSEN DR.
PITTSBURGH,PA. 15220
REPORT AND DISK

INVOICE: With Report

TOTAL ORDER AMOUNT $13,795.00
This is NOT an Invc e

AJC/BKR
09-14Please contact KATAHDIN ANALYTICAL SERVICES promptly if you have any questi

KATAHDIN ANALYTICAL SERVICES

Summary of Report Notes

Report Note	Note Text
A-1	Insufficient sample was provided to enable laboratory to achieve the laboratory's standard Practical Quantitation Level.
E	'E' flag indicates an estimated value. The analyte was detected in the sample at a concentration greater than the standard calibration range.
J	'J' flag denotes an estimated value less than the Laboratory's Practical Quantitation Level.
O-2	Sample dilution required for quantitation of one or more target analytes; therefore, standard laboratory Practical Quantitation Level (PQL) could not be achieved.

KATAHDIN ANALYTICAL SERVICES

Summary of Report Notes

Report Note	Note Text
B	'B' flag denotes detection of this analyte in the laboratory method blank analyzed concurrently with the sample.
E	'E' flag indicates an estimated value. The analyte was detected in the sample at a concentration greater than the standard calibration range.
J	'J' flag denotes an estimated value less than the Laboratory's Practical Quantitation Level.
O-2	Sample dilution required for quantitation of one or more target analytes; therefore, standard laboratory Practical Quantitation Level (PQL) could not be achieved.

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services
Client Field ID: 25GLM0301
Matrix: WATER
SDG Name: WP3906
Percent Solids: 0.00
Lab Sample ID: WP3906-042

Concentration Units (ug/L or mg/Kg dry weight): ug/L

CAS No.	Analyte	Concentration	C	Q	M	DF
7439-92-1	LEAD	1.4	B		P	1

Comments:

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP3906-42
SDG: WP3906
Report Date: 10/6/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: N/A
Method: EPA 8270
Date Analyzed: 9/29/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
25GLM0301	AQ	9/12/99	9/14/99	9/17/99	DPD	EPA 3510	KRT

Compound	Result	Units	DF	Sample PQL	Method PQL
NAPHTHALENE	<10	ug/L	1.0	10	10
2-METHYLNAPHTHALENE	<10	ug/L	1.0	10	10
ACENAPHTHYLENE	<10	ug/L	1.0	10	10
ACENAPHTHENE	<10	ug/L	1.0	10	10
FLUORENE	<10	ug/L	1.0	10	10
PHENANTHRENE	<10	ug/L	1.0	10	10
ANTHRACENE	<10	ug/L	1.0	10	10
FLUORANTHENE	<10	ug/L	1.0	10	10
PYRENE	<10	ug/L	1.0	10	10
BENZO[A]ANTHRACENE	<10	ug/L	1.0	10	10
CHRYSENE	<10	ug/L	1.0	10	10
BENZO[B]FLUORANTHENE	<10	ug/L	1.0	10	10
BENZO[K]FLUORANTHENE	<10	ug/L	1.0	10	10
BENZO[A]PYRENE	<10	ug/L	1.0	10	10
INDENO[1,2,3-CD]PYRENE	<10	ug/L	1.0	10	10
DIBENZ[A,H]ANTHRACENE	<10	ug/L	1.0	10	10
BENZO[G,H,I]PERYLENE	<10	ug/L	1.0	10	10
NITROBENZENE-D5	81	%	1.0		
2-FLUOROBIPHENYL	80	%	1.0		
TERPHENYL-D14	69	%	1.0		

Report Notes:

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP3906-42
SDG: WP3906
Report Date: 10/12/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: N/A
Method: SW8260
Date Analyzed: 9/20/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
25GLM0301	AQ	9/12/99	9/14/99	9/20/99	KMC	5030	KMC

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<5	ug/L	1.0	5	5
TOLUENE	<5	ug/L	1.0	5	5
1,2-DIBROMOETHANE	<5	ug/L	1.0	5	5
ETHYLBENZENE	<5	ug/L	1.0	5	5
NAPHTHALENE	<5	ug/L	1.0	5	5
MTBE	<5	ug/L	1.0	5	5
TOTAL XYLENES	<5	ug/L	1.0	5	5
DIBROMOFLUOROMETHANE	99	%	1.0		
1,2-DICHLOROETHANE-D4	92	%	1.0		
TOLUENE-D8	101	%	1.0		
P-BROMOFLUOROBENZENE	104	%	1.0		

Report Notes:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services | **Client Field ID: 25GLM0801**

Matrix: WATER | **SDG Name: WP3906**

Percent Solids: 0.00 | **Lab Sample ID: WP3906-043**

Concentration Units (ug/L or mg/Kg dry weight): ug/L

CAS No.	Analyte	Concentration	C	Q	M	DF
7439-92-1	LEAD	1.3	B		P	1

Comments:

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP3906-43
SDG: WP3906
Report Date: 10/6/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: N/A
Method: EPA 8270
Date Analyzed: 9/29/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
25GLM0801	AQ	9/12/99	9/14/99	9/17/99	DPD	EPA 3510	KRT

Compound	Result	Units	DF	Sample PQL	Method PQL
NAPHTHALENE	<12	ug/L	1.2	12	10
2-METHYLNAPHTHALENE	<12	ug/L	1.2	12	10
ACENAPHTHYLENE	<12	ug/L	1.2	12	10
ACENAPHTHENE	<12	ug/L	1.2	12	10
FLUORENE	<12	ug/L	1.2	12	10
PHENANTHRENE	<12	ug/L	1.2	12	10
ANTHRACENE	<12	ug/L	1.2	12	10
FLUORANTHENE	<12	ug/L	1.2	12	10
PYRENE	<12	ug/L	1.2	12	10
BENZO[A]ANTHRACENE	<12	ug/L	1.2	12	10
CHRYSENE	<12	ug/L	1.2	12	10
BENZO[B]FLUORANTHENE	<12	ug/L	1.2	12	10
BENZO[K]FLUORANTHENE	<12	ug/L	1.2	12	10
BENZO[A]PYRENE	<12	ug/L	1.2	12	10
INDENO[1,2,3-CD]PYRENE	<12	ug/L	1.2	12	10
DIBENZ[A,H]ANTHRACENE	<12	ug/L	1.2	12	10
BENZO[G,H,I]PERYLENE	<12	ug/L	1.2	12	10
NITROBENZENE-D5	74	%	1.2		
2-FLUOROBIPHENYL	88	%	1.2		
TERPHENYL-D14	104	%	1.2		

Report Notes: A-1

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP3906-43
SDG: WP3906
Report Date: 10/12/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: N/A
Method: SW8260
Date Analyzed: 9/21/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
25GLM0801	AQ	9/12/99	9/14/99	9/21/99	JSS	5030	JSS

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<5	ug/L	1.0	5	5
TOLUENE	<5	ug/L	1.0	5	5
1,2-DIBROMOETHANE	<5	ug/L	1.0	5	5
ETHYLBENZENE	<5	ug/L	1.0	5	5
NAPHTHALENE	<5	ug/L	1.0	5	5
MTBE	<5	ug/L	1.0	5	5
TOTAL XYLENES	<5	ug/L	1.0	5	5
DIBROMOFLUOROMETHANE	109	%	1.0		
1,2-DICHLOROETHANE-D4	104	%	1.0		
TOLUENE-D8	106	%	1.0		
P-BROMOFLUOROBENZENE	103	%	1.0		

Report Notes:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services
Client Field ID: 25GLM0601
Matrix: WATER
SDG Name: WP3906
Percent Solids: 0.00
Lab Sample ID: WP3906-044

Concentration Units (ug/L or mg/Kg dry weight): ug/L

CAS No.	Analyte	Concentration	C	Q	M	DF
7439-92-1	LEAD	1.09	U		P	1

Comments:

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP3906-44
SDG: WP3906
Report Date: 10/6/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: N/A
Method: EPA 8270
Date Analyzed: 9/29/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
25GLM0601	AQ	9/12/99	9/14/99	9/17/99	DPD	EPA 3510	KRT

Compound	Result	Units	DF	Sample PQL	Method PQL
NAPHTHALENE	<10	ug/L	1.0	10	10
2-METHYLNAPHTHALENE	<10	ug/L	1.0	10	10
ACENAPHTHYLENE	<10	ug/L	1.0	10	10
ACENAPHTHENE	<10	ug/L	1.0	10	10
FLUORENE	<10	ug/L	1.0	10	10
PHENANTHRENE	<10	ug/L	1.0	10	10
ANTHRACENE	<10	ug/L	1.0	10	10
FLUORANTHENE	<10	ug/L	1.0	10	10
PYRENE	<10	ug/L	1.0	10	10
BENZO[A]ANTHRACENE	<10	ug/L	1.0	10	10
CHRYSENE	<10	ug/L	1.0	10	10
BENZO[B]FLUORANTHENE	<10	ug/L	1.0	10	10
BENZO[K]FLUORANTHENE	<10	ug/L	1.0	10	10
BENZO[A]PYRENE	<10	ug/L	1.0	10	10
INDENO[1,2,3-CD]PYRENE	<10	ug/L	1.0	10	10
DIBENZ[A,H]ANTHRACENE	<10	ug/L	1.0	10	10
BENZO[G,H,I]PERYLENE	<10	ug/L	1.0	10	10
NITROBENZENE-D5	81	%	1.0		
2-FLUOROBIPHENYL	104	%	1.0		
TERPHENYL-D14	95	%	1.0		

Report Notes:

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP3906-44
SDG: WP3906
Report Date: 10/12/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: N/A
Method: SW8260
Date Analyzed: 9/21/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
25GLM0601	AQ	9/12/99	9/14/99	9/21/99	JSS	5030	JSS

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<5	ug/L	1.0	5	5
TOLUENE	<5	ug/L	1.0	5	5
1,2-DIBROMOETHANE	<5	ug/L	1.0	5	5
ETHYLBENZENE	<5	ug/L	1.0	5	5
NAPHTHALENE	<5	ug/L	1.0	5	5
MTBE	E260	ug/L	1.0	5	5
TOTAL XYLENES	<5	ug/L	1.0	5	5
DIBROMOFLUOROMETHANE	108	%	1.0		
1,2-DICHLOROETHANE-D4	104	%	1.0		
TOLUENE-D8	106	%	1.0		
P-BROMOFLUOROBENZENE	103	%	1.0		

Report Notes: E

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP3906-44DL
SDG: WP3906
Report Date: 10/12/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: N/A
Method: SW8260
Date Analyzed: 9/22/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
25GLM0601	AQ	9/12/99	9/14/99	9/22/99	KMC	5030	KMC

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<25	ug/L	5.0	25	5
TOLUENE	<25	ug/L	5.0	25	5
1,2-DIBROMOETHANE	<25	ug/L	5.0	25	5
ETHYLBENZENE	<25	ug/L	5.0	25	5
NAPHTHALENE	<25	ug/L	5.0	25	5
MTBE	220	ug/L	5.0	25	5
TOTAL XYLENES	<25	ug/L	5.0	25	5
DIBROMOFLUOROMETHANE	111	%	5.0		
1,2-DICHLOROETHANE-D4	102	%	5.0		
TOLUENE-D8	107	%	5.0		
P-BROMOFLUOROBENZENE	104	%	5.0		

Report Notes: O-2

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services
Client Field ID: 25GLM0401
Matrix: WATER
SDG Name: WP3906
Percent Solids: 0.00
Lab Sample ID: WP3906-045

Concentration Units (ug/L or mg/Kg dry weight): ug/L

CAS No.	Analyte	Concentration	C	Q	M	DF
7439-92-1	LEAD	1.09	U		P	1

Comments:

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32306

Proj. ID: CNC CHARLESTON

Lab Number: WP3906-45
SDG: WP3906
Report Date: 10/6/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: N/A
Method: EPA 8270
Date Analyzed: 9/29/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
25GLM0401	AQ	9/13/99	9/14/99	9/20/99	DS	EPA 3510	KRT

Compound	Result	Units	DF	Sample PQL	Method PQL
NAPHTHALENE	<10	ug/L	1.0	10	10
2-METHYLNAPHTHALENE	<10	ug/L	1.0	10	10
ACENAPHTHYLENE	<10	ug/L	1.0	10	10
ACENAPHTHENE	<10	ug/L	1.0	10	10
FLUORENE	<10	ug/L	1.0	10	10
PHENANTHRENE	<10	ug/L	1.0	10	10
ANTHRACENE	<10	ug/L	1.0	10	10
FLUORANTHENE	<10	ug/L	1.0	10	10
PYRENE	<10	ug/L	1.0	10	10
BENZO[A]ANTHRACENE	<10	ug/L	1.0	10	10
CHRYSENE	<10	ug/L	1.0	10	10
BENZO[B]FLUORANTHENE	<10	ug/L	1.0	10	10
BENZO[K]FLUORANTHENE	<10	ug/L	1.0	10	10
BENZO[A]PYRENE	<10	ug/L	1.0	10	10
INDENO[1,2,3-CD]PYRENE	<10	ug/L	1.0	10	10
DIBENZ[A,H]ANTHRACENE	<10	ug/L	1.0	10	10
BENZO[G,H,I]PERYLENE	<10	ug/L	1.0	10	10
NITROBENZENE-D5	70	%	1.0		
2-FLUOROBIPHENYL	80	%	1.0		
TERPHENYL-D14	100	%	1.0		

Report Notes:

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP3906-45
SDG: WP3906
Report Date: 10/12/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: N/A
Method: SW8260
Date Analyzed: 9/21/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
25GLM0401	AQ	9/13/99	9/14/99	9/21/99	JSS	5030	JSS

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<5	ug/L	1.0	5	5
TOLUENE	<5	ug/L	1.0	5	5
1,2-DIBROMOETHANE	<5	ug/L	1.0	5	5
ETHYLBENZENE	<5	ug/L	1.0	5	5
NAPHTHALENE	<5	ug/L	1.0	5	5
MTBE	<5	ug/L	1.0	5	5
TOTAL XYLENES	<5	ug/L	1.0	5	5
DIBROMOFLUOROMETHANE	110	%	1.0		
1,2-DICHLOROETHANE-D4	106	%	1.0		
TOLUENE-D8	106	%	1.0		
P-BROMOFLUOROBENZENE	104	%	1.0		

Report Notes:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services | **Client Field ID: 25GLM0701**

Matrix: WATER | **SDG Name: WP3906**

Percent Solids: 0.00 | **Lab Sample ID: WP3906-046**

Concentration Units (ug/L or mg/Kg dry weight): ug/L

CAS No.	Analyte	Concentration	C	Q	M	DF
7439-92-1	LEAD	1.09	U		P	1

Comments:

Katahdin
ANALYTICAL SERVICES

CLIENT: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr., Suite 102
Tallahassee, FL 32308

Lab Number : WP-3906-46
Report Date: 10/13/99
PO No. : N7912-P99264
Project : CIO #68

WIC#: CNC CHARLESTON

REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE	RECEIVED
25GLM0701	Aqueous	P.HALVERSON/ T.THOMPSON/ J.KRIEGER	09/13/99	09/14/99

PARAMETER	RESULT	UNITS	DF	*PQL	METHOD	ANALYZED	BY	NOTES
Nitrate as N	0.16	mg/L	1.0	0.050	353.2	09/14/99	KW	
Sulfate	160.	mg/L	10	1.0	300.0	09/24/99	CF	

* PQL (Practical Quantitation Level) represents laboratory reporting limits and may not reflect sample-specific reporting limits. Sample-specific limits are indicated by results annotated with '<' values.

10/13/99

LJO/baeajc(dw)/msm
PI14NOW1
CC: MS. LEE LECK
TETRA TECH NUS
FOSTER PLAZA 7
661 ANDERSEN DR.

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP3906-46
SDG: WP3906
Report Date: 10/6/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: N/A
Method: EPA 8270
Date Analyzed: 9/30/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
25GLM0701	AQ	9/13/99	9/14/99	9/20/99	DS	EPA 3510	KRT

Compound	Result	Units	DF	Sample PQL	Method PQL
NAPHTHALENE	<10	ug/L	1.0	10	10
2-METHYLNAPHTHALENE	<10	ug/L	1.0	10	10
ACENAPHTHYLENE	<10	ug/L	1.0	10	10
ACENAPHTHENE	<10	ug/L	1.0	10	10
FLUORENE	<10	ug/L	1.0	10	10
PHENANTHRENE	<10	ug/L	1.0	10	10
ANTHRACENE	<10	ug/L	1.0	10	10
FLUORANTHENE	<10	ug/L	1.0	10	10
PYRENE	<10	ug/L	1.0	10	10
BENZO[A]ANTHRACENE	<10	ug/L	1.0	10	10
CHRYSENE	<10	ug/L	1.0	10	10
BENZO[B]FLUORANTHENE	<10	ug/L	1.0	10	10
BENZO[K]FLUORANTHENE	<10	ug/L	1.0	10	10
BENZO[A]PYRENE	<10	ug/L	1.0	10	10
INDENO[1,2,3-CD]PYRENE	<10	ug/L	1.0	10	10
DIBENZ[A,H]ANTHRACENE	<10	ug/L	1.0	10	10
BENZO[G,H,I]PERYLENE	<10	ug/L	1.0	10	10
NITROBENZENE-D5	49	%	1.0		
2-FLUOROBIPHENYL	58	%	1.0		
TERPHENYL-D14	103	%	1.0		

Report Notes:

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP3906-46
SDG: WP3906
Report Date: 10/12/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: N/A
Method: SW8260
Date Analyzed: 9/21/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
25GLM0701	AQ	9/13/99	9/14/99	9/21/99	JSS	5030	JSS

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<5	ug/L	1.0	5	5
TOLUENE	<5	ug/L	1.0	5	5
1,2-DIBROMOETHANE	<5	ug/L	1.0	5	5
ETHYLBENZENE	<5	ug/L	1.0	5	5
NAPHTHALENE	<5	ug/L	1.0	5	5
MTBE	<5	ug/L	1.0	5	5
TOTAL XYLENES	<5	ug/L	1.0	5	5
DIBROMOFLUOROMETHANE	109	%	1.0		
1,2-DICHLOROETHANE-D4	104	%	1.0		
TOLUENE-D8	105	%	1.0		
P-BROMOFLUOROBENZENE	103	%	1.0		

Report Notes:

3P

PREPARATION BLANKS

Lab Name: Katahdin Analytical Services | Sample ID: PBWPI22ICW0

Matrix: WATER | SDG Name: WP3906

QC Batch ID: PI22ICW0

Concentration Units (ug/L or mg/Kg dry weight): ug/L

Analyte	RESULT	C
LEAD	1.090	U

LABORATORY CONTROL SAMPLES

Lab Name: Katahdin Analytical Services **Sample ID: LCSWPI22ICW0**

Matrix: WATER **SDG Name: WP3906**

QC Batch ID: PI22ICW0

Concentration Units (ug/L or mg/Kg dry weight): ug/L

Analyte	TRUE	FOUND	% R	LIMITS (%)	
LEAD	500.0	552.13	110.4	80	120

5A

SPIKE SAMPLE RECOVERY

Lab Name: Katahdin Analytical Services

Client Field ID: 25GLM0701S

Matrix: WATER

SDG Name: WP3906

Percent Solids: 0.00

Lab Sample ID: WP3906-046S

Concentration Units (ug/L or mg/Kg dry weight): ug/L

Analyte	Spiked Sample Result	C	Sample Result	C	Spike Added	%R	Q	Control Limits (%R) Low	High	M
LEAD	538.0900		0.6200	U	500	107.6		75	125	P

Comments:

FORM V (Part 1) - IN

5A

SPIKE SAMPLE RECOVERY

Lab Name: Katahdin Analytical Services

Client Field ID: 25GLM0701S

Matrix: WATER

SDG Name: WP3906

Percent Solids: 0.00

Lab Sample ID: WP3906-046P

Concentration Units (ug/L or mg/Kg dry weight): ug/L

Analyte	Spiked Sample Result	C	Sample Result	C	Spike Added	%R	Q	Control Limits (%R) Low	High	M
LEAD	504.6900		0.6200	U	500	100.9		75	125	P

Comments:

FORM V (Part 1) - IN

5D

SPIKE DUPLICATES

Lab Name: Katahdin Analytical Services

Client Field ID: 25GLM0701

Matrix: WATER

SDG Name: WP3906

Percent Solids: 0.00

Lab Sample ID: WP3906-046

Concentration Units (ug/L or mg/Kg dry weight): ug/L

Analyte	Control Limits	Spike Result	C	Spike Dup. Result	C	RPD	Q	M
LEAD		538.0900		504.6900		6.4		P

Comments:

FORM VD - IN

[illegible] Quality Control Report

Method Blank and Laboratory Control Sample Results

Client:	Tetra Tech NUS
Work Order:	WP3906

			METHOD BLANK RESULTS						LABORATORY CONTROL SAMPLE RESULTS					
Parameter	Date of Prep	Date of Analysis	Units		Concentration Measured in Blank		Acceptance Range	Practical Quantitation Level**	Units	True Value	Measured Value	Percent Recovered	Acceptance Range (%)	Acceptance Range (mg/kg)
Nitrate-Nitrogen	14-Sep-99	14-Sep-99	mg/L	<	0.050	<	0.050	0.050	mg/L	1.00	0.931	93.1	80-120	
Sulfate	24-Sep-99	24-Sep-99	mg/L	<	1.0	<	1.0	1.0	mg/L	10	10	100.0	80-120	
	04-Oct-99	04-Oct-99	mg/L	<	1.0	<	1.0	1.0	mg/L	250	223	89.2	83-112	@

** Practical quantitation level is the lowest concentration measurable for samples with normal chemical and physical composition during routine laboratory operations.

DATA QUALITY COMMENTS:
Results of all quality control measurements are within the laboratory and method specified acceptance range except as noted.

@ The laboratory uses the internally established statistical 99% confidence range as the acceptance range for this LCS.

Katahdin Analytical Services, Inc.
Quality Control Report

Duplicate and Matrix Spike/Matrix Spike Duplicate Results

Client:	Tetra Tech NUS
Work Order:	WP3906

			DUPLICATE RESULTS					*MATRIX SPIKE/MATRIX SPIKE DUPLICATE RESULTS*										
			Sample Measurements				Acceptance		Concentration or Quantity				Matrix Spike Recovery (%)					
Parameter	Katahdin Sample No	Units	Rep 1	Rep 2	Mean Conc	RPD (%)	Range for RPD (%)	Units	Sampl Only	Spike Added	Sample +Spike Dup 1	Sample +Spike Dup 2	Sample +Spike Dup 1	Sampl +Spik Dup	Acceptance Range (%)	RPD (%)	Acceptance Range (%)
Nitrate - N	WP3906-46	mg/L	0.161	0.163	0.162	1.2	0-20	mg/L	0.16	0.5	0.396		47.2	*	75-125		0-20

RPD = Relative percent difference, which is the absolute value of the difference between two replicate results divided by the mean concentration then multiplied by 100%.

DATA QUALITY COMMENTS:

Results of all quality control measurements are within the laboratory or contract specified acceptance range except as noted. The laboratory does not use the sample duplicate and matrix spike acceptance ranges as acceptance criteria for a specific analysis. Sample duplicate and matrix spike data are used to evaluate method performance in the environmental sample matrix only. Please refer to LCS data for assessment of quality control for each parameter.

* Matrix spike recovery is outside the laboratory's specified acceptance range indicating potential sample matrix interference and potential bias of reported value for this parameter.

4B

SEMIVOLATILE ORGANICS METHOD BLANK SUMMARY

EPA SAMPLE NO.

SBLK;091799

Lab Name: Katahdin Analytical Services SDG No.: WP3906

Lab File ID: X2921 Lab Sample ID: SBLK;091799

Instrument ID: 5970-X Date Extracted: 9/17/99

GC Column: RTX-5 ID: 0.25 (mm) Date Analyzed: 09/27/99

Matrix: (soil/water) WATER Time Analyzed: 16:30

Level: (low/med) LOW

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, LCS'S, MS AND MSD'S :

Client Sample ID	Lab Sample ID	Lab Data File	Date Injected	Time Injected
LCS;091799	LCS;091799	X2922	9/27/99	5:14:00 PM
42GLM1601	WP3906-13	X2923	9/27/99	5:59:00 PM
42GLM1001	WP3906-19	X2924	9/27/99	6:43:00 PM
42GLM1001MS	WP3906-19MS	X2925	9/27/99	7:27:00 PM
42GLM1001MSD	WP3906-19MSD	X2926	9/27/99	8:11:00 PM
42GLM0801	WP3906-21	X2928	9/27/99	9:39:00 PM
42GLM1001	WP3906-19DL	X2933	9/28/99	11:59:00 AM
42GLM1201	WP3906-20	X2934	9/28/99	12:43:00 PM
42GLM0601	WP3906-22	X2935	9/28/99	1:27:00 PM
42GLM0701D	WP3906-23	X2936	9/28/99	2:12:00 PM
42GLM0101D	WP3906-24	X2937	9/28/99	2:56:00 PM
42GLM1801	WP3906-25	X2938	9/28/99	3:40:00 PM
36GLM0601	WP3906-28	X2939	9/28/99	4:24:00 PM
36GLM0201	WP3906-29	X2940	9/28/99	5:09:00 PM
36GLM0301	WP3906-30	X2941	9/28/99	5:53:00 PM
42GLM0901	WP3906-32	X2943	9/28/99	7:22:00 PM
42GLM0101	WP3906-34	X2945	9/28/99	8:50:00 PM
42GLM0601	WP3906-22RA	X2947	9/29/99	10:07:00 AM
42GLM0701	WP3906-31	X2948	9/29/99	10:51:00 AM
42GLM1101	WP3906-33	X2949	9/29/99	11:35:00 AM
42GLM1301	WP3906-35	X2950	9/29/99	12:20:00 PM
25GLM0301	WP3906-42	X2951	9/29/99	1:04:00 PM
25GLM0801	WP3906-43	X2952	9/29/99	1:48:00 PM
25GLM0601	WP3906-44	X2953	9/29/99	2:32:00 PM
16GLM7D01	WP3906-47	X2954	9/29/99	3:17:00 PM

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: SBLK;091799
SDG: WP3906
Report Date: 10/6/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: N/A
Method: EPA 8270
Date Analyzed: 9/27/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
SBLK;091799	AQ	-	-	9/17/99	DPD	EPA 3510	SW

Compound	Result	Units	DF	Sample PQL	Method PQL
NAPHTHALENE	<10	ug/L	1.0	10	10
2-METHYLNAPHTHALENE	<10	ug/L	1.0	10	10
ACENAPHTHYLENE	<10	ug/L	1.0	10	10
ACENAPHTHENE	<10	ug/L	1.0	10	10
FLUORENE	<10	ug/L	1.0	10	10
PHENANTHRENE	<10	ug/L	1.0	10	10
ANTHRACENE	<10	ug/L	1.0	10	10
FLUORANTHENE	<10	ug/L	1.0	10	10
PYRENE	<10	ug/L	1.0	10	10
BENZO[A]ANTHRACENE	<10	ug/L	1.0	10	10
CHRYSENE	<10	ug/L	1.0	10	10
BENZO[B]FLUORANTHENE	<10	ug/L	1.0	10	10
BENZO[K]FLUORANTHENE	<10	ug/L	1.0	10	10
BENZO[A]PYRENE	<10	ug/L	1.0	10	10
INDENO[1,2,3-CD]PYRENE	<10	ug/L	1.0	10	10
DIBENZ[A,H]ANTHRACENE	<10	ug/L	1.0	10	10
BENZO[G,H,I]PERYLENE	<10	ug/L	1.0	10	10
NITROBENZENE-D5	82	%	1.0		
2-FLUOROBIPHENYL	81	%	1.0		
TERPHENYL-D14	112	%	1.0		

Report Notes:

Katahdin Analytical Services

8270 LCS Recovery Sheet

Lab File: X2922 **Sample ID:** LCS;091799 **Date Run:** 9/27/99

Analyst: SW **Time Injected:** 5:14:00 PM **Matrix:** AQ

Compound Name	Spike Amt (ug/L)	Result (ug/L)	Rec (%)	Limits (%)
2-METHYLNAPHTHALENE	50	33.1	*66	70-130
ACENAPHTHENE	50	34.4	*69	70-130
ACENAPHTHYLENE	50	34.5	*69	70-130
ANTHRACENE	50	45.7	91	70-130
BENZO[A]ANTHRACENE	50	44.5	89	70-130
BENZO[A]PYRENE	50	44.6	89	70-130
BENZO[B]FLUORANTHENE	50	44.5	89	70-130
BENZO[G,H,I]PERYLENE	50	46.5	93	70-130
BENZO[K]FLUORANTHENE	50	46.5	93	70-130
CHRYSENE	50	53.3	106	70-130
DIBENZ[A,H]ANTHRACENE	50	44.1	88	70-130
FLUORANTHENE	50	43.5	87	70-130
FLUORENE	50	35.5	71	70-130
INDENO[1,2,3-CD]PYRENE	50	41.0	82	70-130
NAPHTHALENE	50	31.3	*62	70-130
PHENANTHRENE	50	47.5	95	70-130
PYRENE	50	48.8	98	70-130

*** Out of Limits** *1*

Katahdin Analytical Services

MS/MSD Report

Sample	File Name	Date Acquired	Time Inj	Analyst	Matrix	Method
WP3906-19	X2924	9/27/99	6:43:00 PM	SW	AQ	8270_99
WP3906-19MS	X2925	9/27/99	7:27:00 PM	SW	AQ	8270_99
WP3906-19MSD	X2926	9/27/99	8:11:00 PM	SW	AQ	8270_99

Compound Name	Native (ug/L)	MS Spk Amount (ug/L)	MSD Spk Amount (ug/L)	MS Result (ug/L)	MSD Result (ug/L)	MS REC (%)	MSD REC (%)	Recovery Limits (%)	RPD (%)	RPD Limit (%)
CHRYSENE	0	56	54	45.8	44.6	82	82	60-140	2.6	30
ACENAPHTHENE	57.8	56	54	104	97.8	82	74	60-140	6.1	30
ACENAPHTHYLENE	0	56	54	35.9	37.2	64	69	60-140	3.6	30
ANTHRACENE	9.96	56	54	50.1	45.9	72	66	60-140	8.8	30
BENZO[A]ANTHRACENE	0	56	54	37.2	39.2	66	72	60-140	5.2	30
BENZO[A]PYRENE	0	56	54	35.2	41.3	63	76	60-140	16	30
BENZO[B]FLUORANTHENE	0	56	54	34.5	43.5	62	80	60-140	23	30
2-METHYLNAPHTHALENE	34.7	56	54	74.6	52.1	71	*32	60-140	*36	30
BENZO[K]FLUORANTHENE	0	56	54	34.0	42.4	61	78	60-140	22	30
PYRENE	13.2	56	54	57.6	58.9	79	85	60-140	2.2	30
DIBENZ[A,H]ANTHRACENE	0	56	54	35.2	37.8	63	70	60-140	7.1	30
FLUORANTHENE	20.8	56	54	59.1	61.9	68	76	60-140	4.6	30
FLUORENE	32.4	56	54	72.3	60.0	71	*51	60-140	18	30
INDENO[1,2,3-CD]PYRENE	0	56	54	38.2	32.0	68	*59	60-140	18	30
NAPHTHALENE	255	56	54	365	356	*197	*187	60-140	2.5	30
PHENANTHRENE	66.0	56	54	116	98.8	89	61	60-140	16	3
BENZO[G,H,I]PERYLENE	0	56	54	39.3	40.8	70	76	60-140	3.7	30

RPD =[(ms res - msd res) / (ms res + msd res)/2] * 100

* Out of Limits

4B

SEMIVOLATILE ORGANICS METHOD BLANK SUMMARY

EPA SAMPLE NO.

SBLK;092099

Lab Name: Katahdin Analytical Services SDG No.: WP3906

Lab File ID: X2931 Lab Sample ID: SBLK;092099

Instrument ID: 5970-X Date Extracted: 9/20/99

GC Column: RTX-5 ID: 0.25 (mm) Date Analyzed: 09/28/99

Matrix: (soil/water) WATER Time Analyzed: 10:30

Level: (low/med) LOW

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, LCS'S, MS AND MSD'S :

Client Sample ID	Lab Sample ID	Lab Data File	Date Injected	Time Injected
LCS;092099	LCS;092099	X2932	9/28/99	11:14:00 AM
36GLM0201D	WP3906-14	X2955	9/29/99	4:01:00 PM
25GLM0401	WP3906-45	X2956	9/29/99	4:45:00 PM
26GLP1201	WP3906-48	X2958	9/29/99	6:13:00 PM
26GLP1301	WP3906-49	X2959	9/29/99	6:58:00 PM
25GLM0701	WP3906-46	X2962	9/30/99	8:46:00 AM

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: SBLK;092099
SDG: WP3906
Report Date: 10/6/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: N/A
Method: EPA 8270
Date Analyzed: 9/28/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
SBLK;092099	AQ	-	-	9/20/99	DS	EPA 3510	KRT

Compound	Result	Units	DF	Sample PQL	Method PQL
NAPHTHALENE	<10	ug/L	1.0	10	10
2-METHYLNAPHTHALENE	<10	ug/L	1.0	10	10
ACENAPHTHYLENE	<10	ug/L	1.0	10	10
ACENAPHTHENE	<10	ug/L	1.0	10	10
FLUORENE	<10	ug/L	1.0	10	10
PHENANTHRENE	<10	ug/L	1.0	10	10
ANTHRACENE	<10	ug/L	1.0	10	10
FLUORANTHENE	<10	ug/L	1.0	10	10
PYRENE	<10	ug/L	1.0	10	10
BENZO[A]ANTHRACENE	<10	ug/L	1.0	10	10
CHRYSENE	<10	ug/L	1.0	10	10
BENZO[B]FLUORANTHENE	<10	ug/L	1.0	10	10
BENZO[K]FLUORANTHENE	<10	ug/L	1.0	10	10
BENZO[A]PYRENE	<10	ug/L	1.0	10	10
INDENO[1,2,3-CD]PYRENE	<10	ug/L	1.0	10	10
DIBENZ[A,H]ANTHRACENE	<10	ug/L	1.0	10	10
BENZO[G,H,I]PERYLENE	<10	ug/L	1.0	10	10
NITROBENZENE-D5	84	%	1.0		
2-FLUOROBIPHENYL	93	%	1.0		
TERPHENYL-D14	90	%	1.0		

Report Notes:

Katahdin Analytical Services

8270 LCS Recovery Sheet

Lab File: X2932 **Sample ID:** LCS;092099 **Date Run:** 9/28/99

Analyst: SW **Time Injected:** 11:14:00 AM **Matrix:** AQ

Compound Name	Spike Amt (ug/L)	Result (ug/L)	Rec (%)	Limits (%)
2-METHYLNAPHTHALENE	50	37.9	76	70-130
ACENAPHTHENE	50	38.6	77	70-130
ACENAPHTHYLENE	50	40.3	80	70-130
ANTHRACENE	50	42.9	86	70-130
BENZO[A]ANTHRACENE	50	41.3	82	70-130
BENZO[A]PYRENE	50	41.0	82	70-130
BENZO[B]FLUORANTHENE	50	40.5	81	70-130
BENZO[G,H,I]PERYLENE	50	43.8	88	70-130
BENZO[K]FLUORANTHENE	50	42.3	84	70-130
CHRYSENE	50	50.7	101	70-130
DIBENZ[A,H]ANTHRACENE	50	39.2	78	70-130
FLUORANTHENE	50	42.4	85	70-130
FLUORENE	50	37.0	74	70-130
INDENO[1,2,3-CD]PYRENE	50	40.7	81	70-130
NAPHTHALENE	50	37.1	74	70-130
PHENANTHRENE	50	44.5	89	70-130
PYRENE	50	46.0	92	70-130

* Out of Limits

4A

VOLATILE ORGANICS METHOD BLANK SUMMARY

EPA SAMPLE NO.

VBLKU21B

Lab Name: Katahdin Analytical Services SDG No.: WP3906

Lab File ID: U1000 Lab Sample ID: VBLKU21B

Date Analyzed: 09/21/99 Time Analyzed: 16:31

GC Column: RTX-624 ID: 0.18 (mm) Heated Purge: (Y/N) N

Instrument ID: 5973-U

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, LCS'S, MS AND MSD'S :

Client Sample ID	Lab Sample ID	Lab Data File	Date Injected	Time Injected
LCSU21B	LCSU21B	U0999	9/21/99	3:50:00 PM
25GLM0801	WP3906-43	U1009	9/21/99	10:05:00 PM
25GLM0601	WP3906-44	U1010	9/21/99	10:40:00 PM
25GLM0401	WP3906-45	U1011	9/21/99	11:16:00 PM
25GLM0701	WP3906-46	U1012	9/21/99	11:52:00 PM

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: VBLKU21B
SDG: WP3906
Report Date: 10/12/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: N/A
Method: SW8260
Date Analyzed: 9/21/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
VBLKU21B	AQ	-	-	9/21/99	JSS	5030	JSS

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<5	ug/L	1.0	5	5
TOLUENE	<5	ug/L	1.0	5	5
1,2-DIBROMOETHANE	<5	ug/L	1.0	5	5
ETHYLBENZENE	<5	ug/L	1.0	5	5
NAPHTHALENE	<5	ug/L	1.0	5	5
MTBE	<5	ug/L	1.0	5	5
TOTAL XYLENES	<5	ug/L	1.0	5	5
DIBROMOFLUOROMETHANE	105	%	1.0		
1,2-DICHLOROETHANE-D4	99	%	1.0		
TOLUENE-D8	104	%	1.0		
P-BROMOFLUOROBENZENE	102	%	1.0		

Report Notes:

Katahdin Analytical Services
8260 LCS Recovery Sheet

Lab File: U0999 **Sample ID:** LCSU21B **Date Run:** 9/21/99

Analyst: JSS **Time Injected:** 3:50:00 PM **Matrix:** AQ

Compound Name	Spike Amt (ug/L)	Result (ug/L)	Rec (%)	Limits (%)
1,2-DIBROMOETHANE	50	50.2	100	60-140
BENZENE	50	50.3	101	60-140
ETHYLBENZENE	50	49.0	98	60-140
MTBE	50	43.1	86	60-140
NAPHTHALENE	50	45.4	91	60-140
TOLUENE	50	52.7	105	60-140
TOTAL XYLENES	150	143	96	60-140

* Out of Limits

1

4A

VOLATILE ORGANICS METHOD BLANK SUMMARY

EPA SAMPLE NO.

VBLKU22A

Lab Name: Katahdin Analytical Services SDG No.: WP3906

Lab File ID: U1018 Lab Sample ID: VBLKU22A

Date Analyzed: 09/22/99 Time Analyzed: 10:44

GC Column: RTX-624 ID: 0.18 (mm) Heated Purge: (Y/N) N

Instrument ID: 5973-U

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, LCS'S, MS AND MSD'S :

Client Sample ID	Lab Sample ID	Lab Data File	Date Injected	Time Injected
LCSU22A	LCSU22A	U1017	9/22/99	9:54:00 AM
25GLM0601	WP3906-44DL	U1019	9/22/99	11:32:00 AM
23GLM0401	WP3906-36DL	U1021	9/22/99	12:47:00 PM
36GLM0501MS	WP3906-5MS	U1025	9/22/99	3:14:00 PM
36GLM0501MSD	WP3906-5MSD	U1026	9/22/99	3:50:00 PM

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: VBLKU22A
SDG: WP3906
Report Date: 10/12/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: N/A
Method: SW8260
Date Analyzed: 9/22/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
VBLKU22A	AQ	-	-	9/22/99	KMC	5030	KMC

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<5	ug/L	1.0	5	5
TOLUENE	<5	ug/L	1.0	5	5
1,2-DIBROMOETHANE	<5	ug/L	1.0	5	5
ETHYLBENZENE	<5	ug/L	1.0	5	5
NAPHTHALENE	<5	ug/L	1.0	5	5
MTBE	<5	ug/L	1.0	5	5
TOTAL XYLENES	<5	ug/L	1.0	5	5
DIBROMOFLUOROMETHANE	110	%	1.0		
1,2-DICHLOROETHANE-D4	99	%	1.0		
TOLUENE-D8	107	%	1.0		
P-BROMOFLUOROBENZENE	104	%	1.0		

Report Notes:

Katahdin Analytical Services

8260 LCS Recovery Sheet

Lab File: U1017 **Sample ID: LCSU22A** **Date Run: 9/22/99**

Analyst: KMC **Time Injected: 9:54:00 AM** **Matrix: AQ**

Compound Name	Spike Amt (ug/L)	Result (ug/L)	Rec (%)	Limits (%)
1,2-DIBROMOETHANE	50	49.7	99	60-140
BENZENE	50	51.1	102	60-140
ETHYLBENZENE	50	48.6	97	60-140
MTBE	50	41.8	84	60-140
NAPHTHALENE	50	41.2	82	60-140
TOLUENE	50	53.6	107	60-140
TOTAL XYLENES	150	141	94	60-140

*** Out of Limits** *1*

Katahdin Analytical Services

MS/MSD Report

Sample	File Name	Date Acquired	Time inj	Analyst	Matrix	Method
WP3906-5	Q6636	9/15/99	7:27:00 PM	HMP	AQ	8260_99
WP3906-5MS	U1025	9/22/99	3:14:00 PM	KMC	AQ	8260_99
WP3906-5MSD	U1026	9/22/99	3:50:00 PM	KMC	AQ	8260_99

Compound Name	Native (ug/L)	MS Spk Amount (ug/L)	MSD Spk Amount (ug/L)	MS Result (ug/L)	MSD Result (ug/L)	MS REC (%)	MSD REC (%)	Recovery Limits (%)	RPD (%)	RPD Limit (%)
TOTAL XYLENES	0	150	150	134	123	89	82	60-140	8.6	20
TOLUENE	0	50	50	51.1	46.5	102	93	60-140	9.4	20
NAPHTHALENE	0	50	50	45.6	42.6	91	85	60-140	6.8	20
MTBE	0	50	50	45.4	43.4	91	87	60-140	4.5	20
ETHYLBENZENE	0	50	50	45.6	41.8	91	84	60-140	8.7	20
BENZENE	0	50	50	48.5	44.6	97	89	60-140	8.4	20
1,2-DIBROMOETHANE	0	50	50	53.6	48.8	107	98	60-140	9.4	20

RPD =|(ms res - msd res) / (ms res + msd res)/2| * 100

* Out of Limits

ENSR
ENSR Consulting and Engineering
Air Toxics Specialty Laboratory

ENSR
Air Toxics Specialty Laboratory
42 Nagog Park
Acton, MA 01720

DATE: October 12, 1999

TO: Andrea Colby
Katahdin Analytical
340 County Road No. 5
P.O. Box 720
Westbrook, ME 04098

Re: Organic Analyses of Aqueous Samples for Methane by Gas Chromatography/ Flame Ionization Detection (GC/FID)- **WP3906**

PROJECT #: **8601-008-200**

LAB ID #: **990175**

ANALYTICAL PROCEDURE:

Nine (9) aqueous samples were analyzed for methane under the guidelines of SW-846 Method 3810.

A Hewlett Packard 5890 series II gas chromatograph (GC) equipped with a Hewlett Packard flame ionization detector (FID) was used for the analysis. A 1.0 mL headspace aliquot of each sample was injected into the column for analysis. The operating conditions of the GC/FID are listed in Table 1. A five point calibration was performed for the target analyte, methane.

No problems occurred during sample receipt, log-in, or analysis.

QUALITY CONTROL:

1. A laboratory blank was analyzed daily in the same manner as the samples. Methane was not detected in the blank.

2. MS/MSD analyses were performed on the following sample:
   WP3906-28

   The recoveries and relative percent differences of methane were within the QC acceptance limits.

3. A duplicate analysis was performed on the following sample:
   WP3906-34(A)

4. A laboratory control spike was analyzed daily. The recovery of methane was within the QC acceptance limits.

Date Samples Received by the Laboratory: 9/16/99

Date Analysis Started: 9/24/99

C:\My Documents\Kat 990175 990178 990180\katrpt3.doc

Katahdin Analytical Services
340 County Road No. 5
P.O. Box 720
Westbrook, ME 04098
Tel: (207) 874-2400
Fax: (207) 775-4029

CHAIN of CUSTODY

PLEASE PRINT IN PEN

Page ____ of ____

Client	Contact	Phone #	Fax #
Katahdin Analytical Services	Andrea Colby	( )	( )

ddress	City	State	Zip Code
as above			

Purchase Order #	Proj. Name / No.	Katahdin Quote #

Bill (if different than above)	Address

Sampler (Print / Sign)	Copies To:

LAB USE ONLY WORK ORDER #:

KATAHDIN PROJECT MANAGER

REMARKS: Send to ENSR

SHIPPING INFO: ☒ FED EX ☐ UPS ☐ CLIENT

AIRBILL NO:

TEMP°C ____ ☐ TEMP BLANK ☐ INTACT ☐ NOT INTACT

ANALYSIS AND CONTAINER TYPE
PRESERVATIVES

*	Sample Description	Date / Time coll'd	Matrix	No. of Cntrs.	Filt. Y N	Filt. Y N	Filt. Y N	Filt. Y N	Filt. Y N	Filt. Y N	Filt. Y N	Filt. Y N	Filt. Y N	Filt. Y N
					Lab ID									
	UP 3906-28	9-13-99 / 1015	AQ	3	X					1				
	UP 3906-29	/ 1055		3	X					2				
	UP 3906-30	/ 1131		3	X					3				
	UP 3906-31	/ 1202		3	X					4				
	UP 3906-32	/ 1206		3	X					5				
	UP 3906-33	/ 1204		3	X					6				
	UP 3906-34	/ 1435		3	X					1				
	UP 3906-35	/ 1449		3	X					2				
	UP 3906-46	/ 1115		3	X					7				
		/												
		/												
		/												
		/												
		/												
		/												
		/												

COMMENTS

QC-II + Alternative DL (KAL0070C-DB3) Results Due: 10-13-99

Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)
	9-14-99 1625			9/16/99 1440	
Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)

DUPLICATE

SAMPLE LOG-IN & RECEIPT CHECKLIST

Client/Proj #: Katahdin WP3906 / 8601-008-200

Proj Mgr: M. Hoyt

Lab Pool #: 990175

Inspected & Logged in by: A. MacDuff

Date Time: 9/16/99 @ 1440

Sample Matrix	Number of Samples	Analysis Requested	Analyze by (date)	Storage Location
Aqueous	9	CH4	9/30/99 Due 10/13	R1

Circle the appropriate response:

1) Shipped / Hand delivered

2) COC present / not present on receipt

3) COC Tape present / not present on shipping container

4) Samples broken / intact on receipt

5) Samples ambient / chilled on receipt Temp blank = 5°C

6) Samples preserved correctly / incorrectly / none recommended

7) Received within / outside holding time

8) COC tapes present / not present on samples

9) Discrepancies / NO discrepancies noted between COCs and samples

Additional Comments: 3 VOAs per sample

25GLM0701

ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

Lab Name: ENSR Contract: WP3906-46(C)

Lab Code: Case No.: SAS NO.: SDG NO.:

Matrix: (soil/water) water Lab Sample ID: 990175-9

Sample wt / vol: 32.5 ml (g/ml) Lab File ID: KAT_008

Level: (low/med) low Date Received: 9/16/99

% Moisture: NA Date Analyzed: 9/24/99

GC Column: Carboxen 1004 OD: 1/16" Dilution Factor: 1

Soil Extract Volume: NA (µl) Soil Aliquot Volume: NA (µl)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or PPMv) µg/L	Q
74-82-8	Methane	6.5	

ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLK01

Lab Name: ____ ENSR _____ Contract: _____

Lab Code: _____ Case No.: _____ SAS NO.: _____ SDG NO.: _____

Matrix: (soil/water) _____ water _____ Lab Sample ID: MB990175

Sample wt / vol: ____ 32.5 ml _____ (g/ml) Lab File ID: ___KAT_006_____

Level: (low/med) _____ low _____ Date Received: ___NA _____

% Moisture: _____ NA _____ Date Analyzed: ___9/24/99 _____

GC Column: _ Carboxen 1004 __ OD: ___ 1/16" ___ Dilution Factor: _____ 1 _____

Soil Extract Volume: _____ NA ____ (µl) Soil Aliquot Volume: ____ NA ____ (µl)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or PPMv) __ µg/L __	Q
74-82-8	Methane	5.2	U

ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

Lab Name: ENSR Contract: LCS01

Lab Code: Case No.: SAS NO.: SDG NO.:

Matrix: (soil/water) water Lab Sample ID: LCS990175

Sample wt / vol: 32.5 ml (g/ml) Lab File ID: KAT_007

Level: (low/med) low Date Received: NA

% Moisture: NA Date Analyzed: 9/24/99

GC Column: Carboxen 1004 OD: 1/16" Dilution Factor: 1

Soil Extract Volume: NA (µl) Soil Aliquot Volume: NA (µl)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or PPMv) µg/L	Q
74-82-8	Methane	210	

ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

WP3906-28(B) MS

Lab Name: ENSR Contract:

Lab Code: Case No.: SAS NO.: SDG NO.:

Matrix: (soil/water) water

Lab Sample ID: 990175-1 MS

Sample wt / vol: 32.5 ml (g/ml)

Lab File ID: KAT_023

Level: (low/med) low

Date Received: 9/16/99

% Moisture: NA

Date Analyzed: 9/24/99

GC Column: Carboxen 1004 OD: 1/16"

Dilution Factor: 1

Soil Extract Volume: NA (µl)

Soil Aliquot Volume: NA (µl)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or PPMv) µg/L	Q
74-82-8	Methane	340	

ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

WP3906-28(C) MSD

Lab Name: ENSR Contract:

Lab Code: Case No.: SAS NO.: SDG NO.:

Matrix: (soil/water) water

Lab Sample ID: 990175-1 MSD

Sample wt / vol: 32.5 ml (g/ml)

Lab File ID: KAT_024

Level: (low/med) low

Date Received: 9/16/99

% Moisture: NA

Date Analyzed: 9/24/99

GC Column: Carboxen 1004 OD: 1/16"

Dilution Factor: 1

Soil Extract Volume: NA (µl)

Soil Aliquot Volume: NA (µl)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or PPMv) µg/L	Q
74-82-8	Methane	350	

LABORATORY CONTROL SPIKE RECOVERY

Lab Name: ____ ENSR _____ Contract: _____

Lab Code: _____ Case NO.: _____ SAS NO.: _____ SDG NO.: _____

Laboratory Control Sample No: _____ LCS01 _____

COMPOUND	SPIKE ADDED (µg/L)	LCS CONCENTRATION (µg/L)	LCS % REC #	QC LIMITS REC.
Methane	205.0	206.7	101%	50 - 150

* - Values outside of QC limits.

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: ____ ENSR _____ Contract: _____

Lab Code: _____ Case NO.: _____ SAS NO.: _____ SDG NO.: _____

Matrix Spike - EPA Sample NO.: __WP3906-28 _____

COMPOUND	SPIKE ADDED (µg/L)	SAMPLE CONCENTRATION (µg/L)	MS CONCENTRATION (µg/L)	MS % REC #	QC LIMITS REC.
Methane	205.0	189	344.8	76%	50-150

COMPOUND	SPIKE ADDED (µg/L)	MSD CONCENTRATION (µg/L)	MSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
Methane	205.0	345.8	77%	0.68%	50	50-150

Spike recovery: _____ 0 _____ out of ____ 2 ___ outside limits.
RPD: _____ 0 ____ out of ___ 1 ____ outside limits.

Comments:

_____

_____

Katahdin
ANALYTICAL SERVICES

SITE 25
GW

October 20, 1999

Mr. Paul Calligan
Tetra Tech Nus
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

RE: Katahdin Lab Number: WP4035
Project ID: CNC Charleston
Project Manager: Ms. Andrea J.Colby
Sample Receipt Date(s): 9/22/99

Dear Mr. Calligan:

Please find enclosed the following information:

* Report of Analysis
* Quality Control Data Summary
* Chain of Custody
* Confirmation

Should you have any questions or comments concerning this Report of Analysis, please do not hesitate to contact the project manager listed above. This cover letter is an integral part of the ROA.

We appreciate your continued use of our laboratory and look forward to working with you in the future. The following signature indicates technical review and acceptance of the data.

Sincerely,

KATAHDIN ANALYTICAL SERVICES

Patricia Homey
Authorized Signature

10/20/99
Date

340 County Road No. 5
P.O. Box 720, Westbrook, ME 04098
Tel: (207) 874-2400 Fax: (207) 775-4029

http://katahdinlab.com

210 West Road No. 5, Portsmouth, NH 03801
Tel: (603) 431-5777 Fax: (603) 436-3356

Katahdin
ANALYTICAL SERVICES

SDG NARRATIVE
KATAHDIN ANALYTICAL SERVICES
TETRA TECH NUS
CASE CNC CHARLESTON

Sample Receipt

The following samples were received on September 22, 1999 and were logged in under Katahdin Analytical Services work order number WP4035 for a hardcopy due date of October 22, 1999.

KATAHDIN Sample No.	TTNUS Sample Identification	GEL Sample Identification
WP4035-1	22GLM0301	
WP4035-2	22GLM0401	
WP4035-3	22GLM0601	
WP4035-4	25GLM0101	
WP4035-5	25GLM0501	
WP4035-6	25GLM0501D	
WP4035-7	25GLX0201	
WP4035-8	25GLX0401	
WP4035-9	22GLM0301D	
WP4035-10	25TL00201	
WP4035-11	36SLB020405	9909644-05
WP4035-12	36SLB050405	9909644-06
WP4035-13	36SLB030405	9909644-07

The samples were logged in for the analyses specified on the chain of custody form. All problems encountered and resolved during sample receipt have been documented on the applicable chain of custody forms.

Sample analyses have been performed by the methods as noted herein.

Volatile Organic Analysis

Three soil/sediment and ten aqueous samples were received by the Katahdin Analytical Services, Inc. GC/MS laboratory on September 22, 1999 and were specified to be analyzed by USEPA method 8260B for the analytes benzene, toluene, ethylbenzene, xylenes, MTBE, naphthalene, and EDB.

Analyses for this workorder were performed on the 5973-U (aqueous), 5970-Q (aqueous), and 5972-M (low level soils) instruments. A VSTD050 (50 ppb standard) was used for the continuing calibration standard. Internal standard and surrogate compounds were also spiked at 50 ppb.

Batch QC (VBLK, and LCS) was performed in each twelve-hour window. Results are included in this data package. The LCS QC samples were spiked with the entire list of compounds quantitated for at 50 ppb. No matrix spike/matrix spike duplicate analysis was performed on any of the samples in this workorder.

Analyses of samples WP4035-1 and -9 yielded concentrations of 1,1-dichloroethane over the upper limit of the calibration curve. Since this analyte was not requested by the client to be reported, no laboratory action was taken.

Initial analyses of samples WP4035-5 and -6 were performed at 1:50 dilutions due to the matrix, with target analyte concentrations still over the upper limit of the calibration curve, as well as surrogate recovery deviations. Reanalyses occurred at 1:200 dilutions successfully. For each sample, both sets of data are included in this data package.

Several manual integrations were performed due to split peaks; all have been flagged with a "M" (software-generated) on the pertinent quantitation reports. All "M" flags have been dated and initialed by the analyst performing the integration. In addition, all "M" flags have been reviewed and approved by the GC/MS supervisor. Copies of each manual integration are included in the pertinent quantitation reports.

No other protocol deviations were noted by the volatile organics staff.

Semivolatile Organic Analysis

Three soil/sediment and nine aqueous samples were received by Katahdin Analytical Services laboratory on September 22, 1999 for analysis in accordance with 8270C for a client specified PAH list of analytes.

Extraction of the soil samples occurred following USEPA method 3550 on September 24 and 27, 1999. A laboratory control spike was extracted in each batch. Extraction of all of the aqueous samples occurred following USEPA method 3510 on September 23, 1999. A laboratory control sample/laboratory control sample duplicate was extracted in the batch.

Initial analyses of samples WP4035-5 and -6 yielded target analyte concentrations over the upper limit of the calibration curve. Reanalyses occurred at 1:4 dilutions successfully. For each sample, both sets of data are included in this data package.

Initial analysis of sample WP4035-3 yielded internal standard area recovery deviations. Reanalysis yielded similar results, confirming matrix interference. Both sets of data are included in the data package for this sample.

Several manual integrations were performed due to split peaks; all have been flagged with a "M" by the data system. All manual integrations have been dated and initialed by the responsible analyst. Copies of each manual integration are included in the data package. All manual integrations have been reviewed and approved by the GC/MS supervisor.

No other protocol deviations were noted by the semivolatiles organics staff.

Metals Analysis

The samples of Katahdin Work Order WP4035 were prepared and analyzed for metals in accordance with the "Test Methods for Evaluating Solid Waste", SW-846, November 1986, Third Edition.

Inductively-Coupled Plasma (ICP) Atomic Emission Spectroscopic Analysis

Aqueous-matrix Katahdin Sample Nos. WP4035-(1-9) were digested for ICP analysis on 09/24/99 (QC Batch PI24ICW1) in accordance with USEPA Method 3010A. Katahdin Sample No. WP4035-3 was prepared with duplicate matrix-spiked aliquots during digestion.

Soil-matrix Katahdin Sample Nos. WP4035-(11-13) were digested for ICP analysis on 10/01/99 (QC Batch PJ01ICS0) in accordance with USEPA Method 3050B. The measured calcium (16.3 mg/kg) and sodium (11.5 mg/kg) concentrations of the preparation blank that is associated with this QC batch exceed the laboratory's acceptance limits. However, because the measured calcium and sodium concentrations of all associated samples are more than ten times those of the preparation blank, no corrective action was required.

ICP analyses of Katahdin Work Order WP4035 sample digestates were performed in accordance with USEPA Method 6010B, using a Thermo Jarrell Ash (TJA) Trace ICP spectrometer and a TJA 61 ICP spectrometer. All samples were analyzed within holding times and all QC criteria were met with the following comments or exceptions:

Some of the results for run QC samples (ICV, ICB, CCV, CCB, ICSA, and ICSAB) included in the accompanying data package may have exceeded acceptance limits for some elements. Please note that all client samples and batch QC samples associated with out-of-control results for run QC samples were subsequently reanalyzed for the analytes in question.

Analysis of Mercury by Cold Vapor Atomic Absorption (CVAA) Spectrophotometry

Aqueous-matrix Katahdin Sample Nos. WP4035-(1, 2, 3, 9) were digested for mercury analysis on 09/25/99 (QC Batch PI25HGW0) in accordance with USEPA Method 7470A.

Soil-matrix Katahdin Sample Nos. WP4035-(11-13) were digested for mercury analysis on 10/07/99 (QC Batch PJ07HGS1) in accordance with USEPA Method 7471A. Katahdin Sample No. WP4035-11 was prepared with duplicate matrix-spiked aliquots.

Mercury analyses of Katahdin Work Order WP4035 sample digestates were performed using a Leeman Labs PS200 automated mercury analyzer. All samples were analyzed within holding times and all run QC criteria were met.

Katahdin
ANALYTICAL SERVICES

Wet Chemistry Analysis

Due to IC instrument failure, alternate methods were approved for work order WP3906 by Kelly Johnson-Carper for the analysis of nitrate and sulfate. Nitrate analyses (353.2) and Sulfate analyses (375.4) were performed according to the U.S. EPA, Methods for Chemical Analysis of Water and Wastes, EPA 600/4-79-020, 1979, Revised 1983. Sulfate analyses (E300) were performed according to the U.S. EPA "Methods for the Determination of Inorganic Substances in Environmental Samples", EPA 600/R-93/100, August 1993. Analyses for Solids-Total Residue (TS) have been performed in accordance with "Contract Laboratory Program Statement of Work for Inorganic Analysis".

All samples were analyzed within analytical hold times. No protocol deviations were noted by the Wet Chemistry laboratory staff.

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P.O. Box 720, Westbrook, ME 04098
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http://katahdinlab.com

210 West Road No. 5, Portsmouth, NH 03801
Tel: (603) 431-5777 Fax: (603) 436-3356

KATAHDIN ANALYTICAL SERVICES, INC.
SAMPLE RECEIPT CONDITION REPORT
Tel. (207) 874-2400
Fax (207) 775-4029

LAB (WORK ORDER) # WD4035

PAGE: 1 OF 3

COOLER: 1 OF 3

CLIENT: TETRATECH WVS

PROJECT: CTO 68

COC# —
SDG# —
DATE / TIME RECEIVED: 09-22-99 ~ 0930
DELIVERED BY: FEDEX
RECEIVED BY: BKR
LIMS ENTRY BY: BKR
LIMS REVIEW BY / PM: ADL

	YES	NO	EXCEPTIONS	COMMENTS	RESOLUTION
1. CUSTODY SEALS PRESENT / INTACT?	☑	☐	☐		
2. CHAIN OF CUSTODY PRESENT IN THIS COOLER?	☑	☐	☐		
3. CHAIN OF CUSTODY SIGNED BY CLIENT?	☑	☐	☐		
4. CHAIN OF CUSTODY MATCHES SAMPLES?	☑	☐	☐		
5. TEMPERATURE BLANKS PRESENT?	☑	☐	☐	TEMP BLANK TEMP (°C)= 1.0	ADL notified Vanessa Calligan 6 Pm 9/22/99
6. SAMPLES RECEIVED AT 4°C +/- 2?	☐	☑	☐	COOLER TEMP (°C)= NA	
ICE / ICE PACKS PRESENT (Y) or N?				(RECORD COOLER TEMP ONLY IF TEMP BLANK IS NOT PRESENT)	
7. VOLATILES FREE OF HEADSPACE?	☑	☐	☐		
8. TRIP BLANK PRESENT IN THIS COOLER	☑	☐	☐		
9. PROPER SAMPLE CONTAINERS AND VOLUME?	☑	☐	☐		
10. SAMPLES WITHIN HOLD TIME UPON RECEIPT?	☑	☐	☐		
11. SAMPLES PROPERLY PRESERVED[1]?	☐	☑	☐		
12. CORRECTIVE ACTION REPORT FILED?	☐	☑	N/A		

13. ANALYTICAL PROGRAMS (CIRCLE ONE) COMMERCIAL CLP HAZWRAP (NFESC) ACOE AFCEE OTHER (STATE OF ORIGIN):

LOG - IN NOTES[1]:

→ ID 25GL XC401 → Pb only container → pH > 2.0
→ Adj. pH to pH ≤ 2.0

00001104

[1] Use this space (and additional sheets if necessary) to document samples that are received broken or compromised, C-O-C discrepancies, radiation checks, residual chlorine check, results of pH check if required. If samples required pH adjustment, record volume and type of preservative added.

KATAHDIN ANALYTICAL SERVICES, INC.
SAMPLE RECEIPT CONDITION REPORT
Tel. (207) 874-2400
Fax (207) 775-4029

LAB (WORK ORDER) # WP4035

PAGE: 2 OF 3

COOLER: 2 OF 3

CLIENT: T-TECH NUS

PROJECT: CTO 68

COC# —
SDG# —
DATE / TIME RECEIVED: 09-22-99 ~ 0930
DELIVERED BY: FEDEX
RECEIVED BY: BKR
LIMS ENTRY BY: BEH
LIMS REVIEW BY / PM: AJL

	YES	NO	EXCEPTIONS	COMMENTS	RESOLUTION
1. CUSTODY SEALS PRESENT / INTACT?	☑	☐	☐		
2. CHAIN OF CUSTODY PRESENT IN THIS COOLER?	☐	☑	☐		
3. CHAIN OF CUSTODY SIGNED BY CLIENT?	☑	☐	☐		
4. CHAIN OF CUSTODY MATCHES SAMPLES?	☑	☐	☐		
5. TEMPERATURE BLANKS PRESENT?	☑	☐	☐	TEMP BLANK TEMP (°C)= 0.6	AJC notified Dave Calligan EW 9/22/99
6. SAMPLES RECEIVED AT 4°C +/- 2? ICE / ICE PACKS PRESENT (Y) or N?	☐	☑	☐	COOLER TEMP (°C)= NA (RECORD COOLER TEMP ONLY IF TEMP BLANK IS NOT PRESENT)	
7. VOLATILES FREE OF HEADSPACE?	☑	☐	☐		
8. TRIP BLANK PRESENT IN THIS COOLER	☐	☑	☐		
9. PROPER SAMPLE CONTAINERS AND VOLUME?	☑	☐	☐		
10. SAMPLES WITHIN HOLD TIME UPON RECEIPT?	☑	☐	☐		
11. SAMPLES PROPERLY PRESERVED[1]?	☑	☐	☐		
12. CORRECTIVE ACTION REPORT FILED?	☐	☑	N/A		

13. ANALYTICAL PROGRAMS (CIRCLE ONE) COMMERCIAL CLP HAZWRAP (NFESC) ACOE AFCEE OTHER (STATE OF ORIGIN):

LOG - IN NOTES[1]:

0000105

(1) Use this s[illegible] (and additional sheets if necessary) to document samples that are received broken [illegible] promised, C-O-C discrepancies, radiation checks, residual chlorine check, results of pH check if [illegible]d. If samples required pH adjustment, record volume and type of preservative added.

KATAHDIN ANALYTICAL SERVICES, INC.
SAMPLE RECEIPT CONDITION REPORT
Tel. (207) 874-2400
Fax (207) 775-4029

LAB (WORK ORDER) # WP 4035

PAGE: 3 OF 3

COOLER: 3 OF 3

COC# —
SDG# —
DATE / TIME RECEIVED: 09-22-99~0930
DELIVERED BY: FEDEX
RECEIVED BY: BKR
LIMS ENTRY BY: BEH
LIMS REVIEW BY / PM: AC

CLIENT: I-TECH NUS

PROJECT: CTD 68

	YES	NO	EXCEPTIONS	COMMENTS	RESOLUTION
1. CUSTODY SEALS PRESENT / INTACT?	☑	☐	☐		
2. CHAIN OF CUSTODY PRESENT IN THIS COOLER?	☐	☑	☐		
3. CHAIN OF CUSTODY SIGNED BY CLIENT?	☑	☐	☐		
4. CHAIN OF CUSTODY MATCHES SAMPLES?	☑	☐	☐		
5. TEMPERATURE BLANKS PRESENT?	☑	☐	☐	TEMP BLANK TEMP (°C)= 0.6	RSC notified and Jane Calligan 6. for 9/22/99
6. SAMPLES RECEIVED AT 4°C +/- 2? ICE/ ICE PACKS PRESENT (Y) or N?	☐	☑	☐	COOLER TEMP (°C)= NA (RECORD COOLER TEMP ONLY IF TEMP BLANK IS NOT PRESENT)	
7. VOLATILES FREE OF HEADSPACE?	☑	☐	☐		
8. TRIP BLANK PRESENT IN THIS COOLER	☐	☑	☐		
9. PROPER SAMPLE CONTAINERS AND VOLUME?	☑	☐	☐		
10. SAMPLES WITHIN HOLD TIME UPON RECEIPT?	☑	☐	☐		
11. SAMPLES PROPERLY PRESERVED[1]?	☑	☐	☐		
12. CORRECTIVE ACTION REPORT FILED?	☐	☑	N/A		

13. ANALYTICAL PROGRAMS (CIRCLE ONE) COMMERCIAL CLP HAZWRAP (NPESC) ACOE AFCEE OTHER (STATE OF ORIGIN):

LOG - IN NOTES[1]:

00001106

[1] Use this space (and additional sheets if necessary) to document samples that are received broken or compromised, C-O-C discrepancies, radiation checks, residual chlorine check, results of pH check if required. If samples required pH adjustment, record volume and type of preservative added.

Katahdin Analytical Services
P.O. Box 720
Westbrook, ME 04098
Tel: (207) 874-2400
Fax: (207) 775-4029

CHAIN OF CUSTODY

PLEASE PRINT IN PEN

Page ____ of ____

Client: TETRA TECH NUS
Contact: PAUL CALLIGAN
Phone #: (850) 585-9899
Fax #: ( )

Address: 1401 OVEN PARK DR 102
City: TALLAHASSEE
State: FL
Zip Code: 32306

Purchase Order #:
Proj. Name / No.: 0219
Katahdin Quote #:

Bill (if different than above): 8134583693 19
Address:

Sampler (Print / Sign): Thomas Thompson

Copies To:

LAB USE ONLY
WORK ORDER #: WP4035
KATAHDIN PROJECT MANAGER:

REMARKS:

SHIPPING INFO: ☐ FED EX ☐ UPS ☐ CLIENT
AIRBILL NO:
TEMP°C ____ ☐ TEMP BLANK ☐ INTACT ☐ NOT INTACT

ANALYSIS AND CONTAINER TYPE PRESERVATIVES

*	Sample Description	Date / Time coll'd	Matrix	No. of Cntrs.	BTEX, MTBE, EDB, Total Naphthalene	PAH	Metals	Dissolved Methane	Anions	Total Lead					
	22GLM030 1	9-21-99/1137	GW	10	3	2	1	3	1						
	22GLM040 1	9-21-99/1149	GW	10	3	2	1	3	1						
	22GLM060 1	9-21-99/1104	GW	10	3	2	1	3	1						
	22GLM030 1 D	9-21-99/0000	GW	6	3	2	1								
	25GLM010 1	/1205	GW	10	3	2		3	1	1					
	25GLM050 1	/1745	GW	10	3	2		3	1	1					
	25GLM050 1 D	/ —	GW	6	3	2				1					
	~~25GLM070 1~~	~~/~~	~~GW~~	~~10~~	~~3~~	~~2~~		~~3~~	~~1~~	~~1~~					
	25GLX020 1	/1615	GW	6	3	2				1					
	25GLX040 1	/1210	GW	6	3	2				1					
	25TL020 1	9-21-99 —	GW	2	2			TRIP BLANK							
		/													
		/													
		/													
		/													
		/													

COMMENTS:

Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)
[signature]	9-21-99 1805	8134583693 19		09-22-99 0900	[signature]
Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)

FORMSOURCE INC. ☎ (207) 782-3311
FORM # CHN-OF-CSTDY

ORIGINAL

Katahdin

P.O. Box 720
Westbrook, ME 04098
Tel: (207) 874-2400
Fax: (207) 775-4629

CHAIN of CUSTODY

PLEASE PRINT IN PEN

Page 1 of 1

Client: Tetra Tech NUS
Contact: Paul Calligan
Phone #: (843) 554-4925
Fax #: ( )
Address: NH-21 Ave H
City: North Charleston
State: S.C.
Zip Code:
Purchase Order #:
Proj. Name / No.: Charleston Naval Complex
Katahdin Quote #:
Bill (if different than above):
Address:
Sampler (Print / Sign): Roger Franklin / Roger Franklin
Copies To:

LAB USE ONLY
WORK ORDER #: WP 4037
KATAHDIN PROJECT MANAGER:

REMARKS:

SHIPPING INFO: ☐ FED EX ☐ UPS ☐ CLIENT
AIRBILL NO:
TEMP °C: ☐ TEMP BLANK ☐ INTACT ☐ NOT INTACT

ANALYSIS AND CONTAINER TYPE / PRESERVATIVES

*	Sample Description	Date / Time coll'd	Matrix	No. of Cntrs.	BTEX Naphthalene (8260)	TPH (GRO)	TPH Metals									GCID Parkinson ppm
	36SLB02Ø4Ø5	9/21/99 1600	S	6	X	X	X									7
	36SLB05Ø4Ø5	9/21/99 1120	S	6	X	X	X									23
	36SLB03Ø4Ø5	9/21/99 1430	S	6	X	X	X									4
		/														
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		/														

COMMENTS

Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)
[signature]	9/21/99 1800	Fed-Ex 913458369319		09-22-99 0630	[signature]
Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)

FORMSOURCE INC. ☎ (207) 782-3311
FORM # CHN-OF-CSTDY

ORIGINAL

New England-ME Laboratory (207) 874-2400
CONFIRMATION

ORDER NO WP-4035

Project Manager: Andrea J. Colby
ORDER DATE: 09/2[illegible]
PHONE: 850/385-[illegible]
FAX: 850/385-[illegible]60
DUE: 22 OCT
FAC.ID: CNC CHARLESTON

REPORT TO: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr., Suite 102
Tallahassee, FL 32308

INVOICE: ACCOUNTS PAYABLE
TETRA TECH NUS, INC.
FOSTER PLAZA 7, 661 ANDERSEN DR.
PITTSBURGH, PA 15220

PHONE: 412/921-7090
PO: N7912-P99264

PROJECT: CTO #68

SAMPLED BY: T.THOMPSON DELIVERED BY: FEDEX DISPOSE: AFTER 21 NOV

ITEM	LOG NUMBER	SAMPLE DESCRIPTION	SAMPLED DATE/TIME	RECEIVED	MATRIX
1	WP4035-1	22GLM0301	21 SEP 1137	22 SEP	AQ
	WP4035-2	22GLM0401	21 SEP 1149		
	WP4035-3	22GLM0601	21 SEP 1104		

DETERMINATION	METHOD	QTY	PRICE	AMOUNT
Target Analyte List Metals, Total		3	100.00	300.00
Nitrate as N	353.2	3	30.00	90.00
Sulfate	375.4	3	0.00	0.00
Volatile Organics by 8260B	SW8260	3	75.00	225.00
Polynuclear Aromatic Hydrocarbons	EPA 8270	3	125.00	375.00
Methane Subcontract		3	95.00	285.00
TOTALS		3	425.00	1275.0[illegible]

	LOG NUMBER	SAMPLE DESCRIPTION	SAMPLED DATE/TIME	RECEIVED	MATRIX
2	WP4035-6	25GLM0501D	21 SEP	22 SEP	AQ
	WP4035-7	25GLX0201	21 SEP 1615		
	WP4035-8	25GLX0401	21 SEP 1210		

DETERMINATION	METHOD	QTY	PRICE	AMOUNT
Volatile Organics by 8260B	SW8260	3	75.00	225.00
Polynuclear Aromatic Hydrocarbons	EPA 8270	3	125.00	375.00
Lead, Total	200.7/6010	3	20.00	60.00
TOTALS		3	220.00	660.00

LABORATORY ORDER CONTINUED ON PAGE 2

9908106
WP-912199

ORDER NO WP-4035

Project Manager: Andrea J. Colby
ORDER DATE: 09/22/99
PHONE: 850/385-9899
FAX: 850/385-9860
DUE: 22 OCT
FAC.ID: CNC CHARLESTON

REPORT TO: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr., Suite 102
Tallahassee, FL 32308

INVOICE: ACCOUNTS PAYABLE
TETRA TECH NUS, INC.
FOSTER PLAZA 7, 661 ANDERSEN DR.
PITTSBURGH, PA 15220

PHONE: 412/921-7090
PO: N7912-P99264

PROJECT: CTO #68

SAMPLED BY: T.THOMPSON DELIVERED BY: FEDEX DISPOSE: AFTER 21 NOV

	LOG NUMBER	SAMPLE DESCRIPTION	SAMPLED DATE/TIME	RECEIVED	MATRIX
3	WP4035-9	22GLM0301D	21 SEP 0000	22 SEP	AQ

DETERMINATION	METHOD	QTY	PRICE	AMOUNT
Volatile Organics by 8260B	SW8260	1	75.00	75.00
Polynuclear Aromatic Hydrocarbons	EPA 8270	1	125.00	125.00
Target Analyte List Metals, Total		1	100.00	100.00
TOTALS		1	300.00	300.00

	LOG NUMBER	SAMPLE DESCRIPTION	SAMPLED DATE/TIME	RECEIVED	MATRIX
4	WP4035-10	25TL00201	21 SEP	22 SEP	AQ

DETERMINATION	METHOD	QTY	PRICE	AMOUNT
Volatile Organics by 8260B	SW8260	1	75.00	75.00

	LOG NUMBER	SAMPLE DESCRIPTION	SAMPLED DATE/TIME	RECEIVED	MATRIX
5	WP4035-11	36SLB020405	21 SEP 1600	22 SEP	SL
	WP4035-12	36SLB050405	21 SEP 1120		
	WP4035-13	36SLB030405	21 SEP 1430		

DETERMINATION	METHOD	QTY	PRICE	AMOUNT
Volatile Organics by 8260B	SW8260	3	85.00	255.00
Solids-Total Residue (TS)	CLP/CIP SO	3	0.00	0.00
Polynuclear Aromatic Hydrocarbons	EPA 8270	3	135.00	405.00
Target Analyte List Metals, Total		3	100.00	300.00
TPH Subcontract		3	75.00	225.00
TOTALS		3	395.00	1185.00

LABORATORY ORDER CONTINUED ON PAGE 3

ORDER NO WP-4035

Project Manager: Andrea J. Colby
ORDER DATE: 09/22
PHONE: 850/385-9
FAX: 850/385-5
DUE: 22 OCT
FAC.ID: CNC CHARLESTON

REPORT TO: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr., Suite 102
Tallahassee, FL 32308

INVOICE: ACCOUNTS PAYABLE
TETRA TECH NUS, INC.
FOSTER PLAZA 7, 661 ANDERSEN DR.
PITTSBURGH, PA 15220

PHONE: 412/921-7090
PO: N7912-P99264

PROJECT: CTO #68

SAMPLED BY: T.THOMPSON DELIVERED BY: FEDEX DISPOSE: AFTER 21 NOV

	LOG NUMBER	SAMPLE DESCRIPTION	SAMPLED DATE/TIME	RECEIVED	MATRIX
6	WP4035-4	25GLM0101	21 SEP 1205	22 SEP	AQ
	WP4035-5	25GLM0501	21 SEP 1705		

DETERMINATION	METHOD	QTY	PRICE	AMOUNT
Volatile Organics by 8260B	SW8260	2	75.00	150.00
Polynuclear Aromatic Hydrocarbons	EPA 8270	2	125.00	250.00
Methane Subcontract		2	95.00	190.00
Nitrate as N	353.2	2	30.00	60.00
Sulfate	375.4	2	0.00	0.00
Lead, Total	200.7/6010	2	20.00	40.00
TOTALS		2	345.00	690.00

ORDER NOTE: QC-II+ W/NARRATIVE
DD(KAS007QC-DB3)
CNC CHARLESTON

REPORT COPY: MS. LEE LECK
TETRA TECH NUS
FOSTER PLAZA 7
661 ANDERSEN DR.
PITTSBURGH,PA 15220
REPORT & DISK

INVOICE: With Report

TOTAL ORDER AMOUNT $4,185.00
This is NOT an Invo

AJC/BKR/WEST.AJC(dw)
09-29Please contact KATAHDIN ANALYTICAL SERVICES promptly if you have any questi

00001/11

KATAHDIN ANALYTICAL SERVICES

Summary of Report Notes

Report Note	Note Text
#	'#' flag denotes surrogate compound recovery is out of criteria.
B	'B' flag denotes detection of this analyte in the laboratory method blank analyzed concurrently with the sample.
E	'E' flag indicates an estimated value. The analyte was detected in the sample at a concentration greater than the standard calibration range.
J	'J' flag denotes an estimated value less than the Laboratory's Practical Quantitation Level.
O-2	Sample dilution required for quantitation of one or more target analytes; therefore, standard laboratory Practical Quantitation Level (PQL) could not be achieved.

KATAHDIN ANALYTICAL SERVICES

Summary of Report Notes

Report Note	Note Text
A-1	Insufficient sample was provided to enable laboratory to achieve the laboratory's standard Practical Quantitation Level.
DL	'DL' flag denotes inability to calculate surrogate recovery due to sample dilution.
E	'E' flag indicates an estimated value. The analyte was detected in the sample at a concentration greater than the standard calibration range.
J	'J' flag denotes an estimated value less than the Laboratory's Practical Quantitation Level.
O-13	Internal standard area(s) are out of criteria. Reanalysis confirmedmatrix interference.
O-2	Sample dilution required for quantitation of one or more target analytes; therefore, standard laboratory Practical Quantitation Level (PQL) could not be achieved.

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services | **Client Field ID: 25GLM0101**

Matrix: WATER | **SDG Name: WP4035**

Percent Solids: 0.00 | **Lab Sample ID: WP4035-004**

Concentration Units (ug/L or mg/Kg dry weight): ug/L

CAS No.	Analyte	Concentration	C	Q	M	DF
7439-92-1	LEAD	3.9	B		P	1

Comments:

Katahdin
ANALYTICAL SERVICES

Lab Number : WP-4035-4
Report Date: 10/20/99
PO No. : N7912-P99264
Project : CTO #68

CLIENT: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr., Suite 102
Tallahassee, FL 32308

WIC#: CNC CHARLESTON

REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE	RECEIVED
25GLM0101	Aqueous	T.THOMPSON	09/21/99	09/22/99

PARAMETER	RESULT	UNITS	DF	*PQL	METHOD	ANALYZED	BY	NOTES
Nitrate as N	0.29	mg/L	1.0	0.050	353.2	09/23/99	KW	
Sulfate	160.	mg/L	10	1.0	300.0	09/24/99	CF	

* PQL (Practical Quantitation Level) represents laboratory reporting limits and may not reflect sample-specific reporting limits. Sample-specific limits are indicated by results annotated with '<' values.

10/20/99

LJO/ejnajc(dw)/bad/msm
PI23NOW1
CC: MS. LEE LECK
TETRA TECH NUS
FOSTER PLAZA 7
661 ANDERSEN DR.

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP4035-4
SDG: WP4035
Report Date: 10/7/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: N/A
Method: EPA 8270
Date Analyzed: 9/30/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
25GLM0101	AQ	9/21/99	9/22/99	9/23/99	LAP	EPA 3510	KRT

Compound	Result	Units	DF	Sample PQL	Method PQL
NAPHTHALENE	<10	ug/L	1.0	10	10
2-METHYLNAPHTHALENE	<10	ug/L	1.0	10	10
ACENAPHTHYLENE	<10	ug/L	1.0	10	10
ACENAPHTHENE	<10	ug/L	1.0	10	10
FLUORENE	<10	ug/L	1.0	10	10
PHENANTHRENE	<10	ug/L	1.0	10	10
ANTHRACENE	<10	ug/L	1.0	10	10
FLUORANTHENE	<10	ug/L	1.0	10	10
PYRENE	<10	ug/L	1.0	10	10
BENZO[A]ANTHRACENE	<10	ug/L	1.0	10	10
CHRYSENE	<10	ug/L	1.0	10	10
BENZO[B]FLUORANTHENE	<10	ug/L	1.0	10	10
BENZO[K]FLUORANTHENE	<10	ug/L	1.0	10	10
BENZO[A]PYRENE	<10	ug/L	1.0	10	10
INDENO[1,2,3-CD]PYRENE	<10	ug/L	1.0	10	10
DIBENZ[A,H]ANTHRACENE	<10	ug/L	1.0	10	10
BENZO[G,H,I]PERYLENE	<10	ug/L	1.0	10	10
NITROBENZENE-D5	64	%	1.0		
2-FLUOROBIPHENYL	72	%	1.0		
TERPHENYL-D14	97	%	1.0		

Report Notes:

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP4035-4
SDG: WP4035
Report Date: 10/6/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: N/A
Method: SW8260
Date Analyzed: 9/22/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
25GLM0101	AQ	9/21/99	9/22/99	9/22/99	JSS	5030	JSS

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<5	ug/L	1.0	5	5
TOLUENE	<5	ug/L	1.0	5	5
1,2-DIBROMOETHANE	<5	ug/L	1.0	5	5
ETHYLBENZENE	<5	ug/L	1.0	5	5
NAPHTHALENE	<5	ug/L	1.0	5	5
MTBE	<5	ug/L	1.0	5	5
TOTAL XYLENES	<5	ug/L	1.0	5	5
DIBROMOFLUOROMETHANE	96	%	1.0		
1,2-DICHLOROETHANE-D4	101	%	1.0		
TOLUENE-D8	98	%	1.0		
P-BROMOFLUOROBENZENE	106	%	1.0		

Report Notes:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services | **Client Field ID:** 25GLM0501

Matrix: WATER | **SDG Name:** WP4035

Percent Solids: 0.00 | **Lab Sample ID:** WP4035-005

Concentration Units (ug/L or mg/Kg dry weight): ug/L

CAS No.	Analyte	Concentration	C	Q	M	DF
7439-92-1	LEAD	7.3			P	1

Comments:

Katahdin
ANALYTICAL SERVICES

CLIENT: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr., Suite 102
Tallahassee, FL 32308

Lab Number : WP-4035-5
Report Date: 10/20/99
PO No. : N7912-P99264
Project : CTO #68

WIC#: CNC CHARLESTON

REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE	RECEIVED
25GLM0501	Aqueous	T.THOMPSON	09/21/99	09/22/99

PARAMETER	RESULT	UNITS	DF	*PQL	METHOD	ANALYZED	BY	NOTES
Nitrate as N	<0.050	mg/L	1.0	0.050	353.2	09/23/99	KW	
Sulfate	40.	mg/L	10	1.0	300.0	09/24/99	CF	

* PQL (Practical Quantitation Level) represents laboratory reporting limits and may not reflect sample-specific reporting limits. Sample-specific limits are indicated by results annotated with '<' values.

10/20/99

LJO/ejnajc(dw)/bad/msm
PI23NOW1
CC: MS. LEE LECK
TETRA TECH NUS
FOSTER PLAZA 7
661 ANDERSEN DR.

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP4035-5
SDG: WP4035
Report Date: 10/7/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: N/A
Method: EPA 8270
Date Analyzed: 9/30/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
25GLM0501	AQ	9/21/99	9/22/99	9/23/99	LAP	EPA 3510	KRT

Compound	Result	Units	DF	Sample PQL	Method PQL
NAPHTHALENE	E280	ug/L	1.1	10	10
2-METHYLNAPHTHALENE	100	ug/L	1.1	10	10
ACENAPHTHYLENE	<10	ug/L	1.1	10	10
ACENAPHTHENE	<10	ug/L	1.1	10	10
FLUORENE	<10	ug/L	1.1	10	10
PHENANTHRENE	<10	ug/L	1.1	10	10
ANTHRACENE	<10	ug/L	1.1	10	10
FLUORANTHENE	<10	ug/L	1.1	10	10
PYRENE	<10	ug/L	1.1	10	10
BENZO[A]ANTHRACENE	<10	ug/L	1.1	10	10
CHRYSENE	<10	ug/L	1.1	10	10
BENZO[B]FLUORANTHENE	<10	ug/L	1.1	10	10
BENZO[K]FLUORANTHENE	<10	ug/L	1.1	10	10
BENZO[A]PYRENE	<10	ug/L	1.1	10	10
INDENO[1,2,3-CD]PYRENE	<10	ug/L	1.1	10	10
DIBENZ[A,H]ANTHRACENE	<10	ug/L	1.1	10	10
BENZO[G,H,I]PERYLENE	<10	ug/L	1.1	10	10
NITROBENZENE-D5	60	%	1.1		
2-FLUOROBIPHENYL	100	%	1.1		
TERPHENYL-D14	79	%	1.1		

Report Notes: E, A-1

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP4035-5DL
SDG: WP4035
Report Date: 10/7/99
PO No.: N7912-P99264
Project: CTO #68
% Solids: N/A
Method: EPA 8270
Date Analyzed: 10/1/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
25GLM0501	AQ	9/21/99	9/22/99	9/23/99	LAP	EPA 3510	KRT

Compound	Result	Units	DF	Sample PQL	Method PQL
NAPHTHALENE	480	ug/L	4.2	42	10
2-METHYLNAPHTHALENE	160	ug/L	4.2	42	10
ACENAPHTHYLENE	<42	ug/L	4.2	42	10
ACENAPHTHENE	<42	ug/L	4.2	42	10
FLUORENE	<42	ug/L	4.2	42	10
PHENANTHRENE	<42	ug/L	4.2	42	10
ANTHRACENE	<42	ug/L	4.2	42	10
FLUORANTHENE	<42	ug/L	4.2	42	10
PYRENE	<42	ug/L	4.2	42	10
BENZO(A)ANTHRACENE	<42	ug/L	4.2	42	10
CHRYSENE	<42	ug/L	4.2	42	10
BENZO(B)FLUORANTHENE	<42	ug/L	4.2	42	10
BENZO(K)FLUORANTHENE	<42	ug/L	4.2	42	10
BENZO(A)PYRENE	<42	ug/L	4.2	42	10
INDENO(1,2,3-CD)PYRENE	<42	ug/L	4.2	42	10
DIBENZ(A,H)ANTHRACENE	<42	ug/L	4.2	42	10
BENZO(G,H,I)PERYLENE	<42	ug/L	4.2	42	10
NITROBENZENE-D5	DL	%	4.2		
2-FLUOROBIPHENYL	DL	%	4.2		
TERPHENYL-D14	DL	%	4.2		

Report Notes: O-2, DL

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP4035-5
SDG: WP4035
Report Date: 10/6/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: N/A
Method: SW8260
Date Analyzed: 9/23/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
25GLM0501	AQ	9/21/99	9/22/99	9/23/99	HMP	5030	HMP

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	E27000	ug/L	50	250	5
TOLUENE	E30000	ug/L	50	250	5
1,2-DIBROMOETHANE	<250	ug/L	50	250	5
ETHYLBENZENE	4300	ug/L	50	250	5
NAPHTHALENE	660	ug/L	50	250	5
MTBE	E23000	ug/L	50	250	5
TOTAL XYLENES	14000	ug/L	50	250	5
DIBROMOFLUOROMETHANE	83	%	50		
1,2-DICHLOROETHANE-D4	#64	%	50		
TOLUENE-D8	98	%	50		
P-BROMOFLUOROBENZENE	100	%	50		

Report Notes: E, #, O-2

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP4035-5DL
SDG: WP4035
Report Date: 10/6/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: N/A
Method: SW8260
Date Analyzed: 9/24/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
25GLM0501	AQ	9/21/99	9/22/99	9/24/99	KMC	5030	KMC

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	25000	ug/L	200	1000	5
TOLUENE	35000	ug/L	200	1000	5
1,2-DIBROMOETHANE	<1000	ug/L	200	1000	5
ETHYLBENZENE	3000	ug/L	200	1000	5
NAPHTHALENE	J700	ug/L	200	1000	5
MTBE	33000	ug/L	200	1000	5
TOTAL XYLENES	12000	ug/L	200	1000	5
DIBROMOFLUOROMETHANE	105	%	200		
1,2-DICHLOROETHANE-D4	111	%	200		
TOLUENE-D8	102	%	200		
P-BROMOFLUOROBENZENE	100	%	200		

Report Notes: J, O-2

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services | **Client Field ID: 25GLM0501D**

Matrix: WATER | **SDG Name: WP4035**

Percent Solids: 0.00 | **Lab Sample ID: WP4035-006**

Concentration Units (ug/L or mg/Kg dry weight): ug/L

CAS No.	Analyte	Concentration	C	Q	M	DF
7439-92-1	LEAD	7.0			P	1

Comments:

FORM I - IN

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP4035-6
SDG: WP4035
Report Date: 10/7/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: N/A
Method: EPA 8270
Date Analyzed: 9/30/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
25GLM0501D	AQ	9/21/99	9/22/99	9/23/99	LAP	EPA 3510	KRT

Compound	Result	Units	DF	Sample PQL	Method PQL
NAPHTHALENE	E220	ug/L	1.0	10	10
2-METHYLNAPHTHALENE	68	ug/L	1.0	10	10
ACENAPHTHYLENE	<10	ug/L	1.0	10	10
ACENAPHTHENE	<10	ug/L	1.0	10	10
FLUORENE	<10	ug/L	1.0	10	10
PHENANTHRENE	<10	ug/L	1.0	10	10
ANTHRACENE	<10	ug/L	1.0	10	10
FLUORANTHENE	<10	ug/L	1.0	10	10
PYRENE	<10	ug/L	1.0	10	10
BENZO[A]ANTHRACENE	<10	ug/L	1.0	10	10
CHRYSENE	<10	ug/L	1.0	10	10
BENZO[B]FLUORANTHENE	<10	ug/L	1.0	10	10
BENZO[K]FLUORANTHENE	<10	ug/L	1.0	10	10
BENZO[A]PYRENE	<10	ug/L	1.0	10	10
INDENO[1,2,3-CD]PYRENE	<10	ug/L	1.0	10	10
DIBENZ[A,H]ANTHRACENE	<10	ug/L	1.0	10	10
BENZO[G,H,I]PERYLENE	<10	ug/L	1.0	10	10
NITROBENZENE-D5	48	%	1.0		
2-FLUOROBIPHENYL	73	%	1.0		
TERPHENYL-D14	61	%	1.0		

Report Notes: E

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP4035-6DL
SDG: WP4035
Report Date: 10/7/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: N/A
Method: EPA 8270
Date Analyzed: 10/1/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
25GLM0501D	AQ	9/21/99	9/22/99	9/23/99	LAP	EPA 3510	KRT

Compound	Result	Units	DF	Sample PQL	Method PQL
NAPHTHALENE	470	ug/L	4.0	40	10
2-METHYLNAPHTHALENE	170	ug/L	4.0	40	10
ACENAPHTHYLENE	<40	ug/L	4.0	40	10
ACENAPHTHENE	<40	ug/L	4.0	40	10
FLUORENE	<40	ug/L	4.0	40	10
PHENANTHRENE	<40	ug/L	4.0	40	10
ANTHRACENE	<40	ug/L	4.0	40	10
FLUORANTHENE	<40	ug/L	4.0	40	10
PYRENE	<40	ug/L	4.0	40	10
BENZO[A]ANTHRACENE	<40	ug/L	4.0	40	10
CHRYSENE	<40	ug/L	4.0	40	10
BENZO[B]FLUORANTHENE	<40	ug/L	4.0	40	10
BENZO[K]FLUORANTHENE	<40	ug/L	4.0	40	10
BENZO[A]PYRENE	<40	ug/L	4.0	40	10
INDENO[1,2,3-CD]PYRENE	<40	ug/L	4.0	40	10
DIBENZ[A,H]ANTHRACENE	<40	ug/L	4.0	40	10
BENZO[G,H,I]PERYLENE	<40	ug/L	4.0	40	10
NITROBENZENE-D5	DL	%	4.0		
2-FLUOROBIPHENYL	DL	%	4.0		
TERPHENYL-D14	DL	%	4.0		

Report Notes: O-2, DL

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP4035-6
SDG: WP4035
Report Date: 10/6/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: N/A
Method: SW8260
Date Analyzed: 9/23/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
25GLM0501D	AQ	9/21/99	9/22/99	9/23/99	HMP	5030	HMP

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	E26000	ug/L	50	250	5
TOLUENE	E31000	ug/L	50	250	5
1,2-DIBROMOETHANE	<250	ug/L	50	250	5
ETHYLBENZENE	4300	ug/L	50	250	5
NAPHTHALENE	780	ug/L	50	250	5
MTBE	E23000	ug/L	50	250	5
TOTAL XYLENES	15000	ug/L	50	250	5
DIBROMOFLUOROMETHANE	82	%	50		
1,2-DICHLOROETHANE-D4	#63	%	50		
TOLUENE-D8	97	%	50		
P-BROMOFLUOROBENZENE	101	%	50		

Report Notes: E, #, O-2

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP4035-6DL
SDG: WP4035
Report Date: 10/6/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: N/A
Method: SW8260
Date Analyzed: 9/24/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
25GLM0501D	AQ	9/21/99	9/22/99	9/24/99	KMC	5030	KMC

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	26000	ug/L	200	1000	5
TOLUENE	38000	ug/L	200	1000	5
1,2-DIBROMOETHANE	<1000	ug/L	200	1000	5
ETHYLBENZENE	3200	ug/L	200	1000	5
NAPHTHALENE	J760	ug/L	200	1000	5
MTBE	33000	ug/L	200	1000	5
TOTAL XYLENES	13000	ug/L	200	1000	5
DIBROMOFLUOROMETHANE	103	%	200		
1,2-DICHLOROETHANE-D4	108	%	200		
TOLUENE-D8	103	%	200		
P-BROMOFLUOROBENZENE	100	%	200		

Report Notes: J, O-2

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services | **Client Field ID: 25GLX0201**

Matrix: WATER | **SDG Name: WP4035**

Percent Solids: 0.00 | **Lab Sample ID: WP4035-007**

Concentration Units (ug/L or mg/Kg dry weight): ug/L

CAS No.	Analyte	Concentration	C	Q	M	DF
7439-92-1	LEAD	1.6	B		P	1

Comments:

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP4035-7
SDG: WP4035
Report Date: 10/7/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: N/A
Method: EPA 8270
Date Analyzed: 9/30/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
25GLX0201	AQ	9/21/99	9/22/99	9/23/99	LAP	EPA 3510	KRT

Compound	Result	Units	DF	Sample PQL	Method PQL
NAPHTHALENE	<10	ug/L	1.0	10	10
2-METHYLNAPHTHALENE	<10	ug/L	1.0	10	10
ACENAPHTHYLENE	<10	ug/L	1.0	10	10
ACENAPHTHENE	<10	ug/L	1.0	10	10
FLUORENE	<10	ug/L	1.0	10	10
PHENANTHRENE	<10	ug/L	1.0	10	10
ANTHRACENE	<10	ug/L	1.0	10	10
FLUORANTHENE	<10	ug/L	1.0	10	10
PYRENE	<10	ug/L	1.0	10	10
BENZO[A]ANTHRACENE	<10	ug/L	1.0	10	10
CHRYSENE	<10	ug/L	1.0	10	10
BENZO[B]FLUORANTHENE	<10	ug/L	1.0	10	10
BENZO[K]FLUORANTHENE	<10	ug/L	1.0	10	10
BENZO[A]PYRENE	<10	ug/L	1.0	10	10
INDENO[1,2,3-CD]PYRENE	<10	ug/L	1.0	10	10
DIBENZ[A,H]ANTHRACENE	<10	ug/L	1.0	10	10
BENZO[G,H,I]PERYLENE	<10	ug/L	1.0	10	10
NITROBENZENE-D5	46	%	1.0		
2-FLUOROBIPHENYL	56	%	1.0		
TERPHENYL-D14	61	%	1.0		

Report Notes:

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP4035-7
SDG: WP4035
Report Date: 10/6/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: N/A
Method: SW8260
Date Analyzed: 9/23/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
25GLX0201	AQ	9/21/99	9/22/99	9/23/99	HMP	5030	HMP

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<5	ug/L	1.0	5	5
TOLUENE	<5	ug/L	1.0	5	5
1,2-DIBROMOETHANE	<5	ug/L	1.0	5	5
ETHYLBENZENE	<5	ug/L	1.0	5	5
NAPHTHALENE	<5	ug/L	1.0	5	5
MTBE	<5	ug/L	1.0	5	5
TOTAL XYLENES	<5	ug/L	1.0	5	5
DIBROMOFLUOROMETHANE	83	%	1.0		
1,2-DICHLOROETHANE-D4	73	%	1.0		
TOLUENE-D8	93	%	1.0		
P-BROMOFLUOROBENZENE	92	%	1.0		

Report Notes:

3P

PREPARATION BLANKS

Lab Name: Katahdin Analytical Services | Sample ID: PBWPI24ICW1

Matrix: WATER | SDG Name: WP4035

QC Batch ID: PI24ICW1

Concentration Units (ug/L or mg/Kg dry weight): ug/L

Analyte	RESULT	C
ALUMINUM	19.080	B
ANTIMONY	1.810	U
ARSENIC	2.070	U
BARIUM	1.810	B
BERYLLIUM	0.330	U
CADMIUM	1.940	U
CALCIUM	27.640	B
CHROMIUM	4.310	U
COBALT	4.450	U
COPPER	1.620	U
IRON	8.920	B
LEAD	1.090	U
MAGNESIUM	17.160	U
MANGANESE	0.970	U
NICKEL	13.210	U
POTASSIUM	449.540	U
SELENIUM	2.570	U
SILVER	2.540	U
SODIUM	84.140	B
THALLIUM	4.490	U
VANADIUM	3.580	U
ZINC	5.190	B

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP4035-8
SDG: WP4035
Report Date: 10/7/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: N/A
Method: EPA 8270
Date Analyzed: 10/1/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
25GLX0401	AQ	9/21/99	9/22/99	9/23/99	LAP	EPA 3510	KRT

Compound	Result	Units	DF	Sample PQL	Method PQL
NAPHTHALENE	<12	ug/L	1.2	12	10
2-METHYLNAPHTHALENE	<12	ug/L	1.2	12	10
ACENAPHTHYLENE	<12	ug/L	1.2	12	10
ACENAPHTHENE	<12	ug/L	1.2	12	10
FLUORENE	<12	ug/L	1.2	12	10
PHENANTHRENE	<12	ug/L	1.2	12	10
ANTHRACENE	<12	ug/L	1.2	12	10
FLUORANTHENE	<12	ug/L	1.2	12	10
PYRENE	<12	ug/L	1.2	12	10
BENZO[A]ANTHRACENE	<12	ug/L	1.2	12	10
CHRYSENE	<12	ug/L	1.2	12	10
BENZO[B]FLUORANTHENE	<12	ug/L	1.2	12	10
BENZO[K]FLUORANTHENE	<12	ug/L	1.2	12	10
BENZO[A]PYRENE	<12	ug/L	1.2	12	10
INDENO[1,2,3-CD]PYRENE	<12	ug/L	1.2	12	10
DIBENZ[A,H]ANTHRACENE	<12	ug/L	1.2	12	10
BENZO[G,H,I]PERYLENE	<12	ug/L	1.2	12	10
NITROBENZENE-D5	54	%	1.2		
2-FLUOROBIPHENYL	64	%	1.2		
TERPHENYL-D14	74	%	1.2		

Report Notes: A-1

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP4035-8
SDG: WP4035
Report Date: 10/6/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: N/A
Method: SW8260
Date Analyzed: 9/23/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
25GLX0401	AQ	9/21/99	9/22/99	9/23/99	JSS	5030	JSS

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<5	ug/L	1.0	5	5
TOLUENE	<5	ug/L	1.0	5	5
1,2-DIBROMOETHANE	<5	ug/L	1.0	5	5
ETHYLBENZENE	<5	ug/L	1.0	5	5
NAPHTHALENE	<5	ug/L	1.0	5	5
MTBE	130	ug/L	1.0	5	5
TOTAL XYLENES	<5	ug/L	1.0	5	5
DIBROMOFLUOROMETHANE	88	%	1.0		
1,2-DICHLOROETHANE-D4	87	%	1.0		
TOLUENE-D8	96	%	1.0		
P-BROMOFLUOROBENZENE	101	%	1.0		

Report Notes:

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP4035-10
SDG: WP4035
Report Date: 10/6/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: N/A
Method: SW8260
Date Analyzed: 9/23/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
25TL00201	AQ	9/21/99	9/22/99	9/23/99	JSS	5030	JSS

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<5	ug/L	1.0	5	5
TOLUENE	<5	ug/L	1.0	5	5
1,2-DIBROMOETHANE	<5	ug/L	1.0	5	5
ETHYLBENZENE	<5	ug/L	1.0	5	5
NAPHTHALENE	<5	ug/L	1.0	5	5
MTBE	<5	ug/L	1.0	5	5
TOTAL XYLENES	<5	ug/L	1.0	5	5
DIBROMOFLUOROMETHANE	88	%	1.0		
1,2-DICHLOROETHANE-D4	84	%	1.0		
TOLUENE-D8	96	%	1.0		
P-BROMOFLUOROBENZENE	99	%	1.0		

Report Notes:

3P

PREPARATION BLANKS

Lab Name: Katahdin Analytical Services | Sample ID: PBSPJ011CS0

Matrix: SOIL | SDG Name: WP4035

QC Batch ID: PJ011CS0

Concentration Units (ug/L or mg/Kg dry weight): mg/Kg

Analyte	RESULT	C
ALUMINUM	9.223	B
ANTIMONY	-0.205	B
ARSENIC	0.210	U
BARIUM	0.061	B
BERYLLIUM	0.020	U
CADMIUM	0.190	U
CALCIUM	16.324	
CHROMIUM	0.407	B
COBALT	0.060	U
COPPER	0.060	U
IRON	0.669	B
LEAD	0.110	U
MAGNESIUM	1.770	B
MANGANESE	0.053	B
NICKEL	1.320	U
POTASSIUM	44.950	U
SELENIUM	0.260	U
SILVER	0.070	U
SODIUM	11.547	
THALLIUM	0.450	U
VANADIUM	0.060	U
ZINC	0.153	B

LABORATORY CONTROL SAMPLES

Lab Name: Katahdin Analytical Services **Sample ID: LCSSPJ01ICS0**

Matrix: SOIL **SDG Name: WP4035**

QC Batch ID: PJ01ICS0

Concentration Units (ug/L or mg/Kg dry weight): mg/Kg

Analyte	TRUE	FOUND	% R	LIMITS (%)	
ALUMINUM	5720.0	5284.82	92.4	66	134
ANTIMONY	26.6	30.85	116.0	13	186
ARSENIC	163.0	179.02	109.8	62	138
BARIUM	195.0	246.23	126.3	66	134
BERYLLIUM	78.9	86.75	109.9	72	128
CADMIUM	114.0	115.92	101.7	74	124
CALCIUM	1280.0	1286.99	100.5	70	130
CHROMIUM	175.0	202.59	115.8	69	131
COBALT	73.7	83.62	113.5	70	130
COPPER	91.0	95.87	105.4	71	128
IRON	9080.0	8892.45	97.9	53	146
LEAD	66.0	83.22	126.1	68	132
MAGNESIUM	1210.0	1178.63	97.4	73	126
MANGANESE	261.0	289.32	110.9	78	122
NICKEL	68.3	75.55	110.6	56	144
POTASSIUM	1500.0	1373.71	91.6	64	136
SELENIUM	123.0	123.79	100.6	74	126
SILVER	57.2	53.95	94.3	71	128
SODIUM	1380.0	1402.75	101.6	68	133
THALLIUM	80.0	99.81	124.8	57	142
VANADIUM	95.4	108.52	113.8	68	132
ZINC	190.0	210.74	110.9	76	124

3P

PREPARATION BLANKS

Lab Name: Katahdin Analytical Services **Sample ID: PBSPJ07HGS1**

Matrix: SOIL **SDG Name: WP4035**

QC Batch ID: PJ07HGS1

Concentration Units (ug/L or mg/Kg dry weight): mg/Kg

Analyte	RESULT	C
MERCURY	0.010	U

LABORATORY CONTROL SAMPLES

Lab Name: Katahdin Analytical Services **Sample ID: LCSSPJ07HGS1**

Matrix: SOIL **SDG Name: WP4035**

QC Batch ID: PJ07HGS1

Concentration Units (ug/L or mg/Kg dry weight): mg/Kg

Analyte	TRUE	FOUND	% R	LIMITS (%)	
MERCURY	1.8	2.32	128.9	54	146

3P

PREPARATION BLANKS

Lab Name: Katahdin Analytical Services **Sample ID: PBWPI24ICW1**

Matrix: WATER **SDG Name: WP4035**

QC Batch ID: PI24ICW1

Concentration Units (ug/L or mg/Kg dry weight): ug/L

Analyte	RESULT	C
ALUMINUM	19.080	B
ANTIMONY	1.810	U
ARSENIC	2.070	U
BARIUM	1.810	B
BERYLLIUM	0.330	U
CADMIUM	1.940	U
CALCIUM	27.640	B
CHROMIUM	4.310	U
COBALT	4.450	U
COPPER	1.620	U
IRON	8.920	B
LEAD	1.090	U
MAGNESIUM	17.160	U
MANGANESE	0.970	U
NICKEL	13.210	U
POTASSIUM	449.540	U
SELENIUM	2.570	U
SILVER	2.540	U
SODIUM	84.140	B
THALLIUM	4.490	U
VANADIUM	3.580	U
ZINC	5.190	B

LABORATORY CONTROL SAMPLES

Lab Name: Katahdin Analytical Services **Sample ID: LCSWPI24ICW1**

Matrix: WATER **SDG Name: WP4035**

QC Batch ID: PI24ICW1

Concentration Units (ug/L or mg/Kg dry weight): ug/L

Analyte	TRUE	FOUND	% R	LIMITS (%)	
ALUMINUM	2000.0	1957.03	97.9	80	120
ANTIMONY	500.0	501.39	100.3	80	120
ARSENIC	2000.0	1935.06	96.8	80	120
BARIUM	2000.0	2102.62	105.1	80	120
BERYLLIUM	50.0	52.87	105.7	80	120
CADMIUM	50.0	53.05	106.1	80	120
CALCIUM	2500.0	2678.37	107.1	80	120
CHROMIUM	200.0	212.83	106.4	80	120
COBALT	500.0	527.54	105.5	80	120
COPPER	250.0	248.67	99.5	80	120
IRON	1000.0	1070.93	107.1	80	120
LEAD	500.0	550.63	110.1	80	120
MAGNESIUM	5000.0	4828.88	96.6	80	120
MANGANESE	500.0	527.50	105.5	80	120
NICKEL	500.0	539.85	108.0	80	120
POTASSIUM	25000.0	23749.69	95.0	80	120
SELENIUM	2000.0	1853.45	92.7	80	120
SILVER	50.0	43.11	86.2	80	120
SODIUM	7500.0	7501.04	100.0	80	120
THALLIUM	2000.0	2216.78	110.8	80	120
VANADIUM	500.0	524.53	104.9	80	120
ZINC	500.0	499.80	100.0	80	120

3P

PREPARATION BLANKS

Lab Name: Katahdin Analytical Services | Sample ID: PBWPI25HGW0

Matrix: WATER | SDG Name: WP4035

QC Batch ID: PI25HGW0

Concentration Units (ug/L or mg/Kg dry weight): ug/L

Analyte	RESULT	C
MERCURY	0.020	U

LABORATORY CONTROL SAMPLES

Lab Name: Katahdin Analytical Services **Sample ID: LCSWPI25HGW0**

Matrix: WATER **SDG Name: WP4035**

QC Batch ID: PI25HGW0

Concentration Units (ug/L or mg/Kg dry weight): ug/L

Analyte	TRUE	FOUND	% R	LIMITS (%)	
MERCURY	5.0	4.86	97.2	80	120

5A

SPIKE SAMPLE RECOVERY

Lab Name: Katahdin Analytical Services

Client Field ID: 22GLM0601S

Matrix: WATER

SDG Name: WP4035

Percent Solids: 0.00

Lab Sample ID: WP4035-003S

Concentration Units (ug/L or mg/Kg dry weight): ug/L

Analyte	Spiked Sample Result	C	Sample Result	C	Spike Added	%R	Q	Control Limits (%R) Low	High	M
ALUMINUM	2346.3500		136.5400		2000	110.5		75	125	P
ANTIMONY	545.4400		-1.4000	U	500	109.1		75	125	P
ARSENIC	2239.4800		6.0600	B	2000	111.7		75	125	P
BARIUM	2226.8100		65.3700		2000	108.1		75	125	P
BERYLLIUM	55.9100		0.2500	U	50	111.8		75	125	P
CADMIUM	59.5000		1.0800	U	50	119.0		75	125	P
CALCIUM	395830.5000		397131.8300		2500	-52.1		75	125	P
CHROMIUM	216.7400		-3.8000	U	200	108.4		75	125	P
COBALT	642.8200		102.4300		500	108.1		75	125	P
COPPER	269.6900		-0.9900	U	250	107.9		75	125	P
IRON	18672.9600		17767.2500		1000	90.6		75	125	P
LEAD	527.4600		1.3400	B	500	105.2		75	125	P
MAGNESIUM	152163.8000		147898.0800		5000	85.3		75	125	P
MANGANESE	6093.8900		5608.3500		500	97.1		75	125	P
NICKEL	588.7900		31.0100	B	500	111.6		75	125	P
POTASSIUM	41558.4200		14461.4900		25000	108.4		75	125	P
SELENIUM	2109.6200		0.2100	U	2000	105.5		75	125	P
SILVER	47.5900		-3.9200	U	50	95.2		75	125	P
SODIUM	1587538.3300		1600947.6300		7500	-178.8		75	125	P
THALLIUM	2070.8200		-0.3700	U	2000	103.5		75	125	P
VANADIUM	550.5300		-1.6200	U	500	110.1		75	125	P
ZINC	573.9200		29.1400		500	109.0		75	125	P

Comments:

5A

SPIKE SAMPLE RECOVERY

Lab Name: Katahdin Analytical Services

Client Field ID: 22GLM0601S

Matrix: WATER

SDG Name: WP4035

Percent Solids: 0.00

Lab Sample ID: WP4035-003P

Concentration Units (ug/L or mg/Kg dry weight): ug/L

Analyte	Spiked Sample Result	C	Sample Result	C	Spike Added	%R	Q	Control Limits (%R) Low	High	M
ALUMINUM	2349.6500		136.5400		2000	110.7		75	125	P
ANTIMONY	546.4900		-1.4000	U	500	109.3		75	125	P
ARSENIC	2246.7500		6.0600	B	2000	112.0		75	125	P
BARIUM	2248.6000		65.3700		2000	109.2		75	125	P
BERYLLIUM	57.0300		0.2500	U	50	114.1		75	125	P
CADMIUM	61.1500		1.0800	U	50	122.3		75	125	P
CALCIUM	397133.0500		397131.8300		2500	0.0		75	125	P
CHROMIUM	217.6200		-3.8000	U	200	108.8		75	125	P
COBALT	652.8700		102.4300		500	110.1		75	125	P
COPPER	272.5500		-0.9900	U	250	109.0		75	125	P
IRON	19120.2600		17767.2500		1000	135.3		75	125	P
LEAD	521.9400		1.3400	B	500	104.1		75	125	P
MAGNESIUM	155943.0800		147898.0800		5000	160.9		75	125	P
MANGANESE	6243.1600		5608.3500		500	127.0		75	125	P
NICKEL	594.4000		31.0100	B	500	112.7		75	125	P
POTASSIUM	42151.4700		14461.4900		25000	110.8		75	125	P
SELENIUM	2112.5200		0.2100	U	2000	105.6		75	125	P
SILVER	47.9100		-3.9200	U	50	95.8		75	125	P
SODIUM	1639213.8600		1600947.6300		7500	510.2		75	125	P
THALLIUM	2059.0100		-0.3700	U	2000	103.0		75	125	P
VANADIUM	555.3900		-1.6200	U	500	111.1		75	125	P
ZINC	584.0600		29.1400		500	111.0		75	125	P

Comments:

5D

SPIKE DUPLICATES

Lab Name: Katahdin Analytical Services | Client Field ID: 22GLM0601

Matrix: WATER | SDG Name: WP4035

Percent Solids: 0.00 | Lab Sample ID: WP4035-003

Concentration Units (ug/L or mg/Kg dry weight): ug/L

Analyte	Control Limits	Spike Result	C	Spike Dup. Result	C	RPD	Q	M
ALUMINUM		2346.3500		2349.6500		0.1		P
ANTIMONY		545.4400		546.4900		0.2		P
ARSENIC		2239.4800		2246.7500		0.3		P
BARIUM		2226.8100		2248.6000		1.0		P
BERYLLIUM		55.9100		57.0300		2.0		P
CADMIUM		59.5000		61.1500		2.7		P
CALCIUM		395830.5000		397133.0500		0.3		P
CHROMIUM		216.7400		217.6200		0.4		P
COBALT		642.8200		652.8700		1.6		P
COPPER		269.6900		272.5500		1.1		P
IRON		18672.9600		19120.2600		2.4		P
LEAD		527.4600		521.9400		1.1		P
MAGNESIUM		152163.8000		155943.0800		2.5		P
MANGANESE		6093.8900		6243.1600		2.4		P
NICKEL		588.7900		594.4000		0.9		P
POTASSIUM		41558.4200		42151.4700		1.4		P
SELENIUM		2109.6200		2112.5200		0.1		P
SILVER	15	47.5900		47.9100		0.7		P
SODIUM		1587538.3300		1639213.8600		3.2		P
THALLIUM		2070.8200		2059.0100		0.6		P
VANADIUM		550.5300		555.3900		0.9		P
ZINC		573.9200		584.0600		1.8		P

Comments:

5A

SPIKE SAMPLE RECOVERY

Lab Name: Katahdin Analytical Services

Client Field ID: 36SLB020405S

Matrix: SOIL

SDG Name: WP4035

Percent Solids: 75.5

Lab Sample ID: WP4035-011S

Concentration Units (ug/L or mg/Kg dry weight): mg/Kg

Analyte	Spiked Sample Result	C	Sample Result	C	Spike Added	%R	Q	Control Limits (%R) Low	High	M
MERCURY	0.3277		0.1696		0.18	87.8		75	125	CV

Comments:

FORM V (Part 1) - IN

5A

SPIKE SAMPLE RECOVERY

Lab Name: Katahdin Analytical Services

Client Field ID: 36SLB020405S

Matrix: SOIL

SDG Name: WP4035

Percent Solids: 75.5

Lab Sample ID: WP4035-011P

Concentration Units (ug/L or mg/Kg dry weight): mg/Kg

Analyte	Spiked Sample Result	C	Sample Result	C	Spike Added	%R	Q	Control Limits (%R) Low	High	M
MERCURY	0.3739		0.1696		0.18	113.5		75	125	CV

Comments:

FORM V (Part 1) - IN

5D

SPIKE DUPLICATES

Lab Name: Katahdin Analytical Services | **Client Field ID:** 36SLB020405

Matrix: SOIL | **SDG Name:** WP4035

Percent Solids: 75.5 | **Lab Sample ID:** WP4035-011

Concentration Units (ug/L or mg/Kg dry weight): mg/Kg

Analyte	Control Limits	Spike Result	C	Spike Dup. Result	C	RPD	Q	M
MERCURY		0.3277		0.3739		13.2		CV

Comments:

FORM VD - IN

Katahdin
ANALYTICAL SERVICES

CLIENT: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr., Suite 102
Tallahassee, FL 32308

PROJECT: CTO #68

REPORT OF LABORATORY METHOD BLANK RESULTS

SAMPLE DESCRIPTION	MATRIX
METHOD BLANK	Aqueous

ANALYTE	ANALYZED	UNITS	METHOD	RESULT	NOTES
Nitrate as N	09-23-99	mg/L	353.2	<0.050	

* PQL (Practical Quantitation Level) represents laboratory reporting limits and may not reflect sample-specific reporting limits. Sample-specific limits are indicated by results annotated with '<' values. See cover letter for additional information

10/19/99

Lab Number: WP4035-5

340 County Road No. 5
P.O. Box 720, Westbrook, ME 04098
Tel: (207) 874-2400 Fax: (207) 775-4029

http://katahdinlab.com

210 West Road No. 5, Portsmouth, NH 03801
Tel: (603) 431-5777 Fax: (603) 436-3356

Katahdin
ANALYTICAL SERVICES

CLIENT: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr., Suite 102
Tallahassee, FL 32308

PROJECT: CTO #68

REPORT OF LAB CONTROL SPIKE RESULTS

SAMPLE DESCRIPTION	MATRIX
LAB CONTROL SPIKE	Aqueous

ANALYTE	ANALYZED	UNITS	METHOD	SPK	SPK RES	% REC	LIMITS	NOTES
Nitrate as N	09-23-99	mg/L	353.2	1.00	0.906	91		

* PQL (Practical Quantitation Level) represents laboratory reporting limits and may not reflect sample-specific reporting limits. Sample-specific limits are indicated by results annotated with '<' values. See cover letter for additional information

10/19/99

Lab Number: WP4035-5

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Katahdin
ANALYTICAL SERVICES

CLIENT: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr., Suite 102
Tallahassee, FL 32308

PROJECT: CTO #68

REPORT OF DUPLICATE SAMPLE RESULTS

SAMPLE DESCRIPTION	MATRIX
QC DUPLICATE	Aqueous

ANALYTE	ANALYZED	UNITS	METHOD	*PQL	RESULT	DUP #1	RPD	LIMITS	NOTES
Nitrate as N	09-23-99	mg/L	353.2	0.050	<0.050	<0.050	-0.00		

* PQL (Practical Quantitation Level) represents laboratory reporting limits and may not reflect sample-specific reporting limits. Sample-specific limits are indicated by results annotated with '<' values. See cover letter for additional information

10/19/99

Lab Number: WP4035-5

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Katahdin
ANALYTICAL SERVICES

CLIENT: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr., Suite 102
Tallahassee, FL 32308

PROJECT: CTO #68

REPORT OF SAMPLE MATRIX SPIKE RESULTS

SAMPLE DESCRIPTION	MATRIX
QC SPIKE	Aqueous

ANALYTE	ANALYZED	UNITS	METHOD	SPK	RESULT	SPK RES	% REC	LIMITS	NOTES
Nitrate as N	09-23-99	mg/L	353.2	0.500	<0.050	0.397	79		

* PQL (Practical Quantitation Level) represents laboratory reporting limits and may not reflect sample-specific reporting limits. Sample-specific limits are indicated by results annotated with '<' values. See cover letter for additional information

10/19/99

Lab Number: WP4035-5

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Katahdin
ANALYTICAL SERVICES

CLIENT: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr., Suite 102
Tallahassee, FL 32308

PROJECT: CTO #68

REPORT OF LABORATORY METHOD BLANK RESULTS

SAMPLE DESCRIPTION	MATRIX
METHOD BLANK	Aqueous

ANALYTE	ANALYZED	UNITS	METHOD	RESULT	NOTES
Sulfate	10-11-99	mg/L	375.4	<1.0	

* PQL (Practical Quantitation Level) represents laboratory reporting limits and may not reflect sample-specific reporting limits. Sample-specific limits are indicated by results annotated with '<' values. See cover letter for additional information

10/19/99

Lab Number: WP4035-1

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Tel: (603) 431-5777 Fax: (603) 436-3356

Katahdin
ANALYTICAL SERVICES

CLIENT: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr., Suite 102
Tallahassee, FL 32308

PROJECT: CTO #68

REPORT OF LAB CONTROL SPIKE RESULTS

SAMPLE DESCRIPTION	MATRIX
LAB CONTROL SPIKE	Aqueous

ANALYTE	ANALYZED	UNITS	METHOD	SPK	SPK RES	% REC	LIMITS	NOTES
Sulfate	10-11-99	mg/L	375.4	250	221	88		

* PQL (Practical Quantitation Level) represents laboratory reporting limits and may not reflect sample-specific reporting limits. Sample-specific limits are indicated by results annotated with '<' values. See cover letter for additional information

10/19/99

Lab Number: WP4035-1

340 County Road No. 5
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210 West Road No. 5, Portsmouth, NH 03801
Tel: (603) 431-5777 Fax: (603) 436-3356

Katahdin
ANALYTICAL SERVICES

CLIENT: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr., Suite 102
Tallahassee, FL 32308

PROJECT: CTO #68

REPORT OF LABORATORY METHOD BLANK RESULTS

SAMPLE DESCRIPTION	MATRIX
METHOD BLANK	Aqueous

ANALYTE	ANALYZED	UNITS	METHOD	RESULT	NOTES
Sulfate	09-24-99	mg/L	300.0	<1.0	

* PQL (Practical Quantitation Level) represents laboratory reporting limits and may not reflect sample-specific reporting limits. Sample-specific limits are indicated by results annotated with '<' values. See cover letter for additional information

10/19/99

Lab Number: WP4035-4

340 County Road No. 5
P.O. Box 720, Westbrook, ME 04098
Tel: (207) 874-2400 Fax: (207) 775-4029

http://katahdinlab.com

210 West Road No. 5, Portsmouth, NH 03801
Tel: (603) 431-5777 Fax: (603) 436-3356

Katahdin
ANALYTICAL SERVICES

CLIENT: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr., Suite 102
Tallahassee, FL 32308

PROJECT: CTO #68

REPORT OF LAB CONTROL SPIKE RESULTS

SAMPLE DESCRIPTION	MATRIX
LAB CONTROL SPIKE	Aqueous

ANALYTE	ANALYZED	UNITS	METHOD	SPK	SPK RES	% REC	LIMITS	NOTES
Sulfate	09-24-99	mg/L	300.0	10.0	9.90	99		

* PQL (Practical Quantitation Level) represents laboratory reporting limits and may not reflect sample-specific reporting limits. Sample-specific limits are indicated by results annotated with '<' values. See cover letter for additional information

10/19/99

Lab Number: WP4035-4

Katahdin
ANALYTICAL SERVICES

CLIENT: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr., Suite 102
Tallahassee, FL 32308

PROJECT: CTO #68

REPORT OF LABORATORY METHOD BLANK RESULTS

SAMPLE DESCRIPTION	MATRIX
METHOD BLANK	Solid/Soil/Sludge

ANALYTE	ANALYZED	UNITS	METHOD	RESULT	NOTES
Solids-Total Residue (TS)	09-28-99	wt %	CLP/CI	<0.10	1

* PQL (Practical Quantitation Level) represents laboratory reporting limits and may not reflect sample-specific reporting limits. Sample-specific limits are indicated by results annotated with '<' values. See cover letter for additional information

[1] Sample Preparation on 09-27-99 by JF

10/19/99

Lab Number: WP4035-11

340 County Road No. 5
P.O. Box 720, Westbrook, ME 04098
Tel: (207) 874-2400 Fax: (207) 775-4029

http://katahdinlab.com

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Katahdin
ANALYTICAL SERVICES

CLIENT: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr., Suite 102
Tallahassee, FL 32308

PROJECT: CTO #68

REPORT OF LAB CONTROL SPIKE RESULTS

SAMPLE DESCRIPTION	MATRIX
LAB CONTROL SPIKE	Solid/Soil/Sludge

ANALYTE	ANALYZED	UNITS	METHOD	SPK	SPK RES	% REC	LIMITS	NOTES
Solids-Total Residue (TS)	09-28-99	wt %	CLP/CI	90	88.7	99		1

* PQL (Practical Quantitation Level) represents laboratory reporting limits and may not reflect sample-specific reporting limits. Sample-specific limits are indicated by results annotated with '<' values. See cover letter for additional information

[1] Sample Preparation on 09-27-99 by JF

10/19/99

Lab Number: WP4035-11

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Katahdin
ANALYTICAL SERVICES

CLIENT: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr., Suite 102
Tallahassee, FL 32308

PROJECT: CTO #68

REPORT OF DUPLICATE SAMPLE RESULTS

SAMPLE DESCRIPTION	MATRIX
QC DUPLICATE	Solid/Soil/Sludge

ANALYTE	ANALYZED	UNITS	METHOD	*PQL	RESULT	DUP #1	RPD	LIMITS	NOTES
Solids-Total Residue (TS)	09-28-99	wt %	CLP/CI	0.10	75.	75.5	0.66		1

* PQL (Practical Quantitation Level) represents laboratory reporting limits and may not reflect sample-specific reporting limits. Sample-specific limits are indicated by results annotated with '<' values. See cover letter for additional information

[1] Sample Preparation on 09-27-99 by JF

10/19/99

Lab Number: WP4035-11

340 County Road No. 5
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Tel: (603) 431-5777 Fax: (603) 436-3356

4B
SEMIVOLATILE ORGANICS METHOD BLANK SUMMARY

EPA SAMPLE NO.

SBLK;092399

Lab Name: Katahdin Analytical Services SDG No.: WP4035

Lab File ID: X2963 Lab Sample ID: SBLK;092399

Instrument ID: 5970-X Date Extracted: 9/23/99

GC Column: RTX-5 ID: 0.25 (mm) Date Analyzed: 09/30/99

Matrix: (soil/water) WATER Time Analyzed: 9:31

Level: (low/med) LOW

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, LCS'S, MS AND MSD'S :

Client Sample ID	Lab Sample ID	Lab Data File	Date Injected	Time Injected
LCS;092399	LCS;092399	X2964	9/30/99	10:16:00 AM
LCSD;092399	LCSD;092399	X2965	9/30/99	11:00:00 AM
22GLM0401	WP4035-2	X2967	9/30/99	12:29:00 PM
22GLM0601	WP4035-3	X2968	9/30/99	1:14:00 PM
25GLM0101	WP4035-4	X2969	9/30/99	1:58:00 PM
25GLM0501	WP4035-5	X2970	9/30/99	2:43:00 PM
25GLM0501D	WP4035-6	X2971	9/30/99	3:28:00 PM
25GLX0201	WP4035-7	X2972	9/30/99	4:13:00 PM
22GLM0301D	WP4035-9	X2974	9/30/99	5:42:00 PM
22GLM0301	WP4035-1	X2975	9/30/99	6:26:00 PM
22GLM0601	WP4035-3RA	X2976	9/30/99	7:11:00 PM
25GLX0401	WP4035-8	X2982	10/1/99	1:03:00 PM
25GLM0501D	WP4035-6DL	X2986	10/1/99	4:01:00 PM
25GLM0501	WP4035-5DL	X2987	10/1/99	4:46:00 PM

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: SBLK;092399
SDG: WP4035
Report Date: 10/7/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: N/A
Method: EPA 8270
Date Analyzed: 9/30/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
SBLK;092399	AQ	-	-	9/23/99	LAP	EPA 3510	KRT

Compound	Result	Units	DF	Sample PQL	Method PQL
NAPHTHALENE	<10	ug/L	1.0	10	10
2-METHYLNAPHTHALENE	<10	ug/L	1.0	10	10
ACENAPHTHYLENE	<10	ug/L	1.0	10	10
ACENAPHTHENE	<10	ug/L	1.0	10	10
FLUORENE	<10	ug/L	1.0	10	10
PHENANTHRENE	<10	ug/L	1.0	10	10
ANTHRACENE	<10	ug/L	1.0	10	10
FLUORANTHENE	<10	ug/L	1.0	10	10
PYRENE	<10	ug/L	1.0	10	10
BENZO[A]ANTHRACENE	<10	ug/L	1.0	10	10
CHRYSENE	<10	ug/L	1.0	10	10
BENZO[B]FLUORANTHENE	<10	ug/L	1.0	10	10
BENZO[K]FLUORANTHENE	<10	ug/L	1.0	10	10
BENZO[A]PYRENE	<10	ug/L	1.0	10	10
INDENO[1,2,3-CD]PYRENE	<10	ug/L	1.0	10	10
DIBENZ[A,H]ANTHRACENE	<10	ug/L	1.0	10	10
BENZO[G,H,I]PERYLENE	<10	ug/L	1.0	10	10
NITROBENZENE-D5	76	%	1.0		
2-FLUOROBIPHENYL	66	%	1.0		
TERPHENYL-D14	73	%	1.0		

Report Notes:

Katahdin Analytical Services

LCS/LCSD Report

Sample	File Name	Date Acquired	Time Inj	Analyst	Matrix	Method
LCS;092399	X2964	9/30/99	10:16	KRT	AQ	8270
LCSD;092399	X2965	9/30/99	11:00	KRT	AQ	8270

Compound Name	Spk Amt ug/L	LCS Result ug/L	LCSD Result ug/L	LCS Rec (%)	LCSD Rec (%)	Rec. Limits (%)	RPD (%)	RPD Limit (%)
2-METHYLNAPHTHALENE	50	22.6	22.6	*45	*45	70-130	0	30
ACENAPHTHENE	50	29.3	34.9	*59	70	70-130	17	30
ACENAPHTHYLENE	50	27.3	33.5	*55	*67	70-130	20	30
ANTHRACENE	50	29.0	38.8	*58	78	70-130	29	30
BENZO[A]ANTHRACENE	50	28.8	33.4	*58	*67	70-130	14	30
BENZO[A]PYRENE	50	29.0	41.7	*58	83	70-130	*35	30
BENZO[B]FLUORANTHENE	50	30.5	45.3	*61	91	70-130	*39	30
BENZO[G,H,I]PERYLENE	50	27.3	38.6	*55	77	70-130	*33	30
BENZO[K]FLUORANTHENE	50	29.5	47.9	*59	96	70-130	*48	30
CHRYSENE	50	33.3	42.8	*67	86	70-130	25	30
DIBENZ[A,H]ANTHRACENE	50	27.1	39.2	*54	78	70-130	*36	30
FLUORANTHENE	50	31.6	44.4	*63	89	70-130	*34	30
FLUORENE	50	25.8	32.3	*52	*65	70-130	22	30
INDENO[1,2,3-CD]PYRENE	50	22.9	24.8	*46	*50	70-130	8.3	30
NAPHTHALENE	50	30.9	33.9	*62	*68	70-130	9.2	30
PHENANTHRENE	50	29.5	40.0	*59	80	70-130	30	30
PYRENE	50	35.9	46.2	72	92	70-130	24	30

RPD = (lcs rec - lcsd rec) /[(lcsd rec +lcsd rec)/2] * 100

* Out of Limits

4A

VOLATILE ORGANICS METHOD BLANK SUMMARY

EPA SAMPLE NO.

VBLKQ22B

Lab Name: Katahdin Analytical Services SDG No.: WP4035

Lab File ID: Q6709 Lab Sample ID: VBLKQ22B

Date Analyzed: 09/22/99 Time Analyzed: 18:34

GC Column: RTX-502 ID: 0.53 (mm) Heated Purge: (Y/N) N

Instrument ID: 5970-Q

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, LCS'S, MS AND MSD'S :

Client Sample ID	Lab Sample ID	Lab Data File	Date Injected	Time Injected
LCSQ22A	LCSQ22A	Q6707	9/22/99	5:07:00 PM
22GLM0301	WP4035-1	Q6712	9/22/99	8:34:00 PM
22GLM0401	WP4035-2	Q6713	9/22/99	9:12:00 PM
22GLM0601	WP4035-3	Q6714	9/22/99	9:49:00 PM
25GLM0101	WP4035-4	Q6715	9/22/99	10:27:00 PM
25GLX0401	WP4035-8	Q6719	9/23/99	1:02:00 AM
22GLM0301D	WP4035-9	Q6720	9/23/99	1:40:00 AM
25TL00201	WP4035-10	Q6721	9/23/99	2:19:00 AM

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: VBLKQ22B
SDG: WP4035
Report Date: 10/6/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: N/A
Method: SW8260
Date Analyzed: 9/22/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
VBLKQ22B	AQ	-	-	9/22/99	JSS	5030	JSS

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<5	ug/L	1.0	5	5
TOLUENE	<5	ug/L	1.0	5	5
1,2-DIBROMOETHANE	<5	ug/L	1.0	5	5
ETHYLBENZENE	<5	ug/L	1.0	5	5
NAPHTHALENE	<5	ug/L	1.0	5	5
MTBE	<5	ug/L	1.0	5	5
TOTAL XYLENES	<5	ug/L	1.0	5	5
DIBROMOFLUOROMETHANE	92	%	1.0		
1,2-DICHLOROETHANE-D4	84	%	1.0		
TOLUENE-D8	92	%	1.0		
P-BROMOFLUOROBENZENE	91	%	1.0		

Report Notes:

Katahdin Analytical Services

8260 LCS Recovery Sheet

Lab File: Q6707 **Sample ID:** LCSQ22A **Date Run:** 9/22/99

Analyst: JSS **Time Injected:** 5:07:00 PM **Matrix:** AQ

Compound Name	Spike Amt (ug/L)	Result (ug/L)	Rec (%)	Limits (%)
1,2-DIBROMOETHANE	50	43.4	87	60-140
BENZENE	50	47.4	95	60-140
ETHYLBENZENE	50	53.3	106	60-140
MTBE	50	46.4	93	60-140
NAPHTHALENE	50	61.6	123	60-140
TOLUENE	50	44.2	88	60-140
TOTAL XYLENES	150	140	93	60-140

* Out of Limits

4A
VOLATILE ORGANICS METHOD BLANK SUMMARY

EPA SAMPLE NO.

VBLKQ23A

Lab Name: Katahdin Analytical Services SDG No.: WP4035

Lab File ID: Q6724 Lab Sample ID: VBLKQ23A

Date Analyzed: 09/23/99 Time Analyzed: 10:57

GC Column: RTX-502 ID: 0.53 (mm) Heated Purge: (Y/N) N

Instrument ID: 5970-Q

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, LCS'S, MS AND MSD'S :

Client Sample ID	Lab Sample ID	Lab Data File	Date Injected	Time Injected
LCSQ23A	LCSQ23A	Q6723	9/23/99	10:03:00 AM
25GLX0201	WP4035-7	Q6726	9/23/99	1:41:00 PM
25GLM0501	WP4035-5	Q6731	9/23/99	4:51:00 PM
25GLM0501D	WP4035-6	Q6732	9/23/99	5:28:00 PM

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: VBLKQ23A
SDG: WP4035
Report Date: 10/6/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: N/A
Method: SW8260
Date Analyzed: 9/23/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
VBLKQ23A	AQ	-	-	9/23/99	HMP	5030	HMP

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<5	ug/L	1.0	5	5
TOLUENE	<5	ug/L	1.0	5	5
1,2-DIBROMOETHANE	<5	ug/L	1.0	5	5
ETHYLBENZENE	<5	ug/L	1.0	5	5
NAPHTHALENE	<5	ug/L	1.0	5	5
MTBE	<5	ug/L	1.0	5	5
TOTAL XYLENES	<5	ug/L	1.0	5	5
DIBROMOFLUOROMETHANE	86	%	1.0		
1,2-DICHLOROETHANE-D4	78	%	1.0		
TOLUENE-D8	97	%	1.0		
P-BROMOFLUOROBENZENE	97	%	1.0		

Report Notes:

Katahdin Analytical Services
8260 LCS Recovery Sheet

Lab File: Q6723 **Sample ID:** LCSQ23A **Date Run:** 9/23/99

Analyst: HMP **Time Injected:** 10:03:00 AM **Matrix:** AQ

Compound Name	Spike Amt (ug/L)	Result (ug/L)	Rec (%)	Limits (%)
1,2-DIBROMOETHANE	50	54.6	109	60-140
BENZENE	50	50.7	101	60-140
ETHYLBENZENE	50	56.9	114	60-140
MTBE	50	58.6	117	60-140
NAPHTHALENE	50	54.7	109	60-140
TOLUENE	50	51.4	103	60-140
TOTAL XYLENES	150	157	105	60-140

* Out of Limits

4A

VOLATILE ORGANICS METHOD BLANK SUMMARY

EPA SAMPLE NO.

VBLKU24A

Lab Name: Katahdin Analytical Services SDG No.: WP4035

Lab File ID: U1070 Lab Sample ID: VBLKU24A

Date Analyzed: 09/24/99 Time Analyzed: 9:12

GC Column: RTX-624 ID: 0.18 (mm) Heated Purge: (Y/N) N

Instrument ID: 5973-U

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, LCS'S, MS AND MSD'S :

Client Sample ID	Lab Sample ID	Lab Data File	Date Injected	Time Injected
LCSU24A	LCSU24A	U1069	9/24/99	8:28:00 AM
25GLM0501	WP4035-5DL	U1080	9/24/99	3:29:00 PM
25GLM0501D	WP4035-6DL	U1081	9/24/99	4:08:00 PM

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: VBLKU24A
SDG: WP4035
Report Date: 10/6/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: N/A
Method: SW8260
Date Analyzed: 9/24/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
VBLKU24A	AQ	-	-	9/24/99	KMC	5030	KMC

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<5	ug/L	1.0	5	5
TOLUENE	<5	ug/L	1.0	5	5
1,2-DIBROMOETHANE	<5	ug/L	1.0	5	5
ETHYLBENZENE	<5	ug/L	1.0	5	5
NAPHTHALENE	<5	ug/L	1.0	5	5
MTBE	<5	ug/L	1.0	5	5
TOTAL XYLENES	<5	ug/L	1.0	5	5
DIBROMOFLUOROMETHANE	102	%	1.0		
1,2-DICHLOROETHANE-D4	104	%	1.0		
TOLUENE-D8	101	%	1.0		
P-BROMOFLUOROBENZENE	98	%	1.0		

Report Notes:

Katahdin Analytical Services

8260 LCS Recovery Sheet

Lab File: U1069 **Sample ID: LCSU24A** **Date Run: 9/24/99**

Analyst: KMC **Time Injected: 8:28:00 AM** **Matrix: AQ**

Compound Name	Spike Amt (ug/L)	Result (ug/L)	Rec (%)	Limits (%)
1,2-DIBROMOETHANE	50	54.9	110	60-140
BENZENE	50	52.0	104	60-140
ETHYLBENZENE	50	54.0	108	60-140
MTBE	50	49.7	99	60-140
NAPHTHALENE	50	55.4	111	60-140
TOLUENE	50	53.6	107	60-140
TOTAL XYLENES	150	159	106	60-140

*** Out of Limits** *1*

ENSR
ENSR Consulting and Engineering
Air Toxics Specialty Laboratory

ENSR
Air Toxics Specialty Laboratory
42 Nagog Park
Acton, MA 01720

DATE: October 12, 1999

TO: Andrea Colby
Katahdin Analytical
340 County Road No. 5
P.O. Box 720
Westbrook, ME 04098

Re: Organic Analyses of Aqueous Samples for Methane by Gas Chromatography/Flame Ionization Detection (GC/FID)- **WP4035**

PROJECT #: **8601-008-200**

LAB ID #: **990178**

ANALYTICAL PROCEDURE:

Five (5) aqueous samples were analyzed for methane under the guidelines of SW-846 Method 3810.

A Hewlett Packard 5890 series II gas chromatograph (GC) equipped with a Hewlett Packard flame ionization detector (FID) was used for the analysis. A 1.0 mL headspace aliquot of each sample was injected into the column for analysis. The operating conditions of the GC/FID are listed in Table 1. A five point calibration was performed for the target analyte, methane.

It should be noted that all samples were received at 10°C.

QUALITY CONTROL:

1. A laboratory blank was analyzed daily in the same manner as the samples. Methane was not detected in the blank.

2. MS/MSD analyses were performed on a sample from another Katahdin job (WP3906). The recoveries and relative percent differences of methane were within QC limits.

3. A laboratory control spike was analyzed daily. The recovery of methane was within the QC acceptance limits.

Date Samples Received by the Laboratory: 9/23/99

Date Analysis Started: 9/24/99

C:\My Documents\Kat 990175 990178 990180\katrpt4.doc

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340 County Road No. 5
P.O. Box 720
Westbrook, ME 04092
Tel: (207) 874-2400
Fax: (207) 775-4029

CHAIN of CUSTODY

990178

PLEASE PRINT IN PEN

Page ____ of ____

Client	Contact	Phone #	Fax #
Katahdin Analytical Services	Andrew Colby	( )	( )

Address	City	State	Zip Code
as above			

Purchase Order # | Proj. Name / No. | Katahdin Quote #

Bill (if different than above) | Address

Sampler (Print / Sign) | Copies To:

LAB USE ONLY WORK ORDER #:

KATAHDIN PROJECT MANAGER

REMARKS: Sub to ENSR

SHIPPING INFO: ☒ FED EX ☐ UPS ☐ CLIENT

AIRBILL NO:

TEMP°C ____ ☐ TEMP BLANK ☐ INTACT ☐ NOT INTACT

ANALYSIS AND CONTAINER TYPE PRESERVATIVES

*	Sample Description	Date / Time coll'd	Matrix	No. of Cntrs.	Dissolved Methane	Filt. O Y O N	Filt. O Y O N	Filt. O Y O N	Filt. O Y O N	Filt. O Y O N	Filt. O Y O N	Filt. O Y O N	Filt. O Y O N	Filt. O Y O N	Filt. O Y O N
	WP 4035-1	9/21/99 1137	AQ	3	X		990178-1								
	WP 4035-2	/ 1149			X				-2						
	WP 4035-3	/ 1104			X				-3						
	WP 4035-4	/ 1205			X				-4						
	WP 4035-5	/ 1705			X				-5						
		/													
		/													
		/													
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		/													
		/													

COMMENTS

QC - II + W/Narrative DD (KAS007QC-DB3) Results Due: 10-20-99

Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)
[illegible]	9/22/99 1550	[illegible]			
Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)
		9/23/99 0/020			

FORMSOURCE INC. ☎ (207) 782-3311
FORM # CHN-OF-CSTDY

DUPLICATE

SAMPLE LOG-IN & RECEIPT CHECKLIST

Client/Proj #: Katahdin WP4035

Proj Mgr: M. Hoyt

Lab Pool #: 990178

Inspected & Logged in by: A. MacDuff

Date Time: 9/23/99 @1025

Sample Matrix	Number of Samples	Analysis Requested	Analyze by (date)	Storage Location
Aqueous	5	CH_4	10/7/99	R1

Circle the appropriate response:

1) Shipped / Hand delivered

2) COC present / not present on receipt

3) COC Tape present / not present on shipping container

4) Samples broken / intact on receipt

5) Samples ambient / chilled on receipt Temp blank @ 10°C

6) Samples preserved correctly / incorrectly / none recommended

7) Received within / outside holding time

8) COC tapes present / not present on samples

9) Discrepancies / NO discrepancies noted between COCs and samples

Additional Comments: 3 VOAs per sample, no individual vial numbers

ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

Lab Name: ENSR Contract: WP4035-4

Lab Code: Case No.: SAS NO.: SDG NO.:

Matrix: (soil/water) water Lab Sample ID: 990178-4

Sample wt / vol: 32.5 ml (g/ml) Lab File ID: KAT_030

Level: (low/med) low Date Received: 9/23/99

% Moisture: NA Date Analyzed: 9/24/99

GC Column: Carboxen 1004 OD: 1/16" Dilution Factor: 1

Soil Extract Volume: NA (µl) Soil Aliquot Volume: NA (µl)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or PPMv) µg/L	Q
74-82-8	Methane	4400	E

25GLM0101

ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

WP4035-4 D

Lab Name: ENSR Contract: _____

Lab Code: _____ Case No.: _____ SAS NO.: _____ SDG NO.: _____

Matrix: (soil/water) _____ water _____ Lab Sample ID: 990178-4 DIL

Sample wt / vol: 32.5 ml (g/ml) Lab File ID: KAT_031

Level: (low/med) _____ low _____ Date Received: 9/23/99

% Moisture: _____ NA _____ Date Analyzed: 9/24/99

GC Column: Carboxen 1004 OD: 1/16" Dilution Factor: 10

Soil Extract Volume: _____ NA (µl) Soil Aliquot Volume: _____ NA (µl)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or PPMv) µg/L	Q
74-82-8	Methane	6000	D

ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

Lab Name: ENSR Contract: WP4035-5

Lab Code: Case No.: SAS NO.: SDG NO.:

Matrix: (soil/water) water Lab Sample ID: 990178-5

Sample wt / vol: 32.5 ml (g/ml) Lab File ID: KAT_032

Level: (low/med) low Date Received: 9/23/99

% Moisture: NA Date Analyzed: 9/24/99

GC Column: Carboxen 1004 OD: 1/16" Dilution Factor: 1

Soil Extract Volume: NA (µl) Soil Aliquot Volume: NA (µl)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or PPMv) µg/L	Q
74-82-8	Methane	3500	E

ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

Lab Name: ENSR Contract: WP4035-5 D

Lab Code: Case No.: SAS NO.: SDG NO.:

Matrix: (soil/water) water Lab Sample ID: 990178-5 DIL

Sample wt / vol: 32.5 ml (g/ml) Lab File ID: KAT_033

Level: (low/med) low Date Received: 9/23/99

% Moisture: NA Date Analyzed: 9/24/99

GC Column: Carboxen 1004 OD: 1/16" Dilution Factor: 5

Soil Extract Volume: NA (µl) Soil Aliquot Volume: NA (µl)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or PPMv) µg/L	Q
74-82-8	Methane	4400	D

ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLK01

Lab Name: ____ ENSR _____ Contract: _____

Lab Code: _____ Case No.: _____ SAS NO.: _____ SDG NO.: _____

Matrix: (soil/water) ____ water _____ Lab Sample ID: MB990178

Sample wt / vol: ____ 32.5 ml _____ (g/ml) Lab File ID: ___KAT_006_____

Level: (low/med) _____ low _____ Date Received: ___NA _____

% Moisture: ____ NA _____ Date Analyzed: ___9/24/99 _____

GC Column: _ Carboxen 1004 __ OD: ___ 1/16" ___ Dilution Factor: ____ 1 _____

Soil Extract Volume: ____ NA ____ (µl) Soil Aliquot Volume: ____ NA ____ (µl)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or PPMv) __ µg/L __	Q
74-82-8	Methane	5.2	U

ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

Lab Name: ENSR Contract: LCS01

Lab Code: Case No.: SAS NO.: SDG NO.:

Matrix: (soil/water) water Lab Sample ID: LCS990178

Sample wt / vol: 32.5 ml (g/ml) Lab File ID: KAT_007

Level: (low/med) low Date Received: NA

% Moisture: NA Date Analyzed: 9/24/99

GC Column: Carboxen 1004 OD: 1/16" Dilution Factor: 1

Soil Extract Volume: NA (µl) Soil Aliquot Volume: NA (µl)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or PPMv) µg/L	Q
74-82-8	Methane	210	

ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

WP3906-28(B) MS

Lab Name: ENSR Contract:

Lab Code: Case No.: SAS NO.: SDG NO.:

Matrix: (soil/water) water

Lab Sample ID: 990175-1 MS

Sample wt / vol: 32.5 ml (g/ml)

Lab File ID: KAT_023

Level: (low/med) low

Date Received: 9/16/99

% Moisture: NA

Date Analyzed: 9/24/99

GC Column: Carboxen 1004 OD: 1/16"

Dilution Factor: 1

Soil Extract Volume: NA (µl)

Soil Aliquot Volume: NA (µl)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or PPMv) µg/L	Q
74-82-8	Methane	340	

ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

WP3906-28(C) MSD

Lab Name: ENSR Contract:

Lab Code: Case No.: SAS NO.: SDG NO.:

Matrix: (soil/water) water

Lab Sample ID: 990175-1 MSD

Sample wt / vol: 32.5 ml (g/ml)

Lab File ID: KAT_024

Level: (low/med) low

Date Received: 9/16/99

% Moisture: NA

Date Analyzed: 9/24/99

GC Column: Carboxen 1004 OD: 1/16"

Dilution Factor: 1

Soil Extract Volume: NA (µl)

Soil Aliquot Volume: NA (µl)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or PPMv) µg/L	Q
74-82-8	Methane	350	

LABORATORY CONTROL SPIKE RECOVERY

Lab Name: ____ ENSR _____ Contract: _____

Lab Code: _____ Case NO.: _____ SAS NO.: _____ SDG NO.: _____

Laboratory Control Sample No: _____ LCS01 _____

COMPOUND	SPIKE ADDED (µg/L)	LCS CONCENTRATION (µg/L)	LCS % REC #	QC LIMITS REC.
Methane	205.0	206.7	101%	50 - 150

* - Values outside of QC limits.

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: ____ ENSR _____ Contract: _____

Lab Code: _____ Case NO.: _____ SAS NO.: _____ SDG NO.: _____

Matrix Spike - EPA Sample NO.: __WP3906-28 _____

COMPOUND	SPIKE ADDED (µg/L)	SAMPLE CONCENTRATION (µg/L)	MS CONCENTRATION (µg/L)	MS % REC #	QC LIMITS REC.
Methane	205.0	189	344.8	76%	50-150

COMPOUND	SPIKE ADDED (µg/L)	MSD CONCENTRATION (µg/L)	MSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
Methane	205.0	345.8	77%	0.68%	50	50-150

Spike recovery: _____ 0 _____ out of ____ 2 ___ outside limits.
RPD: _____ 0 ____ out of ___ 1 ____ outside limits.

Comments:

_____

_____

METHOD BLANK SUMMARY

EPA SAMPLE NO.

Lab Name: ENSR Contract: VBLK01

Lab Code: Case No.: SAS NO.: SDG NO.:

Lab File ID: KAT_006 Lab Sample I MB990175

Instrument ID: HPGC#3 Date Analyzed: 9/24/99

Matrix: (soil/water) water Level: (low/med) low

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES; MS AND MSD

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
01	LCS01	LCS990175	KAT_007	09/24/99
02	WP3906-28(B) MS	990175-1 MS	KAT_023	09/24/99
03	WP3906-28(C) MSD	990175-1 MSD	KAT_024	09/24/99
04	WP4035-1	990178-1	KAT_025	09/24/99
05	WP4035-1 D	990178-1 DIL	KAT_026	09/24/99
06	WP4035-2	990178-2	KAT_028	09/24/99
07	WP4035-3	990178-3	KAT_029	09/24/99
08	WP4035-4	990178-4	KAT_030	09/24/99
09	WP4035-4 D	990178-4 DIL	KAT_031	09/24/99
10	WP4035-5	990178-5	KAT_032	09/24/99
11	WP4035-5 D	990178-5 DIL	KAT_033	09/24/99
12				
13				
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20				
21				
22				
23				
24				
25				
26				

COMMENTS:

Katahdin
ANALYTICAL SERVICES

SDG NARRATIVE
KATAHDIN ANALYTICAL SERVICES
TETRA TECH NUS
CASE CNC CHARLESTON

Sample Receipt

The following samples were received on June 8, 1999 and were logged in under Katahdin Analytical Services work order number WP2792 for a hardcopy due date of July 8, 1999.

KATAHDIN Sample No.	TTNUS Sample Identification	GEL Sample No.
WP2792-1	25SLB090304	
WP2792-2	25SLB100102	
WP2792-3	25SLB110203	
WP2792-4	25SLB130203	9906242-01
WP2792-5	25SLB130203D	9906242-02
WP2792-6	25SLB140304	
WP2792-7	25SLB160304	
WP2792-8	25SLB170304	
WP2792-9	25SLB120203 → GRAIN SIZE	
WP2792-10	25SLB120708	
WP2792-11	25TL00501	
WP2792-12	25SLB150304	9906242-03
WP2792-13	25SLB150304D	9906242-04

The samples were logged in for the analyses specified on the chain of custody form. All problems encountered and resolved during sample receipt have been documented on the applicable chain of custody forms.

Sample analyses have been performed by the methods as noted herein.

Volatile Organic Analysis

Twelve soil samples were received by the Katahdin Analytical Services, Inc. GC/MS laboratory on June 8, 1999 and were specified to be analyzed by USEPA method 8260B for the analytes benzene, toluene, ethylbenzene, xylenes, MTBE, naphthalene, and EDB.

Analyses for this workorder were performed on the 5972-F, 5972-M, and 5972-Z instruments. A VSTD050 (50 ppb standard) was used for the continuing calibration standard. Internal standard and surrogate compounds were also spiked at 50 ug/l.

Batch QC (VBLK, and LCS) was performed in each twelve-hour window. Results are included

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210 West Road No. 5, Portsmouth, NH 03801
Tel: (603) 431-5777 Fax: (603) 436-3356

in this data package. The LCS QC samples were spiked with the entire list of compounds quantitated for at 50 ppb. No matrix spike/matrix spike duplicate was performed on any sample in this workorder.

Method 8000B, section 7.5.1.2.1 (Revision 2, 12/96) states, "in those instances where the RSD for one or more analytes exceeds 20%, the initial calibration curve may still be acceptable if the mean of the RSD values for all analytes in the calibration is less than or equal to 20%." Method 8260B narrows this 20% maximum to 15%.

The calibration curves in this workorder had several analytes exceeding the maximum allowable 15% RSD. Since the average %RSDs were 8.3%, 12.3%, 10.9%, and 13.3%, the curves were acceptable.

Initial analyses of samples WP2792-2, -4, -5, -8, and -9 following medium level protocols yielded target analyte concentrations over the upper limit of the calibration curve. Analyses of samples WP2792-5 and -9 also yielded surrogate recovery deviations. Reanalyses occurred at 1:2, 1:10, 1:50, 1:20, and 1:100 dilutions, respectively, successfully. Both sets of data are included in this data package for each sample.

Initial analysis of sample WP2792-6 following low level protocols yielded internal standard area and surrogate recovery deviations. Reanalysis yielded internal standard area recovery deviations, confirming matrix interference. Both sets of data are included in this data package.

Several manual integrations were performed due to split peaks; all have been flagged with a "M" (software-generated) on the pertinent quantitation reports. All "M" flags have been dated and initialed by the analyst performing the integration. In addition, all "M" flags have been reviewed and approved by the GC/MS supervisor. Copies of each manual integration are included in the pertinent quantitation reports.

No other protocol deviations were noted by the volatile organics staff.

Semivolatile Organic Analysis

Nine soil/sediment samples were received by Katahdin Analytical Services laboratory on June 8, 1999 for analysis in accordance with 8270C for the PAH list of analytes.

Extraction of the samples occurred following USEPA method 3550 on June 16, 1999. A laboratory control spike consisting of all PAH analytes spiked into organic free sand, was extracted in the batch.

The initial calibration curve analyzed in this SDG had some of the target analyte %RSD values exceeding 15 %.

Method 8000B, section 7.5.1.2.1 (Revision 2, 12/96) states, "in those instances where the RSD for one or more analytes exceeds 20%, the initial calibration curve may still be acceptable if the

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mean of the RSD values for all analytes in the calibration is less than or equal to 20%." Section 7.3.7.1 of method 8270C (revision 3, 12/96) narrows this 20% maximum to 15%.

In the calibration curve analyzed in this SDG, the average %RSD for all analytes was 9.1%, making the curve acceptable.

Initial analyses of samples WP2792-4, -5, and -9 yielded target analyte concentrations over the upper limit of the calibration curve. Analysis of sample WP2792-9 also yielded an internal standard area recovery deviation. Reanalyses occurred at 1:5, 1:100, and 1:5 dilutions, respectively. Both sets of data for each sample are included in this data package.

Several manual integrations were performed due to split peaks; all have been flagged with a "M" by the data system. All manual integrations have been dated and initialed by the responsible analyst. Copies of each manual integration are included in the data package. All manual integrations have been reviewed and approved by the GC/MS supervisor.

No other protocol deviations were noted by the semivolatiles organics staff.

Metals Analysis

The samples of Katahdin Work Order WP2792 were prepared and analyzed for metals in accordance with the "Test Methods for Evaluating Solid Waste", SW-846, November 1986, Third Edition.

Inductively-Coupled Plasma (ICP) Atomic Emission Spectroscopic Analysis

Soil-matrix Katahdin Sample Nos. WP2792-(1-5) were originally digested for lead analysis on 07/07/99 (QC Batch PG07ICS0) in accordance with USEPA Method 3050B. Katahdin Sample No. WP2989-1 was prepared with duplicate matrix-spiked aliquots.

ICP analyses of Katahdin Work Order WP2792 sample digestates were performed in accordance with USEPA Method 6010B, using a Thermo Jarrell Ash Trace ICP. All samples were analyzed within holding times and all QC criteria were met with the following comments or exceptions:

Some of the results for run QC samples (ICV, ICB, CCV, CCB, ICSA, and ICSAB) included in the accompanying data package may have exceeded acceptance limits for some elements. Please note that all client samples and batch QC samples associated with out-of-control results for run QC samples were subsequently reanalyzed for the analytes in question.

Wet Chemistry Analysis

For work order WP2792 the analyses for Total Combustible Organics (TCO) have been performed in accordance with the "Annual Book of ASTM Standards", 1987. Analyses for Solids-Total Residue (TS) for work order WP2792 samples have been performed in accordance

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Katahdin
ANALYTICAL SERVICES

with "Contract Laboratory Program Statement of Work for Inorganic Analysis".

All analyses were performed within analytical hold time. No protocol deviations were noted by the Wet Chemistry laboratory staff.

Subcontracted Analysis

Analyses for Total Organic Carbon, Total Petroleum Hydrocarbon and Grain size were subcontracted to outside laboratories. All sets of data are included as separate sections to the data package.

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager and/or his designee, as verified by the following signature.

Deborah J. Nadeau
Authorized Signature
8-12-99

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KATAHDIN ANALYTICAL SERVICES, INC.
SAMPLE RECEIPT CONDITION REPORT
Tel. (207) 874-2400
Fax (207) 775-4029

LAB (WORK ORDER) #: WP 2792

PAGE: 1 OF 1

COOLER: 1 OF 1

COC#: —
SDG#: —
DATE / TIME RECEIVED: 6-8-99 1015
DELIVERED BY: FedEx
RECEIVED BY: Sam
LIMS ENTRY BY: BKH
LIMS REVIEW BY / PM: KC

CLIENT: Tetra Tech -SC

PROJECT: CNC Charleston

	YES	NO	EXCEPTIONS	COMMENTS	RESOLUTION
1. CUSTODY SEALS PRESENT / INTACT?	☑	☐	☐		
2. CHAIN OF CUSTODY PRESENT IN THIS COOLER?	☑	☐	☐		
3. CHAIN OF CUSTODY SIGNED BY CLIENT?	☑	☐	☐		
4. CHAIN OF CUSTODY MATCHES SAMPLES?	☐	☑	☐	(1)	Client send to add 25SLB120708 to COC for grain size
5. TEMPERATURE BLANKS PRESENT?	☑	☐	☐	TEMP BLANK TEMP (°C)= 1.0 temp blank under bag of ice.	
6. SAMPLES RECEIVED AT 4°C +/- 2?	☐	☑	☐	COOLER TEMP (°C)= NA	KJC contacted Bryan Hence by phone & Paul Calligan by fax 6/9/99
ICE / ICE PACKS PRESENT (Y) or N?				(RECORD COOLER TEMP ONLY IF TEMP BLANK IS NOT PRESENT)	
7. VOLATILES FREE OF HEADSPACE?	☑	☐	☐		
8. TRIP BLANK PRESENT IN THIS COOLER	☑	☐	☐		
9. PROPER SAMPLE CONTAINERS AND VOLUME?	☑	☐	☐		
10. SAMPLES WITHIN HOLD TIME UPON RECEIPT?	☑	☐	☐		
11. SAMPLES PROPERLY PRESERVED(1)?	☑	☐	☑ KJC 6/9/99		
12. CORRECTIVE ACTION REPORT FILED?	☐	☑	N/A		

13. ANALYTICAL PROGRAMS (CIRCLE ONE) COMMERCIAL CLP HAZWRAP NFESC ACOE AFCEE OTHER (STATE OF ORIGIN):

LOG - IN NOTES(1): Sample ID 25SLB120203 only has 7 containers, there is an extra container ID 25SLB120708 for grain size that is not on the chain (no time on container but date matches); ~~Sample ID 25SLB150304 has 6 containers but none labeled for FOC~~ KJC 6/9/99

(1) Use this space (and additional sheets if necessary) to document samples that are received broken or compromised, C-O-C discrepancies, radiation checks, residual chlorine check, re[illegible] of pH ch[illegible] required. If samples required pH adjustment, record volume and type of preservative[illegible]d.

00000006

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CHAIN of CUSTODY

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Client: Tetra Tech NUS
Contact: Bryn Howze
Phone #: (843) 814-9080
Fax #: ( )
Address: NH21 Ave H
City: N. Charleston
State: SC
Zip Code: 2940
Purchase Order #:
Proj. Name / No.:
Katahdin Quote #:
Bill (if different than above):
Address:
Sampler (Print / Sign): Roger Franklin
Copies To:

LAB USE ONLY
WORK ORDER #: WP 2792
KATAHDIN PROJECT MANAGER:
REMARKS:
SHIPPING INFO: ☒ FED EX ☐ UPS ☐ CLIENT
AIRBILL NO: 809609650221
TEMP°C: ☐ TEMP BLANK ☐ INTACT ☐ NOT INTACT

ANALYSIS AND CONTAINER TYPE PRESERVATIVES

*	Sample Description	Date / Time coll'd	Matrix	No. of Cntrs.	Filt. O Y O N PAH 4 oz Naphth.	Filt. O Y O N BTEX 1EDB 5 gram encore	Filt. O Y O N Lead 4 oz	Filt. O Y O N Grain Size 32 oz (1/2 full)	Filt. O Y O N FOC	Filt. O Y O N	Filt. O Y O N	Filt. O Y O N	Filt. O Y O N FID Readings PPM	Filt. O Y O
	25SLB09 03 04	6/7/99/0858	Soil	6	X	X	X						106	
	25SLB10 01 02	6/7/99/0915	Soil	6	X	X	X						>5000	
	25SLB11 02 03	6/7/99/0935	Soil	6	X	X	X						1610	
	25SLB12 02 03	6/7/99/1015	Soil	8	X	X	X	X					>5000	
	25SLB13 02 03	6/7/99/1040	Soil	6	X	X	X						>50	
	25SLB13 02 03D	6/7/99/1040	Soil	6	X	X	X						~~820~~ 750	
	25SLB14 03 04	6/7/99/1055	Soil	6	X	X	X						820	
	25SLB15 03 04	6/7/99/1115	Soil	6	X	X	X		X				150	
	25SLB16 03 04	6/7/99/1330	Soil	6	X	X	X						250	
	25SLB17 03 04	6/7/99/1355	Soil	6	X	X	X						>5000	
	25TL 05 01	6/7/99/ –	Water	2		2								
	25SLB120708	6/7/99/						X						
		/												
		/												
		/												
		/												

COMMENTS

Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)
Roger Franklin	6/7/99 1800	Fed Ex		6-8-99 1015	Shelley Williams
Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)
					0000007

New England-ME Laboratory (207) 874-2400
CONFIRMATION

ORDER NO WP-2792

Project Manager: Andrea J. Colby
ORDER DATE: 06/08/9
PHONE: 850/385-98
FAX: 850/385-9860
DUE: 08 JUL
FAC.ID: CNC CHARLESTON

REPORT TO: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr., Suite 102
Tallahassee, FL 32308

INVOICE: ACCOUNTS PAYABLE
TETRA TECH NUS, INC.
661 ANDERSEN DRIVE, FOSTER PLAZA VII
PITTSBURGH, PA 15220-2745

PHONE: 412/921-7090
PO: N7912-P99264

PROJECT: CTO #68

SAMPLED BY: ROGER FRANKLIN DELIVERED BY: FEDEX DISPOSE: AFTER 07 AUG

ITEM	LOG NUMBER	SAMPLE DESCRIPTION	SAMPLED DATE/TIME	RECEIVED	MATRIX
1	WP2792-1	25SLB090304	07 JUN 0858	08 JUN	SL
	WP2792-2	25SLB100102	07 JUN 0915		
	WP2792-3	25SLB110203	07 JUN 0935		
	WP2792-6	25SLB140304	07 JUN 1055		
	WP2792-7	25SLB160304	07 JUN 1330		
	WP2792-8	25SLB170304	07 JUN 1355		

DETERMINATION	METHOD	QTY	PRICE	AMOUNT
Polynuclear Aromatic Hydrocarbons	EPA 8270	6	135.00	810.00
Volatile Organics by 8260B	SW8260	6	85.00	510.00
Solids-Total Residue (TS)	CLP/CIP SO	6	0.00	0.00
Lead, Total	6010	6	20.00	120.00
TOTALS		6	240.00	1440.00

	LOG NUMBER	SAMPLE DESCRIPTION	SAMPLED DATE/TIME	RECEIVED	MATRIX
2	WP2792-9	25SLB120203	07 JUN 1015	08 JUN	SL

DETERMINATION	METHOD	QTY	PRICE	AMOUNT
Polynuclear Aromatic Hydrocarbons	EPA 8270	1	135.00	135.00
Volatile Organics by 8260B	SW8260	1	85.00	85.00
Solids-Total Residue (TS)	CLP/CIP SO	1	0.00	0.00
Lead, Total	6010	1	20.00	20.00
Wet Lab Subcontract		1	110.00	110.00
TOTALS		1	350.00	350.00

	LOG NUMBER	SAMPLE DESCRIPTION	SAMPLED DATE/TIME	RECEIVED	MATRIX
3	WP2792-10	25SLB120708	07 JUN	08 JUN	SL

DETERMINATION	METHOD	QTY	PRICE	AMOUNT
Wet Lab Subcontract		1	110.00	110.00

LABORATORY ORDER CONTINUED ON PAGE 2

0000008

for [illegible]

ORDER NO WP-2792

Project Manager: Andrea J. Colby
ORDER DATE: 06/08/99
PHONE: 850/385-9899
FAX: 850/385-[illegible]0
DUE: 08 JUL
FAC.ID: CNC CHARLESTON

REPORT TO: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr., Suite 102
Tallahassee, FL 32308

INVOICE: ACCOUNTS PAYABLE
TETRA TECH NUS, INC.
661 ANDERSEN DRIVE, FOSTER PLAZA VII
PITTSBURGH, PA 15220-2745

PHONE: 412/921-7090
PO: N7912-P99264

PROJECT: CTO #68

SAMPLED BY: ROGER FRANKLIN DELIVERED BY: FEDEX DISPOSE: AFTER 07 AUG

	LOG NUMBER	SAMPLE DESCRIPTION	SAMPLED DATE/TIME	RECEIVED	MATRIX
4	WP2792-11	25TL00501	07 JUN	08 JUN	SL

DETERMINATION	METHOD	QTY	PRICE	AMOUNT
Volatile Organics by 8260B	SW8260	1	85.00	85.00

	LOG NUMBER	SAMPLE DESCRIPTION	SAMPLED DATE/TIME	RECEIVED	MATRIX
5	WP2792-12	25SLB150304	07 JUN 1115	08 JUN	SL

DETERMINATION	METHOD	QTY	PRICE	AMOUNT
Polynuclear Aromatic Hydrocarbons	EPA 8270	1	135.00	135.00
Solids-Total Residue (TS)	CLP/CIP SO	1	0.00	0.00
Volatile Organics by 8260B	SW8260	1	85.00	85.[illegible]
Lead, Total	6010	1	20.00	20.[illegible]
Total Combustible Organics	ASTM D2974	1	30.00	30.00
Wet Lab Subcontract		1	60.00	60.00
TOTALS		1	330.00	330.00

	LOG NUMBER	SAMPLE DESCRIPTION	SAMPLED DATE/TIME	RECEIVED	MATRIX
6	WP2792-4	25SLB130203	07 JUN 1040	08 JUN	SL
	WP2792-5	25SLB130203D	07 JUN 1040		

DETERMINATION	METHOD	QTY	PRICE	AMOUNT
Polynuclear Aromatic Hydrocarbons	EPA 8270	2	135.00	270.00
Volatile Organics by 8260B	SW8260	2	85.00	170.00
Solids-Total Residue (TS)	CLP/CIP SO	2	0.00	0.00
Lead, Total	6010	2	20.00	40.00
Wet Lab Subcontract		2	75.00	150.00
TOTALS		2	315.00	630.00

LABORATORY ORDER CONTINUED ON PAGE 3

0000009

[illegible] 6/14/99

ORDER NO WP-2792

Project Manager: Andrea J. Colby
ORDER DATE: 06/08/
PHONE: 850/385-98
FAX: 850/385-9860
DUE: 08 JUL
FAC.ID: CNC CHARLESTON

REPORT TO: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr., Suite 102
Tallahassee, FL 32308

INVOICE: ACCOUNTS PAYABLE
TETRA TECH NUS, INC.
661 ANDERSEN DRIVE, FOSTER PLAZA VII
PITTSBURGH, PA 15220-2745

PHONE: 412/921-7090
PO: N7912-P99264

PROJECT: CTO #68

SAMPLED BY: ROGER FRANKLIN DELIVERED BY: FEDEX DISPOSE: AFTER 07 AUG

	LOG NUMBER	SAMPLE DESCRIPTION	SAMPLED DATE/TIME	RECEIVED	MATRIX
7	WP2792-13	25SLB150304D	07 JUN 1115	07 JUN	SL

DETERMINATION	METHOD	QTY	PRICE	AMOUNT
Wet Lab Subcontract		1	60.00	60.00

ORDER NOTE: QC-IV NFESC-D
DD(KAS007QC-DB3)
CNC CHARLESTON

REPORT COPY: MS. LEE LECK
TETRA TECH NUS
FOSTER PALZA 7
661 ANDERSEN DR.
PITTSBURGH,PA 15220

INVOICE: With Report

TOTAL ORDER AMOUNT $3,005.00
This is NOT an Invoice

C/BKR/WEST.AJC(dw)
06-14Please contact KATAHDIN ANALYTICAL SERVICES promptly if you have any ques

0000010

[illegible]

KATAHDIN ANALYTICAL SERVICES

Summary of Report Notes

Report Note	Note Text
DL	'DL' flag denotes inability to calculate surrogate recovery due to sample dilution.
E	'E' flag indicates an estimated value. The analyte was detected in the sample at a concentration greater than the standard calibration range.
J	'J' flag denotes an estimated value less than the Laboratory's Practical Quantitation Level.
O-2	Sample dilution required for quantitation of one or more target analytes; therefore, standard laboratory Practical Quantitation Level (PQL) could not be achieved.

KATAHDIN ANALYTICAL SERVICES

Summary of Report Notes

Report Note	Note Text
#	'#' flag denotes surrogate compound recovery is out of criteria.
E	'E' flag indicates an estimated value. The analyte was detected in the sample at a concentration greater than the standard calibration range.
J	'J' flag denotes an estimated value less than the Laboratory's Practical Quantitation Level.
O-1	Sample dilution required due to matrix interference, sample viscosity or other matrix-related problem; therefore, standard laboratory Practical Quantitation Level (PQL) could not be achieved.
O-13	Internal standard area(s) are out of criteria. Reanalysis confirmedmatrix interference.
O-2	Sample dilution required for quantitation of one or more target analytes; therefore, standard laboratory Practical Quantitation Level (PQL) could not be achieved.

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP2792-1
SDG: WP2792
Report Date: 8/5/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: 81
Method: EPA 8270
Date Analyzed: 7/23/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
25SLB090304	SL	6/7/99	6/8/99	6/16/99	PMM	EPA 3550	KRT

Compound	Result	Units	DF	Sample PQL	Method PQL
NAPHTHALENE	<400	ug/Kg	1.2	400	330
2-METHYLNAPHTHALENE	<400	ug/Kg	1.2	400	330
ACENAPHTHYLENE	<400	ug/Kg	1.2	400	330
ACENAPHTHENE	<400	ug/Kg	1.2	400	330
FLUORENE	<400	ug/Kg	1.2	400	330
PHENANTHRENE	<400	ug/Kg	1.2	400	330
ANTHRACENE	<400	ug/Kg	1.2	400	330
FLUORANTHENE	<400	ug/Kg	1.2	400	330
PYRENE	<400	ug/Kg	1.2	400	330
BENZO[A]ANTHRACENE	<400	ug/Kg	1.2	400	330
CHRYSENE	<400	ug/Kg	1.2	400	330
BENZO[B]FLUORANTHENE	<400	ug/Kg	1.2	400	330
BENZO[K]FLUORANTHENE	<400	ug/Kg	1.2	400	330
BENZO[A]PYRENE	<400	ug/Kg	1.2	400	330
INDENO[1,2,3-CD]PYRENE	<400	ug/Kg	1.2	400	330
DIBENZ[A,H]ANTHRACENE	<400	ug/Kg	1.2	400	330
BENZO[G,H,I]PERYLENE	<400	ug/Kg	1.2	400	330
NITROBENZENE-D5	42	%	1.2		
2-FLUOROBIPHENYL	48	%	1.2		
TERPHENYL-D14	86	%	1.2		

Report Notes:

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP2792-1
SDG: WP2792
Report Date: 8/2/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: 81
Method: SW8260
Date Analyzed: 6/16/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
25SLB090304	SL	6/7/99	6/8/99	6/16/99	KRT	5030	KRT

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	52	ug/Kg	1.2	6	5
TOLUENE	15	ug/Kg	1.2	6	5
1,2-DIBROMOETHANE	<6	ug/Kg	1.2	6	5
ETHYLBENZENE	<6	ug/Kg	1.2	6	5
NAPHTHALENE	J4	ug/Kg	1.2	6	5
MTBE	<6	ug/Kg	1.2	6	5
TOTAL XYLENES	<6	ug/Kg	1.2	6	5
DIBROMOFLUOROMETHANE	88	%	1.2		
1,2-DICHLOROETHANE-D4	92	%	1.2		
TOLUENE-D8	86	%	1.2		
P-BROMOFLUOROBENZENE	72	%	1.2		

Report Notes: J

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services | **Client Field ID: 25SLB090304**

Matrix: SOIL | **SDG Name: WP2792**

Percent Solids: 80.8 | **Lab Sample ID: WP2792-001**

Concentration Units (ug/L or mg/Kg dry weight): mg/Kg

CAS No.	Analyte	Concentration	C	Q	M	DF
7439-92-1	LEAD	10.5			P	1

Color Before: BROWN | Texture: MEDIUM

Color After: YELLOW | Clarity After: CLEAR

Comments:

Katahdin
ANALYTICAL SERVICES

Lab Number : WP-2792-1
Report Date: 08/11/99
PO No. : N7912-P99264
Project : CTO #68

CLIENT: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr., Suite 102
Tallahassee, FL 32308

WIC#: CNC CHARLESTON

REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE	RECEIVED
25SLB090304	Solid	ROGER FRANKLIN	06/07/99	06/08/99

PARAMETER	RESULT	UNITS	DF	*PQL	METHOD	ANALYZED	BY	NOTES
Solids-Total Residue (TS)	81.	wt %	1.0	0.10	CLP/CIP SOW	06/14/99	JF	1

* PQL (Practical Quantitation Level) represents laboratory reporting limits and may not reflect sample-specific reporting limits. Sample-specific limits are indicated by results annotated with '<' values.
(1) Sample Preparation on 06/11/99 by JF

08/11/99

LJO/baeajc(dw)/msm
PF11TSS7
CC: MS. LEE LECK
TETRA TECH NUS
FOSTER PALZA 7
661 ANDERSEN DR.

340 County Road No. 5
P.O. Box 720, Westbrook, ME 04098
Tel: (207) 874-2400 Fax: (207) 775-4029

http://katahdinlab.com

210 West Road No. 5, Portsmouth, NH 03801
Tel: (603) 431-5777 Fax: (603) 436-3356

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP2792-2
SDG: WP2792
Report Date: 8/5/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: 68
Method: EPA 8270
Date Analyzed: 7/23/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
25SLB100102	SL	6/7/99	6/8/99	6/16/99	PMM	EPA 3550	KRT

Compound	Result	Units	DF	Sample PQL	Method PQL
NAPHTHALENE	2200	ug/Kg	1.5	460	330
2-METHYLNAPHTHALENE	1600	ug/Kg	1.5	460	330
ACENAPHTHYLENE	<460	ug/Kg	1.5	460	330
ACENAPHTHENE	<460	ug/Kg	1.5	460	330
FLUORENE	<460	ug/Kg	1.5	460	330
PHENANTHRENE	<460	ug/Kg	1.5	460	330
ANTHRACENE	<460	ug/Kg	1.5	460	330
FLUORANTHENE	<460	ug/Kg	1.5	460	330
PYRENE	<460	ug/Kg	1.5	460	330
BENZO[A]ANTHRACENE	<460	ug/Kg	1.5	460	330
CHRYSENE	<460	ug/Kg	1.5	460	330
BENZO[B]FLUORANTHENE	<460	ug/Kg	1.5	460	330
BENZO[K]FLUORANTHENE	<460	ug/Kg	1.5	460	330
BENZO[A]PYRENE	<460	ug/Kg	1.5	460	330
INDENO[1,2,3-CD]PYRENE	<460	ug/Kg	1.5	460	330
DIBENZ[A,H]ANTHRACENE	<460	ug/Kg	1.5	460	330
BENZO[G,H,I]PERYLENE	<460	ug/Kg	1.5	460	330
NITROBENZENE-D5	49	%	1.5		
2-FLUOROBIPHENYL	57	%	1.5		
TERPHENYL-D14	75	%	1.5		

Report Notes:

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP2792-2
SDG: WP2792
Report Date: 8/2/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: 68
Method: SW8260
Date Analyzed: 6/11/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
25SLB100102	SL	6/7/99	6/8/99	6/11/99	JSS	5030	JSS

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	6100	ug/Kgdrywt	160	800	5
TOLUENE	<800	ug/Kgdrywt	160	800	5
1,2-DIBROMOETHANE	<800	ug/Kgdrywt	160	800	5
ETHYLBENZENE	E39000	ug/Kgdrywt	160	800	5
NAPHTHALENE	21000	ug/Kgdrywt	160	800	5
MTBE	<800	ug/Kgdrywt	160	800	5
TOTAL XYLENES	1800	ug/Kgdrywt	160	800	5
DIBROMOFLUOROMETHANE	92	%	160		
1,2-DICHLOROETHANE-D4	104	%	160		
TOLUENE-D8	108	%	160		
P-BROMOFLUOROBENZENE	120	%	160		

Report Notes: E

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP2792-2DL
SDG: WP2792
Report Date: 8/2/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: 68
Method: SW8260
Date Analyzed: 6/14/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
25SLB100102	SL	6/7/99	6/8/99	6/14/99	DJP	5030	DJP

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	9100	ug/Kgdrywt	320	1600	5
TOLUENE	<1600	ug/Kgdrywt	320	1600	5
1,2-DIBROMOETHANE	<1600	ug/Kgdrywt	320	1600	5
ETHYLBENZENE	63000	ug/Kgdrywt	320	1600	5
NAPHTHALENE	30000	ug/Kgdrywt	320	1600	5
MTBE	<1600	ug/Kgdrywt	320	1600	5
TOTAL XYLENES	3000	ug/Kgdrywt	320	1600	5
DIBROMOFLUOROMETHANE	95	%	320		
1,2-DICHLOROETHANE-D4	96	%	320		
TOLUENE-D8	106	%	320		
P-BROMOFLUOROBENZENE	109	%	320		

Report Notes: O-2

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services | **Client Field ID: 25SLB100102**

Matrix: SOIL | **SDG Name: WP2792**

Percent Solids: 68.5 | **Lab Sample ID: WP2792-002**

Concentration Units (ug/L or mg/Kg dry weight): mg/Kg

CAS No.	Analyte	Concentration	C	Q	M	DF
7439-92-1	LEAD	34.7			P	1

Color Before: BROWN | Texture: MEDIUM

Color After: YELLOW | Clarity After: CLEAR

Comments:

FORM I - IN

Katahdin
ANALYTICAL SERVICES

CLIENT: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr., Suite 102
Tallahassee, FL 32308

Lab Number : WP-2792-2
Report Date: 08/11/99
PO No. : N7912-P99264
Project : CTO #68

WIC#: CNC CHARLESTON

REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE	RECEIVED
25SLB100102	Solid	ROGER FRANKLIN	06/07/99	06/08/99

PARAMETER	RESULT	UNITS	DF	*PQL	METHOD	ANALYZED	BY	NOTES
Solids-Total Residue (TS)	69.	wt %	1.0	0.10	CLP/CIP SOW	06/14/99	JF	1

* PQL (Practical Quantitation Level) represents laboratory reporting limits and may not reflect sample-specific reporting limits. Sample-specific limits are indicated by results annotated with '<' values.
(1) Sample Preparation on 06/11/99 by JF

08/11/99

LJO/baeajc(dw)/msm
PF11TSS7
CC: MS. LEE LECK
TETRA TECH NUS
FOSTER PALZA 7
661 ANDERSEN DR.

340 County Road No. 5
P.O. Box 720, Westbrook, ME 04098
Tel: (207) 874-2400 Fax: (207) 775-4029

http://katahdinlab.com

210 West Road No. 5, Portsmouth, NH 03801
Tel: (603) 431-5777 Fax: (603) 436-3356

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP2792-3
SDG: WP2792
Report Date: 8/5/99
PO No.: N7912-P99264
Project: CTO #68
% Solids: 87
Method: EPA 8270
Date Analyzed: 7/23/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
25SLB110203	SL	6/7/99	6/8/99	6/16/99	PMM	EPA 3550	KRT

Compound	Result	Units	DF	Sample PQL	Method PQL
NAPHTHALENE	J250	ug/Kg	1.1	360	330
2-METHYLNAPHTHALENE	<360	ug/Kg	1.1	360	330
ACENAPHTHYLENE	<360	ug/Kg	1.1	360	330
ACENAPHTHENE	<360	ug/Kg	1.1	360	330
FLUORENE	<360	ug/Kg	1.1	360	330
PHENANTHRENE	<360	ug/Kg	1.1	360	330
ANTHRACENE	<360	ug/Kg	1.1	360	330
FLUORANTHENE	<360	ug/Kg	1.1	360	330
PYRENE	<360	ug/Kg	1.1	360	330
BENZO[A]ANTHRACENE	<360	ug/Kg	1.1	360	330
CHRYSENE	<360	ug/Kg	1.1	360	330
BENZO[B]FLUORANTHENE	<360	ug/Kg	1.1	360	330
BENZO[K]FLUORANTHENE	<360	ug/Kg	1.1	360	330
BENZO[A]PYRENE	<360	ug/Kg	1.1	360	330
INDENO[1,2,3-CD]PYRENE	<360	ug/Kg	1.1	360	330
DIBENZ[A,H]ANTHRACENE	<360	ug/Kg	1.1	360	330
BENZO[G,H,I]PERYLENE	<360	ug/Kg	1.1	360	330
NITROBENZENE-D5	53	%	1.1		
2-FLUOROBIPHENYL	60	%	1.1		
TERPHENYL-D14	81	%	1.1		

Report Notes: J

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP2792-3
SDG: WP2792
Report Date: 8/2/99
PO No.: N7912-P99264
Project: CTO #68
% Solids: 87
Method: SW8260
Date Analyzed: 6/11/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
25SLB110203	SL	6/7/99	6/8/99	6/11/99	DJP	5030	DJP

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	J6	ug/Kg	1.1	6	5
TOLUENE	<6	ug/Kg	1.1	6	5
1,2-DIBROMOETHANE	<6	ug/Kg	1.1	6	5
ETHYLBENZENE	14	ug/Kg	1.1	6	5
NAPHTHALENE	66	ug/Kg	1.1	6	5
MTBE	<6	ug/Kg	1.1	6	5
TOTAL XYLENES	19	ug/Kg	1.1	6	5
DIBROMOFLUOROMETHANE	82	%	1.1		
1,2-DICHLOROETHANE-D4	92	%	1.1		
TOLUENE-D8	94	%	1.1		
P-BROMOFLUOROBENZENE	88	%	1.1		

Report Notes: J

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services | **Client Field ID: 25SLB110203**

Matrix: SOIL | **SDG Name: WP2792**

Percent Solids: 87.4 | **Lab Sample ID: WP2792-003**

Concentration Units (ug/L or mg/Kg dry weight): mg/Kg

CAS No.	Analyte	Concentration	C	Q	M	DF
7439-92-1	LEAD	125			P	1

Color Before: BROWN | Texture: MEDIUM

Color After: YELLOW | Clarity After: CLEAR

Comments:

FORM I - IN

Katahdin
ANALYTICAL SERVICES

CLIENT: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr., Suite 102
Tallahassee, FL 32308

Lab Number : WP-2792-3
Report Date: 08/11/99
PO No. : N7912-P99264
Project : CTO #68

WIC#: CNC CHARLESTON

REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE	RECEIVED
25SLB110203	Solid	ROGER FRANKLIN	06/07/99	06/08/99

PARAMETER	RESULT	UNITS	DF	*PQL	METHOD	ANALYZED	BY	NOTES
Solids-Total Residue (TS)	87.	wt %	1.0	0.10	CLP/CIP SOW	06/14/99	JF	1

* PQL (Practical Quantitation Level) represents laboratory reporting limits and may not reflect sample-specific reporting limits. Sample-specific limits are indicated by results annotated with '<' values.
(1) Sample Preparation on 06/11/99 by JF

08/11/99

LJO/baeajc(dw)/msm
PF11TSS7
CC: MS. LEE LECK
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KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP2792-4
SDG: WP2792
Report Date: 8/5/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: 85
Method: EPA 8270
Date Analyzed: 7/23/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
25SLB130203	SL	6/7/99	6/8/99	6/16/99	PMM	EPA 3550	KRT

Compound	Result	Units	DF	Sample PQL	Method PQL
NAPHTHALENE	E14000	ug/Kg	1.2	400	330
2-METHYLNAPHTHALENE	E9600	ug/Kg	1.2	400	330
ACENAPHTHYLENE	<400	ug/Kg	1.2	400	330
ACENAPHTHENE	<400	ug/Kg	1.2	400	330
FLUORENE	<400	ug/Kg	1.2	400	330
PHENANTHRENE	<400	ug/Kg	1.2	400	330
ANTHRACENE	<400	ug/Kg	1.2	400	330
FLUORANTHENE	<400	ug/Kg	1.2	400	330
PYRENE	J280	ug/Kg	1.2	400	330
BENZO[A]ANTHRACENE	<400	ug/Kg	1.2	400	330
CHRYSENE	<400	ug/Kg	1.2	400	330
BENZO[B]FLUORANTHENE	<400	ug/Kg	1.2	400	330
BENZO[K]FLUORANTHENE	<400	ug/Kg	1.2	400	330
BENZO[A]PYRENE	<400	ug/Kg	1.2	400	330
INDENO[1,2,3-CD]PYRENE	<400	ug/Kg	1.2	400	330
DIBENZ[A,H]ANTHRACENE	<400	ug/Kg	1.2	400	330
BENZO[G,H,I]PERYLENE	<400	ug/Kg	1.2	400	330
NITROBENZENE-D5	47	%	1.2		
2-FLUOROBIPHENYL	71	%	1.2		
TERPHENYL-D14	75	%	1.2		

Report Notes: J, E

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP2792-4DL
SDG: WP2792
Report Date: 8/5/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: 85
Method: EPA 8270
Date Analyzed: 7/26/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
25SLB130203	SL	6/7/99	6/8/99	6/16/99	PMM	EPA 3550	KRT

Compound	Result	Units	DF	Sample PQL	Method PQL
NAPHTHALENE	15000	ug/Kg	5.9	1900	330
2-METHYLNAPHTHALENE	10000	ug/Kg	5.9	1900	330
ACENAPHTHYLENE	<1900	ug/Kg	5.9	1900	330
ACENAPHTHENE	<1900	ug/Kg	5.9	1900	330
FLUORENE	<1900	ug/Kg	5.9	1900	330
PHENANTHRENE	<1900	ug/Kg	5.9	1900	330
ANTHRACENE	<1900	ug/Kg	5.9	1900	330
FLUORANTHENE	<1900	ug/Kg	5.9	1900	330
PYRENE	<1900	ug/Kg	5.9	1900	330
BENZO[A]ANTHRACENE	<1900	ug/Kg	5.9	1900	330
CHRYSENE	<1900	ug/Kg	5.9	1900	330
BENZO[B]FLUORANTHENE	<1900	ug/Kg	5.9	1900	330
BENZO[K]FLUORANTHENE	<1900	ug/Kg	5.9	1900	330
BENZO[A]PYRENE	<1900	ug/Kg	5.9	1900	330
INDENO[1,2,3-CD]PYRENE	<1900	ug/Kg	5.9	1900	330
DIBENZ[A,H]ANTHRACENE	<1900	ug/Kg	5.9	1900	330
BENZO[G,H,I]PERYLENE	<1900	ug/Kg	5.9	1900	330
NITROBENZENE-D5	37	%	5.9		
2-FLUOROBIPHENYL	63	%	5.9		
TERPHENYL-D14	60	%	5.9		

Report Notes: O-2

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP2792-4
SDG: WP2792
Report Date: 8/2/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: 85
Method: SW8260
Date Analyzed: 6/9/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
25SLB130203	SL	6/7/99	6/8/99	6/9/99	HMP	5035	HMP

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	5000	ug/Kgdrywt	120	600	5
TOLUENE	8400	ug/Kgdrywt	120	600	5
1,2-DIBROMOETHANE	<600	ug/Kgdrywt	120	600	5
ETHYLBENZENE	E84000	ug/Kgdrywt	120	600	5
NAPHTHALENE	E43000	ug/Kgdrywt	120	600	5
MTBE	<600	ug/Kgdrywt	120	600	5
TOTAL XYLENES	140000	ug/Kgdrywt	120	600	5
DIBROMOFLUOROMETHANE	88	%	120		
1,2-DICHLOROETHANE-D4	106	%	120		
TOLUENE-D8	89	%	120		
P-BROMOFLUOROBENZENE	98	%	120		

Report Notes: E

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WPZ792-4DL
SDG: WPZ792
Report Date: 8/2/99
PO No.: N7912-P99264
Project: CTO #68
% Solids: 85
Method: SW8260
Date Analyzed: 6/10/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
25SLB130203	SL	6/7/99	6/8/99	6/10/99	DJP	5030	DJP

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	J5000	ug/Kgdrywt	1200	6000	5
TOLUENE	7600	ug/Kgdrywt	1200	6000	5
1,2-DIBROMOETHANE	<6000	ug/Kgdrywt	1200	6000	5
ETHYLBENZENE	73000	ug/Kgdrywt	1200	6000	5
NAPHTHALENE	70000	ug/Kgdrywt	1200	6000	5
MTBE	<6000	ug/Kgdrywt	1200	6000	5
TOTAL XYLENES	160000	ug/Kgdrywt	1200	6000	5
DIBROMOFLUOROMETHANE	92	%	1200		
1,2-DICHLOROETHANE-D4	87	%	1200		
TOLUENE-D8	103	%	1200		
P-BROMOFLUOROBENZENE	104	%	1200		

Report Notes: J, O-1, O-2

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services | **Client Field ID: 25SLB130203**

Matrix: SOIL | **SDG Name: WP2792**

Percent Solids: 85.4 | **Lab Sample ID: WP2792-004**

Concentration Units (ug/L or mg/Kg dry weight): mg/Kg

CAS No.	Analyte	Concentration	C	Q	M	DF
7439-92-1	LEAD	6.2			P	1

Color Before: BROWN | Texture: MEDIUM

Color After: YELLOW | Clarity After: CLEAR

Comments:

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Katahdin
ANALYTICAL SERVICES

CLIENT: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr., Suite 102
Tallahassee, FL 32308

Lab Number : WP-2792-4
Report Date: 08/11/99
PO No. : N7912-P99264
Project : CTO #68

WIC#: CNC CHARLESTON

REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE	RECEIVED
25SLB130203	Solid	ROGER FRANKLIN	06/07/99	06/08/99

PARAMETER	RESULT	UNITS	DF	*PQL	METHOD	ANALYZED	BY	NOTES
Solids-Total Residue (TS)	85.	wt %	1.0	0.10	CLP/CIP SOW	06/14/99	JF	1

* PQL (Practical Quantitation Level) represents laboratory reporting limits and may not reflect sample-specific reporting limits. Sample-specific limits are indicated by results annotated with '<' values.
(1) Sample Preparation on 06/11/99 by JF

08/11/99

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CC: MS. LEE LECK
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KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP2792-5
SDG: WP2792
Report Date: 8/5/99
PO No.: N7912-P09264
Project: CTO #68
% Solids: 81
Method: EPA 8270
Date Analyzed: 7/23/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
25SLB130203D	SL	6/7/99	6/8/99	6/16/99	PMM	EPA 3550	KRT

Compound	Result	Units	DF	Sample PQL	Method PQL
NAPHTHALENE	E86000	ug/Kg	1.2	400	330
2-METHYLNAPHTHALENE	E62000	ug/Kg	1.2	400	330
ACENAPHTHYLENE	420	ug/Kg	1.2	400	330
ACENAPHTHENE	560	ug/Kg	1.2	400	330
FLUORENE	420	ug/Kg	1.2	400	330
PHENANTHRENE	1100	ug/Kg	1.2	400	330
ANTHRACENE	J330	ug/Kg	1.2	400	330
FLUORANTHENE	450	ug/Kg	1.2	400	330
PYRENE	750	ug/Kg	1.2	400	330
BENZO[A]ANTHRACENE	J240	ug/Kg	1.2	400	330
CHRYSENE	<400	ug/Kg	1.2	400	330
BENZO[B]FLUORANTHENE	<400	ug/Kg	1.2	400	330
BENZO[K]FLUORANTHENE	<400	ug/Kg	1.2	400	330
BENZO[A]PYRENE	<400	ug/Kg	1.2	400	330
INDENO[1,2,3-CD]PYRENE	<400	ug/Kg	1.2	400	330
DIBENZ[A,H]ANTHRACENE	<400	ug/Kg	1.2	400	330
BENZO[G,H,I]PERYLENE	<400	ug/Kg	1.2	400	330
NITROBENZENE-D5	53	%	1.2		
2-FLUOROBIPHENYL	77	%	1.2		
TERPHENYL-D14	84	%	1.2		

Report Notes: J, E

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP2792-5DL
SDG: WP2792
Report Date: 8/5/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: 81
Method: EPA 8270
Date Analyzed: 7/26/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
25SLB130203D	SL	6/7/99	6/8/99	6/16/99	PMM	EPA 3550	KRT

Compound	Result	Units	DF	Sample PQL	Method PQL
NAPHTHALENE	88000	ug/Kg	120	40000	330
2-METHYLNAPHTHALENE	65000	ug/Kg	120	40000	330
ACENAPHTHYLENE	<40000	ug/Kg	120	40000	330
ACENAPHTHENE	<40000	ug/Kg	120	40000	330
FLUORENE	<40000	ug/Kg	120	40000	330
PHENANTHRENE	<40000	ug/Kg	120	40000	330
ANTHRACENE	<40000	ug/Kg	120	40000	330
FLUORANTHENE	<40000	ug/Kg	120	40000	330
PYRENE	<40000	ug/Kg	120	40000	330
BENZO[A]ANTHRACENE	<40000	ug/Kg	120	40000	330
CHRYSENE	<40000	ug/Kg	120	40000	330
BENZO[B]FLUORANTHENE	<40000	ug/Kg	120	40000	330
BENZO[K]FLUORANTHENE	<40000	ug/Kg	120	40000	330
BENZO[A]PYRENE	<40000	ug/Kg	120	40000	330
INDENO[1,2,3-CD]PYRENE	<40000	ug/Kg	120	40000	330
DIBENZ[A,H]ANTHRACENE	<40000	ug/Kg	120	40000	330
BENZO[G,H,I]PERYLENE	<40000	ug/Kg	120	40000	330
NITROBENZENE-D5	DL	%	120		
2-FLUOROBIPHENYL	DL	%	120		
TERPHENYL-D14	DL	%	120		

Report Notes: O-2, DL

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
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Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP2792-5
SDG: WP2792
Report Date: 8/2/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: 81
Method: SW8260
Date Analyzed: 6/9/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
25SLB130203D	SL	6/7/99	6/8/99	6/9/99	HMP	5035	HMP

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	10000	ug/Kgdrywt	110	550	5
TOLUENE	18000	ug/Kgdrywt	110	550	5
1,2-DIBROMOETHANE	<550	ug/Kgdrywt	110	550	5
ETHYLBENZENE	E150000	ug/Kgdrywt	110	550	5
NAPHTHALENE	E74000	ug/Kgdrywt	110	550	5
MTBE	<550	ug/Kgdrywt	110	550	5
TOTAL XYLENES	220000	ug/Kgdrywt	110	550	5
DIBROMOFLUOROMETHANE	99	%	110		
1,2-DICHLOROETHANE-D4	#150	%	110		
TOLUENE-D8	88	%	110		
P-BROMOFLUOROBENZENE	106	%	110		

Report Notes: E, #

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP2792-5DL
SDG: WP2792
Report Date: 8/2/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: 81
Method: SW8260
Date Analyzed: 6/11/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
25SLB130203D	SL	6/7/99	6/8/99	6/11/99	DJP	5030	DJP

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<28000	ug/Kgdrywt	5600	28000	5
TOLUENE	J15000	ug/Kgdrywt	5600	28000	5
1,2-DIBROMOETHANE	<28000	ug/Kgdrywt	5600	28000	5
ETHYLBENZENE	130000	ug/Kgdrywt	5600	28000	5
NAPHTHALENE	90000	ug/Kgdrywt	5600	28000	5
MTBE	<28000	ug/Kgdrywt	5600	28000	5
TOTAL XYLENES	300000	ug/Kgdrywt	5600	28000	5
DIBROMOFLUOROMETHANE	100	%	5600		
1,2-DICHLOROETHANE-D4	90	%	5600		
TOLUENE-D8	100	%	5600		
P-BROMOFLUOROBENZENE	100	%	5600		

Report Notes: J, O-2

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services | **Client Field ID: 25SLB130203D**

Matrix: SOIL | **SDG Name: WP2792**

Percent Solids: 80.6 | **Lab Sample ID: WP2792-005**

Concentration Units (ug/L or mg/Kg dry weight): mg/Kg

CAS No.	Analyte	Concentration	C	Q	M	DF
7439-92-1	LEAD	10.4			P	1

Color Before: BROWN | Texture: MEDIUM

Color After: YELLOW | Clarity After: CLEAR

Comments:

FORM I - IN

Katahdin
ANALYTICAL SERVICES

Lab Number : WP-2792-5
Report Date: 08/11/99
PO No. : N7912-P99264
Project : CTO #68

CLIENT: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr., Suite 102
Tallahassee, FL 32308

WIC#: CNC CHARLESTON

REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE	RECEIVED
25SLB130203D	Solid	ROGER FRANKLIN	06/07/99	06/08/99

PARAMETER	RESULT	UNITS	DF	*PQL	METHOD	ANALYZED	BY	NOTES
Solids-Total Residue (TS)	81.	wt %	1.0	0.10	CLP/CIP SOW	06/14/99	JF	1

* PQL (Practical Quantitation Level) represents laboratory reporting limits and may not reflect sample-specific reporting limits. Sample-specific limits are indicated by results annotated with '<' values.
(1) Sample Preparation on 06/11/99 by JF

08/11/99

LJO/baeajc(dw)/msm
PF11TSS7
CC: MS. LEE LECK
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KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP2792-6
SDG: WP2792
Report Date: 8/5/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: 84
Method: EPA 8270
Date Analyzed: 7/23/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
25SLB140304	SL	6/7/99	6/8/99	6/16/99	PMM	EPA 3550	KRT

Compound	Result	Units	DF	Sample PQL	Method PQL
NAPHTHALENE	<400	ug/Kg	1.2	400	330
2-METHYLNAPHTHALENE	<400	ug/Kg	1.2	400	330
ACENAPHTHYLENE	<400	ug/Kg	1.2	400	330
ACENAPHTHENE	<400	ug/Kg	1.2	400	330
FLUORENE	<400	ug/Kg	1.2	400	330
PHENANTHRENE	<400	ug/Kg	1.2	400	330
ANTHRACENE	<400	ug/Kg	1.2	400	330
FLUORANTHENE	<400	ug/Kg	1.2	400	330
PYRENE	<400	ug/Kg	1.2	400	330
BENZO[A]ANTHRACENE	<400	ug/Kg	1.2	400	330
CHRYSENE	<400	ug/Kg	1.2	400	330
BENZO[B]FLUORANTHENE	<400	ug/Kg	1.2	400	330
BENZO[K]FLUORANTHENE	<400	ug/Kg	1.2	400	330
BENZO[A]PYRENE	<400	ug/Kg	1.2	400	330
INDENO[1,2,3-CD]PYRENE	<400	ug/Kg	1.2	400	330
DIBENZ[A,H]ANTHRACENE	<400	ug/Kg	1.2	400	330
BENZO[G,H,I]PERYLENE	<400	ug/Kg	1.2	400	330
NITROBENZENE-D5	57	%	1.2		
2-FLUOROBIPHENYL	63	%	1.2		
TERPHENYL-D14	91	%	1.2		

Report Notes:

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP2792-6
SDG: WP2792
Report Date: 8/2/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: 84
Method: SW8260
Date Analyzed: 6/11/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
25SLB140304	SL	6/7/99	6/8/99	6/11/99	DJP	5030	DJP

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<5	ug/Kg	0.96	5	5
TOLUENE	12	ug/Kg	0.96	5	5
1,2-DIBROMOETHANE	<5	ug/Kg	0.96	5	5
ETHYLBENZENE	13	ug/Kg	0.96	5	5
NAPHTHALENE	60	ug/Kg	0.96	5	5
MTBE	<5	ug/Kg	0.96	5	5
TOTAL XYLENES	12	ug/Kg	0.96	5	5
DIBROMOFLUOROMETHANE	119	%	0.96		
1,2-DICHLOROETHANE-D4	#182	%	0.96		
TOLUENE-D8	96	%	0.96		
P-BROMOFLUOROBENZENE	100	%	0.96		

Report Notes: #

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP2972-6RE
SDG: WP2792
Report Date: 8/2/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: -
Method: SW8260
Date Analyzed: 6/11/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
25SLB140304	SL	6/7/99	6/8/99	6/11/99	DJP	5030	DJP

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	7	ug/Kg	1.1	6	5
TOLUENE	<6	ug/Kg	1.1	6	5
1,2-DIBROMOETHANE	<6	ug/Kg	1.1	6	5
ETHYLBENZENE	6	ug/Kg	1.1	6	5
NAPHTHALENE	J4	ug/Kg	1.1	6	5
MTBE	<6	ug/Kg	1.1	6	5
TOTAL XYLENES	J5	ug/Kg	1.1	6	5
DIBROMOFLUOROMETHANE	114	%	1.1		
1,2-DICHLOROETHANE-D4	118	%	1.1		
TOLUENE-D8	103	%	1.1		
P-BROMOFLUOROBENZENE	124	%	1.1		

Report Notes: J, O-13

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services | **Client Field ID: 25SLB140304**

Matrix: SOIL | **SDG Name: WP2792**

Percent Solids: 84.4 | **Lab Sample ID: WP2792-006**

Concentration Units (ug/L or mg/Kg dry weight): mg/Kg

CAS No.	Analyte	Concentration	C	Q	M	DF
7439-92-1	LEAD	4.9			P	1

Color Before: BROWN

Texture: MEDIUM

Color After: YELLOW

Clarity After: CLEAR

Comments:

FORM I - IN

Katahdin
ANALYTICAL SERVICES

CLIENT: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr., Suite 102
Tallahassee, FL 32308

Lab Number : WP-2792-6
Report Date: 08/11/99
PO No. : N7912-P99264
Project : CTO #68

WIC#: CNC CHARLESTON

REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE	RECEIVED
25SLB140304	Solid	ROGER FRANKLIN	06/07/99	06/08/99

PARAMETER	RESULT	UNITS	DF	*PQL	METHOD	ANALYZED	BY	NOTES
Solids-Total Residue (TS)	84.	wt %	1.0	0.10	CLP/CIP SOW	06/14/99	JF	1

* PQL (Practical Quantitation Level) represents laboratory reporting limits and may not reflect sample-specific reporting limits. Sample-specific limits are indicated by results annotated with '<' values.
(1) Sample Preparation on 06/11/99 by JF

08/11/99

LJO/baeajc(dw)/msm
PF11TSS7
CC: MS. LEE LECK
TETRA TECH NUS
FOSTER PALZA 7
661 ANDERSEN DR.

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP2792-7
SDG: WP2792
Report Date: 8/5/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: 85
Method: EPA 8270
Date Analyzed: 7/23/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
2SSLB160304	SL	6/7/99	6/8/99	6/16/99	PMM	EPA 3550	KRT

Compound	Result	Units	DF	Sample PQL	Method PQL
NAPHTHALENE	<400	ug/Kg	1.2	400	330
2-METHYLNAPHTHALENE	<400	ug/Kg	1.2	400	330
ACENAPHTHYLENE	<400	ug/Kg	1.2	400	330
ACENAPHTHENE	<400	ug/Kg	1.2	400	330
FLUORENE	<400	ug/Kg	1.2	400	330
PHENANTHRENE	<400	ug/Kg	1.2	400	330
ANTHRACENE	<400	ug/Kg	1.2	400	330
FLUORANTHENE	<400	ug/Kg	1.2	400	330
PYRENE	<400	ug/Kg	1.2	400	330
BENZO[A]ANTHRACENE	<400	ug/Kg	1.2	400	330
CHRYSENE	<400	ug/Kg	1.2	400	330
BENZO[B]FLUORANTHENE	<400	ug/Kg	1.2	400	330
BENZO[K]FLUORANTHENE	<400	ug/Kg	1.2	400	330
BENZO[A]PYRENE	<400	ug/Kg	1.2	400	330
INDENO[1,2,3-CD]PYRENE	<400	ug/Kg	1.2	400	330
DIBENZ[A,H]ANTHRACENE	<400	ug/Kg	1.2	400	330
BENZO[G,H,I]PERYLENE	<400	ug/Kg	1.2	400	330
NITROBENZENE-D5	56	%	1.2		
2-FLUOROBIPHENYL	57	%	1.2		
TERPHENYL-D14	83	%	1.2		

Report Notes:

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP2792-7
SDG: WP2792
Report Date: 8/2/99
PO No.: N7912-P99264
Project: CTO #68
% Solids: 85
Method: SW8260
Date Analyzed: 6/16/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
25SLB160304	SL	6/7/99	6/8/99	6/16/99	KRT	5030	KRT

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	8	ug/Kg	1.0	5	5
TOLUENE	<5	ug/Kg	1.0	5	5
1,2-DIBROMOETHANE	<5	ug/Kg	1.0	5	5
ETHYLBENZENE	<5	ug/Kg	1.0	5	5
NAPHTHALENE	J4	ug/Kg	1.0	5	5
MTBE	<5	ug/Kg	1.0	5	5
TOTAL XYLENES	<5	ug/Kg	1.0	5	5
DIBROMOFLUOROMETHANE	115	%	1.0		
1,2-DICHLOROETHANE-D4	118	%	1.0		
TOLUENE-D8	125	%	1.0		
4-BROMOFLUOROBENZENE	103	%	1.0		

Report Notes: J

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services | **Client Field ID: 25SLB160304**

Matrix: SOIL | **SDG Name: WP2792**

Percent Solids: 85.3 | **Lab Sample ID: WP2792-007**

Concentration Units (ug/L or mg/Kg dry weight): mg/Kg

CAS No.	Analyte	Concentration	C	Q	M	DF
7439-92-1	LEAD	6.5			P	1

Color Before: BROWN

Texture: FINE

Color After: YELLOW

Clarity After: CLEAR

Comments:

FORM I - IN

Katahdin
ANALYTICAL SERVICES

CLIENT: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr., Suite 102
Tallahassee, FL 32308

Lab Number : WP-2792-7
Report Date: 08/11/99
PO No. : N7912-P99264
Project : CTO #68

WIC#: CNC CHARLESTON

REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE	RECEIVED
25SLB160304	Solid	ROGER FRANKLIN	06/07/99	06/08/99

PARAMETER	RESULT	UNITS	DF	*PQL	METHOD	ANALYZED	BY	NOTES
Solids-Total Residue (TS)	85.	wt %	1.0	0.10	CLP/CIP SOW	06/14/99	JF	1

* PQL (Practical Quantitation Level) represents laboratory reporting limits and may not reflect sample-specific reporting limits. Sample-specific limits are indicated by results annotated with '<' values.
(1) Sample Preparation on 06/11/99 by JF

08/11/99

LJO/baeajc(dw)/msm
PF11TSS7
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KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP2792-8
SDG: WP2792
Report Date: 8/5/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: 84
Method: EPA 8270
Date Analyzed: 7/23/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
2SSLB170304	SL	6/7/99	6/8/99	6/16/99	PMM	EPA 3550	KRT

Compound	Result	Units	DF	Sample PQL	Method PQL
NAPHTHALENE	2600	ug/Kg	1.2	400	330
2-METHYLNAPHTHALENE	2000	ug/Kg	1.2	400	330
ACENAPHTHYLENE	<400	ug/Kg	1.2	400	330
ACENAPHTHENE	<400	ug/Kg	1.2	400	330
FLUORENE	<400	ug/Kg	1.2	400	330
PHENANTHRENE	<400	ug/Kg	1.2	400	330
ANTHRACENE	<400	ug/Kg	1.2	400	330
FLUORANTHENE	<400	ug/Kg	1.2	400	330
PYRENE	<400	ug/Kg	1.2	400	330
BENZO(A)ANTHRACENE	<400	ug/Kg	1.2	400	330
CHRYSENE	<400	ug/Kg	1.2	400	330
BENZO(B)FLUORANTHENE	<400	ug/Kg	1.2	400	330
BENZO(K)FLUORANTHENE	<400	ug/Kg	1.2	400	330
BENZO(A)PYRENE	<400	ug/Kg	1.2	400	330
INDENO(1,2,3-CD)PYRENE	<400	ug/Kg	1.2	400	330
DIBENZ(A,H)ANTHRACENE	<400	ug/Kg	1.2	400	330
BENZO(G,H,I)PERYLENE	<400	ug/Kg	1.2	400	330
NITROBENZENE-D5	55	%	1.2		
2-FLUOROBIPHENYL	65	%	1.2		
TERPHENYL-D14	82	%	1.2		

Report Notes:

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP2792-8
SDG: WP2792
Report Date: 8/2/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: 84
Method: SW8260
Date Analyzed: 6/11/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
25SLB170304	SL	6/7/99	6/8/99	6/11/99	JSS	5030	JSS

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	E24000	ug/Kgdrywt	110	550	5
TOLUENE	E85000	ug/Kgdrywt	110	550	5
1,2-DIBROMOETHANE	<550	ug/Kgdrywt	110	550	5
ETHYLBENZENE	E37000	ug/Kgdrywt	110	550	5
NAPHTHALENE	16000	ug/Kgdrywt	110	550	5
MTBE	4300	ug/Kgdrywt	110	550	5
TOTAL XYLENES	160000	ug/Kgdrywt	110	550	5
DIBROMOFLUOROMETHANE	101	%	110		
1,2-DICHLOROETHANE-D4	132	%	110		
TOLUENE-D8	101	%	110		
P-BROMOFLUOROBENZENE	96	%	110		

Report Notes: E

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP2792-8DL
SDG: WP2792
Report Date: 6/2/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: 84
Method: SW8260
Date Analyzed: 6/15/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
25SLB170304	SL	6/7/99	6/8/99	6/15/99	DJP	5030	DJP

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	32000	ug/Kgdrywt	2300	12000	5
TOLUENE	240000	ug/Kgdrywt	2300	12000	5
1,2-DIBROMOETHANE	<12000	ug/Kgdrywt	2300	12000	5
ETHYLBENZENE	49000	ug/Kgdrywt	2300	12000	5
NAPHTHALENE	14000	ug/Kgdrywt	2300	12000	5
MTBE	<12000	ug/Kgdrywt	2300	12000	5
TOTAL XYLENES	250000	ug/Kgdrywt	2300	12000	5
DIBROMOFLUOROMETHANE	96	%	2300		
1,2-DICHLOROETHANE-D4	94	%	2300		
TOLUENE-D8	109	%	2300		
P-BROMOFLUOROBENZENE	104	%	2300		

Report Notes: O-2

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services | **Client Field ID: 25SLB170304**

Matrix: SOIL | **SDG Name: WP2792**

Percent Solids: 83.8 | **Lab Sample ID: WP2792-008**

Concentration Units (ug/L or mg/Kg dry weight): mg/Kg

CAS No.	Analyte	Concentration	C	Q	M	DF
7439-92-1	LEAD	7.4			P	1

Color Before: BROWN | Texture: FINE

Color After: YELLOW | Clarity After: CLEAR

Comments:

FORM I - IN

Katahdin
ANALYTICAL SERVICES

Lab Number : WP-2792-8
Report Date: 08/11/99
PO No. : N7912-P99264
Project : CTO #68

CLIENT: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr., Suite 102
Tallahassee, FL 32308

WIC#: CNC CHARLESTON

REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE	RECEIVED
25SLB170304	Solid	ROGER FRANKLIN	06/07/99	06/08/99

PARAMETER	RESULT	UNITS	DF	*PQL	METHOD	ANALYZED	BY	NOTES
Solids-Total Residue (TS)	84.	wt %	1.0	0.10	CLP/CIP SOW	06/14/99	JF	1

* PQL (Practical Quantitation Level) represents laboratory reporting limits and may not reflect sample-specific reporting limits. Sample-specific limits are indicated by results annotated with '<' values.
(1) Sample Preparation on 06/11/99 by JF

08/11/99

LJO/baeajc(dw)/msm
PF11TSS7
CC: MS. LEE LECK
TETRA TECH NUS
FOSTER PALZA 7
661 ANDERSEN DR.

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP2792-9
SDG: WP2792
Report Date: 8/5/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: 76
Method: EPA 8270
Date Analyzed: 7/23/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
25SLB120203	SL	6/7/99	6/8/99	6/16/99	PMM	EPA 3550	KRT

Compound	Result	Units	DF	Sample PQL	Method PQL
NAPHTHALENE	E10000	ug/Kg	1.3	430	330
2-METHYLNAPHTHALENE	E7400	ug/Kg	1.3	430	330
ACENAPHTHYLENE	<430	ug/Kg	1.3	430	330
ACENAPHTHENE	<430	ug/Kg	1.3	430	330
FLUORENE	<430	ug/Kg	1.3	430	330
PHENANTHRENE	540	ug/Kg	1.3	430	330
ANTHRACENE	<430	ug/Kg	1.3	430	330
FLUORANTHENE	<430	ug/Kg	1.3	430	330
PYRENE	J240	ug/Kg	1.3	430	330
BENZO[A]ANTHRACENE	<430	ug/Kg	1.3	430	330
CHRYSENE	<430	ug/Kg	1.3	430	330
BENZO[B]FLUORANTHENE	<430	ug/Kg	1.3	430	330
BENZO[K]FLUORANTHENE	<430	ug/Kg	1.3	430	330
BENZO[A]PYRENE	<430	ug/Kg	1.3	430	330
INDENO[1,2,3-CD]PYRENE	<430	ug/Kg	1.3	430	330
DIBENZ[A,H]ANTHRACENE	<430	ug/Kg	1.3	430	330
BENZO[G,H,I]PERYLENE	<430	ug/Kg	1.3	430	330
NITROBENZENE-D5	50	%	1.3		
2-FLUOROBIPHENYL	63	%	1.3		
TERPHENYL-D14	80	%	1.3		

Report Notes: J, E

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP2792-9DL
SDG: WP2792
Report Date: 8/5/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: 76
Method: EPA 8270
Date Analyzed: 7/26/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
25SLB120203	SL	6/7/99	6/8/99	6/16/99	PMM	EPA 3550	KRT

Compound	Result	Units	DF	Sample PQL	Method PQL
NAPHTHALENE	11000	ug/Kg	6.6	2200	330
2-METHYLNAPHTHALENE	7900	ug/Kg	6.6	2200	330
ACENAPHTHYLENE	<2200	ug/Kg	6.6	2200	330
ACENAPHTHENE	<2200	ug/Kg	6.6	2200	330
FLUORENE	<2200	ug/Kg	6.6	2200	330
PHENANTHRENE	<2200	ug/Kg	6.6	2200	330
ANTHRACENE	<2200	ug/Kg	6.6	2200	330
FLUORANTHENE	<2200	ug/Kg	6.6	2200	330
PYRENE	<2200	ug/Kg	6.6	2200	330
BENZO[A]ANTHRACENE	<2200	ug/Kg	6.6	2200	330
CHRYSENE	<2200	ug/Kg	6.6	2200	330
BENZO[B]FLUORANTHENE	<2200	ug/Kg	6.6	2200	330
BENZO[K]FLUORANTHENE	<2200	ug/Kg	6.6	2200	330
BENZO[A]PYRENE	<2200	ug/Kg	6.6	2200	330
INDENO[1,2,3-CD]PYRENE	<2200	ug/Kg	6.6	2200	330
DIBENZ[A,H]ANTHRACENE	<2200	ug/Kg	6.6	2200	330
BENZO[G,H,I]PERYLENE	<2200	ug/Kg	6.6	2200	330
NITROBENZENE-D5	41	%	6.6		
2-FLUOROBIPHENYL	59	%	6.6		
TERPHENYL-D14	74	%	6.6		

Report Notes: O-2

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP2792-9
SDG: WP2792
Report Date: 8/2/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: 76
Method: SW8260
Date Analyzed: 6/9/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
25SLB120203	SL	6/7/99	6/8/99	6/9/99	HMP	5035	HMP

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	E100000	ug/Kgdrywt	150	750	5
TOLUENE	E320000	ug/Kgdrywt	150	750	5
1,2-DIBROMOETHANE	<750	ug/Kgdrywt	150	750	5
ETHYLBENZENE	E380000	ug/Kgdrywt	150	750	5
NAPHTHALENE	E160000	ug/Kgdrywt	150	750	5
MTBE	<750	ug/Kgdrywt	150	750	5
TOTAL XYLENES	740000	ug/Kgdrywt	150	750	5
DIBROMOFLUOROMETHANE	93	%	150		
1,2-DICHLOROETHANE-D4	#251	%	150		
TOLUENE-D8	101	%	150		
P-BROMOFLUOROBENZENE	#127	%	150		

Report Notes: E, #

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP2792-9DL
SDG: WP2792
Report Date: 8/2/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: 76
Method: SW8260
Date Analyzed: 6/11/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
25SLB120203	SL	6/7/99	6/8/99	6/11/99	DJP	5030	DJP

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	120000	ug/Kgdrywt	15080	75000	5
TOLUENE	360000	ug/Kgdrywt	15000	75000	5
1,2-DIBROMOETHANE	<75000	ug/Kgdrywt	15000	75000	5
ETHYLBENZENE	560000	ug/Kgdrywt	15000	75000	5
NAPHTHALENE	210000	ug/Kgdrywt	15000	75000	5
MTBE	<75000	ug/Kgdrywt	15000	75000	5
TOTAL XYLENES	2200000	ug/Kgdrywt	15000	75000	5
DIBROMOFLUOROMETHANE	102	%	15000		
1,2-DICHLOROETHANE-D4	91	%	15000		
TOLUENE-D8	101	%	15000		
P-BROMOFLUOROBENZENE	101	%	15000		

Report Notes: O-2

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services | **Client Field ID: 25SLB120203**

Matrix: SOIL | **SDG Name: WP2792**

Percent Solids: 76.0 | **Lab Sample ID: WP2792-009**

Concentration Units (ug/L or mg/Kg dry weight): mg/Kg

CAS No.	Analyte	Concentration	C	Q	M	DF
7439-92-1	LEAD	26.2			P	1

Color Before: BROWN | Texture: MEDIUM

Color After: YELLOW | Clarity After: CLEAR

Comments:

FORM I - IN

Katahdin
ANALYTICAL SERVICES

Lab Number : WP-2792-9
Report Date: 08/11/99
PO No. : N7912-P99264
Project : CTO #68

CLIENT: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr., Suite 102
Tallahassee, FL 32308

WIC#: CNC CHARLESTON

REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE	RECEIVED
25SLB120203	Solid	ROGER FRANKLIN	06/07/99	06/08/99

PARAMETER	RESULT	UNITS	DF	*PQL	METHOD	ANALYZED	BY	NOTES
Solids-Total Residue (TS)	76.	wt %	1.0	0.10	CLP/CIP SOW	06/14/99	JF	1

* PQL (Practical Quantitation Level) represents laboratory reporting limits and may not reflect sample-specific reporting limits. Sample-specific limits are indicated by results annotated with '<' values.
(1) Sample Preparation on 06/11/99 by JF

08/11/99

LJO/baeajc(dw)/msm
PF11TSS7
CC: MS. LEE LECK
TETRA TECH NUS
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210 West Road No. 5, Portsmouth, NH 03801
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KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP2792-11
SDG: WP2792
Report Date: 8/2/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: -
Method: SW8260
Date Analyzed: 6/10/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
25TL00501	SL	6/7/99	6/8/99	6/10/99	JSS	5030	JSS

Compound	Result	Units	BF	Sample PQL	Method PQL
BENZENE	<5	ug/Kgdrywt	1.0	5	5
TOLUENE	<5	ug/Kgdrywt	1.0	5	5
1,2-DIBROMOETHANE	<5	ug/Kgdrywt	1.0	5	5
ETHYLBENZENE	<5	ug/Kgdrywt	1.0	5	5
NAPHTHALENE	<5	ug/Kgdrywt	1.0	5	5
MTBE	<5	ug/Kgdrywt	1.0	5	5
TOTAL XYLENES	<5	ug/Kgdrywt	1.0	5	5
DIBROMOFLUOROMETHANE	104	%	1.0		
1,2-DICHLOROETHANE-D4	101	%	1.0		
TOLUENE-D8	108	%	1.0		
P-BROMOFLUOROBENZENE	99	%	1.0		

Report Notes:

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP2792-12
SDG: WP2792
Report Date: 8/5/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: 92
Method: EPA 8270
Date Analyzed: 7/23/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
25SLB150304	SL	6/7/99	6/8/99	6/16/99	PMM	EPA 3550	KRT

Compound	Result	Units	DF	Sample PQL	Method PQL
NAPHTHALENE	<360	ug/Kg	1.1	360	330
2-METHYLNAPHTHALENE	<360	ug/Kg	1.1	360	330
ACENAPHTHYLENE	<360	ug/Kg	1.1	360	330
ACENAPHTHENE	<360	ug/Kg	1.1	360	330
FLUORENE	<360	ug/Kg	1.1	360	330
PHENANTHRENE	<360	ug/Kg	1.1	360	330
ANTHRACENE	<360	ug/Kg	1.1	360	330
FLUORANTHENE	<360	ug/Kg	1.1	360	330
PYRENE	<360	ug/Kg	1.1	360	330
BENZO[A]ANTHRACENE	<360	ug/Kg	1.1	360	330
CHRYSENE	<360	ug/Kg	1.1	360	330
BENZO[B]FLUORANTHENE	<360	ug/Kg	1.1	360	330
BENZO[K]FLUORANTHENE	<360	ug/Kg	1.1	360	330
BENZO[A]PYRENE	<360	ug/Kg	1.1	360	330
INDENO[1,2,3-CD]PYRENE	<360	ug/Kg	1.1	360	330
DIBENZ[A,H]ANTHRACENE	<360	ug/Kg	1.1	360	330
BENZO[G,H,I]PERYLENE	<360	ug/Kg	1.1	360	330
NITROBENZENE-D5	46	%	1.1		
2-FLUOROBIPHENYL	56	%	1.1		
TERPHENYL-D14	77	%	1.1		

Report Notes:

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP2792-12
SDG: WP2792
Report Date: 8/2/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: 92
Method: SW8260
Date Analyzed: 6/11/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
25SLB150304	SL	6/7/99	6/8/99	6/11/99	DJP	5030	DJP

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<6	ug/Kg	1.2	6	5
TOLUENE	<6	ug/Kg	1.2	6	5
1,2-DIBROMOETHANE	<6	ug/Kg	1.2	6	5
ETHYLBENZENE	<6	ug/Kg	1.2	6	5
NAPHTHALENE	<6	ug/Kg	1.2	6	5
MTBE	<6	ug/Kg	1.2	6	5
TOTAL XYLENES	<6	ug/Kg	1.2	6	5
DIBROMOFLUOROMETHANE	121	%	1.2		
1,2-DICHLOROETHANE-D4	118	%	1.2		
TOLUENE-D8	112	%	1.2		
P-BROMOFLUOROBENZENE	87	%	1.2		

Report Notes:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services | **Client Field ID: 25SLB150304**

Matrix: SOIL | **SDG Name: WP2792**

Percent Solids: 91.7 | **Lab Sample ID: WP2792-012**

Concentration Units (ug/L or mg/Kg dry weight): mg/Kg

CAS No.	Analyte	Concentration	C	Q	M	DF
7439-92-1	LEAD	5.9			P	1

Color Before: BROWN | Texture: COARSE

Color After: YELLOW | Clarity After: CLEAR

Comments:

FORM I - IN

Katahdin
ANALYTICAL SERVICES

Lab Number : WP-2792-12
Report Date: 08/11/99
PO No. : N7912-P99264
Project : CTO #68

CLIENT: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr., Suite 102
Tallahassee, FL 32308

WIC#: CNC CHARLESTON

REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE	RECEIVED
25SLB150304	Solid	ROGER FRANKLIN	06/07/99	06/08/99

PARAMETER	RESULT	UNITS	DF	*PQL	METHOD	ANALYZED	BY	NOTES
Solids-Total Residue (TS)	91.	wt %	1.0	0.10	CLP/CIP SOW	06/14/99	JF	1
Total Combustible Organics	1.4	wt %	1.0	0.1	ASTM D2974-8	06/14/99	JF	1

* PQL (Practical Quantitation Level) represents laboratory reporting limits and may not reflect sample-specific reporting limits. Sample-specific limits are indicated by results annotated with '<' values.
(1) Sample Preparation on 06/11/99 by JF

08/11/99

LJO/baeajc(dw)/msm
PF11VSS8
CC: MS. LEE LECK
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2A

SOIL SEMIVOLATILE SYSTEM MONITORING COMPOUND RECOVERY

Lab Name: Katahdin Analytical Services

SDG No.: WP2792

Matrix: SOIL

Client Sample ID	Lab Sample ID	SMC1 (NBZ) #	SMC2 (FBP) #	SMC3 (TPH) #	Total Out
SBLK;061599	SBLK;061599	70	71	88	0
25SLB090304	WP2792-1	42	48	86	0
25SLB140304	WP2792-6	57	63	91	0
25SLB160304	WP2792-7	56	57	83	0
25SLB170304	WP2792-8	55	65	82	0
25SLB150304	WP2792-12	46	56	77	0
25SLB100102	WP2792-2	49	57	75	0
25SLB110203	WP2792-3	53	60	81	0
25SLB130203	WP2792-4	47	71	75	0
25SLB130203D	WP2792-5	53	77	84	0
25SLB120203	WP2792-9	50	63	80	0
LCS;061699	LCS;061699	71	80	86	0
25SLB130203DL	WP2792-4DL	37	63	60	0
25SLB130203DDL	WP2792-5DL	0*	74	39	1
25SLB120203DL	WP2792-9DL	41	59	74	0

QC LIMITS

SMC1	(NBZ)	=	NITROBENZENE-D5	(14-107)
SMC2	(FBP)	=	2-FLUOROBIPHENYL	(32-109)
SMC3	(TPH)	=	TERPHENYL-D14	(26-116)

Column to be used to flag recovery value

* Values are outside of QC limits

FORM II SVOA-1

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: SBLK;061599
SDG: WP2792
Report Date: 8/5/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: 100
Method: EPA 8270
Date Analyzed: 7/23/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
SBLK;061599	SL	-	-	6/15/99	PMM	EPA 3550	KRT

Compound	Result	Units	DF	Sample PQL	Method PQL
NAPHTHALENE	<330	ug/Kg	1.0	330	330
2-METHYLNAPHTHALENE	<330	ug/Kg	1.0	330	330
ACENAPHTHYLENE	<330	ug/Kg	1.0	330	330
ACENAPHTHENE	<330	ug/Kg	1.0	330	330
FLUORENE	<330	ug/Kg	1.0	330	330
PHENANTHRENE	<330	ug/Kg	1.0	330	330
ANTHRACENE	<330	ug/Kg	1.0	330	330
FLUORANTHENE	<330	ug/Kg	1.0	330	330
PYRENE	<330	ug/Kg	1.0	330	330
BENZO[A]ANTHRACENE	<330	ug/Kg	1.0	330	330
CHRYSENE	<330	ug/Kg	1.0	330	330
BENZO[B]FLUORANTHENE	<330	ug/Kg	1.0	330	330
BENZO[K]FLUORANTHENE	<330	ug/Kg	1.0	330	330
BENZO[A]PYRENE	<330	ug/Kg	1.0	330	330
INDENO[1,2,3-CD]PYRENE	<330	ug/Kg	1.0	330	330
DIBENZ[A,H]ANTHRACENE	<330	ug/Kg	1.0	330	330
BENZO[G,H,I]PERYLENE	<330	ug/Kg	1.0	330	330
NITROBENZENE-D5	70	%	1.0		
2-FLUOROBIPHENYL	71	%	1.0		
TERPHENYL-D14	88	%	1.0		

Report Notes:

2000141

Katahdin Analytical Services
8270 LCS Recovery Sheet

Lab File: I3932 **Sample ID:** LCS;061699 **Date Run:** 7/26/99

Analyst: KRT **Time Injected** 9:35:00 AM **Matrix:** SL

Compound Name	Spike Amt (ug/Kg)	Result (ug/Kg)	Rec (%)	Limits (%)
2-METHYLNAPHTHALENE	1667	1460	88	60-140
ACENAPHTHENE	1667	1220	73	60-140
ACENAPHTHYLENE	1667	1220	73	60-140
ANTHRACENE	1667	1220	73	60-140
BENZO[A]ANTHRACENE	1667	1240	74	60-140
BENZO[A]PYRENE	1667	1200	72	60-140
BENZO[B]FLUORANTHENE	1667	1320	79	60-140
BENZO[G,H,I]PERYLENE	1667	1320	79	60-140
BENZO[K]FLUORANTHENE	1667	1320	79	60-140
CHRYSENE	1667	1410	84	60-140
DIBENZ[A,H]ANTHRACENE	1667	1210	72	60-140
FLUORANTHENE	1667	1220	73	60-140
FLUORENE	1667	1220	73	60-140
INDENO[1,2,3-CD]PYRENE	1667	1320	79	60-140
NAPHTHALENE	1667	1210	73	60-140
PHENANTHRENE	1667	1340	80	60-140
PYRENE	1667	1370	82	60-140

* Out of Limits

2A

WATER VOLATILE SYSTEM MONITORING COMPOUND RECOVERY

Lab Name: Katahdin Analytical Services

SDG No.: WP2792

Matrix: WATER

Client Sample ID	Lab Sample ID	SMC1 (DFM) #	SMC2 (DCA) #	SMC3 (TOL) #	SMC4 (BFB) #	Total Out
LCSF10A	LCSF10A	93	87	103	106	0
VBLKF10A	VBLKF10A	94	87	103	96	0
LCSF11A	LCSF11A	102	86	101	103	0
VBLKF11B	VBLKF11B	97	86	101	98	0
LCSF14A	LCSF14A	98	80	103	101	0
VBLKF14A	VBLKF14A	98	84	102	96	0
LCSF15A	LCSF15A	96	87	107	106	0
VBLKF15B	VBLKF15B	94	93	106	96	0
LCSM10A	LCSM10A	102	94	105	99	0
VBLKM10B	VBLKM10B	104	96	106	98	0
LCSQ09A	LCSQ09A	86	84	88	84	0
VBLKQ09A	VBLKQ09A	83	81	90	88	0

QC LIMITS

SMC1	(DFM)	=	DIBROMOFLUOROMETHANE	(75-129)
SMC2	(DCA)	=	1,2-DICHLOROETHANE-D4	(65-135)
SMC3	(TOL)	=	TOLUENE-D8	(82-120)
SMC4	(BFB)	=	P-BROMOFLUOROBENZENE	(69-125)

Column to be used to flag recovery value

* Values are outside of QC limits

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: VBLKF10A
SDG: WPZ792
Report Date: 6/2/99
PO No.: N7912-P99264
Project: CTO #68
% Solids: N/A
Method: SW8260
Date Analyzed: 6/10/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
VBLKF10A	AQ	-	-	6/10/99	DJP	5030	DJP

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<5	ug/L	1.0	5	5
TOLUENE	<5	ug/L	1.0	5	5
1,2-DIBROMOETHANE	<5	ug/L	1.0	5	5
ETHYLBENZENE	<5	ug/L	1.0	5	5
NAPHTHALENE	<5	ug/L	1.0	5	5
MTBE	<5	ug/L	1.0	5	5
TOTAL XYLENES	<5	ug/L	1.0	5	5
DIBROMOFLUOROMETHANE	94	%	1.0		
1,2-DICHLOROETHANE-D4	87	%	1.0		
TOLUENE-D8	103	%	1.0		
P-BROMOFLUOROBENZENE	98	%	1.0		

Report Notes:

1000471

Katahdin Analytical Services
8260 LCS Recovery Sheet

Lab File: F0891 **Sample ID:** LCSF10A **Date Run:** 6/10/99

Analyst: DJP **Time Injected** 8:12:00 PM **Matrix:** AQ

Compound Name	Spike Amt (ug/L)	Result (ug/L)	Rec (%)	Limits (%)
1,2-DIBROMOETHANE	50	55.7	111	60-140
BENZENE	50	54.0	108	60-140
ETHYLBENZENE	50	54.4	109	60-140
MTBE	50	50.7	101	60-140
NAPHTHALENE	50	50.9	102	60-140
TOLUENE	50	55.4	111	60-140
TOTAL XYLENES	150	162	108	60-140

* Out of Limits

1

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: VBLKF11B
SDG: WP2792
Report Date: 8/2/99
PO No.: N7912-P99264
Project: CTO #68
% Solids: N/A
Method: SW8260
Date Analyzed: 6/11/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
VBLKF11B	AQ	-	-	6/11/99	JSS	5030	JSS

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<5	ug/L	1.0	5	5
TOLUENE	<5	ug/L	1.0	5	5
1,2-DIBROMOETHANE	<5	ug/L	1.0	5	5
ETHYLBENZENE	<5	ug/L	1.0	5	5
NAPHTHALENE	<5	ug/L	1.0	5	5
MTBE	<5	ug/L	1.0	5	5
TOTAL XYLENES	<5	ug/L	1.0	5	5
DIBROMOFLUOROMETHANE	97	%	1.0		
1,2-DICHLOROETHANE-D4	86	%	1.0		
TOLUENE-D8	101	%	1.0		
P-BROMOFLUOROBENZENE	98	%	1.0		

Report Notes:

1000492

Katahdin Analytical Services

8260 LCS Recovery Sheet

Lab File: F0909 **Sample ID: LCSF11A** **Date Run: 6/11/99**

Analyst: JSS **Time Injected 11:39:00 AM** **Matrix: AQ**

Compound Name	Spike Amt (ug/L)	Result (ug/L)	Rec (%)	Limits (%)
1,2-DIBROMOETHANE	50	51.1	102	60-140
BENZENE	50	54.0	108	60-140
ETHYLBENZENE	50	53.0	106	60-140
MTBE	50	51.8	104	60-140
NAPHTHALENE	50	50.9	102	60-140
TOLUENE	50	54.6	109	60-140
TOTAL XYLENES	150	157	105	60-140

* Out of Limits

Katahdin Analytical Services
8260 LCS Recovery Sheet

Lab File: F0944 **Sample ID:** LCSF14A **Date Run:** 6/14/99

Analyst: DJP **Time Injected** 11:07:00 AM **Matrix:** AQ

Compound Name	Spike Amt (ug/L)	Result (ug/L)	Rec (%)	Limits (%)
1,2-DIBROMOETHANE	50	49.4	99	60-140
BENZENE	50	51.5	103	60-140
ETHYLBENZENE	50	51.9	104	60-140
MTBE	50	46.8	94	60-140
NAPHTHALENE	50	49.9	100	60-140
TOLUENE	50	53.1	106	60-140
TOTAL XYLENES	150	156	104	60-140

* Out of Limits

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: VBLKF15B
SDG: WP2792
Report Date: 8/2/99
PO No.: N7912-P99264
Project: CTO #68
% Solids: N/A
Method: SW8260
Date Analyzed: 6/15/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
VBLKF15B	AQ	-	-	6/15/99	DJP	5030	DJP

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<5	ug/L	1.0	5	5
TOLUENE	<5	ug/L	1.0	5	5
1,2-DIBROMOETHANE	<5	ug/L	1.0	5	5
ETHYLBENZENE	<5	ug/L	1.0	5	5
NAPHTHALENE	<5	ug/L	1.0	5	5
MTBE	<5	ug/L	1.0	5	5
TOTAL XYLENES	<5	ug/L	1.0	5	5
DIBROMOFLUOROMETHANE	94	%	1.0		
1,2-DICHLOROETHANE-D4	93	%	1.0		
TOLUENE-D8	106	%	1.0		
P-BROMOFLUOROBENZENE	96	%	1.0		

Report Notes:

1000516

Katahdin Analytical Services
8260 LCS Recovery Sheet

Lab File: F0977 **Sample ID: LCSF15A** **Date Run: 6/15/99**

Analyst: DJP **Time Injected 9:26:00 AM** **Matrix: AQ**

Compound Name	Spike Amt (ug/L)	Result (ug/L)	Rec (%)	Limits (%)
1,2-DIBROMOETHANE	50	51.1	102	60-140
BENZENE	50	54.7	109	60-140
ETHYLBENZENE	50	55.0	110	60-140
MTBE	50	49.4	99	60-140
NAPHTHALENE	50	49.3	98	60-140
TOLUENE	50	56.0	112	60-140
TOTAL XYLENES	150	162	108	60-140

* Out of Limits

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: VBLKM10B
SDG: WP2792
Report Date: 8/2/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: N/A
Method: SW8260
Date Analyzed: 6/10/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
VBLKM10B	AQ	-	-	6/10/99	JSS	5030	JSS

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<5	ug/L	1.0	5	5
TOLUENE	<5	ug/L	1.0	5	5
1,2-DIBROMOETHANE	<5	ug/L	1.0	5	5
ETHYLBENZENE	<5	ug/L	1.0	5	5
NAPHTHALENE	<5	ug/L	1.0	5	5
MTBE	<5	ug/L	1.0	5	5
TOTAL XYLENES	<5	ug/L	1.0	5	5
DIBROMOFLUOROMETHANE	104	%	1.0		
1,2-DICHLOROETHANE-D4	96	%	1.0		
TOLUENE-D8	108	%	1.0		
P-BROMOFLUOROBENZENE	98	%	1.0		

Report Notes:

1000479

Katahdin Analytical Services
8260 LCS Recovery Sheet

Lab File: M0599 **Sample ID:** LCSM10A **Date Run:** 6/10/99

Analyst: JSS **Time Injected** 9:52:00 AM **Matrix:** AQ

Compound Name	Spike Amt (ug/L)	Result (ug/L)	Rec (%)	Limits (%)
1,2-DIBROMOETHANE	50	44.2	88	60-140
BENZENE	50	51.5	103	60-140
ETHYLBENZENE	50	51.0	102	60-140
MTBE	50	45.3	91	60-140
NAPHTHALENE	50	45.7	91	60-140
TOLUENE	50	51.6	103	60-140
TOTAL XYLENES	150	149	99	60-140

* Out of Limits

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: VBLKQ09A
SDG: WP2792
Report Date: 8/2/99
PO No.: N7912-P99264
Project: CTO #68
% Solids: N/A
Method: SW8260
Date Analyzed: 6/9/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
VBLKQ09A	AQ	-	-	6/9/99	HMP	5030	HMP

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<5	ug/L	1.0	5	5
TOLUENE	<5	ug/L	1.0	5	5
1,2-DIBROMOETHANE	<5	ug/L	1.0	5	5
ETHYLBENZENE	<5	ug/L	1.0	5	5
NAPHTHALENE	<5	ug/L	1.0	5	5
MTBE	<5	ug/L	1.0	5	5
TOTAL XYLENES	<5	ug/L	1.0	5	5
DIBROMOFLUOROMETHANE	83	%	1.0		
1,2-DICHLOROETHANE-D4	81	%	1.0		
TOLUENE-D8	90	%	1.0		
P-BROMOFLUOROBENZENE	88	%	1.0		

Report Notes:

1000460

Katahdin Analytical Services
8260 LCS Recovery Sheet

Lab File: Q5423 **Sample ID:** LCSQ09A **Date Run:** 6/9/99

Analyst: HMP **Time Injected** 11:36:00 AM **Matrix:** AQ

Compound Name	Spike Amt (ug/L)	Result (ug/L)	Rec (%)	Limits (%)
1,2-DIBROMOETHANE	50	48.7	97	60-140
BENZENE	50	49.6	99	60-140
ETHYLBENZENE	50	57.1	114	60-140
MTBE	50	43.1	86	60-140
NAPHTHALENE	50	48.0	96	60-140
TOLUENE	50	50.4	101	60-140
TOTAL XYLENES	150	149	99	60-140

* Out of Limits

2A

SOIL VOLATILE SYSTEM MONITORING COMPOUND RECOVERY

Lab Name: Katahdin Analytical Services

SDG No.: WP2792

Matrix: SOIL

Client Sample ID	Lab Sample ID	SMC1 (DFM) #	SMC2 (DCA) #	SMC3 (TOL) #	SMC4 (BFB) #	Total Out
MBLK061099	MBLK061099	92	86	102	95	0
25SLB130203DL	WP2792-4DL	92	87	103	104	0
25SLB130203DDL	WP2792-5DL	100	90	100	100	0
25SLB120203DL	WP2792-9DL	102	91	101	101	0
25SLB100102	WP2792-2	92	104	106	120	0
25SLB170304	WP2792-8	101	132	101	96	0
25SLB100102DL	WP2792-2DL	95	96	106	109	0
25SLB170304DL	WP2792-8DL	96	94	109	104	0
25TL00501	WP2792-11	104	101	106	99	0
25SLB130203	WP2792-4	88	106	89	98	0
25SLB130203D	WP2792-5	99	150*	88	106	1
25SLB120203	WP2792-9	93	251*	101	127	1
LCSZ11A	LCSZ11A	100	100	100	95	0
VBLKZ11B	VBLKZ11B	130	126	119	88	0
25SLB110203	WP2792-3	82	92	94	88	0
25SLB140304	WP2792-6	119	182*	96	100	1
25SLB150304	WP2792-12	121	118	112	87	0
25SLB140304RE	WP2972-6RE	114	118	103	124	0
LCSZ16A	LCSZ16A	101	112	107	103	0
VBLKZ16B	VBLKZ16B	125	127	120	105	0
25SLB090304	WP2792-1	88	92	86	72	0
25SLB160304	WP2792-7	115	118	125	103	0

QC LIMITS

SMC1	(DFM)	=	DIBROMOFLUOROMETHANE	(69-148)
SMC2	(DCA)	=	1,2-DICHLOROETHANE-D4	(66-149)
SMC3	(TOL)	=	TOLUENE-D8	(68-147)
SMC4	(BFB)	=	P-BROMOFLUOROBENZENE	(64-152)

Column to be used to flag recovery value

* Values are outside of QC limits

FORM II VOA-1

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: MBLK061099
SDG: WP2792
Report Date: 8/2/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: 100
Method: SW8260
Date Analyzed: 6/10/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
MBLK061099	SL	-	-	6/10/99	DJP	5030	DJP

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<600	ug/Kgdrywt	120	600	5
TOLUENE	<600	ug/Kgdrywt	120	600	5
1,2-DIBROMOETHANE	<600	ug/Kgdrywt	120	600	5
ETHYLBENZENE	<600	ug/Kgdrywt	120	600	5
NAPHTHALENE	<600	ug/Kgdrywt	120	600	5
MTBE	<600	ug/Kgdrywt	120	600	5
TOTAL XYLENES	<600	ug/Kgdrywt	120	600	5
DIBROMOFLUOROMETHANE	92	%	120		
1,2-DICHLOROETHANE-D4	86	%	120		
TOLUENE-D8	102	%	120		
P-BROMOFLUOROBENZENE	95	%	120		

Report Notes:

1000485

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: VBLKZ11B
SDG: WP2792
Report Date: 8/2/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: 100
Method: SW8260
Date Analyzed: 6/11/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
VBLKZ11B	SL	-	-	6/11/99	DJP	5030	DJP

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<5	ug/Kg	1.0	5	5
TOLUENE	<5	ug/Kg	1.0	5	5
1,2-DIBROMOETHANE	<5	ug/Kg	1.0	5	5
ETHYLBENZENE	<5	ug/Kg	1.0	5	5
NAPHTHALENE	<5	ug/Kg	1.0	5	5
MTBE	<5	ug/Kg	1.0	5	5
TOTAL XYLENES	<5	ug/Kg	1.0	5	5
DIBROMOFLUOROMETHANE	130	%	1.0		
1,2-DICHLOROETHANE-D4	126	%	1.0		
TOLUENE-D8	119	%	1.0		
P-BROMOFLUOROBENZENE	88	%	1.0		

Report Notes:

1000502

Katahdin Analytical Services
8260 LCS Recovery Sheet

Lab File: Z1075 **Sample ID:** LCSZ11A **Date Run:** 6/11/99

Analyst: DJP **Time Injected** 2:41:00 PM **Matrix:** SL

Compound Name	Spike Amt (ug/Kg)	Result (ug/Kg)	Rec (%)	Limits (%)
1,2-DIBROMOETHANE	50	50.0	100	60-140
BENZENE	50	51.8	104	60-140
ETHYLBENZENE	50	66.1	132	60-140
MTBE	50	50.7	101	60-140
NAPHTHALENE	50	62.2	124	60-140
TOLUENE	50	50.9	102	60-140
TOTAL XYLENES	150	202	135	60-140

* Out of Limits

1

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: VBLKZ168
SDG: WP2792
Report Date: 8/2/99
PO No.: N7912-P99264
Project: CTO #68
% Solids: 100
Method: SW8260
Date Analyzed: 6/16/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
VBLKZ168	SL	-	-	6/16/99	KRT	5030	KRT

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<5	ug/Kg	1.0	5	5
TOLUENE	<5	ug/Kg	1.0	5	5
1,2-DIBROMOETHANE	<5	ug/Kg	1.0	5	5
ETHYLBENZENE	<5	ug/Kg	1.0	5	5
NAPHTHALENE	<5	ug/Kg	1.0	5	5
MTBE	<5	ug/Kg	1.0	5	5
TOTAL XYLENES	<5	ug/Kg	1.0	5	5
DIBROMOFLUOROMETHANE	125	%	1.0		
1,2-DICHLOROETHANE-D4	127	%	1.0		
TOLUENE-D8	120	%	1.0		
P-BROMOFLUOROBENZENE	105	%	1.0		

Report Notes:

Katahdin Analytical Services
8260 LCS Recovery Sheet

Lab File: Z1119 **Sample ID: LCSZ16A** **Date Run: 6/16/99**

Analyst: KRT **Time Injected 2:17:00 PM** **Matrix: SL**

Compound Name	Spike Amt (ug/Kg)	Result (ug/Kg)	Rec (%)	Limits (%)
1,2-DIBROMOETHANE	50	51.8	104	60-140
BENZENE	50	53.8	108	60-140
ETHYLBENZENE	50	64.3	129	60-140
MTBE	50	53.9	108	60-140
NAPHTHALENE	50	63.2	126	60-140
TOLUENE	50	52.5	105	60-140
TOTAL XYLENES	150	201	134	60-140

*** Out of Limits** *1*

5A

SPIKE SAMPLE RECOVERY

Lab Name: Katahdin Analytical Services

Client Field ID: 25SLB090304S

Matrix: SOIL

SDG Name: WP2792

Percent Solids: 80.8

Lab Sample ID: WP2792-001S

Concentration Units (ug/L or mg/Kg dry weight): mg/Kg

Analyte	Spiked Sample Result	C	Sample Result	C	Spike Added	%R	Q	Control Limits (%R) Low	High	M
LEAD	64.6423		10.4929		53.82	100.6		75	125	P

Comments:

FORM V (Part 1) - IN

5A

SPIKE SAMPLE RECOVERY

Lab Name: Katahdin Analytical Services

Client Field ID: 25SLB090304S

Matrix: SOIL

SDG Name: WP2792

Percent Solids: 80.8

Lab Sample ID: WP2792-001P

Concentration Units (ug/L or mg/Kg dry weight): mg/Kg

Analyte	Spiked Sample Result	C	Sample Result	C	Spike Added	%R	Q	Control Limits (%R) Low	High	M
LEAD	61.0438		10.4929		50.32	100.5		75	125	P

Comments:

FORM V (Part 1) - IN

5D

SPIKE DUPLICATES

Lab Name: Katahdin Analytical Services

Client Field ID: 25SLB090304

Matrix: SOIL

SDG Name: WP2792

Percent Solids: 80.8

Lab Sample ID: WP2792-001

Concentration Units (ug/L or mg/Kg dry weight): mg/Kg

Analyte	Control Limits	Spike Result	C	Spike Dup. Result	C	RPD	Q	M
LEAD		64.6423		61.0438		5.7		P

Comments:

FORM VD - IN

LABORATORY CONTROL SAMPLES

Lab Name: Katahdin Analytical Services **Sample ID: LCSSPG07ICS0**

Matrix: SOIL **SDG Name: WP2792**

QC Batch ID: PG07ICS0

Concentration Units (ug/L or mg/Kg dry weight): mg/Kg

Analyte	TRUE	FOUND	% R	LIMITS (%)	
LEAD	66.0	71.20	107.9	68	132

[redacted]

Method Blank and Laboratory Control Sample Results

Client:	Tetra Tech NUS
Work Order:	WP2792

			METHOD BLANK RESULTS					LABORATORY CONTROL SAMPLE RESULTS					
Parameter	Date of Prep	Date of Analysis	Units		Concentration Measured in Blank		Acceptance Range	Practical Quantitation Level**	Units	True Value	Measured Value	Percent Recovered	Acceptance Range (%)	Acceptance Range (mg/kg)
TS -Total Residue	11-Jun-99	14-Jun-99	wt %	<	0.10	<	0.10	0.10	wt %	90	89.6	99.6	80-120	
	11-Jun-99	14-Jun-99	wt %	<	0.10	<	0.10	0.10						
TCO-Total Combustible Organics	11-Jun-99	14-Jun-99	wt %	<	0.10	<	0.10	0.10						

** Practical quantitation level is the lowest concentration measurable for samples with normal chemical and physical composition during routine laboratory operations.

DATA QUALITY COMMENTS:
Results of all quality control measurements are within the laboratory and method specified acceptance range except as noted.

5000003

[redacted]

Duplicate and Matrix Spike/Matrix Spike Duplicate Results

Client:	Tetra Tech NUS
Work Order:	WP2792

			DUPLICATE RESULTS					*MATRIX SPIKE/MATRIX SPIKE DUPLICATE RESULTS*								
			Sample Measurements				Acceptance Range		Concentration or Quantity				Matrix Spike Recovery (%)			
Parameter	Sample No	Units	Rep 1	Rep 2	Mean Conc	RPD (%)	for RPD (%)	Units	Sampl Only	Spike Added	Sample +Spike Dup 1	Sample +Spike Dup 2	Sample +Spike Dup 1	Sample +Spike Dup 2	Acceptance Range (%)	RPD (%)	Acceptance Range (%)
TS	WP2792-8	mg/L	83.9	83.8	83.9	0.1	0-20	mg/L		NA					75-125		0-20
	WP2792-12	mg/L	91.3	91.7	91.5	0.4	0-20	mg/L		NA					75-125		0-20
TCO	WP2792-12	mg/L	1.40	1.37	1.39	2.2	0-20	mg/L		NA					75-125		0-20

RPD = Relative percent difference, which is the absolute value of the difference between two replicate results divided by the mean concentration then multiplied by 100%.

NA = Not applicable.

DATA QUALITY COMMENTS:

Results of all quality control measurements are within the laboratory or contract specified acceptance range except as noted. The laboratory does not use the sample duplicate and matrix spike acceptance ranges as acceptance criteria for a specific analysis. Sample duplicate and matrix spike data are used to evaluate method performance in the environmental sample matrix only. Please refer to LCS data for assessment of quality control for each parameter.

5000004

CASE NARRATIVE
for
Katahdin Analytical
Westbrook, ME
Former Charleston Naval Complex Site
SDG #96242

June 29, 1999

Laboratory Identification:

General Engineering Laboratories, Inc. (GEL)

Mailing Address:

P.O. Box 30712
Charleston, SC 29417

Express Mail Delivery and Shipping Address:

2040 Savage Rd
Charleston, SC 29414

Telephone Number:

(843) 556-8171

Summary:

Sample receipt

The samples from the former Charleston Naval Complex site arrived at General Engineering Laboratories, Inc., Charleston, SC on June 7, 1999, for environmental analyses. All sample containers arrived without any visible signs of tampering or breakage. The samples were delivered with chain of custody documentation and signatures.

The following samples were received by the laboratory:

Laboratory Identification	Sample Description
9906242-01	25SLB130203
9906242-02	25SLB130203D
9906242-03	25SLB50304
9906242-04	25SLB150304D

Case Narrative

Sample analyses were conducted using methodology as outlined in General Engineering Laboratories Standard Operating Procedures. Any technical or administrative problems during analysis, data review, and reduction are listed below by analytical parameter.

Internal Chain of Custody:

Custody was maintained for all samples.

Data Package:

The enclosed data package contains the following sections: Case Narrative, Chain of Custody, Cooler Receipt Checklist, and General Chemistry.

The following are definitions of reporting limits used at General Engineering Laboratories:

DL — Detection Limit: The minimum level of an analyte that can be determined (identified not quantified) with 99% confidence. The values are normally achieved by preparing and analyzing seven aliquots of laboratory water spiked 1 to 5 times the estimated MDL, taking the standard deviation and multiplying it against the one-tailed t-statistic at 99%. This computed value is then verified for reasonableness by repeating the study using the concentration found in the initial study, calculating an F-ratio, and computing the final limit. Sample specific preparation and dilution factors are applied to these limits when they are reported.

The detection limit is the minimum concentration of a substance that can be identified, measured, and reported with 99% confidence that the analyte concentration is above zero. It answers the question "Is It Present."

QL — Quantitation Limit: The lowest concentration that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions. The QL is generally 5 to 10 times the MDL. However, it may be nominally chosen within these guidelines to simplify data reporting. For many analytes the QL analyte concentration is selected as the lowest non-zero standard in the calibration curve.

Sample QL's are highly matrix-dependent. Sample specific preparation and dilution factors are applied to these limits when they are reported.

The QL is always $\geq$ DL.

This data package, to the best of my knowledge, is in compliance with technical and administrative requirements.

Valerie S. Davis
Project Manager

fc:saic99062428%

Case Narrative for
KATA
SDG# 96242

TOTAL ORGANIC CARBON

Analytical Batch Number: 151981

Analytical Method: SW846 9060 Modified

Laboratory Number	Sample Description
9906242-03	25SLB50304
9906242-04	25SLB150304D
QC622750	Blank
QC622751	Duplicate of 9906242-03
QC622752	Post Spike of 9906242-03
QC622753	Laboratory Control Sample

Sample Preparation:

All samples were prepared in accordance with accepted procedures. The method quoted is only for liquid samples. It is modified to handle soils analysis.

Instrument Calibration:

The instrument used was a Dohrmann DC-190 high temperature combustion TOC analyzer with a Dohrmann solids boat sampler. The instrument was properly calibrated on the day of the analysis.

Sample Preparation:

All samples were prepared in accordance with accepted procedures.

Instrument Calibration:

The instrument used was a Dohrmann DC-80 TOC analyzer. The instrument was properly calibrated.

Holding Time:

All samples were analyzed within the required holding time.

Blanks:

No target analytes were detected in the method blank above the required acceptance limit.

Spike Analyses:

The post spike was run on the following Sample Number.

9906242-03

All analyte recoveries in the post spike were within the required acceptance limits.

Laboratory Control Samples:

All analyte recoveries in the laboratory control sample were within the required acceptance limits.

Sample Duplicates:

All sample duplicate results were within the required acceptance limits.

Dilutions:

None of the samples were diluted.

Non Conformance Reports:

There were no Nonconformance Reports associated with this batch.

Additional Comments:

TOC solid samples are are tested to determine if inorganic carbon such as carbonates and bicarbonates are present in the sample. If so, the sample is acidified to remove the inorganic carbon, then dried in a low temperature oven. Because the sample portion is dried before analysis, the percent moisture correction is not applied to the TOC solid result.

TOTAL PETROLEUM HYDROCARBONS

Analytical Batch Number: 151686

Analytical Method: SW846 9071A

Laboratory Number	Sample Description
9906242-01	25SLB130203
9906242-02	25SLB130203D
QC621595	Blank
QC621596	Laboratory Control Sample
QC621599	Duplicate of 9906242-01
QC621600	Matrix Spike of 9906242-01

Instrument Calibration:

The balance was properly calibrated.

Holding Time:

All samples were analyzed within the required holding time.

Blanks:

No target analytes were detected in the method blank above the required acceptance limit.

Spike Analyses:

The matrix spike was run on the following Sample Number.

9906242-01

All analyte recoveries in the matrix spike were within the required acceptance limits.

Laboratory Control Samples:

All analyte recoveries in the laboratory control sample were within the required acceptance limits.

Sample Duplicates:

All sample duplicate results were within the required acceptance limits.

Dilutions:

None of the samples were diluted.

Non Conformance Reports:

There were no Nonconformance Reports associated with this batch.

The preceding narratives have been reviewed by: [illegible] Date: 06/25/99

General Engineering Laboratories, Inc.
2040 Savage Road
Charleston, South Carolina 29407
P.O. Box 30712
Charleston, South Carolina 29417
(803) 556-8171

CHAIN OF CUSTODY RECORD

9906242%

Client Name/Facility Name: Katahdin Analytical

Collected by/Company: Tetra tech NUS

SAMPLE ANALYSIS REQUIRED (s) - use remarks area to specify specific compounds or methods

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

SAMPLE ID	DATE	TIME	WELL	SOIL	COMP	GRAB	# OF CONTAINERS	pH, conductivity	TOC/DOC	TOX	Chloride, Fluoride, Sulfide	Nitrite/Nitrate	VOC - Specify Method required	METALS - specify	Pesticide	Herbicide	Total Phenol	Acid Extractables	B/N Extractables	PCB's	Cyanide	Coliform - specify type		TPH	Remarks
Z5SLB13Φ2Φ3	6/7/99	1040		X		X	1		X															X	FID Readings = >5000 ppm .4
Z5SLB13 Φ2ΦSD	6/7/99	1040		X		X	1																	X	" " ~~=150~~ .1
Z5SLB15Φ3Φ4	6/7/99	1115		X		X	1		X																" " = 150 ppm .2
Z5SLB15Φ3ΦΦD	6/7/99	1115		X		X	1		X																.2

Relinquished by:	Date:	Time:	Received by:	Relinquished by:	Date:	Time:	Received by:
[signature]	6/7/99	1814	[signature]				

Relinquished by:	Date:	Time:	Received by lab by:	Date:	Time:	Remarks:
			GEZ	6/7/99	18:15	

White = sample collector Yellow = file Pink = with report

INDUSTRIAL SAMPLE RECEIPT REVIEW

Client Tetra Tech Received by GCC Date 6-5-99

GENERAL ENGINEERING LABORATORIES

Meeting today's needs with a vision for tomorrow

GEL COOLER ___ GEL POLY COOLER ___ CLIENT COOLER ___ OTHER ✓

SAMPLE REVIEW CRITERIA	YES	NO	COMMENTS/QUALIFIERS
1. Were shipping containers received intact and sealed? Call project Manager if No	✓		
2. Is the shipment identified as RADIOACTIVE and/or from a DOE site or subcontainer (see list in EPI SOP S-007)?	—	—	
If YES, was the shipment screened following the radiochemistry survey procedure (EPI SOP S-007)?	—	—	
Were the survey results negative? Call Project Manager if No.	—	—	
3. Were chain of custody documents included?	✓		
4. Were chain of custody documents completed properly? (link, signed, match containers)	✓		
5. Did all samples containers arrive intact? (sealed, unbroken)? Call Project Manager if No	✓		
6. Were all sample containers properly labeled?	✓		
7. Were proper sample containers received?	✓		
8. Preserved samples checked for proper pH?	✓		
9. Were samples preserved properly? If no, list samples & tests	✓		
10. Shipping container temperature checked?	✓		
11. Was shipping container temperature within specifications (4+2C) If no, Call Project Manager	✓		4°C
12. Were samples received within holding time? If No, Call Project Manager	✓		
13. Were VOA vials free of headspace?	—	—	

REVIEW [signature] DATE 6-8-99 SA - SEALS ATTACHED NSA - NO SEALS ATTACHED

Client:	Katahdin Analytical
	340 County Road
	Westbrook, Maine 04092
Contact:	Ms. Andrea Colby
Project Description:	Former Naval Complex

cc: KATA00199 Report Date: June 24, 1999

Sample ID	: 25SLB130203
Lab ID	: 9906242-01
Matrix	: Soil
Date Collected	: 06/07/99
Date Received	: 06/07/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Total Rec. Petro. Hydrocarbons		1560	59.0	118	mg/kg	1.0	AAT	06/22/99	0950	151686	
Evaporative Loss @ 105 C		15.0	1.00	1.00	wt%	1.0	GJ	06/08/99	1455	150962	

M = Method	Method-Description
M 1	SW846 9071A
M 2	EPA 3550

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

Data reported in mass/mass units is reported as 'dry weight'.

This data report has been prepared and reviewed
in accordance with General Engineering Laboratories
standard operating procedures. Please direct
any questions to your Project Manager, Valerie Davis at (843) 769-7391.

Reviewed By

Client:	Katahdin Analytical 340 County Road Westbrook, Maine 04092
Contact:	Ms. Andrea Colby
Project Description:	Former Naval Complex

cc: KATA00199 Report Date: June 24, 1999

Sample ID	: 25SLB130203D
Lab ID	: 9906242-02
Matrix	: Soil
Date Collected	: 06/07/99
Date Received	: 06/07/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Total Rec. Petro. Hydrocarbons		426	56.0	112	mg/kg	1.0	AAT	06/22/99	0950	151686	1
Evaporative Loss @ 105 C		11.0	1.00	1.00	wt%	1.0	GJ	06/08/99	1455	150962	2

M = Method	Method-Description
M 1	SW846 9071A
M 2	EPA 3550

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

Data reported in mass/mass units is reported as 'dry weight'.

This data report has been prepared and reviewed
in accordance with General Engineering Laboratories
standard operating procedures. Please direct
any questions to your Project Manager, Valerie Davis at (843) 769-7391.

Reviewed By

Client: Katahdin Analytical
340 County Road
Westbrook, Maine 04092
Contact: Ms. Andrea Colby
Project Description: Former Naval Complex

25SLB150304

cc: KATA00199 Report Date: June 24, 1999

Sample ID	: 25SLB50304
Lab ID	: 9906242-03
Matrix	: Soil
Date Collected	: 06/07/99
Date Received	: 06/07/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Evaporative Loss @ 105 C		10.0	1.00	1.00	wt%	1.0	GJ	06/08/99	1455	150962	1
Total Organic Carbon		771	43.1	100	mg/kg	1.0	LIB	06/23/99	1452	151981	

M = Method	Method-Description
M 1	EPA 3550
M 2	SW846 9060 Modified

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

Data reported in mass/mass units is reported as 'dry weight'.

This data report has been prepared and reviewed
in accordance with General Engineering Laboratories
standard operating procedures. Please direct
any questions to your Project Manager, Valerie Davis at (843) 769-7391.

Reviewed By

771
460
1,231

Client:	Katahdin Analytical 340 County Road Westbrook, Maine 04092
Contact:	Ms. Andrea Colby
Project Description:	Former Naval Complex

cc: KATA00199 Report Date: June 24, 1999

Sample ID	: 255LB150304D
Lab ID	: 9906242-04
Matrix	: Soil
Date Collected	: 06/07/99
Date Received	: 06/07/99
Priority	: Routine
Collector	: Client

AVG. 615.5

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Evaporative Loss @ 105 C		10.0	1.00	1.00	wt%	1.0	GJ	06/08/99	1455	150962	1
Total Organic Carbon		460	43.1	100	mg/kg	1.0	LS	06/23/99	1558	151981	2

M = Method	Method-Description
M 1	EPA 3550
M 2	SW846 9060 Modified

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

Data reported in mass/mass units is reported as 'dry weight'.

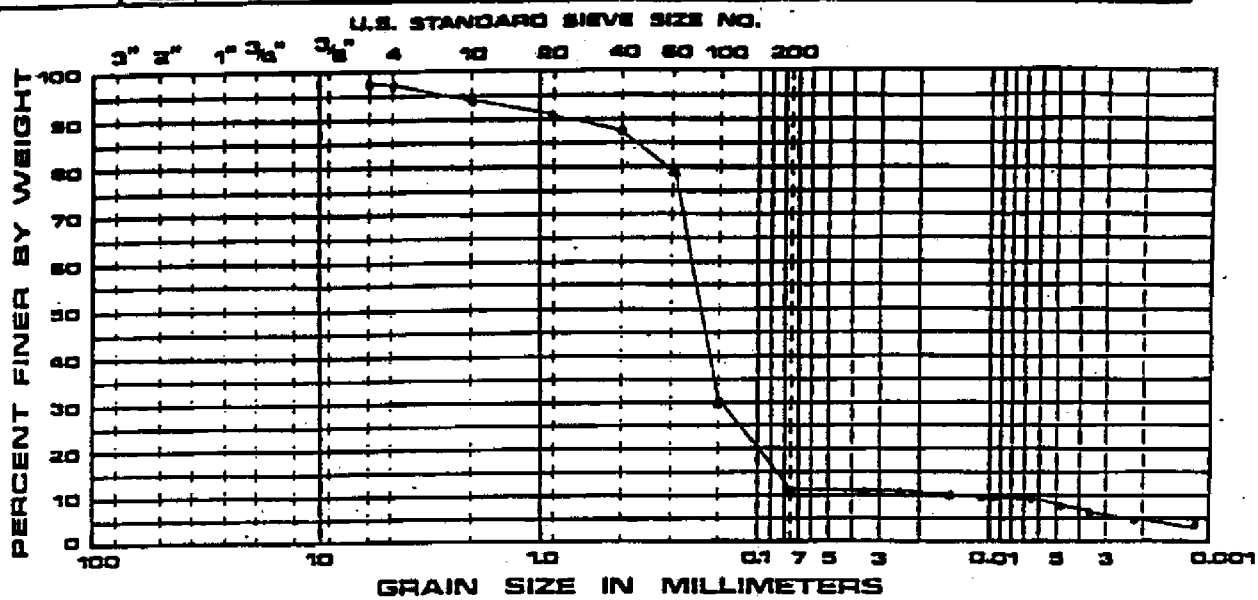
This data report has been prepared and reviewed
in accordance with General Engineering Laboratories
standard operating procedures. Please direct
any questions to your Project Manager, Valerie Davis at (843) 769-7391.

Reviewed By

JOB NO: 97-M8

GRAIN SIZE ANALYSIS

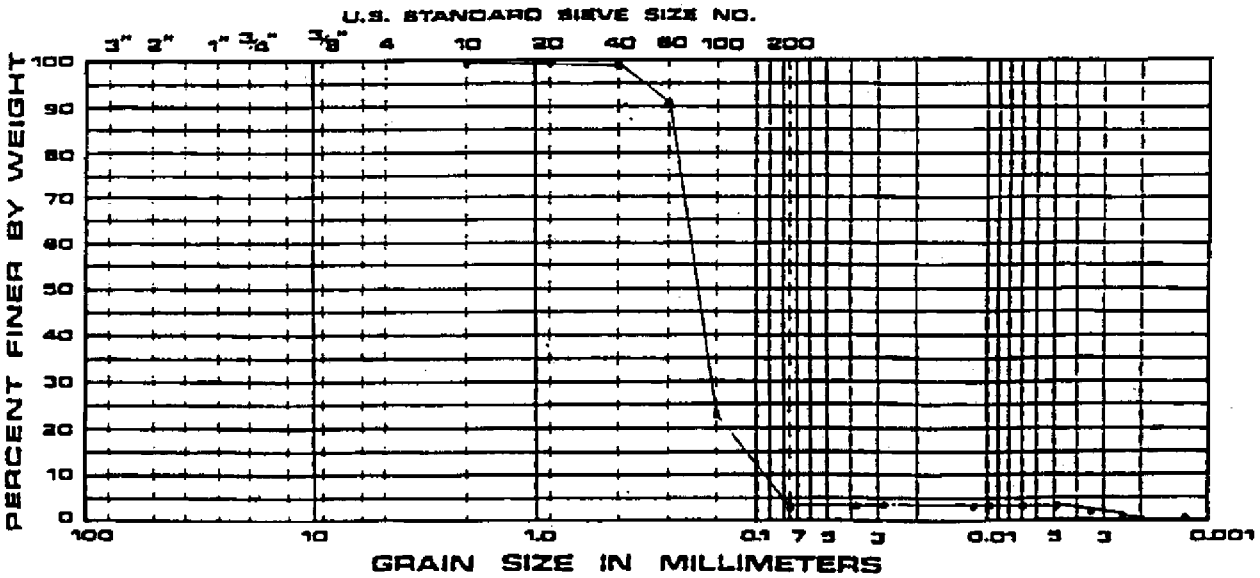
SLB12
0203



PLOT	SOURCE	SAMP.	DEPTH	CLASSIFICATION		W
•	WB07B9	28				

GRAIN SIZE ANALYSIS

SLB12
0708



PLOT	SOURCE	SAMP.	DEPTH	CLASSIFICATION		W
•	WB07B2D	24				

S. W. COLE ENGINEERING, INC.

REPORT OF GRADATION
ASTM C-117, C-136

Project No. 99008
Date 06/09/1999

Project MISCELLANEOUS

Client KATAHDIN ANALYTICAL

Sample No. 23, SILTY SAND, WP2792-9 25SLB120203

Sieve Size	Percent Passing	PROJECT Specifications %
1/2 "	100.0	
1/4 "	98.0	
# 4	97.0	
# 10	94.2	
# 20	91.4	
# 40	88.5	
# 60	79.6	
# 100	30.2	
# 200	11.8	

S. W. COLE ENGINEERING, INC.

REPORT OF GRADATION
ASTM C-117, C-136

Project No. 99008
Date 06/09/1999

Project MISCELLANEOUS

Client KATAHDIN ANALYTICAL

Sample No. 24, SILTY SAND, WP2792-10 25SLB120708

Sieve Size	Percent Passing	PROJECT Specifications %
# 4	100.0	
# 10	99.9	
# 20	99.7	
# 40	99.0	
# 60	91.0	
# 100	23.6	
# 200	3.4	

APPENDIX C

AQUIFER CHARACTERIZATION DATA

SUMMARY OF SLUG TEST
SOUTH CAROLINA
Department of Health and Environmental Control (DHEC)

Site Data

SITE ID #: 01782 **COUNTY:** North Charleston, South Carolina

FACILITY NAME: Former Charleston Naval Complex

Slug Data

See *Zone F RCRA Facility Investigation Report, E/A&H, 1996* for all data measurements.

Water Level Recovery Data was measured by a Hermit Data Logger.

Slug Test Conducted in well(s) number	**613004**	**613004**	**620002**	**620002**
Initial Rise/Drawdown in well (feet)	Rise=4.1	Fall=1.5	Rise=3.8	Fall=2.0
Radius of Well Casing (feet)	0.083	0.083	0.083	0.083
Effective Radius of Well (feet)	--	--	--	--
Static Saturated Aquifer Thickness (feet)	6	6	6.5	6.5
Length of Well Screen (feet)	9.4	9.4	9.4	9.4
Static Height of Water Column in Well (ft)	6	6	6.5	6.5

Calculations

The method for aquifer calculations was: Bouwer-Rice

Calculated values by well were as follows:

Slug Test Conducted in well(s) number	**613004**	**62002**
Hydraulic Conductivity (ft/day) (geometric mean)	0.32	0.41

Thickness of the aquifer used to calculate hydraulic conductivity was 5 to 6 feet.
The aquifer is water table.
The estimated seepage velocity is 6.8 feet per year based on
a hydraulic conductivity of 0.7 ft/day (for Quaternary sand aquifer), a hydraulic gradient of 0.0096 (from 9/11/99 Site 25 potentiometric data), and
a porosity of 36 per cent for the Quaternary sandy soil.

SUMMARY OF SLUG TEST
SOUTH CAROLINA
Department of Health and Environmental Control (DHEC)

Site Data

SITE ID #: 01782 **COUNTY:** North Charleston, South Carolina

FACILITY NAME: Former Charleston Naval Complex

Slug Data

See *Zone F RCRA Facility Investigation Report* for all data measurements.

Water Level Recovery Data was measured by a Hermit Data Logger.

Slug Test Conducted in well(s) number	**607001**	**607001**	**613001**	**613001**
Initial Rise/Drawdown in well (feet)	Rise=1.4	Fall=1.5	Rise=3.2	Fall=1.5
Radius of Well Casing (feet)	0.083	0.083	0.083	0.083
Effective Radius of Well (feet)	--	--	--	--
Static Saturated Aquifer Thickness (feet)	5	5	4	4
Length of Well Screen (feet)	1.9	1.9	9.4	9.4
Static Height of Water Column in Well (ft)	5	5	4	4

Calculations

The method for aquifer calculations was: Bouwer-Rice

Calculated values by well were as follows:

Slug Test Conducted in well(s) number	**607001**	**613001**	**Geo. Mean of 4 Wells**
Hydraulic Conductivity (ft/day) (geometric mean)	1.8	1.0	**0.7**

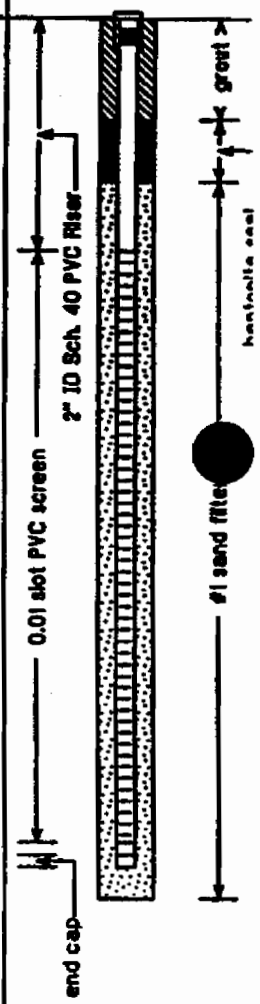
EnSafe/Allen & Hoshall

Monitoring Well NBCF613004

Project: ZONE F – Naval Base Charleston	Coordinates: 2398222.98 E, 373823.70 N
Location: Charleston, SC	Surface Elevation: 9.8 feet msl
Started at 10:30 on 10-22-98	TOC Elevation: 9.44 feet msl
Completed at 13:30 on 10-22-98	Depth to Groundwater: 7.01 feet TOC Measured: 12/18/98
Drilling Method: 4.25" ID (7.5" OD) HSA with split spoon sampler	Groundwater Elevation: 2.43 feet msl
Drilling Company: Alliance Environmental (SC cert. # 8808)	Total Well Depth: 13.5 feet bgs
Geologist: B. Blythe	Well Screen: 3.7 to 13.1 feet bgs

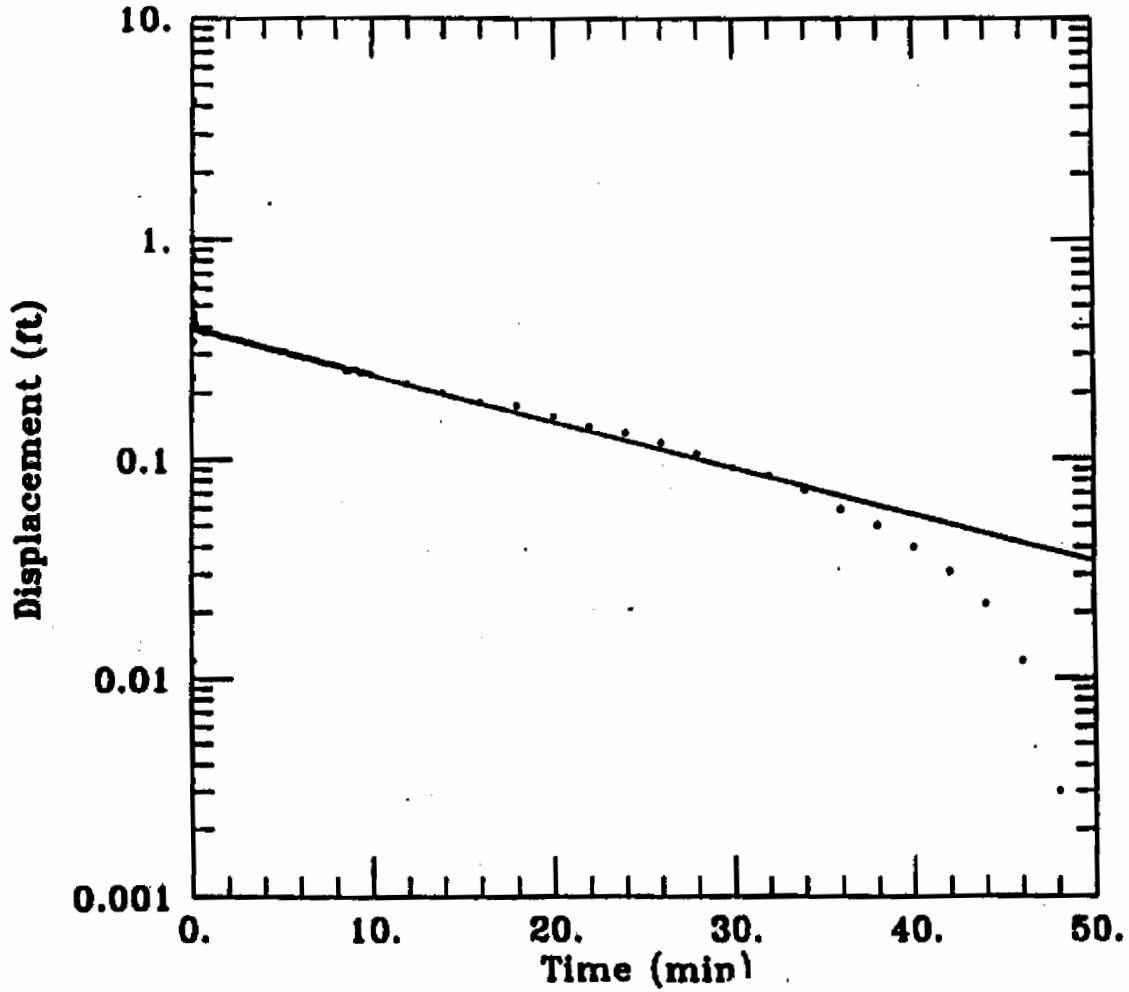
DEPTH IN FEET	LITHOLOGIC SAMPLE	ANALYTICAL SAMPLE	SAMPLE NO.	% RECOVERY	PID (ppm)	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION	ELEV. (ft msl)
								Surface conditions: Asphalt	
							SP SC	Poor recovery: most is mottled CaCO3 sand with ROC and trace amounts of black to green mottled clay; moist; soft; some sandy shell hash seen on bottom of spoon; pepper color.	8.8 / 8.3
5			1	20	2.4			Shelby tube: Top: CaCO3 gravel on top; tan; dry; Bottom: tan and brown red mottled; moist to wet; clayey sand to sandy clay; soft; medium plasticity.	
			2	100	0				
							SP SC	Clayey sand: same as bottom of shelby tube above.	1.8 / 8
10			3	40	0				
							SC SP	Clay: gray to mottled red and brown; fat; stiff; medium plasticity; alternates to wet sands at bottom of spoon.	14 / 3
			4	75	0				
15									
20									

WELL DIAGRAM



Client: CLEAN	Company: E/A&H
Location: NAVAL BASE CHARLESTON	Project: 2906-08450

FALLING HEAD SLUG TEST NBCF613004



DATA SET:
61304FAL.AQT
04/15/97

AQUIFER MODEL:
Unconfined

SOLUTION METHOD:
Bouwer-Rice

PROJECT DATA:
test date: January 1997

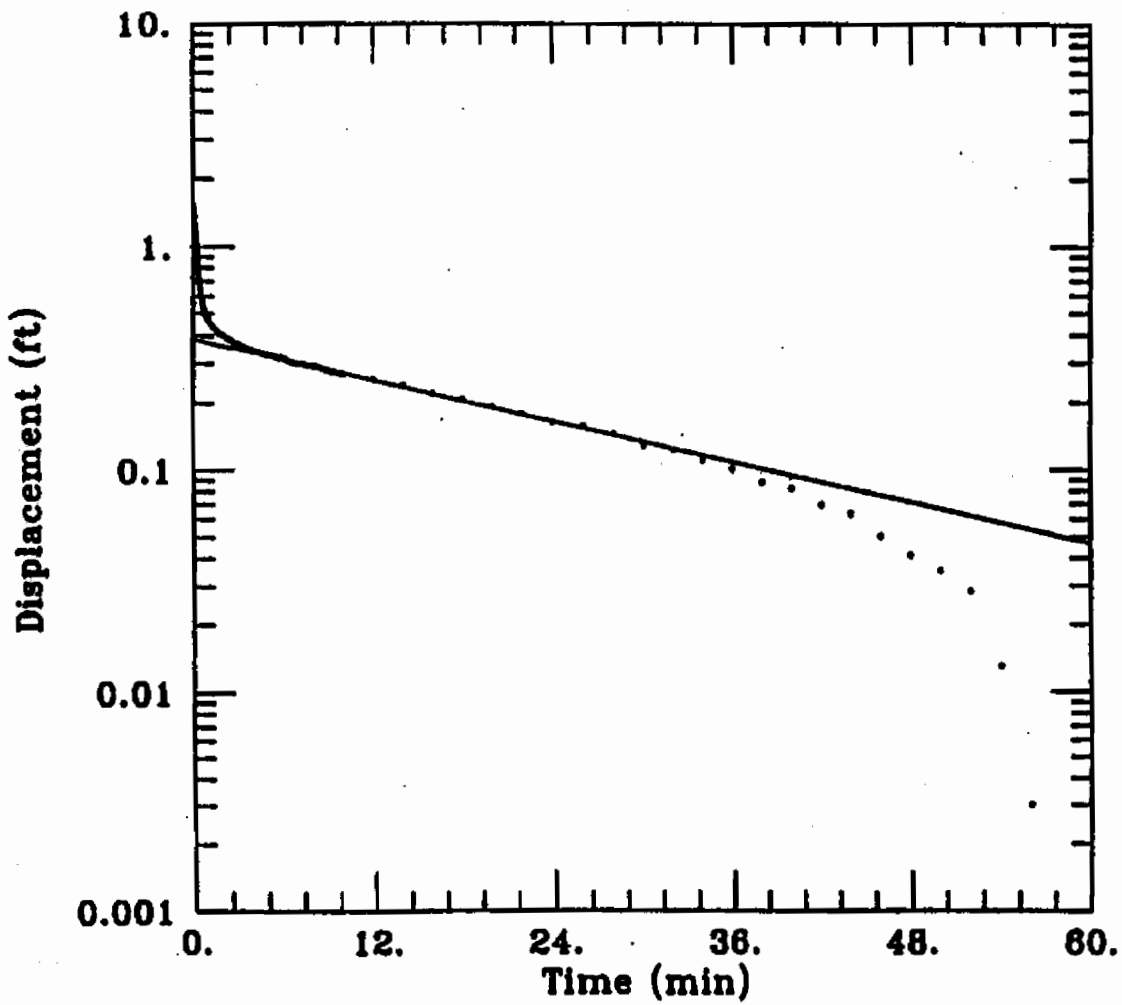
TEST DATA:
H0 = 1. ft
rc = 0.083 ft
rw = 0.3125 ft
L = 6. ft
b = 6. ft
H = 6. ft

PARAMETER ESTIMATES:
K = 0.0002619 ft/min
y0 = 0.391 ft

AQTESOL

Client: CLEAN	Company: E/A&H
Location: NAVAL BASE CHARLESTON	Project: 2906-08450

RISING HEAD SLUG TEST NBCF613004



DATA SET:
61304RIS.AGT
04/15/97

AQUIFER MODEL:
Unconfined

SOLUTION METHOD:
Bouwer-Rice

PROJECT DATA:
test date: January 1997

TEST DATA:
H0 = 1. ft
rc = 0.083 ft
rw = 0.3125 ft
L = 6. ft
b = 6. ft
H = 6. ft

PARAMETER ESTIMATES:
K = 0.0001895 ft/min
y0 = 0.384 ft

AQTESOl

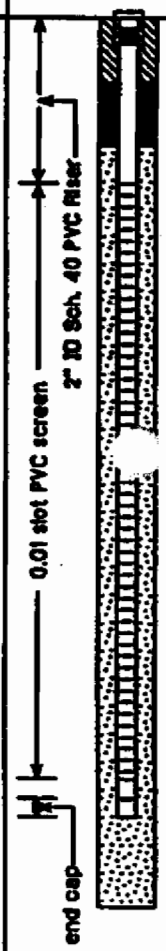
EnSafe/Allen & Hoshall

Monitoring Well NBCF620002

Project: ZONE F - Naval Base Charleston	Coordinates: 2320270.09 E, 373259.77 N
Location: Charleston, SC	Surface Elevation: 9.8 feet msl
Started at: 14:30 on 09-03-96	TOC Elevation: 9.58 feet msl
Completed at: 18:15 on 09-03-96	Depth to Groundwater: 5.80 feet TOC Measured: 12/18/96
Drilling Method: 4.25" ID (7.5" OD) HSA with split spoon sampler	Groundwater Elevation: 3.98 feet msl
Drilling Company: Alliance Environmental (SC cert. #669)	Total Well Depth: 12.6 feet bgs
Geologist: D. Doyle	Well Screen: 2.8 to 12.0 feet bgs

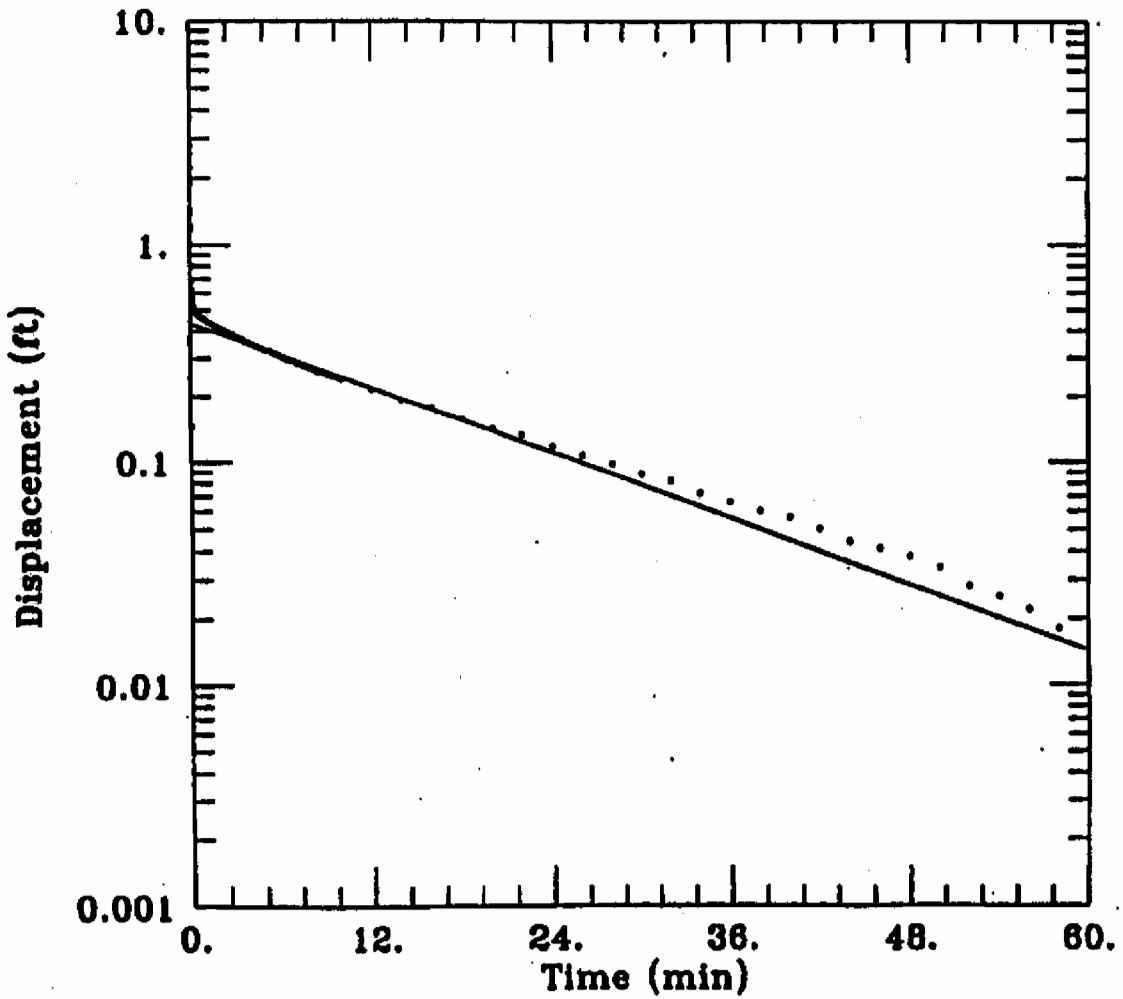
DEPTH IN FEET	LITHOLOGIC SAMPLE	ANALYTICAL SAMPLE	SAMPLE NO.	% RECOVERY	PID (ppm)	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION	ELEV. (ft-msl)
								Surface conditions: Asphalt.	
5							CL	Clay: gray w/ red-brown; fine to medium sand; stiff; moist.	4.8
			1	100	2		CL SC	Sand and clay: gray w/ some red-brown; fine to medium; stiff; moist.	3 / 2.8
			2	100				Shelby Tube (7-9' bgs): bottom: Sand: gray; fine to coarse; dense; saturated.	
10							SW	Sand: gray; fine to coarse; dense; saturated.	-2
			3	100	0				-2.2
15									
20									

WELL DIAGRAM



Client: **CLEAN**	Company: **E/A&H**
Location: **NAVAL BASE CHARLESTON**	Project: **2906-08450**

FALLING HEAD SLUG TEST NBCF620002



DATA SET:
62002FAL.AQT
04/16/97

AQUIFER MODEL:
Unconfined

SOLUTION METHOD:
Bouwer-Rice

PROJECT DATA:
test date: January 1997

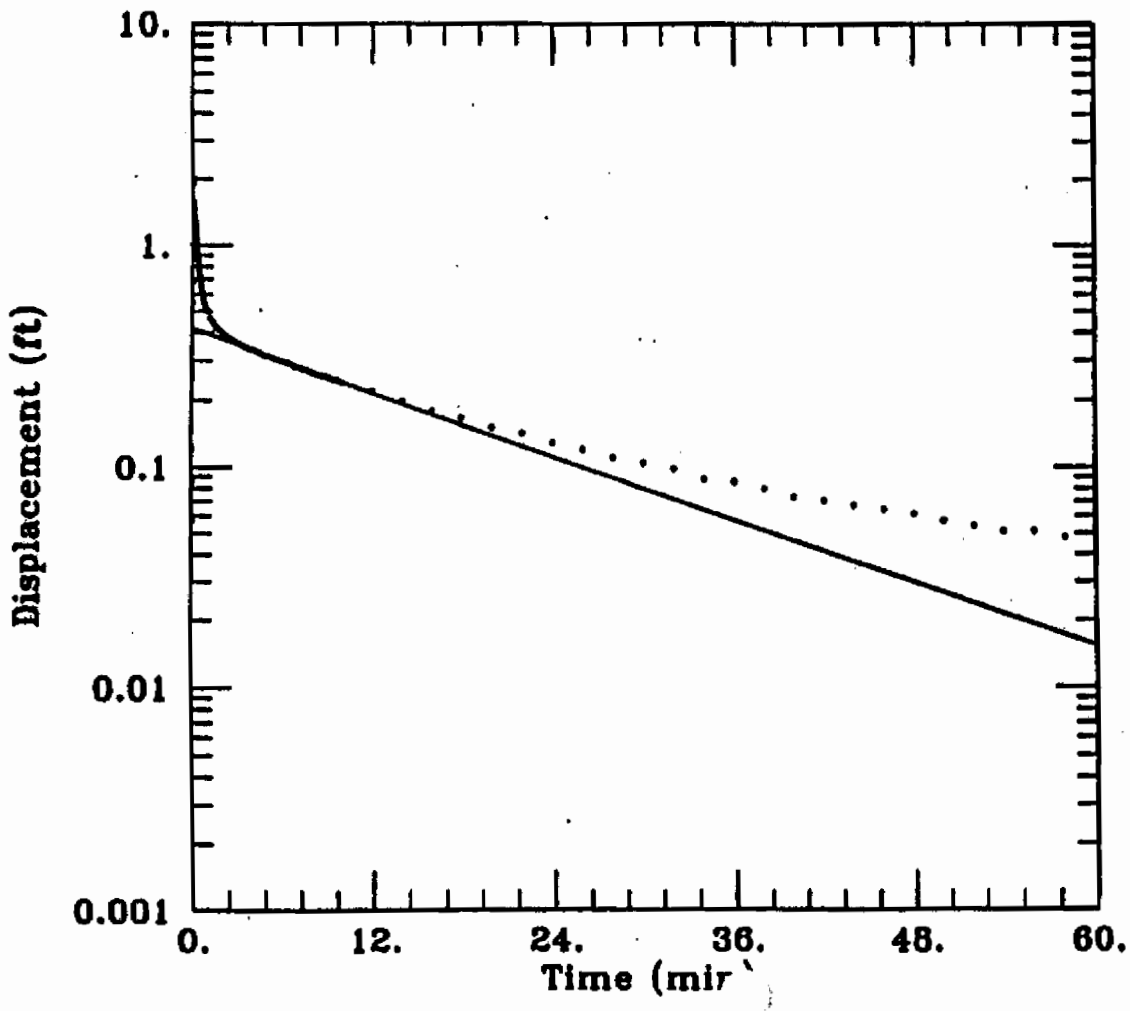
TEST DATA:
H0 = 1. ft
rc = 0.083 ft
rw = 0.3125 ft
L = 6.5 ft
b = 6.5 ft
H = 6.5 ft

PARAMETER ESTIMATES:
K = 0.0002918 ft/min
y0 = 0.4329 ft

AQTESOL

Client: CLEAN	Company: E/A&H
Location: NAVAL BASE CHARLESTON	Project: 2906-08450

RISING HEAD SLUG TEST NBCF620002



DATA SET:
62002RIS.AGT
04/16/97

AQUIFER MODEL:
Unconfined

SOLUTION METHOD:
Bouwer-Rice

PROJECT DATA:
test date: January 1997

TEST DATA:
H0 = 1. ft
rc = 0.083 ft
rw = 0.3125 ft
L = 6.5 ft
b = 6.5 ft
H = 6.5 ft

PARAMETER ESTIMATES:
K = 0.000283 ft/min
y0 = 0.419 ft

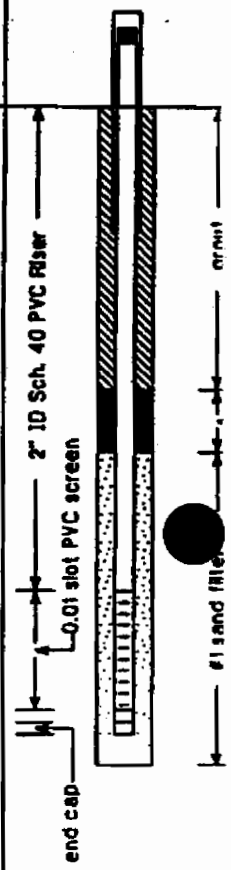
AQTESOl

EnSafe/Allen & Hoshall

Monitoring Well NBCF607001

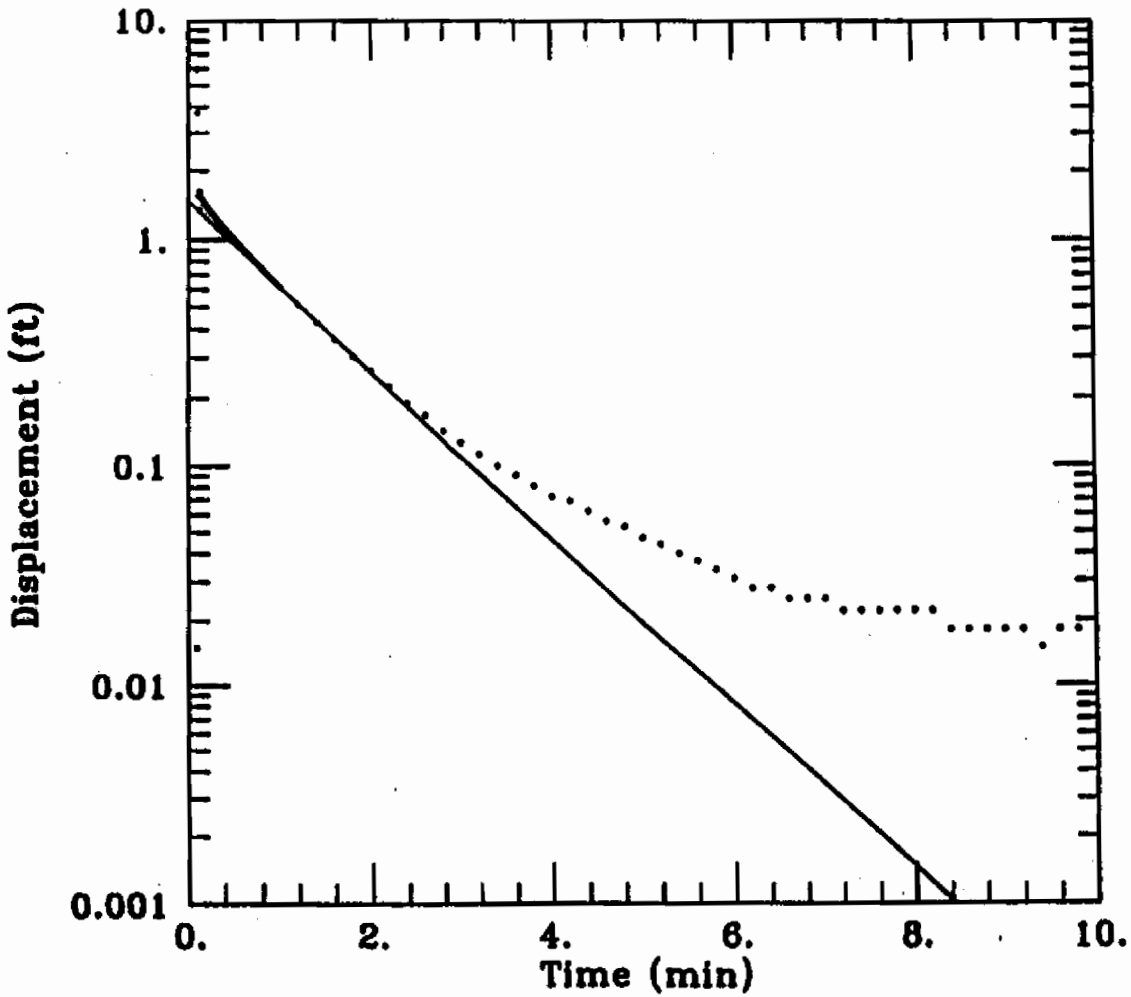
Project: ZONE F – Naval Base Charleston	Coordinates: 2317609.05 E, 374168.33 N
Location: Charleston, SC	Surface Elevation: 8.5 feet msl
Started at: 14:05 on 11-02-98	TOC Elevation: 10.78 feet msl
Completed at: 14:30 on 11-02-98	Depth to Groundwater: 8.67 feet TOC Measured: 12/18/98
Drilling Method: 4.25" ID (7.5" OD) HSA with split spoon sampler	Groundwater Elevation: 2.11 feet msl
Drilling Company: Alliance Environmental (SC cert. #8889)	Total Well Depth: 10.0 feet bgs
Geologist: B. Blythe	Well Screen: 7.7 to 9.8 feet bgs

DEPTH IN FEET	LITHOLOGIC SAMPLE	ANALYTICAL SAMPLE	SAMPLE NO.	% RECOVERY	PID (ppm)	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION	ELEV. (ft-msl)	WELL DIAGRAM
								Surface: Asphalt.		
								Note: No splitspoon samples were taken at this location due to detailed lithologic sampling in NBCF607010 located approximately 25 ft east-northeast. Please refer to log of NBCF607010 for specific lithologic details.		
5										
10										
15										
20										



Client: CLEAN	Company: E/A&H
Location: NAVAL BASE CHARLESTON	Project: 2906-08450

FALLING HEAD SLUG TEST NBCF607001



DATA SET:
60701FAL.AQT
04/11/97

AQUIFER MODEL:
Unconfined

SOLUTION METHOD:
Bouwer-Rice

PROJECT DATA:
test date: January 1997

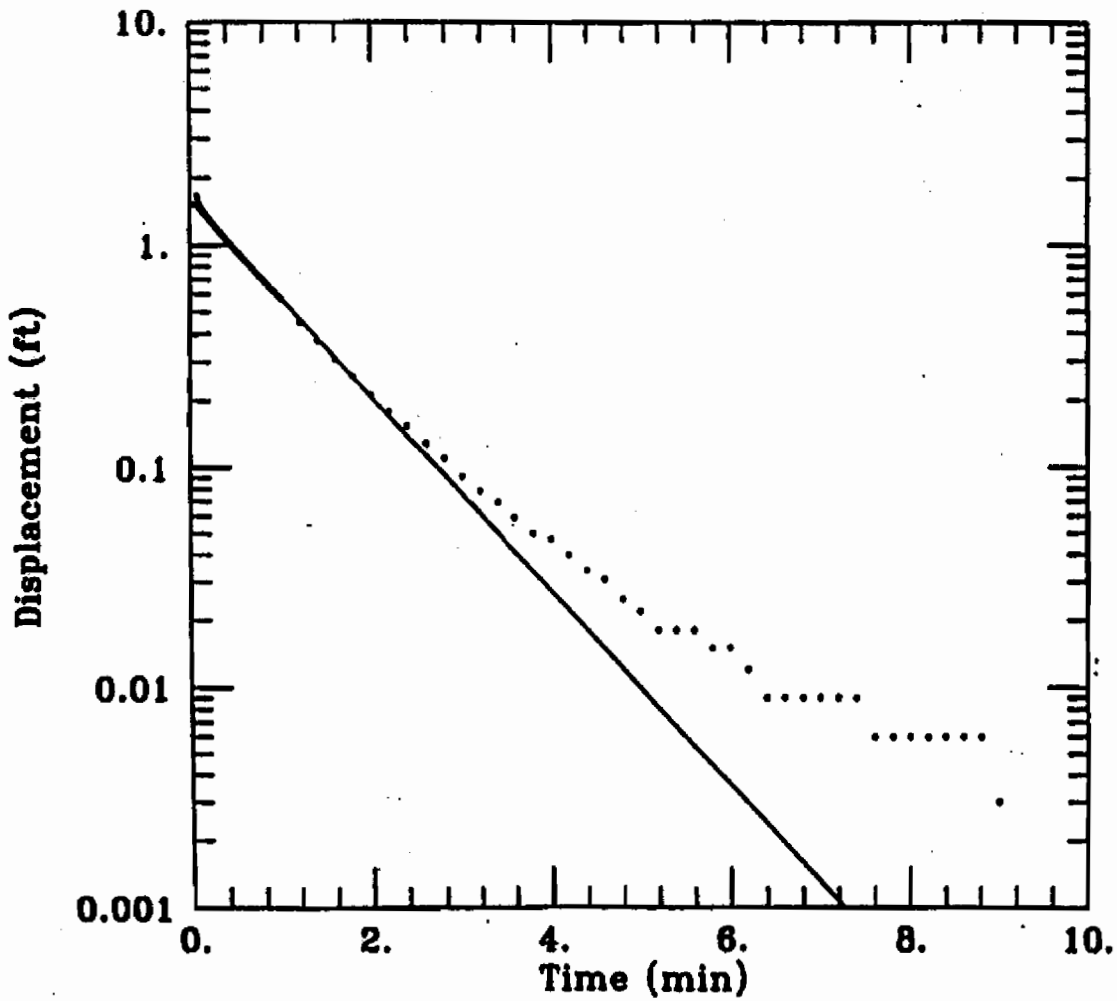
TEST DATA:
H0 = 1. ft
rc = 0.083 ft
rw = 0.3125 ft
L = 5. ft
b = 5. ft
H = 5. ft

PARAMETER ESTIMATES:
K = 0.001209 ft/min
y0 = 1.457 ft

AQTESOL

Client: CLEAN	Company: E/A&H
Location: NAVAL BASE CHARLESTON	Project: 2906-08450

RISING HEAD SLUG TEST NBCF607001



DATA SET:
B0701RIS.AQT
04/11/97

AQUIFER MODEL:
Unconfined

SOLUTION METHOD:
Bouwer-Rice

PROJECT DATA:
test date: January 1997

TEST DATA:
H0 = 1. ft
rc = 0.083 ft
rw = 0.3125 ft
L = 5. ft
b = 5. ft
H = 5. ft

PARAMETER ESTIMATES:
K = 0.001418 ft/min
y0 = 1.581 ft

AQTESO

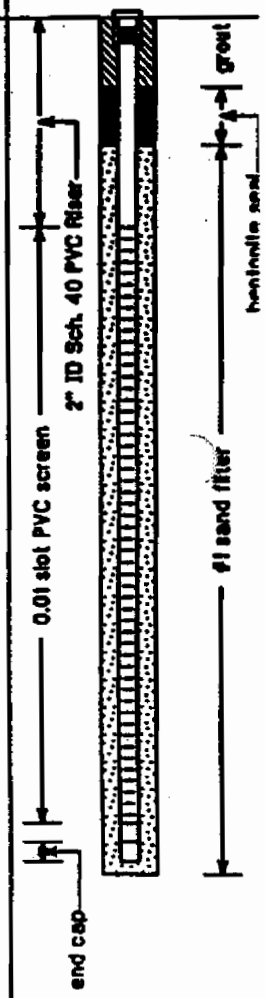
EnSafe/Allen & Hoshall

Monitoring Well NBCF613001

Project: ZONE F – Naval Base Charleston	Coordinates: 2318224.29 E, 374017.05 N
Location: Charleston, SC	Surface Elevation: 9.5 feet msl
Started at 14:00 on 10-21-98	TOC Elevation: 9.48 feet msl
Completed at 15:30 on 10-21-98	Depth to Groundwater: 8.90 feet TOC Measured: 12/18/98
Drilling Method: 4.25" ID (7.5" OD) HSA with split spoon sampler	Groundwater Elevation: 0.58 feet msl
Drilling Company: Alliance Environmental (SC cert. # 6669)	Total Well Depth: 13.3 feet bgs
Geologist: B. Blythe	Well Screen: 3.3 to 12.7 feet bgs

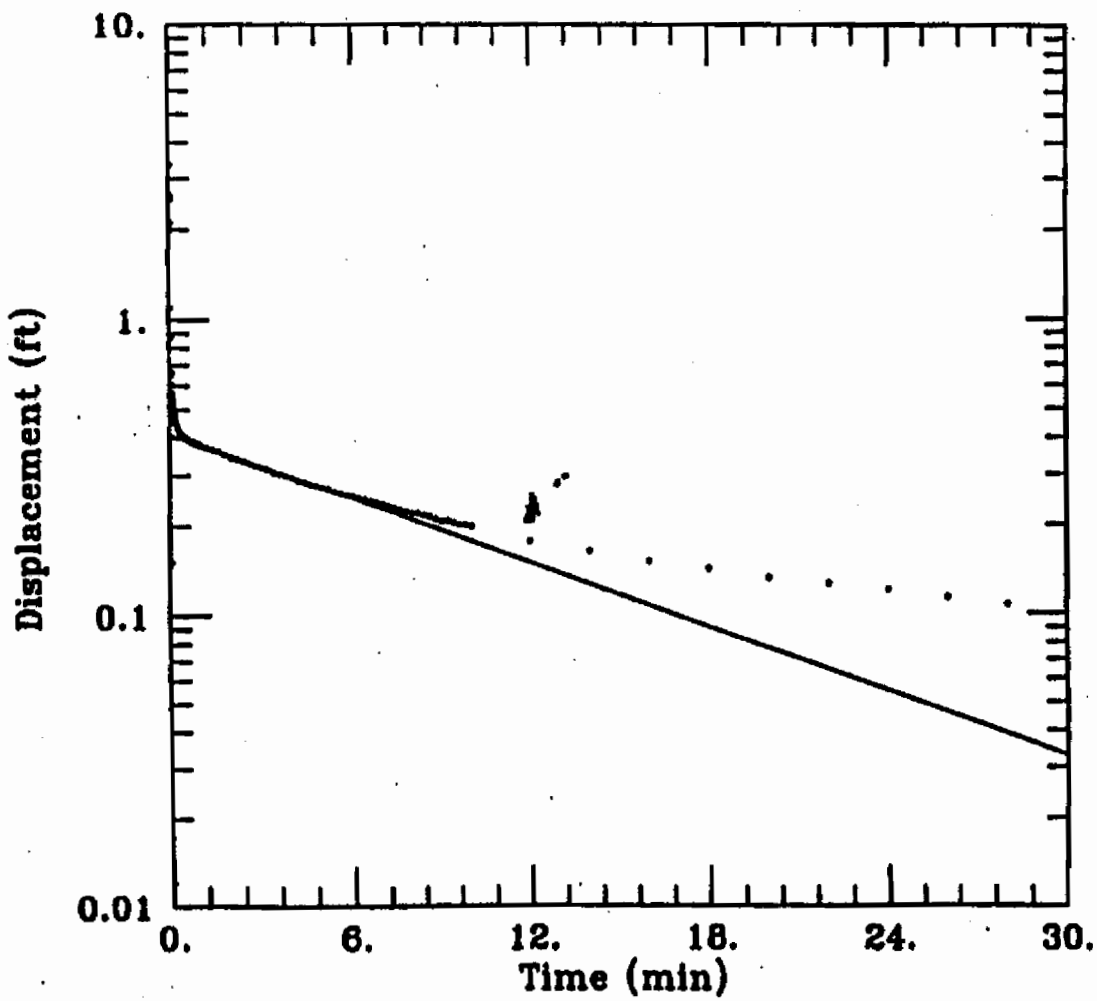
DEPTH IN FEET	LITHOLOGIC SAMPLE	ANALYTICAL SAMPLE	SAMPLE NO.	% RECOVERY	PID (ppm)	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION	ELEV. (ft-msl)
								Surface conditions: Asphalt	
								No recovery; evidence of sandy clay with mottled black organic sandy clay on augers.	
5			1	0				No recovery.	
			2	0			SM	Sand: red and grey; fine to medium; silty; dense; dry to moist.	2.5
							SM CL	Sand and clay; gray to green; fine to medium; dense; moist.	1.8 / 1.5
			3	50	0				
10							SC	Sand: gray to green; clayey; fine to medium; dense; moist; with saturated sand lenses at 11.2 – 11.4.	-5
			4	95	0				-2.4
15									
20									

WELL DIAGRAM



Client: CLEAN	Company: E/A&H
Location: NAVAL BASE CHARLESTON	Project: 2906-08450

FALLING HEAD SLUG TEST NBCF613001



DATA SET:
61301FAL.AQT
04/15/97

AQUIFER MODEL:
Unconfined

SOLUTION METHOD:
Bouwer-Rice

PROJECT DATA:
test date: January 1997

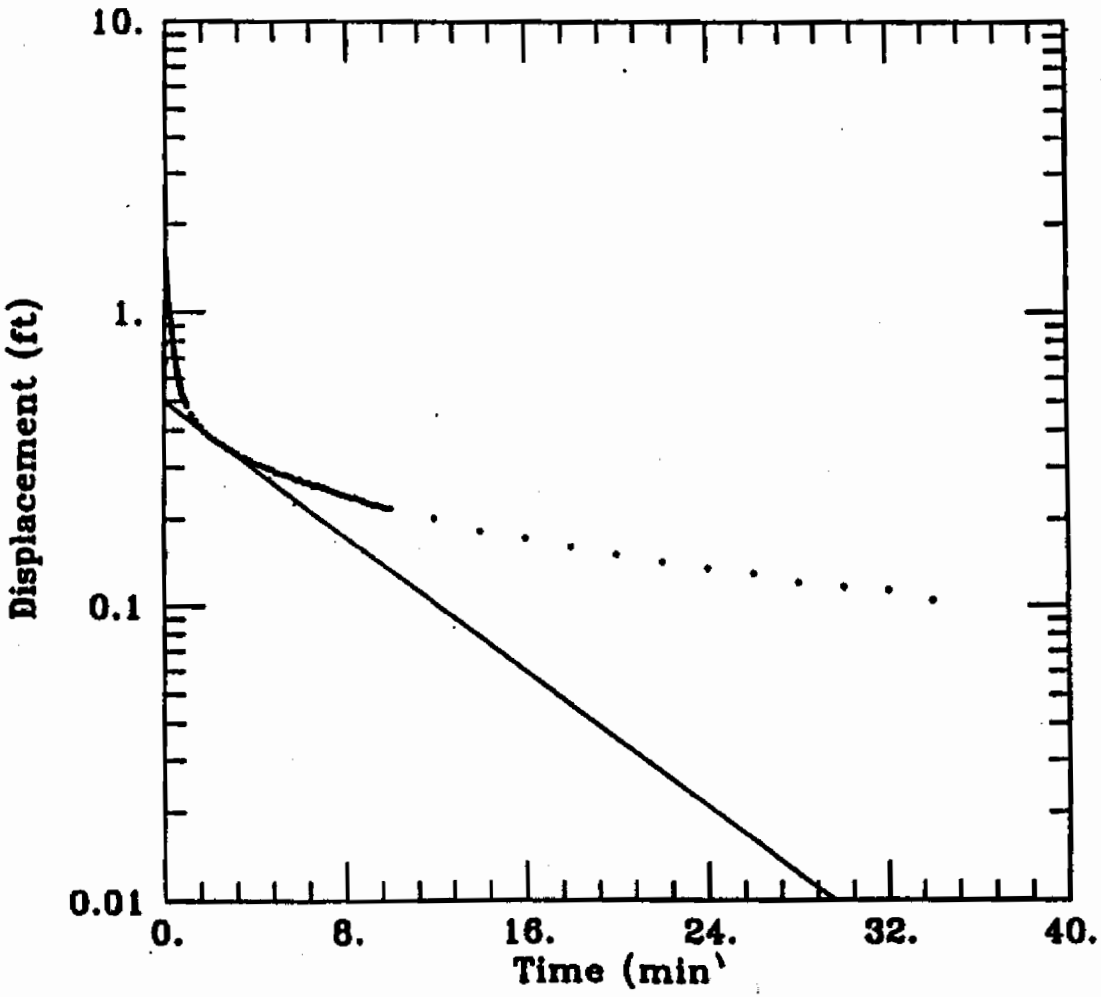
TEST DATA:
H0 = 1. ft
rc = 0.083 ft
rw = 0.3125 ft
L = 4. ft
b = 4. ft
H = 4. ft

PARAMETER ESTIMATES:
K = 0.0005749 ft/min
y0 = 0.4125 ft

AQTESOL

Client: CLEAN	Company: E/A&H
Location: NAVAL BASE CHARLESTON	Project: 2906-08450

RISING HEAD SLUG TEST NBCF613001



DATA SET:
61301RIS.AQT
04/15/97

AQUIFER MODEL:
Unconfined

SOLUTION METHOD:
Bouwer-Rice

PROJECT DATA:
test date: January 1997

TEST DATA:
H0 = 1. ft
rc = 0.083 ft
rw = 0.3125 ft
L = 4. ft
b = 4. ft
H = 4. ft

PARAMETER ESTIMATES:
K = 0.0009022 ft/min
y0 = 0.4989 ft

AQTESOL

APPENDIX D

RBCA CALCULATIONS

Minimum Construction Worker RBSLs

	Dermal RBSL mg/L	Incidental Ingestion RBSL mg/L	Inhalation RBSL mg/L	Minimum RBSL mg/L
Benzene	0.85	68.52	0.15	0.15
Toluene	23.98	5677.78	5.38	5.38
Ethylbenzene	6.05	2838.89	14.50	6.05
Xylene	102.33	56777.78	NA*	102.33
Naphthalene	1.63	1135.56	2.63	1.63
MTBE	25.92	141.94	293.44	25.92

*No inhalation reference dose is available for xylenes; therefore, no inhalation RBSL can be calculated.

Prepared By: _____ Reviewed By: _____

Construction Worker Dermal RBSLs

	Kow	MW	Kp	B	τ_{event}	c	b	t*	t_{event}	DAevent
			cm/hr	unitless	hr/event			hr	hr/event	
Benzene	199.5262315	78.1	0.11551543	0.392637855	2.87E-01	6.32E-01	6.03E-01	6.90E-01	1	eq 3.3
Toluene	537.0317964	92.1	0.259561335	0.958068292	3.44E-01	1.13E+00	1.31E+00	1.33E+00	1	eq 3.2
Ethylbenzene	1412.537545	106.2	0.569219802	2.256154884	4.13E-01	2.36E+00	4.39E+00	1.70E+00	1	eq 3.2
Xylene*	1584.893192	106.2	0.638675123	2.531447415	4.13E-01	2.63E+00	5.31E+00	1.72E+00	1	eq 3.2
Naphthalene	1995.262315	128.2	0.605452393	2.636638957	5.48E-01	2.73E+00	5.69E+00	2.29E+00	1	eq 3.2
MTBE	15.136	88.15	0.00769788	0.027797704	3.27E-01	3.52E-01	3.20E-01	7.85E-01	1	eq 3.3

	BW	AT	EV	ED	EF	SA	CSF derm	Rfd derm	Target	RBSL	RBSL
	kg	day	events/day	yrs	days/yr	cm^2	$(mg/kg\text{-}day)^{-1}$	mg/kg-day	Risk or HQ	mg/L	mg/L
Benzene	70	25550	1	1	90	4500	2.99E-02	NA	1.00E-06		8.52E-01
Toluene	70	365	1	1	90	4500	NA	1.60E-01	1.0	2.40E+01	
Ethylbenzene	70	365	1	1	90	4500	NA	9.70E-02	1.0	6.05E+00	
Xylene*	70	365	1	1	90	4500	NA	1.84E+00	1.0	1.02E+02	
Naphthalene	70	365	1	1	90	4500	NA	3.20E-02	1.0	1.63E+00	
MTBE	70	365	1	1	90	4500	NA	5.00E-03	1.0	2.59E+01	

* Kow and MW values for xylene, m-

Prepared By: Jeriasungavi

Reviewed By: Allan T. Jenkins

Construction Worker Incidental Ingestion RBSLs

	BW	AT	IR	ED	EF	Target	CSF oral	Rfd oral	RBSL
	kg	day	L/day	yrs	days/yr	Risk or HQ			mg/L
Benzene	70	25550	0.01	1	90	1.00E-06	2.90E-02		6.85E+01
Toluene	70	365	0.01	1	90	1.0	NA	2.00E-01	5677.778
Ethylbenzene	70	365	0.01	1	90	1.0	NA	1.00E-01	2838.889
Xylene	70	365	0.01	1	90	1.0	NA	2.00E+00	56777.78
Naphthalene	70	365	0.01	1	90	1.0	NA	4.00E-02	1135.556
MTBE	70	365	0.01	1	90	1.0	NA	5.00E-03	141.9444

Prepared By: Jerica Singavi

Reviewed By: Albert T. Jenkins

Construction Worker Inhalation RBSLs

Chemical			Dair	Dwater	H	θ_{acap}	θ_{wcap}	θ_{ac}	θ_{wc}	θ_T	Deff-cap	Deff-s
			cm^2/s	cm^2/s	cm^3/cm^3	cm^3/cm^3	cm^3/cm^3	cm^3/cm^3	cm^3/cm^3	cm^3/cm^3	cm^2/s	cm^2/s
Benzene			0.093	1.10E-05	2.26E-01	0.038	0.342	0.33	0.15	0.48	1.35E-05	1.01E-02
Toluene			0.085	9.40E-06	3.01E-01	0.038	0.342	0.33	0.15	0.48	1.07E-05	9.20E-03
Ethylbenzene			0.076	8.50E-06	2.80E-01	0.038	0.342	0.33	0.15	0.48	9.85E-06	8.22E-03
Xylenes			0.072	8.50E-06	2.78E-01	0.038	0.342	0.33	0.15	0.48	9.55E-06	7.79E-03
Naphthalene			0.072	9.40E-06	2.00E-03	0.038	0.342	0.33	0.15	0.48	5.79E-04	7.83E-03
MTBE			0.102	1.05E-05	4.16E-02	0.038	0.342	0.33	0.15	0.48	3.90E-05	1.10E-02

Chemical			hcap	hv	Deff-ws	Uair	δair	Lgw	W	VFwamb	TR (carc)	HI (nonc)
			cm	cm	cm^2/s	cm/sec	cm	cm	cm	$mg/m^3/mg/L$		
Benzene			5	117	3.18E-04	225	200	122	1500	1.97E-05	1.00E-06	NA
Toluene			5	117	2.54E-04	225	200	122	1500	2.09E-05	NA	1
Ethylbenzene			5	117	2.34E-04	225	200	122	1500	1.79E-05	NA	1
Xylenes			5	117	2.27E-04	225	200	122	1500	1.72E-05	NA	1
Naphthalene			5	117	5.17E-03	225	200	122	1500	2.63E-06	NA	1
MTBE			5	117	8.79E-04	225	200	122	1500	9.99E-06	NA	1

Chemical	TR (carc)	HI (nonc)	BWadult	AT	Sfi (carc)	RfD (nonc)	IR air	EF	ED	RBSLair	H	RBSLwater
			kg	yr	$[mg/kg\text{-}day]^{-1}$	[mg/kg-day]	m^3/day	day/yr	yr	mg/m^3	cm^3/cm^3	mg/L
Benzene	1.00E-06	NA	70	70	2.90E-02	NA	20	90	1	3.43E-02	2.26E-01	0.15
Toluene	NA	1	70	1	NA	1.14E-01	20	90	1	1.62E+00	3.01E-01	5.38
Ethylbenzene	NA	1	70	1	NA	2.86E-01	20	90	1	4.06E+00	2.80E-01	14.50
Xylenes	NA	1	70	1	NA	NA*	20	90	1	NA*	2.78E-01	NA*
Naphthalene	NA	1	70	1	NA	3.71E-04	20	90	1	5.27E-03	2.00E-03	2.63
MTBE	NA	1	70	1	NA	8.60E-01	20	90	1	1.22E+01	4.16E-02	293.443

*No inhalation reference dose is available for xylenes; therefore, no RBSL can be calculated for xylene.

Prepared By: _____

Reviewed By: _____

IN-SITU SOIL RISK EVALUATION

SOUTH CAROLINA
Department of Health and Environmental Control (DHEC)

Site Data

SITE ID #	01782	COUNTY	Columbia
FACILITY NAME	Site 25, Building 1346		
STREET ADDRESS	Charleston Naval Complex, North Charleston, SC		

Soil Risk Evaluation Data

					Figure
TPH		993	mg/kg		
Soil % SAND (Estimated)		88	%		
Soil % CLAY (Estimated)		7	%		
Worst Case	Benzene	120	mg/kg	Cs	
Soil Analyses	Toluene	360	mg/kg	Cs	
	Ethylbenzene	560	mg/kg	Cs	
	Xylenes	2200	mg/kg	Cs	
	Naphthalene	217.9	mg/kg	Cs	
	MTBE	4.3	mg/kg	Cs	
Natural Organic Carbon Content		616	mg/kg	foc	
Average Annual Recharge		25	cm	Hw	
Distance from highest Soil Impact to water table		46	cm	L	
Bulk Density of Soil		1.6	g/cc	Bd	1
Wetting Front Suction		10	cm	Hf	2
Soil Hydraulic Conductivity		5.60E-03	cm/sec	Kf	3
Porosity		0.45	decimal %	Φ	4
Residual Water Content		0.04	decimal %	Wr	5

List possible human exposure pathways from surface soil.
Soil leaching to groundwater - utility worker in utility trench.

IN-SITU SOIL RISK EVALUATION

11/18/1999

SOIL LEACHABILITY MODEL FOR MTBE

RISK-BASED CORRECTIVE ACTION FOR PETROLEUM RELEASES

SITE INFORMATION:

Site:	Site 25, Building 1346
Location:	Charleston Naval Complex, North Charleston, SC

REFERENCES:

(1) SCDHEC, RBCA For Petroleum Releases, June 1995, Appendix B, Figure 1.
(2) SCDHEC, RBCA For Petroleum Releases, June 1995, Appendix B, Table 2.
(3) SCDHEC, RBCA For Petroleum Releases, June 1995, Appendix B, Input Parameters.
(4) SCDHEC, RBCA For Petroleum Releases, June 1995, Appendix B, Table 1.
(5) SCDHEC, RBCA For Petroleum Releases, June 1995, Appendix B, Figure 2.
(6) SCDHEC, RBCA For Petroleum Releases, June 1995, Appendix B, Figure 3.
(7) SCDHEC, RBCA For Petroleum Releases, June 1995, Appendix B, Figure 4.
(8) SCDHEC, RBCA For Petroleum Releases, June 1995, Appendix B, Figure 5.

INPUT:

			MTBE
Bd	Soil Bulk Density (1)	g/cm3	1.6
Crsbl	Risk Based Screening Level	mg/L	25.92
Cs	Concentration of COC in soil	mg/kg	217.9
DAF	Dilution/Attenuation Factor (2)	unitless	8
foc	Organic Carbon Content in Soil (3)	mg/kg	616
H'	Henry's Law Constant (4)	unitless	0.04
Hf	Wetting front suction head (always negative) (5)	cm	-10
Hw	Average Annual Recharge (3)	cm	25
Kf	Soil Hydraulic Conductivity (6)	cm/s	0.0056
Koc	Soil/Water Partioning Coefficient (2)	ml/g	12
L	Depth between soil sample with greatest COC concentration to groundwater.	cm	46
ø	Porosity (7)	unitless	0.45
t1/2	Biodegradation "half life" (2)	days	183
TPH	Total Petroleum Hydrocarbons, EPA Method 3550	mg/kg	993
Wr	Residual Water Content (8)	volume fraction	0.04

CALCULATIONS:

Equation Set I - Determine soil pore water concentration resulting from physical partioning (Cw).

Step 1 - Calculate the total organic carbon content (fcs) of the soil.

fcs = (foc + TPH/1.724)*1E-6 = 0.0012 decimal %

Step 2 - Calculate the concentration of COC in soil pore water (Cw) directly in contact with the contaminate soil.

Cw = Cs*((Wr *1g/cc + Bd)/((Bd*Koc*fcs) + Wr + ((ø-Wr)*H'))) = 176.55 mg/l

Equation Set II - Determine the velocity of the soil pore water (Vw)

Step 1 - Calculate the air filled porosity (f) in decimal percent.

f = ø - Wr = 0.41 decimal %

Step 2 - Determine the time for water to percolate through the vadose zone soil (from depth of worst case soil sample to the water table at site).

t = (f/Kf)*(L-(Hw-Hf))*(ln(Hw + ((L-Hf)/(Hw-Hf)))) = 1,218 seconds

Step 3 - Determine the velocity of the water (Vw) in feet per year.

Vw = (L/30.48cm/ft)/(t/31,500,000sec/year) = 39042 ft/year

Equation Set III - Determine the organic retardation effect (Vc) of the contaminant.

Step 1 - Calculate the soil/water distribution coefficient (Kd) (ml/g) for uncontaminated soil.

Kd = Koc*foc*1E-6 = 0.007084 ml/g

Step 2 - Calculate the retardation effect of natural soil organic matter on COC migration.

Vc = Vw*(1 + ((Bd*Kd)/ø)) = 38,082 ft/year

Equation Set IV - Determine biodegradation rates and provide final COC concentration (Cf) at depth of concern.

Step 1 - Calculate the time (Tc) in days required for the COC to reach groundwater.

Tc = 365 day/yr*((L/30.48cm/ft)/Vc) = 0.01 days

Step 2 - Calculate estimated concentration of COC in the soil pore water (Cp) necessary to protect groundwater.

Cp = 10^(log (Crsbl) + ((Tc/2.3)*(0.693/t1/2))) = 25.92 mg/l

COC concentration in soil pore water (Cp) is greater than Crsbl, therefore the SSTL must be calculated.

Equation Set V - Calculate the Site Specific Target Level (SSTL) for the COC in soil.

Csstl for MTBE in soil = Cp*DAF*(((Bd*Koc*fcs) + Wr + (F*'H''))/(Wr*1g/cc + Bd)) = 9.987784 mg/kg

PREPARED BY:_____

Date

CHECKED BY:_____

Date

IN-SITU SOIL RISK EVALUATION

SOUTH CAROLINA
Department of Health and Environmental Control (DHEC)

Site Data

SITE ID # 01782
FACILITY NAME Site 25, Building 1346

Instructions

Provide results, separately, for each constituent in the worst case soil analysis.

Data

List Constituent: MTBE
(BTEX, Napth.)

				Table
Bioremediation "half-life"	183	days	t 1/2	C2
Soil/water partitioning coefficient	12	ml/g	K oc	C2

Results

				Equation Set	Step
Total Organic Carbon Content	0.0012	decimal %	f cs	I	1
Leachate Concentration	176.552	mg/l	C w	I	2
Air Filled Porosity	0.41	decimal %	f	II	1
Infiltration Rate Time	1,218	seconds	t	II	2
Velocity of Water	39,042	ft/year	V w	II	3
Soil/Water Distribution Coefficient	0.01	ml/g	K d	III	1
Contaminant Percolation Rate	38,082	ft/year	V c	III	2
Time to Reach Groundwater	0	days	T c	IV	1
Concentration reaching Groundwater	25.92	mg/l	C p	IV	2
Site Specific Target Level	9.9878	mg/kg	C sstl	V	

Conclusions

Does concentration of chemical of concern in soil exceed SSTL? YES

Risk of Human Exposure due to contaminated soil.

X YES _____ NO

IN-SITU SOIL RISK EVALUATION

SOIL LEACHABILITY MODEL FOR BENZENE

RISK-BASED CORRECTIVE ACTION FOR PETROLEUM RELEASES

SITE INFORMATION:

Site:	Site 25, Building 1346
Location:	Charleston Naval Complex, North Charleston, SC

REFERENCES:

(1) SCDHEC, RBCA For Petroleum Releases, June 1995, Appendix B, Figure 1.
(2) SCDHEC, RBCA For Petroleum Releases, June 1995, Appendix B, Table 2.
(3) SCDHEC, RBCA For Petroleum Releases, June 1995, Appendix B, Input Parameters.
(4) SCDHEC, RBCA For Petroleum Releases, June 1995, Appendix B, Table 1.
(5) SCDHEC, RBCA For Petroleum Releases, June 1995, Appendix B, Figure 2.
(6) SCDHEC, RBCA For Petroleum Releases, June 1995, Appendix B, Figure 3.
(7) SCDHEC, RBCA For Petroleum Releases, June 1995, Appendix B, Figure 4.
(8) SCDHEC, RBCA For Petroleum Releases, June 1995, Appendix B, Figure 5.

INPUT:

			BENZENE
COC	Chemical of Concern		
Bd	Soil Bulk Density (1)	g/cm3	1.6
Crsbl	Risk Based Screening Level	mg/L	0.15
Cs	Concentration of COC in soil	mg/kg	120
DAF	Dilution/Attenuation Factor (2)	unitless	8
foc	Organic Carbon Content in Soil (3)	mg/kg	616
H'	Henry's Law Constant (4)	unitless	0.23
Hf	Wetting front suction head (always negative) (5)	cm	-10
Hw	Average Annual Recharge (3)	cm	25.00
Kf	Soil Hydraulic Conductivity (6)	cm/s	5.60E-03
Koc	Soil/Water Partioning Coefficient (2)	ml/g	81
L	Depth between soil sample with greatest COC concentration to groundwater.	cm	46
Φ	Porosity (7)	unitless	0.45
t1/2	Biodegradation "half life" (2)	days	16
TPH	Total Petroleum Hydrocarbons, EPA Method 3550	mg/kg	993
Wr	Residual Water Content (8)	volume fraction	0.04

CALCULATIONS:

Equation Set I - Determine soil pore water concentration resulting from physical partioning (Cw).

Step 1 - Calculate the total organic carbon content (fcs) of the soil.

fcs = (foc + TPH/1.724)*1E-6 = 0.0012 decimal %

Step 2 - Calculate the concentration of COC in soil pore water (Cw) directly in contact with the contaminate soil.

Cw = Cs*((Wr *1g/cc+Bd)/((Bd*Koc*fcs)+Wr+((ø-Wr)*H'))) = 685.3766 mg/l

Equation Set II - Determine the velocity of the soil pore water (Vw)

Step 1 - Calculate the air filled porosity (f) in decimal percent.

f = ø - Wr = 0.41 decimal %

Step 2 - Determine the time for water to percolate through the vadose zone soil (from depth of worst case soil sample to the water table at site).

t = (f/Kf)*(L-((Hw-Hf)*(ln((Hw+L-Hf)/(Hw-Hf))))) = 1,218 seconds

Step 3 - Determine the velocity of the water (Vw) in feet per year.

Vw = (L/30.48cm/ft)/(t/31,500,000sec/year) = 39,042 ft/year

Equation Set III - Determine the organic retardation effect (Vc) of the contaminant.

Step 1 - Calculate the soil/water distribution coefficient (Kd) (ml/g) for uncontaminated soil.

Kd = Koc*foc*1E-6 = 0.049896 ml/g

Step 2 - Calculate the retardation effect of natural soil organic matter on COC migration.

Vc = Vw/(1+((Bd*Kd)/ø)) = 33,159 ft/year

Equation Set IV - Determine biodegradation rates and provide final COC concentration (Cf) at depth of concern.

Step 1 - Calculate the time (Tc) in days required for the COC to reach groundwater.

Tc = 365 day/yr*((L/30.48cm/ft)/Vc) = 0.02 days

Step 2 - Calculate estimated concentration of COC in the soil pore water (Cp) necessary to protect groundwater.

Cp = 10^(log (Crsbl)+((Tc/2.3)*(0.693/t1/2))) = 0.1501 mg/l

COC concentration in soil pore water (Cw) is less than concentration necessary to protect groundwater (Cp). Not necessary to calculate SSTL

Equation Set V - Calculate the Site Specific Target Level (SSTL) for the COC in soil.

Csstl for BENZENE in soil = Cp*DAF*((Bd*Koc*fcs)+Wr+(F*'H'''))/(Wr*1g/cc+Bd)) = 0.210255 mg/kg

PREPARED BY:_____

Date

CHECKED BY:_____

Date

IN-SITU SOIL RISK EVALUATION

SOUTH CAROLINA
Department of Health and Environmental Control (DHEC)

Site Data

SITE ID # 01782
FACILITY NAME Site 25, Building 1346

Instructions

Provide results, separately, for each constituent in the worst case soil analysis.

Data

List Constituent: BENZENE
(BTEX, Napth.)

				Table
Bioremediation "half-life"	16	days	t 1/2	C2
Soil/water partitioning coefficient	81	ml/g	K oc	C2

Results

				Equation Set	Step
Total Organic Carbon Content	0.0012	decimal %	f cs	I	1
Leachate Concentration	685.377	mg/l	C w	I	2
Air Filled Porosity	0.41	decimal %	f	II	1
Infiltration Rate Time	1,218	seconds	t	II	2
Velocity of Water	39,042	ft/year	V w	II	3
Soil/Water Distribution Coefficient	0.0499	ml/g	K d	III	1
Contaminant Percolation Rate	33,159	ft/year	V c	III	2
Time to Reach Groundwater	0.02	days	T c	IV	1
Concentration reaching Groundwater	0.1501	mg/l	C p	IV	2
Site Specific Target Level	0.2103	mg/kg	C sstl	V	

Conclusions

Does concentration of chemical of concern in soil exceed SSTL? YES

Risk of Human Exposure due to contaminated soil.

X YES _____ NO

IN-SITU SOIL RISK EVALUATION

SOIL LEACHABILITY MODEL FOR NAPHTHALENE

RISK-BASED CORRECTIVE ACTION FOR PETROLEUM RELEASES

SITE INFORMATION:

Site:	Site 25, Building 1346
Location:	Charleston Naval Complex, North Charleston, SC

REFERENCES:

(1) SCDHEC, RBCA For Petroleum Releases, June 1995, Appendix B, Figure 1.
(2) SCDHEC, RBCA For Petroleum Releases, June 1995, Appendix B, Table 2.
(3) SCDHEC, RBCA For Petroleum Releases, June 1995, Appendix B, Input Parameters.
(4) SCDHEC, RBCA For Petroleum Releases, June 1995, Appendix B, Table 1.
(5) SCDHEC, RBCA For Petroleum Releases, June 1995, Appendix B, Figure 2.
(6) SCDHEC, RBCA For Petroleum Releases, June 1995, Appendix B, Figure 3.
(7) SCDHEC, RBCA For Petroleum Releases, June 1995, Appendix B, Figure 4.
(8) SCDHEC, RBCA For Petroleum Releases, June 1995, Appendix B, Figure 5.

INPUT:

			NAPHTHALENE
COC	Chemical of Concern		
Bd	Soil Bulk Density (1)	g/cm3	1.6
Crsbl	Risk Based Screening Level	mg/L	1.63
Cs	Concentration of COC in soil	mg/kg	217.9
DAF	Dilution/Attenuation Factor (2)	unitless	8
foc	Organic Carbon Content in Soil (3)	mg/kg	616
H'	Henry's Law Constant (4)	unitless	0.002
Hf	Wetting front suction head (always negative) (5)	cm	-10
Hw	Average Annual Recharge (3)	cm	25
Kf	Soil Hydraulic Conductivity (6)	cm/s	0.0056
Koc	Soil/Water Partioning Coefficient (2)	ml/g	1543
L	Depth between soil sample with greatest COC concentration to groundwater.	cm	46
ø	Porosity (7)	unitless	0.45
t1/2	Biodegradation "half life" (2)	days	48
TPH	Total Petroleum Hydrocarbons, EPA Method 3550	mg/kg	993
Wr	Residual Water Content (8)	volume fraction	0.04

CALCULATIONS:

Equation Set I - Determine soil pore water concentration resulting from physical partioning (Cw).

Step 1 - Calculate the total organic carbon content (fcs) of the soil.

fcs = (foc + TPH/1.724)*1E-6 = 0.0012 decimal %

Step 2 - Calculate the concentration of COC in soil pore water (Cw) directly in contact with the contaminate soil.

Cw = Cs*((Wr *1g/cc + Bd)/((Bd*Koc*fcs) + Wr + ((e-Wr)*H'))) = 4.67 mg/l

Equation Set II - Determine the velocity of the soil pore water (Vw)

Step 1 - Calculate the air filled porosity (f) in decimal percent.

f = Ø - Wr = 0.41 decimal %

Step 2 - Determine the time for water to percolate through the vadose zone soil (from depth of worst case soil sample to the water table at site).

t = (f/Kf)*(L-(Hw-Hf))*(ln(Hw + ((L-Hf)/(Hw-Hf)))) = 1,218 seconds

Step 3 - Determine the velocity of the water (Vw) in feet per year.

Vw = (L/30.48cm/ft)/(t/31,500,000sec/year) = 39042 ft/year

Equation Set III - Determine the organic retardation effect (Vc) of the contaminant.

Step 1 - Calculate the soil/water distribution coefficient (Kd) (ml/g) for uncontaminated soil.

Kd = Koc*foc*1E-6 = 0.950488 ml/g

Step 2 - Calculate the retardation effect of natural soil organic matter on COC migration.

Vc = Vw*(1 + ((Bd*Kd)/e)) = 8,915 ft/year

Equation Set IV - Determine biodegradation rates and provide final COC concentration (Cf) at depth of concern.

Step 1 - Calculate the time (Tc) in days required for the COC to reach groundwater.

Tc = 365 day/yr*((L/30.48cm/ft)/Vc) = 0.06 days

Step 2 - Calculate estimated concentration of COC in the soil pore water (Cp) necessary to protect groundwater.

Cp = 10^(log (Crsbl)+((Tc/2.3)*(0.693/t1/2))) = 1.63 mg/l

COC concentration in soil pore water (Cp) is greater than Crsbl, therefore the SSTL must be calculated.

Equation Set V - Calculate the Site Specific Target Level (SSTL) for the COC in soil.

Csstl for NAPHTHALENE in soil = Cp*DAF*(((Bd*Koc*fcs)+Wr+(F*'H'''))/(Wr*1g/cc+Bd)) = 23.744418 mg/kg

PREPARED BY:_____

Date

CHECKED BY:_____

Date

IN-SITU SOIL RISK EVALUATION

SOUTH CAROLINA
Department of Health and Environmental Control (DHEC)

Site Data

SITE ID # 01782
FACILITY NAME Site 25, Building 1346

Instructions

Provide results, separately, for each constituent in the worst case soil analysis.

Data

List Constituent: NAPHTHALENE
(BTEX, Napth.)

				Table
Bioremediation "half-life"	48	days	t 1/2	C2
Soil/water partitioning coefficient	1543	ml/g	K oc	C2

Results

				Equation Set	Step
Total Organic Carbon Content	0.0012	decimal %	f cs	I	1
Leachate Concentration	4.674	mg/l	C w	I	2
Air Filled Porosity	0.41	decimal %	f	II	1
Infiltration Rate Time	1,218	seconds	t	II	2
Velocity of Water	39,042	ft/year	V w	II	3
Soil/Water Distribution Coefficient	0.95	ml/g	K d	III	1
Contaminant Percolation Rate	8,915	ft/year	V c	III	2
Time to Reach Groundwater	0	days	T c	IV	1
Concentration reaching Groundwater	1.63	mg/l	C p	IV	2
Site Specific Target Level	24	mg/kg	C sstl	V	

Conclusions

Does concentration of chemical of concern in soil exceed SSTL? YES

Risk of Human Exposure due to contaminated soil.

X YES _____ NO

IN-SITU SOIL RISK EVALUATION

SOIL LEACHABILITY MODEL FOR TOLUENE

RISK-BASED CORRECTIVE ACTION FOR PETROLEUM RELEASES

SITE INFORMATION:

Site:	Site 25, Building 1346
Location:	Charleston Naval Complex, North Charleston, SC

REFERENCES:

(1) SCDHEC, RBCA For Petroleum Releases, June 1995, Appendix B, Figure 1.
(2) SCDHEC, RBCA For Petroleum Releases, June 1995, Appendix B, Table 2.
(3) SCDHEC, RBCA For Petroleum Releases, June 1995, Appendix B, Input Parameters.
(4) SCDHEC, RBCA For Petroleum Releases, June 1995, Appendix B, Table 1.
(5) SCDHEC, RBCA For Petroleum Releases, June 1995, Appendix B, Figure 2.
(6) SCDHEC, RBCA For Petroleum Releases, June 1995, Appendix B, Figure 3.
(7) SCDHEC, RBCA For Petroleum Releases, June 1995, Appendix B, Figure 4.
(8) SCDHEC, RBCA For Petroleum Releases, June 1995, Appendix B, Figure 5.

INPUT:

			TOLUENE
COC	Chemical of Concern		
Bd	Soil Bulk Density (1)	g/cm3	1.6
Crsbl	Risk Based Screening Level	mg/L	5.38
Cs	Concentration of COC in soil	mg/kg	360
DAF	Dilution/Attenuation Factor (2)	unitless	8
foc	Organic Carbon Content in Soil (3)	mg/kg	616
H'	Henry's Law Constant (4)	unitless	0.30
Hf	Wetting front suction head (always negative) (5)	cm	-10
Hw	Average Annual Recharge (3)	cm	25
Kf	Soil Hydraulic Conductivity (6)	cm/s	0.0056
Koc	Soil/Water Partioning Coefficient (2)	ml/g	133
L	Depth between soil sample with greatest COC concentration to groundwater.	cm	46
ø	Porosity (7)	unitless	0.45
t1/2	Biodegradation "half life" (2)	days	22
TPH	Total Petroleum Hydrocarbons, EPA Method 3550	mg/kg	993
Wr	Residual Water Content (8)	volume fraction	0.04

CALCULATIONS:

Equation Set I - Determine soil pore water concentration resulting from physical partioning (Cw).

Step 1 - Calculate the total organic carbon content (fcs) of the soil.

fcs = (foc + TPH/1.724)*1E-6 = 0.0012 decimal %

Step 2 - Calculate the concentration of COC in soil pore water (Cw) directly in contact with the contaminate soil.

Cw = Cs*((Wr *1g/cc + Bd)/((Bd*Koc*fcs) + Wr + ((e-Wr)*H'))) = 55 mg/l

Equation Set II - Determine the velocity of the soil pore water (Vw)

Step 1 - Calculate the air filled porosity (f) in decimal percent.

f = Ø - Wr = 0.41 decimal %

Step 2 - Determine the time for water to percolate through the vadose zone soil (from depth of worst case soil sample to the water table at site).

t = (f/Kf)*(L-(Hw-Hf))*(ln(Hw + ((L-Hf)/(Hw-Hf)))) = 1,218 seconds

Step 3 - Determine the velocity of the water (Vw) in feet per year.

Vw = (L/30.48cm/ft)/(t/31,500,000sec/year) = 39,042 ft/year

Equation Set III - Determine the organic retardation effect (Vc) of the contaminant.

Step 1 - Calculate the soil/water distribution coefficient (Kd) (ml/g) for uncontaminated soil.

Kd = Koc*foc*1E-6 = 0.081928 ml/g

Step 2 - Calculate the retardation effect of natural soil organic matter on COC migration.

Vc = Vw*(1 + ((Bd*Kd)/e)) = 30,234 ft/year

Equation Set IV - Determine biodegradation rates and provide final COC concentration (Cf) at depth of concern.

Step 1 - Calculate the time (Tc) in days required for the COC to reach groundwater.

Tc = 365 day/yr*((L/30.48cm/ft)/Vc) = 0.02 days

Step 2 - Calculate estimated concentration of COC in the soil pore water (Cp) necessary to protect groundwater.

Cp = 10^(log (Crsbl)+((Tc/2.3)*(0.693/t1/2))) = 5.3831 mg/l

COC concentration in soil pore water (Cp) is greater than Crsbl, therefore the SSTL must be calculated.

Equation Set V - Calculate the Site Specific Target Level (SSTL) for the COC in soil.

Csstl for TOLUENE in soil = Cp*DAF*(((Bd*Koc*fcs)+Wr+(F*'H''')/(Wr*1g/cc+Bd)) = 10.951686 mg/kg

PREPARED BY:_____

Date

CHECKED BY:_____

Date

IN-SITU SOIL RISK EVALUATION

SOUTH CAROLINA

Department of Health and Environmental Control (DHEC)

Site Data

SITE ID # 01782

FACILITY NAME Site 25, Building 1346

Instructions

Provide results, separately, for each constituent in the worst case soil analysis.

Data

List Constituent: TOLUENE

(BTEX, Napth.)

				Table
Bioremediation "half-life"	22	days	t 1/2	C2
Soil/water partitioning coefficient	133	ml/g	K oc	C2

Results

				Equation Set	Step
Total Organic Carbon Content	0.0012	decimal %	f cs	I	1
Leachate Concentration	55.243	mg/l	C w	I	2
Air Filled Porosity	0.41	decimal %	f	II	1
Infiltration Rate Time	1,218	seconds	t	II	2
Velocity of Water	39,042	ft/year	V w	II	3
Soil/Water Distribution Coefficient	0.0819	ml/g	K d	III	1
Contaminant Percolation Rate	30,234	ft/year	V c	III	2
Time to Reach Groundwater	0	days	T c	IV	1
Concentration reaching Groundwater	5	mg/l	Cp	IV	2
Site Specific Target Level	11	mg/kg	C sstl	V	

Conclusions

Does concentration of chemical of concern in soil exceed SSTL? YES

Risk of Human Exposure due to contaminated soil.

X YES _____ NO

IN-SITU SOIL RISK EVALUATION

11/18/1999

SOIL LEACHABILITY MODEL FOR ETHYLBENZENE

RISK-BASED CORRECTIVE ACTION FOR PETROLEUM RELEASES

SITE INFORMATION:

Site: Site 25, Building 1346

Location: Charleston Naval Complex, North Charleston, SC

REFERENCES:

(1) SCDHEC, RBCA For Petroleum Releases, June 1995, Appendix B, Figure 1.
(2) SCDHEC, RBCA For Petroleum Releases, June 1995, Appendix B, Table 2.
(3) SCDHEC, RBCA For Petroleum Releases, June 1995, Appendix B, Input Parameters.
(4) SCDHEC, RBCA For Petroleum Releases, June 1995, Appendix B, Table 1.
(5) SCDHEC, RBCA For Petroleum Releases, June 1995, Appendix B, Figure 2.
(6) SCDHEC, RBCA For Petroleum Releases, June 1995, Appendix B, Figure 3.
(7) SCDHEC, RBCA For Petroleum Releases, June 1995, Appendix B, Figure 4.
(8) SCDHEC, RBCA For Petroleum Releases, June 1995, Appendix B, Figure 5.

INPUT:

			ETHYLBENZENE
COC	Chemical of Concern		
Bd	Soil Bulk Density (1)	g/cm3	1.6
Crsbl	Risk Based Screening Level	mg/L	6.05
Cs	Concentration of COC in soil	mg/kg	560
DAF	Dilution/Attenuation Factor (2)	unitless	8
foc	Organic Carbon Content in Soil (3)	mg/kg	616
H'	Henry's Law Constant (4)	unitless	0.28
Hf	Wetting front suction head (always negative) (5)	cm	-10
Hw	Average Annual Recharge (3)	cm	25
Kf	Soil Hydraulic Conductivity (6)	cm/s	0.0056
Koc	Soil/Water Partioning Coefficient (2)	ml/g	176
L	Depth between soil sample with greatest COC concentration to groundwater.	cm	46
Ø	Porosity (7)	unitless	0.45
t1/2	Biodegradation "half life" (2)	days	10
TPH	Total Petroleum Hydrocarbons, EPA Method 3550	mg/kg	993
Wr	Residual Water Content (8)	volume fraction	0.04

CALCULATIONS:

Equation Set I - Determine soil pore water concentration resulting from physical partioning (Cw).

Step 1 - Calculate the total organic carbon content (fcs) of the soil.

fcs = (foc +TPH/1.724)*1E-6 = 0.0012 decimal %

Step 2 - Calculate the concentration of COC in soil pore water (Cw) directly in contact with the contaminate soil.

Cw = Cs*((Wr *1g/cc+Bd)/((Bd*Koc*fcs)+Wr+((ø-Wr)*H'))) = 73.0737682 mg/l

Equation Set II - Determine the velocity of the soil pore water (Vw)

Step 1 - Calculate the air filled porosity (f) in decimal percent.

f = ø - Wr = 0.41 decimal %

Step 2 - Determine the time for water to percolate through the vadose zone soil (from depth of worst case soil sample to the water table at site).

t = (f/Kf)*(L-(Hw-Hf))*(ln(Hw+((L-Hf)/(Hw-Hf)))) = 1,218 seconds

Step 3 - Determine the velocity of the water (Vw) in feet per year.

Vw = (L/30.48cm/ft)/(t/31,500,000sec/year) = 39,042 ft/year

Equation Set III - Determine the organic retardation effect (Vc) of the contaminant.

Step 1 - Calculate the soil/water distribution coefficient (Kd) (ml/g) for uncontaminated soil.

Kd = Koc*foc*1E-6 = 0.108416 ml/g

Step 2 - Calculate the retardation effect of natural soil organic matter on COC migration.

Vc = Vw*(1+((Bd*Kd)/ø)) = 28,179 ft/year

Equation Set IV - Determine biodegradation rates and provide final COC concentration (Cf) at depth of concern.

Step 1 - Calculate the time (Tc) in days required for the COC to reach groundwater.

Tc = 365 day/yr*((L/30.48cm/ft)/Vc) = 0.02 days

Step 2 - Calculate estimated concentration of COC in the soil pore water (Cp) necessary to protect groundwater.

Cp = 10^(log (Crsbl) + ((Tc/2.3)*(0.693/t1/2))) = 6.06 mg/l

COC concentration in soil pore water (Cp) is greater then Crsbl, therefore the SSTL must be calculated.

Equation Set V - Calculate the Site Specific Target Level (SSTL) for the COC in soil.

Cssti for THYLBENZENE in soil = Cp*DAF*(((Bd*Koc*fcs) + Wr + (F*'H''')) / (Wr*1g/cc + Bd)) = 14.494292 mg/kg

PREPARED BY: _____

Date

CHECKED BY: _____

Date

IN-SITU SOIL RISK EVALUATION

SOUTH CAROLINA
Department of Health and Environmental Control (DHEC)

Site Data

SITE ID # 01782
FACILITY NAME Site 25, Building 1346

Instructions

Provide results, separately, for each constituent in the worst case soil analysis.

Data

List Constituent: ETHYLBENZENE
(BTEX, Napth.)

				Table
Bioremediation "half-life"	10	days	t 1/2	C2
Soil/water partitioning coefficient	176	ml/g	K oc	C2

Results

				Equation Set	Step
Total Organic Carbon Content	0.0012	decimal %	f cs	I	1
Leachate Concentration	7.31E+01	mg/l	C w	I	2
Air Filled Porosity	0.41	decimal %	f	II	1
Infiltration Rate Time	1,218	seconds	t	II	2
Velocity of Water	39,042	ft/year	V w	II	3
Soil/Water Distribution Coefficient	0.1084	ml/g	K d	III	1
Contaminant Percolation Rate	28,179	ft/year	V c	III	2
Time to Reach Groundwater	0	days	T c	IV	1
Concentration reaching Groundwater	6	mg/l	C p	IV	2
Site Specific Target Level	14	mg/kg	C sstl	V	

Conclusions

Does concentration of chemical of concern in soil exceed SSTL? YES

Risk of Human Exposure due to contaminated soil.

X YES _____ NO

IN-SITU SOIL RISK EVALUATION

SOIL LEACHABILITY MODEL FOR XYLENES

RISK-BASED CORRECTIVE ACTION FOR PETROLEUM RELEASES

SITE INFORMATION:

Site:	Site 25, Building 1346
Location:	Charleston Naval Complex, North Charleston, SC

REFERENCES:

(1) SCDHEC, RBCA For Petroleum Releases, June 1995, Appendix B, Figure 1.
(2) SCDHEC, RBCA For Petroleum Releases, June 1995, Appendix B, Table 2.
(3) SCDHEC, RBCA For Petroleum Releases, June 1995, Appendix B, Input Parameters.
(4) SCDHEC, RBCA For Petroleum Releases, June 1995, Appendix B, Table 1.
(5) SCDHEC, RBCA For Petroleum Releases, June 1995, Appendix B, Figure 2.
(6) SCDHEC, RBCA For Petroleum Releases, June 1995, Appendix B, Figure 3.
(7) SCDHEC, RBCA For Petroleum Releases, June 1995, Appendix B, Figure 4.
(8) SCDHEC, RBCA For Petroleum Releases, June 1995, Appendix B, Figure 5.

INPUT:

COC	Chemical of Concern		XYLENES
Bd	Soil Bulk Density (1)	g/cm3	1.6
Crsbl	Risk Based Screening Level	mg/L	102.33
Cs	Concentration of COC in soil	mg/kg	2200
DAF	Dilution/Attenuation Factor (2)	unitless	8
foc	Organic Carbon Content in Soil (3)	mg/kg	616
H'	Henry's Law Constant (4)	unitless	0.28
Hf	Wetting front suction head (always negative) (5)	cm	-10
Hw	Average Annual Recharge (3)	cm	25
Kf	Soil Hydraulic Conductivity (6)	cm/s	0.0056
Koc	Soil/Water Partioning Coefficient (2)	ml/g	639
L	Depth between soil sample with greatest COC concentration to groundwater.	cm	46
ø	Porosity (7)	unitless	0.45
t1/2	Biodegradation "half life" (2)	days	28
TPH	Total Petroleum Hydrocarbons, EPA Method 3550	mg/kg	993
Wr	Residual Water Content (8)	volume fraction	0.04

CALCULATIONS:

Equation Set I - Determine soil pore water concentration resulting from physical partioning (Cw).

Step 1 - Calculate the total organic carbon content (fcs) of the soil.

fcs = (foc + TPH/1.724)*1E-6 = 0.0012 decimal %

Step 2 - Calculate the concentration of COC in soil pore water (Cw) directly in contact with the contaminate soil.

Cw = Cs*((Wr *1g/cc + Bd)/((Bd*Koc*fcs) + Wr + ((e-Wr)*H'))) = 103 mg/l

Equation Set II - Determine the velocity of the soil pore water (Vw)

Step 1 - Calculate the air filled porosity (f) in decimal percent.

f = Ø - Wr = 0.41 decimal %

Step 2 - Determine the time for water to percolate through the vadose zone soil (from depth of worst case soil sample to the water table at site).

t = (f/Kf)*(L-(Hw-Hf))*(ln(Hw + ((L-Hf)/(Hw-Hf)))) = 1,218 seconds

Step 3 - Determine the velocity of the water (Vw) in feet per year.

Vw = (L/30.48cm/ft)/(t/31,500,000sec/year) = 39,042 ft/year

Equation Set III - Determine the organic retardation effect (Vc) of the contaminant.

Step 1 - Calculate the soil/water distribution coefficient (Kd) (ml/g) for uncontaminated soil.

Kd = Koc*foc*1E-6 = 0.393624 ml/g

Step 2 - Calculate the retardation effect of natural soil organic matter on COC migration.

Vc = Vw*(1 + ((Bd*Kd)/e)) = 16,270 ft/year

Equation Set IV - Determine biodegradation rates and provide final COC concentration (Cf) at depth of concern.

Step 1 - Calculate the time (Tc) in days required for the COC to reach groundwater.

Tc = 365 day/yr*((L/30.48cm/ft)/Vc) = 0.03 days

Step 2 - Calculate estimated concentration of COC in the soil pore water (Cp) necessary to protect groundwater.

Cp = 10^(log (Crsbl)+((Tc/2.3)*(0.693/t1/2))) = 102.42 mg/l

COC concentration in soil pore water (Cp) is greater than Crsbl, therefore the SSTL must be calculated.

Equation Set V - Calculate the Site Specific Target Level (SSTL) for the COC in soil.

Csstl for XYLENES in soil = Cp*DAF*(((Bd*Koc*fcs)+Wr+(F*'H'''))/(Wr*1g/cc+Bd)) = 685.770015 mg/kg

PREPARED BY:_____

Date

CHECKED BY:_____

Date

IN-SITU SOIL RISK EVALUATION

SOUTH CAROLINA
Department of Health and Environmental Control (DHEC)

Site Data

SITE ID # 01782
FACILITY NAME Site 25, Building 1346

Instructions

Provide results, separately, for each constituent in the worst case soil analysis.

Data

List Constituent: XYLENES
(BTEX, Napth.)

				Table
Bioremediation "half-life"	28	days	t 1/2	C2
Soil/water partitioning coefficient	639	ml/g	K oc	C2

Results

				Equation Set	Step
Total Organic Carbon Content	0.0012	decimal %	f cs	I	1
Leachate Concentration	102.5741	mg/l	C w	I	2
Air Filled Porosity	0.41	decimal %	f	II	1
Infiltration Rate Time	1,218	seconds	t	II	2
Velocity of Water	39,042	ft/year	V w	II	3
Soil/Water Distribution Coefficient	0.3936	ml/g	K d	III	1
Contaminant Percolation Rate	16,270	ft/year	V c	III	2
Time to Reach Groundwater	0	days	T c	IV	1
Concentration reaching Groundwater	102	mg/l	C p	IV	2
Site Specific Target Level	**686**	mg/kg	C sstl	V	

Conclusions

Does concentration of chemical of concern in soil exceed SSTL? YES

Risk of Human Exposure due to contaminated soil.

X YES _____ NO

IN-SITU SOIL RISK EVALUATION

Site Specific Target Level Calculations for Soil: Construction Worker Inhalation of Volatiles from Soil

Parameter Descriptions:	Units	Parameter Descriptions:	Units
ABS = Absorption Fraction		ET = Exposure Time	hours/day
AF = Adherence Factor of Soil to Skin	mg/cm^2	FI = Fraction Ingested	
AT = Averaging Time	days	HQ = Hazard Quotient	
BW = Body Weight	kg	IR = Inhalation or Ingestion Rate	m^3/hour or mg/day
CF = Conversion Factor		RBSL = Risk Based Sceening Level	
CSF_D = Dermal Cancer Slope Factor	$(mg/kg\text{-}day)^{-1}$	RfD_D = Dermal Reference Dose	mg/kg-day
CSF_I = Inhalation Cancer Slope Factor	$(mg/kg\text{-}day)^{-1}$	RfD_I = Inhalation Reference Dose	mg/kg-day
CSF_O = Oral Cancer Slope Factor	$(mg/kg\text{-}day)^{-1}$	RfD_O = Oral Reference Dose	mg/kg-day
ED = Exposure Duration	year	SA = Skin Surface Area Available for Contact	cm^2
EF = Exposure Frequency	days/year	VF_{SS} = Volatilization Factor	
ELCR = Excess Lifetime Cancer Risk			

Construction Worker Inhalation of Vapor from Soil (Outdoor)

Constituent	IR	ET	EF	ED	AT	BW
	m^3/hour	hours/day	days/year	years	days	kg
Benzene	0.83	8	90	1	25550	70
Toluene	0.83	8	90	1	87.6	70
Ethylbenzene	0.83	8	90	1	87.6	70
Xylenes	0.83	8	90	1	87.6	70
Napthalene	0.83	8	90	1	87.6	70

Constituent	CSF_I	RfD_I	Target ELCR	Target HQ	$RBSL_{AIR}$	VF_{SS}	$RBSL_{SOIL}$
	$(mg/kg\text{-}day)^{-1}$	mg/kg-day			mg/m^3	mg/m^3 / mg/kg	mg/kg
Benzene	0.029	NA	1.0E-06	NA	0.102787	1.31E-05	7,853
Toluene	NA	0.11	NA	1.0E+00	1.1242	1.31E-05	85,887
Ethylbenzene	NA	0.29	NA	1.0E+00	2.9638	1.31E-05	226,430
Xylenes	NA	NA	NA	1.0E+00	NA	1.31E-05	NA
Napthalene	NA	0.004	NA	1.0E+00	0.04088	1.31E-05	3,123

Source: ASTM (American Society for Testing and Materials), 1997. *Standard Guide for Risk-Based Corrective Action* applied at Petroleum Release Sites: E 1739 - 95E1, Annual Book of ASTM Standards, West Conshohocken, PA

HYDROCARBON CONSTITUENT CONCENTRATIONS IN WATER BASED ON RAOULT'S LAW

Parameter Descriptions:	Units
C_W = Aqueous Solubility of Organic Constituents Dissolved from Product	mg/L
C_F = Concentration of the Constituent in the Fuel	mg/L
K_{FW} = Fuel/Water Partition Coefficient	
P_F = Density of the Product	g/mL
MW_F = Molecular Weight of the Product	g/mol
C_{SAT} = Aqueous Solubility of the Constituent	mol/L
MW_C = Molecular Weight of the Constituent	g/mol
$K_{FW} = (10^3(mL/L)\ p_F)/(MW_F * C_{SAT}/(MW_C * 1000))$	
$C_W = C_F/K_{FW}$	mg/L

Source: "Solubility, Sorption, and Transport of Hydrophobic Organic Chemicals in Complex Mixtures," EPA Environmental Research Brief, EPA/600/M-91/009, Robert S. Kerr Environmental Research Laboratory, ADA, Oklahoma.

Key Assumptions:

MW_F : Molecular Weight of Weathered Product, Source: "A Practical Approach to the Design, Operation, and Monitoring of In-Situ Soil Venting Systems", Shell Development/Shell Oil Company, Houston, Texas.
P_F : Density of the Product, Source: Conoco Material Safety Data Sheet for unleaded gasoline.

Concentration of Hydrocarbon Constituents in Water Based on Molar Solubility

Constituent	MW_F g/mol	C_{SAT} mg/L	MW_C g/mol	P_F g/mL	K_{FW}	C_F mg/L	C_W mg/L
Benzene	111.00	1,750	78	0.77	309.19	18,480.0	59.77
Toluene	111.00	535	92	0.77	1192.89	115,500.0	96.82
Ethylbenzene	111.00	152	106	0.77	4837.60	15,400.0	3.18
Xylene	111.00	198	106	0.77	3713.71	92,400.0	24.88
MTBE	111.00	48,000	88.15	0.77	12.74	67,375.0	5288.71
Naphthalene	111.00	33	128.2	0.77	26948.95	5,852.0	0.22

SITE 25, BUILDING 1346
ZONE F, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

DOMENICO'S DILUTION/ATTENUATION EQUATION FOR GROUNDWATER TRANSPORT

Predicted 10-year Migration of Constituents in Groundwater

Parameter Descriptions:	Units
POE = Point of Exposure	
SSTL = Site-Specific Target Level	mg/L
$SSTL_{SOURCE}$ = Hydrocarbon Concentration in Plume Source Area protective of RBSLs at POE	mg/L
$SSTL_{COMP}$ = Hydrocarbon Concentration at Compliance Point protective of RBSLs at POE	mg/L
X_{POE} = x = Distance from Plume Source to POE (along Centerline)	m
X_{COMP} = x = Distance from POE to Compliance Point (along Centerline)	m
Y = Source Width (Perpendicular to Flow Direction)	m
Z = Source Depth (Perpendicular to Flow Direction in Vertical Plane)	m
K_s = Saturated Hydraulic Conductivity	m/sec
I = Groundwater Gradient	cm/cm
θ = Porosity in Saturated Zone	cm^3/cm^3

Parameter Descriptions:	Units
ρ_s = Soil Bulk Density	g/cm^3
f_{oc} = Fraction Organic Carbon in Soil	g-C/g-soil
α_x = Longitudinal Dispersivity = x/10	m
α_y = Transverse Dispersivity = $\alpha_x/3$	m
α_z = Vertical Dispersivity = $\alpha_x/20$	m
k_{oc} = Organic Carbon Partition Coefficient	cm^3-H_2O/g-C
k_d = Soil-Water Sorption Coefficient	cm^3-H_2O/g-soil
V = Pore Water Velocity	m/sec
R_c = Constituent Retardation Factor	
V/R_c = Maximum Transport Rate of Dissolved Constituent = $(K_s I)/(\theta R_c)$	m/sec
RBSL = Risk-Based Screening Level in Water Provided by SCDHEC (1998)	mg/L

Dilution & Attenuation without Biological Decay

Constituent	X_{POE} ft	X_{POE} m	Y m	Z m	t sec	K_s m/sec	I m/m	θ cm^3/cm	ρ_s g/cm^3	α_x m	α_y m	α_z m	f_{oc} g-C/g-soil	k_{oc} cm^3-H_2O/g-C	k_d cm^3-H_2O/g-soil	V m/sec	R_c	C_{POE}/C_{SOURCE}
Benzene	202	61.6703	15	2	3.15E+08	2.47E-06	0.0096	0.36	1.73	6.16	2.05	0.31	6.16E-04	81	0.049896	6.59E-08	1.240	8.355E-05
Toluene	106	32.9188	15	2	3.15E+08	2.47E-06	0.0096	0.36	1.73	3.29	1.10	0.16	6.16E-04	133	0.081928	6.59E-08	1.394	9.799E-03
Ethylbenzene	56	17.069	15	2	3.15E+08	2.47E-06	0.0096	0.36	1.73	1.71	0.57	0.09	6.16E-04	178	0.108416	6.59E-08	1.521	2.134E-01
Xylenes	26.1	7.95638	15	2	3.15E+08	2.47E-06	0.0096	0.36	1.73	0.80	0.27	0.04	6.16E-04	639	0.393624	6.59E-08	2.892	4.047E-01
MTBE	287	87.4787	15	2	3.15E+08	2.47E-06	0.0096	0.36	1.73	8.75	2.92	0.44	6.16E-04	12	0.007392	6.59E-08	1.038	7.619E-06
Naphthalene	25.5	7.77249	15	2	3.15E+08	2.47E-06	0.0096	0.36	1.73	0.78	0.26	0.04	6.16E-04	1543	0.950488	6.59E-08	5.568	4.617E-02

Source: South Carolina Department of Health and Environmental Control (SCDHEC) 1998. *Risk-Based Corrective Action for Petroleum Releases*, Bureau of Underground Storage Tank Management.

DOMENICO DILUTION/ATTENUATION MODEL WITHOUT BIOLOGICAL DECAY

$$\frac{C_X}{C_{SOURCE}} = \frac{1}{2} erfc\left[\frac{\left(x - \frac{vt}{R_c}\right)}{2\sqrt{\alpha_X \frac{vt}{R_c}}}\right] \times erf\left[\frac{Y}{4\sqrt{\alpha_Y x}}\right] \times erf\left[\frac{Z}{2\sqrt{\alpha_Z x}}\right]$$

Constituent	C_{SOURCE} mg/L	C_X mg/L	RBSL mg/L
Benzene	59.77	0.005	0.005
Toluene	96.82	0.949	1.000
Ethylbenzene	3.18	0.679	0.700
Xylenes	24.88	10.069	10.000
MTBE	5288.71	0.040	0.040
Naphthalene	0.217	0.010	0.010

Prepared By: Gregory F. Sizer

Reviewed By: Allan T. Jenkins

SITE 25, BUILDING 1348
ZONE F, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

DOMENICO'S DILUTION/ATTENUATION EQUATION FOR GROUNDWATER TRANSPORT

Predicted 20-year Migration of Constituents in Groundwater

Parameter Descriptions:	Units
POE = Point of Exposure	
SSTL = Site-Specific Target Level	mg/L
$SSTL_{SOURCE}$ = Hydrocarbon Concentration in Plume Source Area protective of RBSLs at POE	mg/L
$SSTL_{COMP}$ = Hydrocarbon Concentration at Compliance Point protective of RBSLs at POE	mg/L
X_{POE} = x = Distance from Plume Source to POE (along Centerline)	m
X_{COMP} = x = Distance from POE to Compliance Point (along Centerline)	m
Y = Source Width (Perpendicular to Flow Direction)	m
Z = Source Depth (Perpendicular to Flow Direction in Vertical Plane)	m
K_s = Saturated Hydraulic Conductivity	m/sec
I = Groundwater Gradient	cm/cm
θ = Porosity in Saturated Zone	cm^3/cm^3

Parameter Descriptions:	Units
ρ_b = Soil Bulk Density	g/cm^3
f_{oc} = Fraction Organic Carbon in Soil	g-C/g-soil
α_x = Longitudinal Dispersivity = x/10	m
α_y = Transverse Dispersivity = $\alpha_x/3$	m
α_z = Vertical Dispersivity = $\alpha_x/20$	m
k_{oc} = Organic Carbon Partition Coefficient	cm^3-H_2O/g-C
k_p = Soil-Water Sorption Coefficient	cm^3-H_2O/g-soil
V = Pore Water Velocity	m/sec
R_c = Constituent Retardation Factor	
V/R_c = Maximum Transport Rate of Dissolved Constituent = $[K_s I/(\theta R_c)]$	m/sec
RBSL = Risk-Based Screening Level in Water Provided by SCDHEC (1998)	mg/L

Dilution & Attenuation without Biological Decay

Constituent	X_{POE} ft	X_{POE} m	Y m	Z m	t sec	K_s m/sec	I m/m	θ cm^3/cm^3	ρ_b g/cm^3	α_x m	α_y m	α_z m	f_{oc} g-C/g-soil	k_{oc} cm^3-H_2O/g-C	k_p cm^3-H_2O/g-soil	V m/sec	R_c	C_{POE}/C_{SOURCE}
Benzene	358	109.205	15	2	6.31E+08	2.47E-06	0.0096	0.36	1.73	10.92	3.61	0.54	6.18E-04	81	0.049896	6.59E-08	1.240	8.597E-05
Toluene	159	48.4638	15	2	6.31E+08	2.47E-06	0.0096	0.36	1.73	4.85	1.62	0.24	9.78E-04	133	0.130074	6.59E-08	1.826	1.0528-02
Ethylbenzene	76.9	23.4394	15	2	6.31E+08	2.47E-06	0.0096	0.36	1.73	2.34	0.78	0.12	9.78E-04	176	0.172128	6.59E-08	1.827	2.261E-01
Xylenes	36.5	11.1263	15	2	6.31E+08	2.47E-06	0.0096	0.36	1.73	1.11	0.37	0.06	9.78E-04	639	0.624942	6.59E-08	4.003	4.029E-01
MTBE	507	154.536	15	2	6.31E+08	2.47E-06	0.0096	0.36	1.73	15.45	5.15	0.77	9.78E-04	12	0.011736	6.59E-08	1.056	7.300E-06
Naphthalene	34	10.3633	15	2	6.31E+08	2.47E-06	0.0096	0.36	1.73	1.04	0.35	0.05	9.78E-04	1543	1.509064	6.59E-08	8.252	4.661E-02

Source: South Carolina Department of Health and Environmental Control (SCDHEC) 1998. *Risk-Based Corrective Action for Petroleum Releases*, Bureau of Underground Storage Tank Management.

DOMENICO DILUTION/ATTENUATION MODEL WITHOUT BIOLOGICAL DECAY

$$\frac{C_X}{C_{SOURCE}} = \frac{1}{2} erfc\left[\frac{\left(x - \frac{vt}{R_c}\right)}{2\sqrt{\alpha_X \frac{vt}{R_c}}}\right] \times erf\left[\frac{Y}{4\sqrt{\alpha_Y x}}\right] \times erf\left[\frac{Z}{2\sqrt{\alpha_Z x}}\right]$$

Constituent	C_{SOURCE} mg/L	C_X mg/L	RBSL mg/L
Benzene	60	0.005	0.005
Toluene	97	1.019	1.000
Ethylbenzene	3	0.716	0.700
Xylenes	25	10.023	10.000
MTBE	5289	0.039	0.040
Naphthalene	0.217	0.010	0.010

Prepared By: Gregory F. Sisco

Reviewed By: Allan T. Jenkins

Appendix C

Initial Comments and Responses on the Draft Final Zone F RFI Report
Specific to AOC 609
April 7, 1999
Clarifications inserted May 4, 2001

SCDHEC (Eric Cathcart) Comments on the
Zone F Draft RCRA Facility Investigation Report
(dated 31 December 1998) NAVBASE Charleston
February 26, 1999

SCDHEC Comment 1: Soil sample blanks for the following areas contained detectable contaminants: SWMU 4, AOC 619, SWMU 36, AOC 620, SWMU 109, AOC 607, AOC 609, AOC 611, AOC 613, AOC 616, AOC 617, and Grid soil samples. Groundwater blanks contained detectable contaminants for the following areas: AOC 619, AOC 620, SWMU 109, AOC 607, AOC 609, AOC 613, GEL samples, Location 240, AOC 617, and Grid groundwater samples. These detections were noted in the volatile, semivolatile, and metals methods. In accordance with the Environmental Protection Agency, *Standard Operating Procedures* for sample collection, trace contaminants in field, trip, equipment, and distilled water blanks may indicate a problem with either decontamination procedures and/or cross contamination of samples during collection or transport. The RFI report should fully explain the existence of trace contaminants in blanks. Please revise the text to include this/these explanation(s).

EnSafe Response 1: The Project Chemist has reviewed and evaluated the data and compiled the findings in the following memo to the Project Team for review and approval.

Memorandum

To: Charleston Naval Complex Project Team

From: Charlie Vernoy, EnSafe

Subject: **Response to Comments on the Draft Zone F and K RFI Reports**

Date: March 31, 1999

Several comments by the South Carolina Department of Health and Environmental Control (SCDHEC) on the Draft Zone F and K RFI Report discuss the context of the Data Validation section and how blank contamination can be further explained relevantly to specific site samples. This memo is intended to explain the data validation process and how it relates to blank contamination associated with the RFI report process for the Charleston Naval

Complex (CNC) project and offer a resolution to stated comments. For demonstration purposes, AOC 607 in Zone F has been designated as the site to be addressed in this memo.

As part of the RFI process at CNC, chemical environmental samples undergo a third party data validation review process following USEPA Functional Guidelines. This process includes the review of analytical data generated at specific data quality objectives (DQOs) and making a determination of the validity of the results through implementation of the functional guidelines and providing professional judgement in the qualification of the data. DQOs include the collection and analysis of quality control (QC) blanks which are intended to identify possible contaminants that may be associated with the collection/analysis process.

To assess possible cross contamination from sampling procedures, deionized water, equipment, and field blanks are collected on a weekly basis per sampling event and trip blanks are submitted daily when volatile organic compounds (VOCs) are requested for analysis. The laboratory is also required to provide data on internal laboratory contamination and must analyze method blanks according to specific method requirements. The QC blanks and environmental samples are analyzed by the same methods and are routinely batched in the same Sample Delivery Group (SDG). A typical SDG includes a total of 20 samples. Batching QC and environmental samples together in the same SDG provides needed information to the data validator to make necessary decisions about the quality of the data. There are occasions when a sampling event at a particular site will have multiple SDGs and it becomes the responsibility of the data validator to incorporate the findings of QC blanks into other SDGs associated with the site.

Each SDG has its own data package incorporating the analytical results of samples and providing necessary QC data to make judgements about the validity of the data. When reviewing the data, the validator follows strict guidelines and must qualify sample data when appropriate. Contamination found in QC blank data is one aspect where qualification of data is necessary. Functional guidelines state that when contamination is found in QC blanks the validator must incorporate the findings to site samples where applicable. The way the validator applies the finding is through the "5x" or "10x" rule. The "5x" rule is taking the analytical result of the contaminant found in a QC blank and multiplying the result by five. If a compound is found in all associated blanks, then the highest result is subjected to the rule. The adjusted result is then compared to all site samples and if detections in site samples are less than the adjusted result of the blank contaminant, site sample detections are adjusted to non-detect. This rule covers all compounds except for acetone, methylene chloride, 2-butanone, and bis(2-ethylhexyl)phthalate, which are known laboratory and possible field sampling contaminants, where the "10x" rule will apply.

Upon completion of the data review process, the validator generates a validation report which includes the functional guideline checklist with instructions on qualifying data, actual data sheets of site samples showing data qualifiers, an electronic file of the site sample data with qualifiers, and a summary report outlining deficiencies noted and data

qualifiers used. EnSafe reviews the report for consistency and electronically adds the data files to a database. Once the data is validated and added to the database it becomes final and is used in writing nature and extent, fate and transport, and risk assessment sections for RFI reports. As part of the Data Validation section in the CNC RFI reports, all SDG data validation summary reports and database spreadsheets are included for review.

As part of the RFI report process, all contaminants detected in site samples that are not validated to non-detect are to be mentioned in the nature and extent section and compared to regulatory limits such as risk-based concentrations, soil screening and maximum contaminant levels. In short, if an adjusted blank contaminant detection was not higher than the site sample detection, then the site sample result is reported in the RFI report. This result would then be reviewed as a possible chemical of potential concern (COPC) or chemical of concern (COC) and identified as such where applicable. The quarterly monitoring sampling program would help to determine if a COPC or COC was from cross contamination or actual detection.

Section 4.3 in the Zone F and K Draft RFI reports summarized blank contamination found in common multiple blanks associated with a particular site (usually first round sampling events). The sections did not list contaminations found in only one blank because of the assumption that it was a single occurrence and not part of a trend. The data validation summary reports listed all blank contamination per SDG but do not point out trends between the SDGs.

In addressing comments concerning blank contamination at CNC, AOC 607 was used to demonstrate the association between field and method blank detections in all sampling events under the RFI in Zone F. Tables 1 and 2 list compounds detected and the ranges associated with the blanks. The asterisk denotes compounds that were detected in a blank but were not detected in a site sample.

Table 1 - Soil AOC 607

Field Blanks	*Range*	*Method Blanks*	*Range*
1234678-HxCDF	3.76-11.7 pg/L	1234678-HpCDD	3.67 pg/L
123478-HxCDF	0.704-2.29 pg/L	234678-HxCDF	3.15 pg/L
123678-HxCDD	2.74-7.37 pg/L	Acetone	2-12 ug/L
123678-HxCDF	1.3 pg/L	Aluminum	2.27 ug/L
123789-HxCDD	50.2-131 pg/L	Beryllium	.035-.039 ug/L
234678-HxCDF	2.74-3.5 pg/L	bis(2-Ethylhexy)lphthalate	45-53 ug/L
2-Butanone	23 ug/L	Butylbenzylphthalate	94 ug/L
Acetone	4-120 ug/L	Chloroform	1 ug/L
Acetonitrile	2800-14000 ug/L	Chromium*	.155-.202 ug/L
Aluminum	246 ug/L	Iron	4.9-6.27 ug/L
Barium	16.7 ug/L	Lead	0.296 ug/L
Benzyl Alcohol*	2 ug/L	Methylene Chloride	2-14 ug/L
Beryllium	0.31-.41 ug/L	OCDD	31 pg/L

Bromodichloromethane*	13 ug/L
Calcium	18.7 ug/L
Chloroform*	34 ug/L
Chromium	1 ug/L
Copper	0.75 ug/L
Cyanide	3.5 ug/L
Iron	596 ug/L
Magnesium	1340 ug/L
Manganese	13.3 ug/L
Mercury	0.11 ug/L
Methylene Chloride	1-14 ug/L
Napthalene	1 ug/L
Nickel	14 ug/L
N-Nitrosodimethylamine*	1-4 ug/L
OCDD	388-744 pg/L
OCDF	2.5-6.71 pg/L
Potassium	1320 ug/L
Sodium	6410 ug/L
Thallium	6.8 ug/L
Tin	2.8 ug/L
Toluene	2 ug/L
Vanadium	1.7 ug/L
Zinc	7.1-10.3 ug/L

Thallium	.425-4.76 ug/L
Tin	1.37-2.8 ug/L
Vanadium	0.052-.852 ug/L

Notes:

* Compounds not detected in any site samples.

Table 2 - Water AOC 607

Field Blanks	*Ranges*
1234678-HpCDD*	3-6 pg/L
234678-HxCDF*	3 pg/L
Acetone	3 ug/l
Aluminum	9.3-19.6 ug/L
Antimony	1.7-2.8 ug/L
Arsenic	2.2-2.5 ug/L
Barium	.34-.98 ug/L
BEHP*	1-110 ug/L
Bromodichloromethane*	2 ug/L
Calcium	39.2-99.8 ug/L
Chloroform*	1-7 ug/L
Chromium	1.5 ug/L
Cobalt	1.1 ug/L
Di-n-octyl phthalate*	9 ug/L
Iron	22.4-35.9 ug/L
Magesnium	49.8 ug/L
Manganese	.38-.72 ug/L

Method Blanks	*Ranges*
1234789-HpCDF*	3.76 pg/L
234678-HxCDF*	6.45 pg/L
Acetone	3-7 ug/L
Aluminum	12-23.8 ug/L
Antimony	1.6-6.22 ug/L
Arsenic	2.53-2.67 ug/L
Barium	.35-2.55 ug/L
BEHP*	1-10 ug/L
Benzene*	1 ug/L
Benzoic acid	4 ug/L
Calcium	60.5 ug/L
Chloroform*	1-3 ug/L
Cobalt	1.24 ug/L
Copper	1.14-2.5 ug/L
Cyanide*	1.79-2.5 ug/L
Diethylphthalate*	1 ug/L
Heptachlor*	0.012 ug/L

Methylene Chloride	6-19 ug/L
Nickel	1.8 ug/L
OCDD*	9 pg/L
OCDF*	4 pg/L
Potassium	690-699 ug/L
Silver	2.3-3.8 ug/L
Sodium	33.2-24700 ug/L
Tetrachloroethene	1-14 ug/L
Zinc	7.6 ug/L

Iron	20.1-32 ug/L
Lead	.91-1.4 ug/L
Magesnium	50.6-56.9 ug/L
Manganese	.5-1.2 ug/L
Methylene Chloride	2-17 ug/L
Nickel	.72-1 ug/L
OCDD*	7.35-11 pg/L
OCDF*	5.66 pg/L
Potassium	178 ug/L
Silver	1.44-1.94 ug/L
Sodium	27.5-107 ug/L
Tetrachloroethene	2 ug/L
Thallium	3.4-3.75 ug/L
Tin	19.6 ug/L
Toluene	2 ug/L
Vanadium	0.813 ug/L
Xylene*	1-2 ug/L
Zinc	7.61-10.2 ug/L

Notes:

* Compounds not detected in any site samples.

In reviewing the compounds for both lists, explanations can be made as to why certain compounds were detected. The majority of compounds that make the lists are inorganics. In comparing the method blank lists there was an increase of inorganic compounds detected in the water events as compared to the soil events. Detections generally ranged higher for the water event method blanks. The field blank lists showed virtually the same number of inorganic compounds for both soil and water events. In contrast to the method blanks, detections of common metals in the field blanks generally ranged higher for soil events. A possible reason for the high incident of metals in field blanks maybe the water from the North Charleston Water System which is used for the on-site carbon filtered/single canister deionized water system. The deionized system is routinely maintained by the Culligan company, but even working at optimal efficiency the system cannot filter out all compounds. The same can be said of the laboratories that use a carbon filtered/dual canister deionized system to filter water for the method blanks. Eliminating all metal detections from blank analyses is an insurmountable task and efforts to identify exact sources of metals are impossible.

The organic blank detections are easier to explain in some cases. For example, the VOCs bromodichloromethane and chloroform were detected in field blanks for the soil and water events and but just chloroform was detected in the method blanks. The two VOCs are common by-products of the chlorination process of municipal water systems. As noted in the tables, bromodichloromethane and chloroform were not detected in any site samples during water sampling events.

The chlorinated dioxin and dibenzofuran detections noted in the field and method blanks are common contaminants found in a dioxin lab. Due to the extremely low detection limits

(parts per quadrillion) that a dioxin lab routinely meets due to current technology, it has become extremely difficult to decontaminate glassware down to non-detect levels. However, once the 2,3,7,8-TCDD Toxicity Equivalency Factors (TEFs) are applied to the results, the overall detections are minimal.

It is possible for acetone to be detected in samples because of the decontamination procedures at CNC that use isopropyl alcohol. Acetone being a contaminant of isopropyl alcohol. But the decontamination procedures used in the field are not what laboratories follow so the acetone detections in the method blanks must be from cross contamination in the lab. Acetone is used in laboratories as a solvent for the extraction of soils.

Methylene chloride is not used in decontamination procedures but was detected in field blanks as well as in method blanks. The explanation for this is that laboratories use methylene chloride when performing water extraction for semivolatile and pesticides analyses and very likely cross contamination with CNC samples has occurred. Methylene chloride has not been identified as a COC at AOC 607.

Tetrachloroethene (PCE), also not used in decontamination procedures, was detected in the field and method blanks for the water events. AOC 607 has large PCE detections in the shallow and intermediate groundwater around building 1189 and it is very possible that cross contamination between samples as occurred. The detections for PCE do not affect the results found in the site samples.

The detections of benzene, toluene, and xylene are all below their respective method detection limits (MDLs) and cannot be verified as a true detection. The high detections of acetonitrile (an Appendix IX compound) occurred in two field blanks collected in 11/96. Both blanks were from the same SDG and no associated site samples had detections of the compound.

The phthalate compounds detected in both field and method blanks are commonly found in plastics found in disposable gloves and glassware. The phthalates that were detected in blanks during water events were not detected in any site samples. Phthalates were detected in the method blanks during soil events and not the field blanks leading to the speculation that phthalate contamination is caused by the laboratory.

CH2M-Jones Response Clarification: *See document "Response to Reply to Comment Responses"*

SCDHEC Comment 5:
The organics in groundwater surrounding well SME005 have not been fully delineated. Additional groundwater wells should be installed.

EnSafe Response 5:
Constitents are primarily BTEX not waste oil. Propose to transfer this site to the UST

program. Two shallow monitoring wells should be installed to address this data gap.

CH2M-Jones Response Clarification: *See document "Response to Reply to Comment Responses"*

SCDHEC Comment 6:
Several VOCs that exist above MCL in groundwater at this site have not been fully defined horizontally. Well data from other wells that may exist around SME005 should be used to produce isoconcentration maps.

EnSafe Response 6:
No other wells exist, see comment response #5.

CH2M-Jones Response Clarification:
Two wells were installed and sampled southeast of the area described. Constituents detected at FSMEGW005 related to petroleum hydrocarbon UST release at Site 25 are not considered pertinent to site AOC 609 – Waste Oil Tank. The Corrective Action Plan for Site 25 will present applicable concentration maps for fuel constituents detected in this well.

SCDHEC (Johnny Tapia) Comments on The Zone F Draft RCRA Facility Investigation Report (dated 31 December 1998) NAVBASE Charleston March 12, 1999

SCDHEC Comment 2:
Section 4.3. "Data Validation Reports" is an enumeration of the results and detections of blank samples in soil and groundwater. These results should be interpreted in a relevant and meaningful manner by describing if the blank detection means the contaminant is present in the sample, is a product of cross-contamination, etc. This would clarify the significance of the presence of certain contaminants in the samples collected at each unit. As written, contributes minimum value for the review of the document. Please revise this section.

EnSafe Response 2:
The Project Chemist will review and evaluate the data and compile the findings into a memo for the Project Team's review and approval. Please see response to E. Cathcart Comment #1.

CH2M-Jones Response Clarification: *No further clarification needed.*

SCDHEC Comment 3:
Table 6.4 which calculates the Soil Screening Levels for the protection of groundwater needs to revise and recalculate the values for Thallium and Benzo(a)pyrene. The MCL values for the Target Leachate Concentration are not correct, therefore the calculated SSL values need to be verified. Please correct and consider implications throughout the report.

EnSafe Response 3:
The MCL value for benzo(a)pyrene in Table 6.4, used as the unadjusted target leachate concentration, is shown incorrectly as 0.002 mg/L; it should be 0.0002 mg/L, and will be corrected in the final report. The unadjusted target leachate concentration of 0.0005 mg/L shown for thallium is actually the MCLG rather than thallium's MCL of 0.002 (see column heading in table), and is therefore more conservative (lower) than the MCL. The *Soil Screening Guidance: User's Guide* specifies the use of a nonzero MCLG, MCL, or HBL (Equation 10, p. 29) to determine the target soil leachate concentration. In any event, neither of the calculated SSLs from Table 6.4 was used in the Section 10 screening tables. Because benzo(a)pyrene has an EPA-calculated SSL of 8 mg/kg (*Soil Screening Guidance: Technical Background Document*, Appendix A), that value was used in the tables. The EPA-calculated value of 0.7 mg/kg for thallium would have been used in the screening tables, except that thallium's background reference value of 1.24 mg/kg for subsurface soil was higher, and was therefore used instead. Sometime after the draft RFI report for Zone F was submitted, SCDHEC requested that background reference values for inorganics not be used in place of corresponding SSLs in the fate and transport screening tables

when they exceed the SSLs. Consequently, 0.7 mg/kg will be used as the SSL for thallium in the final RFI report.

CH2M-Jones Response Clarification: *SSLs for both Thallium and Benzo(a)pyrene are taken from the EPA Region III RBC charts, October, 2000 and adjusted for the site-specific DAF. SSLs for most other detected inorganics are derived from site-specific SPLP evaluations, using the MCL CH2M-Jones does not agree that background values that exceed SSL values should not be considered in the assessment of COCs. Therefore, for thallium, if background data indicate that background values exceed the SSL, these background data will also be used as screening levels in assessing whether a chemical may be a COC.*

SCDHEC Comment 4:
The second paragraph of page 6.16 needs to be revised for the statements made about the use of the highest of background values (upper or lower soil) used as the screening alternative to SSLs. The same approach is mentioned for groundwater where the greater of shallow or deep background concentrations is used as an screening alternative to the tap water RBCs. Using this approach defeats the purpose of collecting two set of samples (upper and lower) to determine background reference concentrations and is not a conservative screening process. In addition, the same paragraph states that this approach is proposed based only on assumptions. The Screening process should continue as previously approved. Please revise this paragraph and consider implications throughout the report.

EnSafe Response 4:
Contaminant transport from soil to groundwater involves infiltration of rainwater into the soil followed by percolation downward through surface soil and subsurface soil (the vadose, or unsaturated zone), through the water table into the saturated zone (the unconfined aquifer). Each molecule of water is exposed to contaminants in both surface and subsurface soil as it moves downward to the aquifer. Because the migrating soil water is also exposed to background concentrations of soil constituents at each level, the only relevant background concentration for making comparisons to contaminant concentrations is the greater of the surface soil or subsurface soil values. Collecting background soil samples at both depths is necessary because most human health risk assessment applications require comparisons to background for surface soil only. Because of SCDHEC's request (see Response 3 above) that background values not be used in place of SSLs, however, this is a moot point.

As stated in the paragraph in question on page 6.16, the lithology of the surficial aquifer in Zone F is complex. Given the uncertainty about the interconnectedness of the portions of the aquifer encountered in each well, groundwater results from each depth (shallow or deep) will be screened only against background reference values from the corresponding depth for the final report.

CH2M-Jones Response Clarification: *See document "Response to Reply to Comment Responses" for revised Ensafe response.*

SCDHEC Comment 5:
Please clarify in the text that according to EPA's latest guidance on dioxins the 1,000 ng/Kg (as 2,3,7,8-TCDD TEQs) is based on a residential cleanup level with a risk level of 1E-4. Please clarify also that this cleanup level is being used as a screening number due to the complex and time-consuming calculations involved with risk presented by dioxins. For instance page 7.7 needs this clarification. Please correct accordingly.

EnSafe Response 5:
The above clarifications will be made in the revised report with one exception. The 1,000 ng/kg PRG for 2,3,7,8-TCDD TEQs is based on an *industrial* scenario and a target risk of 1E-04.

CH2M-Jones Response Clarification: *Dioxin detections in soil duplicate samples from AOC 609 were at least 3 orders of magnitude lower than the 1,000 ng/kg TEQ PRG quoted, and therefore were not considered of concern at the site.*

SCDHEC Comment 6:
Page 7.10, "Summary of COPCs" paragraph makes the statement that "If no groundwater impacts were identified, the current soil concentrations were considered sufficiently protective of the underlying aquifer". The Department does not necessarily agree with this statement. Other factors as age of the unit, age of spills, type of contaminants present, barriers present (asphalt, concrete, etc.) would influence the presence of contaminants in groundwater. Please modify this statement and consider this factor when making this statement in reference to a specific unit.

EnSafe Response 6:
The factors mentioned above will be considered when evaluating soil's potential impact to the groundwater.

CH2M-Jones Response Clarification: *See document "Response to Reply to Comment Responses" for revised Ensafe response. CH2M-Jones is applying the soil screening process to both surface and subsurface soils, as agreed with DHEC.*

SCDHEC Comment 7:
It may be appropriate to determine a background reference concentration, at Zone F soil and groundwater, for chemicals considered essential nutrients specially for iron. This natural nutrient has been detected at higher concentrations than usual throughout this zone and may be of concern. An evaluation can not be properly done at this time without having an appropriate background concentration and it has been dismissed many times without further consideration. This should be corrected in the final RFI report.

EnSafe Response 7: Printouts of iron detections in both soil and groundwater exhibit smooth distributions with one high anomalous concentration in each case. Iron in soil samples appears to correlate closely with aluminum, indicating that high concentrations of both metals are related to high percentages of clay in the sample. Scatterplots of iron vs. aluminum would help confirm this interpretation, and would also make it possible to identify individual samples with genuinely anomalous high iron concentrations.

Agreed, a background concentration should be developed for iron. Since iron is an essential nutrient, there is no clear guidance for iron risk assessment for human health and therefore no clear risk based remedial alternatives to the background concentration. For sites with iron reported at concentrations above the background reference concentration it is highly recommended that the Project Team develop a framework for managing such sites. However, it will be necessary to do so with a minimum of risk based decision making tools.

CH2M-Jones Response Clarification: *Background concentrations for iron are identified from grid samples from combined Zones F and G. The following concentrations will be used for screening:*

Iron in Grid Samples – Zones F and G combined					
Media	*No. of Samples*	*Units*	*Min Detect*	*Max Detect*	*2 x Mean*
Shallow Groundwater	*21*	*ug/L*	*2000*	*62,300*	*46,853*
Deep Groundwater	*20*	*ug/L*	*38.3*	*18,300*	*12,113*
Surface Soil	*15*	*Mg/Kg*	*3570*	*32,700*	*26,896*
Subsurface Soil	*13*	*Mg/Kg*	*3110*	*58,100*	*31,289*

SCDHEC Comment 8:
This comment is applicable to all units in Zone F. The Risk uncertainty section generally summarizes all detections and explain contributing or mitigating factors to be considered when reaching a decision on the fate of the unit. Since groundwater contamination is assessed based mainly on the first quarter of groundwater sampling, mitigating or contributing factors, such as results of subsequent rounds of groundwater sampling that confirm or refute possible contamination, should be acknowledged. Also, new contaminants detected should be mentioned. Please review the report.

EnSafe Response 8:
The Navy agrees and will evaluate all available data for incorporation into the final report.

CH2M-Jones Response Clarification: *Groundwater data from all monitoring events will be assessed in evaluating the presence of contamination.*

SCDHEC Comment 19:

Additional groundwater samples may be needed to determine if chemicals as Pentachlorophenol, Lead and Thallium are consistently present. These constituents were detected at levels exceeding MCLs or background after the first round of groundwater sampling , which is the only round considered to identify potential COPCs. In addition, the thallium background value used in table 10.5.8 should be replaced by the correct value of 5.58.

EnSafe Response 19:
Four sampling events will be used to evaluate the AOC for the Final Report. The thallium background will also be revised.

CH2M-Jones Response Clarification: *As indicated previously, groundwater data from all monitoring events will be assessed in evaluating the presence of contamination.*

SCDHEC Comment 20:
Arsenic was detected in soil and groundwater exceeding acceptable levels. There is a strong possibility that there is a transfer of contamination from soil to groundwater. This potential problem should be acknowledged and remediated.

EnSafe Response 20:
The Navy concurs.

CH2M-Jones Response Clarification: *The decision as to whether to remediate or not is applicable if there are COCs identified at the site. If so, then the decision should be based on a full evaluation of site and background concentrations and evaluation of remedial alternatives in a CMS. A CMS has not been completed for this site; therefore it is premature to conclude that a potential problem must be remediated.*

SCDHEC Comment 21:
NAVBASE should report if the Department's UST program is already addressing this unit for groundwater contamination present. If so, based on their investigation/remediation objectives, it will be determined if the unit could be transferred to this program or is kept under the Subtitle C of RCRA.

EnSafe Response 21:
The Navy concurs.

CH2M-Jones Response Clarification: *The Department's UST program has investigated the UST and completed a Rapid Assessment at the site. SCDHEC Groundwater Quality Section has provided correspondence stating that no additional investigation or remedial actions need be considered for the waste oil UST Site 24 at Building 1346.*

Note: Zone F Draft RFI Report comments by Susan Byrd/SCDHEC and responses are presented in document "Response to Reply to Comment Responses."

Response to Reply to Comment Responses on the Draft Final Zone F RFI Report
June 25, 1999

clarifications inserted May 4, 2001 for AOC 609 RFI Addendum

SCDHEC (Eric Cathcart) Reply to Comments received 7 April 1999 on the Zone F Draft RCRA Facility Investigation Report (dated 31 December 1998) Charleston Naval Complex

SCDHEC Comment 1: Soil sample blanks for the following areas contained detectable contaminants: SWMU 4, AOC 619, SWMU 36, AOC 620, SWMU 109, AOC 607, AOC 609, AOC 611, AOC 613, AOC 616, AOC 617, and Grid soil samples. Groundwater blanks contained detectable contaminants for the following areas: AOC 619, AOC 620, SWMU 109, AOC 607, AOC 609, AOC 613, GEL samples, Location 240, AOC 617, and Grid groundwater samples. These detections were noted in the volatile, semivolatile, and metals methods. In accordance with the Environmental Protection Agency, *Standard Operating Procedures* for sample collection, trace contaminants in field, trip, equipment, and distilled water blanks may indicate a problem with either decontamination procedures and/or cross contamination of samples during collection or transport. The RFI report should fully explain the existence of trace contaminants in blanks. Please revise the text to include this/these explanation(s).

EnSafe Response 1: The Project Chemist has reviewed and evaluated the data and compiled the findings in the following memo to the Project Team for review and approval.

Memorandum

To: Charleston Naval Complex Project Team

From: Charlie Vernoy, EnSafe

Subject: **Response to Comments on the Draft Zone F and K RFI Reports**

Date: March 31, 1999

Contents of the memorandum not included. Refer to original comment letter.

SCDHEC reply:

The presence of tetrachloroethene in the field and method blanks for groundwater samples and the Navy's suggestion that cross contamination may have occurred between samples for AOC 607 concerns the Department. The Navy should make every effort to prevent cross contamination in future samples. Field personnel should review the procedures for sample collection and shipment as noted in CVA Final Comprehensive Sampling and Analysis Plan dated 30 August

1994 and the EPA Region IV Environmental Compliance Branch Standard Operating Procedures and Quality Assurance Manual.

The Navy's explanation for the high incident of metals in the field blanks should be validated through water quality data from the North Charleston Water System. The data report should be submitted within ninety days of receipt of this letter.

Ensafe Response:
EnSafe will contact the City of North Charleston to inquire if such data is available and, if so, obtain a copy for comparison to the metals detected in Zone F field blanks.

CH2M-Jones Response Clarification: *Data from the City for the time period during described sampling is not available for comparison.*

SCDHEC Comment 5:
Figures 10.5-9 through 10.5-17, AOC 609
The organics in groundwater surrounding well SME005 have not been fully delineated. Additional groundwater wells should be installed.

EnSafe Response 5:
Constituents are primarily BTEX not waste oil. Propose to transfer this site to the UST program. Two shallow monitoring wells should be installed to address this data gap.

SCDHEC reply:

The Division is not prepared to transfer the site to the UST program. Groundwater data revealed the presence of chlorinated solvents in the area around AOC 609. The presence of these chlorinated solvents may indicate an additional source of contamination, not related to the UST. The Navy agreed in the 13 April 1999 Team meeting to install two additional wells and sample for the Appendix IX at DQO Level IV for at least two rounds. The Department issued monitoring well approval for two wells dated 28 April 1999.

EnSafe Response:
These wells were installed, developed, and sampled in May 1999. Validated data should be available in early July. These samples were analyzed for VOCs, SVOCs, metals, and pesticides/PCBs at DQO Level III.

CH2M-Jones Response Clarification: *Groundwater data from all monitoring events will be assessed in evaluating the presence of contamination. The existing BTEX plume that is related to the UST fuel release should not be confused with a release from the waste oil tank.*

SCDHEC (Johnny Tapia) Reply to Comments on The Zone F Draft RCRA Facility Investigation Report (dated 31 December 1998) Charleston Naval Complex

SCDHEC Comment 4:
The second paragraph of page 6.16 needs to be revised for the statements made about the use of the highest of background values (upper or lower soil) used as the screening alternative to SSLs. The same approach is mentioned for groundwater where the greater of shallow or deep background concentrations is used as an screening alternative to the tap water RBCs. Using this approach defeats the purpose of collecting two set of samples (upper and lower) to determine background reference concentrations and is not a conservative screening process. In addition, the same paragraph states that this approach is proposed based only on assumptions. The Screening process should continue as previously approved. Please revise this paragraph and consider implications throughout the report.

EnSafe revised Response 4:

The text will be modified to clarify that only SSLs will be used for the initial fate and transport screening. Inorganic SSL exceedances will be compared to background concentrations for discussion purposes only. Because the migration path, soil-to-groundwater, crosses through both soil intervals, the greater background will be used for this comparison.

As stated in the paragraph in question on page 6.16, the lithology of the surficial aquifer in Zone F is complex. Given the uncertainty about the interconnectedness of the portions of the aquifer encountered in each well, groundwater results from each depth (shallow or deep) will be screened only against background reference values from the corresponding depth for the final report.

CH2M-Jones Response Clarification: *CH2M-Jones is screening soil parameters against background samples from the corresponding depth intervals using the soil screening process as agreed upon with DHEC.*

SCDHEC Comment 6:
Page 7.10, "Summary of COPCs" paragraph makes the statement that "If no groundwater impacts were identified, the current soil concentrations were considered sufficiently protective of the underlying aquifer". The Department does not necessarily agree with this statement. Other factors as age of the unit, age of spills, type of contaminants present, barriers present (asphalt, concrete, etc.) would influence the presence of contaminants in groundwater. Please modify this statement and consider this factor when making this statement in reference to a specific unit.

EnSafe revised Response 6:
The Navy agrees and will revise the text in Section 7. Site specific factors potentially affecting the soil-to-groundwater pathway will be identified and discussed as appropriate for the site. This information will be added to the fate and transportation subsections of Section 10 text.

CH2M-Jones Response Clarification: *CH2M HILL is screening soil parameters for COPCs using the soil screening process as agreed upon with DHEC.*

SCDHEC (Susan Byrd) Reply to Comments on The Zone F Draft RCRA Facility Investigation Report (dated 31 December 1998) Charleston Naval Complex

SCDHEC Comment 1:
Section 6.2.1, Page 6.11, Line 20
The text states that the soil-to-groundwater migration pathway was assessed using generic SSLs that assume a DAF of 20, rather than site specific SSLs. A vague description was given for the justification of the DAF value used; however, a more thorough explanation as to why the DAF value of 20 was selected, including site specific parameters, should be discussed in this section. A table showing the comparative site specific values should be included.

EnSafe Response 1:
Because of the number of sites in each zone, fate and transport evaluation consists of a conservative, first-look screening followed by a more detailed look at the potential problem chemicals identified in the screening. In keeping with the preliminary nature of the screening, generic DAFs of 10 or 20 have been used to calculate SSLs for protection of groundwater. Normally, a DAF of 20 is used, as recommended in the 1996 USEPA *Soil Screening Guidance*. Where hydrogeological conditions indicate that a more conservative value is appropriate, a DAF of 10 is used. For example, DAFs of 10 were used for the Naval Annex in Zone K because sediments there are almost entirely permeable sand, and for Zone I because groundwater levels are very close to the surface and the horizontal gradient is unusually low. Fate and transport evaluation for Zone E was carried out differently than for other zones: recognizing that groundwater would not be used as drinking water in this industrial area, the focus was on potential threats to surface water in the Cooper River. To make up for this less conservative approach to groundwater, the DAF was arbitrarily lowered from 20 to 10, although hydrogeological conditions would have justified using 20. The decision to use a DAF of 20 was not dependant on site specific parameters. The rationale for using a DAF of 20 for Zone G is presented in Section 6.3.

CH2M-Jones Response Clarification: *Site-specific DAFs have been calculated for each group of sites within Zone F. The site-specific DAF for AOC 609 was estimated at 8.6, under the assumption that all existing structures and pavement could be removed in the future, resulting in more infiltration than is currently occurring.*

SCDHEC Comment 6:
Section 10.1
It would be very helpful to have a map at the beginning of each SWMU and AOC section showing the location of each SWMU or AOC within Zone F. The maps provided in each section are larger scale maps of the SWMUs and AOCs which do not show their locations within the entire Zone.

EnSafe Response 6:
This information is provided as Figure1-2 in Volume I of the RFI.

CH2M-Jones Response Clarification: *A location map will be provided at the beginning of each AOC or SWMU section.*

Appendix D

Charleston Naval Complex
AOC 609, Zone F
Groundwater VOA Analytical Data Summary

	StationID	F609GW001		F609GW001	
	SampleID	609GW00101		609GW00101	
	DateCollected	05/20/1999		05/20/1999	
	DateAnalyzed	05/24/1999		06/02/1999	
	SDGNumber	38649		38649	
BENZENE	UG/L	5	U		
CHLOROMETHANE	UG/L	5	U		
NAPHTHALENE	UG/L			10	U
TOLUENE	UG/L	5	U		
VINYL CHLORIDE	UG/L	5	U		
BROMOMETHANE	UG/L	5	U		
ETHYLBENZENE	UG/L	5	U		
CHLOROETHANE	UG/L	5	U		
1,1-DICHLOROETHENE	UG/L	5	U		
METHYLENE CHLORIDE	UG/L	5	U		
XYLENES, TOTAL	UG/L	5	U		
1,1-DICHLOROETHANE	UG/L	5	U		
CHLOROFORM	UG/L	5	U		
1,1,1-TRICHLOROETHANE	UG/L	5	U		
CARBON TETRACHLORIDE	UG/L	5	U		
1,2-DICHLOROETHANE	UG/L	5	U		
TRICHLOROETHYLENE (TCE)	UG/L	5	U		
1,2-DICHLOROPROPANE	UG/L	5	U		
BROMODICHLOROMETHANE	UG/L	5	U		
1,1,2-TRICHLOROETHANE	UG/L	5	U		
TETRACHLOROETHYLENE(PCE)	UG/L	5	U		
DIBROMOCHLOROMETHANE	UG/L	5	U		
CHLOROBENZENE	UG/L	5	U		
STYRENE	UG/L	5	U		
BROMOFORM	UG/L	5	U		
1,1,2,2-TETRACHLOROETHANE	UG/L	5	U		
ACETONE	UG/L	5	R		
CARBON DISULFIDE	UG/L	5	UJ		
Vinyl acetate	UG/L	5	U		
METHYL ETHYL KETONE (2-BUTANON	UG/L	5	R		
2-Chloroethyl vinyl ether	UG/L	5	R		
METHYL ISOBUTYL KETONE (4-METHYL-2-PENTANONE)	UG/L	5	U		
cis-1,3-DICHLOROPROPENE	UG/L	5	U		
trans-1,3-DICHLOROPROPENE	UG/L	5	U		
2-HEXANONE	UG/L	5	U		
1,2-Dichloroethene (total)	UG/L	5	U		

Charleston Naval Complex
AOC 609, Zone F
Groundwater VOA Analytical Data Summary

	StationID	F609GW001		F609GW002	
	SampleID	609GW00102		609GW00201	
	DateCollected	10/12/1999		05/20/1999	
	DateAnalyzed	10/18/1999		05/24/1999	
	SDGNumber	EN018		38649	
BENZENE	UG/L	3	U	5	U
CHLOROMETHANE	UG/L	3	U	5	U
NAPHTHALENE	UG/L				
TOLUENE	UG/L	3	U	5	U
VINYL CHLORIDE	UG/L	3	U	5	U
BROMOMETHANE	UG/L	3	U	5	U
ETHYLBENZENE	UG/L	3	U	5	U
CHLOROETHANE	UG/L	3	U	5	U
1,1-DICHLOROETHENE	UG/L	3	U	5	U
METHYLENE CHLORIDE	UG/L	3	U	5	U
XYLENES, TOTAL	UG/L	3	U	5	U
1,1-DICHLOROETHANE	UG/L	3	U	5	U
CHLOROFORM	UG/L	3	U	5	U
1,1,1-TRICHLOROETHANE	UG/L	3	U	5	U
CARBON TETRACHLORIDE	UG/L	3	U	5	U
1,2-DICHLOROETHANE	UG/L	3	U	5	U
TRICHLOROETHYLENE (TCE)	UG/L	3	U	5	U
1,2-DICHLOROPROPANE	UG/L	3	U	5	U
BROMODICHLOROMETHANE	UG/L	3	U	5	U
1,1,2-TRICHLOROETHANE	UG/L	3	U	5	U
TETRACHLOROETHYLENE(PCE)	UG/L	3	U	5	U
DIBROMOCHLOROMETHANE	UG/L	3	U	5	U
CHLOROBENZENE	UG/L	3	U	5	U
STYRENE	UG/L	3	U	5	U
BROMOFORM	UG/L	3	U	5	U
1,1,2,2-TETRACHLOROETHANE	UG/L	3	U	5	U
ACETONE	UG/L	5	R	5	R
CARBON DISULFIDE	UG/L	3	U	5	UJ
Vinyl acetate	UG/L	3	U	5	U
METHYL ETHYL KETONE (2-BUTANON	UG/L	5	U	5	R
2-Chloroethyl vinyl ether	UG/L	10	U	5	R
METHYL ISOBUTYL KETONE (4-METHYL-2-PENTANONE)	UG/L	5	U	5	U
cis-1,3-DICHLOROPROPENE	UG/L	3	U	5	U
trans-1,3-DICHLOROPROPENE	UG/L	3	U	5	U
2-HEXANONE	UG/L	5	U	5	U
1,2-Dichloroethene (total)	UG/L	3	U	5	U

Charleston Naval Complex
AOC 609, Zone F
Groundwater VOA Analytical Data Summary

		StationID	F609GW002		F609GW002	
		SampleID	609GW00201		609GW00202	
		DateCollected	05/20/1999		10/12/1999	
		DateAnalyzed	06/02/1999		10/29/1999	
		SDGNumber	38649		EN018	
BENZENE	UG/L				3	U
CHLOROMETHANE	UG/L				3	U
NAPHTHALENE	UG/L		10	U		
TOLUENE	UG/L				3	U
VINYL CHLORIDE	UG/L				3	U
BROMOMETHANE	UG/L				3	U
ETHYLBENZENE	UG/L				3	U
CHLOROETHANE	UG/L				3	U
1,1-DICHLOROETHENE	UG/L				3	U
METHYLENE CHLORIDE	UG/L				3	U
XYLENES, TOTAL	UG/L				3	U
1,1-DICHLOROETHANE	UG/L				3	U
CHLOROFORM	UG/L				3	U
1,1,1-TRICHLOROETHANE	UG/L				3	U
CARBON TETRACHLORIDE	UG/L				3	U
1,2-DICHLOROETHANE	UG/L				3	U
TRICHLOROETHYLENE (TCE)	UG/L				3	U
1,2-DICHLOROPROPANE	UG/L				3	U
BROMODICHLOROMETHANE	UG/L				3	U
1,1,2-TRICHLOROETHANE	UG/L				3	U
TETRACHLOROETHYLENE(PCE)	UG/L				3	U
DIBROMOCHLOROMETHANE	UG/L				3	U
CHLOROBENZENE	UG/L				3	U
STYRENE	UG/L				3	U
BROMOFORM	UG/L				3	U
1,1,2,2-TETRACHLOROETHANE	UG/L				3	U
ACETONE	UG/L				5	R
CARBON DISULFIDE	UG/L				3	U
Vinyl acetate	UG/L				3	U
METHYL ETHYL KETONE (2-BUTANON	UG/L				5	U
2-Chloroethyl vinyl ether	UG/L				10	U
METHYL ISOBUTYL KETONE (4-METHYL-2-PENTANONE)	UG/L				5	U
cis-1,3-DICHLOROPROPENE	UG/L				3	U
trans-1,3-DICHLOROPROPENE	UG/L				3	U
2-HEXANONE	UG/L				5	U
1,2-Dichloroethene (total)	UG/L				3	U

Charleston Naval Complex
AOC 609, Zone F
Groundwater VOA Analytical Data Summary

		StationID	FSMEGW001		FSMEGW001	
		SampleID	SMEGW00104		SMEGW00104	
		DateCollected	11/21/1997		11/21/1997	
		DateAnalyzed	12/02/1997		12/08/1997	
		SDGNumber	31911		31911	
BENZENE	UG/L		5	U		
CHLOROMETHANE	UG/L		5	U		
NAPHTHALENE	UG/L				10	U
TOLUENE	UG/L		5	U		
VINYL CHLORIDE	UG/L		5	U		
BROMOMETHANE	UG/L		5	U		
ETHYLBENZENE	UG/L		5	U		
CHLOROETHANE	UG/L		5	U		
1,1-DICHLOROETHENE	UG/L		5	U		
METHYLENE CHLORIDE	UG/L		5	U		
XYLENES, TOTAL	UG/L		5	U		
1,1-DICHLOROETHANE	UG/L		5	U		
CHLOROFORM	UG/L		5	U		
1,1,1-TRICHLOROETHANE	UG/L		5	U		
CARBON TETRACHLORIDE	UG/L		5	U		
1,2-DICHLOROETHANE	UG/L		5	U		
TRICHLOROETHYLENE (TCE)	UG/L		5	U		
1,2-DICHLOROPROPANE	UG/L		5	U		
BROMODICHLOROMETHANE	UG/L		5	U		
1,1,2-TRICHLOROETHANE	UG/L		5	U		
TETRACHLOROETHYLENE(PCE)	UG/L		5	U		
DIBROMOCHLOROMETHANE	UG/L		5	U		
CHLOROBENZENE	UG/L		5	U		
STYRENE	UG/L		5	U		
BROMOFORM	UG/L		5	U		
1,1,2,2-TETRACHLOROETHANE	UG/L		5	U		
ACETONE	UG/L		5	U		
CARBON DISULFIDE	UG/L		5	U		
Vinyl acetate	UG/L		5	U		
METHYL ETHYL KETONE (2-BUTANON	UG/L		5	U		
2-Chloroethyl vinyl ether	UG/L		5	U		
METHYL ISOBUTYL KETONE (4-METHYL-2-PENTANONE)	UG/L		5	U		
cis-1,3-DICHLOROPROPENE	UG/L		5	U		
trans-1,3-DICHLOROPROPENE	UG/L		5	U		
2-HEXANONE	UG/L		5	U		
1,2-Dichloroethene (total)	UG/L		5	U		

Charleston Naval Complex
AOC 609, Zone F
Groundwater VOA Analytical Data Summary

		StationID	FSMEGW003		FSMEGW003	
		SampleID	SMEGW00304		SMEGW00304	
		DateCollected	11/21/1997		11/21/1997	
		DateAnalyzed	12/02/1997		12/08/1997	
		SDGNumber	31911		31911	
BENZENE	UG/L		5	U		
CHLOROMETHANE	UG/L		5	U		
NAPHTHALENE	UG/L				10	U
TOLUENE	UG/L		5	U		
VINYL CHLORIDE	UG/L		5	U		
BROMOMETHANE	UG/L		5	U		
ETHYLBENZENE	UG/L		5	U		
CHLOROETHANE	UG/L		5	U		
1,1-DICHLOROETHENE	UG/L		5	U		
METHYLENE CHLORIDE	UG/L		5	U		
XYLENES, TOTAL	UG/L		5	U		
1,1-DICHLOROETHANE	UG/L		5	U		
CHLOROFORM	UG/L		5	U		
1,1,1-TRICHLOROETHANE	UG/L		5	U		
CARBON TETRACHLORIDE	UG/L		5	U		
1,2-DICHLOROETHANE	UG/L		5	U		
TRICHLOROETHYLENE (TCE)	UG/L		5	U		
1,2-DICHLOROPROPANE	UG/L		5	U		
BROMODICHLOROMETHANE	UG/L		5	U		
1,1,2-TRICHLOROETHANE	UG/L		5	U		
TETRACHLOROETHYLENE(PCE)	UG/L		5	U		
DIBROMOCHLOROMETHANE	UG/L		5	U		
CHLOROBENZENE	UG/L		5	U		
STYRENE	UG/L		5	U		
BROMOFORM	UG/L		5	U		
1,1,2,2-TETRACHLOROETHANE	UG/L		5	U		
ACETONE	UG/L		5	U		
CARBON DISULFIDE	UG/L		5	U		
Vinyl acetate	UG/L		5	U		
METHYL ETHYL KETONE (2-BUTANOI	UG/L		5	U		
2-Chloroethyl vinyl ether	UG/L		5	U		
METHYL ISOBUTYL KETONE (4-METHYL-2-PENTANONE)	UG/L		5	U		
cis-1,3-DICHLOROPROPENE	UG/L		5	U		
trans-1,3-DICHLOROPROPENE	UG/L		5	U		
2-HEXANONE	UG/L		5	U		
1,2-Dichloroethene (total)	UG/L		5	U		

Charleston Naval Complex
AOC 609, Zone F
Groundwater VOA Analytical Data Summary

	StationID	FSMEGW004		FSMEGW004	
	SampleID	SMEGW00404		SMEGW00404	
	DateCollected	11/21/1997		11/21/1997	
	DateAnalyzed	12/02/1997		12/08/1997	
	SDGNumber	31911		31911	
BENZENE	UG/L	5	U		
CHLOROMETHANE	UG/L	5	U		
NAPHTHALENE	UG/L			10	U
TOLUENE	UG/L	5	U		
VINYL CHLORIDE	UG/L	5	U		
BROMOMETHANE	UG/L	5	U		
ETHYLBENZENE	UG/L	5	U		
CHLOROETHANE	UG/L	5	U		
1,1-DICHLOROETHENE	UG/L	5	U		
METHYLENE CHLORIDE	UG/L	5	U		
XYLENES, TOTAL	UG/L	5	U		
1,1-DICHLOROETHANE	UG/L	5	U		
CHLOROFORM	UG/L	5	U		
1,1,1-TRICHLOROETHANE	UG/L	5	U		
CARBON TETRACHLORIDE	UG/L	5	U		
1,2-DICHLOROETHANE	UG/L	5	U		
TRICHLOROETHYLENE (TCE)	UG/L	5	U		
1,2-DICHLOROPROPANE	UG/L	5	U		
BROMODICHLOROMETHANE	UG/L	5	U		
1,1,2-TRICHLOROETHANE	UG/L	5	U		
TETRACHLOROETHYLENE(PCE)	UG/L	5	U		
DIBROMOCHLOROMETHANE	UG/L	5	U		
CHLOROBENZENE	UG/L	5	U		
STYRENE	UG/L	5	U		
BROMOFORM	UG/L	5	U		
1,1,2,2-TETRACHLOROETHANE	UG/L	5	U		
ACETONE	UG/L	5	U		
CARBON DISULFIDE	UG/L	5	U		
Vinyl acetate	UG/L	5	U		
METHYL ETHYL KETONE (2-BUTANOI	UG/L	5	U		
2-Chloroethyl vinyl ether	UG/L	5	U		
METHYL ISOBUTYL KETONE (4-METHYL-2-PENTANONE)	UG/L	5	U		
cis-1,3-DICHLOROPROPENE	UG/L	5	U		
trans-1,3-DICHLOROPROPENE	UG/L	5	U		
2-HEXANONE	UG/L	5	U		
1,2-Dichloroethene (total)	UG/L	5	U		

Charleston Naval Complex
AOC 609, Zone F
Groundwater VOA Analytical Data Summary

	StationID	FSMEGW005		FSMEGW005	
	SampleID	SMEGW00504		SMEGW00504	
	DateCollected	11/20/1997		11/20/1997	
	DateAnalyzed	11/25/1997		12/03/1997	
	SDGNumber	31911		31911	
BENZENE	UG/L	23000	=		
CHLOROMETHANE	UG/L	5	UJ		
NAPHTHALENE	UG/L			370	=
TOLUENE	UG/L	34000	=		
VINYL CHLORIDE	UG/L	5	UJ		
BROMOMETHANE	UG/L	5	UJ		
ETHYLBENZENE	UG/L	2600	=		
CHLOROETHANE	UG/L	5	UJ		
1,1-DICHLOROETHENE	UG/L	5	UJ		
METHYLENE CHLORIDE	UG/L	5	UJ		
XYLENES, TOTAL	UG/L	12000	=		
1,1-DICHLOROETHANE	UG/L	5	UJ		
CHLOROFORM	UG/L	5	UJ		
1,1,1-TRICHLOROETHANE	UG/L	5	UJ		
CARBON TETRACHLORIDE	UG/L	5	UJ		
1,2-DICHLOROETHANE	UG/L	5	UJ		
TRICHLOROETHYLENE (TCE)	UG/L	5	UJ		
1,2-DICHLOROPROPANE	UG/L	5	UJ		
BROMODICHLOROMETHANE	UG/L	5	UJ		
1,1,2-TRICHLOROETHANE	UG/L	5	UJ		
TETRACHLOROETHYLENE(PCE)	UG/L	5	UJ		
DIBROMOCHLOROMETHANE	UG/L	5	UJ		
CHLOROBENZENE	UG/L	5	UJ		
STYRENE	UG/L	5	UJ		
BROMOFORM	UG/L	5	UJ		
1,1,2,2-TETRACHLOROETHANE	UG/L	5	UJ		
ACETONE	UG/L	5	UJ		
CARBON DISULFIDE	UG/L	5	UJ		
Vinyl acetate	UG/L	5	UJ		
METHYL ETHYL KETONE (2-BUTANON	UG/L	5	UJ		
2-Chloroethyl vinyl ether	UG/L	5	UJ		
METHYL ISOBUTYL KETONE (4-METHYL-2-PENTANONE)	UG/L	5	UJ		
cis-1,3-DICHLOROPROPENE	UG/L	5	UJ		
trans-1,3-DICHLOROPROPENE	UG/L	5	UJ		
2-HEXANONE	UG/L	5	UJ		
1,2-Dichloroethene (total)	UG/L	5	UJ		

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	StationID	FSMEGW006		FSMEGW006	
	SampleID	SMEGW00604		SMEGW00604	
	DateCollected	11/20/1997		11/20/1997	
	DateAnalyzed	12/02/1997		12/15/1997	
	SDGNumber	31911		31911	
BENZENE	UG/L	5	U		
CHLOROMETHANE	UG/L	5	U		
NAPHTHALENE	UG/L			10	U
TOLUENE	UG/L	5	U		
VINYL CHLORIDE	UG/L	5	U		
BROMOMETHANE	UG/L	5	U		
ETHYLBENZENE	UG/L	5	U		
CHLOROETHANE	UG/L	5	U		
1,1-DICHLOROETHENE	UG/L	5	U		
METHYLENE CHLORIDE	UG/L	5	U		
XYLENES, TOTAL	UG/L	5	U		
1,1-DICHLOROETHANE	UG/L	5	U		
CHLOROFORM	UG/L	5	U		
1,1,1-TRICHLOROETHANE	UG/L	5	U		
CARBON TETRACHLORIDE	UG/L	5	U		
1,2-DICHLOROETHANE	UG/L	5	U		
TRICHLOROETHYLENE (TCE)	UG/L	5	U		
1,2-DICHLOROPROPANE	UG/L	5	U		
BROMODICHLOROMETHANE	UG/L	5	U		
1,1,2-TRICHLOROETHANE	UG/L	5	U		
TETRACHLOROETHYLENE(PCE)	UG/L	5	U		
DIBROMOCHLOROMETHANE	UG/L	5	U		
CHLOROBENZENE	UG/L	5	U		
STYRENE	UG/L	5	U		
BROMOFORM	UG/L	5	U		
1,1,2,2-TETRACHLOROETHANE	UG/L	5	U		
ACETONE	UG/L	5	U		
CARBON DISULFIDE	UG/L	5	U		
Vinyl acetate	UG/L	5	U		
METHYL ETHYL KETONE (2-BUTANON	UG/L	5	U		
2-Chloroethyl vinyl ether	UG/L	5	U		
METHYL ISOBUTYL KETONE (4-METHYL-2-PENTANONE)	UG/L	5	U		
cis-1,3-DICHLOROPROPENE	UG/L	5	U		
trans-1,3-DICHLOROPROPENE	UG/L	5	U		
2-HEXANONE	UG/L	5	U		
1,2-Dichloroethene (total)	UG/L	5	U		

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	StationID	FSMEGW007		FSMEGW007	
	SampleID	SMEGW00704		SMEHW00704	
	DateCollected	11/20/1997		11/20/1997	
	DateAnalyzed	12/03/1997		12/03/1997	
	SDGNumber	31911		31911	
BENZENE	UG/L	5	U	5	U
CHLOROMETHANE	UG/L	5	U	5	U
NAPHTHALENE	UG/L	10	U	10	U
TOLUENE	UG/L	5	U	5	U
VINYL CHLORIDE	UG/L	5	U	5	U
BROMOMETHANE	UG/L	5	U	5	U
ETHYLBENZENE	UG/L	5	U	5	U
CHLOROETHANE	UG/L	5	U	5	U
1,1-DICHLOROETHENE	UG/L	5	U	5	U
METHYLENE CHLORIDE	UG/L	5	U	5	U
XYLENES, TOTAL	UG/L	5	U	5	U
1,1-DICHLOROETHANE	UG/L	5	U	5	U
CHLOROFORM	UG/L	5	U	5	U
1,1,1-TRICHLOROETHANE	UG/L	5	U	5	U
CARBON TETRACHLORIDE	UG/L	5	U	5	U
1,2-DICHLOROETHANE	UG/L	5	U	5	U
TRICHLOROETHYLENE (TCE)	UG/L	5	U	5	U
1,2-DICHLOROPROPANE	UG/L	5	U	5	U
BROMODICHLOROMETHANE	UG/L	5	U	5	U
1,1,2-TRICHLOROETHANE	UG/L	5	U	5	U
TETRACHLOROETHYLENE(PCE)	UG/L	5	U	5	U
DIBROMOCHLOROMETHANE	UG/L	5	U	5	U
CHLOROBENZENE	UG/L	5	U	5	U
STYRENE	UG/L	5	U	5	U
BROMOFORM	UG/L	5	U	5	U
1,1,2,2-TETRACHLOROETHANE	UG/L	5	U	5	U
ACETONE	UG/L	5	U	5	U
CARBON DISULFIDE	UG/L	5	U	5	U
Vinyl acetate	UG/L	5	U	5	U
METHYL ETHYL KETONE (2-BUTANON	UG/L	5	U	5	U
2-Chloroethyl vinyl ether	UG/L	5	U	5	U
METHYL ISOBUTYL KETONE (4-METHYL-2-PENTANONE)	UG/L	5	U	5	U
cis-1,3-DICHLOROPROPENE	UG/L	5	U	5	U
trans-1,3-DICHLOROPROPENE	UG/L	5	U	5	U
2-HEXANONE	UG/L	5	U	5	U
1,2-Dichloroethene (total)	UG/L	5	U	5	U

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Groundwater VOA Analytical Data Summary

	StationID	FSMEGW008		FSMEGW008	
	SampleID	SMEGW00804		SMEGW00804	
	DateCollected	11/19/1997		11/19/1997	
	DateAnalyzed	11/25/1997		12/12/1997	
	SDGNumber	31911		31911	
BENZENE	UG/L	5	U		
CHLOROMETHANE	UG/L	5	U		
NAPHTHALENE	UG/L			10	U
TOLUENE	UG/L	5	U		
VINYL CHLORIDE	UG/L	5	U		
BROMOMETHANE	UG/L	5	UJ		
ETHYLBENZENE	UG/L	5	U		
CHLOROETHANE	UG/L	5	UJ		
1,1-DICHLOROETHENE	UG/L	5	U		
METHYLENE CHLORIDE	UG/L	7	U		
XYLENES, TOTAL	UG/L	4	J		
1,1-DICHLOROETHANE	UG/L	5	U		
CHLOROFORM	UG/L	5	U		
1,1,1-TRICHLOROETHANE	UG/L	5	U		
CARBON TETRACHLORIDE	UG/L	5	U		
1,2-DICHLOROETHANE	UG/L	5	U		
TRICHLOROETHYLENE (TCE)	UG/L	5	U		
1,2-DICHLOROPROPANE	UG/L	5	U		
BROMODICHLOROMETHANE	UG/L	5	U		
1,1,2-TRICHLOROETHANE	UG/L	5	U		
TETRACHLOROETHYLENE(PCE)	UG/L	5	U		
DIBROMOCHLOROMETHANE	UG/L	5	U		
CHLOROBENZENE	UG/L	5	U		
STYRENE	UG/L	5	U		
BROMOFORM	UG/L	5	U		
1,1,2,2-TETRACHLOROETHANE	UG/L	5	U		
ACETONE	UG/L	5	U		
CARBON DISULFIDE	UG/L	5	U		
Vinyl acetate	UG/L	5	U		
METHYL ETHYL KETONE (2-BUTANON	UG/L	5	U		
2-Chloroethyl vinyl ether	UG/L	5	U		
METHYL ISOBUTYL KETONE (4-METHYL-2-PENTANONE)	UG/L	5	U		
cis-1,3-DICHLOROPROPENE	UG/L	5	U		
trans-1,3-DICHLOROPROPENE	UG/L	5	U		
2-HEXANONE	UG/L	5	U		
1,2-Dichloroethene (total)	UG/L	5	U		

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Groundwater SVOA Analytical Data Summary

	StationID	F609GW001		F609GW002	
	SampleID	609GW00101		609GW00201	
	DateCollected	05/20/1999		05/20/1999	
	DateAnalyzed	06/02/1999		06/02/1999	
	SDGNumber	38649		38649	
2,2'-OXYBIS(1-CHLORO)PROPANE	UG/L	10	U	10	U
2-METHYLNAPHTHALENE	UG/L	10	U	10	U
2-METHYLPHENOL (o-CRESOL)	UG/L	10	U	10	U
PHENOL	UG/L	10	U	10	U
ACENAPHTHYLENE	UG/L	10	U	10	U
bis(2-CHLOROETHYL) ETHER (2-CHLOROETHYL ETHER)	UG/L	10	U	10	U
2-CHLOROPHENOL	UG/L	10	U	10	U
ACENAPHTHENE	UG/L	10	U	10	U
1,3-DICHLOROBENZENE	UG/L	10	U	10	U
FLUORENE	UG/L	10	U	10	U
1,4-DICHLOROBENZENE	UG/L	10	U	10	U
PHENANTHRENE	UG/L	10	U	10	U
ANTHRACENE	UG/L	10	U	10	U
Benzyl alcohol	UG/L	10	U	10	U
FLUORANTHENE	UG/L	10	U	10	U
1,2-DICHLOROBENZENE	UG/L	10	U	10	U
PYRENE	UG/L	10	U	10	U
BENZO(a)ANTHRACENE	UG/L	10	U	10	U
CHRYSENE	UG/L	10	U	10	U
BENZO(b)FLUORANTHENE	UG/L	10	U	10	U
N-NITROSODI-n-PROPYLAMINE	UG/L	10	U	10	U
4-METHYLPHENOL (p-CRESOL)	UG/L	10	U	10	U
BENZO(k)FLUORANTHENE	UG/L	10	U	10	U
BENZO(a)PYRENE	UG/L	10	U	10	U
HEXACHLOROETHANE	UG/L	10	U	10	U
INDENO(1,2,3-c,d)PYRENE	UG/L	10	U	10	U
NITROBENZENE	UG/L	10	U	10	U
DIBENZ(a,h)ANTHRACENE	UG/L	10	U	10	U
ISOPHORONE	UG/L	10	U	10	U
2-NITROPHENOL	UG/L	10	U	10	U
BENZO(g,h,i)PERYLENE	UG/L	10	U	10	U
2,4-DIMETHYLPHENOL	UG/L	10	U	10	U
bis(2-CHLOROETHOXY) METHANE	UG/L	10	U	10	U
Benzoic acid	UG/L	25	U	25	U
2,4-DICHLOROPHENOL	UG/L	10	U	10	U
1,2,4-TRICHLOROBENZENE	UG/L	10	U	10	U
4-CHLOROANILINE	UG/L	10	U	10	U
HEXACHLOROBUTADIENE	UG/L	10	U	10	U
4-CHLORO-3-METHYLPHENOL	UG/L	10	U	10	U
HEXACHLOROCYCLOPENTADIENE	UG/L	10	U	10	U
2,4,6-TRICHLOROPHENOL	UG/L	10	U	10	U
2,4,5-TRICHLOROPHENOL	UG/L	25	U	25	U
2-CHLORONAPHTHALENE	UG/L	10	U	10	U
2-NITROANILINE	UG/L	25	U	25	U

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Groundwater SVOA Analytical Data Summary

	StationID	F609GW001		F609GW002	
	SampleID	609GW00101		609GW00201	
	DateCollected	05/20/1999		05/20/1999	
	DateAnalyzed	06/02/1999		06/02/1999	
	SDGNumber	38649		38649	
2,6-DINITROTOLUENE	UG/L	10	U	10	U
3-NITROANILINE	UG/L	25	U	25	U
2,4-DINITROPHENOL	UG/L	25	U	25	U
DIBENZOFURAN	UG/L	10	U	10	U
4-NITROPHENOL	UG/L	25	U	25	U
2,4-DINITROTOLUENE	UG/L	10	U	10	U
DIMETHYL PHTHALATE	UG/L	10	U	10	U
DIETHYL PHTHALATE	UG/L	10	U	10	U
4-CHLOROPHENYL PHENYL ETHER	UG/L	10	U	10	U
4-NITROANILINE	UG/L	25	U	25	U
4,6-DINITRO-2-METHYLPHENOL	UG/L	25	U	25	U
N-NITROSODIPHENYLAMINE	UG/L	10	U	10	U
4-BROMOPHENYL PHENYL ETHER	UG/L	10	U	10	U
HEXACHLOROBENZENE	UG/L	10	U	10	U
PENTACHLOROPHENOL	UG/L	25	U	25	U
DI-n-BUTYL PHTHALATE	UG/L	10	U	10	U
BENZYL BUTYL PHTHALATE	UG/L	10	U	10	U
3,3'-DICHLOROBENZIDINE	UG/L	10	U	10	U
bis(2-ETHYLHEXYL) PHTHALATE	UG/L	10	U	10	U
DI-n-OCTYLPHTHALATE	UG/L	10	U	10	U

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Groundwater SVOA Analytical Data Summary

	StationID	FSMEGW001		FSMEGW003	
	SampleID	SMEGW00104		SMEGW00304	
	DateCollected	11/21/1997		11/21/1997	
	DateAnalyzed	12/08/1997		12/08/1997	
	SDGNumber	31911		31911	
2,2'-OXYBIS(1-CHLORO)PROPANE	UG/L	10	U	10	U
2-METHYLNAPHTHALENE	UG/L	10	U	10	U
2-METHYLPHENOL (o-CRESOL)	UG/L	10	U	10	U
PHENOL	UG/L	10	U	10	U
ACENAPHTHYLENE	UG/L	10	U	10	U
bis(2-CHLOROETHYL) ETHER (2-CHLOROETHYL ETHER)	UG/L	10	U	10	U
2-CHLOROPHENOL	UG/L	10	U	10	U
ACENAPHTHENE	UG/L	10	U	10	U
1,3-DICHLOROBENZENE	UG/L	10	U	10	U
FLUORENE	UG/L	10	U	10	U
1,4-DICHLOROBENZENE	UG/L	10	U	10	U
PHENANTHRENE	UG/L	10	U	10	U
ANTHRACENE	UG/L	10	U	10	U
Benzyl alcohol	UG/L	10	U	10	U
FLUORANTHENE	UG/L	10	U	10	U
1,2-DICHLOROBENZENE	UG/L	10	U	10	U
PYRENE	UG/L	10	U	10	U
BENZO(a)ANTHRACENE	UG/L	10	U	10	U
CHRYSENE	UG/L	10	U	10	U
BENZO(b)FLUORANTHENE	UG/L	10	U	10	U
N-NITROSODI-n-PROPYLAMINE	UG/L	10	U	10	U
4-METHYLPHENOL (p-CRESOL)	UG/L	1	J	10	U
BENZO(k)FLUORANTHENE	UG/L	10	U	10	U
BENZO(a)PYRENE	UG/L	10	U	10	U
HEXACHLOROETHANE	UG/L	10	U	10	U
INDENO(1,2,3-c,d)PYRENE	UG/L	10	U	10	U
NITROBENZENE	UG/L	10	U	10	U
DIBENZ(a,h)ANTHRACENE	UG/L	10	U	10	U
ISOPHORONE	UG/L	10	U	10	U
2-NITROPHENOL	UG/L	10	U	10	U
BENZO(g,h,i)PERYLENE	UG/L	10	U	10	U
2,4-DIMETHYLPHENOL	UG/L	10	U	10	U
bis(2-CHLOROETHOXY) METHANE	UG/L	10	U	10	U
Benzoic acid	UG/L	50	U	50	U
2,4-DICHLOROPHENOL	UG/L	10	U	10	U
1,2,4-TRICHLOROBENZENE	UG/L	10	U	10	U
4-CHLOROANILINE	UG/L	10	U	10	U
HEXACHLOROBUTADIENE	UG/L	10	U	10	U
4-CHLORO-3-METHYLPHENOL	UG/L	10	U	10	U
HEXACHLOROCYCLOPENTADIENE	UG/L	10	U	10	U
2,4,6-TRICHLOROPHENOL	UG/L	10	U	10	U
2,4,5-TRICHLOROPHENOL	UG/L	50	U	50	U
2-CHLORONAPHTHALENE	UG/L	10	U	10	U
2-NITROANILINE	UG/L	50	U	50	U

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Groundwater SVOA Analytical Data Summary

	StationID	FSMEGW001		FSMEGW003	
	SampleID	SMEGW00104		SMEGW00304	
	DateCollected	11/21/1997		11/21/1997	
	DateAnalyzed	12/08/1997		12/08/1997	
	SDGNumber	31911		31911	
2,6-DINITROTOLUENE	UG/L	10	U	10	U
3-NITROANILINE	UG/L	50	U	50	U
2,4-DINITROPHENOL	UG/L	50	U	50	U
DIBENZOFURAN	UG/L	10	U	10	U
4-NITROPHENOL	UG/L	50	U	50	U
2,4-DINITROTOLUENE	UG/L	10	U	10	U
DIMETHYL PHTHALATE	UG/L	10	U	10	U
DIETHYL PHTHALATE	UG/L	10	U	10	U
4-CHLOROPHENYL PHENYL ETHER	UG/L	10	U	10	U
4-NITROANILINE	UG/L	50	U	50	U
4,6-DINITRO-2-METHYLPHENOL	UG/L	50	U	50	U
N-NITROSODIPHENYLAMINE	UG/L	10	U	10	U
4-BROMOPHENYL PHENYL ETHER	UG/L	10	U	10	U
HEXACHLOROBENZENE	UG/L	10	U	10	U
PENTACHLOROPHENOL	UG/L	50	U	50	U
DI-n-BUTYL PHTHALATE	UG/L	10	U	10	U
BENZYL BUTYL PHTHALATE	UG/L	10	U	10	U
3,3'-DICHLOROBENZIDINE	UG/L	20	U	20	U
bis(2-ETHYLHEXYL) PHTHALATE	UG/L	10	U	10	U
DI-n-OCTYLPHTHALATE	UG/L	10	U	10	U

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Groundwater SVOA Analytical Data Summary

		StationID	FSMEGW004		FSMEGW005	
		SampleID	SMEGW00404		SMEGW00504	
		DateCollected	11/21/1997		11/20/1997	
		DateAnalyzed	12/08/1997		12/03/1997	
		SDGNumber	31911		31911	
2,2'-OXYBIS(1-CHLORO)PROPANE	UG/L		10	U	10	U
2-METHYLNAPHTHALENE	UG/L		10	U	100	=
2-METHYLPHENOL (o-CRESOL)	UG/L		10	U	340	=
PHENOL	UG/L		10	U	170	=
ACENAPHTHYLENE	UG/L		10	U	10	U
bis(2-CHLOROETHYL) ETHER (2-CHLOROETHYL ETHER)	UG/L		10	U	10	U
2-CHLOROPHENOL	UG/L		10	U	10	U
ACENAPHTHENE	UG/L		10	U	10	U
1,3-DICHLOROBENZENE	UG/L		10	U	10	U
FLUORENE	UG/L		10	U	10	U
1,4-DICHLOROBENZENE	UG/L		10	U	10	U
PHENANTHRENE	UG/L		10	U	10	U
ANTHRACENE	UG/L		10	U	10	U
Benzyl alcohol	UG/L		10	U	10	U
FLUORANTHENE	UG/L		10	U	10	U
1,2-DICHLOROBENZENE	UG/L		10	U	10	U
PYRENE	UG/L		10	U	10	U
BENZO(a)ANTHRACENE	UG/L		10	U	10	U
CHRYSENE	UG/L		10	U	10	U
BENZO(b)FLUORANTHENE	UG/L		10	U	10	U
N-NITROSODI-n-PROPYLAMINE	UG/L		10	U	10	U
4-METHYLPHENOL (p-CRESOL)	UG/L		10	U	310	=
BENZO(k)FLUORANTHENE	UG/L		10	U	10	U
BENZO(a)PYRENE	UG/L		10	U	10	U
HEXACHLOROETHANE	UG/L		10	U	10	U
INDENO(1,2,3-c,d)PYRENE	UG/L		10	U	10	U
NITROBENZENE	UG/L		10	U	10	U
DIBENZ(a,h)ANTHRACENE	UG/L		10	U	10	U
ISOPHORONE	UG/L		10	U	10	U
2-NITROPHENOL	UG/L		10	U	10	U
BENZO(g,h,i)PERYLENE	UG/L		10	U	10	U
2,4-DIMETHYLPHENOL	UG/L		10	U	140	=
bis(2-CHLOROETHOXY) METHANE	UG/L		10	U	10	U
Benzoic acid	UG/L		50	U	50	U
2,4-DICHLOROPHENOL	UG/L		10	U	10	U
1,2,4-TRICHLOROBENZENE	UG/L		10	U	10	U
4-CHLOROANILINE	UG/L		10	U	10	U
HEXACHLOROBUTADIENE	UG/L		10	U	10	U
4-CHLORO-3-METHYLPHENOL	UG/L		10	U	10	U
HEXACHLOROCYCLOPENTADIENE	UG/L		10	U	10	U
2,4,6-TRICHLOROPHENOL	UG/L		10	U	10	U
2,4,5-TRICHLOROPHENOL	UG/L		50	U	50	U
2-CHLORONAPHTHALENE	UG/L		10	U	10	U
2-NITROANILINE	UG/L		50	U	50	U

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Groundwater SVOA Analytical Data Summary

	StationID	FSMEGW004		FSMEGW005	
	SampleID	SMEGW00404		SMEGW00504	
	DateCollected	11/21/1997		11/20/1997	
	DateAnalyzed	12/08/1997		12/03/1997	
	SDGNumber	31911		31911	
2,6-DINITROTOLUENE	UG/L	10	U	10	U
3-NITROANILINE	UG/L	50	U	50	U
2,4-DINITROPHENOL	UG/L	50	U	50	U
DIBENZOFURAN	UG/L	10	U	10	U
4-NITROPHENOL	UG/L	50	U	50	U
2,4-DINITROTOLUENE	UG/L	10	U	10	UJ
DIMETHYL PHTHALATE	UG/L	10	U	10	U
DIETHYL PHTHALATE	UG/L	10	U	10	U
4-CHLOROPHENYL PHENYL ETHER	UG/L	10	U	10	U
4-NITROANILINE	UG/L	50	U	50	U
4,6-DINITRO-2-METHYLPHENOL	UG/L	50	U	50	U
N-NITROSODIPHENYLAMINE	UG/L	10	U	10	U
4-BROMOPHENYL PHENYL ETHER	UG/L	10	U	10	U
HEXACHLOROBENZENE	UG/L	10	U	10	U
PENTACHLOROPHENOL	UG/L	50	U	50	U
DI-n-BUTYL PHTHALATE	UG/L	10	U	10	U
BENZYL BUTYL PHTHALATE	UG/L	10	U	10	U
3,3'-DICHLOROBENZIDINE	UG/L	20	U	20	U
bis(2-ETHYLHEXYL) PHTHALATE	UG/L	10	U	10	U
DI-n-OCTYLPHTHALATE	UG/L	10	U	10	U

Charleston Naval Complex
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Groundwater SVOA Analytical Data Summary

	StationID	FSMEGW006		FSMEGW007	
	SampleID	SMEGW00604		SMEGW00704	
	DateCollected	11/20/1997		11/20/1997	
	DateAnalyzed	12/15/1997		12/03/1997	
	SDGNumber	31911		31911	
2,2'-OXYBIS(1-CHLORO)PROPANE	UG/L	10	U	10	U
2-METHYLNAPHTHALENE	UG/L	10	U	10	U
2-METHYLPHENOL (o-CRESOL)	UG/L	10	U	10	U
PHENOL	UG/L	10	U	10	U
ACENAPHTHYLENE	UG/L	10	U	10	U
bis(2-CHLOROETHYL) ETHER (2-CHLOROETHYL ETHER)	UG/L	10	U	10	U
2-CHLOROPHENOL	UG/L	10	U	10	U
ACENAPHTHENE	UG/L	10	U	10	U
1,3-DICHLOROBENZENE	UG/L	10	U	10	U
FLUORENE	UG/L	10	U	10	U
1,4-DICHLOROBENZENE	UG/L	10	U	10	U
PHENANTHRENE	UG/L	10	U	10	U
ANTHRACENE	UG/L	10	U	10	U
Benzyl alcohol	UG/L	10	U	10	U
FLUORANTHENE	UG/L	10	U	10	U
1,2-DICHLOROBENZENE	UG/L	10	U	10	U
PYRENE	UG/L	10	U	10	U
BENZO(a)ANTHRACENE	UG/L	10	U	10	U
CHRYSENE	UG/L	10	U	10	U
BENZO(b)FLUORANTHENE	UG/L	10	U	10	U
N-NITROSODI-n-PROPYLAMINE	UG/L	10	U	10	U
4-METHYLPHENOL (p-CRESOL)	UG/L	10	U	10	U
BENZO(k)FLUORANTHENE	UG/L	10	U	10	U
BENZO(a)PYRENE	UG/L	10	U	10	U
HEXACHLOROETHANE	UG/L	10	U	10	U
INDENO(1,2,3-c,d)PYRENE	UG/L	10	U	10	U
NITROBENZENE	UG/L	10	U	10	U
DIBENZ(a,h)ANTHRACENE	UG/L	10	U	10	U
ISOPHORONE	UG/L	10	U	10	U
2-NITROPHENOL	UG/L	10	U	10	U
BENZO(g,h,i)PERYLENE	UG/L	10	U	10	U
2,4-DIMETHYLPHENOL	UG/L	10	U	10	U
bis(2-CHLOROETHOXY) METHANE	UG/L	10	U	10	U
Benzoic acid	UG/L	50	U	50	U
2,4-DICHLOROPHENOL	UG/L	10	U	10	U
1,2,4-TRICHLOROBENZENE	UG/L	10	U	10	U
4-CHLOROANILINE	UG/L	10	U	10	U
HEXACHLOROBUTADIENE	UG/L	10	U	10	U
4-CHLORO-3-METHYLPHENOL	UG/L	10	U	10	U
HEXACHLOROCYCLOPENTADIENE	UG/L	10	U	10	U
2,4,6-TRICHLOROPHENOL	UG/L	10	U	10	U
2,4,5-TRICHLOROPHENOL	UG/L	50	U	50	U
2-CHLORONAPHTHALENE	UG/L	10	U	10	U
2-NITROANILINE	UG/L	50	U	50	U

Charleston Naval Complex
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Groundwater SVOA Analytical Data Summary

	StationID	FSMEGW006		FSMEGW007	
	SampleID	SMEGW00604		SMEGW00704	
	DateCollected	11/20/1997		11/20/1997	
	DateAnalyzed	12/15/1997		12/03/1997	
	SDGNumber	31911		31911	
2,6-DINITROTOLUENE	UG/L	10	U	10	U
3-NITROANILINE	UG/L	50	U	50	U
2,4-DINITROPHENOL	UG/L	50	U	50	U
DIBENZOFURAN	UG/L	10	U	10	U
4-NITROPHENOL	UG/L	50	U	50	U
2,4-DINITROTOLUENE	UG/L	10	U	10	UJ
DIMETHYL PHTHALATE	UG/L	10	U	10	U
DIETHYL PHTHALATE	UG/L	10	U	10	U
4-CHLOROPHENYL PHENYL ETHER	UG/L	10	U	10	U
4-NITROANILINE	UG/L	50	U	50	U
4,6-DINITRO-2-METHYLPHENOL	UG/L	50	U	50	U
N-NITROSODIPHENYLAMINE	UG/L	10	U	10	U
4-BROMOPHENYL PHENYL ETHER	UG/L	10	U	10	U
HEXACHLOROBENZENE	UG/L	10	U	10	U
PENTACHLOROPHENOL	UG/L	50	U	50	U
DI-n-BUTYL PHTHALATE	UG/L	10	U	10	U
BENZYL BUTYL PHTHALATE	UG/L	10	U	10	U
3,3'-DICHLOROBENZIDINE	UG/L	20	U	20	U
bis(2-ETHYLHEXYL) PHTHALATE	UG/L	10	U	10	U
DI-n-OCTYLPHTHALATE	UG/L	10	U	10	U

Charleston Naval Complex
AOC 609, Zone F
Groundwater SVOA Analytical Data Summary

	StationID	FSMEGW007		FSMEGW008	
	SampleID	SMEHW00704		SMEGW00804	
	DateCollected	11/20/1997		11/19/1997	
	DateAnalyzed	12/03/1997		12/12/1997	
	SDGNumber	31911		31911	
2,2'-OXYBIS(1-CHLORO)PROPANE	UG/L	10	U	10	U
2-METHYLNAPHTHALENE	UG/L	10	U	10	U
2-METHYLPHENOL (o-CRESOL)	UG/L	10	U	10	U
PHENOL	UG/L	10	U	10	U
ACENAPHTHYLENE	UG/L	10	U	10	U
bis(2-CHLOROETHYL) ETHER (2-CHLOROETHYL ETHER)	UG/L	10	U	10	U
2-CHLOROPHENOL	UG/L	10	U	10	U
ACENAPHTHENE	UG/L	10	U	10	U
1,3-DICHLOROBENZENE	UG/L	10	U	10	U
FLUORENE	UG/L	10	U	10	U
1,4-DICHLOROBENZENE	UG/L	10	U	10	U
PHENANTHRENE	UG/L	10	U	10	U
ANTHRACENE	UG/L	10	U	10	U
Benzyl alcohol	UG/L	10	U	10	U
FLUORANTHENE	UG/L	10	U	10	U
1,2-DICHLOROBENZENE	UG/L	10	U	10	U
PYRENE	UG/L	10	U	10	U
BENZO(a)ANTHRACENE	UG/L	10	U	10	U
CHRYSENE	UG/L	10	U	10	U
BENZO(b)FLUORANTHENE	UG/L	10	U	10	U
N-NITROSODI-n-PROPYLAMINE	UG/L	10	U	10	U
4-METHYLPHENOL (p-CRESOL)	UG/L	10	U	10	U
BENZO(k)FLUORANTHENE	UG/L	10	U	10	U
BENZO(a)PYRENE	UG/L	10	U	10	U
HEXACHLOROETHANE	UG/L	10	U	10	U
INDENO(1,2,3-c,d)PYRENE	UG/L	10	U	10	U
NITROBENZENE	UG/L	10	U	10	U
DIBENZ(a,h)ANTHRACENE	UG/L	10	U	10	U
ISOPHORONE	UG/L	10	U	10	U
2-NITROPHENOL	UG/L	10	U	10	U
BENZO(g,h,i)PERYLENE	UG/L	10	U	10	U
2,4-DIMETHYLPHENOL	UG/L	10	U	10	U
bis(2-CHLOROETHOXY) METHANE	UG/L	10	U	10	U
Benzoic acid	UG/L	50	U	52	U
2,4-DICHLOROPHENOL	UG/L	10	U	10	U
1,2,4-TRICHLOROBENZENE	UG/L	10	U	10	U
4-CHLOROANILINE	UG/L	10	U	10	U
HEXACHLOROBUTADIENE	UG/L	10	U	10	U
4-CHLORO-3-METHYLPHENOL	UG/L	10	U	10	U
HEXACHLOROCYCLOPENTADIENE	UG/L	10	U	10	U
2,4,6-TRICHLOROPHENOL	UG/L	10	U	10	U
2,4,5-TRICHLOROPHENOL	UG/L	50	U	52	U
2-CHLORONAPHTHALENE	UG/L	10	U	10	U
2-NITROANILINE	UG/L	50	U	52	U

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AOC 609, Zone F
Groundwater SVOA Analytical Data Summary

	StationID	FSMEGW007		FSMEGW008	
	SampleID	SMEHW00704		SMEGW00804	
	DateCollected	11/20/1997		11/19/1997	
	DateAnalyzed	12/03/1997		12/12/1997	
	SDGNumber	31911		31911	
2,6-DINITROTOLUENE	UG/L	10	U	10	U
3-NITROANILINE	UG/L	50	U	52	U
2,4-DINITROPHENOL	UG/L	50	U	52	U
DIBENZOFURAN	UG/L	10	U	10	U
4-NITROPHENOL	UG/L	50	U	52	U
2,4-DINITROTOLUENE	UG/L	10	UJ	10	U
DIMETHYL PHTHALATE	UG/L	10	U	10	U
DIETHYL PHTHALATE	UG/L	10	U	10	U
4-CHLOROPHENYL PHENYL ETHER	UG/L	10	U	10	U
4-NITROANILINE	UG/L	50	U	52	U
4,6-DINITRO-2-METHYLPHENOL	UG/L	50	U	52	U
N-NITROSODIPHENYLAMINE	UG/L	10	U	10	U
4-BROMOPHENYL PHENYL ETHER	UG/L	10	U	10	U
HEXACHLOROBENZENE	UG/L	10	U	10	U
PENTACHLOROPHENOL	UG/L	50	U	52	U
DI-n-BUTYL PHTHALATE	UG/L	10	U	10	U
BENZYL BUTYL PHTHALATE	UG/L	10	U	10	U
3,3'-DICHLOROBENZIDINE	UG/L	20	U	21	U
bis(2-ETHYLHEXYL) PHTHALATE	UG/L	10	U	10	U
DI-n-OCTYLPHTHALATE	UG/L	10	U	10	U

Charleston Naval Complex
AOC 609, Zone F
Groundwater Metals Analytical Data Summary

	StationID	F609GW001		F609GW001		F609GW002		F609GW002	
	SampleID	609GW00101		609GW00102		609GW00201		609GW00202	
	DateCollected	05/20/1999		10/12/1999		05/20/1999		10/12/1999	
	DateAnalyzed	05/28/1999		10/19/1999		05/28/1999		10/19/1999	
	SDGNumber	38649		EN018		38649		EN018	
ALUMINUM	UG/L	7440	J	153	J	308	J	58.7	UJ
ANTIMONY	UG/L	5	U	2.4	U	5	U	2.4	U
ARSENIC	UG/L	7.5	J	47.3	=	105	=	30.1	=
BARIUM	UG/L	79.5	=	91.1	J	13.4	J	21.5	J
BERYLLIUM	UG/L	0.3	U	0.9	U	0.3	U	0.9	U
CADMIUM	UG/L	0.3	U	0.3	U	0.3	U	0.3	U
CALCIUM	UG/L	24200	J	24600	=	28100	J	84500	=
CHROMIUM, TOTAL	UG/L	13.4	=	0.6	UJ	1.5	J	0.6	UJ
COBALT	UG/L	3.2	J	0.5	U	1.7	U	0.5	U
COPPER	UG/L	3.4	U	2.9	J	1.3	U	1.5	J
IRON	UG/L	12600	J	22900	=	6370	J	16400	=
LEAD	UG/L	4.7	=	2.1	U	2.1	U	2.1	J
MAGNESIUM	UG/L	34900	J	31200	=	49500	J	52900	=
MANGANESE	UG/L	529	=	523	=	330	=	2020	=
MERCURY	UG/L	0.16	J	0.2	U	0.67	J	0.2	U
NICKEL	UG/L	2.9	J	1.1	UJ	1.3	J	1.1	UJ
POTASSIUM	UG/L	24500	J	30000	J	52500	J	52100	J
SELENIUM	UG/L	2.9	U	2.8	J	3.1	J	1.7	U
SILVER	UG/L	2	U	0.5	U	2	U	0.5	U
SODIUM	UG/L	239000	=	171000	J	775000	=	274000	J
THALLIUM	UG/L	2.3	UJ	2.4	U	2.3	UJ	2.4	U
Tin (Sn)	UG/L	29.5	U	2.7	U	29.5	U	2.7	U
VANADIUM	UG/L	15.4	J	1.2	J	3.8	J	5.6	J
ZINC	UG/L	14.1	U	8.1	U	6.8	U	22.3	U

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AOC 609, Zone F
Groundwater Metals Analytical Data Summary

	StationID	FSMEGW001		FSMEGW003		FSMEGW004		FSMEGW005	
	SampleID	SMEGW00104		SMEGW00304		SMEGW00404		SMEGW00504	
	DateCollected	11/21/1997		11/21/1997		11/21/1997		11/20/1997	
	DateAnalyzed	12/08/1997		12/08/1997		12/08/1997		12/08/1997	
	SDGNumber	31911		31911		31911		31911	
ALUMINUM	UG/L	661	=	1540	=	59.6	U	124	U
ANTIMONY	UG/L	6.7	J	1.6	UJ	1.6	UJ	1.6	UJ
ARSENIC	UG/L	36	=	5.2	J	19.2	=	42.2	=
BARIUM	UG/L	29.3	J	14.8	J	22.9	J	24.6	J
BERYLLIUM	UG/L	0.2	U	0.2	U	0.2	U	0.2	U
CADMIUM	UG/L	0.64	J	0.3	U	0.3	U	1	J
CALCIUM	UG/L	49800	=	3910	=	24700	=	2290	=
CHROMIUM, TOTAL	UG/L	5.1	U	2	U	1.6	U	1.1	U
COBALT	UG/L	1	J	4.3	J	1	J	1.3	J
COPPER	UG/L	6.8	U	3.4	U	1.4	U	2	U
IRON	UG/L	9310	J	2870	J	2230	J	14300	J
LEAD	UG/L	0.9	U	4.5	U	0.9	U	3.7	U
MAGNESIUM	UG/L	62600	=	2500	=	6790	=	2670	=
MANGANESE	UG/L	283	=	36.2	=	28.3	=	57.5	=
MERCURY	UG/L	0.1	U	0.1	U	0.18	J	0.1	U
NICKEL	UG/L	1.7	J	1.7	J	1.8	J	0.7	U
POTASSIUM	UG/L	45100	=	4450	J	10800	=	1370	J
SELENIUM	UG/L	3.4	U	3.4	U	3.4	U	7.8	=
SILVER	UG/L	1	U	1	U	1	U	1	U
SODIUM	UG/L	829000	=	292000	=	248000	=	1870000	=
THALLIUM	UG/L	5	U	5	U	5	U	5	U
Tin (Sn)	UG/L	14	U	14	U	14	U	14	U
VANADIUM	UG/L	9.4	J	3.3	J	1.5	J	1.3	J
ZINC	UG/L	17	U	37.2	U	14.8	U	5.8	U

Charleston Naval Complex
AOC 609, Zone F
Groundwater Metals Analytical Data Summary

	StationID	FSMEGW006		FSMEGW007		FSMEGW007		FSMEGW008	
	SampleID	SMEGW00604		SMEGW00704		SMEHW00704		SMEGW00804	
	DateCollected	11/20/1997		11/20/1997		11/20/1997		11/19/1997	
	DateAnalyzed	12/08/1997		12/08/1997		12/08/1997		12/08/1997	
	SDGNumber	31911		31911		31911		31911	
ALUMINUM	UG/L	14.3	U	1420	J	2290	J	58.6	J
ANTIMONY	UG/L	1.6	UJ	1.6	UJ	1.6	UJ	1.6	UJ
ARSENIC	UG/L	56.1	=	2.5	J	3	J	31.5	=
BARIUM	UG/L	42.6	J	15.9	J	21.2	J	35.7	J
BERYLLIUM	UG/L	0.2	U	0.2	U	0.2	U	0.2	U
CADMIUM	UG/L	0.51	J	0.3	U	0.3	U	1	J
CALCIUM	UG/L	156000	=	10700	J	15700	J	10400	=
CHROMIUM, TOTAL	UG/L	1	U	3.2	U	5.7	U	1	U
COBALT	UG/L	6.7	UJ	2.2	J	3.9	J	2.2	J
COPPER	UG/L	1.4	U	3	U	3.6	U	1.7	U
IRON	UG/L	6750	J	1570	J	2410	J	14300	J
LEAD	UG/L	0.9	U	1.5	U	1.6	U	0.9	U
MAGNESIUM	UG/L	81900	=	3790	=	5570	=	22400	=
MANGANESE	UG/L	1130	=	102	J	161	J	127	=
MERCURY	UG/L	0.1	U	0.1	U	0.48	=	0.1	U
NICKEL	UG/L	15.1	J	1.5	J	2.3	J	1.1	J
POTASSIUM	UG/L	17100	=	4680	J	4480	J	26200	=
SELENIUM	UG/L	3.4	U	3.4	U	3.4	U	3.4	U
SILVER	UG/L	2.9	J	1	U	1	U	1	U
SODIUM	UG/L	1030000	=	143000	J	227000	J	2360000	=
THALLIUM	UG/L	5	U	5	U	5	U	5	U
Tin (Sn)	UG/L	14	U	14	U	14	U	14	U
VANADIUM	UG/L	1.1	U	3.3	J	5.3	J	1.1	U
ZINC	UG/L	5.8	U	15.3	U	13.7	U	5.9	U

Charleston Naval Complex
AOC 609, Zone F
Groundwater Pesticides Analytical Data Summary

	StationID	F609GW001		F609GW002	
	SampleID	609GW00101		609GW00201	
	DateCollected	05/20/1999		05/20/1999	
	DateAnalyzed	05/26/1999		05/26/1999	
	SDGNumber	38649		38649	
ALPHA BHC (ALPHA HEXACHLOROCYCLOHEXANE)	UG/L	0.04	UJ	0.04	U
GAMMA BHC (LINDANE)	UG/L	0.04	UJ	0.04	U
BETA BHC (BETA HEXACHLOROCYCLOHEXANE)	UG/L	0.04	UJ	0.04	U
HEPTACHLOR	UG/L	0.04	UJ	0.04	U
DELTA BHC (DELTA HEXACHLOROCYCLOHEXANE)	UG/L	0.04	UJ	0.04	U
ALDRIN	UG/L	0.04	UJ	0.04	U
HEPTACHLOR EPOXIDE	UG/L	0.04	UJ	0.04	U
GAMMA-CHLORDANE	UG/L	0.04	UJ	0.04	U
ALPHA-CHLORDANE	UG/L	0.04	UJ	0.04	U
ENDOSULFAN I	UG/L	0.04	UJ	0.04	U
p,p'-DDE	UG/L	0.08	UJ	0.08	U
DIELDRIN	UG/L	0.08	UJ	0.08	U
ENDRIN	UG/L	0.08	UJ	0.08	U
p,p'-DDD	UG/L	0.08	UJ	0.08	U
ENDOSULFAN II	UG/L	0.08	UJ	0.08	U
p,p'-DDT	UG/L	0.08	UJ	0.08	U
ENDRIN ALDEHYDE	UG/L	0.08	UJ	0.08	U
ENDOSULFAN SULFATE	UG/L	0.08	UJ	0.08	U
METHOXYCHLOR	UG/L	0.38	UJ	0.38	U
ENDRIN KETONE	UG/L	0.08	UJ	0.08	U
TOXAPHENE	UG/L	2.5	UJ	2.5	U

Charleston Naval Complex
AOC 609, Zone F
Groundwater PCB Analytical Data Summary

	StationID	F609GW001		F609GW002	
	SampleID	609GW00101		609GW00201	
	DateCollected	05/20/1999		05/20/1999	
	DateAnalyzed	05/26/1999		05/26/1999	
	SDGNumber	38649		38649	
PCB-1016 (AROCHLOR 1016)	UG/L	1	UJ	1	U
PCB-1221 (AROCHLOR 1221)	UG/L	1	UJ	1	U
PCB-1232 (AROCHLOR 1232)	UG/L	1	UJ	1	U
PCB-1242 (AROCHLOR 1242)	UG/L	1	UJ	1	U
PCB-1248 (AROCHLOR 1248)	UG/L	1	UJ	1	U
PCB-1254 (AROCHLOR 1254)	UG/L	2	UJ	2	U
PCB-1260 (AROCHLOR 1260)	UG/L	2	UJ	2	U

Charleston Naval Complex
AOC 609, Zone F
Soil VOA Analytical Data Summary

	StationID	F609SB001		F609SB001		F609SB001	
	SampleID	609SB001S1 (0-1ft)		609SB001S1 (0-1ft)		609SB001S2 (3-5ft)	
	DateCollected	10/15/1999		10/15/1999		10/15/1999	
	DateAnalyzed	10/21/1999		10/29/1999		10/21/1999	
	SDGNumber	EN022		EN022		EN022	
1,1,1-TRICHLOROETHANE, SPLP	UG/L	60	U			60	U
1,1,2,2-TETRACHLOROETHANE, SPLP	UG/L	60	U			60	U
1,1,2-TRICHLOROETHANE, SPLP	UG/L	60	U			60	U
1,1-DICHLOROETHANE, SPLP	UG/L	60	U			60	U
1,1-DICHLOROETHENE, SPLP	UG/L	60	U			60	U
1,2-DICHLOROETHANE, SPLP	UG/L	60	U			60	U
1,2-Dichloroethene (total), SPLP	UG/L	60	U			60	U
1,2-DICHLOROPROPANE, SPLP	UG/L	60	U			60	U
2-Chloroethyl vinyl ether, SPLP	UG/L	200	U			200	U
2-HEXANONE, SPLP	UG/L	100	U			100	U
ACETONE, SPLP	UG/L	100	R			100	R
BENZENE, SPLP	UG/L	60	U			60	U
BROMODICHLOROMETHANE, SPLP	UG/L	60	U			60	U
BROMOFORM, SPLP	UG/L	60	U			60	U
BROMOMETHANE, SPLP	UG/L	60	U			60	U
CARBON DISULFIDE, SPLP	UG/L	60	U			60	U
CARBON TETRACHLORIDE, SPLP	UG/L	60	U			60	U
CHLOROBENZENE, SPLP	UG/L	60	U			60	U
CHLOROETHANE, SPLP	UG/L	60	U			60	U
CHLOROFORM, SPLP	UG/L	60	U			60	U
CHLOROMETHANE, SPLP	UG/L	60	U			60	U
cis-1,3-DICHLOROPROPENE, SPLP	UG/L	60	U			60	U
DIBROMOCHLOROMETHANE, SPLP	UG/L	60	U			60	U
METHYL ETHYL KETONE (2-BUTANONE), SPLP	UG/L	100	U			100	U
METHYL ISOBUTYL KETONE (4-METHYL-2 PENTANONE), SPL	UG/L	100	U			100	U
METHYLENE CHLORIDE, SPLP	UG/L	60	U			60	U
STYRENE, SPLP	UG/L	60	U			60	U
TETRACHLOROETHYLENE(PCE), SPLP	UG/L	60	U			60	U
trans-1,3-DICHLOROPROPENE, SPLP	UG/L	60	U			60	U

Charleston Naval Complex
AOC 609, Zone F
Soil VOA Analytical Data Summary

	StationID	F609SB001		F609SB001		F609SB001	
	SampleID	609SB001S1 (0-1ft)		609SB001S1 (0-1ft)		609SB001S2 (3-5ft)	
	DateCollected	10/15/1999		10/15/1999		10/15/1999	
	DateAnalyzed	10/21/1999		10/29/1999		10/21/1999	
	SDGNumber	EN022		EN022		EN022	
TRICHLOROETHYLENE (TCE), SPLP	UG/L	60	U			60	U
Vinyl acetate, SPLP	UG/L	60	U			60	U
VINYL CHLORIDE, SPLP	UG/L	60	U			60	U
BENZENE	UG/KG						
CHLOROMETHANE	UG/KG						
NAPHTHALENE, SPLP	UG/L			5	U		
NAPHTHALENE	UG/KG						
TOLUENE, SPLP	UG/L	60	U			60	U
TOLUENE	UG/KG						
VINYL CHLORIDE	UG/KG						
BROMOMETHANE	UG/KG						
ETHYLBENZENE, SPLP	UG/L	60	U			60	U
ETHYLBENZENE	UG/KG						
CHLOROETHANE	UG/KG						
1,1-DICHLOROETHENE	UG/KG						
METHYLENE CHLORIDE	UG/KG						
XYLENES, TOTAL, SPLP	UG/L	60	U			60	U
XYLENES, TOTAL	UG/KG						
1,1-DICHLOROETHANE	UG/KG						
CHLOROFORM	UG/KG						
1,1,1-TRICHLOROETHANE	UG/KG						
CARBON TETRACHLORIDE	UG/KG						
1,2-DICHLOROETHANE	UG/KG						
TRICHLOROETHYLENE (TCE)	UG/KG						
1,2-DICHLOROPROPANE	UG/KG						
BROMODICHLOROMETHANE	UG/KG						
1,1,2-TRICHLOROETHANE	UG/KG						
TETRACHLOROETHYLENE(PCE)	UG/KG						
DIBROMOCHLOROMETHANE	UG/KG						
CHLOROBENZENE	UG/KG						
STYRENE	UG/KG						

Charleston Naval Complex
AOC 609, Zone F
Soil VOA Analytical Data Summary

	StationID	F609SB001		F609SB001		F609SB001	
	SampleID	609SB001S1 (0-1ft)		609SB001S1 (0-1ft)		609SB001S2 (3-5ft)	
	DateCollected	10/15/1999		10/15/1999		10/15/1999	
	DateAnalyzed	10/21/1999		10/29/1999		10/21/1999	
	SDGNumber	EN022		EN022		EN022	
BROMOFORM	UG/KG						
1,1,2,2-TETRACHLOROETHANE	UG/KG						
ACETONE	UG/KG						
CARBON DISULFIDE	UG/KG						
Vinyl acetate	UG/KG						
METHYL ETHYL KETONE (2-BUTANONE)	UG/KG						
2-Chloroethyl vinyl ether	UG/KG						
METHYL ISOBUTYL KETONE (4-METHYL-2 PENTANONE)	UG/KG						
cis-1,3-DICHLOROPROPENE	UG/KG						
trans-1,3-DICHLOROPROPENE	UG/KG						
2-HEXANONE	UG/KG						
1,2-Dichloroethene (total)	UG/KG						

Charleston Naval Complex
AOC 609, Zone F
Soil VOA Analytical Data Summary

	StationID	F609SB001		F609SB001		F609SB001		
	SampleID	609SB001S2 (3-5ft)		609SB001T1 (0-1ft)		609SB001T1 (0-1ft)		
	DateCollected	10/15/1999		10/15/1999		10/15/1999		
	DateAnalyzed	10/29/1999		10/19/1999		10/28/1999		
	SDGNumber	EN022		EN022		EN022		
1,1,1-TRICHLOROETHANE, SPLP	UG/L							
1,1,2,2-TETRACHLOROETHANE, SPLP	UG/L							
1,1,2-TRICHLOROETHANE, SPLP	UG/L							
1,1-DICHLOROETHANE, SPLP	UG/L							
1,1-DICHLOROETHENE, SPLP	UG/L							
1,2-DICHLOROETHANE, SPLP	UG/L							
1,2-Dichloroethene (total), SPLP	UG/L							
1,2-DICHLOROPROPANE, SPLP	UG/L							
2-Chloroethyl vinyl ether, SPLP	UG/L							
2-HEXANONE, SPLP	UG/L							
ACETONE, SPLP	UG/L							
BENZENE, SPLP	UG/L							
BROMODICHLOROMETHANE, SPLP	UG/L							
BROMOFORM, SPLP	UG/L							
BROMOMETHANE, SPLP	UG/L							
CARBON DISULFIDE, SPLP	UG/L							
CARBON TETRACHLORIDE, SPLP	UG/L							
CHLOROBENZENE, SPLP	UG/L							
CHLOROETHANE, SPLP	UG/L							
CHLOROFORM, SPLP	UG/L							
CHLOROMETHANE, SPLP	UG/L							
cis-1,3-DICHLOROPROPENE, SPLP	UG/L							
DIBROMOCHLOROMETHANE, SPLP	UG/L							
METHYL ETHYL KETONE (2-BUTANONE), SPLP	UG/L							
METHYL ISOBUTYL KETONE (4-METHYL-2 PENTANONE), SPL	UG/L							
METHYLENE CHLORIDE, SPLP	UG/L							
STYRENE, SPLP	UG/L							
TETRACHLOROETHYLENE(PCE), SPLP	UG/L							
trans-1,3-DICHLOROPROPENE, SPLP	UG/L							

Charleston Naval Complex
AOC 609, Zone F
Soil VOA Analytical Data Summary

	StationID	F609SB001		F609SB001		F609SB001	
	SampleID	609SB001S2 (3-5ft)		609SB001T1 (0-1ft)		609SB001T1 (0-1ft)	
	DateCollected	10/15/1999		10/15/1999		10/15/1999	
	DateAnalyzed	10/29/1999		10/19/1999		10/28/1999	
	SDGNumber	EN022		EN022		EN022	
TRICHLOROETHYLENE (TCE), SPLP	UG/L						
Vinyl acetate, SPLP	UG/L						
VINYL CHLORIDE, SPLP	UG/L						
BENZENE	UG/KG			4	U		
CHLOROMETHANE	UG/KG			4	U		
NAPHTHALENE, SPLP	UG/L	5	U				
NAPHTHALENE	UG/KG					440	U
TOLUENE, SPLP	UG/L						
TOLUENE	UG/KG			4	U		
VINYL CHLORIDE	UG/KG			4	U		
BROMOMETHANE	UG/KG			4	U		
ETHYLBENZENE, SPLP	UG/L						
ETHYLBENZENE	UG/KG			4	U		
CHLOROETHANE	UG/KG			4	U		
1,1-DICHLOROETHENE	UG/KG			4	U		
METHYLENE CHLORIDE	UG/KG			11	U		
XYLENES, TOTAL, SPLP	UG/L						
XYLENES, TOTAL	UG/KG			4	U		
1,1-DICHLOROETHANE	UG/KG			4	U		
CHLOROFORM	UG/KG			4	U		
1,1,1-TRICHLOROETHANE	UG/KG			4	U		
CARBON TETRACHLORIDE	UG/KG			4	U		
1,2-DICHLOROETHANE	UG/KG			4	U		
TRICHLOROETHYLENE (TCE)	UG/KG			4	U		
1,2-DICHLOROPROPANE	UG/KG			4	U		
BROMODICHLOROMETHANE	UG/KG			4	U		
1,1,2-TRICHLOROETHANE	UG/KG			4	U		
TETRACHLOROETHYLENE(PCE)	UG/KG			4	U		
DIBROMOCHLOROMETHANE	UG/KG			4	U		
CHLOROBENZENE	UG/KG			4	U		
STYRENE	UG/KG			4	U		

Charleston Naval Complex
AOC 609, Zone F
Soil VOA Analytical Data Summary

		StationID	F609SB001		F609SB001		F609SB001	
		SampleID	609SB001S2 (3-5ft)		609SB001T1 (0-1ft)		609SB001T1 (0-1ft)	
		DateCollected	10/15/1999		10/15/1999		10/15/1999	
		DateAnalyzed	10/29/1999		10/19/1999		10/28/1999	
		SDGNumber	EN022		EN022		EN022	
BROMOFORM	UG/KG				4	U		
1,1,2,2-TETRACHLOROETHANE	UG/KG				4	U		
ACETONE	UG/KG				69	J		
CARBON DISULFIDE	UG/KG				2	J		
Vinyl acetate	UG/KG				4	U		
METHYL ETHYL KETONE (2-BUTANONE)	UG/KG				7	=		
2-Chloroethyl vinyl ether	UG/KG				13	U		
METHYL ISOBUTYL KETONE (4-METHYL-2-PENTANONE)	UG/KG				6	U		
cis-1,3-DICHLOROPROPENE	UG/KG				4	U		
trans-1,3-DICHLOROPROPENE	UG/KG				4	U		
2-HEXANONE	UG/KG				6	U		
1,2-Dichloroethene (total)	UG/KG				4	U		

Charleston Naval Complex
AOC 609, Zone F
Soil VOA Analytical Data Summary

	StationID	F609SB001		F609SB001		F609SB002	
	SampleID	609SB001T2 (3-5ft)		609SB001T2 (3-5ft)		609SB002S1 (0-1ft)	
	DateCollected	10/15/1999		10/15/1999		10/15/1999	
	DateAnalyzed	10/19/1999		10/28/1999		10/21/1999	
	SDGNumber	EN022		EN022		EN022	
1,1,1-TRICHLOROETHANE, SPLP	UG/L					60	U
1,1,2,2-TETRACHLOROETHANE, SPLP	UG/L					60	U
1,1,2-TRICHLOROETHANE, SPLP	UG/L					60	U
1,1-DICHLOROETHANE, SPLP	UG/L					60	U
1,1-DICHLOROETHENE, SPLP	UG/L					60	U
1,2-DICHLOROETHANE, SPLP	UG/L					60	U
1,2-Dichloroethene (total), SPLP	UG/L					60	U
1,2-DICHLOROPROPANE, SPLP	UG/L					60	U
2-Chloroethyl vinyl ether, SPLP	UG/L					200	U
2-HEXANONE, SPLP	UG/L					100	U
ACETONE, SPLP	UG/L					100	R
BENZENE, SPLP	UG/L					60	U
BROMODICHLOROMETHANE, SPLP	UG/L					60	U
BROMOFORM, SPLP	UG/L					60	U
BROMOMETHANE, SPLP	UG/L					60	U
CARBON DISULFIDE, SPLP	UG/L					60	U
CARBON TETRACHLORIDE, SPLP	UG/L					60	U
CHLOROBENZENE, SPLP	UG/L					60	U
CHLOROETHANE, SPLP	UG/L					60	U
CHLOROFORM, SPLP	UG/L					60	U
CHLOROMETHANE, SPLP	UG/L					60	U
cis-1,3-DICHLOROPROPENE, SPLP	UG/L					60	U
DIBROMOCHLOROMETHANE, SPLP	UG/L					60	U
METHYL ETHYL KETONE (2-BUTANONE), SPLP	UG/L					100	U
METHYL ISOBUTYL KETONE (4-METHYL-2 PENTANONE), SPL	UG/L					100	U
METHYLENE CHLORIDE, SPLP	UG/L					60	U
STYRENE, SPLP	UG/L					60	U
TETRACHLOROETHYLENE(PCE), SPLP	UG/L					60	U
trans-1,3-DICHLOROPROPENE, SPLP	UG/L					60	U

Charleston Naval Complex
AOC 609, Zone F
Soil VOA Analytical Data Summary

	StationID	F609SB001		F609SB001		F609SB002	
	SampleID	609SB001T2 (3-5ft)		609SB001T2 (3-5ft)		609SB002S1 (0-1ft)	
	DateCollected	10/15/1999		10/15/1999		10/15/1999	
	DateAnalyzed	10/19/1999		10/28/1999		10/21/1999	
	SDGNumber	EN022		EN022		EN022	
TRICHLOROETHYLENE (TCE), SPLP	UG/L					60	U
Vinyl acetate, SPLP	UG/L					60	U
VINYL CHLORIDE, SPLP	UG/L					60	U
BENZENE	UG/KG	4	R				
CHLOROMETHANE	UG/KG	4	R				
NAPHTHALENE, SPLP	UG/L						
NAPHTHALENE	UG/KG			400	U		
TOLUENE, SPLP	UG/L					60	U
TOLUENE	UG/KG	4	R				
VINYL CHLORIDE	UG/KG	4	R				
BROMOMETHANE	UG/KG	4	R				
ETHYLBENZENE, SPLP	UG/L					60	U
ETHYLBENZENE	UG/KG	4	R				
CHLOROETHANE	UG/KG	4	R				
1,1-DICHLOROETHENE	UG/KG	4	R				
METHYLENE CHLORIDE	UG/KG	14	R				
XYLENES, TOTAL, SPLP	UG/L					60	U
XYLENES, TOTAL	UG/KG	4	R				
1,1-DICHLOROETHANE	UG/KG	4	R				
CHLOROFORM	UG/KG	4	R				
1,1,1-TRICHLOROETHANE	UG/KG	4	R				
CARBON TETRACHLORIDE	UG/KG	4	R				
1,2-DICHLOROETHANE	UG/KG	4	R				
TRICHLOROETHYLENE (TCE)	UG/KG	4	R				
1,2-DICHLOROPROPANE	UG/KG	4	R				
BROMODICHLOROMETHANE	UG/KG	4	R				
1,1,2-TRICHLOROETHANE	UG/KG	4	R				
TETRACHLOROETHYLENE(PCE)	UG/KG	4	R				
DIBROMOCHLOROMETHANE	UG/KG	4	R				
CHLOROBENZENE	UG/KG	4	R				
STYRENE	UG/KG	4	R				

Charleston Naval Complex
AOC 609, Zone F
Soil VOA Analytical Data Summary

	StationID	F609SB001		F609SB001		F609SB002	
	SampleID	609SB001T2 (3-5ft)		609SB001T2 (3-5ft)		609SB002S1 (0-1ft)	
	DateCollected	10/15/1999		10/15/1999		10/15/1999	
	DateAnalyzed	10/19/1999		10/28/1999		10/21/1999	
	SDGNumber	EN022		EN022		EN022	
BROMOFORM	UG/KG	4	R				
1,1,2,2-TETRACHLOROETHANE	UG/KG	4	R				
ACETONE	UG/KG	50	R				
CARBON DISULFIDE	UG/KG	2	R				
Vinyl acetate	UG/KG	4	R				
METHYL ETHYL KETONE (2-BUTANONE)	UG/KG	6	R				
2-Chloroethyl vinyl ether	UG/KG	13	R				
METHYL ISOBUTYL KETONE (4-METHYL-2-PENTANONE)	UG/KG	6	R				
cis-1,3-DICHLOROPROPENE	UG/KG	4	R				
trans-1,3-DICHLOROPROPENE	UG/KG	4	R				
2-HEXANONE	UG/KG	6	R				
1,2-Dichloroethene (total)	UG/KG	4	R				

Charleston Naval Complex
AOC 609, Zone F
Soil VOA Analytical Data Summary

	StationID	F609SB002		F609SB002		F609SB002	
	SampleID	609SB002S1 (0-1ft)		609SB002S2 (3-5ft)		609SB002S2 (3-5ft)	
	DateCollected	10/15/1999		10/15/1999		10/15/1999	
	DateAnalyzed	10/28/1999		10/21/1999		10/29/1999	
	SDGNumber	EN022		EN022		EN022	
1,1,1-TRICHLOROETHANE, SPLP	UG/L			60	U		
1,1,2,2-TETRACHLOROETHANE, SPLP	UG/L			60	U		
1,1,2-TRICHLOROETHANE, SPLP	UG/L			60	U		
1,1-DICHLOROETHANE, SPLP	UG/L			60	U		
1,1-DICHLOROETHENE, SPLP	UG/L			60	U		
1,2-DICHLOROETHANE, SPLP	UG/L			60	U		
1,2-Dichloroethene (total), SPLP	UG/L			60	U		
1,2-DICHLOROPROPANE, SPLP	UG/L			60	U		
2-Chloroethyl vinyl ether, SPLP	UG/L			200	U		
2-HEXANONE, SPLP	UG/L			100	U		
ACETONE, SPLP	UG/L			100	R		
BENZENE, SPLP	UG/L			60	U		
BROMODICHLOROMETHANE, SPLP	UG/L			60	U		
BROMOFORM, SPLP	UG/L			60	U		
BROMOMETHANE, SPLP	UG/L			60	U		
CARBON DISULFIDE, SPLP	UG/L			60	U		
CARBON TETRACHLORIDE, SPLP	UG/L			60	U		
CHLOROBENZENE, SPLP	UG/L			60	U		
CHLOROETHANE, SPLP	UG/L			60	U		
CHLOROFORM, SPLP	UG/L			60	U		
CHLOROMETHANE, SPLP	UG/L			60	U		
cis-1,3-DICHLOROPROPENE, SPLP	UG/L			60	U		
DIBROMOCHLOROMETHANE, SPLP	UG/L			60	U		
METHYL ETHYL KETONE (2-BUTANONE), SPLP	UG/L			100	U		
METHYL ISOBUTYL KETONE (4-METHYL-2 PENTANONE), SPL	UG/L			100	U		
METHYLENE CHLORIDE, SPLP	UG/L			60	U		
STYRENE, SPLP	UG/L			60	U		
TETRACHLOROETHYLENE(PCE), SPLP	UG/L			60	U		
trans-1,3-DICHLOROPROPENE, SPLP	UG/L			60	U		

Charleston Naval Complex
AOC 609, Zone F
Soil VOA Analytical Data Summary

	StationID	F609SB002		F609SB002		F609SB002	
	SampleID	609SB002S1 (0-1ft)		609SB002S2 (3-5ft)		609SB002S2 (3-5ft)	
	DateCollected	10/15/1999		10/15/1999		10/15/1999	
	DateAnalyzed	10/28/1999		10/21/1999		10/29/1999	
	SDGNumber	EN022		EN022		EN022	
TRICHLOROETHYLENE (TCE), SPLP	UG/L			60	U		
Vinyl acetate, SPLP	UG/L			60	U		
VINYL CHLORIDE, SPLP	UG/L			60	U		
BENZENE	UG/KG						
CHLOROMETHANE	UG/KG						
NAPHTHALENE, SPLP	UG/L	5	U			5	U
NAPHTHALENE	UG/KG						
TOLUENE, SPLP	UG/L			60	U		
TOLUENE	UG/KG						
VINYL CHLORIDE	UG/KG						
BROMOMETHANE	UG/KG						
ETHYLBENZENE, SPLP	UG/L			60	U		
ETHYLBENZENE	UG/KG						
CHLOROETHANE	UG/KG						
1,1-DICHLOROETHENE	UG/KG						
METHYLENE CHLORIDE	UG/KG						
XYLENES, TOTAL, SPLP	UG/L			60	U		
XYLENES, TOTAL	UG/KG						
1,1-DICHLOROETHANE	UG/KG						
CHLOROFORM	UG/KG						
1,1,1-TRICHLOROETHANE	UG/KG						
CARBON TETRACHLORIDE	UG/KG						
1,2-DICHLOROETHANE	UG/KG						
TRICHLOROETHYLENE (TCE)	UG/KG						
1,2-DICHLOROPROPANE	UG/KG						
BROMODICHLOROMETHANE	UG/KG						
1,1,2-TRICHLOROETHANE	UG/KG						
TETRACHLOROETHYLENE(PCE)	UG/KG						
DIBROMOCHLOROMETHANE	UG/KG						
CHLOROBENZENE	UG/KG						
STYRENE	UG/KG						

Charleston Naval Complex
AOC 609, Zone F
Soil VOA Analytical Data Summary

	StationID	F609SB002	F609SB002	F609SB002
	SampleID	609SB002S1 (0-1ft)	609SB002S2 (3-5ft)	609SB002S2 (3-5ft)
	DateCollected	10/15/1999	10/15/1999	10/15/1999
	DateAnalyzed	10/28/1999	10/21/1999	10/29/1999
	SDGNumber	EN022	EN022	EN022
BROMOFORM	UG/KG			
1,1,2,2-TETRACHLOROETHANE	UG/KG			
ACETONE	UG/KG			
CARBON DISULFIDE	UG/KG			
Vinyl acetate	UG/KG			
METHYL ETHYL KETONE (2-BUTANONE)	UG/KG			
2-Chloroethyl vinyl ether	UG/KG			
METHYL ISOBUTYL KETONE (4-METHYL-2 PENTANONE)	UG/KG			
cis-1,3-DICHLOROPROPENE	UG/KG			
trans-1,3-DICHLOROPROPENE	UG/KG			
2-HEXANONE	UG/KG			
1,2-Dichloroethene (total)	UG/KG			

Charleston Naval Complex
AOC 609, Zone F
Soil VOA Analytical Data Summary

	StationID	F609SB002		F609SB002		F609SB002	
	SampleID	609SB002T1 (0-1ft)		609SB002T1 (0-1ft)		609SB002T2 (3-5ft)	
	DateCollected	10/15/1999		10/15/1999		10/15/1999	
	DateAnalyzed	10/19/1999		10/28/1999		10/19/1999	
	SDGNumber	EN022		EN022		EN022	
1,1,1-TRICHLOROETHANE, SPLP	UG/L						
1,1,2,2-TETRACHLOROETHANE, SPLP	UG/L						
1,1,2-TRICHLOROETHANE, SPLP	UG/L						
1,1-DICHLOROETHANE, SPLP	UG/L						
1,1-DICHLOROETHENE, SPLP	UG/L						
1,2-DICHLOROETHANE, SPLP	UG/L						
1,2-Dichloroethene (total), SPLP	UG/L						
1,2-DICHLOROPROPANE, SPLP	UG/L						
2-Chloroethyl vinyl ether, SPLP	UG/L						
2-HEXANONE, SPLP	UG/L						
ACETONE, SPLP	UG/L						
BENZENE, SPLP	UG/L						
BROMODICHLOROMETHANE, SPLP	UG/L						
BROMOFORM, SPLP	UG/L						
BROMOMETHANE, SPLP	UG/L						
CARBON DISULFIDE, SPLP	UG/L						
CARBON TETRACHLORIDE, SPLP	UG/L						
CHLOROBENZENE, SPLP	UG/L						
CHLOROETHANE, SPLP	UG/L						
CHLOROFORM, SPLP	UG/L						
CHLOROMETHANE, SPLP	UG/L						
cis-1,3-DICHLOROPROPENE, SPLP	UG/L						
DIBROMOCHLOROMETHANE, SPLP	UG/L						
METHYL ETHYL KETONE (2-BUTANONE), SPLP	UG/L						
METHYL ISOBUTYL KETONE (4-METHYL-2 PENTANONE), SPL	UG/L						
METHYLENE CHLORIDE, SPLP	UG/L						
STYRENE, SPLP	UG/L						
TETRACHLOROETHYLENE(PCE), SPLP	UG/L						
trans-1,3-DICHLOROPROPENE, SPLP	UG/L						

Charleston Naval Complex
AOC 609, Zone F
Soil VOA Analytical Data Summary

	StationID	F609SB002		F609SB002		F609SB002	
	SampleID	609SB002T1 (0-1ft)		609SB002T1 (0-1ft)		609SB002T2 (3-5ft)	
	DateCollected	10/15/1999		10/15/1999		10/15/1999	
	DateAnalyzed	10/19/1999		10/28/1999		10/19/1999	
	SDGNumber	EN022		EN022		EN022	
TRICHLOROETHYLENE (TCE), SPLP	UG/L						
Vinyl acetate, SPLP	UG/L						
VINYL CHLORIDE, SPLP	UG/L						
BENZENE	UG/KG	5	U			4	U
CHLOROMETHANE	UG/KG	5	U			4	U
NAPHTHALENE, SPLP	UG/L						
NAPHTHALENE	UG/KG			490	U		
TOLUENE, SPLP	UG/L						
TOLUENE	UG/KG	5	U			4	U
VINYL CHLORIDE	UG/KG	5	U			4	U
BROMOMETHANE	UG/KG	5	U			4	U
ETHYLBENZENE, SPLP	UG/L						
ETHYLBENZENE	UG/KG	5	U			4	U
CHLOROETHANE	UG/KG	5	U			4	U
1,1-DICHLOROETHENE	UG/KG	5	U			4	U
METHYLENE CHLORIDE	UG/KG	13	U			14	U
XYLENES, TOTAL, SPLP	UG/L						
XYLENES, TOTAL	UG/KG	5	U			4	U
1,1-DICHLOROETHANE	UG/KG	5	U			4	U
CHLOROFORM	UG/KG	5	U			4	U
1,1,1-TRICHLOROETHANE	UG/KG	5	U			4	U
CARBON TETRACHLORIDE	UG/KG	5	U			4	U
1,2-DICHLOROETHANE	UG/KG	5	U			4	U
TRICHLOROETHYLENE (TCE)	UG/KG	5	U			4	U
1,2-DICHLOROPROPANE	UG/KG	5	U			4	U
BROMODICHLOROMETHANE	UG/KG	5	U			4	U
1,1,2-TRICHLOROETHANE	UG/KG	5	U			4	U
TETRACHLOROETHYLENE(PCE)	UG/KG	5	U			4	U
DIBROMOCHLOROMETHANE	UG/KG	5	U			4	U
CHLOROBENZENE	UG/KG	5	U			4	U
STYRENE	UG/KG	5	U			4	U

Charleston Naval Complex
AOC 609, Zone F
Soil VOA Analytical Data Summary

		StationID	F609SB002		F609SB002		F609SB002	
		SampleID	609SB002T1 (0-1ft)		609SB002T1 (0-1ft)		609SB002T2 (3-5ft)	
		DateCollected	10/15/1999		10/15/1999		10/15/1999	
		DateAnalyzed	10/19/1999		10/28/1999		10/19/1999	
		SDGNumber	EN022		EN022		EN022	
BROMOFORM	UG/KG		5	U			4	U
1,1,2,2-TETRACHLOROETHANE	UG/KG		5	U			4	U
ACETONE	UG/KG		99	J			28	U
CARBON DISULFIDE	UG/KG		2	J			4	U
Vinyl acetate	UG/KG		4	U			4	U
METHYL ETHYL KETONE (2-BUTANONE)	UG/KG		8	U			7	U
2-Chloroethyl vinyl ether	UG/KG		15	U			15	U
METHYL ISOBUTYL KETONE (4-METHYL-2 PENTANONE)	UG/KG		8	U			7	U
cis-1,3-DICHLOROPROPENE	UG/KG		5	U			4	U
trans-1,3-DICHLOROPROPENE	UG/KG		5	U			4	U
2-HEXANONE	UG/KG		8	U			7	U
1,2-Dichloroethene (total)	UG/KG		5	U			4	U

Charleston Naval Complex
AOC 609, Zone F
Soil VOA Analytical Data Summary

	StationID	F609SB002	
	SampleID	609SB002T2 (3-5ft)	
	DateCollected	10/15/1999	
	DateAnalyzed	10/28/1999	
	SDGNumber	EN022	
1,1,1-TRICHLOROETHANE, SPLP	UG/L		
1,1,2,2-TETRACHLOROETHANE, SPLP	UG/L		
1,1,2-TRICHLOROETHANE, SPLP	UG/L		
1,1-DICHLOROETHANE, SPLP	UG/L		
1,1-DICHLOROETHENE, SPLP	UG/L		
1,2-DICHLOROETHANE, SPLP	UG/L		
1,2-Dichloroethene (total), SPLP	UG/L		
1,2-DICHLOROPROPANE, SPLP	UG/L		
2-Chloroethyl vinyl ether, SPLP	UG/L		
2-HEXANONE, SPLP	UG/L		
ACETONE, SPLP	UG/L		
BENZENE, SPLP	UG/L		
BROMODICHLOROMETHANE, SPLP	UG/L		
BROMOFORM, SPLP	UG/L		
BROMOMETHANE, SPLP	UG/L		
CARBON DISULFIDE, SPLP	UG/L		
CARBON TETRACHLORIDE, SPLP	UG/L		
CHLOROBENZENE, SPLP	UG/L		
CHLOROETHANE, SPLP	UG/L		
CHLOROFORM, SPLP	UG/L		
CHLOROMETHANE, SPLP	UG/L		
cis-1,3-DICHLOROPROPENE, SPLP	UG/L		
DIBROMOCHLOROMETHANE, SPLP	UG/L		
METHYL ETHYL KETONE (2-BUTANONE), SPLP	UG/L		
METHYL ISOBUTYL KETONE (4-METHYL-2 PENTANONE), SPL	UG/L		
METHYLENE CHLORIDE, SPLP	UG/L		
STYRENE, SPLP	UG/L		
TETRACHLOROETHYLENE(PCE), SPLP	UG/L		
trans-1,3-DICHLOROPROPENE, SPLP	UG/L		

Charleston Naval Complex
AOC 609, Zone F
Soil VOA Analytical Data Summary

	StationID	F609SB002	
	SampleID	609SB002T2 (3-5ft)	
	DateCollected	10/15/1999	
	DateAnalyzed	10/28/1999	
	SDGNumber	EN022	
TRICHLOROETHYLENE (TCE), SPLP	UG/L		
Vinyl acetate, SPLP	UG/L		
VINYL CHLORIDE, SPLP	UG/L		
BENZENE	UG/KG		
CHLOROMETHANE	UG/KG		
NAPHTHALENE, SPLP	UG/L		
NAPHTHALENE	UG/KG	420	U
TOLUENE, SPLP	UG/L		
TOLUENE	UG/KG		
VINYL CHLORIDE	UG/KG		
BROMOMETHANE	UG/KG		
ETHYLBENZENE, SPLP	UG/L		
ETHYLBENZENE	UG/KG		
CHLOROETHANE	UG/KG		
1,1-DICHLOROETHENE	UG/KG		
METHYLENE CHLORIDE	UG/KG		
XYLENES, TOTAL, SPLP	UG/L		
XYLENES, TOTAL	UG/KG		
1,1-DICHLOROETHANE	UG/KG		
CHLOROFORM	UG/KG		
1,1,1-TRICHLOROETHANE	UG/KG		
CARBON TETRACHLORIDE	UG/KG		
1,2-DICHLOROETHANE	UG/KG		
TRICHLOROETHYLENE (TCE)	UG/KG		
1,2-DICHLOROPROPANE	UG/KG		
BROMODICHLOROMETHANE	UG/KG		
1,1,2-TRICHLOROETHANE	UG/KG		
TETRACHLOROETHYLENE(PCE)	UG/KG		
DIBROMOCHLOROMETHANE	UG/KG		
CHLOROBENZENE	UG/KG		
STYRENE	UG/KG		

Charleston Naval Complex
AOC 609, Zone F
Soil VOA Analytical Data Summary

	StationID	F609SB002	
	SampleID	609SB002T2 (3-5ft)	
	DateCollected	10/15/1999	
	DateAnalyzed	10/28/1999	
	SDGNumber	EN022	
BROMOFORM	UG/KG		
1,1,2,2-TETRACHLOROETHANE	UG/KG		
ACETONE	UG/KG		
CARBON DISULFIDE	UG/KG		
Vinyl acetate	UG/KG		
METHYL ETHYL KETONE (2-BUTANONE)	UG/KG		
2-Chloroethyl vinyl ether	UG/KG		
METHYL ISOBUTYL KETONE (4-METHYL-2 PENTANONE)	UG/KG		
cis-1,3-DICHLOROPROPENE	UG/KG		
trans-1,3-DICHLOROPROPENE	UG/KG		
2-HEXANONE	UG/KG		
1,2-Dichloroethene (total)	UG/KG		

Charleston Naval Complex
AOC 609, Zone F
Soil SVOA Analytical Data Summary

	StationID	F609SB001		F609SB001		F609SB001	
	SampleID	609SB001S1 (0-1ft)		609SB001S2 (3-5ft)		609SB001T1 (0-1ft)	
	DateCollected	10/15/1999		10/15/1999		10/15/1999	
	DateAnalyzed	10/29/1999		10/29/1999		10/28/1999	
	SDGNumber	EN022		EN022		EN022	
1,2,4-TRICHLOROBENZENE, SPLP	UG/L	5	U	5	U		
1,2-DICHLOROBENZENE, SPLP	UG/L	5	U	5	U		
1,3-DICHLOROBENZENE, SPLP	UG/L	5	U	5	U		
1,4-DICHLOROBENZENE, SPLP	UG/L	5	U	5	U		
2,2'-OXYBIS(1-CHLORO)PROPANE, SPLP	UG/L	5	U	5	U		
2,2'-OXYBIS(1-CHLORO)PROPANE	UG/KG					440	U
2,4,5-TRICHLOROPHENOL, SPLP	UG/L	5	U	5	U		
2,4,6-TRICHLOROPHENOL, SPLP	UG/L	5	U	5	U		
2,4-DICHLOROPHENOL, SPLP	UG/L	5	U	5	U		
2,4-DIMETHYLPHENOL, SPLP	UG/L	5	U	5	U		
2,4-DINITROPHENOL, SPLP	UG/L	10	U	10	U		
2,4-DINITROTOLUENE, SPLP	UG/L	5	U	5	U		
2,6-DINITROTOLUENE, SPLP	UG/L	5	U	5	U		
2-CHLORONAPHTHALENE, SPLP	UG/L	5	U	5	U		
2-CHLOROPHENOL, SPLP	UG/L	5	U	5	U		
2-METHYLNAPHTHALENE, SPLP	UG/L	5	U	5	U		
2-METHYLNAPHTHALENE	UG/KG					440	U
2-METHYLPHENOL (o-CRESOL), SPLP	UG/L	5	U	5	U		
2-METHYLPHENOL (o-CRESOL)	UG/KG					440	U
2-NITROANILINE, SPLP	UG/L	5	U	5	U		
2-NITROPHENOL, SPLP	UG/L	5	U	5	U		
3,3'-DICHLOROBENZIDINE, SPLP	UG/L	10	U	10	U		
3-NITROANILINE, SPLP	UG/L	5	U	5	U		
4,6-DINITRO-2-METHYLPHENOL, SPLP	UG/L	10	U	10	U		
4-BROMOPHENYL PHENYL ETHER, SPLP	UG/L	5	U	5	U		
4-CHLORO-3-METHYLPHENOL, SPLP	UG/L	5	U	5	U		
4-CHLOROANILINE, SPLP	UG/L	5	U	5	U		
4-CHLOROPHENYL PHENYL ETHER, SPLP	UG/L	5	U	5	U		
4-NITROANILINE, SPLP	UG/L	5	U	5	U		
4-NITROPHENOL, SPLP	UG/L	10	U	10	U		
Benzoic acid, SPLP	UG/L	25	U	26	U		

Charleston Naval Complex
AOC 609, Zone F
Soil SVOA Analytical Data Summary

	StationID	F609SB001		F609SB001		F609SB001	
	SampleID	609SB001S1 (0-1ft)		609SB001S2 (3-5ft)		609SB001T1 (0-1ft)	
	DateCollected	10/15/1999		10/15/1999		10/15/1999	
	DateAnalyzed	10/29/1999		10/29/1999		10/28/1999	
	SDGNumber	EN022		EN022		EN022	
Benzyl alcohol, SPLP	UG/L	5	U	5	U		
BENZYL BUTYL PHTHALATE, SPLP	UG/L	5	U	5	U		
bis(2-CHLOROETHOXY) METHANE, SPLP	UG/L	5	U	5	U		
bis(2-ETHYLHEXYL) PHTHALATE, SPLP	UG/L	5	U	2	J		
DI-n-BUTYL PHTHALATE, SPLP	UG/L	5	U	5	U		
DI-n-OCTYLPHTHALATE, SPLP	UG/L	5	U	5	U		
DIBENZOFURAN, SPLP	UG/L	5	U	5	U		
DIETHYL PHTHALATE, SPLP	UG/L	5	U	5	U		
DIMETHYL PHTHALATE, SPLP	UG/L	5	U	5	U		
HEXACHLOROBENZENE, SPLP	UG/L	5	U	5	U		
HEXACHLOROBUTADIENE, SPLP	UG/L	5	U	5	U		
HEXACHLOROCYCLOPENTADIENE, SPLP	UG/L	5	U	5	U		
HEXACHLOROETHANE, SPLP	UG/L	5	U	5	U		
ISOPHORONE, SPLP	UG/L	5	U	5	U		
N-NITROSODI-n-PROPYLAMINE, SPLP	UG/L	5	U	5	U		
N-NITROSODIPHENYLAMINE, SPLP	UG/L	5	U	5	U		
NITROBENZENE, SPLP	UG/L	5	U	5	U		
PENTACHLOROPHENOL, SPLP	UG/L	10	U	10	U		
PHENOL, SPLP	UG/L	5	U	5	U		
PHENOL	UG/KG					440	U
ACENAPHTHYLENE, SPLP	UG/L	5	U	5	U		
ACENAPHTHYLENE	UG/KG					440	U
bis(2-CHLOROETHYL) ETHER (2-CHLOROETHYL ETHER), S	UG/L	5	U	5	U		
bis(2-CHLOROETHYL) ETHER (2-CHLOROETHYL ETHER)	UG/KG					440	U
2-CHLOROPHENOL	UG/KG					440	U
ACENAPHTHENE, SPLP	UG/L	5	U	5	U		
ACENAPHTHENE	UG/KG					440	U
1,3-DICHLOROBENZENE	UG/KG					440	U
FLUORENE, SPLP	UG/L	5	U	5	U		

Charleston Naval Complex
AOC 609, Zone F
Soil SVOA Analytical Data Summary

	StationID	F609SB001		F609SB001		F609SB001	
	SampleID	609SB001S1 (0-1ft)		609SB001S2 (3-5ft)		609SB001T1 (0-1ft)	
	DateCollected	10/15/1999		10/15/1999		10/15/1999	
	DateAnalyzed	10/29/1999		10/29/1999		10/28/1999	
	SDGNumber	EN022		EN022		EN022	
FLUORENE	UG/KG					440	U
1,4-DICHLOROBENZENE	UG/KG					440	U
PHENANTHRENE, SPLP	UG/L	5	U	5	U		
PHENANTHRENE	UG/KG					360	J
ANTHRACENE, SPLP	UG/L	5	U	5	U		
ANTHRACENE	UG/KG					440	U
Benzyl alcohol	UG/KG					440	U
FLUORANTHENE, SPLP	UG/L	5	U	5	U		
FLUORANTHENE	UG/KG					770	=
1,2-DICHLOROBENZENE	UG/KG					440	U
PYRENE, SPLP	UG/L	5	U	5	U		
PYRENE	UG/KG					760	=
BENZO(a)ANTHRACENE, SPLP	UG/L	5	U	5	U		
BENZO(a)ANTHRACENE	UG/KG					380	J
CHRYSENE, SPLP	UG/L	5	U	5	U		
CHRYSENE	UG/KG					510	=
BENZO(b)FLUORANTHENE, SPLP	UG/L	5	U	5	U		
BENZO(b)FLUORANTHENE	UG/KG					610	=
N-NITROSODI-n-PROPYLAMINE	UG/KG					440	U
4-METHYLPHENOL (p-CRESOL), SPLP	UG/L	5	U	5	U		
4-METHYLPHENOL (p-CRESOL)	UG/KG					440	U
BENZO(k)FLUORANTHENE, SPLP	UG/L	5	U	5	U		
BENZO(k)FLUORANTHENE	UG/KG					320	J
BENZO(a)PYRENE, SPLP	UG/L	5	U	5	U		
BENZO(a)PYRENE	UG/KG					480	=
HEXACHLOROETHANE	UG/KG					440	U
INDENO(1,2,3-c,d)PYRENE, SPLP	UG/L	5	U	5	U		
INDENO(1,2,3-c,d)PYRENE	UG/KG					400	J
NITROBENZENE	UG/KG					440	U
DIBENZ(a,h)ANTHRACENE, SPLP	UG/L	5	U	5	U		
DIBENZ(a,h)ANTHRACENE	UG/KG					140	J

Charleston Naval Complex
AOC 609, Zone F
Soil SVOA Analytical Data Summary

	StationID	F609SB001		F609SB001		F609SB001	
	SampleID	609SB001S1 (0-1ft)		609SB001S2 (3-5ft)		609SB001T1 (0-1ft)	
	DateCollected	10/15/1999		10/15/1999		10/15/1999	
	DateAnalyzed	10/29/1999		10/29/1999		10/28/1999	
	SDGNumber	EN022		EN022		EN022	
ISOPHORONE	UG/KG					440	U
2-NITROPHENOL	UG/KG					440	U
BENZO(g,h,i)PERYLENE, SPLP	UG/L	5	U	5	U		
BENZO(g,h,i)PERYLENE	UG/KG					350	J
2,4-DIMETHYLPHENOL	UG/KG					440	U
bis(2-CHLOROETHOXY) METHANE	UG/KG					440	U
Benzoic acid	UG/KG					2200	U
2,4-DICHLOROPHENOL	UG/KG					440	U
1,2,4-TRICHLOROBENZENE	UG/KG					440	U
4-CHLOROANILINE	UG/KG					440	U
HEXACHLOROBUTADIENE	UG/KG					440	U
4-CHLORO-3-METHYLPHENOL	UG/KG					440	U
HEXACHLOROCYCLOPENTADIENE	UG/KG					440	U
2,4,6-TRICHLOROPHENOL	UG/KG					440	U
2,4,5-TRICHLOROPHENOL	UG/KG					440	U
2-CHLORONAPHTHALENE	UG/KG					440	U
2-NITROANILINE	UG/KG					440	U
2,6-DINITROTOLUENE	UG/KG					440	U
3-NITROANILINE	UG/KG					440	U
2,4-DINITROPHENOL	UG/KG					880	U
DIBENZOFURAN	UG/KG					440	U
4-NITROPHENOL	UG/KG					880	U
2,4-DINITROTOLUENE	UG/KG					440	U
DIMETHYL PHTHALATE	UG/KG					440	U
DIETHYL PHTHALATE	UG/KG					440	U
4-CHLOROPHENYL PHENYL ETHER	UG/KG					440	U
4-NITROANILINE	UG/KG					440	U
4,6-DINITRO-2-METHYLPHENOL	UG/KG					880	U
N-NITROSODIPHENYLAMINE	UG/KG					440	U
4-BROMOPHENYL PHENYL ETHER	UG/KG					440	U
HEXACHLOROBENZENE	UG/KG					440	U

Charleston Naval Complex
AOC 609, Zone F
Soil SVOA Analytical Data Summary

	StationID	F609SB001		F609SB001		F609SB001	
	SampleID	609SB001S1 (0-1ft)		609SB001S2 (3-5ft)		609SB001T1 (0-1ft)	
	DateCollected	10/15/1999		10/15/1999		10/15/1999	
	DateAnalyzed	10/29/1999		10/29/1999		10/28/1999	
	SDGNumber	EN022		EN022		EN022	
PENTACHLOROPHENOL	UG/KG					880	U
DI-n-BUTYL PHTHALATE	UG/KG					440	U
BENZYL BUTYL PHTHALATE	UG/KG					440	U
3,3'-DICHLOROBENZIDINE	UG/KG					880	U
bis(2-ETHYLHEXYL) PHTHALATE	UG/KG					440	U
DI-n-OCTYLPHTHALATE	UG/KG					440	U

Charleston Naval Complex
AOC 609, Zone F
Soil SVOA Analytical Data Summary

	StationID	F609SB001		F609SB002		F609SB002	
	SampleID	609SB001T2 (3-5ft)		609SB002S1 (0-1ft)		609SB002S2 (3-5ft)	
	DateCollected	10/15/1999		10/15/1999		10/15/1999	
	DateAnalyzed	10/28/1999		10/28/1999		10/29/1999	
	SDGNumber	EN022		EN022		EN022	
1,2,4-TRICHLOROBENZENE, SPLP	UG/L			5	U	5	U
1,2-DICHLOROBENZENE, SPLP	UG/L			5	U	5	U
1,3-DICHLOROBENZENE, SPLP	UG/L			5	U	5	U
1,4-DICHLOROBENZENE, SPLP	UG/L			5	U	5	U
2,2'-OXYBIS(1-CHLORO)PROPANE, SPLP	UG/L			5	U	5	U
2,2'-OXYBIS(1-CHLORO)PROPANE	UG/KG	400	U				
2,4,5-TRICHLOROPHENOL, SPLP	UG/L			5	U	5	U
2,4,6-TRICHLOROPHENOL, SPLP	UG/L			5	U	5	U
2,4-DICHLOROPHENOL, SPLP	UG/L			5	U	5	U
2,4-DIMETHYLPHENOL, SPLP	UG/L			5	U	5	U
2,4-DINITROPHENOL, SPLP	UG/L			11	U	10	U
2,4-DINITROTOLUENE, SPLP	UG/L			5	U	5	U
2,6-DINITROTOLUENE, SPLP	UG/L			5	U	5	U
2-CHLORONAPHTHALENE, SPLP	UG/L			5	U	5	U
2-CHLOROPHENOL, SPLP	UG/L			5	U	5	U
2-METHYLNAPHTHALENE, SPLP	UG/L			5	U	5	U
2-METHYLNAPHTHALENE	UG/KG	400	U				
2-METHYLPHENOL (o-CRESOL), SPLP	UG/L			5	U	5	U
2-METHYLPHENOL (o-CRESOL)	UG/KG	400	U				
2-NITROANILINE, SPLP	UG/L			5	U	5	U
2-NITROPHENOL, SPLP	UG/L			5	U	5	U
3,3'-DICHLOROBENZIDINE, SPLP	UG/L			11	U	10	U
3-NITROANILINE, SPLP	UG/L			5	U	5	U
4,6-DINITRO-2-METHYLPHENOL, SPLP	UG/L			11	U	10	U
4-BROMOPHENYL PHENYL ETHER, SPLP	UG/L			5	U	5	U
4-CHLORO-3-METHYLPHENOL, SPLP	UG/L			5	U	5	U
4-CHLOROANILINE, SPLP	UG/L			5	U	5	U
4-CHLOROPHENYL PHENYL ETHER, SPLP	UG/L			5	U	5	U
4-NITROANILINE, SPLP	UG/L			5	U	5	U
4-NITROPHENOL, SPLP	UG/L			11	U	10	U
Benzoic acid, SPLP	UG/L			27	U	26	U

Charleston Naval Complex
AOC 609, Zone F
Soil SVOA Analytical Data Summary

	StationID	F609SB001		F609SB002		F609SB002	
	SampleID	609SB001T2 (3-5ft)		609SB002S1 (0-1ft)		609SB002S2 (3-5ft)	
	DateCollected	10/15/1999		10/15/1999		10/15/1999	
	DateAnalyzed	10/28/1999		10/28/1999		10/29/1999	
	SDGNumber	EN022		EN022		EN022	
Benzyl alcohol, SPLP	UG/L			5	U	5	U
BENZYL BUTYL PHTHALATE, SPLP	UG/L			5	U	5	U
bis(2-CHLOROETHOXY) METHANE, SPLP	UG/L			5	U	5	U
bis(2-ETHYLHEXYL) PHTHALATE, SPLP	UG/L			5	U	1	J
DI-n-BUTYL PHTHALATE, SPLP	UG/L			5	U	5	U
DI-n-OCTYLPHTHALATE, SPLP	UG/L			5	U	5	U
DIBENZOFURAN, SPLP	UG/L			5	U	5	U
DIETHYL PHTHALATE, SPLP	UG/L			5	U	5	U
DIMETHYL PHTHALATE, SPLP	UG/L			5	U	5	U
HEXACHLOROBENZENE, SPLP	UG/L			5	U	5	U
HEXACHLOROBUTADIENE, SPLP	UG/L			5	U	5	U
HEXACHLOROCYCLOPENTADIENE, SPLP	UG/L			5	U	5	U
HEXACHLOROETHANE, SPLP	UG/L			5	U	5	U
ISOPHORONE, SPLP	UG/L			5	U	5	U
N-NITROSODI-n-PROPYLAMINE, SPLP	UG/L			5	U	5	U
N-NITROSODIPHENYLAMINE, SPLP	UG/L			5	U	5	U
NITROBENZENE, SPLP	UG/L			5	U	5	U
PENTACHLOROPHENOL, SPLP	UG/L			11	U	10	U
PHENOL, SPLP	UG/L			5	U	5	U
PHENOL	UG/KG	400	U				
ACENAPHTHYLENE, SPLP	UG/L			5	U	5	U
ACENAPHTHYLENE	UG/KG	400	U				
bis(2-CHLOROETHYL) ETHER (2-CHLOROETHYL ETHER), S	UG/L			5	U	5	U
bis(2-CHLOROETHYL) ETHER (2-CHLOROETHYL ETHER)	UG/KG	400	U				
2-CHLOROPHENOL	UG/KG	400	U				
ACENAPHTHENE, SPLP	UG/L			5	U	5	U
ACENAPHTHENE	UG/KG	400	U				
1,3-DICHLOROBENZENE	UG/KG	400	U				
FLUORENE, SPLP	UG/L			5	U	5	U

Charleston Naval Complex
AOC 609, Zone F
Soil SVOA Analytical Data Summary

	StationID	F609SB001		F609SB002		F609SB002	
	SampleID	609SB001T2 (3-5ft)		609SB002S1 (0-1ft)		609SB002S2 (3-5ft)	
	DateCollected	10/15/1999		10/15/1999		10/15/1999	
	DateAnalyzed	10/28/1999		10/28/1999		10/29/1999	
	SDGNumber	EN022		EN022		EN022	
FLUORENE	UG/KG	400	U				
1,4-DICHLOROBENZENE	UG/KG	400	U				
PHENANTHRENE, SPLP	UG/L			5	U	5	U
PHENANTHRENE	UG/KG	160	J				
ANTHRACENE, SPLP	UG/L			5	U	5	U
ANTHRACENE	UG/KG	400	U				
Benzyl alcohol	UG/KG	400	U				
FLUORANTHENE, SPLP	UG/L			5	U	5	U
FLUORANTHENE	UG/KG	240	J				
1,2-DICHLOROBENZENE	UG/KG	400	U				
PYRENE, SPLP	UG/L			5	U	5	U
PYRENE	UG/KG	210	J				
BENZO(a)ANTHRACENE, SPLP	UG/L			5	U	5	U
BENZO(a)ANTHRACENE	UG/KG	86	J				
CHRYSENE, SPLP	UG/L			5	U	5	U
CHRYSENE	UG/KG	130	J				
BENZO(b)FLUORANTHENE, SPLP	UG/L			5	U	5	U
BENZO(b)FLUORANTHENE	UG/KG	94	J				
N-NITROSODI-n-PROPYLAMINE	UG/KG	400	U				
4-METHYLPHENOL (p-CRESOL), SPLP	UG/L			5	U	5	U
4-METHYLPHENOL (p-CRESOL)	UG/KG	400	U				
BENZO(k)FLUORANTHENE, SPLP	UG/L			5	U	5	U
BENZO(k)FLUORANTHENE	UG/KG	400	U				
BENZO(a)PYRENE, SPLP	UG/L			5	U	5	U
BENZO(a)PYRENE	UG/KG	97	J				
HEXACHLOROETHANE	UG/KG	400	U				
INDENO(1,2,3-c,d)PYRENE, SPLP	UG/L			5	U	5	U
INDENO(1,2,3-c,d)PYRENE	UG/KG	86	J				
NITROBENZENE	UG/KG	400	U				
DIBENZ(a,h)ANTHRACENE, SPLP	UG/L			5	U	5	U
DIBENZ(a,h)ANTHRACENE	UG/KG	400	U				

Charleston Naval Complex
AOC 609, Zone F
Soil SVOA Analytical Data Summary

		StationID	F609SB001		F609SB002		F609SB002	
		SampleID	609SB001T2 (3-5ft)		609SB002S1 (0-1ft)		609SB002S2 (3-5ft)	
		DateCollected	10/15/1999		10/15/1999		10/15/1999	
		DateAnalyzed	10/28/1999		10/28/1999		10/29/1999	
		SDGNumber	EN022		EN022		EN022	
ISOPHORONE	UG/KG	400	U					
2-NITROPHENOL	UG/KG	400	U					
BENZO(g,h,i)PERYLENE, SPLP	UG/L			5	U	5	U
BENZO(g,h,i)PERYLENE	UG/KG	400	U					
2,4-DIMETHYLPHENOL	UG/KG	400	U					
bis(2-CHLOROETHOXY) METHANE	UG/KG	400	U					
Benzoic acid	UG/KG	2000	U					
2,4-DICHLOROPHENOL	UG/KG	400	U					
1,2,4-TRICHLOROBENZENE	UG/KG	400	U					
4-CHLOROANILINE	UG/KG	400	U					
HEXACHLOROBUTADIENE	UG/KG	400	U					
4-CHLORO-3-METHYLPHENOL	UG/KG	400	U					
HEXACHLOROCYCLOPENTADIENE	UG/KG	400	U					
2,4,6-TRICHLOROPHENOL	UG/KG	400	U					
2,4,5-TRICHLOROPHENOL	UG/KG	400	U					
2-CHLORONAPHTHALENE	UG/KG	400	U					
2-NITROANILINE	UG/KG	400	U					
2,6-DINITROTOLUENE	UG/KG	400	U					
3-NITROANILINE	UG/KG	400	U					
2,4-DINITROPHENOL	UG/KG	790	U					
DIBENZOFURAN	UG/KG	400	U					
4-NITROPHENOL	UG/KG	790	U					
2,4-DINITROTOLUENE	UG/KG	400	U					
DIMETHYL PHTHALATE	UG/KG	400	U					
DIETHYL PHTHALATE	UG/KG	400	U					
4-CHLOROPHENYL PHENYL ETHER	UG/KG	400	U					
4-NITROANILINE	UG/KG	400	U					
4,6-DINITRO-2-METHYLPHENOL	UG/KG	790	U					
N-NITROSODIPHENYLAMINE	UG/KG	400	U					
4-BROMOPHENYL PHENYL ETHER	UG/KG	400	U					
HEXACHLOROBENZENE	UG/KG	400	U					

Charleston Naval Complex
AOC 609, Zone F
Soil SVOA Analytical Data Summary

	StationID	F609SB001		F609SB002		F609SB002	
	SampleID	609SB001T2 (3-5ft)		609SB002S1 (0-1ft)		609SB002S2 (3-5ft)	
	DateCollected	10/15/1999		10/15/1999		10/15/1999	
	DateAnalyzed	10/28/1999		10/28/1999		10/29/1999	
	SDGNumber	EN022		EN022		EN022	
PENTACHLOROPHENOL	UG/KG	790	U				
DI-n-BUTYL PHTHALATE	UG/KG	400	U				
BENZYL BUTYL PHTHALATE	UG/KG	400	U				
3,3'-DICHLOROBENZIDINE	UG/KG	790	U				
bis(2-ETHYLHEXYL) PHTHALATE	UG/KG	400	U				
DI-n-OCTYLPHTHALATE	UG/KG	400	U				

Charleston Naval Complex
AOC 609, Zone F
Soil SVOA Analytical Data Summary

	StationID	F609SB002		F609SB002	
	SampleID	609SB002T1 (0-1ft)		609SB002T2 (3-5ft)	
	DateCollected	10/15/1999		10/15/1999	
	DateAnalyzed	10/28/1999		10/28/1999	
	SDGNumber	EN022		EN022	
1,2,4-TRICHLOROBENZENE, SPLP	UG/L				
1,2-DICHLOROBENZENE, SPLP	UG/L				
1,3-DICHLOROBENZENE, SPLP	UG/L				
1,4-DICHLOROBENZENE, SPLP	UG/L				
2,2'-OXYBIS(1-CHLORO)PROPANE, SPLP	UG/L				
2,2'-OXYBIS(1-CHLORO)PROPANE	UG/KG	490	U	420	U
2,4,5-TRICHLOROPHENOL, SPLP	UG/L				
2,4,6-TRICHLOROPHENOL, SPLP	UG/L				
2,4-DICHLOROPHENOL, SPLP	UG/L				
2,4-DIMETHYLPHENOL, SPLP	UG/L				
2,4-DINITROPHENOL, SPLP	UG/L				
2,4-DINITROTOLUENE, SPLP	UG/L				
2,6-DINITROTOLUENE, SPLP	UG/L				
2-CHLORONAPHTHALENE, SPLP	UG/L				
2-CHLOROPHENOL, SPLP	UG/L				
2-METHYLNAPHTHALENE, SPLP	UG/L				
2-METHYLNAPHTHALENE	UG/KG	490	U	420	U
2-METHYLPHENOL (o-CRESOL), SPLP	UG/L				
2-METHYLPHENOL (o-CRESOL)	UG/KG	490	U	420	U
2-NITROANILINE, SPLP	UG/L				
2-NITROPHENOL, SPLP	UG/L				
3,3'-DICHLOROBENZIDINE, SPLP	UG/L				
3-NITROANILINE, SPLP	UG/L				
4,6-DINITRO-2-METHYLPHENOL, SPLP	UG/L				
4-BROMOPHENYL PHENYL ETHER, SPLP	UG/L				
4-CHLORO-3-METHYLPHENOL, SPLP	UG/L				
4-CHLOROANILINE, SPLP	UG/L				
4-CHLOROPHENYL PHENYL ETHER, SPLP	UG/L				
4-NITROANILINE, SPLP	UG/L				
4-NITROPHENOL, SPLP	UG/L				
Benzoic acid, SPLP	UG/L				

Charleston Naval Complex
AOC 609, Zone F
Soil SVOA Analytical Data Summary

	StationID	F609SB002		F609SB002	
	SampleID	609SB002T1 (0-1ft)		609SB002T2 (3-5ft)	
	DateCollected	10/15/1999		10/15/1999	
	DateAnalyzed	10/28/1999		10/28/1999	
	SDGNumber	EN022		EN022	
Benzyl alcohol, SPLP	UG/L				
BENZYL BUTYL PHTHALATE, SPLP	UG/L				
bis(2-CHLOROETHOXY) METHANE, SPLP	UG/L				
bis(2-ETHYLHEXYL) PHTHALATE, SPLP	UG/L				
DI-n-BUTYL PHTHALATE, SPLP	UG/L				
DI-n-OCTYLPHTHALATE, SPLP	UG/L				
DIBENZOFURAN, SPLP	UG/L				
DIETHYL PHTHALATE, SPLP	UG/L				
DIMETHYL PHTHALATE, SPLP	UG/L				
HEXACHLOROBENZENE, SPLP	UG/L				
HEXACHLOROBUTADIENE, SPLP	UG/L				
HEXACHLOROCYCLOPENTADIENE, SPLP	UG/L				
HEXACHLOROETHANE, SPLP	UG/L				
ISOPHORONE, SPLP	UG/L				
N-NITROSODI-n-PROPYLAMINE, SPLP	UG/L				
N-NITROSODIPHENYLAMINE, SPLP	UG/L				
NITROBENZENE, SPLP	UG/L				
PENTACHLOROPHENOL, SPLP	UG/L				
PHENOL, SPLP	UG/L				
PHENOL	UG/KG	490	U	420	U
ACENAPHTHYLENE, SPLP	UG/L				
ACENAPHTHYLENE	UG/KG	490	U	420	U
bis(2-CHLOROETHYL) ETHER (2-CHLOROETHYL ETHER), S	UG/L				
bis(2-CHLOROETHYL) ETHER (2-CHLOROETHYL ETHER)	UG/KG	490	U	420	U
2-CHLOROPHENOL	UG/KG	490	U	420	U
ACENAPHTHENE, SPLP	UG/L				
ACENAPHTHENE	UG/KG	490	U	420	U
1,3-DICHLOROBENZENE	UG/KG	490	U	420	U
FLUORENE, SPLP	UG/L				

Charleston Naval Complex
AOC 609, Zone F
Soil SVOA Analytical Data Summary

	StationID	F609SB002		F609SB002	
	SampleID	609SB002T1 (0-1ft)		609SB002T2 (3-5ft)	
	DateCollected	10/15/1999		10/15/1999	
	DateAnalyzed	10/28/1999		10/28/1999	
	SDGNumber	EN022		EN022	
FLUORENE	UG/KG	490	U	420	U
1,4-DICHLOROBENZENE	UG/KG	490	U	420	U
PHENANTHRENE, SPLP	UG/L				
PHENANTHRENE	UG/KG	490	U	420	U
ANTHRACENE, SPLP	UG/L				
ANTHRACENE	UG/KG	490	U	420	U
Benzyl alcohol	UG/KG	490	U	420	U
FLUORANTHENE, SPLP	UG/L				
FLUORANTHENE	UG/KG	490	U	420	U
1,2-DICHLOROBENZENE	UG/KG	490	U	420	U
PYRENE, SPLP	UG/L				
PYRENE	UG/KG	490	U	420	U
BENZO(a)ANTHRACENE, SPLP	UG/L				
BENZO(a)ANTHRACENE	UG/KG	490	U	420	U
CHRYSENE, SPLP	UG/L				
CHRYSENE	UG/KG	490	U	420	U
BENZO(b)FLUORANTHENE, SPLP	UG/L				
BENZO(b)FLUORANTHENE	UG/KG	490	U	420	U
N-NITROSODI-n-PROPYLAMINE	UG/KG	490	U	420	U
4-METHYLPHENOL (p-CRESOL), SPLP	UG/L				
4-METHYLPHENOL (p-CRESOL)	UG/KG	490	U	420	U
BENZO(k)FLUORANTHENE, SPLP	UG/L				
BENZO(k)FLUORANTHENE	UG/KG	490	U	420	U
BENZO(a)PYRENE, SPLP	UG/L				
BENZO(a)PYRENE	UG/KG	490	U	420	U
HEXACHLOROETHANE	UG/KG	490	U	420	U
INDENO(1,2,3-c,d)PYRENE, SPLP	UG/L				
INDENO(1,2,3-c,d)PYRENE	UG/KG	490	U	420	U
NITROBENZENE	UG/KG	490	U	420	U
DIBENZ(a,h)ANTHRACENE, SPLP	UG/L				
DIBENZ(a,h)ANTHRACENE	UG/KG	490	U	420	U

Charleston Naval Complex
AOC 609, Zone F
Soil SVOA Analytical Data Summary

		StationID	F609SB002		F609SB002	
		SampleID	609SB002T1 (0-1ft)		609SB002T2 (3-5ft)	
		DateCollected	10/15/1999		10/15/1999	
		DateAnalyzed	10/28/1999		10/28/1999	
		SDGNumber	EN022		EN022	
ISOPHORONE	UG/KG		490	U	420	U
2-NITROPHENOL	UG/KG		490	U	420	U
BENZO(g,h,i)PERYLENE, SPLP	UG/L					
BENZO(g,h,i)PERYLENE	UG/KG		490	U	420	U
2,4-DIMETHYLPHENOL	UG/KG		490	U	420	U
bis(2-CHLOROETHOXY) METHANE	UG/KG		490	U	420	U
Benzoic acid	UG/KG		2500	U	2100	U
2,4-DICHLOROPHENOL	UG/KG		490	U	420	U
1,2,4-TRICHLOROBENZENE	UG/KG		490	U	420	U
4-CHLOROANILINE	UG/KG		490	U	420	U
HEXACHLOROBUTADIENE	UG/KG		490	U	420	U
4-CHLORO-3-METHYLPHENOL	UG/KG		490	U	420	U
HEXACHLOROCYCLOPENTADIENE	UG/KG		490	U	420	U
2,4,6-TRICHLOROPHENOL	UG/KG		490	U	420	U
2,4,5-TRICHLOROPHENOL	UG/KG		490	U	420	U
2-CHLORONAPHTHALENE	UG/KG		490	U	420	U
2-NITROANILINE	UG/KG		490	U	420	U
2,6-DINITROTOLUENE	UG/KG		490	U	420	U
3-NITROANILINE	UG/KG		490	U	420	U
2,4-DINITROPHENOL	UG/KG		980	U	830	U
DIBENZOFURAN	UG/KG		490	U	420	U
4-NITROPHENOL	UG/KG		980	U	830	U
2,4-DINITROTOLUENE	UG/KG		490	U	420	U
DIMETHYL PHTHALATE	UG/KG		490	U	420	U
DIETHYL PHTHALATE	UG/KG		490	U	420	U
4-CHLOROPHENYL PHENYL ETHER	UG/KG		490	U	420	U
4-NITROANILINE	UG/KG		490	U	420	U
4,6-DINITRO-2-METHYLPHENOL	UG/KG		980	U	830	U
N-NITROSODIPHENYLAMINE	UG/KG		490	U	420	U
4-BROMOPHENYL PHENYL ETHER	UG/KG		490	U	420	U
HEXACHLOROBENZENE	UG/KG		490	U	420	U

Charleston Naval Complex
AOC 609, Zone F
Soil SVOA Analytical Data Summary

	StationID	F609SB002		F609SB002	
	SampleID	609SB002T1 (0-1ft)		609SB002T2 (3-5ft)	
	DateCollected	10/15/1999		10/15/1999	
	DateAnalyzed	10/28/1999		10/28/1999	
	SDGNumber	EN022		EN022	
PENTACHLOROPHENOL	UG/KG	980	U	830	U
DI-n-BUTYL PHTHALATE	UG/KG	490	U	420	U
BENZYL BUTYL PHTHALATE	UG/KG	490	U	420	U
3,3'-DICHLOROBENZIDINE	UG/KG	980	U	830	U
bis(2-ETHYLHEXYL) PHTHALATE	UG/KG	490	U	420	U
DI-n-OCTYLPHTHALATE	UG/KG	490	U	420	U

Charleston Naval Complex
AOC 609, Zone F
Soil Metals Analytical Data Summary

	StationID	F609SB001		F609SB001		F609SB001		F609SB001	
	SampleID	609SB001S1 (0-1ft)		609SB001S2 (3-5ft)		609SB001T1 (0-1ft)		609SB001T2 (3-5ft)	
	DateCollected	10/15/1999		10/15/1999		10/15/1999		10/15/1999	
	DateAnalyzed	10/25/1999		10/25/1999		10/29/1999		10/29/1999	
	SDGNumber	EN022		EN022		EN022		EN022	
ALUMINUM, SPLP	UG/L	11200	=	15100	=				
ANTIMONY, SPLP	UG/L	7.5	J	2.4	U				
ARSENIC,SPLP	UG/L	12.4	=	16	=				
BARIUM, SPLP	UG/L	709	=	1200	=				
BERYLLIUM, SPLP	UG/L	0.9	U	0.9	U				
CADMIUM, SPLP	UG/L	0.3	U	0.3	U				
CALCIUM, SPLP	UG/L	5340	=	1840	J				
COBALT, SPLP	UG/L	14.7	J	2.3	J				
COPPER, SPLP	UG/L	27.7	=	23.2	J				
IRON, SPLP	UG/L	9120	=	10800	=				
LEAD, SPLP	UG/L	65.1	=	22.4	=				
MAGNESIUM, SPLP	UG/L	1990	J	1840	J				
MANGANESE, SPLP	UG/L	128	=	120	=				
MERCURY, SPLP	UG/L	0.4	R	0.4	R				
NICKEL, SPLP	UG/L	8.2	J	7.1	J				
POTASSIUM, SPLP	UG/L	1930	J	2180	J				
SELENIUM, SPLP	UG/L	2.4	U	1.7	U				
SILVER, SPLP	UG/L	0.5	UJ	0.5	UJ				
SODIUM, SPLP	UG/L	2900	J	3340	J				
THALLIUM, SPLP	UG/L	2.4	UJ	2.4	UJ				
Tin (Sn), SPLP	UG/L	4.1	J	2.7	U				
VANADIUM, SPLP	UG/L	23.2	J	34.9	J				
ALUMINUM	MG/KG					4080	=	5740	=
ANTIMONY	MG/KG					2.8	J	0.3	J
ARSENIC	MG/KG					30.8	J	3.4	J
BARIUM	MG/KG					116	=	19.3	J
BERYLLIUM	MG/KG					0.57	J	0.52	J
CADMIUM	MG/KG					0.32	J	0.03	UJ
CALCIUM	MG/KG					2390	J	640	J
CHROMIUM, TOTAL	MG/KG					20.3	J	6.7	J
CHROMIUM, TOTAL	UG/L	17.2	=	20.6	=				

Charleston Naval Complex
AOC 609, Zone F
Soil Metals Analytical Data Summary

	StationID	F609SB001		F609SB001		F609SB001		F609SB001	
	SampleID	609SB001S1 (0-1ft)		609SB001S2 (3-5ft)		609SB001T1 (0-1ft)		609SB001T2 (3-5ft)	
	DateCollected	10/15/1999		10/15/1999		10/15/1999		10/15/1999	
	DateAnalyzed	10/25/1999		10/25/1999		10/29/1999		10/29/1999	
	SDGNumber	EN022		EN022		EN022		EN022	
COBALT	MG/KG					22.4	=	1.7	J
COPPER	MG/KG					65	=	13.7	=
IRON	MG/KG					11500	=	3680	=
LEAD	MG/KG					184	=	17.7	=
MAGNESIUM	MG/KG					425	J	430	J
MANGANESE	MG/KG					122	=	55.1	=
MERCURY	MG/KG					1.3	=	0.06	=
NICKEL	MG/KG					17.7	=	2.7	J
POTASSIUM	MG/KG					336	J	223	J
SELENIUM	MG/KG					2	=	0.49	J
SILVER	MG/KG					0.29	J	0.05	U
SODIUM	MG/KG					194	J	41.3	U
THALLIUM	MG/KG					0.29	UJ	0.26	UJ
Tin (Sn)	MG/KG					7.6	J	4.3	J
VANADIUM	MG/KG					21.4	=	9.3	=
ZINC, SPLP	UG/L	241	=	264	=				
ZINC	MG/KG					338	J	11.4	J

Charleston Naval Complex
AOC 609, Zone F
Soil Metals Analytical Data Summary

	StationID	F609SB002		F609SB002		F609SB002		F609SB002	
	SampleID	609SB002S1 (0-1ft)		609SB002S2 (3-5ft)		609SB002T1 (0-1ft)		609SB002T2 (3-5ft)	
	DateCollected	10/15/1999		10/15/1999		10/15/1999		10/15/1999	
	DateAnalyzed	10/25/1999		10/25/1999		10/29/1999		10/29/1999	
	SDGNumber	EN022		EN022		EN022		EN022	
ALUMINUM, SPLP	UG/L	17200	=	200000	=				
ANTIMONY, SPLP	UG/L	2.4	U	2.4	U				
ARSENIC,SPLP	UG/L	13	=	62.5	=				
BARIUM, SPLP	UG/L	1050	=	3080	=				
BERYLLIUM, SPLP	UG/L	0.9	U	2.7	J				
CADMIUM, SPLP	UG/L	0.3	U	0.3	U				
CALCIUM, SPLP	UG/L	6500	=	17100	=				
COBALT, SPLP	UG/L	4.2	J	26.4	J				
COPPER, SPLP	UG/L	20.3	J	22.8	J				
IRON, SPLP	UG/L	15700	=	177000	=				
LEAD, SPLP	UG/L	24.5	=	87.6	=				
MAGNESIUM, SPLP	UG/L	3460	J	13000	=				
MANGANESE, SPLP	UG/L	291	=	341	=				
MERCURY, SPLP	UG/L	0.4	R	0.4	J				
NICKEL, SPLP	UG/L	9.7	J	66	=				
POTASSIUM, SPLP	UG/L	4620	J	15500	=				
SELENIUM, SPLP	UG/L	3.5	U	13.9	J				
SILVER, SPLP	UG/L	0.5	UJ	0.5	UJ				
SODIUM, SPLP	UG/L	4660	J	16500	=				
THALLIUM, SPLP	UG/L	2.4	UJ	2.4	UJ				
Tin (Sn), SPLP	UG/L	4.6	J	13.9	J				
VANADIUM, SPLP	UG/L	39.3	J	372	=				
ALUMINUM	MG/KG					36000	=	13900	=
ANTIMONY	MG/KG					1.4	J	0.88	J
ARSENIC	MG/KG					18.7	J	5.7	J
BARIUM	MG/KG					50.3	=	23.4	=
BERYLLIUM	MG/KG					1.6	=	0.29	J
CADMIUM	MG/KG					0.04	UJ	0.03	UJ
CALCIUM	MG/KG					4400	J	1190	J
CHROMIUM, TOTAL	MG/KG					54.7	J	26.7	J
CHROMIUM, TOTAL	UG/L	24	=	274	=				

Charleston Naval Complex
AOC 609, Zone F
Soil Metals Analytical Data Summary

	StationID	F609SB002		F609SB002		F609SB002		F609SB002	
	SampleID	609SB002S1 (0-1ft)		609SB002S2 (3-5ft)		609SB002T1 (0-1ft)		609SB002T2 (3-5ft)	
	DateCollected	10/15/1999		10/15/1999		10/15/1999		10/15/1999	
	DateAnalyzed	10/25/1999		10/25/1999		10/29/1999		10/29/1999	
	SDGNumber	EN022		EN022		EN022		EN022	
COBALT	MG/KG					11.9	=	2.2	J
COPPER	MG/KG					42	=	1.3	J
IRON	MG/KG					38800	=	19000	=
LEAD	MG/KG					62.9	=	8.1	=
MAGNESIUM	MG/KG					4560	J	1110	J
MANGANESE	MG/KG					389	=	51.2	=
MERCURY	MG/KG					0.81	=	0.05	U
NICKEL	MG/KG					20.6	=	4.3	J
POTASSIUM	MG/KG					2930	J	763	J
SELENIUM	MG/KG					2.6	=	1.8	=
SILVER	MG/KG					0.06	U	0.06	U
SODIUM	MG/KG					377	J	264	J
THALLIUM	MG/KG					0.31	UJ	0.27	UJ
Tin (Sn)	MG/KG					7.8	J	5.3	J
VANADIUM	MG/KG					88.7	=	36.3	=
ZINC, SPLP	UG/L	306	=	1940	=				
ZINC	MG/KG					172	J	13.5	J

Charleston Naval Complex
AOC 609, Zone F
Soil Metals Analytical Data Summary

	StationID	F609SB007		F609SB007		F609SB008		F609SB008	
	SampleID	609SB00701 (0-1ft)		609SB00702 (3-5ft)		609SB00801 (0-1ft)		609SB00802 (3-5ft)	
	DateCollected	10/16/1999		10/16/1999		10/15/1999		10/15/1999	
	DateAnalyzed	10/28/1999		10/28/1999		10/29/1999		10/29/1999	
	SDGNumber	EN025		EN025		EN022		EN022	
ALUMINUM, SPLP	UG/L								
ANTIMONY, SPLP	UG/L								
ARSENIC,SPLP	UG/L								
BARIUM, SPLP	UG/L								
BERYLLIUM, SPLP	UG/L								
CADMIUM, SPLP	UG/L								
CALCIUM, SPLP	UG/L								
COBALT, SPLP	UG/L								
COPPER, SPLP	UG/L								
IRON, SPLP	UG/L								
LEAD, SPLP	UG/L								
MAGNESIUM, SPLP	UG/L								
MANGANESE, SPLP	UG/L								
MERCURY, SPLP	UG/L								
NICKEL, SPLP	UG/L								
POTASSIUM, SPLP	UG/L								
SELENIUM, SPLP	UG/L								
SILVER, SPLP	UG/L								
SODIUM, SPLP	UG/L								
THALLIUM, SPLP	UG/L								
Tin (Sn), SPLP	UG/L								
VANADIUM, SPLP	UG/L								
ALUMINUM	MG/KG	8460	=	7900	=	7730	=	2720	=
ANTIMONY	MG/KG	18.5	J	0.21	J	0.91	J	0.44	J
ARSENIC	MG/KG	14.1	=	2.1	=	11.4	J	0.89	J
BARIUM	MG/KG	172	=	28	=	117	=	13.2	J
BERYLLIUM	MG/KG	2.1	=	0.67	=	0.59	=	0.35	J
CADMIUM	MG/KG	0.11	U	0.02	U	0.04	UJ	0.03	UJ
CALCIUM	MG/KG	3040	=	182	J	1090	J	192	J
CHROMIUM, TOTAL	MG/KG	50.6	=	7.1	=	12.3	J	3.5	J
CHROMIUM, TOTAL	UG/L								

Charleston Naval Complex
AOC 609, Zone F
Soil Metals Analytical Data Summary

	StationID	F609SB007		F609SB007		F609SB008		F609SB008	
	SampleID	609SB00701 (0-1ft)		609SB00702 (3-5ft)		609SB00801 (0-1ft)		609SB00802 (3-5ft)	
	DateCollected	10/16/1999		10/16/1999		10/15/1999		10/15/1999	
	DateAnalyzed	10/28/1999		10/28/1999		10/29/1999		10/29/1999	
	SDGNumber	EN025		EN025		EN022		EN022	
COBALT	MG/KG	49.7	=	2.9	J	9.2	=	1.1	J
COPPER	MG/KG	480	=	1.1	U	26.8	=	0.24	J
IRON	MG/KG	23800	=	5880	=	8830	=	1710	=
LEAD	MG/KG	511	=	4.1	=	35	=	2.3	=
MAGNESIUM	MG/KG	1050	=	363	J	815	J	216	J
MANGANESE	MG/KG	234	=	35.8	=	115	=	18.9	=
MERCURY	MG/KG	1	J	0.05	U	0.12	=	0.04	U
NICKEL	MG/KG	68.7	=	3.6	=	7.8	=	1.5	J
POTASSIUM	MG/KG	550	J	213	J	457	J	103	J
SELENIUM	MG/KG	2.7	=	0.63	J	1	J	0.24	J
SILVER	MG/KG	0.7	U	0.04	U	0.06	U	0.05	U
SODIUM	MG/KG	426	J	41.2	J	112	J	49.3	J
THALLIUM	MG/KG	1.1	UJ	0.2	UJ	0.28	UJ	0.24	UJ
Tin (Sn)	MG/KG	125	=	2.8	U	8.8	J	3.7	J
VANADIUM	MG/KG	22.7	=	10.8	=	18.7	=	4.7	J
ZINC, SPLP	UG/L								
ZINC	MG/KG	2650	=	9.7	=	148	J	4	J

Charleston Naval Complex
AOC 609, Zone F
Soil Metals Analytical Data Summary

	StationID	F609SB009		F609SB009		F609SB010		F609SB010	
	SampleID	609SB00901 (0-1ft)		609SB00902 (3-5ft)		609SB01001 (0-1ft)		609SB01002 (3-5ft)	
	DateCollected	10/16/1999		10/16/1999		10/15/1999		10/15/1999	
	DateAnalyzed	10/28/1999		10/28/1999		11/18/1999		11/18/1999	
	SDGNumber	EN025		EN025		EN026		EN026	
ALUMINUM, SPLP	UG/L								
ANTIMONY, SPLP	UG/L								
ARSENIC,SPLP	UG/L								
BARIUM, SPLP	UG/L								
BERYLLIUM, SPLP	UG/L								
CADMIUM, SPLP	UG/L								
CALCIUM, SPLP	UG/L								
COBALT, SPLP	UG/L								
COPPER, SPLP	UG/L								
IRON, SPLP	UG/L								
LEAD, SPLP	UG/L								
MAGNESIUM, SPLP	UG/L								
MANGANESE, SPLP	UG/L								
MERCURY, SPLP	UG/L								
NICKEL, SPLP	UG/L								
POTASSIUM, SPLP	UG/L								
SELENIUM, SPLP	UG/L								
SILVER, SPLP	UG/L								
SODIUM, SPLP	UG/L								
THALLIUM, SPLP	UG/L								
Tin (Sn), SPLP	UG/L								
VANADIUM, SPLP	UG/L								
ALUMINUM	MG/KG	6840	=	36400	=	11600	J	3540	J
ANTIMONY	MG/KG	0.33	J	1.2	J	0.73	J	0.26	J
ARSENIC	MG/KG	2.2	=	32.2	=	9.1	J	2.5	J
BARIUM	MG/KG	13.9	J	48.3	=	24.1	J	13.9	J
BERYLLIUM	MG/KG	0.18	J	1.6	=	0.47	J	0.45	J
CADMIUM	MG/KG	0.03	U	0.05	U	0.03	UJ	0.03	UJ
CALCIUM	MG/KG	1210	=	3050	=	27400	J	744	J
CHROMIUM, TOTAL	MG/KG	8	=	53.8	=	21.7	J	5.5	J
CHROMIUM, TOTAL	UG/L								

Charleston Naval Complex
AOC 609, Zone F
Soil Metals Analytical Data Summary

	StationID	F609SB009		F609SB009		F609SB010		F609SB010	
	SampleID	609SB00901 (0-1ft)		609SB00902 (3-5ft)		609SB01001 (0-1ft)		609SB01002 (3-5ft)	
	DateCollected	10/16/1999		10/16/1999		10/15/1999		10/15/1999	
	DateAnalyzed	10/28/1999		10/28/1999		11/18/1999		11/18/1999	
	SDGNumber	EN025		EN025		EN026		EN026	
COBALT	MG/KG	1.4	J	8.9	=	5.3	=	0.85	J
COPPER	MG/KG	3.5	=	59	=	15.2	J	1.1	J
IRON	MG/KG	5360	=	33300	=	17100	J	3530	J
LEAD	MG/KG	9	=	49.9	=	22.7	J	6.2	J
MAGNESIUM	MG/KG	499	J	4410	=	1490	J	291	J
MANGANESE	MG/KG	48.3	=	398	=	133	J	48.3	J
MERCURY	MG/KG	0.07	J	0.38	J	0.06	J	0.07	J
NICKEL	MG/KG	3	J	17.5	=	6.7	J	1.6	J
POTASSIUM	MG/KG	257	J	2770	J	787	J	133	J
SELENIUM	MG/KG	0.91	J	3.5	=	1.5	=	0.6	U
SILVER	MG/KG	0.05	U	0.08	U	0.58	J	0.05	U
SODIUM	MG/KG	130	J	555	J	174	J	44.8	J
THALLIUM	MG/KG	0.24	UJ	1.8	UJ	0.26	UJ	0.23	UJ
Tin (Sn)	MG/KG	3.5	U	8	U	4.3	U	3.2	U
VANADIUM	MG/KG	12.1	=	86.3	=	35	J	8.5	J
ZINC, SPLP	UG/L								
ZINC	MG/KG	15.5	=	134	=	62.6	J	5.7	J

Charleston Naval Complex
AOC 609, Zone F
Soil Metals Analytical Data Summary

	StationID	F609SB011		F609SB011		F609SB012		F609SB012	
	SampleID	609SB01101 (0-1ft)		609SB01102 (3-5ft)		609SB01201 (0-1ft)		609SB01202 (3-5ft)	
	DateCollected	10/15/1999		10/15/1999		10/15/1999		10/15/1999	
	DateAnalyzed	11/18/1999		11/18/1999		11/18/1999		11/18/1999	
	SDGNumber	EN026		EN026		EN026		EN026	
ALUMINUM, SPLP	UG/L								
ANTIMONY, SPLP	UG/L								
ARSENIC,SPLP	UG/L								
BARIUM, SPLP	UG/L								
BERYLLIUM, SPLP	UG/L								
CADMIUM, SPLP	UG/L								
CALCIUM, SPLP	UG/L								
COBALT, SPLP	UG/L								
COPPER, SPLP	UG/L								
IRON, SPLP	UG/L								
LEAD, SPLP	UG/L								
MAGNESIUM, SPLP	UG/L								
MANGANESE, SPLP	UG/L								
MERCURY, SPLP	UG/L								
NICKEL, SPLP	UG/L								
POTASSIUM, SPLP	UG/L								
SELENIUM, SPLP	UG/L								
SILVER, SPLP	UG/L								
SODIUM, SPLP	UG/L								
THALLIUM, SPLP	UG/L								
Tin (Sn), SPLP	UG/L								
VANADIUM, SPLP	UG/L								
ALUMINUM	MG/KG	9100	J	13700	J	5090	J	6920	J
ANTIMONY	MG/KG	0.32	UJ	1.6	J	0.69	J	0.6	J
ARSENIC	MG/KG	2.4	J	15	J	3.3	J	4.7	J
BARIUM	MG/KG	27.1	J	34.2	J	20.6	J	13.2	J
BERYLLIUM	MG/KG	1.1	=	1.3	=	0.44	J	0.25	J
CADMIUM	MG/KG	0.04	UJ	0.13	UJ	0.03	UJ	0.14	UJ
CALCIUM	MG/KG	517	J	2240	J	432	J	682	J
CHROMIUM, TOTAL	MG/KG	6.3	J	26.5	J	7.8	J	19.7	J
CHROMIUM, TOTAL	UG/L								

Charleston Naval Complex
AOC 609, Zone F
Soil Metals Analytical Data Summary

	StationID	F609SB011		F609SB011		F609SB012		F609SB012	
	SampleID	609SB01101 (0-1ft)		609SB01102 (3-5ft)		609SB01201 (0-1ft)		609SB01202 (3-5ft)	
	DateCollected	10/15/1999		10/15/1999		10/15/1999		10/15/1999	
	DateAnalyzed	11/18/1999		11/18/1999		11/18/1999		11/18/1999	
	SDGNumber	EN026		EN026		EN026		EN026	
COBALT	MG/KG	2.7	J	9.1	=	13.7	=	4.9	=
COPPER	MG/KG	0.88	J	34.8	J	8.9	J	1.5	J
IRON	MG/KG	4180	J	21500	J	6150	J	18400	J
LEAD	MG/KG	3.8	J	50.1	J	19.1	J	10.1	J
MAGNESIUM	MG/KG	446	J	2320	J	373	J	978	J
MANGANESE	MG/KG	46.8	J	363	J	28.7	J	40.6	J
MERCURY	MG/KG	0.55	J	0.04	U	0.05	J	0.05	U
NICKEL	MG/KG	4.7	J	12	J	3.8	J	2	J
POTASSIUM	MG/KG	191	J	1280	J	189	J	553	J
SELENIUM	MG/KG	0.67	U	2.1	=	1	U	2.3	=
SILVER	MG/KG	0.07	U	0.04	U	0.96	J	0.05	U
SODIUM	MG/KG	57.6	J	147	J	96.8	J	313	J
THALLIUM	MG/KG	0.32	UJ	0.21	UJ	0.24	UJ	0.22	UJ
Tin (Sn)	MG/KG	4.3	U	6.5	U	4.4	U	4	U
VANADIUM	MG/KG	9.4	J	43.1	J	11.9	J	26.1	J
ZINC, SPLP	UG/L								
ZINC	MG/KG	7	J	143	J	53.2	J	24.2	J

Charleston Naval Complex
AOC 609, Zone F
Soil Pesticides Analytical Data Summary

	StationID	F609SB001		F609SB001	
	SampleID	609SB001S1 (0-1ft)		609SB001S2 (3-5ft)	
	DateCollected	10/15/1999		10/15/1999	
	DateAnalyzed	10/24/1999		10/24/1999	
	SDGNumber	EN022		EN022	
ALDRIN, SPLP	UG/L	0.05	U	0.05	U
DIELDRIN, SPLP	UG/L	0.1	U	0.1	U
ENDOSULFAN I, SPLP	UG/L	0.05	U	0.05	U
ENDOSULFAN II, SPLP	UG/L	0.1	U	0.1	U
ENDOSULFAN SULFATE, SPLP	UG/L	0.1	U	0.1	U
ENDRIN ALDEHYDE, SPLP	UG/L	0.1	U	0.1	U
ENDRIN KETONE, SPLP	UG/L	0.1	U	0.1	U
ENDRIN, SPLP	UG/L	0.1	U	0.1	U
GAMMA BHC (LINDANE), SPLP	UG/L	0.05	U	0.05	U
GAMMA-CHLORDANE, SPLP	UG/L	0.05	U	0.05	U
HEPTACHLOR EPOXIDE, SPLP	UG/L	0.05	U	0.05	U
HEPTACHLOR, SPLP	UG/L	0.05	U	0.05	U
METHOXYCHLOR, SPLP	UG/L	0.5	U	0.5	U
p,p'-DDD, SPLP	UG/L	0.1	U	0.1	U
p,p'-DDE, SPLP	UG/L	0.1	U	0.1	U
p,p'-DDT, SPLP	UG/L	0.1	U	0.1	U
TOXAPHENE, SPLP	UG/L	5	U	5	U
ALPHA BHC (ALPHA HEXACHLOROCYCLOHEXANE), SPLP	UG/L	0.05	U	0.05	U
ALPHA BHC (ALPHA HEXACHLOROCYCLOHEXANE)	UG/KG				
GAMMA BHC (LINDANE)	UG/KG				
BETA BHC (BETA HEXACHLOROCYCLOHEXANE), SPLP	UG/L	0.05	U	0.05	U
BETA BHC (BETA HEXACHLOROCYCLOHEXANE)	UG/KG				
HEPTACHLOR	UG/KG				
DELTA BHC (DELTA HEXACHLOROCYCLOHEXANE), SPLP	UG/L	0.05	U	0.05	U
DELTA BHC (DELTA HEXACHLOROCYCLOHEXANE)	UG/KG				
ALDRIN	UG/KG				
HEPTACHLOR EPOXIDE	UG/KG				
GAMMA-CHLORDANE	UG/KG				
ALPHA-CHLORDANE, SPLP	UG/L	0.05	U	0.05	U
ALPHA-CHLORDANE	UG/KG				
ENDOSULFAN I	UG/KG				
p,p'-DDE	UG/KG				
DIELDRIN	UG/KG				
ENDRIN	UG/KG				
p,p'-DDD	UG/KG				
ENDOSULFAN II	UG/KG				
p,p'-DDT	UG/KG				
ENDRIN ALDEHYDE	UG/KG				

Charleston Naval Complex
AOC 609, Zone F
Soil Pesticides Analytical Data Summary

	StationID	F609SB001	F609SB001
	SampleID	609SB001S1 (0-1ft)	609SB001S2 (3-5ft)
	DateCollected	10/15/1999	10/15/1999
	DateAnalyzed	10/24/1999	10/24/1999
	SDGNumber	EN022	EN022
ENDOSULFAN SULFATE	UG/KG		
METHOXYCHLOR	UG/KG		
ENDRIN KETONE	UG/KG		
TOXAPHENE	UG/KG		

Charleston Naval Complex
AOC 609, Zone F
Soil Pesticides Analytical Data Summary

	StationID	F609SB001		F609SB001	
	SampleID	609SB001T1 (0-1ft)		609SB001T2 (3-5ft)	
	DateCollected	10/15/1999		10/15/1999	
	DateAnalyzed	10/27/1999		10/27/1999	
	SDGNumber	EN022		EN022	
ALDRIN, SPLP	UG/L				
DIELDRIN, SPLP	UG/L				
ENDOSULFAN I, SPLP	UG/L				
ENDOSULFAN II, SPLP	UG/L				
ENDOSULFAN SULFATE, SPLP	UG/L				
ENDRIN ALDEHYDE, SPLP	UG/L				
ENDRIN KETONE, SPLP	UG/L				
ENDRIN, SPLP	UG/L				
GAMMA BHC (LINDANE), SPLP	UG/L				
GAMMA-CHLORDANE, SPLP	UG/L				
HEPTACHLOR EPOXIDE, SPLP	UG/L				
HEPTACHLOR, SPLP	UG/L				
METHOXYCHLOR, SPLP	UG/L				
p,p'-DDD, SPLP	UG/L				
p,p'-DDE, SPLP	UG/L				
p,p'-DDT, SPLP	UG/L				
TOXAPHENE, SPLP	UG/L				
ALPHA BHC (ALPHA HEXACHLOROCYCLOHEXANE), SPLP	UG/L				
ALPHA BHC (ALPHA HEXACHLOROCYCLOHEXANE)	UG/KG	2.2	U	2	U
GAMMA BHC (LINDANE)	UG/KG	2.2	U	2	U
BETA BHC (BETA HEXACHLOROCYCLOHEXANE), SPLP	UG/L				
BETA BHC (BETA HEXACHLOROCYCLOHEXANE)	UG/KG	2.2	U	2	U
HEPTACHLOR	UG/KG	2.2	U	2	U
DELTA BHC (DELTA HEXACHLOROCYCLOHEXANE), SPLP	UG/L				
DELTA BHC (DELTA HEXACHLOROCYCLOHEXANE)	UG/KG	2.2	U	2	U
ALDRIN	UG/KG	2.2	U	2	U
HEPTACHLOR EPOXIDE	UG/KG	2.2	U	2	U
GAMMA-CHLORDANE	UG/KG	2.2	U	2	U
ALPHA-CHLORDANE, SPLP	UG/L				
ALPHA-CHLORDANE	UG/KG	2.2	U	2	U
ENDOSULFAN I	UG/KG	2.2	U	2	U
p,p'-DDE	UG/KG	180	=	6.3	J
DIELDRIN	UG/KG	4.3	U	3.9	U
ENDRIN	UG/KG	4.3	U	3.9	U
p,p'-DDD	UG/KG	66	=	3.9	U
ENDOSULFAN II	UG/KG	4.3	U	3.9	U
p,p'-DDT	UG/KG	26	=	3.9	U
ENDRIN ALDEHYDE	UG/KG	4.3	U	3.9	U

Charleston Naval Complex
AOC 609, Zone F
Soil Pesticides Analytical Data Summary

	StationID	F609SB001		F609SB001	
	SampleID	609SB001T1 (0-1ft)		609SB001T2 (3-5ft)	
	DateCollected	10/15/1999		10/15/1999	
	DateAnalyzed	10/27/1999		10/27/1999	
	SDGNumber	EN022		EN022	
ENDOSULFAN SULFATE	UG/KG	4.3	U	3.9	U
METHOXYCHLOR	UG/KG	22	U	20	U
ENDRIN KETONE	UG/KG	4.3	U	3.9	U
TOXAPHENE	UG/KG	220	U	200	U

Charleston Naval Complex
AOC 609, Zone F
Soil Pesticides Analytical Data Summary

	StationID	F609SB002		F609SB002	
	SampleID	609SB002S1 (0-1ft)		609SB002S2 (3-5ft)	
	DateCollected	10/15/1999		10/15/1999	
	DateAnalyzed	10/24/1999		10/24/1999	
	SDGNumber	EN022		EN022	
ALDRIN, SPLP	UG/L	0.05	U	0.05	U
DIELDRIN, SPLP	UG/L	0.1	U	0.1	U
ENDOSULFAN I, SPLP	UG/L	0.05	U	0.05	U
ENDOSULFAN II, SPLP	UG/L	0.1	U	0.1	U
ENDOSULFAN SULFATE, SPLP	UG/L	0.1	U	0.1	U
ENDRIN ALDEHYDE, SPLP	UG/L	0.1	U	0.1	U
ENDRIN KETONE, SPLP	UG/L	0.1	U	0.1	U
ENDRIN, SPLP	UG/L	0.1	U	0.1	U
GAMMA BHC (LINDANE), SPLP	UG/L	0.05	U	0.05	U
GAMMA-CHLORDANE, SPLP	UG/L	0.05	U	0.05	U
HEPTACHLOR EPOXIDE, SPLP	UG/L	0.05	U	0.05	U
HEPTACHLOR, SPLP	UG/L	0.05	U	0.05	U
METHOXYCHLOR, SPLP	UG/L	0.5	U	0.5	U
p,p'-DDD, SPLP	UG/L	0.1	U	0.1	U
p,p'-DDE, SPLP	UG/L	0.1	U	0.1	U
p,p'-DDT, SPLP	UG/L	0.1	U	0.1	U
TOXAPHENE, SPLP	UG/L	5	U	5	U
ALPHA BHC (ALPHA HEXACHLOROCYCLOHEXANE), SPLP	UG/L	0.05	U	0.05	U
ALPHA BHC (ALPHA HEXACHLOROCYCLOHEXANE)	UG/KG				
GAMMA BHC (LINDANE)	UG/KG				
BETA BHC (BETA HEXACHLOROCYCLOHEXANE), SPLP	UG/L	0.05	U	0.05	U
BETA BHC (BETA HEXACHLOROCYCLOHEXANE)	UG/KG				
HEPTACHLOR	UG/KG				
DELTA BHC (DELTA HEXACHLOROCYCLOHEXANE), SPLP	UG/L	0.05	U	0.05	U
DELTA BHC (DELTA HEXACHLOROCYCLOHEXANE)	UG/KG				
ALDRIN	UG/KG				
HEPTACHLOR EPOXIDE	UG/KG				
GAMMA-CHLORDANE	UG/KG				
ALPHA-CHLORDANE, SPLP	UG/L	0.05	U	0.05	U
ALPHA-CHLORDANE	UG/KG				
ENDOSULFAN I	UG/KG				
p,p'-DDE	UG/KG				
DIELDRIN	UG/KG				
ENDRIN	UG/KG				
p,p'-DDD	UG/KG				
ENDOSULFAN II	UG/KG				
p,p'-DDT	UG/KG				
ENDRIN ALDEHYDE	UG/KG				

Charleston Naval Complex
AOC 609, Zone F
Soil Pesticides Analytical Data Summary

	StationID	F609SB002	F609SB002
	SampleID	609SB002S1 (0-1ft)	609SB002S2 (3-5ft)
	DateCollected	10/15/1999	10/15/1999
	DateAnalyzed	10/24/1999	10/24/1999
	SDGNumber	EN022	EN022
ENDOSULFAN SULFATE	UG/KG		
METHOXYCHLOR	UG/KG		
ENDRIN KETONE	UG/KG		
TOXAPHENE	UG/KG		

Charleston Naval Complex
AOC 609, Zone F
Soil Pesticides Analytical Data Summary

	StationID	F609SB002		F609SB002	
	SampleID	609SB002T1 (0-1ft)		609SB002T2 (3-5ft)	
	DateCollected	10/15/1999		10/15/1999	
	DateAnalyzed	10/27/1999		10/27/1999	
	SDGNumber	EN022		EN022	
ALDRIN, SPLP	UG/L				
DIELDRIN, SPLP	UG/L				
ENDOSULFAN I, SPLP	UG/L				
ENDOSULFAN II, SPLP	UG/L				
ENDOSULFAN SULFATE, SPLP	UG/L				
ENDRIN ALDEHYDE, SPLP	UG/L				
ENDRIN KETONE, SPLP	UG/L				
ENDRIN, SPLP	UG/L				
GAMMA BHC (LINDANE), SPLP	UG/L				
GAMMA-CHLORDANE, SPLP	UG/L				
HEPTACHLOR EPOXIDE, SPLP	UG/L				
HEPTACHLOR, SPLP	UG/L				
METHOXYCHLOR, SPLP	UG/L				
p,p'-DDD, SPLP	UG/L				
p,p'-DDE, SPLP	UG/L				
p,p'-DDT, SPLP	UG/L				
TOXAPHENE, SPLP	UG/L				
ALPHA BHC (ALPHA HEXACHLOROCYCLOHEXANE), SPLP	UG/L				
ALPHA BHC (ALPHA HEXACHLOROCYCLOHEXANE)	UG/KG	2.5	U	2.1	U
GAMMA BHC (LINDANE)	UG/KG	2.5	U	2.1	U
BETA BHC (BETA HEXACHLOROCYCLOHEXANE), SPLP	UG/L				
BETA BHC (BETA HEXACHLOROCYCLOHEXANE)	UG/KG	2.5	U	2.1	U
HEPTACHLOR	UG/KG	2.5	U	2.1	U
DELTA BHC (DELTA HEXACHLOROCYCLOHEXANE), SPLP	UG/L				
DELTA BHC (DELTA HEXACHLOROCYCLOHEXANE)	UG/KG	2.5	U	2.1	U
ALDRIN	UG/KG	2.5	U	2.1	U
HEPTACHLOR EPOXIDE	UG/KG	2.5	U	2.1	U
GAMMA-CHLORDANE	UG/KG	2.5	U	2.1	U
ALPHA-CHLORDANE, SPLP	UG/L				
ALPHA-CHLORDANE	UG/KG	2.5	U	2.1	U
ENDOSULFAN I	UG/KG	2.5	U	2.1	U
p,p'-DDE	UG/KG	20	=	4.1	U
DIELDRIN	UG/KG	4.9	U	4.1	U
ENDRIN	UG/KG	4.9	U	4.1	U
p,p'-DDD	UG/KG	5.2	=	4.1	U
ENDOSULFAN II	UG/KG	4.9	U	4.1	U
p,p'-DDT	UG/KG	4.9	U	4.1	U
ENDRIN ALDEHYDE	UG/KG	4.9	U	4.1	U

Charleston Naval Complex
AOC 609, Zone F
Soil Pesticides Analytical Data Summary

	StationID	F609SB002		F609SB002	
	SampleID	609SB002T1 (0-1ft)		609SB002T2 (3-5ft)	
	DateCollected	10/15/1999		10/15/1999	
	DateAnalyzed	10/27/1999		10/27/1999	
	SDGNumber	EN022		EN022	
ENDOSULFAN SULFATE	UG/KG	4.9	U	4.1	U
METHOXYCHLOR	UG/KG	25	U	21	U
ENDRIN KETONE	UG/KG	4.9	U	4.1	U
TOXAPHENE	UG/KG	250	U	210	U

Charleston Naval Complex
AOC 609, Zone F
Soil PCB Analytical Data Summary

	StationID	F609SB001		F609SB001		F609SB001	
	SampleID	609SB001S1 (0-1ft)		609SB001S2 (3-5ft)		609SB001T1 (0-1ft)	
	DateCollected	10/15/1999		10/15/1999		10/15/1999	
	DateAnalyzed	10/24/1999		10/24/1999		10/27/1999	
	SDGNumber	EN022		EN022		EN022	
PCB-1016 (AROCHLOR 1016), SPLP	UG/L	1	U	1	U		
PCB-1221 (AROCHLOR 1221), SPLP	UG/L	2	U	2	U		
PCB-1232 (AROCHLOR 1232), SPLP	UG/L	1	U	1	U		
PCB-1242 (AROCHLOR 1242), SPLP	UG/L	1	U	1	U		
PCB-1248 (AROCHLOR 1248), SPLP	UG/L	1	U	1	U		
PCB-1254 (AROCHLOR 1254), SPLP	UG/L	1	U	1	U		
PCB-1260 (AROCHLOR 1260), SPLP	UG/L	1	U	1	U		
PCB-1016 (AROCHLOR 1016)	UG/KG					43	U
PCB-1221 (AROCHLOR 1221)	UG/KG					87	U
PCB-1232 (AROCHLOR 1232)	UG/KG					43	U
PCB-1242 (AROCHLOR 1242)	UG/KG					43	U
PCB-1248 (AROCHLOR 1248)	UG/KG					43	U
PCB-1254 (AROCHLOR 1254)	UG/KG					43	U
PCB-1260 (AROCHLOR 1260)	UG/KG					43	U

Charleston Naval Complex
AOC 609, Zone F
Soil PCB Analytical Data Summary

	StationID	F609SB001		F609SB002		F609SB002	
	SampleID	609SB001T2 (3-5ft)		609SB002S1 (0-1ft)		609SB002S2 (3-5ft)	
	DateCollected	10/15/1999		10/15/1999		10/15/1999	
	DateAnalyzed	10/27/1999		10/24/1999		10/24/1999	
	SDGNumber	EN022		EN022		EN022	
PCB-1016 (AROCHLOR 1016), SPLP	UG/L			1	U	1	U
PCB-1221 (AROCHLOR 1221), SPLP	UG/L			2	U	2	U
PCB-1232 (AROCHLOR 1232), SPLP	UG/L			1	U	1	U
PCB-1242 (AROCHLOR 1242), SPLP	UG/L			1	U	1	U
PCB-1248 (AROCHLOR 1248), SPLP	UG/L			1	U	1	U
PCB-1254 (AROCHLOR 1254), SPLP	UG/L			1	U	1	U
PCB-1260 (AROCHLOR 1260), SPLP	UG/L			1	U	1	U
PCB-1016 (AROCHLOR 1016)	UG/KG	39	U				
PCB-1221 (AROCHLOR 1221)	UG/KG	79	U				
PCB-1232 (AROCHLOR 1232)	UG/KG	39	U				
PCB-1242 (AROCHLOR 1242)	UG/KG	39	U				
PCB-1248 (AROCHLOR 1248)	UG/KG	39	U				
PCB-1254 (AROCHLOR 1254)	UG/KG	39	U				
PCB-1260 (AROCHLOR 1260)	UG/KG	39	U				

Charleston Naval Complex
AOC 609, Zone F
Soil PCB Analytical Data Summary

	StationID	F609SB002		F609SB002	
	SampleID	609SB002T1 (0-1ft)		609SB002T2 (3-5ft)	
	DateCollected	10/15/1999		10/15/1999	
	DateAnalyzed	10/27/1999		10/27/1999	
	SDGNumber	EN022		EN022	
PCB-1016 (AROCHLOR 1016), SPLP	UG/L				
PCB-1221 (AROCHLOR 1221), SPLP	UG/L				
PCB-1232 (AROCHLOR 1232), SPLP	UG/L				
PCB-1242 (AROCHLOR 1242), SPLP	UG/L				
PCB-1248 (AROCHLOR 1248), SPLP	UG/L				
PCB-1254 (AROCHLOR 1254), SPLP	UG/L				
PCB-1260 (AROCHLOR 1260), SPLP	UG/L				
PCB-1016 (AROCHLOR 1016)	UG/KG	49	U	41	U
PCB-1221 (AROCHLOR 1221)	UG/KG	97	U	82	U
PCB-1232 (AROCHLOR 1232)	UG/KG	49	U	41	U
PCB-1242 (AROCHLOR 1242)	UG/KG	49	U	41	U
PCB-1248 (AROCHLOR 1248)	UG/KG	49	U	41	U
PCB-1254 (AROCHLOR 1254)	UG/KG	49	U	41	U
PCB-1260 (AROCHLOR 1260)	UG/KG	49	U	41	U

Charleston Naval Complex
AOC 609, Zone F
Soil Cyanide,SPLP Analytical Data Summary

	StationID	F609SB001	F609SB001	F609SB002	F609SB002
	SampleID	609SB001S1 (0-1ft)	609SB001S2 (3-5ft)	609SB002S1 (0-1ft)	609SB002S2 (3-5ft)
	DateCollected	10/15/1999	10/15/1999	10/15/1999	10/15/1999
	DateAnalyzed	10/27/1999	10/27/1999	10/27/1999	10/27/1999
	SDGNumber	EN022	EN022	EN022	EN022
CYANIDE, SPLP	MG/L	0.01 U	0.01 U	0.01 U	0.01 U

Charleston Naval Complex
AOC 609, Zone F
Soil Cyanide Analytical Data Summary

	StationID	F609SB001	F609SB001	F609SB002	F609SB002
	SampleID	609SB001T1 (0-1ft)	609SB001T2 (3-5ft)	609SB002T1 (0-1ft)	609SB002T2 (3-5ft)
	DateCollected	10/15/1999	10/15/1999	10/15/1999	10/15/1999
	DateAnalyzed	11/01/1999	11/01/1999	11/01/1999	11/01/1999
	SDGNumber	EN022	EN022	EN022	EN022
CYANIDE	MG/KG	0.5 U	0.5 U	0.8 U	0.5 U

Charleston Naval Complex
AOC 609, Zone F
Soil General Chemistry Analytical Data Summary

	StationID	F609SB001		F609SB001		F609SB002		F609SB002	
	SampleID	609SB001T1 (0-1ft)		609SB001T2 (3-5ft)		609SB002T1 (0-1ft)		609SB002T2 (3-5ft)	
	DateCollected	10/15/1999		10/15/1999		10/15/1999		10/15/1999	
	DateAnalyzed	11/02/1999		11/02/1999		11/02/1999		11/02/1999	
	SDGNumber	EN022		EN022		EN022		EN022	
TOTAL ORGANIC CARBON	%, DR	30	=	0.57	=	1.7	=	0.14	=

Appendix E

APPENDIX E IS PROVIDED IN .PDF FORMAT/CD-ROM,
AND IS PROVIDED IN THE FRONT POCKET OF THIS BINDER.

Appendix F

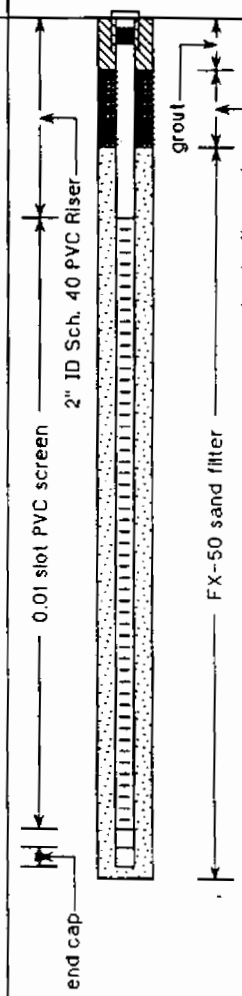
ENSAFE

Monitoring Well NBCF609001

Project: *ZONE F – Naval Base Charleston*	Coordinates: *2318340.9 E, 373661.0 N*
Location: *Charleston, SC*	Surface Elevation: *8.0 feet msl*
Started at *0800 on 05/11/99*	TOC Elevation: *7.83 feet msl*
Completed at *1100 on 05/11/99*	Depth to Groundwater: *4.49 feet TOC* Measured: *5-13-99*
Drilling Method: *4.25" ID (7.5" OD) HSA with split spoon sampler*	Groundwater Elevation: *3.34 feet msl*
Drilling Company: *Alliance Environmental (SC cert. #889)*	Total Depth: *13.3 feet*
Geologist: *P. Bayley*	Well Screen: *3.1 to 12.7 feet*

DEPTH IN FEET	LITHOLOGIC SAMPLE	ANALYTICAL SAMPLE	SAMPLE NO.	OVA (ppm)	% RECOVERY	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION	ELEV. (ft-msl)
								Surface conditions: grass	
							GP GM ML CL	Gravel: dk. brown-black w/ silty vf sand matrix & dk. brown organic soil.	7.4
			1		100			Silt: dk. gray-brown; clayey; firm; plastic; w/ occ. very fine black laminae.	6
			2		0		CL	Clay: blue-green; plastic; w/ vf sand; moist; @ 4.8-4.9' very thin sandy laminae.	4
5									3.1
			3		45			Cuttings consist of lt. brown, plastic, soft, sandy clay.	
			4		0		CL SC	Clay: brown; very fine sand; very soft; plastic; wet.	0
									-.4
10			5		20				2.4
			6		80		CL	Clay: green-gray w/ orange thin laminae; plastic; soft; w/ orange sandy laminae; moist to wet; @ 11.3' grades to brown to gray brown. Clay: brown to gray brown, firm to stiff, plastic.	
			7		95				5.9
15									
20									

WELL DIAGRAM



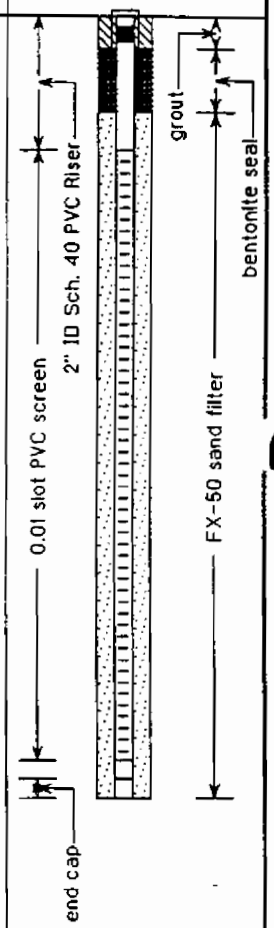
ENSAFE

Monitoring Well NBCF609002

Project: *ZONE F – Naval Base Charleston*	Coordinates: *2318446.3 E, 373737.5 N*
Location: *Charleston, SC*	Surface Elevation: *7.8 feet msl*
Started at *1245 on 05/11/99*	TOC Elevation: *7.54 feet msl*
Completed at *1430 on 05/11/99*	Depth to Groundwater: *5.39 feet TOC* Measured: *5-13-99*
Drilling Method: *4.25" ID (7.5" OD) HSA with split spoon sampler*	Groundwater Elevation: *2.15 feet msl*
Drilling Company: *Alliance Environmental (SC cert. #889)*	Total Depth: *12.3 feet*
Geologist: *S. Tompkins*	Well Screen: *2.1 to 11.7 feet*

DEPTH IN FEET	LITHOLOGIC SAMPLE	ANALYTICAL SAMPLE	SAMPLE NO.	OVA (ppm)	% RECOVERY	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION	ELEV. (ft-msl)
							GP	Surface conditions: grass	
							GM	Gravel: gray; fine; w/ sand and silt.	7
							SC	Clay: brown-red; sandy; soft.	
			1		42		CL	Clay: red-gray to brown; soft; dry to moist.	5.8
									5.1
			2		33		CL	Clay: dk. gray; very soft; wet.	3.8
5									3.1
			3		33				
			4		0		CL	Clay: gray; soft.	2
							SC	Sand: lt. green-gray; fine; clayey.	.5
									1.2
10			5		50		SC CL	Sand: gray; clayey; grades into mottled brown-gray clay @11.1'.	2.2
									3.5
			6		67				
15									
20									

WELL DIAGRAM



Appendix G

Appendix G

Soil Screening Level Tables

Soil screening levels (SSLs) were prepared as described in the attached Technical Memorandum: Application of Soil-Screening Levels (SSLs) at the Charleston Naval Complex (CNC), dated January 9, 2001. Infiltration rates were subsequently adjusted to account for the full infiltration value provide by the U.S. Geological Survey (USGS). The SSL tables provided in this appendix present values for dilution attenuation factor (DAF) and corresponding SSLs, both of which were calculated using the partial infiltration and the full infiltration rates.

Application of Soil-Screening Levels (SSLs) at Charleston Naval Complex (CNC)

PREPARED FOR: CNC BCT

PREPARED BY: Paul Favara

DATE: January 9, 2001

Introduction

The purpose of this memorandum is to present the rationale CH2M-Jones will use in developing Soil Screening Levels (SSLs) that are protective of groundwater. The development of SSLs is a process that considers data from a multitude of sources, ranging from laboratory results to literature referenced values. As data availability, and quantity, for different SWMUs /AOCs is variable, and data input sources to the SSL calculation can be from a wide variety of sources, it is not possible to develop a process that will precisely identify SSL development for every possible data availability scenario. However, this memorandum presents an overall approach to developing SSLs that should apply to the majority of sites at CNC.

Site-Specific SSLs for groundwater protection are derived using the methods presented in the OSWER Soil Screening Guidance, July 1996 (EPA, 1996). The guidance document requires development of two independent equations to deriving site-specific SSLs:

Step 1: The first step involves solving a partitioning calculation, to derive target soil concentrations independent of aquifer characteristics.

Step 2: The second step further revises the target concentration based on the dilution attenuation factor (DAF) of the aquifer.

Throughout this memorandum, SWMUs/AOCs in Zone F will be used as an example.

Step 1: Partitioning Calculations

Contaminants at CNC can be subdivided into two broad contaminant groups: organics and metals. Each group will follow a separate flow chart for the development of partitioning equation (See Figures 1 and 2).

Organics

A flow chart for developing a partition coefficient for organic compounds is presented in Figure 1. For organic compounds, the partitioning equation (Eqn 10 in the EPA, 1996) is

used to calculate a soil concentration protective of groundwater. The target soil concentration is a function of the target leachate concentration, and soil characteristics such as porosity, density, and fraction of organic carbon. The partitioning equation provides a target soil concentration assuming no dilution or attenuation within the aquifer (i.e., dilution-attenuation factor (DAF) = 1).

Equation 10: $SSL_{DAF=1} = C_W \left[K_d + \frac{(\theta_w + \theta_a H')}{\gamma_{dry}}\right]$

where SSL = Target soil screening level (with a DAF of 1)
C_W = target leachate concentration (MCL or other appropriate standard)
K_d = soil water partition coefficient (chemical specific), = $K_{oc} \times f_{oc}$
θ_w = water-filled soil porosity
θ_a = air-filled soil porosity
H' = Henry's Law constant (chemical-specific)
γ_{dry} = soil dry bulk density

At Zone F, soil parameters were measured at each site and the geometric mean was used when more than one sample was collected. Sites within Zone F were organized into seven site groupings according to proximity. The geometric mean of the fraction of soil that is organic carbon (also referred to as f_{oc}) for each site grouping was calculated and used as the central tendency f_{oc} value to allow for the probability that f_{oc} in soil is lognormally distributed. The table below presents f_{oc} data.

With respect to soil parameters (bulk density and water- and air-filled porosity) a zone-wide average was considered most representative of site conditions to account for variability of laboratory tests and the statistically low number of Shelby tube samples collected for this analysis.

Fraction of Organic Carbon at Zone F Site Groups

	f_{oc} in All Soil Samples[1]			f_{oc} in Surface Soil Samples[2]		
Site Group	**Number of Samples**	**Arithmetic Mean**	**Geometric Mean**	**Number of Samples**	**Arithmetic Mean**	**Geometric Mean**
004/619 036/620	10	0.022	0.011	4	0.043	0.030
109	6	0.013	0.010	3	0.0095	0.0086
607	9	0.006	0.0051	3	0.0061	0.0056
609, 611	11	0.034	0.0065	5	0.069	0.016
613/615/ 175	7	0.013	0.007	3	0.0075	0.0067
616, 617	7	0.0049	0.0042	3	0.0028	0.0025
709	2	0.0205	0.0204	1	0.019	0.019

Notes:

1 = Use geometric mean of all site soil samples to calculate soil-to-groundwater SSLs.

2 = Use geometric mean of site surface soil samples to calculate soil-to-air SSLs.

Equation 10 was used at Zone F to derive the partitioning component SSLs development for organic compounds.

Inorganics

A flow chart for developing a partition coefficient for inorganic constituents is presented in Figure 2. As provided for in EPA (1996), leach tests were used to develop SSLs for soil inorganics. SPLP tests were conducted on new samples from the AOCs and SWMUs and the leachate was compared to the related concentrations in the bulk samples. The methodology used to estimate contaminant release in soil leachate is based on the Freundlich equation, which was developed to model sorption from liquids to solids. The based Freundlich equation applied to the soil/water system is:

$$K_d = C_s / C_w^{\,n}$$

Where:

K_d = Freundlich soil/water partition coefficient (L/kg)

C_s = concentration sorbed on soil (mg/kg)

C_w = solution concentration (mg/L)

n = Freundlich exponent (dimensionless)

Assuming that adsorption is linear with respect to concentration, the equation can be re-arranged to backcalculate a sorbed concentration (C_s):

$$C_s = (K_d)C_w$$

For the SSL calculation, C_w is the target soil leachate concentration.

To develop the K_d, soil was sampled from 2 to 4 locations at each AOC (except AOC 709) and analyzed for total organic carbon, VOCs, SVOCs, metals, cyanide, pesticides, and PCBs, and for SPLP on the above analyte list. Surface soil and subsurface soil samples were collected from each location. In general, PCBs, pesticides, and organic compounds were not detected in the leachate. Therefore, the K_d was used to calculate SSLs for inorganics, and the partitioning equation was used to calculate SSLs for organics and those inorganics with insufficient SPLP data. However, there were some instances where the inorganic analyte was not detected; methods to address these occurrences are listed below.

Situation	Resolution
Parameter detected in bulk, but nondetect in the leach	Use one-half the detection limit for leach samples as the leach value
Parameter detected in the leach but nondetect in the bulk	Use the detection limit for bulk samples as the bulk value
Parameter non-detect in both the bulk and the leach	No value assigned
Re-extraction analyses	Either use the re-extraction result or, if the origina analysis uses lower detection limits, assign the original value to the bulk and/or leach

K_d was calculated for detected parameters in each sample and averaged geometrically to assign a central-tendency K_d value to each inorganic parameter at each site group. This central-tendency K_d was then used to calculate the parameter's target SSL (DAF = 1), using the equation shown above. Because sample sizes were small and the underlying K_d distributions were assumed to be lognormal, geometric means were used.

A zone-specific SSL was used when certain inorganics were not detected in both bulk and leach portions of any of the SPLP samples from a given site group. Zone-specific SSLs were developed by obtaining the geometric means of SSLs from all Zone F site groups with relevant data.

If an SSL was not available via SPLP in the rest of the zone, a modified version of equation 10 can be used:

Equation 10b: $SSL_{DAF=1} = C_W \left[K_d + \frac{(\theta_w)}{\gamma_{dry}}\right]$

where SSL = Target soil screening level
C_W = target leachate concentration (MCL or RBC if MCL not available)
K_d = soil water partition coefficient (chemical specific),
θ_w = water-filled soil porosity
γ_{dry} = soil dry bulk density

Step 2: Dilution-Attenuation Factors

Dilution-attenuation factors (DAF) were calculated for each site within Zone F to account for the dilution effect of the aquifer on the soil leachate (either the hypothetical leachate calculated from the partitioning equation or the actual leachate observed in the SPLP.) The DAF is calculated using Equation 11 from the Soil Screening Guidance:

Equation 11: $DAF = 1 + \frac{Kid}{IL}$

Where K = hydraulic conductivity
i = hydraulic gradient
d = mixing zone thickness (from equation 12)
I = infiltration rate
L = source length parallel to groundwater flow direction

The gradient, source length, and mixing zone thickness are specific to each AOC.

The hydraulic conductivity was averaged from the various slug tests conducted within the Zone. A zone-wide average was considered most representative of site conditions to account for differences in well construction, test procedures, and the statistically low number of slug tests per site. Slug test results are presented below.

Zone F Hydraulic Conductivity		
Wells	Hydraulic Conductivity (ft/day)	
	Falling Head	Rising Head
Shallow		
GDF001	6	8.4
607001	1.74	2
607002	0.42	0.62
607004	0.191	0.197
613001	0.83	1.3
613004	0.38	0.27
619002	0.11	0.11
619003	0.28	0.32
620002	0.42	0.41
GEL005	0.42	0.41
GEL007	0.31	0.21
SME004	8.70E-02	9.20E-02
Intermediate		
60701I	1.3	1.2
60702I	0.37	0.55
60704I	0.7	0.66
Deep		
GDF01D	2.7	1.7
60701D	2.70E-02	NM
60702D	2.30E-02	NM
60704D	8.10E-03	NM
61302D	0.12	0.12
Average =	0.82	1.09
	Average for all values =	0.95
NM	Not measured	
0.95 ft/day =		346.75 ft/yr
		105.7 m/yr

The USGS estimated infiltration at CNC as 1.2 inch/year (in/yr) (USGS, 1999). However, Zone F is semi-industrial with a large percentage of overall area covered with an impervious surface, and numerous engineered drainage systems to divert runoff and potential recharge. A conservative estimate of 25% of the USGS value was used for Zone F, or 0.3 in/yr (.00762 m/yr), which is considered more realistic for the Zone F sites.

The mixing zone thickness is that portion of the aquifer thickness that may be assumed to transport the contamination. It is estimated from Equation 12 in the Soil Screening Guidance, and does not exceed the total aquifer thickness.

Equation 12: $d = (0.0112L^2)^{0.5} + d_a\{1-\exp[(-LI)/(Kid_a)]\}$

Where d = mixing zone depth (m)
L = source length parallel to groundwater flow direction (m)
d_a = aquifer thickness (m)
I = infiltration rate (m/yr)
K = hydraulic conductivity (m/yr)
i = hydraulic gradient

The following table presents the parameters used to calculate the DAFs for each area within Zone F:

Site(s)	Hydraulic Conductivity K (m/yr)	Hydraulic Gradient i (m/m)	Aquifer Thickness da (m)	Source Length L (m)	Infiltration Rate I (m/yr)	Mixing Zone D (m)	DAF
004/619, 036/620	105.7	0.02	9.8	120	0.00762	9.8	23.7
616,617	105.7	0.018	9.8	34	0.00762	3.7	28.4
607	105.7	0.0079	8.2	46	0.00762	5.3	13.6
609, 611	105.7	0.0043	8.5	38	0.00762	4.6	8.3
109	105.7	0.0058	7.6	30	0.00762	3.5	10.5
613/615/175	105.7	0.0227	9.1	150	0.00762	9.1	20.1
709	105.7	0.025	10.8	120	0.00762	10.8	32.2

The site-specific DAF is influenced by the source length, which may be interpreted to be the length of the spill area, if known, or the dimensions of the AOC, if no specific release area has been identified. It is very conservative to assume the entire AOC dimensions, and this parameter should be refined if possible. Actual DAFs may be assumed to be significantly higher than those presented in the table.

Site-Specific SSLs

When a partitioning coefficient is developed, the site-specific DAF is multiplied by the $SSL_{DAF=1}$ to arrive at the site-specific SSL:

$$SSL = [SSL_{DAF=1}][DAF]$$

When SPLP data is used in lieu of the partitioning equation, the K_d equation can be used to derive a target SSL by making C(leach) equivalent to the maximum acceptable groundwater concentration in the aquifer, and then calculating the corresponding C_s (when $C_s = (K_d)$ And C_w is set to the MCL. This value can then be multiplied by the DAF to define a site specific SSL:

$$SSL = [C_s][DAF]$$

According to the EPA (1996), the average site soil concentration should be compared to the final SSL to evaluate if soil concentrations could potentially impact groundwater. Mapping areas in which maximum soil concentrations exceed SSLs may further reduce the source length L, which has the effect of increasing SSLs. Groundwater concentrations at the site should then be reviewed to evaluate if the soil may be a source of groundwater contamination.

Sensitivity Analysis

SSLs are most sensitive to changes in the dilution-attenuation factor. Thick aquifers show no source size effect because the increases in infiltration flux from a larger source area is balanced by a proportional increase in mixing zone depth, which increases dilution in the aquifer. For relatively thin aquifers, as is generally the case at CNC, the mixing zone depth is limited by the aquifer thickness and the increased infiltration flux predominates, decreasing the dilution factor for a larger source. Therefore, a conservative over-estimate of SWMU/AOC size will result in a lower than necessary DAF being applied to the site.

Attachment A is a detailed sensitivity analysis from the EPA (1996) and discusses sensitivity of other SSL parameters.

References

1. EPA, 1996. Soil Screening Guidance: Technical Background Document (EPA/540/R-95/128, May , 1996).

2. USGS, 1999. Hydrogeology and Simulation of Ground-Water Flow in the Surficial Aquifer System in the Area of Charleston Naval Base, North Charleston, South Carolina, 1995-1997.

Figure 1

Partitioning Calculations
Organics

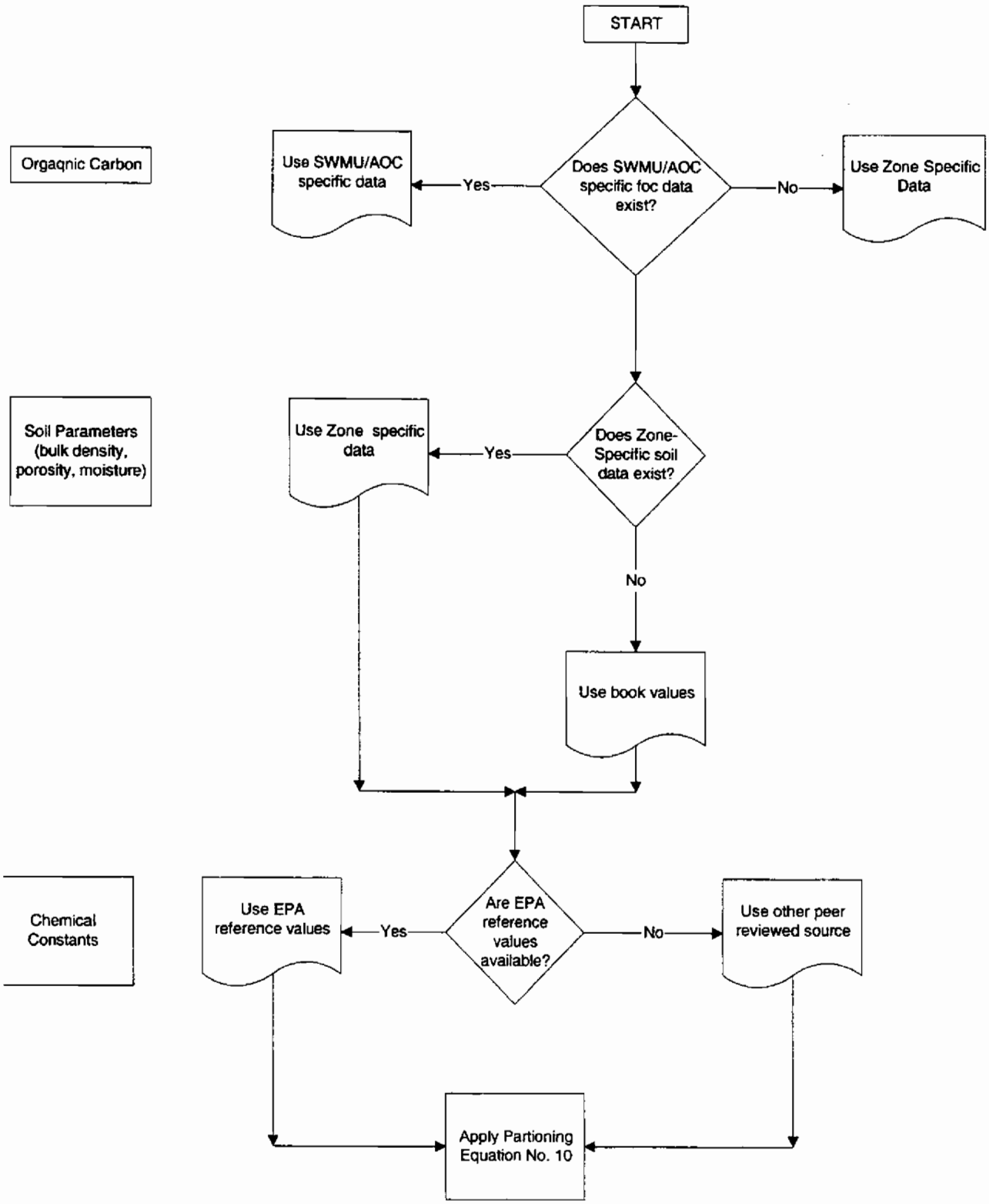
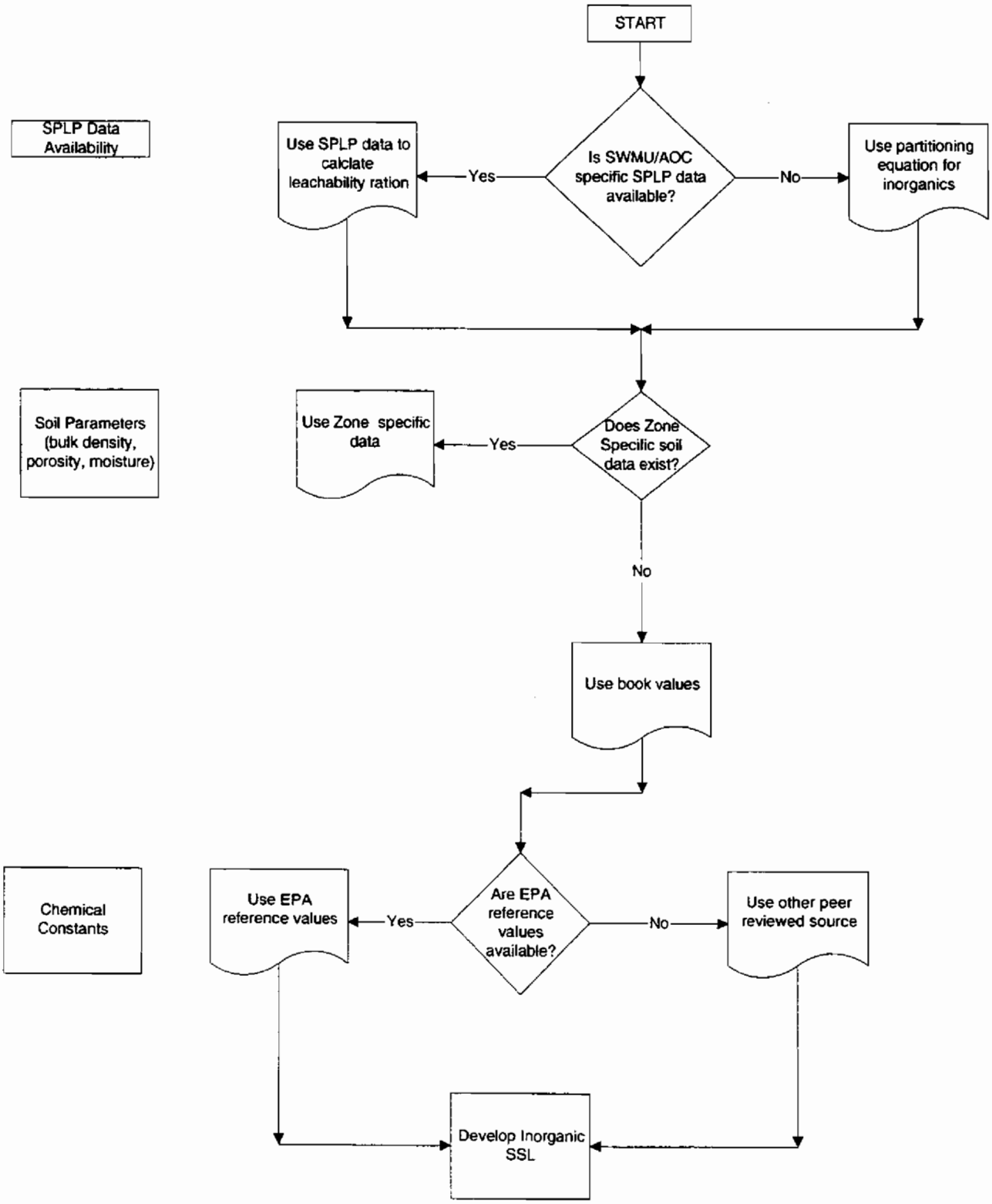


Figure 2

Partitioning Calculations
Inorganics



Attachment A

Excerpts from EPA Soil Screening Guidance (EPA, 1996)

result from a smaller source.

2.5.7 Sensitivity Analysis. A sensitivity analysis was conducted to examine the effects of site-specific parameters on migration to ground water SSLs. Both the partition equation and the dilution factor model were considered in this analysis. Because an adequate database of national distributions of these parameters was not available, a nominal range method was used to conduct the analysis. In this analysis, independent parameters were selected and each was taken to maximum and minimum values while keeping all other parameters at their nominal, or default, values.

Overall, SSLs are most sensitive to changes in the dilution factor. As shown in Table 7, the 10th to 90th percentile dilution factors vary from 2 to 292 for the 300 DNAPL and HGDB sites. Much of this variability can be attributed to the wide range of aquifer hydraulic conductivity across the Nation. In contrast, the most sensitive parameter in the partition equation (f_{oc}) only affects the SSL by a factor of 1.5.

Partition Equation. The partition equation requires the following site-specific inputs: fraction organic carbon, average annual soil moisture content, and soil bulk density. Although volumetric soil moisture content is somewhat dependent on bulk density (in terms of the porosity available to be filled with water), calculations were conducted to ensure that the parameter ranges selected do not result in impossible combinations of these parameters. Because the effects of the soil parameters on the SSLs are highly dependent on chemical properties, the analysis was conducted on four organic chemicals spanning the range of these properties: chloroform, trichloroethylene, naphthalene, and benzo(*a*)pyrene.

The range used for soil moisture conditions was 0.02 to 0.43 L water/L soil. The lower end of this range represents a likely residual moisture content value for sand, as might be found in the drier regions of the United States. The higher value (0.43) represents full saturation conditions for a loam soil. The range of bulk density (1.25 to 1.75) was obtained from the Patriot soils database, which contains bulk density measurements for over 20,000 soil series across the United States.

Establishing a range for subsurface organic carbon content (f_{oc}) was more difficult. In spite of an extensive literature review and contacts with soil scientists, very little information was found on the distribution of this parameter with depth in U.S. soils. The range used was 0.001 to 0.003 g carbon / g soil. The lower limit represents the critical organic carbon content below which the partition equation is no longer applicable. The upper limit was obtained from EPA's Environmental Research Laboratory in Ada, Oklahoma, as an expert opinion. Generally, soil organic carbon content falls off rapidly with depth. Since the typical value used as an SSL default for surface soils is 0.006, and 0.002 is used for subsurface soils, this limited range is consistent with the other default assumptions used in the Soil Screening Guidance.

The results of the partition equation sensitivity analysis are shown in Table 8.

For volatile chemicals, the model is somewhat sensitive to water content, with up to 54 and 19 percent change in SSLs for chloroform and trichloroethylene, respectively. The model is less sensitive to bulk density, with a high percent change of 18 for chloroform and 14 for trichloroethylene. Organic carbon content has the greatest effect on SSLs for all chemicals except chloroform. As expected, the effect of f_{oc} increases with increasing K_{oc}. The greatest effect was seen for benzo(*a*)pyrene whose SSL showed a 50 percent increase at an f_{oc} of 0.03. An f_{oc} of 0.005 will increase the benzo(*a*)pyrene SSL by 150 percent.

Dilution Factor. Site-specific parameters for the dilution factor model include aquifer hydraulic conductivity (K), hydraulic gradient (i), infiltration rate (I), aquifer thickness (d), and source length parallel to ground water flow (L). Because they are somewhat dependent, hydraulic conductivity and hydraulic gradient were treated together as Darcy velocity (K × i). The parameter ranges used for the dilution factor analysis represent the 10th and 90th percentile values taken from the HGDB and DNAPL site databases, with the geometric mean serving as the nominal value, as shown in Table 9.

Source length was varied by assuming square sources of 0.5 to 30 acres in size. Bounding estimates were conducted for each of these source sizes.

The results in Table 9 show that Darcy velocity has the greatest effect on the dilution factor, with a range of dilution factors from 1.2 to 85 for a 30-acre source and 2.1 to 263 for a 0.5-acre source. Infiltration rate has the next highest effect, followed by source size and aquifer thickness. Note that aquifer thickness has a profound effect on the influence of source size on the dilution factor. Thick aquifers show no source size effect because the increase in infiltration flux from a larger source is balanced by the increase in mixing zone depth, which increases dilution in the aquifer. For very thin aquifers, the mixing zone depth is limited by the aquifer thickness and the increased infiltration flux predominates, decreasing the dilution factor for larger sources.

Table 7. SSL Dilution Factor Model Results: DNAPL and HGDB Sites

	Source area (acres)				
	0.5	10	30	100	600
DNAPL Sites (92)					
Geomean	34	15	10	6	4
Average	321	138	80	44	19
10th percentile	3	2	1	1	1
25th percentile	8	4	3	2	1
Median	30	13	8	5	3
75th percentile	140	60	35	20	9
90th percentile	336	144	84	46	20
HGDB sites (208)					
Geomean	16	10	7	5	3
Average	958	829	561	371	159
10th percentile	2	1	1	1	1
25th percentile	3	2	1	1	1
Median	10	6	5	3	2
75th percentile	56	30	19	12	5
90th percentile	240	134	90	51	21
All 300 sites					
Geomean	20	11	8	6	3
Average	763	617	414	271	116
10th percentile	2	1	1	1	1
25th percentile	4	2	2	1	1
Median	15	8	5	4	2
75th percentile	70	35	23	13	6
90th percentile	292	144	88	49	21

DAF Values

DNAPL = DNAPL Site Survey (EPA/OERR).
HGDB = Hydrogeologic database (API).

Table 8. Sensitivity Analysis for SSL Partition Equation

Parameter assignments	Chloroform		Trichloroethylene		Naphthalene		Benzo(*a*)pyrene	
	SSL (mg/kg)	Percent change	SSL (mg/kg)	Percent change	SSL (mg/kg)	Percent change	SSL (mg/kg)	Percent change
All default parameter values	0.59	—	0.057	—	84	—	8	—
Less conservative parameter value								
Organic carbon	0.67	14	0.074	29	124	48	12	50
Bulk density	0.69	18	0.065	14	85	1	8	0
Soil moisture	0.74	26	0.062	9	86	2	8	0
More conservative parameter value								
Organic carbon	0.51	-14	0.040	-29	44	-48	4	-50
Bulk density	0.51	-13	0.051	-10	83	-1	8	0
Soil moisture	0.27	-54	0.046	-19	80	-4	8	0

Input parameters	Conservatism		
	Less	Nominal	More
Fraction org. carbon (g/g)	0.003	0.002	0.001
Bulk density (kg/L)	1.25[a]	1.50	1.75[b]
Average soil moisture (L/L)	0.43	0.30	0.02

[a] $n = 0.53$; $q_a = 0.23$.

[b] $n = 0.34$; $q_a = 0.04$.

Chemical-specific parameters	Chloroform	Trichloroethylene	Naphthalene	Benzo(*a*)pyrene
K_{oc}	3.98E+01	1.66E+02	2.00E+03	1.02E+06
H'	1.50E-01	4.22E-01	1.98E-02	4.63E-05
C_w	2.0[c]	0.1[c]	20[d]	0.004[c]

[c] MCL x 20 DAF.

[d] HBL (UC-4) x 20 DAF.

Table A. DAF Calculations
Assuming100% of USGS Infiltration Rate for all sites; uniform K from all Zone F slug tests

Site(s)	Hydraulic Conductivity K (m/yr)	Hydraulic Gradient I (m/m)	Aquifer Thickness da (m)	Source Length Sw (m)	Infiltration Rate I' (m/yr)	Mixing Zone d (m)	DAF
004/619, 036/620	105.7	0.02	9.8	120	0.0305	9.8	6.7
616,617	105.7	0.018	9.8	21	0.0305	2.6	8.6
607	105.7	0.0079	8.2	46	0.0305	6.4	4.8
609, 611	105.7	0.0043	8.5	38	0.0305	6.2	3.4
109	105.7	0.0058	7.6	30	0.0305	4.5	4.0
613/615/175	105.7	0.0227	9.1	150	0.0305	9.1	5.8
709	105.7	0.025	10.8	120	0.0305	10.8	8.8

From Eqs 11 and 12 in EPA Soil Screening Guidance
Equation assumes that the same soil concentration occurs all the way to the water table. Depth to water has very minor effect on the DAF; only affecting the mixing zone thickness to a limit.

The 'Source width' is almost directly proportional to DAF, as is K and I.

K values are higher if using USGS model instead of all site slug tests

Table B. DAF Calculations
Assuming100% of USGS Infiltration Rate for all sites; K from USGS model

Site(s)	Hydraulic Conductivity K (m/yr)	Hydraulic Gradient I (m/m)	Aquifer Thickness da (m)	Source Length Sw (m)	Infiltration Rate I' (m/yr)	Mixing Zone d (m)	DAF
004/619, 036/620	445	0.02	9.8	120	0.0305	9.8	24.8
616,617	278	0.018	9.8	21	0.0305	2.3	19.4
607	534	0.0079	8.2	46	0.0305	5.2	16.6
609, 611	445	0.0043	8.5	38	0.0305	4.6	8.6
109	300	0.0058	7.6	30	0.0305	3.7	8.0
613/615/175	222	0.0227	9.1	150	0.0305	9.1	11.0
709	278	0.025	10.8	120	0.0305	10.8	21.5

AOC 609 & AOC 611 ZONE F SSL calculations

Infiltration, m/yr			I' = .00762	I' = .0305	I' = .0305
Hydraulic Conductivity, m/yr			105.7	105.7	445
Site-Specific DAF			8.3	3.4	8.6
Constituent		SSL for DAF=1	Adjusted SSL	Adjusted SSL	Adjusted SSL
Ag	MG/KG	5.8E+01	4.8E+02	2.0E+02	5.0E+02
Al	MG/KG	2.5E+04	2.1E+05	8.5E+04	2.2E+05
As	MG/KG	2.5E+01	2.1E+02	8.5E+01	2.2E+02
Ba	MG/KG	1.1E+02	8.9E+02	3.7E+02	9.3E+02
Be	MG/KG	4.2E-01	3.5E+00	1.4E+00	3.6E+00
Cd	MG/KG	4.6E+00	3.8E+01	1.6E+01	4.0E+01
Co	MG/KG	2.3E+03	1.9E+04	7.8E+03	2.0E+04
Cr	MG/KG	1.3E+02	1.1E+03	4.3E+02	1.1E+03
Cu	MG/KG	9.8E+02	8.1E+03	3.3E+03	8.4E+03
Fe	MG/KG	4.4E+04	3.7E+05	1.5E+05	3.8E+05
Hg	MG/KG	2.9E+00	2.4E+01	9.8E+00	2.5E+01
Mn	MG/KG	1.9E+03	1.6E+04	6.5E+03	1.7E+04
Ni	MG/KG	5.6E+01	4.6E+02	1.9E+02	4.8E+02
Pb	MG/KG	7.7E+01	6.4E+02	4.0E+02	6.6E+02
Sb	MG/KG	1.4E+00	1.2E+01	4.8E+00	1.2E+01
Se	MG/KG	1.6E+01	1.3E+02	5.3E+01	1.3E+02
Sn	MG/KG				
Tl[a]	MG/KG	1.8E-01	1.5E+00	6.1E-01	1.5E+00
V	MG/KG	1.9E+02	1.6E+03	6.5E+02	1.7E+03
Zn	MG/KG	1.5E+03	1.2E+04	5.1E+03	1.3E+04

SSL calculated from SPLP data for each site

[a] Thallium from EPA Region III tables; no SPLP detects

Residential RBC	Industrial RBC	Surface Background	Subsurface Background
39	1000	1.85	
7800	200000	18500	17100
0.43	3.8	19.9	18.2
550	14000	61.5	51.8
16	410	1.05	1.2
7.8	100	0.26	0.09
470	12000	15.1	6.85
210	450	34.8	32.2
310	8200	48.2	30.4
2300	61000		
2.3	61	0.62	0.23
1100	4100	307	469
160	4100	12.6	8.85
400	100	180	51.7
3.1	82	0.79	
39	1022	1.15	1.24
		9.38	
0.55	14		1.24
55	1400	48.9	49.4
2300	61000	198	84.2

Appendix G
SPLP data - AOC 609

Location **609SB001**

Sample No.		Concentration	Units	Qualifier	Sample No.		SPLP Concentratic	Units	Qualifier
609SB001T1	Ag	0.29	MG/KG	J	609SB001S1	Ag	0.50	UG/L	UJ
0' - 1' depth	Al	4080.00	MG/KG	=	0' - 1' depth	Al	11200.00	UG/L	=
	As	30.80	MG/KG	J		As	12.40	UG/L	=
	Ba	116.00	MG/KG	=		Ba	709.00	UG/L	=
	Be	0.57	MG/KG	J		Be	0.90	UG/L	U
	Ca	2390.00	MG/KG	J		Ca	5340.00	UG/L	=
	Cd	0.32	MG/KG	J		Cd	0.30	UG/L	U
	Co	22.40	MG/KG	=		Co	14.70	UG/L	J
	Cr	20.30	MG/KG	J		Cr	17.20	UG/L	=
	Cu	65.00	MG/KG	=		Cu	27.70	UG/L	=
	Fe	11500.00	MG/KG	=		Fe	9120.00	UG/L	=
	Hg	1.30	MG/KG	=		Hg	0.40	UG/L	R
	K	336.00	MG/KG	J		K	1930.00	UG/L	J
	Mg	425.00	MG/KG	J		Mg	1990.00	UG/L	J
	Mn	122.00	MG/KG	=		Mn	128.00	UG/L	=
	Na	194.00	MG/KG	J		Na	2900.00	UG/L	J
	Ni	17.70	MG/KG	=		Ni	8.20	UG/L	J
	Pb	184.00	MG/KG	=		Pb	65.10	UG/L	=
	Sb	2.80	MG/KG	J		Sb	7.50	UG/L	J
	Se	2.00	MG/KG	=		Se	2.40	UG/L	U
	Sn	7.60	MG/KG	J		Sn	4.10	UG/L	J
	Tl	0.29	MG/KG	UJ		Tl	2.40	UG/L	UJ
	V	21.40	MG/KG	=		V	23.20	UG/L	J
	Zn	338.00	MG/KG	J		Zn	241.00	UG/L	=
609SB001T2	Ag	0.05	MG/KG	U	609SB001S2	Ag	0.50	UG/L	UJ
3' - 5' depth	Al	5740.00	MG/KG	=	3' - 5' depth	Al	15100.00	UG/L	=
	As	3.40	MG/KG	J		As	16.00	UG/L	=
	Ba	19.30	MG/KG	J		Ba	1200.00	UG/L	=
	Be	0.52	MG/KG	J		Be	0.90	UG/L	U
	Ca	640.00	MG/KG	J		Ca	1840.00	UG/L	J
	Cd	0.03	MG/KG	UJ		Cd	0.30	UG/L	U
	Co	1.70	MG/KG	J		Co	2.30	UG/L	J
	Cr	6.70	MG/KG	J		Cr	20.60	UG/L	=
	Cu	13.70	MG/KG	=		Cu	23.20	UG/L	J
	Fe	3680.00	MG/KG	=		Fe	10800.00	UG/L	=
	Hg	0.06	MG/KG	=		Hg	0.40	UG/L	R
	K	223.00	MG/KG	J		K	2180.00	UG/L	J
	Mg	430.00	MG/KG	J		Mg	1840.00	UG/L	J
	Mn	55.10	MG/KG	=		Mn	120.00	UG/L	=
	Na	41.30	MG/KG	U		Na	3340.00	UG/L	J
	Ni	2.70	MG/KG	J		Ni	7.10	UG/L	J
	Pb	17.70	MG/KG	=		Pb	22.40	UG/L	=
	Sb	0.30	MG/KG	J		Sb	2.40	UG/L	U
	Se	0.49	MG/KG	J		Se	1.70	UG/L	U
	Sn	4.30	MG/KG	J		Sn	2.70	UG/L	U
	Tl	0.26	MG/KG	UJ		Tl	2.40	UG/L	UJ
	V	9.30	MG/KG	=		V	34.90	UG/L	J
	Zn	11.40	MG/KG	J		Zn	264.00	UG/L	=

U	Not detected, reported value is detection limit.
UJ	Not detected, reported value is estimated detection limit.
J	Detected, reported value is an estimated concentration.
=	Detected, reported value equals detected concentration.
R	Data rejected.

Appendix G
SPLP data - AOC 609

Location **609SB002**

Sample No.		Concentration	Units	Qualifier	Sample No.		SPLP Concentratic	Units	Qualifier
609SB002T1	Ag	0.06	MG/KG	U	609SB002S1	Ag	0.50	UG/L	UJ
0' - 1' depth	Al	36000.00	MG/KG	=	0' - 1' depth	Al	17200.00	UG/L	=
	As	18.70	MG/KG	J		As	13.00	UG/L	=
	Ba	50.30	MG/KG	=		Ba	1050.00	UG/L	=
	Be	1.60	MG/KG	=		Be	0.90	UG/L	U
	Ca	4400.00	MG/KG	J		Ca	6500.00	UG/L	=
	Cd	0.04	MG/KG	UJ		Cd	0.30	UG/L	U
	Co	11.90	MG/KG	=		Co	4.20	UG/L	J
	Cr	54.70	MG/KG	J		Cr	24.00	UG/L	=
	Cu	42.00	MG/KG	=		Cu	20.30	UG/L	J
	Fe	38800.00	MG/KG	=		Fe	15700.00	UG/L	=
	Hg	0.81	MG/KG	=		Hg	0.40	UG/L	R
	K	2930.00	MG/KG	J		K	4620.00	UG/L	J
	Mg	4560.00	MG/KG	J		Mg	3460.00	UG/L	J
	Mn	389.00	MG/KG	=		Mn	291.00	UG/L	=
	Na	377.00	MG/KG	J		Na	4660.00	UG/L	J
	Ni	20.60	MG/KG	=		Ni	9.70	UG/L	J
	Pb	62.90	MG/KG	=		Pb	24.50	UG/L	=
	Sb	1.40	MG/KG	J		Sb	2.40	UG/L	U
	Se	2.60	MG/KG	=		Se	3.50	UG/L	U
	Sn	7.80	MG/KG	J		Sn	4.60	UG/L	J
	Tl	0.31	MG/KG	UJ		Tl	2.40	UG/L	UJ
	V	88.70	MG/KG	=		V	39.30	UG/L	J
	Zn	172.00	MG/KG	J		Zn	306.00	UG/L	=
609SB002T2	Ag	0.06	MG/KG	U	609SB002S2	Ag	0.50	UG/L	UJ
3' - 5' depth	Al	13900.00	MG/KG	=	3' - 5' depth	Al	200000.00	UG/L	=
	As	5.70	MG/KG	J		As	62.50	UG/L	=
	Ba	23.40	MG/KG	=		Ba	3080.00	UG/L	=
	Be	0.29	MG/KG	J		Be	2.70	UG/L	J
	Ca	1190.00	MG/KG	J		Ca	17100.00	UG/L	=
	Cd	0.03	MG/KG	UJ		Cd	0.30	UG/L	U
	Co	2.20	MG/KG	J		Co	26.40	UG/L	J
	Cr	26.70	MG/KG	J		Cr	274.00	UG/L	=
	Cu	1.30	MG/KG	J		Cu	22.80	UG/L	J
	Fe	19000.00	MG/KG	=		Fe	177000.00	UG/L	=
	Hg	0.05	MG/KG	U		Hg	0.40	UG/L	J
	K	763.00	MG/KG	J		K	15500.00	UG/L	=
	Mg	1110.00	MG/KG	J		Mg	13000.00	UG/L	=
	Mn	51.20	MG/KG	=		Mn	341.00	UG/L	=
	Na	264.00	MG/KG	J		Na	16500.00	UG/L	=
	Ni	4.30	MG/KG	J		Ni	66.00	UG/L	=
	Pb	8.10	MG/KG	=		Pb	87.60	UG/L	=
	Sb	0.88	MG/KG	J		Sb	2.40	UG/L	U
	Se	1.80	MG/KG	=		Se	13.90	UG/L	J
	Sn	5.30	MG/KG	J		Sn	13.90	UG/L	J
	Tl	0.27	MG/KG	UJ		Tl	2.40	UG/L	UJ
	V	36.30	MG/KG	=		V	372.00	UG/L	=
	Zn	13.50	MG/KG	J		Zn	1940.00	UG/L	=

U	Not detected, reported value is detection limit.
UJ	Not detected, reported value is estimated detection limit.
J	Detected, reported value is an estimated concentration.
=	Detected, reported value equals detected concentration.
R	Data rejected.

Appendix H

Responses to SCDHEC Comments on the AOC 609 RFI Report Addendum, Revision 0
Comments dated September 28, 2001
Received October 2, 2001

Jamelle Ellis General Comments

SCDHEC Comment 1:
Section 7.0 Recommendations, p. 7-1
Lines 4-6, p. 7-1, recommend No Further Action (NFA) for AOC 609. The Department does not concur with the No Further Action Recommendation for the following reason:

Site 24. addressing petroleum products under the Department's RCRA Subtitle I program (UST Program), has been NFA'd. Site 25 is also being handled by the UST Program and is an open/active site. There is currently monitoring being conducted on Site 25. The Department cannot fully assess AOC 609 until investigations and subsequent recommendations regarding Site 25 have been made. The Department generally defers an NFA determination for this type of site until after the investigation under RCRA Subtitle I program is complete. The *Recommendations* section of the document should be revised to state that the final corrective action for AOC 609 will be selected subsequent to selection of remedial action at Site 25.

All references to NFA with the released document should be removed.

> **CH2M-Jones Response 1:**
> *We understand that although selection of No Further Action (NFA) for AOC 609 should be independent of selection of corrective action for Underground Storage Tank (UST) Site 25, the RCRA permit cannot be changed until the issues at Site 25 are resolved. SCDHEC agrees with the recommendation of NFA for the portion of AOC 609 not relating to the UST release. The last paragraph in Section 7.0, Recommendations, of the RFI Report Addendum will be removed, and the last line of the preceding paragraph will be changed to read the following: "Therefore, this site is recommended for NFA under RCRA Subtitle C. However, the RCRA permit may be modified for AOC 609 only after remedial action at Site 25 is completed." Likewise, the discussion of NFA in Section 1.0, Introduction, of the RFI Report Addendum will be revised.*

Jo Cherie Overcash Comments

SCDHEC Comment 1a:
Groundwater Flow
The Division of Hydrogeology is concerned that the Navy has not adequately determined the direction of groundwater flow at AOC 609, Site 24 and Site 25. In Appendix A and B of this RFI Addendum, portions of three other documents have been provided. Each of these documents gives a different direction for groundwater flow from southeast, southwest to northwest. Moreover, the Navy states that seasonal factors may influence the direction of groundwater flow. The Navy does not provide substantiating evidence. Due to the uncertainty of the direction of groundwater flow and the uncertainty of whether a seasonal fluctuation exists, it is unclear as to whether the existing groundwater monitoring wells are appropriately located to distinguish a contaminant plume emanating from Site 24 [R.61 – 79.264.97(a)].

CH2M-Jones Response 1a:

Numerous groundwater measurements have been conducted at AOC 609. Overall, the data at the site strongly confirm that the general direction of groundwater flow at the site is toward the southwest. This evidence includes the following:

1. *Of the flow direction measurements reviewed, only the maps presented in the Zone F RFI Report, Revision 0 (EnSafe, 1997) suggest anything other than a southwest flow direction (see discussion below and attached figures).*

2. *The dissolved phase plume resulting from the release of gasoline from the USTs at Site 25 has migrated in a southwesterly direction from the USTs, as described in the Site 25 Corrective Action Plan. The migration of dissolved phase gasoline components in a southwesterly direction provides confirmation that the predominant direction of groundwater flow at the site is towards the southwest.*

Further, because the only groundwater contamination present at the site is related to the USTs at Site 25, any further concerns about confirming groundwater flow direction is appropriately addressed under the petroleum program work for Site 25.

A further discussion of each groundwater flow direction monitoring event under review is provided below:

i. *EnSafe prepared groundwater flow maps from 1996 with measurements from five wells (SME wells 3, 4, 5, 7, and 8). These maps show groundwater flow in a southeast direction. It is unclear what data were used to prepare the maps presented in the Zone F RFI Report, Revision 0. However, groundwater depths measured during EnSafe's May, September, and November 1997 sampling events all indicate a flow pattern in a west-to-southwest direction. For the first sampling event in November 1996, the wells were sampled over a two-week time interval; groundwater flow patterns cannot be reliably estimated over this period of time. Note that this sampling event was not used to prepare the maps in the Zone F RFI Report, Revision 0.*

ii. *On September 8, 1999, Tetra Tech NUS, Inc. (TtNUS) measured groundwater elevations from four wells all clustered within only a 30-ft radius and centered approximately 100 ft northwest of the former waste oil UST location. It was concluded that the localized flow direction was west-northwest. The well locations are shown in the Initial Groundwater Assessment Report for Site 24, which is included in Appendix B of the AOC 609 RFI Report Addendum. Because the measuring area was so small, and this measurement did not include the area-wide groundwater elevations around AOC 609, it should not be considered applicable to the entire AOC 609, but only to the specific area measured.*

iii. *Groundwater measured for the Site 25 Rapid Assessment, on September 11, 1999, shows a southwest flow direction. These measurements included seven SME monitoring wells that surround AOC 609 and cover the waste oil UST area.*

iv. *Groundwater elevations measured on March 26, 2001 for the Site 25 Corrective Action Plan are mapped as Figure 4-4 in the RFI Report Addendum. This map also shows groundwater flow in a southwestern direction.*

v. *Groundwater measured by CH2M-Jones on October 19, 2001 confirms the groundwater flow direction to the southwest.*

It is common to expect some seasonal influence in groundwater gradient and flow, but evidence at AOC 609 indicates only minor variation. Along with a table presenting groundwater elevation data, groundwater flow maps from six different measurements over the period 1997 through 2001 are attached to these comment responses. A plume map for dissolved phase contamination associated with the USTs is also included, showing the migration of the plume to be in a southwest direction.

In conclusion, the overall weight of evidence strongly confirms a predominant southwesterly groundwater flow direction. Recent measurements confirm that the groundwater flow direction continues in this southwestern direction. FSMEGW004 is located correctly to monitor any impacts to groundwater caused by potential releases from the waste oil UST. Any minor uncertainty about the degree of seasonal variations at AOC 609 is, in our opinion, an insufficient basis for delaying a regulatory decision for the site.

SCDHEC Comment 1b:

Groundwater Flow

Moreover, in Section 7.0, Recommendations, the Navy has concluded that the hazardous constituents detected in groundwater at AOC 609 are associated with the fuel product USTs designated as Site 25. According to Section VI of the *Department's Underground Storage Tank Assessment Guidelines for Permanent Closure, Change-in-Owner and Change-in-Service (June 1995)*, the contaminants detected at AOC 609 can also be associated with "Used Oil". Inherent in the Navy's conclusion is the assumption that the existing monitoring well system is adequately located.

CH2M-Jones Response 1b:

The weight of evidence and analytical data for the site adequately and convincingly demonstrate that the source of the dissolved phase BTEX plume at the site originated from the gasoline USTs at Site 25. This weight of evidence includes the following:

1. *It is documented that the USTs at Site 25 failed a tank-tightness test, confirming that these tanks leaked fuel.*
2. *The subsequent identification of product in soil and groundwater at the location of these Site 25 USTs confirmed that the tanks were leaking. See the BTEX plume map attached to these comment responses.*
3. *The absence of BTEX parameters in soil and groundwater collected in the excavation from which the waste oil tank was removed (Site 24) confirms that the waste oil tank could not have been the source of the BTEX plume in Site 25 groundwater.*

Thus, the speculation that the waste oil tank could have been the source of the BTEX plume in this area, simply because BTEX parameters are on a list of suggested analytes for waste oil tank sampling, is disproved by the actual data and documented site conditions.

SCDHEC Comment 1c:
Groundwater Flow
Furthermore, in Appendix B, the *UST Assessment Report for UST NS1346* includes one groundwater sample collected during the 1996 closure of the 560 gallon Waste Oil Tank and piping (Site 24). The groundwater sample was collected from a depth of 7 feet at the south end of the excavation pit. Analysis of this groundwater sample detected the following constituents in concentrations greater than their corresponding maximum contaminant level (MCL) or action level (AL) as established by Federal Drinking Water Standards and Health Advisories, as amended:

Mercury at 2.69 micrograms per liter (ug/L);
Arsenic at 191 ug/L;
Chromium at 534 ug/L; and
Lead at 4550 ug/L.

CH2M-Jones Response 1c:
As noted above, BTEX parameters are noticeably absent from the list of parameters detected in the groundwater sample collected when the waste oil tank was removed, confirming that the BTEX plume did not originate at the waste oil tank. The only parameters detected above maximum contaminant levels (MCLs) or action levels were metals. The presence of these metals at elevated concentrations is most likely due to the conditions under which the groundwater sample was collected.

The groundwater sample collected during UST closure was scooped from the excavation pit at a 7-ft depth. The typical procedure during UST closure assessments is to dig with the excavator bucket several feet below the tank pit until groundwater is encountered, and collect a sample as soon as it is visible. This sample is collected quickly to reduce loss of potential volatile constituents, and therefore contains many particulates (i.e., it is usually muddy). Metals that are generally encountered in background soil samples at the CNC, such as mercury, arsenic, chromium, and lead, are to be expected in this groundwater sample. Naturally occurring metals in an unscreened groundwater sample collected from the excavation cannot be considered representative of site groundwater or evaluated similar to those from a monitoring well that has been properly screened and developed.

SCDHEC Comment 1d:
Groundwater Flow
Although the Navy has included groundwater data generated from monitoring well FSMEGW004 during the RFI (Appendix A, Table 10.5.8) and during the RFI Addendum activities (Appendix D), there is concern regarding the direction of groundwater flow and the location of the monitoring wells at the Waste Oil Tank, Site 24. For example, FSMEGW004 is approximate 30 feet southwest of Site 24, while FSMEGW005 is approximately 135 feet southeast of Site 24. Note that there are no monitoring wells located northwest of Site 24.

CH2M-Jones Response 1d:
See CH2M-Jones Response to SCDHEC Comment 1a regarding groundwater flow direction. As shown in the February 2000 Site 24 Assessment Report, five groundwater monitoring

wells are located northwest of the former UST. The closest one, CNC24-MW04, is approximately 75 ft northwest of the former waste oil UST. Data from these wells have been used for the Subtitle I UST assessment. The data indicate only very low concentrations of toluene and naphthalene (below MCLs), and no other BTEX or PAHs associated with fuel products. In addition, metals were not detected in the groundwater above their method detection limits or background levels. Therefore, these monitoring wells located northwest of the waste oil UST indicate that contamination above regulatory standards is not present at Site 24.

SCDHEC Comment 1e:

Groundwater Flow

In conclusion, the Navy has not definitively established that the groundwater plume at AOC 609 is not from Site 24 Waste Oil Tank. However, the facility's RCRA Hazardous Waste Permit does not distinguish Site 24 Waste Oil Tank from Site 25 USTs but lists AOC 609 as Building 1346 Gas Station. Under the RCRA Permit, a decision regarding groundwater will be made for AOC 609 and will not distinguish between the Sites. However, the Navy further states that the documented fuel release at Site 25 is being addressed under the Department's UST program.

CH2M-Jones Response 1e:

As previously discussed in CH2M-Jones' Response to SCDHEC Comment 1b, the site data and documented conditions conclusively indicate that the dissolved BTEX plume originated with the documented leaks in the gasoline USTs at Site 25, and not at Site 24. No data support speculation that the waste oil tank is the source of this release; in fact, the data directly contradict this hypothesis. In addition, no COCs related to releases from other areas of AOC 609 have been identified.

SCDHEC Comment 1f:

Groundwater Flow

Therefore, it is recommended that the Navy monitor groundwater elevation at AOC 609 to determine the direction of groundwater flow and to determine whether there is a seasonal fluctuation in the flow direction. It is also recommended that the Navy address AOC 609 in its entirety such that all concerns regarding the presence of arsenic, volatile organic compounds, and semi-volatile organic compounds are included whether from Site 24 or from Site 25.

CH2M-Jones Response 1f:

As previously indicated, the direction of groundwater flow is adequately known. Groundwater elevations have been measured at least six times. A measurement on October 19, 2001 confirms the previously known direction. In addition, measurements taken during the past four years indicate negligible seasonal variation in flow direction.

All constituents relating to a potential release from Building 1346 operations have been addressed either through this AOC 609 RFI or are being addressed through Subtitle I work at Site 25. All data indicate that arsenic has not been released to the groundwater through any Building 1346 operations, whether from Site 24 or Site 25, and that it has been addressed in

the AOC 609 RFI Addendum. Groundwater COPCs encountered at Site 25 are related to fuel products and are managed under the Subtitle I program.

SCDHEC Comment 2:

Section 4, Summary of Additional Investigation

The Navy states that monitoring wells F609GW001 and F609GW002 were installed in response to the Department's initial comments regarding *the Zone F-RFI Report, Revision 0*. In Appendix C, the SCDHEC reply to Comment 5 (Eric Cathcart) states that in the April 1999 meeting, the Team agreed to install these two wells and to sample for the Appendix IX at DQO Level IV for at least two rounds. The Navy states that the May 1999 groundwater samples from these wells were analyzed for volatile organic compounds, semi-volatile organic compounds, metals, pesticides and polychlorinated biphenyls (arochlor). The Navy further states that in October 1999 the analysis was reduced to metals and volatile organic compounds. No chain of custody forms have been included. The Navy should explain the lack of Appendix IX analysis of groundwater samples collected from E609GW001 and F609GW002.

CH2M-Jones Response 2:

The first sampling event for these two wells included SW846 pesticides, PCBs, VOCs, and SVOCs, and CLP-TAL metals; no PCBs, SVOCs, or pesticides were detected. Neither these three chemical groups nor cyanide would be expected in the perimeter wells, due to either their low solubility or lack of contaminant source at AOC 609. With the exception of 4-methylphenol (an anaerobic biodegradation breakdown product of toluene), there have been no SVOCs consistently identified in any AOC 609 or Site 25 groundwater monitoring wells that have exceeded MCLs or RBCs. Therefore, in the second sampling event, only metals and VOCs were monitored. Because the expanded list of constituents was not detected in the first sampling event and they are not expected to be at the well locations, it was not considered essential to analyze for compounds that were determined to be absent.

SCDHEC Comment 3:

Section 4, Summary of Additional Investigation

No chain of custody forms have been included for the soil and/or groundwater samples collected during the RFI Addendum activities. The Navy must provide the chain of custody forms for all the additional samples.

CH2M-Jones Response 3:

CH2M-Jones and the Navy will try to locate the chain of custody forms for the additional samples collected by EnSafe. It should be noted that no chain of custody forms have been submitted as part of previous Zone RFI reports. Although it is feasible to provide these forms for sampling performed by CH2M-Jones, it may not be possible to locate them from previous sampling efforts.

SCDHEC Comment 4:

Figure 4-4 Groundwater Potentiometric Surface Map

Groundwater monitoring well FSMEGW002 is depicted on Figure 4-4 but is not mentioned in the text. No analysis from this well is included in the data. The Navy should give the

history and present condition of this well and clarify its purpose. If this well has been damaged, replaced and/or abandoned, the text should clearly state its condition.

CH2M-Jones Response 4:
Groundwater monitoring well FSMEGW002 is damaged and full of sediment, and therefore will be properly abandoned in accordance with SCDHEC requirements. It has not been sampled and should not be used for groundwater level measurements. The text and groundwater level maps in the RFI Report Addendum will be adjusted.

SCDHEC Comment 5:
Figure 4-4 Groundwater Potentiometric Surface Map
The following two concerns regarding Figure 4-4 entitled Groundwater Potentiometric Surface Map should be addressed:

a. No date is given for the groundwater elevation data.

b. The contours are incorrect at the FSMEGW002 location.

CH2M-Jones Response 5:
The figure will be revised with measurement date and removal of groundwater measurements from the damaged well. Please see CH2M-Jones Response to SCDHEC Comment 4.

SCDEHC Comment 6:
Appendix B
In this Appendix, the Navy has included portions of documents that have been submitted to the Department's Bureau of Water. Specifically, the appendices to the *Initial Groundwater Assessment Report for Site 24, Building NS1346*, dated February 2000, and the appendices to the *Rapid Assessment Report for Site 25, Building 1346*, dated November 1999, have not been included. The Navy should provide these appendices.

CH2M-Jones Response 6:
Appendices will be provided for the referenced reports.

SCDHEC Comment 7:
Appendix D
The tables included in Appendix D are entitled "Data Summary". This document is an "Addendum" to the RFI Report and a complete set of data should be provided. All historical and new data for each monitoring well (soil location) should be presented on tables to include the date of sample collection. The organization of the table should be such that the reviewer can readily determine groundwater quality at each location and whether trends are present. Although a portion of the RFI Report is reproduced in this Addendum, the Navy should incorporate old and new data for ease of review.

CH2M-Jones Response 7:
Because of the volume of data generated for the RFI, the reader is requested to refer to the Zone F RFI Report, Revision 0, for a complete summary of historical data. A summary of all analyses for newer data is provided in Appendix D, along with date of sampling. All detected

analytes from normal samples (not field duplicates) of the more recent field efforts are further presented in Section 4.0. The BRAC Cleanup Team (BCT) has previously agreed that complete summary tables of all data are not required in the RFI Report Addenda. Where appropriate, we will provide comprehensive data tables for selected parameters. Comprehensive tables of groundwater COPCs have been added to Section 5.0. Figures showing all groundwater data for a specific COPC are provided in the report where appropriate.

Susan Byrd Comments:

After review of the above referenced document, no revisions or corrections are requested in regards to risk assessment issues. However, the Department has questions/concerns regarding the utilization of the August 2001 Technical Memorandum regarding inorganic background values. Although I agree with the risk conclusions drawn in the SWMU 609 RFI Addendum, I do not concur with the overall approach for the elimination of COPCs utilizing the background data. CH2M-Jones should note that the approach outlined in the August 2001 Background Tech Memo has not yet been approved by the Department. Based on the Department's review of the Background Tech Memo, application of the background data in regards to the elimination of COPCs has not clearly been provided. It is recommended that the CNC Team discuss the application of background in the next Team meeting so that COPC selection or elimination can be technically defensible and consistent in future documents. This will assist the Department in the expedited review/approval of the approach for using background values at CNC.

CH2M-Jones Response:
Comment noted. This item will be discussed at the BCT meeting. CH2M-Jones is willing to revise Section 5.0 as necessary to be compatible with recent discussions regarding the evaluation of COCs.

AOC 609, Zone F Groundwater Elevation Measurements
Charleston Naval Complex

Monitoring Well No.	Date Measured	Groundwater Depth below Top of Casing (ft)	Top of Casing Elevation (ft msl)	Groundwater Elevation (ft msl)
SME001	11/21/1996	3.05	7.90	4.85
	05/12/1997	3.05	7.90	4.85
	09/09/1997	3.1	7.90	4.80
	11/21/1997	3.07	7.90	4.83
	09/11/1999	3.58	7.90	4.32
	03/26/2001			4.99
	10/19/2001	3.76	7.90	4.14
SME003	11/13/1996	5.6	7.40	1.80
	05/12/1997	4.55	7.40	2.85
	09/05/1997	4.99	7.40	2.41
	11/21/1997	5.35	7.40	2.05
	09/11/1999	5.87	7.40	1.53
	03/26/2001			2.42
	10/19/2001	6.19	7.40	1.21
SME004	05/13/1997	4.56	8.00	3.44
	09/05/1997	5.13	8.00	2.87
	11/21/1997	5.58	8.00	2.42
	03/26/2001			2.79
SME005	11/13/1996	5.23	8.02	2.79
	05/13/1997	4.2	8.02	3.82
	09/08/1997	4.63	8.02	3.39
	11/20/1997	5.73	8.02	2.29
	09/11/1999	5.46	8.02	2.56
	03/26/2001			3.69
	10/19/2001	5.31	8.02	2.71
SME006 (screened in deeper water-bearing zone)	11/13/1996	5.84	7.92	2.08
	05/13/1997	4.43	7.92	3.49
	09/09/1997	7.65	7.92	0.27
	11/20/1997	5.52	7.92	2.40
	09/11/1999	5.98	7.92	1.94
	03/26/2001			2.66
	10/19/2001	5.57	7.92	2.35
SME007	11/13/1996	7.8	7.41	-0.39
	05/14/1997	4.74	7.41	2.67
	09/09/1997	6.08	7.41	1.33
	11/20/1997	6.2	7.41	1.21
	09/11/1999	6.44	7.41	0.97
	03/26/2001			1.55
	10/19/2001	6.64	7.41	0.77

AOC 609, Zone F Groundwater Elevation Measurements
Charleston Naval Complex

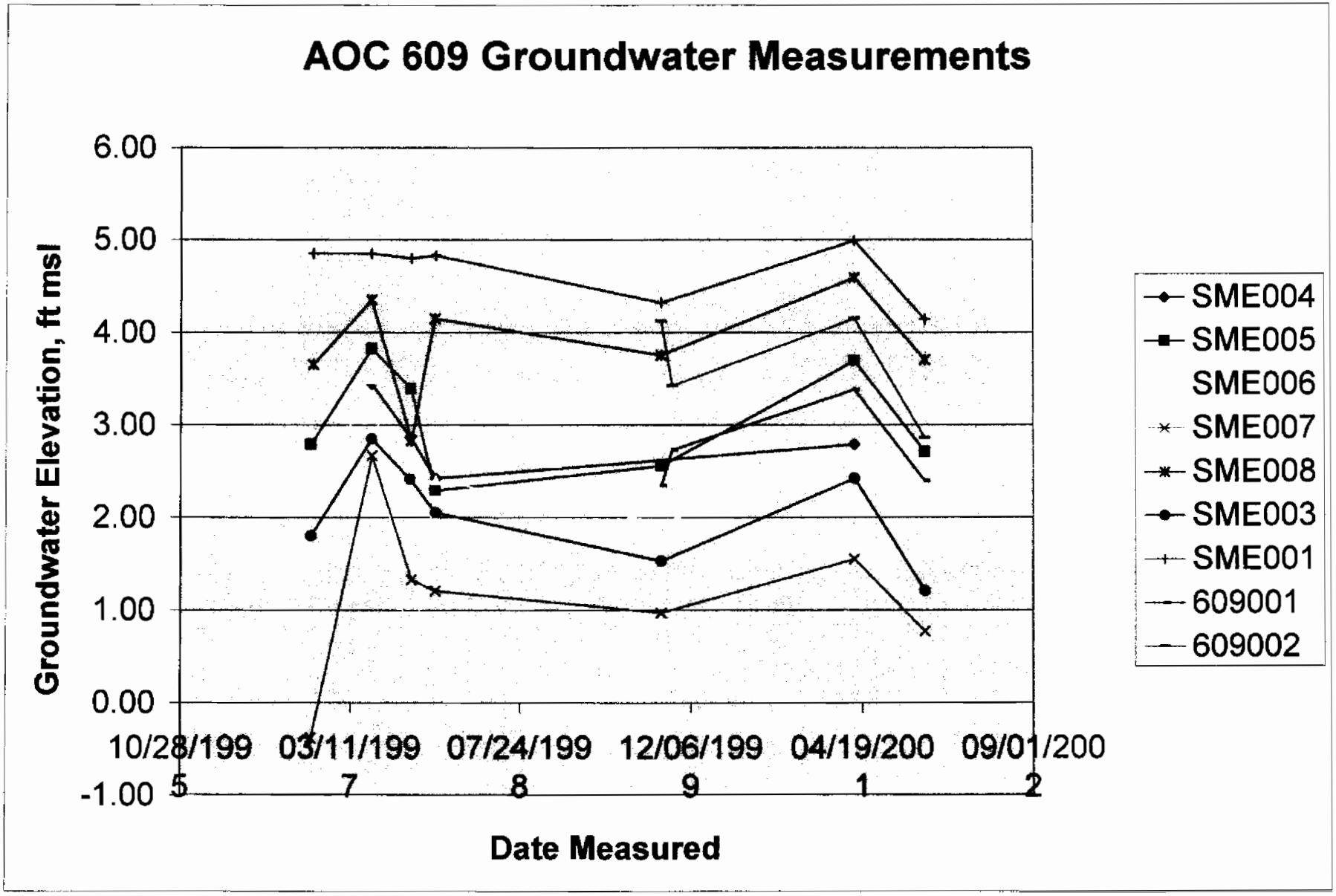
Monitoring Well No.	Date Measured	Groundwater Depth below Top of Casing (ft)	Top of Casing Elevation (ft msl)	Groundwater Elevation (ft msl)
SME008	11/21/1996	3.95	7.60	3.65
	05/13/1997	3.25	7.60	4.35
	09/09/1997	4.77	7.60	2.83
	11/19/1997	3.45	7.60	4.15
	09/11/1999	3.85	7.60	3.75
	03/26/2001			4.59
	10/19/2001	3.9	7.60	3.70
609001	09/11/1999	5.49	7.83	2.34
	10/12/1999	5.1	7.83	2.73
	03/26/2001			3.38
	10/19/2001	5.44	7.83	2.39
609002	09/11/1999	3.42	7.54	4.12
	10/12/1999	4.12	7.54	3.42
	03/26/2001			4.15
	10/19/2001	4.68	7.54	2.86

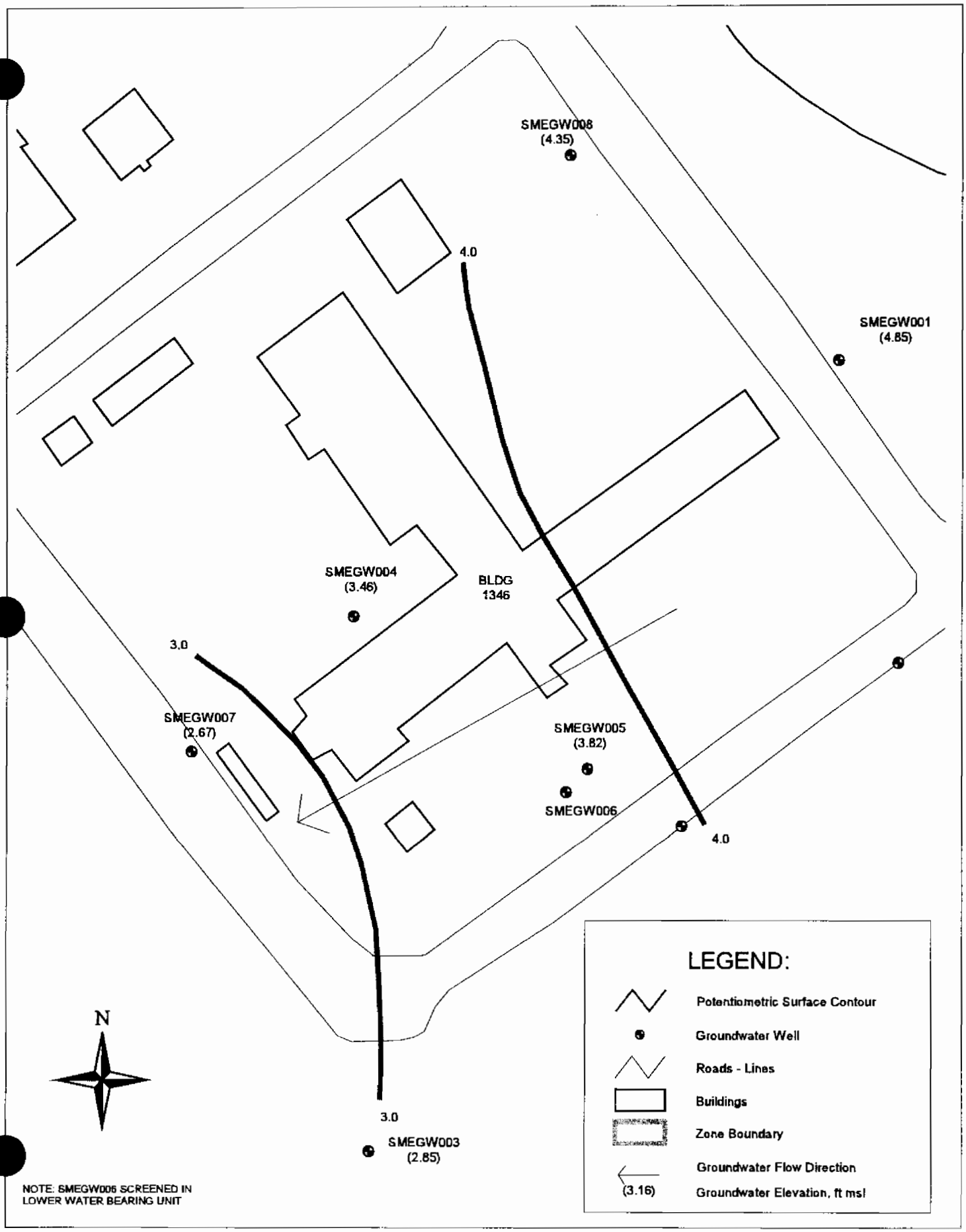
Measurements dated 1996 and 1997 from EnSafe groundwater sampling field notes.

Measurements dated 9/11/1999 from Rapid Assessment Report for Site 25, Building 1346.

Measurements dated 10/12/1999 (609001 and 609002) from EnSafe sampling field notes.

Measurements dated 2001 by CH2M-Jones.


AOC 609 Groundwater Measurements
Groundwater Elevation, ft msl
6.00
5.00
4.00
3.00
2.00
1.00
0.00
-1.00
10/28/199 5
03/11/199 7
07/24/199 8
12/06/199 9
04/19/200 1
09/01/200 2
Date Measured
SME004
SME005
SME006
SME007
SME008
SME003
SME001
609001
609002



CH2MHILL

60 0 60 Feet

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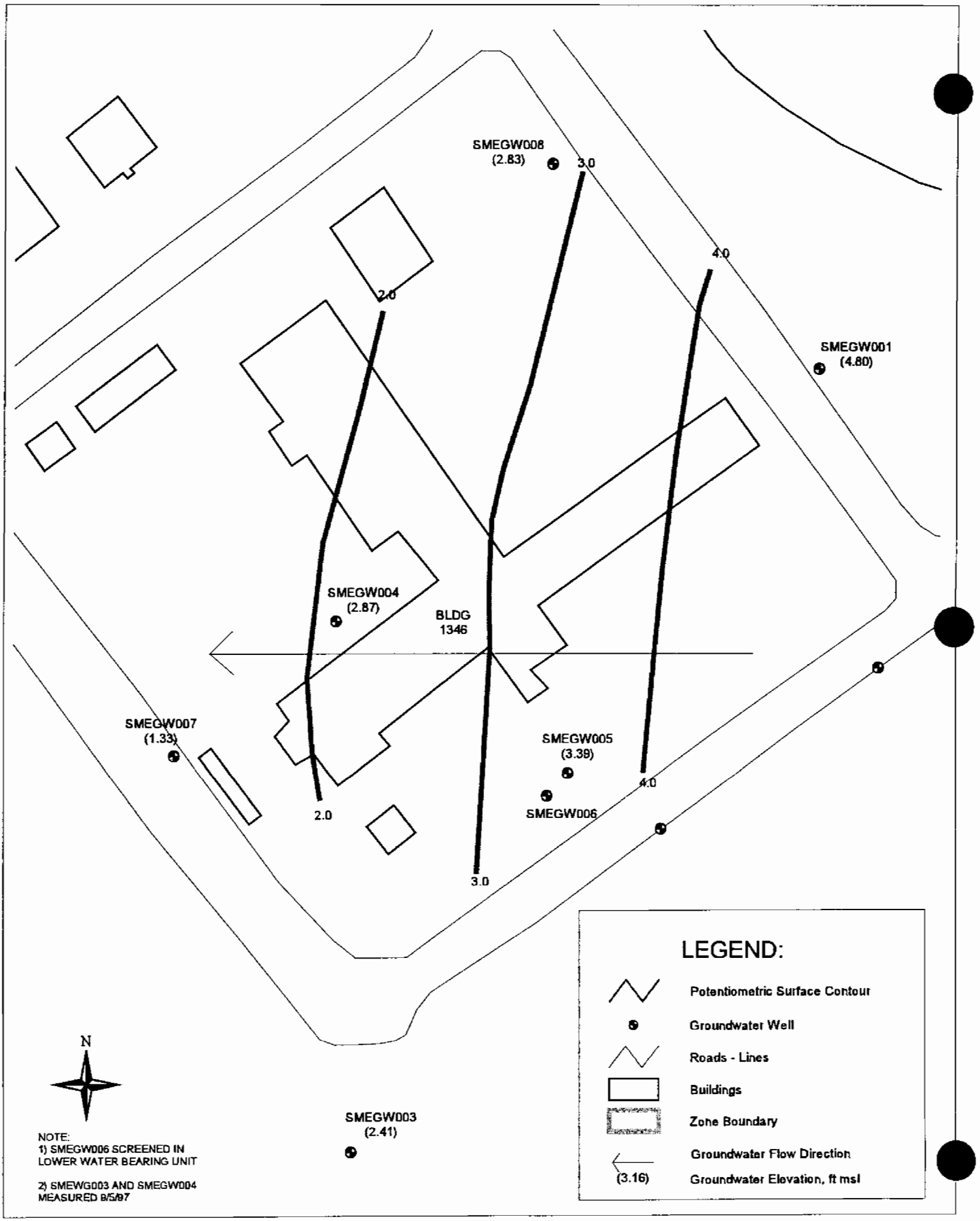
AOC609
GROUNDWATER POTENTIOMETRIC SURFACE MAP
MAY 12 - MAY 14,1997
CHARLESTON NAVAL COMPLEX



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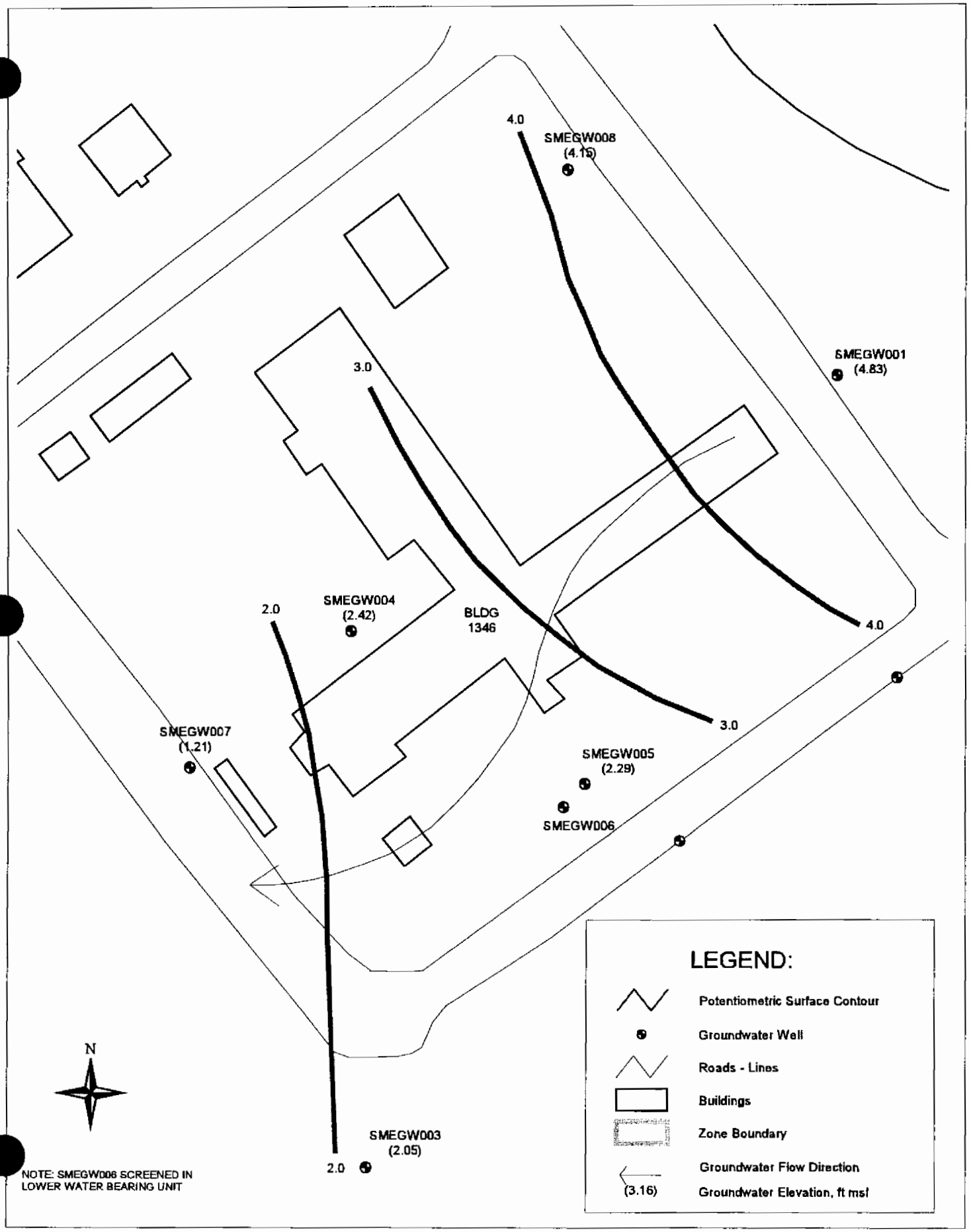
AOC609
GROUNDWATER POTENTIOMETRIC SURFACE MAP
SEPTEMBER 8-9,1997
CHARLESTON NAVAL COMPLEX



NOTE: SMEGW006 SCREENED IN LOWER WATER BEARING UNIT

CH2MHILL

60 0 60 Feet

AOC609
GROUNDWATER POTENTIOMETRIC SURFACE MAP
NOVEMBER 19-21,1997
CHARLESTON NAVAL COMPLEX

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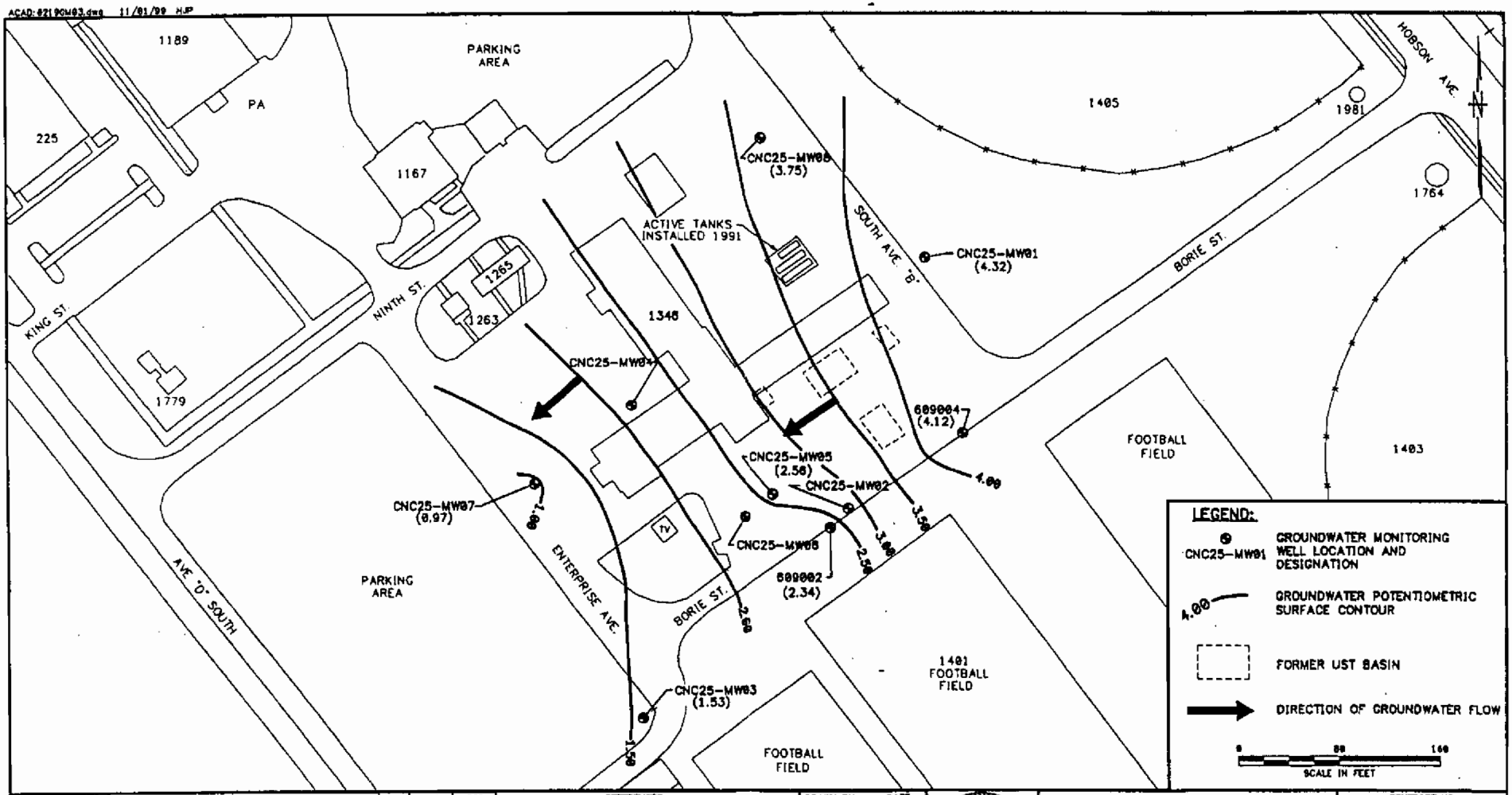
ACAD: 0219GM03.dwg 11/01/99 HJP



NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

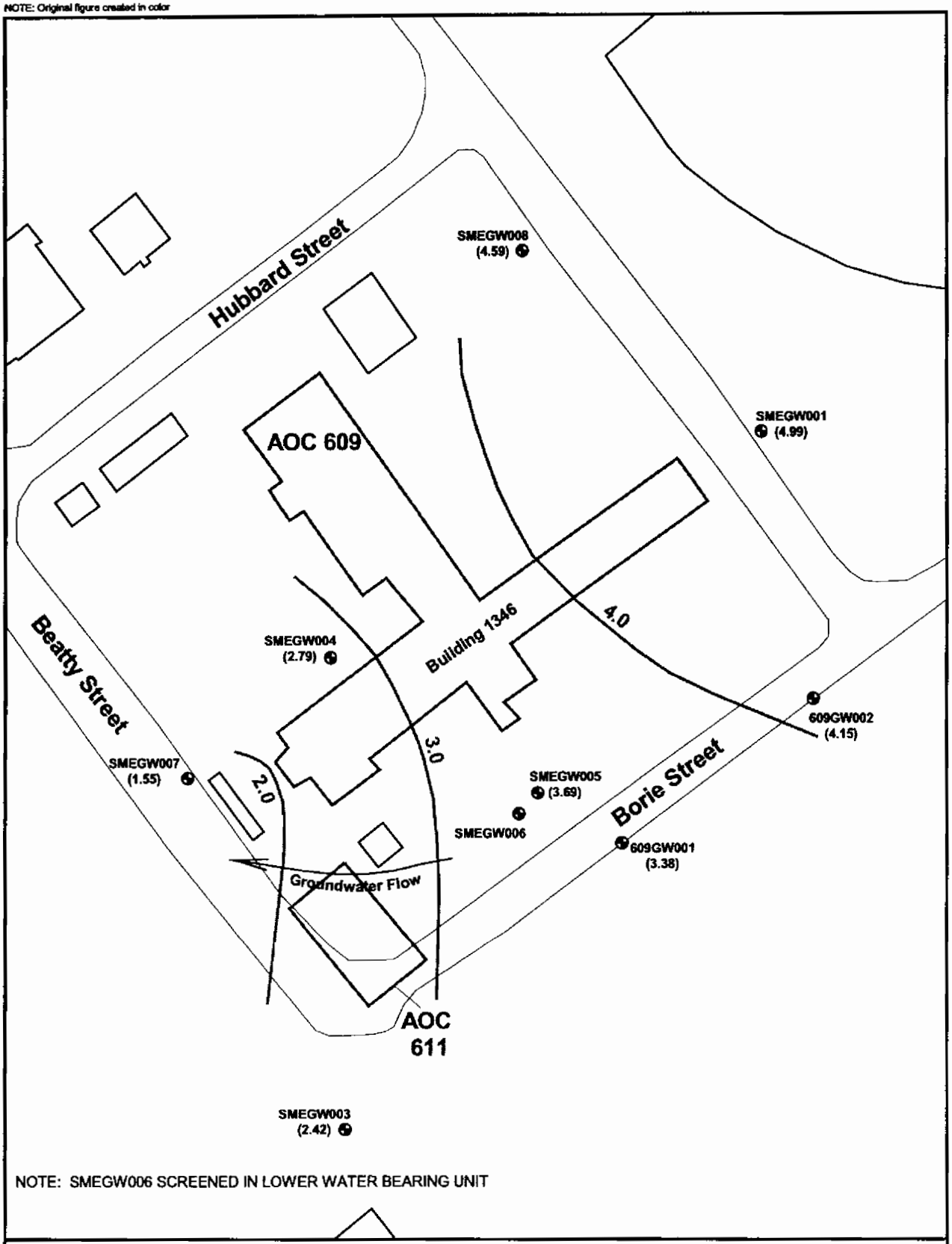
DRAWN BY HJP DATE 11/1/99
CHECKED BY DATE
COST/SCHED-AREA
SCALE AS NOTED

GROUNDWATER POTENTIOMETRIC SURFACE MAP
(SEPTEMBER 11, 1999)
SITE 25, BUILDING 1346
ZONE F, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

CONTRACT NO. 0219
APPROVED BY DATE
APPROVED BY DATE
DRAWING NO. FIGURE 6
REV. 0

FORM CADD NO. 5010_BASING - REV 0 - 1/29/98

NOTE: Original figure created in color



NOTE: SMEGW006 SCREENED IN LOWER WATER BEARING UNIT

Groundwater Well
Potentiometric Surface Contours
Groundwater Flow Direction
Roads
AOC Boundary
Buildings
(3.16) Groundwater Elevation, ft msl

N

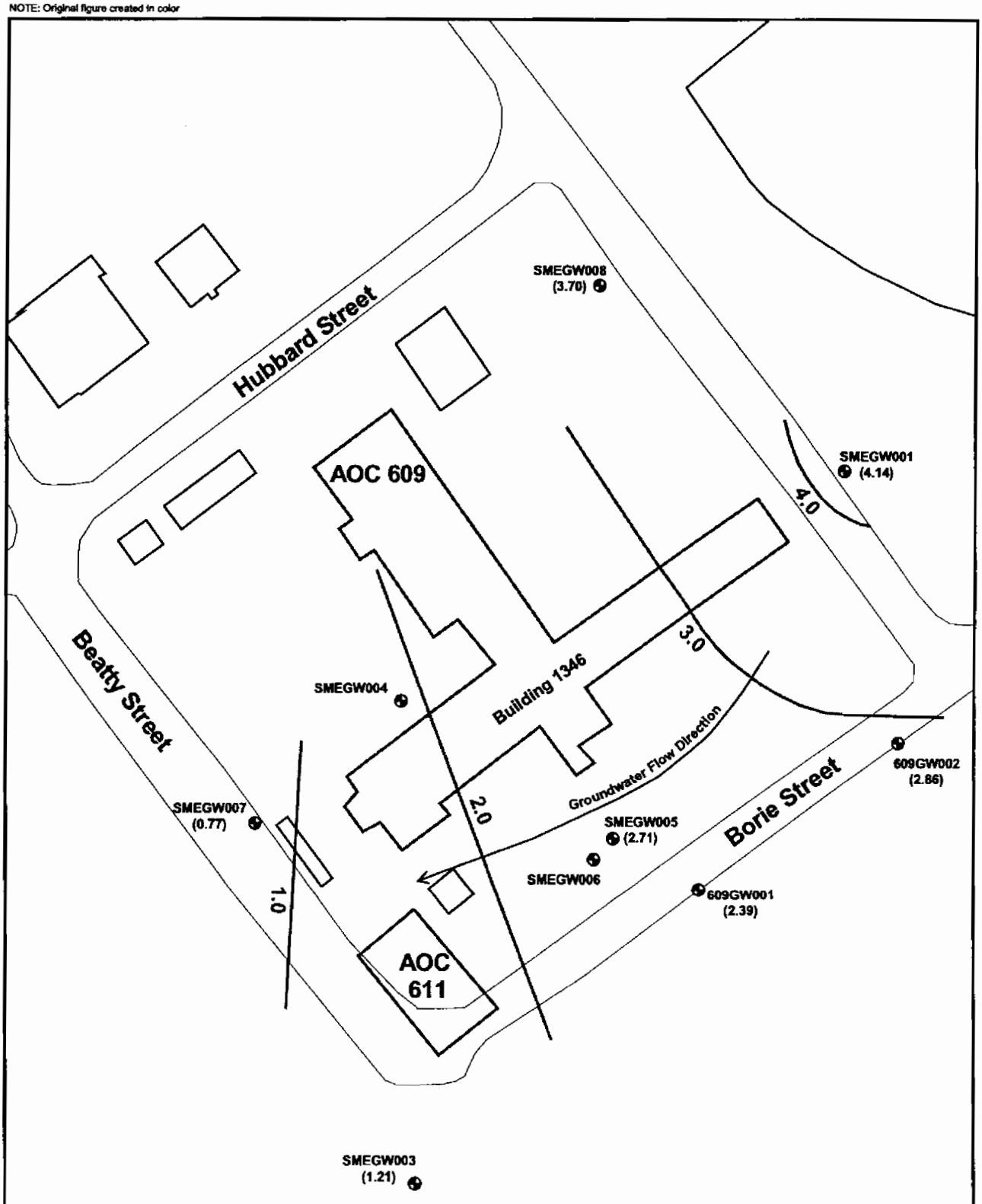
0 60 120 Feet

Figure 4-4
AOC 609
Groundwater Potentiometric Surface Map, March 26, 2001
Charleston Naval Complex

CH2MHILL

File Path: C:\18gis\Projects\Zone_Flaoc_609\apra\aoc_609.apr, Date: 24 Oct 2001 14:09, User: ASWINFOR, Figure 4 - Figure 4-4 AOC 609

NOTE: Original figure created in color



NOTE:
1) SMEGW006 SCREENED IN LOWER WATER BEARING UNIT
2) SMEGW004 NOT ACCESSIBLE

- Groundwater Well
- Potentiometric Surface Contours
- Groundwater Flow Direction
- Roads
- AOC Boundary
- Buildings
- (3.16) Groundwater Elevation, ft msl

N

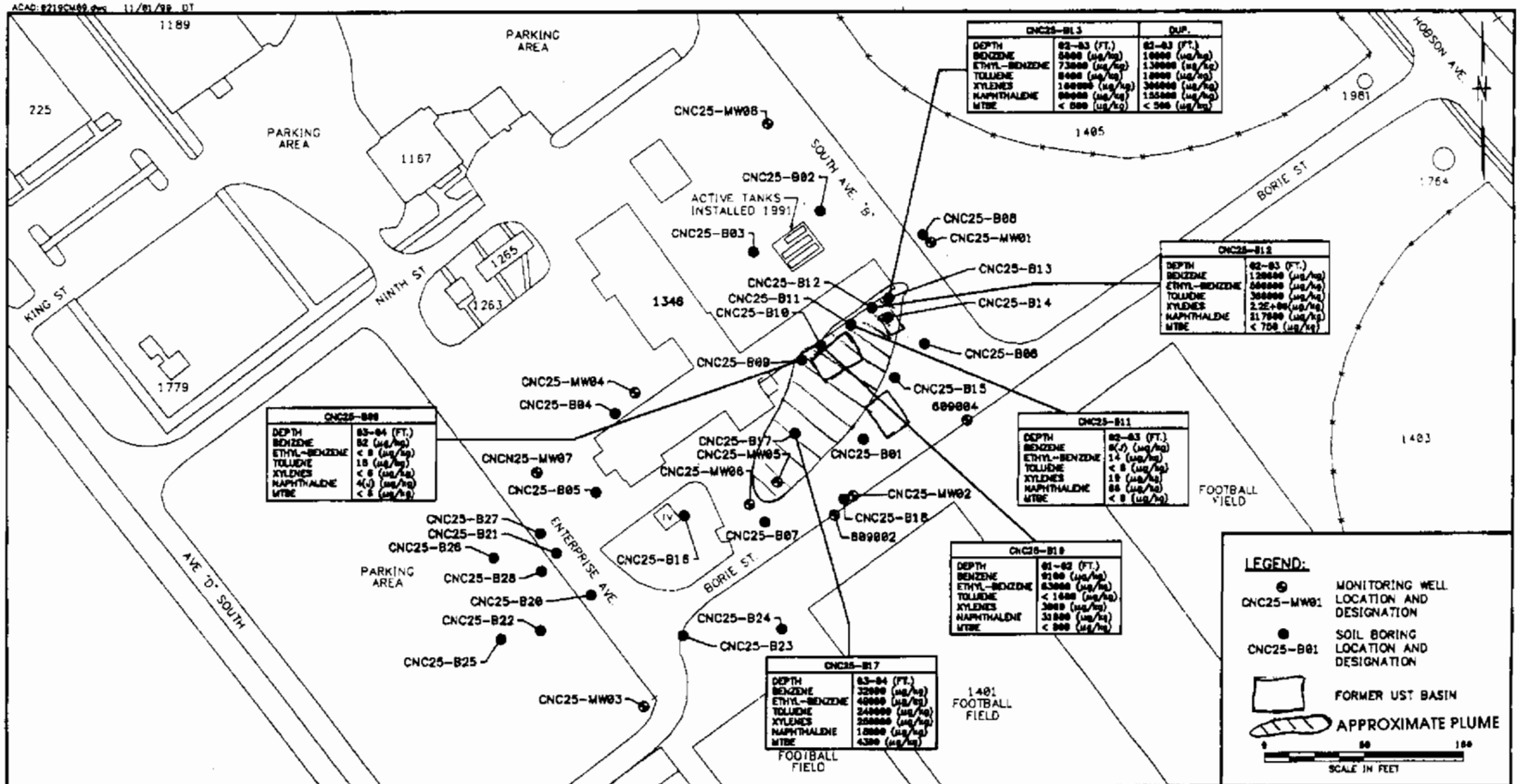
90 0 90 Feet

Figure 5
AOC 609
October 19, 2001 Groundwater Potentiometric Surface Map
Charleston Naval Complex

CH2MHILL

File Path: C:\18gis\Projects\Zone_F\aoc_609\aprs\aoc_609.apr, Date: 24 Oct 2001 11:32, User: ASWINFOR, EGIS: Charleston Naval Complex - Figure 5 AOC 609

ACAD: 0219CM09.dwg 11/01/99 DT



CNC25-B13		DUP.
DEPTH	02-03 (FT.)	02-03 (FT.)
BENZENE	5800 (µg/kg)	10000 (µg/kg)
ETHYL-BENZENE	73000 (µg/kg)	130000 (µg/kg)
TOLUENE	8400 (µg/kg)	10000 (µg/kg)
XYLENES	100000 (µg/kg)	300000 (µg/kg)
NAPHTHALENE	80000 (µg/kg)	155000 (µg/kg)
MTBE	< 500 (µg/kg)	< 500 (µg/kg)

CNC25-B12	
DEPTH	02-03 (FT.)
BENZENE	120000 (µg/kg)
ETHYL-BENZENE	5000000 (µg/kg)
TOLUENE	300000 (µg/kg)
XYLENES	2.2E+00 (µg/kg)
NAPHTHALENE	217000 (µg/kg)
MTBE	< 750 (µg/kg)

CNC25-B08	
DEPTH	03-04 (FT.)
BENZENE	82 (µg/kg)
ETHYL-BENZENE	< 8 (µg/kg)
TOLUENE	18 (µg/kg)
XYLENES	< 6 (µg/kg)
NAPHTHALENE	4(J) (µg/kg)
MTBE	< 5 (µg/kg)

CNC25-B11	
DEPTH	02-03 (FT.)
BENZENE	8(J) (µg/kg)
ETHYL-BENZENE	14 (µg/kg)
TOLUENE	< 8 (µg/kg)
XYLENES	18 (µg/kg)
NAPHTHALENE	86 (µg/kg)
MTBE	< 8 (µg/kg)

CNC25-B19	
DEPTH	01-02 (FT.)
BENZENE	9100 (µg/kg)
ETHYL-BENZENE	83000 (µg/kg)
TOLUENE	< 1600 (µg/kg)
XYLENES	3000 (µg/kg)
NAPHTHALENE	33000 (µg/kg)
MTBE	< 800 (µg/kg)

CNC25-B17	
DEPTH	03-04 (FT.)
BENZENE	32000 (µg/kg)
ETHYL-BENZENE	40000 (µg/kg)
TOLUENE	240000 (µg/kg)
XYLENES	250000 (µg/kg)
NAPHTHALENE	18000 (µg/kg)
MTBE	4300 (µg/kg)

NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

DRAWN BY DLT 10/29/99 DATE
CHECKED BY DATE
COST/SCHED-AREA
SCALE AS NOTED

SOIL CoC MAP
SITE 25, BUILDING 1346
ZONE F, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

CONTRACT NO. 0219
APPROVED BY DATE
APPROVED BY DATE
DRAWING NO. FIGURE 4 REV. 0

FORM CADD NO. SBIV_BLDVC - REV 0 - 1/16/98

CH2M-Hill 11/09/01 LAP