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ADDENDUM TO DELISTING PETITION 0759 AT AREA A FORMER HERBICIDE ORANGE STORAGE NCBC GULFPORT MS

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ABB ENVIRONMENTAL

ADDENDUM TO DELISTING PETITION 0759

AREA A, FORMER HERBICIDE ORANGE STORAGE AREA
NAVAL CONSTRUCTION BATTALION CENTER
GULFPORT, MISSISSIPPI

Unit Identification No. N62604

Contract No. N62467-89-D-0317/092

Prepared by:

ABB Environmental Services, Inc.
2590 Executive Center Circle, East
Berkeley Building
Tallahassee, Florida 32301

Prepared for:

Department of the Navy, Southern Division
Naval Facilities Engineering Command
2155 Eagle Drive
North Charleston, South Carolina 29418

Dan Owens, Code 18210, Remedial Project Manager

August 1997

FOREWORD

To meet its mission objectives, the U.S. Navy performs a variety of operations, some requiring the use, handling, storage, or disposal of hazardous materials. Through accidental spills and leaks and conventional methods of past disposal, hazardous materials may have entered the environment in ways unacceptable by today's standards. With growing knowledge of the long-term effects of hazardous materials on the environment, the Department of Defense initiated various programs to investigate and remediate conditions related to suspected past releases of hazardous materials at their facilities.

One of these programs is the Installation Restoration (IR) program. This program complies with the Comprehensive Environmental Response, Compensation, and Liability Act as amended by the Superfund Amendments and Reauthorization Act, the Resource Conservation and Recovery Act (RCRA), and the Hazardous and Solid Waste Amendments (HSWA) of 1984. These acts establish the means to assess and clean up hazardous waste sites for both private-sector and Federal facilities.

The program that has been adopted to address present hazardous material management is RCRA and the HSWA (RCRA/HSWA) corrective action program. RCRA ensures that solid and hazardous wastes are managed in an environmentally sound manner. The law applies to facilities generating or handling hazardous waste. The HSWA corrective action program is designed to identify and clean up releases of hazardous substances at RCRA-permitted facilities.

The Southern Division, Naval Facilities Engineering Command manages and the U.S. Environmental Protection Agency and the Mississippi Department of Environmental Quality oversee the Navy environmental program at Naval Construction Battalion Center (NCBC), Gulfport, Mississippi. All aspects of the program are conducted in compliance with State and Federal regulations, as ensured by the participation of these regulatory agencies.

Questions regarding the delisting petition at NCBC Gulfport should be addressed to Mr. Dan Owens, Code 18210, at (803) 820-7331.

EXECUTIVE SUMMARY

This document is the final addendum to petition number 0759 first submitted on November 9, 1988, by the U.S. Air Force Engineering and Services Center, Tyndall Air Force Base, Florida, to the U.S. Environmental Protection Agency. The petition seeks to delist up to 30,000 cubic yards of listed waste F028 generated from the thermal destruction of the listed waste F027 at Naval Construction Battalion Center, Gulfport. This addendum is submitted to the Mississippi Department of Environmental Quality, which now has delisting authority for the State of Mississippi.

Delisting is the process that allows a facility to demonstrate that a specific waste from a particular site should no longer be regulated as a hazardous waste under 40 Code of Federal Regulation 261. This document contains additional data from sampling the ash and groundwater at Site 8. This data is presented to support delisting of the F028 ash currently stored at Site 8.

This document demonstrates that the regulatory criteria for delisting have been met. Although the ash contains low levels of dioxins, the ash can still be delisted because the waste meets certain conditions. These conditions can be grouped into three general categories. First, the waste cannot pose a significant health threat. Site 8 is in an industrialized area with no residential receptors. Ash dioxin concentrations associated with an excess lifetime cancer risk for realistic industrial receptors are compared to the highest detected ash dioxin level. The highest detected ash concentration carries with it a lifetime excess cancer risk level of less than one in a million for the most sensitive realistic receptor.

The second group of factors are that the waste does not have the potential to adversely impact another medium. A mass balance calculation using groundwater and ash samples collected at Site 8, combined with historical evidence and physical site conditions, illustrate that there is a limited ability for the ash to adversely impact the soil or groundwater. The third group of conditions are that the petition must address actions pertaining to the site taken under other regulatory programs. This addendum discusses the relationship of delisting the ash to the Administrative Order under which the byase is currently operating. The discussion concludes that delisting of the ash will help focus and accelerate the overall cleanup process for the site.

Additional criteria that must be met to allow delisting include a demonstration that the waste has a low potential for persistence, degradation or bioaccumulation in the environment; that the waste will be handled under proper management; and that the delisted waste does not exhibit any of the hazardous waste characteristics. The mass balance calculation further shows that the dioxin-contaminated soil, not the ash, has the greatest potential to persist or affect site conditions. This addendum presents the overall cleanup management strategy for the site and actions that will be taken under the Administrative Order to demonstrate that the site will continue to be properly managed. Finally, samples of the ash were analyzed for hazardous waste characteristics and did not exhibit any of the characteristics of ignitability, corrosivity, reactivity, or toxicity.

This addendum convincingly demonstrates that the F028 ash at Site 8 has met all delisting requirements. The document concludes that the ash should be delisted provided that it does not leave the site and that it is considered part of the required overall cleanup of the site as ordered by the Administrative Order.

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GLOSSARY

ABB-ES	ABB Environmental Services, Inc.
AO	Administrative Order
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulation
CLP	Contract Laboratory Program
D	duplicate
DRE	destruction and removal efficiency
ELCR	excess lifetime cancer risk
FR	Federal Register
ICMS	Interim Corrective Measures Study
µg/kg	micrograms per kilogram
µg/ℓ	micrograms per liter
MCL	maximum concentration limit
mg/kg	milligrams per kilogram
mg/ℓ	milligrams per liter
MS/MSD	matrix spike and matrix spike duplicate
MSDEQ	Mississippi Department of Environmental Quality
NCBC	Naval Construction Battalion Center
NEESA	Naval Energy and Environmental Support Activity
OCDD	octachlorodibenzo-p-dioxin
PAH	polyaromatic hydrocarbon
PARCC	precision, accuracy, representativeness, completeness, and comparability
PCB	polychlorinated biphenyl
pg/g	picograms per gram
POHC	Principal Organic Hazardous Constituent
ppb	parts per billion
ppq	parts per quadrillion
ppt	parts per trillion
PQL	practical quantitation level
QA/QC	quality assurance and quality control
QAL	Quality Analytical Laboratories
QC	quality control
Quanterra	Quanterra Environmental Services
RCRA	Resource Conservation and Recovery Act
RPD	relative percent difference
SAP	sampling and analysis plan
SVOC	semivolatile organic compound

GLOSSARY (Continued)

2,4,5-T	2,4,5-trichlorophenoxyacetic acid
2,3,7,8-TCDD	2,3,7,8-tetrachloro-p-dibenzodioxin
TCLP	toxicity characteristic leaching procedures
TEF	toxic equivalency factor
TEQ	toxic equivalency
™	trademark
USAF	U.S. Air Force
USEPA	U.S. Environmental Protection Agency
VOC	volatile organic compound

1.0 INTRODUCTION

This document is the final addendum to petition number 0759 first submitted on November 9, 1988, by the U.S. Air Force (USAF) Engineering and Services Center, Tyndall Air Force Base, Florida, to the U.S. Environmental Protection Agency (USEPA). The petition seeks to delist, as described in 40 Code of Federal Regulation (CFR) 260.20, up to 30,000 cubic yards of listed waste F028 generated from the thermal destruction of the listed waste F027 at Naval Construction Battalion Center (NCBC) Gulfport.

This addendum to petition 0759 is submitted to the Mississippi Department of Environmental Quality (MSDEQ), which now has delisting authority for the State of Mississippi. This document presents additional data from ash and groundwater samples collected to support delisting of the F028 ash currently stored at Area A, NCBC Gulfport, Mississippi. Area A is part of Site 8, as shown on Figure 1-1.

1.1 HISTORICAL PERSPECTIVE. A series of documents entitled *Full-Scale Incineration System Demonstration at the Naval Construction Battalion Center Gulfport, Mississippi* (ESL-TR-89-39), Volumes I through VIII, dated March 1991, provide a complete description of the incineration process conducted at NCBC Gulfport.

Briefly, a draft delisting petition was submitted to the USEPA in January 1986. Subsequent meetings and correspondences identified the constituents to be analyzed as part of the delisting petition, consideration to cross-media impact was a primary focus of these discussions. The use of groundwater modeling to evaluate the potential for cross-media transfer due to leaching from the ash was also discussed. Delisting of the F028 ash was believed probable based upon incinerator verification test-burn data and indications that cross-media leaching was not significant (EG&G, 1991).

The delisting petition, submitted November 9, 1988, contained monthly ash analytical data obtained during the initial testing of the rotary kiln incinerator in 1986 and during Site A burn operations between November 1987 and July 1988 (USAF, 1988). The first addendum to petition 0759, submitted March 1989, provided monthly data obtained during the period from August 1988 to the completion of the incineration project in November 1988 (USAF, 1989).

The USEPA recommended that the petition be denied based upon an "evaluation of chlorinated dibenzo-p-dioxin and -furan levels and polynuclear aromatic levels in the ash" (USEPA, 1991). Further, the USEPA raised concerns regarding the results of the highly conservative Vertical and Horizontal Spread leach model applied to the ash sample data. The analytical results modeled were from a single ash sample collected by a contractor from USEPA who also cited the lack of data from Verification Burn 4 as a concern. It was recommended that the USAF withdraw the delisting petition rather than have the petition officially denied in the Federal Register.

1.2 CURRENT STATUS OF DELISTING PETITION 0759. In response to the USEPA's action on the petition, the USAF submitted a draft Sampling and Analysis Plan (SAP) to collect additional data to support the delisting petition (Versar, 1991). The USEPA commented on the draft SAP, noting that the additional data were warranted

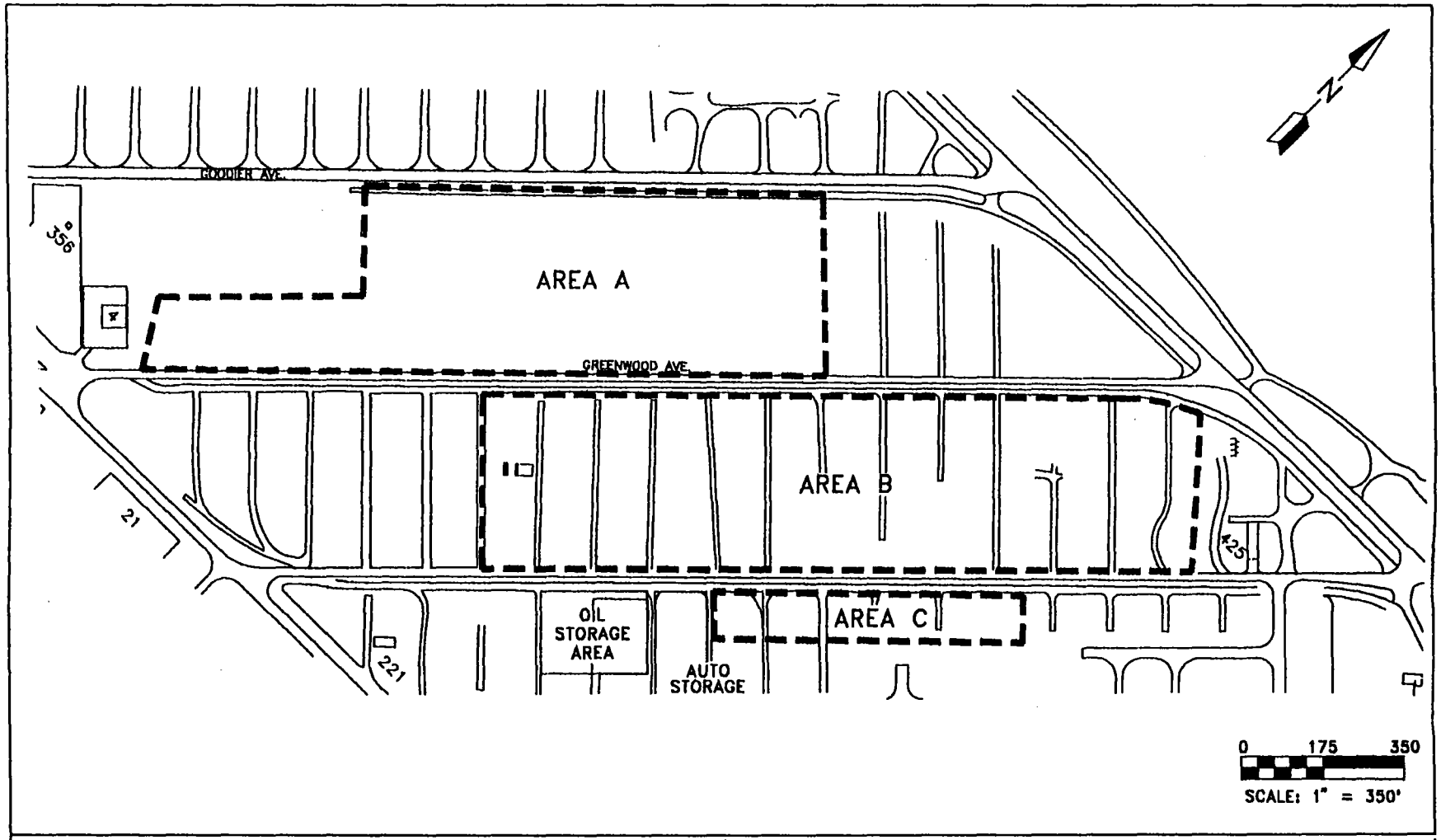

FIGURE 1-1

SITE MAP

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to verify the original ash data presented in the petition and would help resolve concerns identified in 1991 (USEPA, 1992a). The USEPA also requested that apparent discrepancies in the volume of F028 ash to be delisted be resolved by an evaluation of the ash volume at Area A.

In the Navy response letter, it was agreed that the additional ash sampling plan would include the following items to resolve these issues:

- Area A would be sampled by subdividing the area into 100 subareas;
- collection of 10 composite samples would consist of 5 subsamples from 9 randomly selected subareas and 1 from the large ash pile on Area A;
- collection of composite core ash samples would be from the full depth of the ash piles;
- analyses of the ash samples for all Appendix IX analytes in accordance with USEPA SW-846 methods (USEPA, 1986). Analyses will consist of polyaromatic hydrocarbons (PAHs) SW-846 Method 8310 and all 2,3,7,8-substituted dioxin and furan congeners with SW-846 Method 8290; and
- toxicity characteristic leaching procedures (TCLP) extraction and analysis of all 10 composite ash samples for dioxins and furans, PAHs, metals, and any other organic compounds detected in the ash samples.

In addition to the ash sampling plan described above, the USEPA requested a demonstration that showed groundwater had not been impacted by the listed F028 ash. To meet this new requirement, a groundwater monitoring plan would be implemented, which will satisfy the requirements set forth in the CFR (54 Federal Register [FR] 41930, October 12, 1989) for the use of groundwater data in support of delisting petitions. In this letter, however, the USEPA noted that there was some "uncertainty whether the monitoring system can truly distinguish any impact of the petitioned waste from contamination possible caused by untreated soils...." (USEPA, 1992a). The U.S. Navy provided a groundwater monitoring plan that included the following:

- confirmation of groundwater flow direction around Area A;
- collection of a minimum of four rounds of groundwater samples over a course of at least 12 months to fully account for possible seasonal variations; and
- analysis of all groundwater samples for dioxins and furans using USEPA SW-846 Method 8290, PAHs, total metals, and any constituents detected in the original analyses of the ash.

Subsequent to these discussions regarding the sampling plans described above, the Navy contracted ABB Environmental Services, Inc. (ABB-ES), to implement the SAP. Minor modifications were suggested and approved in meetings with the USEPA and the State of Mississippi, which was granted delisting authority within the State

in May 1994. It was agreed that the SAP met all of the data requirements to support the delisting petition.

1.3 REGULATORY CONTEXT. As described in 40 CFR 261.31, any waste containing polychlorinated dioxin and furans derived from chlorinated phenols is considered acutely hazardous and listed as F027. In November 1989, the USEPA banned the land disposal of dioxin-containing wastes (except F028, which was banned in November 1990) containing 2,3,7,8-tetrachloro-p-dibenzodioxin (2,3,7,8-TCDD) in excess of 1 part per billion (ppb) (40 CFR 268.31). While land disposal of dioxin-containing waste less than 1 ppb was allowed, no such USEPA-permitted facility was in existence.

Land disposal of F027 waste required treatment to nonhazardous levels. The most practical method for processing F027 waste is thermal destruction. This process produces another listed hazardous waste, F028, which is also banned from land disposal unless it meets the land disposal restriction concentrations described in 40 CFR 268.41. Delisting is the process that allows demonstration that a specific waste from a particular site or generating facility should no longer be regulated as a hazardous waste.

The F028 ash is a listed hazardous waste because of the possible presence of polychlorinated-p-dibenzodioxins and dibenzofurans as listed in 40 CFR 261.31 and Appendix VII of 40 CFR 261. Under Section 261.31, F028 waste is given a waste code of "T" indicating that the waste is considered toxic. Under the 260.22(d) requirements for delisting waste code "T" wastes, a petition must demonstrate that either (1) the waste no longer contains the constituents listed in Appendix VII of 261; or (2) that although the waste contains one or more of the constituents listed in Appendix VII of 261, that it does not meet any of the criteria described in 261.11(a)(3); and (3) the petitioned waste does not exhibit any of the characteristics defined in 261.21 (ignitability), 261.22 (corrosivity), 261.23 (reactivity), or 261.24 (toxicity). If these criteria are met, the petitioned waste can be delisted.

The purpose of this document is to demonstrate that the criteria noted above for delisting have been met. The data demonstrate that the F028 listed ash at NCBC Gulfport should no longer be considered hazardous and should be delisted. It is proposed that the delisted ash remain at Area A and be managed in the overall long-term remediation of the site. This is in accordance with an interim corrective measures workplan (ABB-ES, 1996a) submitted for Site A. An Administrative Order (AO), issued on February 14, 1996, by the MSDEQ, requires that the remaining dioxin-contaminated soil at Area A be remediated. Delisting of the F028 ash at Area A will allow the ash to be incorporated into interim and final onsite remediation plans, thereby providing more timely and cost-effective protection of human health and the environment. If the ash is not delisted, the schedule for meeting the AO will be greatly extended due to the requirements to obtain Resource Conservation and Recovery Act (RCRA) permits for NCBC Gulfport.

1.4 REPORT FORMAT. This document will be structured in the following manner. A brief discussion of the SAPs used in collecting the data presented in this document will be discussed along with relevant technical information, such as analytical practical quantitation levels (PQLs) and sampling techniques. The analytical results of the ash and groundwater samples will be presented separate-

ly followed by an analysis of the data as it relates to the delisting petition. To enhance the readability of the document, some data will be provided in the appendices rather than in the body of the text. The reader will be apprised of the appendix location of the data being discussed.

1.5 CERTIFICATION STATEMENT UNDER CFR 260.20. The petitioner's name, address, facility location, and USEPA identification number are unchanged from the original petition (USAF, 1989). The petitioner's interest as described in 260.20(b)(2), description for proposed action described in 260.20(b)(3), and the description of limiting factors described in 260.20(b)(4) are also unchanged from the original petition.

The person to contact for additional information is Mr. Dan Owens, Remedial Project Manager, Code 18210, Southern Division, Naval Facilities Engineering Command, 2155 Eagle Drive, North Charleston, South Carolina 29418. His phone number is (803) 820-7331.

2.0 ASH AND GROUNDWATER SAMPLING AND ANALYSIS PLAN

This chapter describes in detail the ash and groundwater SAP used to collect data to support the delisting petition.

2.1 DATA OBJECTIVES. The additional sampling agreed between the USEPA and Navy was conducted to provide supplemental information to support the delisting petition for the F028 ash piles on Area A. To obtain the necessary information for the new delisting petition, an addendum SAP was generated (ABB-ES, 1993) to guide both the ash and groundwater sampling at Area A.

2.2 ASH SAMPLING PLAN. Characterizing the ash was accomplished by collecting and analyzing composite samples from a randomly selected grid pattern that was superimposed on Area A. Sampling from a randomly selected grid pattern was selected as the best method to characterize the levels of contamination in the ash without having to sample each and every pile.

2.2.1 Ash Sampling Grid Area A, where all of the ash is currently stored, was divided into 50-by-50-foot grid nodes (Figure 2-1). The total area covered by the grid was 20 nodes (1,000 feet) by 9 nodes (450 feet) (Figure 2-2). The grids were numbered sequentially, and nine individual grids were selected using a random number generator. The largest ash pile was preselected as the tenth sampling location. An alpha-numeric grid pattern was superimposed in the field to ease identification, and the selected grid nodes were identified.

2.2.2 Analytical Program for Ash Samples The ash samples were analyzed in accordance with USEPA SW-846 methods (USEPA, 1986) and Naval Energy and Environmental Support Activity (NEESA) Level D documentation (NEESA, 1988) for dioxins and furans (USEPA Method 8290), PAH (Method 8310), and for a list of Appendix IX (USEPA, 1986) volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), pesticides and polychlorinated biphenyls (PCBs), organophosphorus pesticides, herbicides, and inorganic analytes (including total cyanide and sulfide). Appendix A is the list of Appendix IX compounds with corresponding analytical method numbers and PQLs.

2.2.3 Ash Sampling Methodology Ash samples were collected using Level B personal protective equipment. Each sample consisted of a composite of 5 to 10 subsamples collected from the selected ash grid. Two to four samples were collected just below the surface at different parts of the pile(s). The remaining three to six ash samples were collected from the interior of the ash pile(s), including near the ash and soil interface. The following steps were followed for ash sample collection:

- place plastic sheeting on the ground surface prior to laying any equipment down,
- collect first ash composite from just below surface of pile(s) with stainless-steel auger and place into compositing bowl,
- collect second composite from halfway down pile(s) and place in bowl (volatile sample collected at this time),

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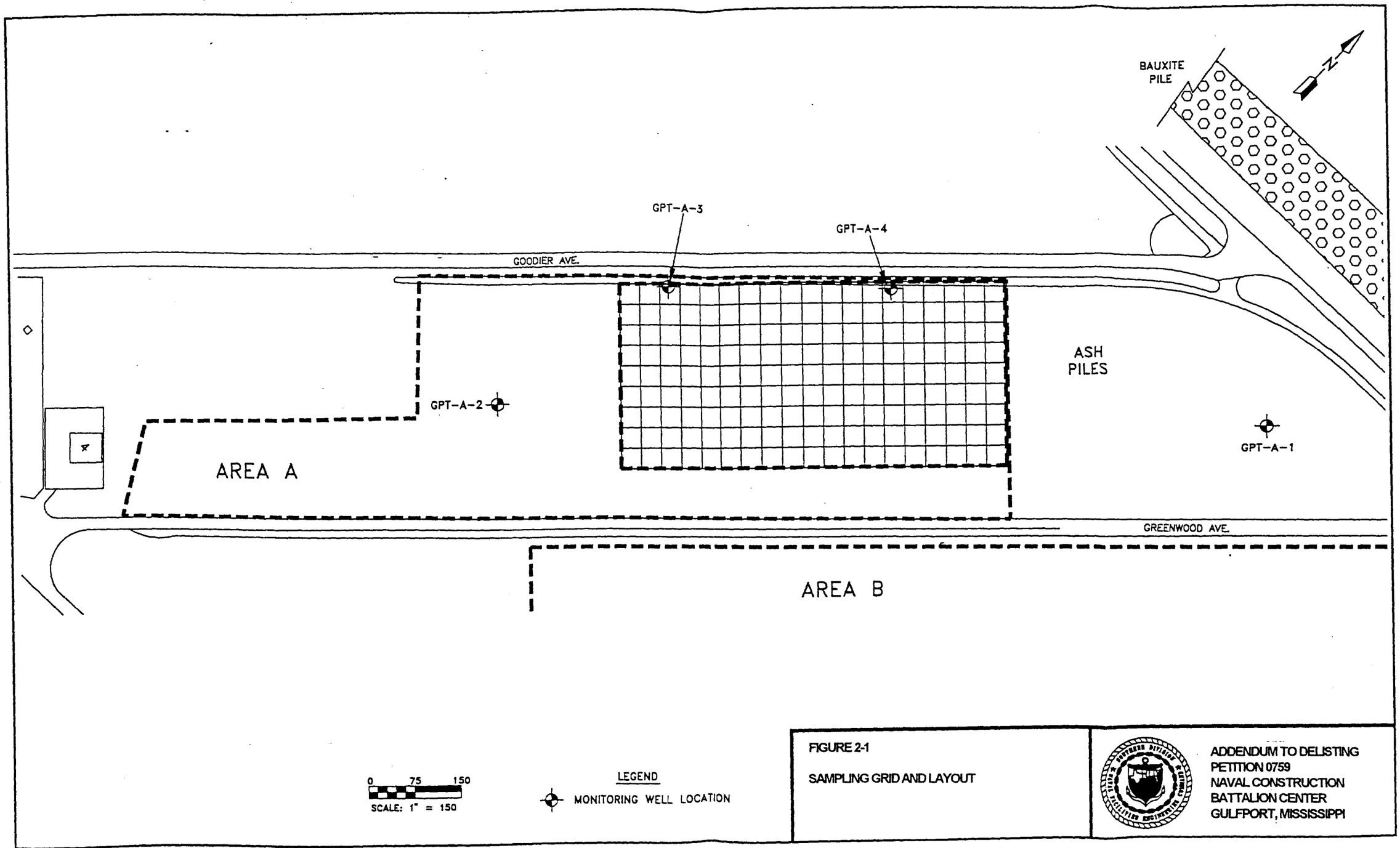

FIGURE 2-1

SAMPLING GRID AND LAYOUT

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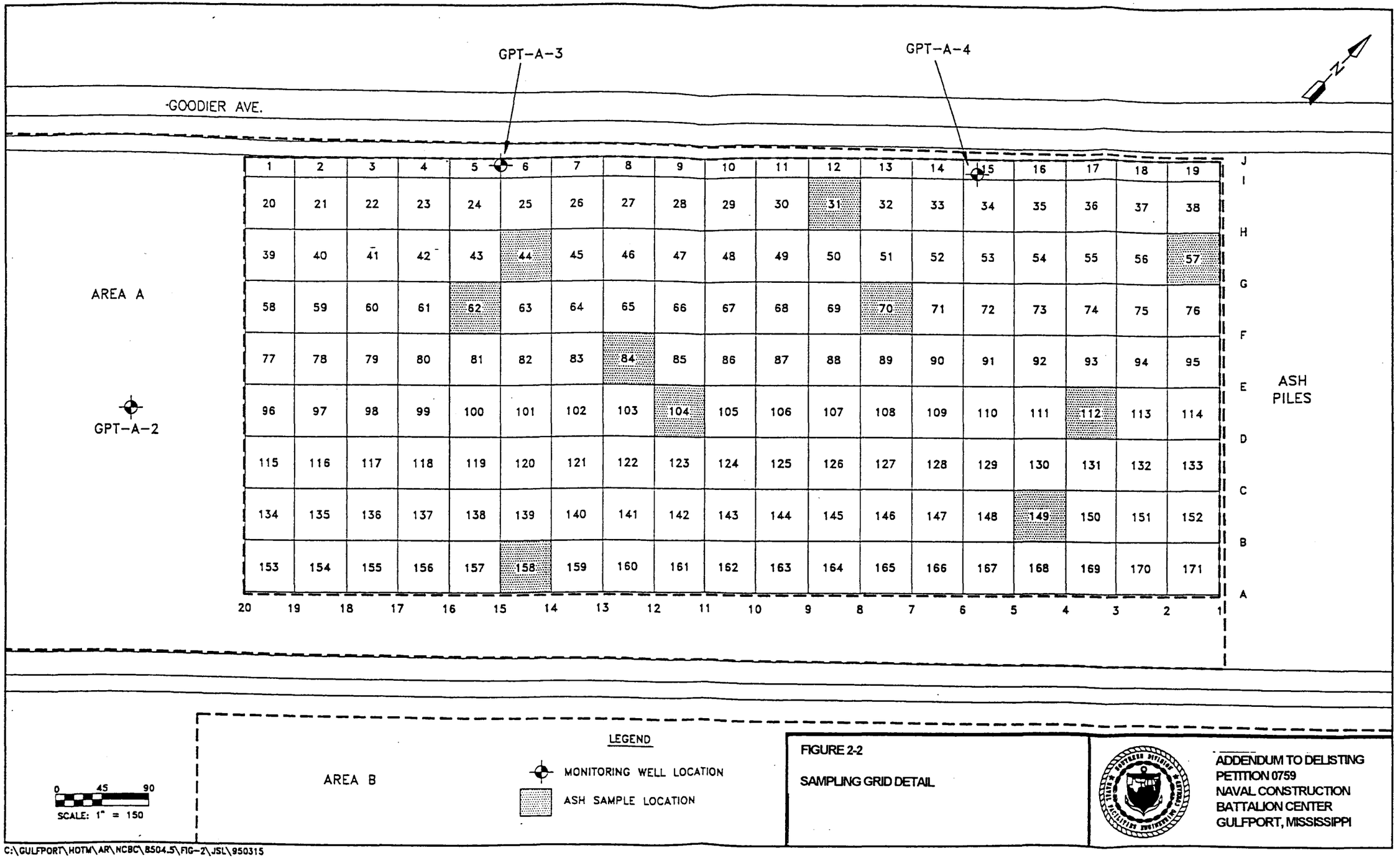

FIGURE 2-2

SAMPLING GRID DETAIL

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- continue digging down to just above ash and soil interface and collect third composite sample, and

- thoroughly composite discrete ash samples together and place the mixed sample into the appropriate sample container.

Quality assurance and quality control (QA/QC) samples were collected in accordance with the SAP (ABB-ES, 1993).

Samples collected for laboratory analysis were labeled with an identification code that indicated site, media, horizontal location, and a modifier for duplicate and matrix spike and matrix spike duplicate (MS/MSD) samples. For example, GPT-A-B14 indicated that the sample was from NCBC Gulfport (GPT), the medium was ash (A), and the horizontal location was B-14. A "D" modifier indicates a duplicate sample, while the "MS/MSD" modifier indicates the sample was collected for matrix spike analysis. Laboratory deliverables corresponded with USEPA requirements and the analytical data were systematically validated in conformance with *USEPA Functional Guidelines for Evaluating Organic Analyses* (USEPA, 1988a) and *Functional Guidelines for Evaluating Inorganic Analyses* (USEPA, 1988b). Precision, accuracy, representativeness, completeness, and comparability parameters (PARCC) were evaluated during validation of the analytical results.

2.2.4 Ash Analytical Methodology Samples were submitted to Quality Analytical Laboratories (QAL) for chemical analyses. Samples were analyzed in accordance with USEPA SW-846 methods (USEPA, 1986) and NEESA Level D documentation (NEESA, 1988) for PAH (Method 8310) and for the list of Appendix IX constituents and dioxins and furans (Method 8290). Samples were also analyzed using TCLP.

2.3 GROUNDWATER SAMPLING PLAN. As part of the delisting effort, the impact to groundwater quality was determined through the installation and sampling of four monitoring wells on and around Area A. As noted by the USEPA (USEPA, 1992a), while the analytical results of groundwater samples will be used in the delisting petition effort for the ash, it may be difficult to distinguish between groundwater impact resulting from the F028 ash and that resulting from direct contact of the groundwater with the remaining dioxin-contaminated soil left behind after the incineration.

2.3.1 Installation of Well Points and the Potentiometric Surface To assure accurate placement of the permanent monitoring wells, such that one well was upgradient and three were downgradient, eight well points were installed in February 1994 around Area A to determine the direction of groundwater flow. The well points (Figure 2-3) were surveyed, and measurements of the depth to groundwater were collected. From these observations, a potentiometric surface map (Figure 2-4) was generated, which indicates groundwater flow is to the west. All six determinations of groundwater flow since have confirmed a westerly flow.

2.3.2 Monitoring Well Installation The locations of the permanent monitoring wells were determined based on the potentiometric surface. Figure 2-5 shows the final locations of the wells and a potentiometric surface map generated after the monitoring wells were installed. The monitoring wells were constructed of 2-inch

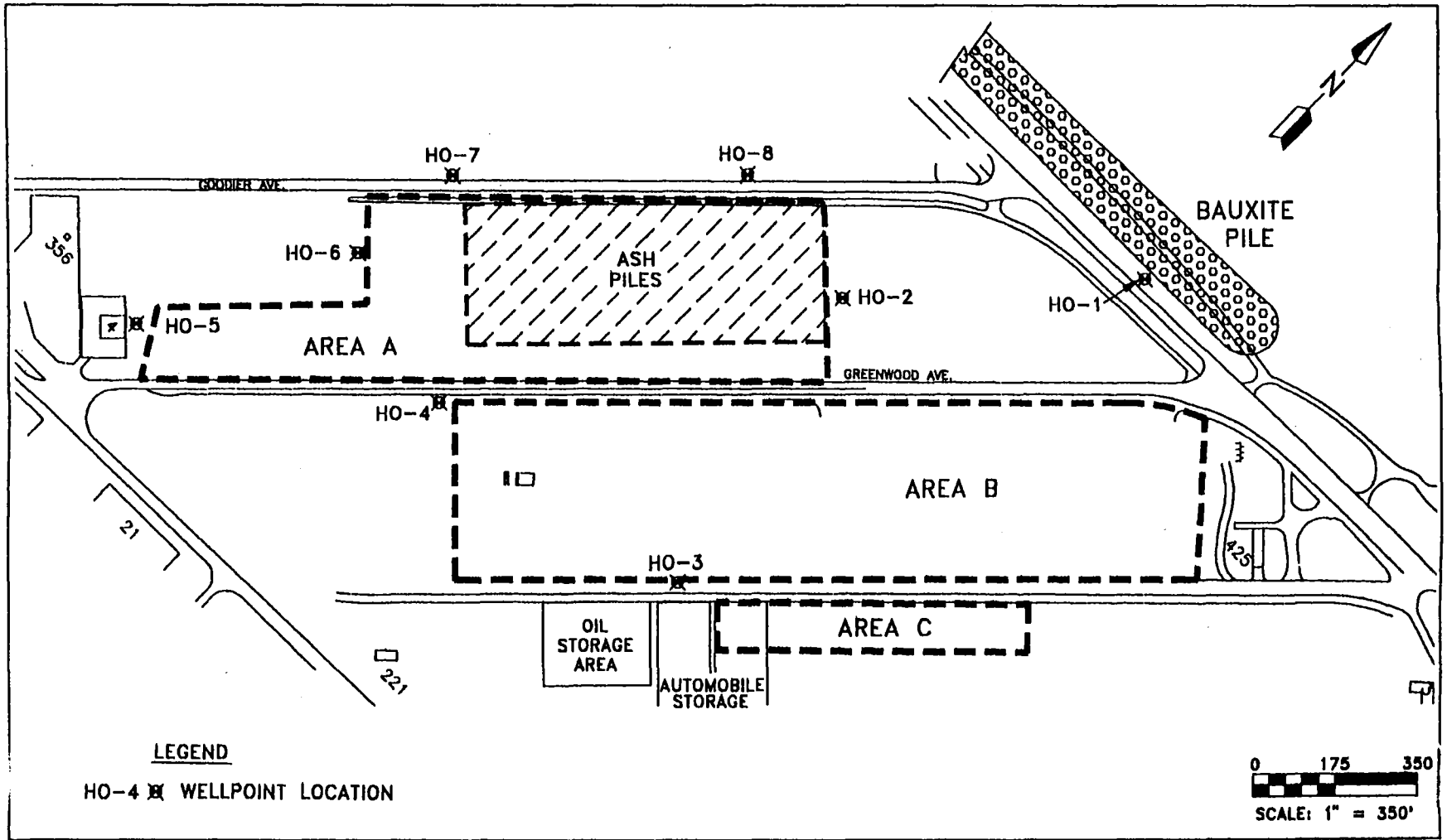

FIGURE 2-3

WELL POINT LOCATIONS

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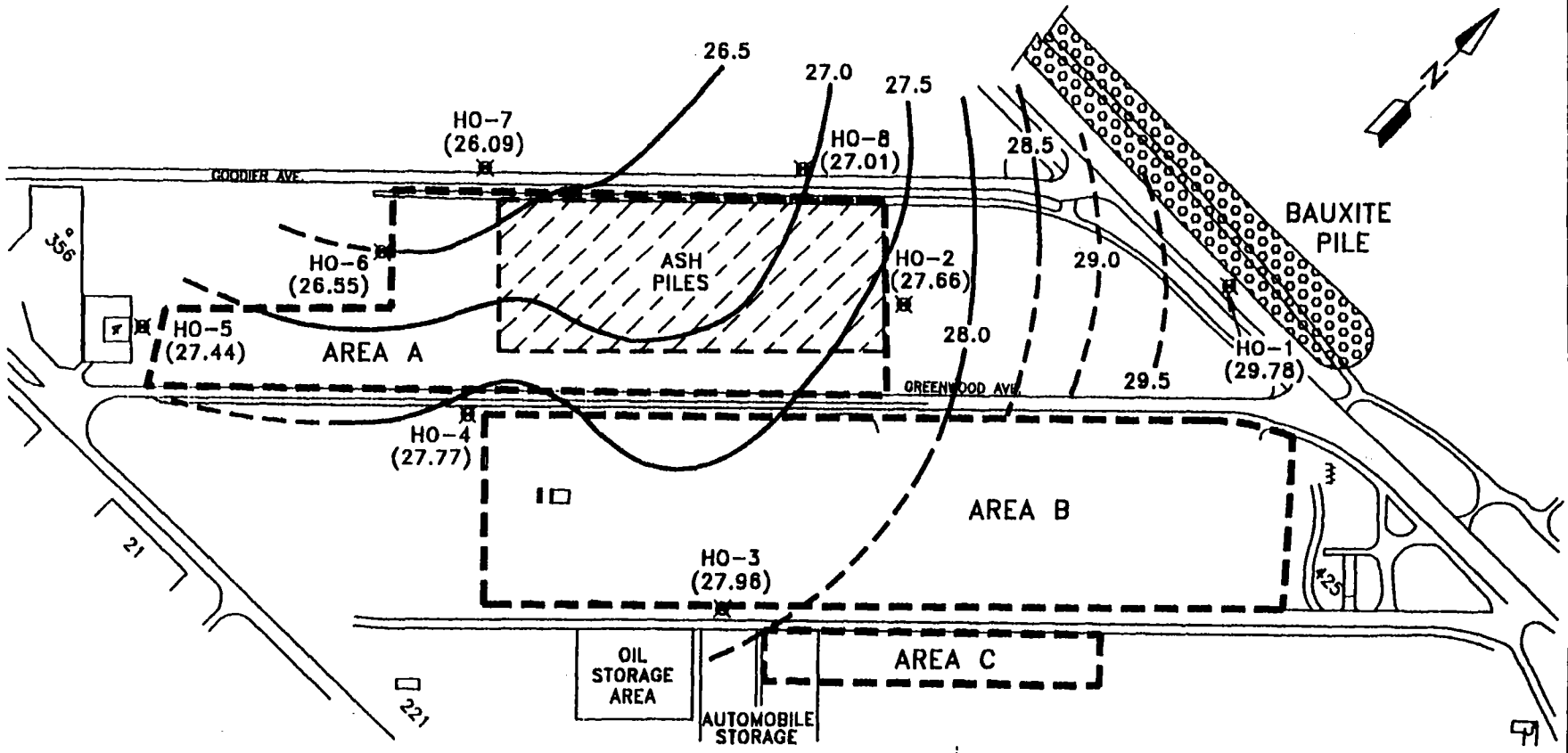
GULFPORT, MISSISSIPPI



LEGEND

HO-4 (27.77) WELLPOINT LOCATION AND GROUNDWATER ELEVATION (FEET ABOVE MEAN SEA LEVEL)

26.0 POTENTIOMETRIC CONTOUR LINE, DASHED WHERE INFERRED (0.5 FOOT INTERVAL)

FIGURE 2-4

POTENTIOMETRIC MAP FROM WELL POINTS

ADDENDUM TO DELISTING PETITION 0759
NAVAL CONSTRUCTION BATTALION CENTER
GULFPORT, MISSISSIPPI

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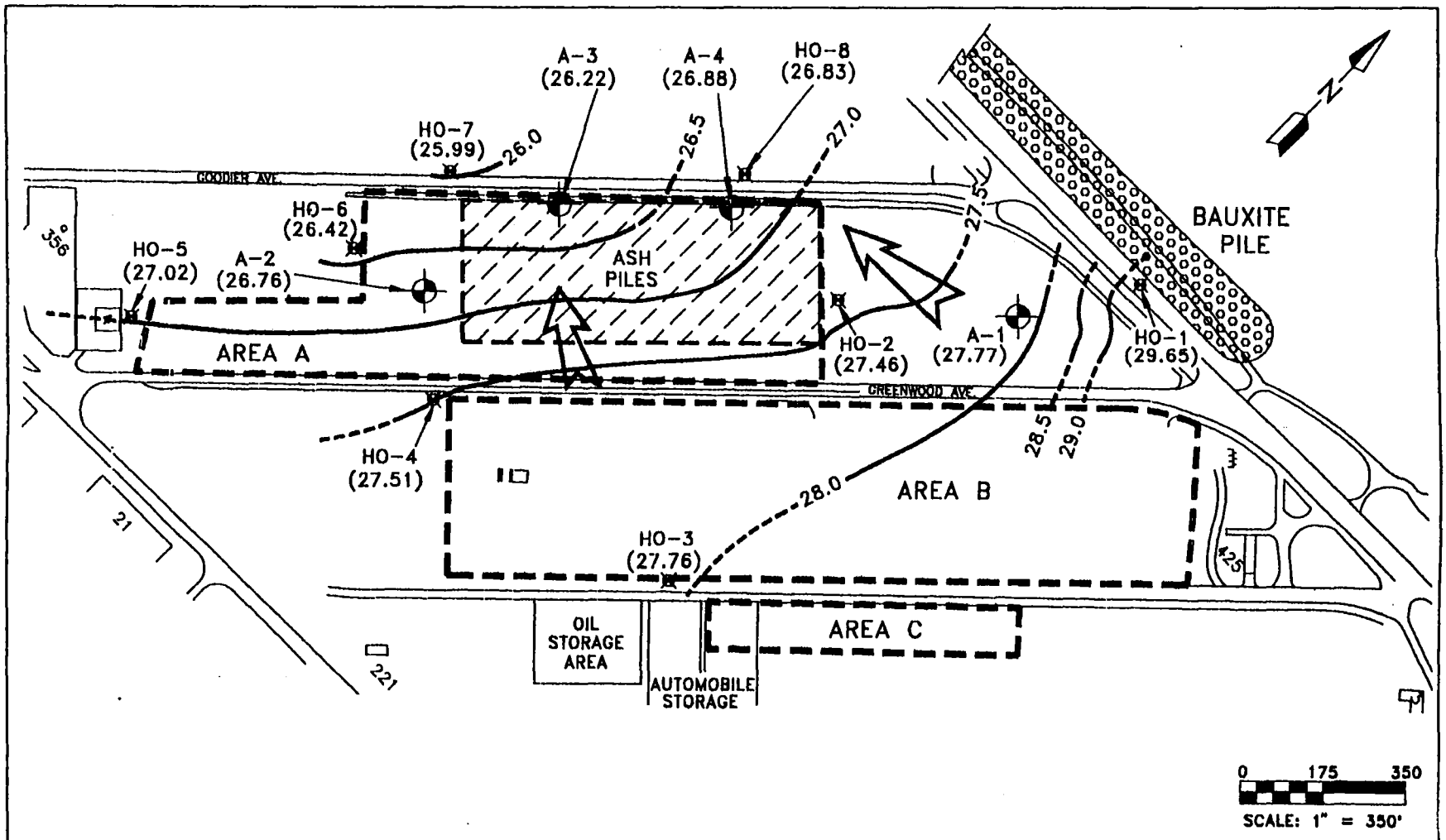

FIGURE 2-5

POTENTIOMETRIC SURFACE MAP
MAY 19, 1994

\08504-60\FIG 2-5\MLV\080696

ADDENDUM TO DELISTING
PETITION 0759

NAVAL CONSTRUCTION BATTALION CENTER
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stainless steel with 10-foot wire-wrapped screens. The total depth of the wells is approximately 12.5 feet below land surface.

2.3.3 Groundwater Sampling Methodology Groundwater samples were collected on a quarterly basis until four complete rounds of groundwater samples were analyzed and validated. Upon opening each monitoring well, the headspace was screened for VOCs using a flame ionization detector. Prior to sample collection, each well was purged of at least three well volumes. Decontaminated Teflon™ bailers were used to purge the monitoring wells and to collect samples. Field parameters for groundwater samples included pH, conductivity, and temperature.

Samples were collected within 24 hours following purging and were properly preserved, placed in coolers, and packed with bagged ice immediately after collection. All samples remained in the custody of the field operations leader until delivery to the courier service providing overnight shipment to the laboratory. Samples were shipped, complete with chain-of-custody forms, to the analytical laboratory within 24 hours for analysis. Upon arrival at the laboratory, the chain of custody and preservation of the samples were checked with the contents of each cooler by laboratory personnel. After verification, the chain-of-custody form was signed by laboratory personnel and the samples accepted for analysis.

2.3.4 Groundwater Analytical Program The groundwater samples were analyzed in accordance with USEPA SW-846 methods (USEPA, 1986) and NEESA Level D documentation (NEESA, 1988) for dioxins and furans (USEPA Method 8290), PAH (Method 8310), and for a list of Appendix IX (USEPA, 1986) VOCs, SVOCs, pesticides and PCBs, organophosphorus pesticides, herbicides, and inorganic analytes (including total cyanide and sulfide).

2.4 RESAMPLING AND ANALYSIS. The analytical program included four complete rounds of samples for each well. Laboratory data were validated and found to be identical to the ash data. Through the validation process, several data sets were rejected and required resampling and reanalysis. In each case, the rejection was the result of laboratory error and not due to incorrect field procedures. The data that required resampling included the first two rounds of groundwater and the ash for dioxin only. The ash was resampled and reanalyzed twice before the data passed validation. Whenever resampled and reanalyzed data are used, it will be indicated in both the data set and in the narrative.

3.0 ANALYTICAL RESULTS

This chapter of the document provides the analytical results of both the ash and groundwater sampling at Area A.

3.1 QUANTIFICATION OF F028 ASH VOLUME. The volume of ash was estimated on April 18, 1994. Piles were counted and categorized by size: small piles were approximately 10 cubic yards, medium piles were approximately 20 cubic yards, large piles were approximately 30 cubic yards, and piles larger than 30 cubic yards were measured independently. Several piles were also measured and their volumes calculated prior as reference values for estimating volumes. The total volume of ash was determined to be 20,000 to 23,000 cubic yards, which is approximately 67 percent of the permitted incinerated soil volume.

3.2 THE TOXIC EQUIVALENCY FACTOR APPROACH. While USEPA Method 8290 is specifically designed to detect tetra- through octa-chlorinated dioxin and furan congeners in soil and sediment, the dioxin and furan congeners of toxicologic importance are those with chlorine substitutions at molecular positions 2, 3, 7, and 8. Some of these 2,3,7,8-substituted dioxins and furans are far more toxic than others, and a simple presentation of the detected concentrations of all congeners is insufficient to adequately assess the potential toxicological effects associated with exposure to a complex mixture of these compounds (USEPA, 1989).

To address this problem, the USEPA developed a method that reasonably estimates the toxicity of each congener by assigning a toxic equivalency factor (TEF) based upon the toxicological data and structure-activity studies on the toxic mechanism of dioxin (USEPA, 1989). These studies showed 2,3,7,8-TCDD to be the most toxic of all the different congeners, and it was assigned a TEF of 1. All other 2,3,7,8-substituted congeners were less toxic and were assigned a TEF relative to TCDD. Those congeners without substitutions at molecular positions 2, 3, 7, and 8 were not considered toxic, at least in terms of carcinogenic potency, and were assigned a TEF of zero. The TEFs for the various dioxin and furan congeners are provided in Table 3-1.

Applying the TEF to the analytical results of the various dioxin and furan congeners provides an expression of an equivalent amount of 2,3,7,8-TCDD. This is termed the TCDD toxic equivalency (TEQ). For example, the TCDD TEQ for a sample with 100 picograms per gram (pg/g) of 2,3,7,8-pentachloro-p-dioxin is 50 pg/g since the TEF for congener is 0.5 ($100 \times 0.5 = 50$). This process is repeated for all 2,3,7,8-substituted dioxin and furan congeners detected in a sample, and the sum of all these values is called the total TCDD TEQ.

3.3 ASH ANALYTICAL RESULTS. The following subsections summarize the analytical program for ash samples collected at Area A. In addition, they present an assessment of data quality and useability.

3.3.1 Ash Dioxins and Furans Detected Due to laboratory error, ash samples from the grid shown on Figure 2-1 had to be recollected in February 1996. The results from the February ash sampling are shown in Table 3-2.

Table 3-1
USEPA Dioxin and Furan Toxic Equivalency Factors

Addendum to Delisting Petition 0759
Area A, Former Herbicide Orange Storage Area
Naval Construction Battalion Center
Gulfport, Mississippi

Congener	Toxic Equivalency Factor
Dioxins	
2,3,7,8-Tetrachloro-p-dibenzodioxins (TCDDs)	1
Other TCDDs	0
2,3,7,8-Pentachloro-p-dibenzodioxins (PeCDDs)	0.5
Other PeCDDs	0
2,3,4,7,8-Hexachloro-p-dibenzodioxins (HxCDDs)	0.1
Other HxCDDs	0
1,2,3,4,6,7,8-Heptachloro-p-dibenzodioxins (HpCDDs)	0.01
Other HpCDDs	0
Octachloro-p-dibenzodioxins (OCDDs)	0.001
Furans	
2,3,7,8 - Tetrachloro-p-dibenzofurans (TCDFs)	0.1
Other TCDFs	0
2,3,7,8 - Pentachloro-p-dibenzofurans (PeCDFs)	0.05
Other PeCDFs	0
2,3,7,8 - Hexachloro-p-dibenzofurans (HxCDFs)	0.1
Other HxCDFs	0
2,3,7,8 - Heptachloro-p-dibenzofurans (HpCDFs)	0.01
Other HpCDFs	0
Octachloro-p-dibenzofurans (OCDFs)	0.001

Source: Interim Procedures for Estimating Risks Associated with Exposures to Mixtures of Chlorinated Dibenzo-p-Dioxins and -Dibenzofurans and 1989 Update (USEPA, 1989).

Note: USEPA = U.S. Environmental Protection Agency.

Table 3-2
Dioxins and Furans Detected in Ash
Collected February 1996

Addendum to Delisting Petition 0759
Area A, Former Herbicide Orange Storage Area
Naval Construction Battalion Center
Gulfport, Mississippi

Analyte	GPT-HO -A14	GPT-HO -B4	GPT-HO -D3	GPT-HO -D11	GPT-HO -E12	GPT-HO -F7	GPT-HO -F7D	GPT-HO -F15	GPT-HO -G1	GPT-HO -G14	GPT-HO -H8
Dioxins											
2,3,7,8-TCDD	ND	ND	ND	ND	ND	3.96	3.38	1.15	ND	67.1	ND
1,2,3,4,6,7,8-HpCDD	MD	MD	3.72	MD	MD	ND	ND	ND	MD	53	MD
OCDD	ND	ND	19.7	ND	ND	12.5	7.23	12.3	ND	1,347	ND
Furans											
2,3,7,8-TCDF	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.37	ND
2,3,7,8-HpCDF	ND	ND	ND	ND	ND	ND	ND	ND	ND	7.54	ND
OCDF	ND	ND	ND	ND	ND	ND	ND	ND	ND	16.7	ND
TCDD TEQ	**0**	**0**	**0.057**	**0**	**0**	**3.97**	**3.39**	**1.16**	**0**	**69.30**	**0**

Notes: All concentrations are reported in nanograms per kilogram or parts per trillion.

TCDD = tetrachlorodibenzo-p-dioxin.
HpCDD = heptachlorodibenzo-p-dioxin.
OCDD = octachlorodibenzodioxin.
TCDF = tetrachlorodibenzofuran.
HpCDF = heptachlorodibenzofuran.
OCDF = octachlorodibenzofuran.
TEQ = toxicity equivalent.
ND = not detected.

TCDD was detected in samples from grid modes F-7, F-15, and G-14. The TCDD TEQs ranged from not detected to a high of 69.30 parts per trillion (ppt) in sample GPT-HO-G14.

3.3.2 Ash Organic Analytes Detected Methylene chloride and benzene were the only two VOCs detected in the ash samples. Methylene chloride was detected in samples GPT-HO-A14, GPT-HO-D3, GPT-HO-F15, GPT-HO-G14, and GPT-HO-H8 at estimated concentrations of 1 to 3 micrograms per kilogram (μg/kg). Benzene was only detected in sample GPT-HO-D3 at a concentration of 20 μg/kg. Analyses of SVOCs and organophosphorus pesticides did not result in any positive detections. Benzo(b)fluoranthene was detected in sample GPT-HO-A14 at a concentration of 5.4 μg/kg. 4,4'-Dichlorodiphenyldichloroethene and 4,4'-dichlorodiphenyltrichloroethane were detected in three samples at concentrations ranging from 1.8 to 6.0 μg/kg. The only herbicide detected was 2,4,5-trichlorophenoxyacetic acid (2,4,5-T), which was reported in sample GPT-HO-D11 at 16 μg/kg. Table 3-3 shows all organic analytes detected. Appendix B provides a summary of all data for the organic analyses.

3.3.3 Ash Inorganic Analytes Detected Lead was detected in concentrations ranging from an estimated 3.4 to 12 milligrams per kilogram (mg/kg). Sulfide was only detected in sample GPT-HO-B4 at a concentration of 29 mg/kg. Tin was detected in two samples at estimated concentrations of 2.9 and 3.5 mg/kg. Table 3-4 summarizes all of the positive detections for the inorganic analyses. Appendix B contains all of the inorganic sample results.

3.3.4 Toxicity Characteristic Leaching Procedure Analytes Detected There were no detections for TCLP analyses of SVOCs, PAHs, pesticides, PCBs, or herbicides. Benzene was detected in seven samples at estimated concentrations ranging from 5 to 22 micrograms per liter (μg/ℓ) compared to the regulatory limit of 500 μg/ℓ. Barium was the only inorganic analyte detected and it was detected in all 10 samples. Barium concentrations ranged from 0.21 to 0.62 milligrams per liter (mg/ℓ) compared to the regulatory limit of 100 mg/ℓ.

This data indicate that none of the analytes detected in the TCLP analysis exceeded regulatory limits. Therefore, the ash passes the TCLP analysis and should not be considered hazardous. Table 3-5 shows all of the detections for the TCLP analyses. Appendix B contains the complete TCLP sample results.

3.3.5 Ash Data Quality Assessment Review of the field notebook and chain-of-custody forms did not indicate any nonconformance relative to field instrument calibration or sample handling. All required field quality control (QC) samples were collected in conformance with the requirements of the USEPA and ABB-ES quality assurance plans and the June 1988 NEESA *Sampling and Chemical Analysis Quality Assurance Requirements for the Navy Installation Restoration Program* (NEESA, 1988). These field QC samples included field duplicates, equipment rinsate blanks, source water blanks, and VOC trip blanks for each VOC sample shipment.

The data review and validation of the ash were performed under subcontract to Validata Chemical Services, Norcross, Georgia, and by Heartland Environmental Services, St. Charles, Missouri. Review of analytical data indicated that the laboratory generally met applicable analytical QC criteria for all chemical analyses with the exception of dioxin and furans. All positive analytical results for dioxin and furans from the April 1994 and August 1994 sampling events

Table 3-3
Organics Detected in Ash

Addendum to Delisting Petition 0759
Area A, Former Herbicide Orange Storage Area
Naval Construction Battalion Center
Gulfport, Mississippi

Analyte	GPT-HO -A14	GPT-HO -B4	GPT-HO -D3	GPT-HO -D11	GPT-HO -E12	GPT-HO -F7	GPT-HO -F7D	GPT-HO -F15	GPT-HO -G1	GPT-HO -G14	GPT-HO -H8
Volatile Organic Compounds											
Methylene chloride	2 J	ND	1 J	ND	ND	ND	ND	3 J	ND	3 J	2 J
Benzene	ND	ND	20	ND	ND	ND	ND	ND	ND	ND	ND
Semivolatile Organic Compounds - (none detected)											
Polynuclear Aromatic Hydrocarbons											
Benzo(b)fluoranthene	5.4 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pesticides/PCBs											
4,4'-DDE	1.8	6	ND	2.3	ND	ND	ND	ND	ND	ND	ND
4,4'-DDT	ND	2.1	ND	ND	ND	ND	ND	ND	ND	ND	ND
Organophosphorus Pesticides - (none detected)											
Herbicides											
2,4,5-T	ND	ND	ND	16	ND	ND	ND	ND	ND	ND	ND

Notes: All concentrations are reported in micrograms per kilogram.

J = reported concentrations are estimated.
ND = not detected.
PCB = polychlorinated biphenyl.
4,4'-DDE = 4,4'-dichlorodiphenyldichloroethene.
4,4'-DDT = 4,4'-dichlorodiphenyltrichloroethane.
2,4,5-T = 2,4,5-trichlorophenoxyacetic acid.

Table 3-4
Inorganics Detected in Ash

Addendum to Delisting Petition 0759
Area A, Former Herbicide Orange Storage Area
Naval Construction Battalion Center
Gulfport, Mississippi

Analyte	GPT-HO -A14	GPT-HO -B4	GPT-HO -D3	GPT-HO -D11	GPT-HO -E12	GPT-HO -F7	GPT-HO -F7D	GPT-HO -F15	GPT-HO -G1	GPT-HO -G14	GPT-HO -H8
Arsenic	6.1 J	6.3 J	6.7 J	4.4 J	8.0 J	5.6 J	3.6 J	3.3 J	6.4 J	5.3 J	4.0 J
Barium	38.0 J	29.3 J	31.7 J	26.3 J	32.4 J	20.6 J	19.3 J	26.8 J	34.6 J	25.7 J	47.8 J
Beryllium	0.34 J	ND	ND	ND	ND	ND	ND	0.12 J	0.13 J	ND	0.17 J
Chromium	8.7	7.0	8.7	10.3	6.2	5.3	5.3	8.9	10.1	7.6	10.5
Cobalt	0.83 J	ND	0.80 J	0.75 J	ND	ND	ND	1.1 J	ND	0.81 J	ND
Copper	3.5 J	3.8 J	4.7 J	2.4 J	2.7 J	2.6 J	1.9 J	3.1 J	5.2 J	3.6 J	3.2 J
Lead	8.7 J	5.9 J	7.9 J	9.1 J	12.0 J	5.0 J	3.4 J	5.6 J	7.1 J	7.7 J	8.4 J
Mercury	0.04 J	ND	0.04 J	ND	0.04 J	0.03 J	ND	0.03 J	ND	0.03 J	ND
Nickel	ND	2.5 J	ND	3.5 J	2.3 J	2.5 J	ND	ND	3.7 J	ND	3.4 J
Selenium	0.16 J	0.25 J	0.17 J	0.13 J	0.29 J	0.17 J	0.19 J	0.24 J	0.27 J	0.14 J	ND
Tin	ND	ND	ND	2.9 J	3.5 J	ND	ND	ND	ND	ND	ND
Vanadium	19.3	12.8 J	14.2	14.5	12.0	9.5 J	9.2 J	14.5	15.8	12.0	16.9
Zinc	19.0	11.6	15.6	18.8	27.3	11.2	10.5	13.2	13.5	20.3	36.0
Sulfide	ND	29	ND	ND	ND	ND	ND	ND	ND	ND	ND

Notes: All concentrations are reported in milligrams per kilogram.

J = reported concentrations are estimated.
ND = not detected.

Table 3-5
Analytes Detected in Toxicity Characteristic Leaching Procedures from Ash

Addendum to Delisting Petition 0759
Area A, Former Herbicide Orange Storage Area
Naval Construction Battalion Center
Gulfport, Mississippi

Analyte	GPT-HO -A14	GPT-HO -B4	GPT-HO -D3	GPT-HO -D11	GPT-HO -E12	GPT-HO -F7	GPT-HO -F7D	GPT-HO -F15	GPT-HO -G1	GPT-HO -G14	GPT-HO -H8
Dioxin and Furan (pg/ℓ)											
	2.55					ND					
Volatile Organic Compound (μg/ℓ)											
Benzene	19 J	5 J	17 J	ND	ND	ND	ND	5 J	9 J	22 J	9 J
Semivolatile Organic Compounds - (none detected)											
Polynuclear Aromatic Hydrocarbons - (none detected)											
Pesticides/PCBs - (none detected)											
Herbicides - (none detected)											
Inorganic (mg/ℓ)											
Barium	0.21	0.25	0.24	0.27	0.35	0.62	0.36	0.38	0.32	0.28	0.37

Notes:
pg/ℓ = picograms per liter.
ND = not detected.
μg/ℓ = micrograms per liter.
J = reported concentrations are estimated.
PCB = polychlorinated biphenyl.
mg/ℓ = milligrams per liter.

were rejected and all nondetected results were estimated because of deviations from USEPA Method 8290. The February 1996 dioxin and furan data did meet all applicable analytical QC criteria.

The analytical results for environmental samples were evaluated and validated according to NEESA Level D QC criteria to determine data quality and useability. The full PARCCs report is provided in Appendix C.

Precision. Precision of the ash matrix was acceptable based on the assessment of duplicate precision criteria except for a few minor exceptions. The VOC, SVOC, PAH, pesticide, ketone, and herbicide compounds were totally (100 percent) compliant with functional QC guidelines. The MS/MSD for octachlorodibenzofuran exhibited noncompliant relative percent difference (RPD). The precision for the inorganic analytes was acceptable.

Accuracy. Accuracy criteria were met for all data with the following exceptions: the relative response factors for isobutanol and 1,4-dioxane exceeded QC limits. For these compounds, all nondetect results were rejected and positive results were qualified as estimated. Nine surrogate spikes for pesticides and PCBs exceeded QC limits and the associated data qualified as estimated. The accuracy of the ash matrix analytical data was acceptable for each fraction.

Representativeness. Five VOCs were detected in the field blanks and three VOCs were detected in the trip blank; associated analytical results were qualified as appropriate. N-nitrosodiphenylamine was detected in a method blank for the SVOCs, and the associated data was qualified as needed. Barium and lead were detected in preparation blanks, and barium and zinc were detected in the potable water sample. However, no qualification of the data was necessary. Representativeness of the project data is considered acceptable after qualification for blank contamination.

Comparability. Comparability is the qualitative measure designed to express confidence with which one data set may be compared to another. The comparability of the project data is regarded as acceptable.

Completeness. Overall, the analytical data met the completeness goal of 85 percent for every fraction.

3.3.6 Rejection of Dioxin and Furan Data All positive dioxin and furan detections from the April 1994 and August 1994 sampling event were rejected and all nondetects were qualified as estimated because of laboratory deviations from USEPA Method 8290. These deviations included not performing gas chromatograph column performance checks, mass resolution check, mass verification checks, and calibration verification checks at the end of each 12-hour run. According to the method, these deviations invalidate all positive sample data performed during each 12-hour period for which the checks were not performed. Additionally, the instrument's total cycle time exceeded the method limit of 1.0 second. Ion abundance ratios were also outside the QC limits. These issues required the ash to be resampled for a third time in February 1996. The results from the February 1996 samples met all QC criteria.

3.4 GROUNDWATER ANALYTICAL RESULTS. The following subsections summarize the analytical program for groundwater samples collected at Area A. In addition, it presents an assessment of data quality and useability.

3.4.1 Groundwater Sampling Rounds This subsection presents the analytical results of all six rounds of groundwater collected at Area A. Originally, only four quarterly rounds were scheduled, but rejection of dioxin data from the first two rounds (May and August 1994) necessitated the additional two rounds (May and August 1995). The final two sampling events included only the collection of samples for dioxins and furans to fill in the data gap resulting from the first two rounds of rejected dioxin data. Groundwater sampling was performed on May 17, 1994; August 13, 1994; November 18, 1994; February 15, 1995; May 19, 1995; and August 15, 1995.

Laboratory services for the first two sampling events were provided by QAL. Laboratory services for the third and fourth sampling events were provided by Quanterra Environmental Services (Quanterra). Both QAL and Quanterra provided analytical data for the fifth event, and QAL provided services for the last event. NEESA Level D data quality objectives and deliverables were specified for the analytical programs (NEESA, 1988).

3.4.2 Dioxin and Furans Detected in Groundwater Samples Dioxins and furans were sampled in quarterly intervals May 1994 through August 1995. The analytical results of the first two rounds (May and August 1994) of groundwater sampling were rejected during data validation due to a lack of conformance to USEPA Method 8290 by the analytical laboratories. The subsequent four rounds of groundwater sampling (November 1994 through August 1995) were conducted in strict accordance with USEPA Method 8290 and are presented in support of the delisting petition. The full groundwater dioxin and furan analytical results are provided in Appendix D.

As shown in Table 3-6, only four 2,3,7,8-substituted chlorinated dioxins were detected in the groundwater at Site 8: 2,3,7,8-TCDD, 1,2,3,7,8,9-hexachlorodibenzo-p-dioxin, 1,2,3,4,6,7,8-heptachlorodibenzo-p-dioxin, and octachlorodibenzo-p-dioxin (OCDD). No furans were detected in the groundwater at Area A and only OCDD was consistently detected in all of the groundwater monitoring wells. However, both the congeners identified and their detected concentrations in the remaining three wells were widely divergent both with respect to sample location and sampling date.

The highest concentration of all the dioxins detected in the groundwater at Area A were found in monitoring well GPT-A-2. This well was also the only one found to have TCDD TEQs in excess of the TCDD maximum concentration limit (MCL). However, this finding was not consistent throughout the four rounds of groundwater monitoring as demonstrated in Table 3-6.

Table 3-6 shows the results of the groundwater sampling event (May 1995) in which inter-laboratory analytical variability was evaluated using split samples submitted to two different laboratories. The data indicate considerable inter-laboratory variability both between split samples and between duplicate samples. In the monitoring well with the highest dioxin concentrations, GPT-A-2, the results indicated that inter-laboratory variability was sufficiently great, even with samples that passed data validation, that it was difficult to conclusively determine whether or not the TCDD concentrations detected were greater than the MCL. The duplicate samples sent to Quanterra indicated that the TCDD TEQ level

Table 3-6
Dioxins and Furans Detected in Groundwater Monitoring Wells

Addendum to Delisting Petition 0759
Area A, Former Herbicide Orange Storage Area
Naval Construction Battalion Center
Gulfport, Mississippi

Well ID	Analyte	November 1994	February 1995	May 1995[1]		August 1995
				Quanterra	QAL	
GPT-A-1						
	2,3,7,8-Tetrachlorodibenzo-p-dioxin	ND	ND	ND	ND	ND
	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	ND	ND	ND	ND	ND
	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	ND	ND	ND	ND	ND
	Octachlorodibenzo-p-dioxin	560	240	520	63.6	110
	TCDD TEQ	0.56	0.24	0.52	0.06	0.11
GPT-A-2						
	2,3,7,8-Tetrachlorodibenzo-p-dioxin	18	11 J	56	31.8	ND
	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	ND	ND	ND	ND	ND
	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	110	110	110	30.1	ND
	Octachlorodibenzo-p-dioxin	3,500 J	1,300	2,900 J	468	147
	TCDD TEQ	22.6	13.4	60	32.6	0.15
GPT-A-2D						
	2,3,7,8-Tetrachlorodibenzo-p-dioxin	---	27	17	45.2	ND
	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	---	ND	ND	ND	ND
	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	---	86	ND	36.8	ND
	Octachlorodibenzo-p-dioxin	---	2,500	670	620	112
	TCDD TEQ	---	30.4	17.7	46.2	0.11
GPT-A-3						
	2,3,7,8-Tetrachlorodibenzo-p-dioxin	ND	6.2 J	ND	ND	ND
	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	ND	ND	ND	ND	ND
	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	90	110	47	ND	185
	Octachlorodibenzo-p-dioxin	1,700	1,800	840	153	783
	TCDD TEQ	2.6	9.1	1.3	0.15	2.6
GPT-A-4						
	2,3,7,8-Tetrachlorodibenzo-p-dioxin	ND	ND	ND	ND	ND
	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	58	63	ND	ND	ND
	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	260	280	130	30.2	ND
	Octachlorodibenzo-p-dioxin	5,000 J	5,200	2,800	343	298
	TCDD TEQ	13.4	14.3	4.1	0.64	0.30

[1] Split samples sent to different analytical laboratories.

Notes: All concentrations are reported in picograms per gram or parts per quadrillion.

ID = identification.
Quanterra = Quanterra Environmental Services.
QAL = Quality Analytical Laboratories.
ND = not detected.
TCDD = 2,3,7,8-tetrachloro-p-dibenzodioxin.
TEQ = toxicity equivalents.
J = reported concentrations are estimated.
--- = a duplicate sample was collected from a different well during this period.

in one sample collected from GPT-A-2 was twice the MCL while the TCDD TEQ in its duplicate sample, GPT-A-2D, was well below the MCL. The split samples sent to QAL indicated that both the sample and its duplicate were above the MCL; however, neither of the reported dioxin concentrations were comparable to those from Quanterra.

3.4.3 Organic and Inorganic Analytes Detected in Groundwater Tables 3-7 through 3-10 provide the analytical results of the groundwater samples collected at Area A. As noted in Subsection 3.4.1, the analytical results of the first four rounds of groundwater sampling were not rejected by data validation, and the groundwater for the final two rounds of sampling were not analyzed for either organics or inorganics. The entire data set for groundwater is provided in Appendix D.

Organic analytes were intermittently detected in all four groundwater monitoring wells at Area A. No clear pattern was discernable from the data, and there was no evidence that the groundwater had been adversely impacted by organic analytes from the F028 ash on the site. The only organic analyte detected in both the ash and the groundwater was 2,4,5-T. However, this analyte was not detected in the TCLP extracts of the ash, indicating that the source of this analyte is probably not the ash but the herbicide orange-contaminated soil, containing significant levels of 2,4,5-T, under the F028 ash.

As expected, a number of inorganic analytes were detected in the groundwater samples collected at Area A. Many of the same analytes detected in the ash were also detected in the groundwater; however, the only inorganic analyte detected in the TCLP extract, barium, was detected in either higher or comparable concentrations in the upgradient well as the downgradient wells. This indicates that the barium detected in the wells is not related to the ash but is either related to the soil under the ash or, more likely since barium is not a component of herbicide orange, due to natural background conditions.

3.4.4 Groundwater Data Quality Assessment Review of the field notebook and chain-of-custody forms did not indicate any nonconformance relative to field instrument calibration or sample handling. All required field QC samples were collected in conformance with the requirements of the USEPA and ABB-ES quality assurance plans and the June 1988 NEESA *Sampling and Chemical Analysis Quality Assurance Requirements for the Navy Installation Restoration Program* (NEESA, 1988). These field QC samples included field duplicates, equipment rinsate blanks, source water blanks, and VOC trip blanks for each VOC sample shipment.

The analytical results for environmental samples were evaluated and validated according to NEESA Level D QC criteria to determine data quality and useability. The data tables included in Appendix D reflect validation according to Level D criteria. The following subsections discuss analytical performance and the evaluation of field and laboratory QC samples, except the rejected dioxin and furan samples from the first two rounds, which are discussed in Subsection 3.4.5.

Precision. Precision was met for all groundwater data with a few minor exceptions. Naphthalene exhibited noncompliant RPDs for the third sampling event; however, the data were not qualified and are considered useable. The fourth round had noncompliant RPDs for xylene, zinc, and copper. Seven dioxin and furan congeners had noncompliant RPD due to high sample turbidity, which required qualification as estimated for some fractions. The fifth round had noncompliant

Table 3-7
Analytes Detected in Groundwater Monitoring Well GPT-A-1

Addendum to Delisting Petition 0759
Area A, Former Herbicide Orange Storage Area
Naval Construction Battalion Center
Gulfport, Mississippi

Analyte	May 1994	August 1994	November 1994	February 1995
Volatile Organic Compounds (none detected)				
Semivolatile Organic Compound (μg/ℓ)				
bis(2-Ethylhexyl)phthalate	ND	ND	3 J	ND
Polynuclear Aromatic Hydrocarbons (none detected)				
Pesticides and PCBs (none detected)				
Organophosphorus Pesticides (none detected)				
Herbicides (none detected)				
Inorganics (mg/ℓ)				
Antimony	ND	ND	3.2 J	3.0 J
Arsenic	19.2 J	24.3	25.2 J	17.6
Barium	166 J	218	184 J	147 J
Beryllium	1.2 J	1.7 J	ND	ND
Cadmium	ND	1.3 J	ND	ND
Chromium	26.6	58	48	35.6
Cobalt	12.1 J	15.9 J	11.6 J	8.8 J
Copper	ND	25.2	11.2 J	10.9 J
Lead	19.8 J	23.2	19.3	11.6
Mercury	0.10 J	0.12 J	ND	ND
Nickel	37.0 J	38.7 J	31.4 J	22.7 J
Selenium	ND	2.4 J	4.1 J	ND
Silver	3.4 J	ND	ND	ND
Sulfide	1,000	ND	ND	ND
Vanadium	49.1 J	63.7	8.8 J	43.7 J
Zinc	87.9	67.7 J	72.5 J	54.8

Notes: μg/ℓ = micrograms per liter.
ND = not detected.
J = estimated value.
PCB = polychlorinated biphenyl.
mg/ℓ = milligrams per liter.

Table 3-8
Analytes Detected in Groundwater Monitoring Well GPT-A-2

Addendum to Delisting Petition 0759
Area A, Former Herbicide Orange Storage Area
Naval Construction Battalion Center
Gulfport, Mississippi

Analyte	May 1994	August 1994	November 1994	February 1994
Volatile Organic Compounds (μg/ℓ)				
Toluene	ND	ND	ND	4 J
Xylenes (total)	ND	ND	ND	7
Semivolatile Organic Compounds (none detected)				
Polynuclear Aromatic Hydrocarbons (none detected)				
Pesticides and PCBs (none detected)				
Organophosphorus Pesticides (none detected)				
Herbicides (μg/ℓ)				
2,4,5-T	ND	1.5	1.2	ND
2,4,5-TP	3.5	ND	0.33	ND
Inorganics (mg/ℓ)				
Arsenic	9.2 J	10.7	19.6 J	11.7
Barium	123 J	113 J	116 J	64.1 J
Beryllium	1.2 J	1.3 J	1.0 J	ND
Chromium	30.7	7.4 J	51.3	16.2
Cobalt	5.2 J	ND	5.0 J	3.4 J
Copper	ND	4.0 J	20.5 J	4.8 J
Cyanide	1.0 J	ND	ND	ND
Lead	14.3 J	5.7	15.1	4.9
Mercury	0.24	ND	0.23	ND
Nickel	23.0 J	ND	21.2 J	7.3 J
Selenium	1.4 J	0.68 J	ND	ND
Sulfide	ND	ND	ND	1,000 J
Vanadium	42.6 J	37.4 J	43.7 J	23.1 J
Zinc	42.9	22.3 J	46.2 J	26.2

Notes: μg/ℓ = micrograms per liter.
ND = not detected.
J = estimated value.
PCB = polychlorinated biphenyl.
2,4,5-T = (2,4,5-trichlorophenoxy)acetic acid.
2,4,5-TP = (2,4,5-trichlorophenoxy)propionic acid.
mg/ℓ = milligrams per liter.

Table 3-9
Analytes Detected in Groundwater Monitoring Well GPT-A-3

Addendum to Delisting Petition 0759
Area A, Former Herbicide Orange Storage Area
Naval Construction Battalion Center
Gulfport, Mississippi

Analyte	May 1994	August 1994	November 1994	February 1995
Volatile Organic Compounds (μg/ℓ)				
Acetone	ND	9 J	ND	ND
Carbon disulfide	2 J	ND	ND	ND
Trichlorofluoromethane	ND	1 J	ND	ND
Semivolatile Organic Compounds (μg/ℓ)				
Phenol	53	ND	2 J	0.9 J
2-Chlorophenol	10 J	4 J	1 J	0.9 J
4-Methylphenol	8 J	4 J	ND	1 J
Benzoic acid	13 J	ND	ND	ND
2,4-Dichlorophenol	8 J	4 J	0.80 J	1 J
Naphthalene	430	ND	14	23
2,4,5-Trichlorophenol	8 J	ND	ND	ND
bis(2-Ethylhexyl)phthalate	38	ND	ND	ND
Polynuclear Aromatic Hydrocarbons (none detected)				
Pesticides and PCBs (none detected)				
Organophosphorus Pesticides (none detected)				
Herbicides (μg/ℓ)				
2,4,5-T	2.7	1.3	---	ND
2,4,5-TP	ND	ND	---	1.7
Inorganics (mg/ℓ)				
Antimony	ND	ND	ND	3.3 J
Arsenic	35.4 J	18.8	35.6 J	45.5
Barium	174 J	106 J	114 J	103 J
Beryllium	5.5	3.1 J	2.3 J	ND
Chromium	83.5	45.8	104	82.4
Cobalt	30.1 J	11.1 J	18.8 J	19.4 J
Copper	ND	22.9 J	25.5	21.9 J
Cyanide	255 J	ND	ND	ND
Lead	28.4 J	19.7	37	34.4
Mercury	0.51	ND	0.28	0.48
Nickel	79.2	23.5 J	39.4 J	30.6 J
Selenium	8.4 J	6.0 J	13.3 J	16.5
Sulfide	9,300	ND	1,000	18,000 J
Vanadium	153	88.1	130	129
Zinc	41.1	23.2 J	37.0 J	45.3

Notes: μg/ℓ = micrograms per liter.
ND = not detected.
J = estimated value.
PCB = polychlorinated biphenyl.
2,4,5-T = (2,4,5-trichlorophenoxy)acetic acid.
2,4,5-TP = (2,4,5-trichlorophenoxy)propionic acid.
mg/ℓ = milligrams per liter.
--- = no data.

Table 3-10
Analytes Detected in Groundwater Monitoring Well GPT-A-4

Addendum to Delisting Petition 0759
Area A, Former Herbicide Orange Storage Area
Naval Construction Battalion Center
Gulfport, Mississippi

Analyte	May 1994	August 1994	November 1994	February 1995
Volatile Organic Compound (μg/ℓ)				
Acetone	ND	11	ND	ND
Semivolatile Organic Compound (μg/ℓ)				
Diethylphthalate	ND	0.90 J	0.90 J	ND
Polynuclear Aromatic Hydrocarbons (none detected)				
Pesticides and PCBs (none detected)				
Organophosphorus Pesticides (none detected)				
Herbicides (none detected)				
Inorganics (mg/ℓ)				
Antimony	ND	15.0 J	ND	2.2 J
Arsenic	12.7 J	28.0 J	14.3 J	23.9
Barium	238	473	152 J	167 J
Beryllium	1.4 J	2.8 J	ND	ND
Cadmium	ND	3.2 J	ND	ND
Chromium	81.0	189	85.3	68.4
Cobalt	12.9 J	26.6 J	10.6 J	11.1 J
Copper	ND	59.4	19.1 J	19.4 J
Cyanide	51.2 J	ND	ND	ND
Lead	36.8 J	67.9	29.3	34.6
Mercury	0.50	ND	0.32	0.56
Nickel	35.0 J	78.4	37.0 J	28.1 J
Selenium	13.9 J	ND	6.3 J	9.1
Silver	ND	20.8 J	ND	ND
Sulfide	9,200	14,000	1,000	27,000 J
Thallium	ND	ND	7.0 J	ND
Vanadium	122	240	95.5	108
Zinc	24.9	58.7 J	54.2 J	41.9

Notes: μg/ℓ = micrograms per liter.
ND = not detected.
J = estimated value.
PCB = polychlorinated biphenyl.
mg/ℓ = milligrams per liter.

RPDs for eight dioxin congeners and one OCDD sample required qualification as estimated. The sixth round of groundwater sampling was in compliance for all fractions.

Accuracy. Accuracy criteria was met for the first sampling event with a few exceptions. The MS/MSD exhibited noncompliance for arsenic, selenium, thallium, and cyanide, which qualified the positive and undetected results as estimated. The MS/MSD exhibited noncompliance for lead, which also caused the undetected results to be rejected and the positive results to be estimated.

Accuracy criteria was met for the second sampling event with the following exceptions. The MS/MSD exhibited noncompliance for benzo(k)fluoranthene, benzo(a)-pyrene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, benzo(g,h,i)perlyene, and selenium, which qualified the positive and undetected results as estimated. Twenty-five SVOC data points in the potable field blank were rejected because the surrogate compound d_5-phenol was recovered at less than 10 percent.

The MS/MSD for the third sampling event (MS/MSD) exhibited noncompliance for pyrene, thionazin, phorate, methylparathion, parathion, dinoseb, and selenium. Dinoseb and selenium were qualified as estimated. Surrogate recoveries for pesticides and PCBs were below QC limits and the field samples were qualified as estimated. Internal standard recoveries for OCDD were unacceptable, and the associated data were qualified as estimated. The accuracy of the groundwater matrix analytical data was acceptable for each fraction.

The fourth round had slightly noncompliant percent recoveries for several fractions that did not require qualification. Several other fractions exhibited recoveries below QC limits that required qualification. The cyanide fraction had zero percent recovery from an MS/MSD analyzed and all positive results were qualified as estimated and all nondetect results were rejected.

In the fifth round, all eight congeners detected had noncompliant percent recovery for the internal standard ^{13}C-OCDD, which requires that all positive results for OCDD be qualified as estimated. The sixth round exhibited compliance for all fractions.

Representativeness. Representativeness of the analytical data was assessed and corrective action was taken when necessary. The representativeness for the first groundwater sampling event was acceptable with a few qualifications. The field blank exhibited some laboratory contamination. Holding times were met with the exception of the SVOCs, PAHs, and organophosphorus pesticides. Exceeding the holding times did not require any data to be rejected, only estimated.

The representativeness for the second sampling event was acceptable with a few qualifications. Holding times were met with the exception of the dioxin and furans, and a few re-extracted and reanalyzed SVOCs, organophosphorus pesticides, and PAHs. All re-extracted and reanalyzed samples were rejected in favor of the original analysis.

Acetone was detected in the trip blank and equipment rinsate blank for the third sampling event. Positive results for acetone were appropriately qualified. Methylene chloride and barium were detected in the field blank. Zinc, tin, chromium, lead, and arsenic were detected in the method blanks; data were

appropriately qualified. The assessment of the method blank for representativeness was acceptable even though some of the analytical results required qualification. Holding times were met for all fractions analyzed for the third sampling event.

Acetone was detected in field blanks and rinsate blanks in the fourth round. The acetone was likely the result of laboratory contamination; some samples required qualification as estimated. Methylene chloride and di-n-octylphlate were detected in the method blank requiring some results to be qualified. The representativeness of the fifth and sixth rounds were acceptable for all fractions.

Comparability. Comparability is the qualitative measure designed to express the confidence with which one data set may be compared to another. The analytical samples were collected and transported to the chemical analytical laboratory in accordance with standard procedures and were analyzed in conformance with acceptable USEPA procedures.

Completeness. The analytical data from the first sampling event met the completeness goal of 85 percent for every fraction with the exceptions of pesticides, PCBs and herbicides. The analytical data for the second and third sampling events met the completeness goal of 85 percent for every fraction. The fourth groundwater sampling event met completeness goals except for cyanide due to low recoveries with the matrix spike. The fifth and sixth rounds met all completeness criteria. Appendix E contains the complete PARCCs report for each of the groundwater sampling events.

3.4.5 Rejection of Dioxin Data Dioxin data for the first two rounds were rejected based on the findings summarized in Subsection 3.4.2. The data collected in rounds five and six were needed to complete the four quarterly rounds required in the USEPA-approved SAP.

4.0 DATA ANALYSIS SUPPORTING DELISTING

The delisting of the F028 ash is part of an overall site remediation plan that will remove some of the potentially burdensome requirements of dealing with a listed waste. In accordance with 40 CFR 260.22(d), the following section will make the demonstration for exclusion from Part 261 Subpart D, for the F028 ash at Site A. Provided that the delisted ash not leave the site and that the requirements for dealing with the ash are fully considered as part of the overall remediation process at Site A, the F028 ash should be delisted.

4.1 EVALUATION OF THE HAZARDOUS WASTE LISTING CRITERIA. The F028 ash is a listed hazardous waste because of the possible presence of polychlorinated-p-dibenzodioxins and dibenzofurans as listed in 40 CFR 261.31 and Appendix VII of 40 CFR 261. Under Section 261.31, F028 waste is given a waste code of "T," indicating that the waste is considered toxic. Under the 260.22(d)(1) requirements for delisting waste code "T" wastes, a petition must demonstrate that the waste no longer contains the constituents listed in Appendix VII of 261. If the waste contains one or more of the constituents listed in Appendix VII of 261, under 260.22(d)(3) it must be demonstrated that the waste does not meet any of the criteria described in 261.11(a)(3). If this criterion is met, then the petition must demonstrate that the waste does not exhibit any of the characteristics defined in 261.21, 261.22, 261.23, or 261.24. If all of these criteria are met, the petitioned waste can be delisted.

4.2 DELISTING CRITERIA UNDER PART 260.22(d)(1). This criterion is not met by the F028 ash because low concentrations of polychlorinated-p-dibenzodioxins were detected in 5 of the 10 ash samples. This finding, however, is neither surprising nor does it suggest a failure on the part of the incineration process conducted at Site A.

Under 40 CFR 264.343(a)(2), the Destruction and Removal Efficiency (DRE) requirement for a dioxin waste-burning incinerator is 99.9999 percent with acceptable degradation of Principal Organic Hazardous Constituents (POHCs) as described in 40 CFR 264.342. The DRE of the rotary-kiln incinerator used at Site A was 99.99997 percent with acceptable degradation of dioxin's POHCs (USAF, 1989). Because the DRE for the incinerator was not 100 percent, as would be required to meet the criteria of 260.22(d)(1), low levels of dioxins are present in the ash.

4.3 DELISTING CRITERIA UNDER PART 260.22(d)(1). Because the F028 ash does contain one or more constituents in Appendix VII, to be delisted it must satisfy the criteria specified in 260.22(d)(1) and no longer meet the 11 specific factors described in 261.11(a)(3). These 11 factors can be grouped into 3 main categories. To delist the ash, it must be demonstrated that (1) the ash does not pose a significant health threat to human health or the environment, (2) the ash does not have the potential to adversely impact another medium under plausible types of improper management, and (3) the petition addresses actions taken by other governmental agencies or regulatory programs based on the hazards posed by the listed waste.

4.3.1 F028 Ash Health Threat Analysis Site A is in a highly industrialized area with no realistic potential for a residential exposure. The realistic receptors at Site A are the adult trespasser, the occupational worker in an area near Site A, a site worker conducting physical maintenance at Site A, and the excavation worker digging into the ash as part of a utility repair or installation activity. Using standard USEPA exposure assumptions for these receptors, ash levels associated with a specific level of excess lifetime cancer risks (ELCR) can be calculated. Table 4-1 provides the ash concentrations associated with the ELCR of 1×10^{-6} (1 in a million) resulting from ash exposure for each identified receptor.

Table 4-1
F028 Ash Dioxin Levels Associated with an ELCR of 1×10^{-6} (1 in a Million)

Addendum to Delisting Petition 0759
Site A, Former Herbicide Orange Storage Area
Naval Construction Battalion Center
Gulfport, Mississippi

Receptor	Ash Level (ppt)
Adult Trespasser	160
Occupational Worker	251
Site Worker	242
Excavation Worker	710
Highest Detected Ash Concentration	69.3

Note: ELCR = excess lifetime cancer risk.
ppt = parts per trillion.

The highest detected dioxin concentration in the ash at Site A was less than half the concentration associated with an ELCR of 1×10^{-6} of the most sensitive realistic receptor, the adult trespasser (Table 4-1). These data indicate that the human health risks associated with exposure to the highest detected concentration of dioxin in the F028 ash would not represent an unacceptable health risk to either the USEPA or MSDEQ. The full calculations in the health threat analysis are provided in Appendix F.

4.3.2 F028 Ash Impact on Other Media The data in Table 3-6 indicate that dioxins are present in the groundwater at Site A. As previously noted, a good deal of attention has been focused on the F028 ash's potential to adversely impact groundwater, and groundwater modeling has been used to evaluate this potential. However, an underlying assumption for applying groundwater models is that the ash is managed at a site where the groundwater has not been previously impacted. At Site A, this assumption does not accurately describe the site-specific conditions, and data presented in this document raise significant doubt that the F028 ash is the source of the groundwater contamination at Site A.

The USEPA also has expressed some uncertainty "whether the [groundwater] monitoring system can truly distinguish any impact of the petitioned waste from contamination possibly caused by untreated soils..." (USEPA, 1992a). This statement

is especially relevant because the USEPA research, development, and demonstration permit allowed the F028 ash to be returned to Site A in areas considered "clean." As previously noted in Section 1.3, the soil dioxin level that was used to distinguish clean from contaminated was 1 ppb. Soil at Site A with dioxin levels less than 1 ppb was left in place. This practice resulted in the current situation of thermally treated F028 ash and nontreated soil with dioxin concentrations lower than 1 ppb in the same areas.

The USEPA further acknowledges, as described in 54 FR 41390, that groundwater data submitted as part of a typical delisting petition may provide inconclusive results and allow for three possible interpretations when evaluating groundwater data in delisting petitions. These are (1) the petitioned waste has not contributed to the contamination detected in the groundwater; (2) the (groundwater contamination) exceedance is due to an error in sampling and analysis and is not associated with the petitioned waste; and (3) the exceedance, although greater than health-based levels, is not statistically significant.

4.3.2.1 **Groundwater Contamination Not from the Petitioned Waste** Several lines of evidence demonstrate that the Site 8 petitioned waste has not contributed to the contamination detected in the groundwater. The most important is the fact that the F028 ash is not in direct contact with the groundwater at Site A. Rather, it is the soil at Site A, known to be contaminated with dioxin at concentrations up to 1 ppb, that is in direct physical contact with the groundwater. It is reasonable to assume that dioxin-contaminated soil in direct contact with groundwater would serve as the primary source of contamination to this medium. That the soil, rather than the ash, is the primary source of the groundwater contamination at Site A is further supported by the chemical properties of dioxin.

Two well-known physical properties of dioxin are that it binds tightly to soil (or ash) particles and has a very low water solubility (USEPA, 1992b). Once bound to an ash particle, dioxin is difficult to remove, even under laboratory conditions. Data from the first two rounds of groundwater sampling clearly show that the dioxin in the groundwater at Site A is almost exclusively bound to soil particulates and only a small amount is dissolved in the water (Table 4-2). It should be noted that the first two rounds of groundwater monitoring data (May and August 1994) were rejected by the data validators because the laboratory did not follow the USEPA Method 8290 protocol. Specifically, the laboratory did not analyze the extract from the particulate fraction along with the water fraction, resulting in low TCDD TEQs in these samples. Comparison of the analytical results of the first two rounds of groundwater data to the results of the next four rounds, in which dioxins attached to the soil particulates were also measured, clearly demonstrates that the dioxin in the groundwater at Site A is bound to particulates and that only a small fraction of the total dioxin in the groundwater is dissolved. The low dioxin concentration in the final round of groundwater sampling is due to another factor that is discussed in Paragraph 4.3.2.3.

It is unlikely that the low levels of dioxin in the F028 ash would partition from the ash, percolate through the soil into the groundwater, and then rebind to soil particulates suspended in the water. A more reasonable explanation is that the soil, in direct contact with the groundwater, is the source of the groundwater contamination at Site A rather than the ash on the surface of the soil. While it is possible that the dioxin in the ash may have some potential to leach from

the ash, the TCLP data presented in Table 3-5 demonstrate that this potential is low.

Table 4-2
TCDD TEQs Detected in Groundwater

Addendum to Delisting Petition 0759
Site A, Former Herbicide Orange Storage Area
Naval Construction Battalion Center
Gulfport, Mississippi

Well ID	May 1994	August 1994	November 1994	February 1995	May 1995[1]		August 1995
GPT-A-1	0.133	0.0447	0.56	0.24	0.52*	0.06**	0.11
GPT-A-1D	0.215	ND	--	--	--	--	--
GPT-A-2	0.215	0.298	22.6	13.4	60*	32.6**	0.15
GPT-A-2D	--	--	--	30.4	17.7*	46.2**	0.11
GPT-A-3	0.116	0.173	2.6	9.1	1.3*	0.15**	2.6
GPT-A-3D	--	--	11.2	--	--	--	--
GPT-A-4	0.0596	0.0367	13.4	14.3	4.1*	0.64**	0.30

[1] Split samples sent to different analytical laboratories.

Notes: All concentrations are reported in picograms per gram or parts per quadrillion (ppq). The TCDD maximum contaminant level is 30 ppq.

TCDD = 2,3,7,8-tetrachloro-p-dibenzodioxin.
TEQ = toxicity equivalent.
ID = identification.
* = samples analyzed by Quanterra Laboratory.
** = samples analyzed by QAL Analytical Laboratory.
ND = not detected.
-- = Duplicate samples were collected from different wells during this sampling round.

Another line of evidence that the soil is the source of the groundwater contamination, rather than the ash, is mass balance. The highest detected concentration of dioxin in the ash is approximately 70 ppt, but the soil at Site A contains up to 1 ppb. Using 70 ppt for the ash and 1 ppb for the soil and assuming the ash and the soil each have comparable potential to contaminate the groundwater, then the ash could have contributed only 7 percent of the total dioxin in the groundwater. At the highest detected concentration in the groundwater, 60 parts per quadrillion (ppq) at well GPT-A-2, the dioxin contribution by the ash would be 4.2 ppq, as shown by the following calculation:

$$\frac{0.070\ ppb\ [highest\ ash\ TCDD\ level]}{1.000\ ppb[soil\ cleanup\ level]} \times 100\% = 7\% \qquad (1)$$

$$7\% \times 60\ ppq\ [highest\ groundwater\ TCDD\ level] = 4.2\ ppq$$

where:

TCDD = 2,3,7,8-tetrachloro-p-dibenzodioxin and
% = percent.

Therefore, by mass balance, the F028 ash at Site A could not have caused the groundwater contamination at Site A to exceed the dioxin MCL of 30 ppq.

4.3.2.2 **Sampling and Analysis Error** Demonstrating the errors inherent in sampling and analysis at dioxin concentrations near the detection limit is the interlaboratory study conducted during the fifth round (May 1995) of groundwater sampling. The difficulties encountered by two Contract Laboratory Program- (CLP) certified analytical laboratories to measure reproducibly ppq concentrations of dioxin in the groundwater are demonstrated in Tables 3-6 and 4-2. The discrepancies between the two laboratories with respect to the split samples, as well as sample duplicates, indicate the technical difficulties associated with quantifying dioxins in groundwater at these concentrations. This is undoubtedly due to both the difficult chemical nature of dioxin bound to soil particles as well as other uncontrollable factors such as sampling technique, minute differences in total dissolved solids in the water samples, and minor differences in laboratory protocols.

An additional statistical analysis of the entire groundwater dioxin data set was conducted to determine if the dioxin concentrations detected in the groundwater at Site A could be the result of normal random variation in measurements of groundwater with average dioxin levels at the MCL. This analysis indicates that the groundwater data are log-normally distributed and that the data set could have come from groundwater monitoring wells with an average dioxin concentration at the MCL of 30 ppq. This suggests that either the groundwater at Site A is not significantly impacted over the dioxin MCL or that sampling and analytical limitations make it impossible to determine, with a reasonable level of confidence (e.g., 95 percent confidence level), if exceedances have actually occurred. The full groundwater data set analysis is presented in Appendix G.

4.3.2.3 **Groundwater Not a Significant Health Threat** As previously noted, Site A is an industrialized area with little realistic potential for a residential exposure. Therefore, comparing health-based groundwater criteria, such as MCLs, associated with residential groundwater consumption to the groundwater at Site A is not realistic. No one is currently using the groundwater at Site A, and the nearest potential residential receptor, at least 2,000 feet away, is connected to a public water supply.

In addition, the use of the shallow groundwater as a potable water supply is doubtful because the pH of the groundwater at Site A is highly acidic (pH range 4.0 to 6.0). A Mississippi Geological Survey publication confirmed that, although the groundwater is potable, "the most consistent complaint throughout Mississippi is low pH and excessive iron" and that problems have been reported in using this water as a long-term potable water source because the reactivity of the water to plumbing (Shows, 1970).

Further, data presented in this analysis demonstrate that movement of dioxin in the groundwater is also extremely limited. During the sixth groundwater sampling round (August 1995) the water table was nearly 3 feet lower than in previous rounds. Dioxin concentrations in these samples were also significantly lower, indicating that the concentrations increase as the water table rises and contacts the capillary fringe soils. It is likely that small particulates carrying adsorbed dioxin become trapped within the capillary fringe as the water table elevation drops; as the water table rises some of these particulates are suspended, and in unfiltered samples, the measured dioxin concentration increases. Since horizontal movement of the dioxin-bound soil particles is also extremely limited, the dioxin in the groundwater at Site A has low potential to migrate significantly.

While the minute amount of dioxin dissolved in the groundwater has limited potential to move both horizontally and vertically, concentrations would not pose a significant health threat to a receptor using the groundwater as a potable water source. The data collected from the first and second rounds of groundwater samples demonstrate that the dioxin concentration in the dissolved portion of the groundwater is far below the MCL, and any dispersion that occurred during migration from Site A would further reduce the potential for significant health effects (Table 4-2).

4.3.3 Other Governmental or Regulatory Actions Delisting of the F028 ash on Site A is only part of the overall site remediation activity. Delisting does, however, eliminate potentially burdensome requirements of dealing with an RCRA-listed waste and makes it easier to implement overall site remediation. Also, all of NCBC Gulfport, including Site A, is now under an AO, issued on February 14, 1996, by the MSDEQ, which requires that dioxin-contaminated media be remediated. Currently, onsite and offsite investigation workplans (ABB-ES, 1996b and 1996c) have been presented to MSDEQ for review along with an Interim Corrective Measures Study (ICMS) workplan (ABB-ES, 1996a) for all of NCBC Gulfport Site 8, including Site A. Additional workplans and remediation activities that will result in the final remediation of Site A are required by the AO. As part of this ongoing remediation activity at Site A, delisting of the F028 ash will help focus and accelerate the overall cleanup process through a Comprehensive Environmental Response, Compensation, and Liability Act- (CERCLA) type process. RCRA concerns can also be easily addressed through CERCLA remediation processes.

4.3.4 Remaining Delisting Criteria Under 261.11(a)(3) The remaining parts of the delisting criteria covered in 40 CFR 261.11(a)(3), including dioxin persistence and degradation rates, dioxin bioaccumulation in the ecosystem, plausible types of improper management, quantities of waste generated, and other such factors as appropriate, have little bearing to this delisting petition.

By mass balance it can be demonstrated that the potential for dioxin persistence, degradation, and bioaccumulation in the F028 ash is less than 10 percent of the potential in the remaining soil at Site A. Further, the quantity of F028 ash generated and stored at Site A is small compared to the remaining quantity of dioxin-contaminated soil at the site. Thermal degradation was conducted only on soils with dioxin levels above 1 ppb; soils below this level were left in place. A review of the analytical data indicates large areas of Site A were left undisturbed because dioxin levels in the soil were below 1 ppb. Therefore, because both the volume and dioxin concentration of the soil at Site A is much greater than the F028 ash, regulatory action concerning the ash will have little effect on the overall potential for dioxin persistence, degradation, and bioaccumulation at Site A.

The most plausible, and cost-effective, type of waste management at Site A will be to place an impermeable cap over the dioxin-contaminated soil and ash. This action effectively prevents migration of dioxin-contaminated media from the site and eliminates potential exposure pathways to the soil and ash. By eliminating exposure, the health risks are also eliminated. Offsite migration is currently being addressed by the ICMS workplan (ABB-ES, 1996a), with additional remediation activities required by the AO. If the ash is delisted, it will remain on Site A and will be included as part of the overall site remediation. Otherwise, the overall remediation process at Site A would likely be considerably more costly, more difficult to initiate, and require much more time to complete.

4.4 RCRA CHARACTERISTIC WASTE EVALUATION. The final criterion established in 260.22 (3) for delisting waste is that it not exhibit any of the hazardous waste characteristics described in 40 CFR 261.21, 261.22, 261.23, and 261.24. This petition demonstrates that the ash does not meet any of the hazardous waste characteristics described in these sections and should be delisted.

4.4.1 Ignitability (261.21) and Reactivity (261.22) The petitioned waste was processed through a high-temperature rotary-kiln incinerator, reducing organic constituents in the ash to levels that are not ignitable or reactive. This is supported by the Appendix IX analytical data from the 10 ash samples presented in Tables 3-3 and 3-4. Only six organic analytes were detected in the ash samples and all were at concentrations well below 10 ppb. These low concentrations of organic analytes in the ash are neither ignitable nor reactive.

4.4.2 Corrosivity (261.23) The corrosivity of the ash was addressed in the original petition with pH measurements well within the limits established in 261.22 as not corrosive (USAF, 1989). The USEPA also presented supporting data that the ash is well within the acceptable pH limits as it "compared the physical properties (e.g., pH, percent moisture, color, texture)..." of the ash at Site A and indicated that the pH of samples collected for the pesticide fraction of the analysis "ranged from 10 to 12" (USEPA, 1991). Since this pH is below the pH defined as corrosive in 261.22, the ash is not considered corrosive.

4.4.3 Toxicity (261.24) The ash passes all TCLP analyses as shown in Table 3-5. Only two constituents were detected in the TCLP extract and both were well below their respective regulatory thresholds. Although there are no regulatory levels for dioxin in 261.24, ash TCLP extracts were found to contain very low levels of dioxins from the ash with almost 70 ppt dioxin. These data demonstrate that the ash does not have the characteristic of toxicity as described in 261.24.

4.4.4 RCRA Characteristic Waste Summary Based on the presented data, the petitioner believes that the third criterion for delisting a "T" waste code hazardous waste has been met. The petitioned F028 waste at Site A does not meet any of the characteristics described in 261.22 through 261.24 and should not be considered hazardous waste.

4.5 F028 ASH DELISTING SUMMARY. After evaluating the RCRA delisting petition requirements described in 40 CFR Parts 260.20 and 260.22 for granting the exclusion of a waste, it is clear that the F028 ash at Site A, NCBC Gulfport meets these criteria and should be delisted. Table 4-3 summarizes the criteria for delisting a waste under RCRA and shows how the F028 ash compares with these criteria. The criteria given in 40 CFR 260.22 (d), 40 CFR 261.11(a)(3), and 40 CFR 261.21 through 261.24 have been used in this analysis as benchmarks for comparison, as required in 40 CFR 260.22. Comparison to these benchmarks demonstrate that the F028 ash should no longer be listed as an RCRA-listed hazardous waste.

Based upon the physical and chemical properties of the ash and the data and analysis presented to address each delisting criterion, the petitioner requests that the F028 ash at Site A be excluded as an RCRA-listed hazardous waste as part of the overall management of dioxin-contaminated material at NCBC Gulfport, Site A. Significant reductions in dioxin concentration, the very limited ability for

the ash to adversely impact or degrade soil or groundwater, current MSDEQ AO requirements for remediation of Site A, and the Navy's proposal that the ash remain on Site A as part of the overall remediation support the petition for delisting the F028 ash. It is understood that specific management requirements may be applied to the final remedial activities associated with this material.

Table 4-3
Summary of the F028 Ash Performance in Meeting the Delisting Criteria

Addendum to Delisting Petition 0759
Site A, Former Herbicide Orange Storage Area
Naval Construction Battalion Center
Gulfport, Mississippi

40 CFR Citation	Criteria Description	Delisting Criteria Met?
261.11(a)(3)	**General Criteria for Listing Hazardous Waste**	**Yes**
261.11(a)(3) (i), (ii) and (ix)	Health Threat Analysis	Yes
261.11(a)(3) (iii)	Potential to Adversely Impact Other Media	Yes
261.11(a)(3) (iv), (v), and (vi)	Persistence, Degradation, and Bioaccumulation	Yes
261.11(a)(3) (vii)	Plausible Types of Improper Management	Yes
261.11 (a) (x)	Actions by Other Governmental or Regulatory Programs	Yes
260.22 (d) (3)	**RCRA Waste Characteristics**	**Yes**
261.21	Ignitability	Yes
261.22	Corrosivity	Yes
261.23	Reactivity	Yes
261.24	Toxicity	Yes

Notes: CFR = Code of Federal Regulations.
RCRA = Resource Conservation and Recovery Act.

4.6 F028 DELISTING CONCLUSIONS AND RECOMMENDATIONS. The F028 ash at Site A has met all of the delisting requirements described in 40 CFR 260.20 and 260.22. The petitioner believes that all factors have been accounted for in this delisting action and that the F028 ash does not represent a significant human health threat nor has it impacted any other media at the site above health-based standards. The F028 ash should be delisted provided that it does not leave the site and that it is considered as part of the required overall cleanup of the site as ordered by MSDEQ under an AO.

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APPENDIX A

GENERIC APPENDIX IX COMPOUNDS LIST WITH METHOD NUMBERS AND PRACTICAL QUANTITATION LIMITS

Table A-1
Appendix IX Compound List and Practical Quantitation Limits for Corresponding SW-846 Methods

Addendum to Delisting Petition 0759
Area A, Former Herbicide Orange Storage Area
Naval Construction Battalion Center
Gulfport, Mississippi

	PQL Water ($\mu g/\ell$)
Appendix IX Volatile Organic Compounds	
Method: USEPA SW-846 Method 8240	
Chloromethane	10
Bromomethane	10
Vinyl chloride	10
Chloroethane	10
Methylene chloride	5
Acetone	10
Carbon disulfide	5
Trichlorofluoromethane	5
1,1-Dichloroethene	5
1,1-Dichloroethane	5
1,2-Dichloroethene (total)	5
Chloroform	5
1,2-Dichloroethane	5
2-Butanone (methyl ethyl ketone)	10
1,1,1-Trichloroethane	5
Carbon tetrachloride	5
Vinyl acetate	10
Bromodichloromethane	5
1,2-Dichloropropane	5
cis-1,3-Dichloropropene	5
Trichloroethene	5
Dibromochloromethane	5
1,1,2-Trichloroethane	5
Benzene	5
trans-1,3-Dichloropropene	5
2-Chloroethylvinylether	10
Bromoform	5
2-Hexanone	10
4-Methyl-2-pentanone	10
Tetrachloroethene	5
1,1,2,2-Tetrachloroethane	5

See notes at end of table.

Table A-1 (Continued)
Appendix IX Compound List and Practical Quantitation Limits for Corresponding SW-846 Methods

Addendum to Delisting Petition 0759
Area A, Former Herbicide Orange Storage Area
Naval Construction Battalion Center
Gulfport, Mississippi

	PQL Water ($\mu g/\ell$)
Toluene	5
Chlorobenzene	5
Ethylbenzene	5
Styrene	5
Xylene (total)	5
1,3-Dichlorobenzene	5
1,4-Dichlorobenzene	5
1,2-Dichlorobenzene	5
Acrolein	100
Iodomethane	10
Acrylonitrile	100
Dibromomethane	5
Ethyl methacrylate	5
1,2,3-Trichloropropane	5
trans-1,4-Dichloro-2-butene	5
Acetonitrile	100
3-Chloropropene	5
Propionitrile	100
Methacrylonitrile	5
1,4-Dioxane	200
Methyl methacrylate	10
1,2-Dibromoethane	5
1,1,1,2-Tetrachloroethane	5
1,2-Dibromo-3-chloropropane	10
Pentachloroethane	10
Isobutyl alcohol	200
Chloroprene	200
Appendix IX Semivolatile Organic Compounds	
Method: USEPA SW-846 Method 8270	
n-Nitrosodimethylamine	10
Phenol	10
Aniline	10
bis(2-Chloroethyl)ether	10

See notes at end of table.

Table A-1 (Continued)
Appendix IX Compound List and Practical Quantitation Limits for Corresponding SW-846 Methods

Addendum to Delisting Petition 0759
Area A, Former Herbicide Orange Storage Area
Naval Construction Battalion Center
Gulfport, Mississippi

	PQL Water ($\mu g/\ell$)
2-Chlorophenol	10
1,3-Dichlorobenzene	10
1,4-Dichlorobenzene	10
Benzyl alcohol	10
1,2-Dichlorobenzene	10
2-Methylphenol	10
bis(2-Chloroisopropyl)ether	10
n-Nitrosodi-n-propylamine	10
Hexachloroethane	10
Nitrobenzene	10
Isophorone	10
2-Nitrophenol	10
2,4-Dimethylphenol	10
Benzoic acid	50
bis(2-Chloroethoxy)methane	10
2,4-Dichlorophenol	10
1,2,4-Trichlorobenzene	10
Naphthalene	10
4-Chloroaniline	10
Hexachlorobutadiene	10
4-Chloro-3-methylphenol	10
2-Methylnaphthalene	10
Hexachlorocyclopentadiene	10
2,4,6-Trichlorophenol	10
2,4,5-Trichlorophenol	50
2-Chloronaphthalene	10
2-Nitroaniline	50
Dimethylphthalate	10
Acenaphthylene	10
2,6-Dinitrotoluene	10
3-Nitroaniline	50
Acenaphthene	10
2,4-Dinitrophenol	50

See notes at end of table.

Table A-1 (Continued)
Appendix IX Compound List and Practical Quantitation Limits for Corresponding SW-846 Methods

Addendum to Delisting Petition 0759
Area A, Former Herbicide Orange Storage Area
Naval Construction Battalion Center
Gulfport, Mississippi

	PQL Water ($\mu g/\ell$)
4-Nitrophenol	50
Dibenzofuran	10
2,4-Dinitrotoluene	10
Diethylphthalate	10
4-Chlorophenyl-phenylether	10
Fluorene	10
4-Nitroaniline	50
4,6-Dinitro-2-methylphenol	50
n-Nitrosodiphenylamine	10
Diphenylamine	10
1,2-Diphenylhydrazine	10
4-Bromophenyl-phenylether	10
Hexachlorobenzene	10
Pentachlorophenol	50
Phenanthrene	10
Anthracene	10
Di-n-butylphthalate	10
Fluoranthene	10
Pyrene	10
Butylbenzylphthalate	10
3,3'-Dichlorobenzidine	20
Benzo(a)anthracene	10
Chrysene	10
bis(2-ethylhexyl)Phthalate	10
Di-n-octyl phthalate	10
Benzo(b)fluoranthene	10
Benzo(k)fluoranthene	10
Benzo(a)pyrene	10
Indeno(1,2,3-cd)pyrene	10
Dibenz(a,h)anthracene	10
Benzo(g,h,i)perylene	10
2-Picoline	50
Methyl methanesulfonate	10

See notes at end of table.

Table A-1 (Continued)
Appendix IX Compound List and Practical Quantitation Limits for Corresponding SW-846 Methods

Addendum to Delisting Petition 0759
Area A, Former Herbicide Orange Storage Area
Naval Construction Battalion Center
Gulfport, Mississippi

	PQL Water ($\mu g/\ell$)
Ethyl methanesulfonate	10
Acetophenone	10
n-Nitrosopiperidine	10
Phenyl-tert-butylamine	50
2,6-Dichlorophenol	10
n-Nitrosodi-n-butylamine	10
n-Nitrosodiethylamine	10
n-Nitrosopyrrolidine	10
Benzidine	50
1,2,4,5-Tetrachlorobenzene	50
Pentachlorobenzene	50
1-Naphthylamine	50
2-Naphthylamine	50
2,3,4,6-Tetrachlorophenol	10
Phenacetin	10
4-Aminobiphenyl	50
Pentachloronitrobenzene	50
Pronamide	10
p-Dimethylaminoazobenzene	10
7,12-Dimethylbenz(a)anthracene	10
3-Methylcholanthrene	10
Pyridine	50
n-Nitrosomethylethylamine	10
n-Nitrosomorpholine	10
o-Toluidine	10
3-Methylphenol	20
4-Methylphenol	20
Hexachloropropene	50
p-Phenylenediamine	50
Safrole	50
Isosafrole	50
1,4-Naphthoquinone	50
1,3-Dinitrobenzene	10

See notes at end of table.

Table A-1 (Continued)
Appendix IX Compound List and Practical Quantitation Limits for Corresponding SW-846 Methods

Addendum to Delisting Petition 0759
Area A, Former Herbicide Orange Storage Area
Naval Construction Battalion Center
Gulfport, Mississippi

	PQL Water ($\mu g/\ell$)
5-Nitro-o-toluidine	10
1,3,5-Trinitrobenzene	10
4-Nitroquinoline-1-oxide	10
Methapyrilene	50
Aramite	50
3,3'-Dimethylbenzidine	10
2-Acetamidofluorene	10
Hexachlorophene	50
Parameter: Organochlorine Pesticides and PCBs	
Method: USEPA SW-846 Method 8080	
Alpha-benzene hexachloride	0.05
Beta-benzene hexachloride	0.05
Delta-benzene hexachloride	0.05
Gamma-benzene hexachloride (lindane)	0.05
Heptachlor	0.05
Aldrin	0.05
Heptachlor epoxide	0.05
Endosulfan I	0.10
Dieldrin	0.10
4,4'-Dichlorodiphenyldichloroethene	0.10
Endrin	0.10
Endosulfan II	0.10
4,4'-Dichlorodiphenyldichloroethane	0.10
Endrin aldehyde	0.10
Endosulfan sulfate	0.10
4,4'-Dichlorodiphenyltrichloroethane	0.10
Methoxychlor	0.50
Endrin ketone	0.10
Chlordane	0.50
Toxaphene	1.0
Aroclor-1016	0.8
Aroclor-1221	2.0

See notes at end of table.

Table A-1 (Continued)
Appendix IX Compound List and Practical Quantitation Limits for Corresponding SW-846 Methods

Addendum to Delisting Petition 0759
Area A, Former Herbicide Orange Storage Area
Naval Construction Battalion Center
Gulfport, Mississippi

	PQL Water ($\mu g/\ell$)
Aroclor-1232	2.0
Aroclor-1242	0.8
Aroclor-1248	0.5
Aroclor-1254	1.0
Aroclor-1260	1.0
Chlorobenzilate	0.50
Diallate	1.0
Isodrin	0.02
Kepone	1.0
Parameter: Herbicides	
Method: USEPA SW-846 Method 8150	
2,4-Dichlorophenoxyacetic acid	2.5
2,4,5-Trichlorophenoxyacetic acid	0.5
Dinoseb	2.5
Silvex	0.5
Parameter: Organophosphorus Pesticides	
Method: USEPA SW-846 Method 8140	
Triethylphosphorothioate	1.0
Thionazin	1.0
Sulfotepp	1.0
Phorate	1.0
Dimethoate	5.0
Disulfoton	1.0
Methyl parathion	1.0
Ethyl parathion	1.0
Famphur	1.0
Parameter: Inorganic Analytes	
Method: Various SW-846 Methods	
Antimony (Method 6010)	60
Arsenic (Method 7060)	10
Barium (Method 6010)	200

See notes at end of table.

Table A-1 (Continued)
Appendix IX Compound List and Practical Quantitation Limits for Corresponding SW-846 Methods

Addendum to Delisting Petition 0759
Area A, Former Herbicide Orange Storage Area
Naval Construction Battalion Center
Gulfport, Mississippi

	PQL Water ($\mu g/\ell$)
Beryllium (Method 6010)	5
Cadmium (Method 6010)	5
Chromium (Method 6010)	10
Cobalt (Method 6010)	50
Copper (Method 6010)	25
Lead (Method 7421)	3
Mercury (Method 7470)	0.2
Nickel (Method 6010)	40
Selenium (Method 7740)	5
Silver (Method 6010)	10
Thallium (Method 7841)	10
Vanadium (Method 6010)	50
Zinc (Method 6010)	20
Cyanide (Method 9010)	10
Tin (Method 6010)	200
Sulfide (Method 9030)	100

Source: U.S. Environmental Protection Agency, 1986.

Notes: These are typically expected values. Actual practical quantitation limits may vary depending on laboratory historic performances and media.

SW-846 = U.S. Environmental Protection Agency, 1986.
PQL = practical quantitation level.
$\mu g/\ell$ = micrograms per liter.
USEPA = U.S. Environmental Protection Agency.
PCB = polychlorinated biphenyl.

APPENDIX B

ASH ORGANIC DATA

Table B-1
Dioxins and Furans Detected in Ash

Addendum to Delisting Petition 0759
Area A, Former Herbicide Orange Storage Area
Naval Construction Battalion Center
Gulfport, Mississippi

Analyte	GPT-R-A14	GPT-R-B4	GPT-R-D3	GPT-R-D11	GPT-R-E12	GPT-R-F7	GPT-R-F7D
2,3,7,8-TCDD	ND	ND	ND	ND	6.74 J	ND	ND
1,2,3,4,6,7,8-HpCDD	ND	1.29 J	ND	ND	ND	ND	ND
OCDD	NR	ND	ND	NR	194 J	ND	ND

Analyte	GPT-R-F15	GPT-R-G1	GPT-R-G14	GPT-R-H8
2,3,7,8-TCDD	ND	ND	ND	ND
1,2,3,4,6,7,8-HpCDD	ND	ND	ND	ND
OCDD	ND	ND	NR	ND

Notes: All concentrations are reported in picograms per gram.

2,3,7,8-TCDD = 2,3,7,8-tetrachlorodibenzo-p-dioxin.
ND = not detected.
J = reported concentrations are estimated because of missed holding times.
1,2,3,4,6,7,8-HpCDD = 1,2,3,4,6,7,8-heptachlorodibenzo-p-dioxin.
OCDD = octachlorodibenzo-p-dioxin.
NR = not reported.

Table B-2
Organics Detected in Ash

Addendum to Delisting Petition 0759
Area A, Former Herbicide Orange Storage Area
Naval Construction Battalion Center
Gulfport, Mississippi

Analyte	GPT-HO-A14	GPT-HO-B4	GPT-HO-D3	GPT-HO-D11	GPT-HO-E12	GPT-HO-F7	GPT-HO-F7D
Volatile Organic Compounds							
Methylene chloride	2 J	ND	1 J	ND	ND	ND	ND
Benzene	ND	ND	20	ND	ND	ND	ND
Semivolatile Organic Compounds (none detected)							
Polynuclear Aromatic Hydrocarbons							
Benzo(b)fluoranthene	5.4	ND	ND	ND	ND	ND	ND
Pesticides and PCBs							
4,4'-DDE	1.8	6.0	ND	2.3	ND	ND	ND
4,4'-DDT	ND	2.1	ND	ND	ND	ND	ND
Organophosphorus Pesticides (none detected)							
Herbicides							
2,4,5-T	ND	ND	ND	16	ND	ND	ND

Analyte	GPT-HO-F15	GPT-HO-G1	GPT-HO-G14	GPT-HO-H8
Volatile Organic Compounds				
Methylene chloride	3 J	ND	3 J	2 J
Benzene	ND	ND	ND	ND
Semivolatile Organic Compounds (none detected)				
Polynuclear Aromatic Hydrocarbons				
Benzo(b)fluoranthene	ND	ND	ND	ND
Pesticides and PCBs				
4,4'-DDE	ND	ND	ND	ND
4,4'-DDT	ND	ND	ND	ND
Organophosphorus Pesticides (none detected)				
Herbicides				
2,4,5-T	ND	ND	ND	ND

Notes: All concentrations are reported in micrograms per kilogram.

J = reported concentrations are estimated.
ND = not detected.
PCB = polychlorinated biphenyl.
4,4'-DDE = 4,4'-dichlorodiphenyl dichloroethylene.
4,4'-DDT = 4,4'-dichlorodiphenyltrichloroethane.
2,4,5-T = 2,4,5-trichlorophenoxyacetic acid.

Table B-3
Inorganics Detected in Ash

Addendum to Delisting Petition 0759
Area A, Former Herbicide Orange Storage Area
Naval Construction Battalion Center
Gulfport, Mississippi

Analyte	GPT-HO-A14	GPT-HO-B4	GPT-HO-D3	GPT-HO-D11	GPT-HO-E12	GPT-HO-F7	GPT-HO-F7D
Arsenic	6.1 J	6.3 J	6.7 J	4.4 J	8.0 J	5.6 J	3.6 J
Barium	38.0 J	29.3 J	31.7 J	26.3 J	32.4 J	20.6 J	19.3 J
Beryllium	0.34 J	ND	ND	ND	ND	ND	ND
Chromium	8.7	7.0	8.7	10.3	6.2	5.3	5.3
Cobalt	0.83 J	ND	0.80 J	0.75 J	ND	ND	ND
Copper	3.5 J	3.8 J	4.7 J	2.4 J	2.7 J	2.6 J	1.9 J
Lead	8.7 J	5.9 J	7.9 J	9.1 J	12.0 J	5.0 J	3.4 J
Mercury	0.04 J	ND	0.04 J	ND	0.04 J	0.03 J	ND
Nickel	ND	2.5 J	ND	3.5 J	2.3 J	2.5 J	ND
Selenium	0.16 J	0.25 J	0.17 J	0.13 J	0.29 J	0.17 J	0.19 J
Tin	ND	ND	ND	2.9 J	3.5 J	ND	ND
Vanadium	19.3	12.8 J	14.2	14.5	12.0	9.5 J	9.2 J
Zinc	19.0	11.6	15.6	18.8	27.3	11.2	10.5
Sulfide	ND	29	ND	ND	ND	ND	ND

Analyte	GPT-HO-F15	GPT-HO-G1	GPT-HO-G14	GPT-HO-H8
Arsenic	3.3 J	6.4 J	5.3 J	4.0 J
Barium	26.8 J	34.6 J	25.7 J	47.8 J
Beryllium	0.12 J	0.13 J	ND	0.17 J
Chromium	8.9	10.1	7.6	10.5
Cobalt	1.1 J	ND	0.81 J	ND
Copper	3.1 J	5.2 J	3.6 J	3.2 J
Lead	5.6 J	7.1 J	7.7 J	8.4 J
Mercury	0.03 J	ND	0.03 J	ND
Nickel	ND	3.7 J	ND	3.4 J
Selenium	0.24 J	0.27 J	0.14 J	ND
Tin	ND	ND	ND	ND
Vanadium	14.5	15.8	12.0	16.9
Zinc	13.2	13.5	20.3	36.0
Sulfide	ND	ND	ND	ND

Notes: All concentrations are reported in milligrams per kilogram.

J = reported concentrations are estimated.
ND = not detected.

Table B-4
Analytes Detected in Toxicity Characteristic Leaching Procedures from Ash

Addendum to Delisting Petition 0759
Area A, Former Herbicide Orange Storage Area
Naval Construction Battalion Center
Gulfport, Mississippi

Analyte	GPT-HO-A14	GPT-HO-B4	GPT-HO-D3	GPT-HO-D11	GPT-HO-E12	GPT-HO-F7	GPT-HO-F7D
Dioxins and Furans (none detected)							
Volatile Organic Compounds (μg/ℓ)							
Benzene	19 J	5 J	17 J	ND	ND	ND	ND
Semivolatile Organic Compounds (none detected)							
Polynuclear Aromatic Hydrocarbons (none detected)							
Pesticides and PCBs (none detected)							
Herbicides (none detected)							
Inorganics (mg/ℓ)							
Barium	0.21	0.25	0.24	0.27	0.35	0.62	0.36

Analyte	GPT-HO-F15	GPT-HO-G1	GPT-HO-G14	GPT-HO-H8
Dioxins and Furans (none detected)				
Volatile Organic Compounds (μg/ℓ)				
Benzene	5 J	9 J	22 J	9 J
Semivolatile Organic Compounds (none detected)				
Polynuclear Aromatic Hydrocarbons (none detected)				
Pesticides and PCBs (none detected)				
Herbicides (none detected)				
Inorganics (mg/ℓ)				
Barium	0.38	0.32	0.28	0.37

Notes: μg/ℓ = micrograms per liter.
J = reported concentrations are estimated.
ND = not detected.
PCB = polychlorinated biphenyl.
mg/ℓ = milligrams per liter.

Table B-5
Volume of Ash

Addendum to Delisting Petition 0759
Area A, Former Herbicide Orange Storage Area
Naval Construction Battalion Center
Gulfport, Mississippi

	Small	Medium	Large	Extra Large
Number of piles	96	824	5	1
Volume per pile (cubic yards)	10	20	30	2690
Volume (cubic yards)	960	16,480	600	2,690
Total volume (cubic yards)				20,730

APPENDIX C

ASH PRECISION, ACCURACY, REPRESENTATIVENESS, COMPARABILITY, AND COMPLETENESS REPORTS

PRECISION, ACCURACY, REPRESENTATIVENESS, COMPARABILITY, AND COMPLETENESS FOR NCBC GULFPORT SITE 8

NCBC GULFPORT
GULFPORT, MISSISSIPPI

Prepared by:
Heartland Environmental Services, Inc.
4127 Plaza 94 South
St. Charles, Missouri 63304

Prepared for:

ABB Environmental Services, Inc.
1400 Center Point Blvd., Suite 158
Knoxville, TN 37932

April 1996

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Precision, Accuracy, Representativeness,
Comparability, and Completeness

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1.0 INTRODUCTION

Prior to evaluating the data for precision, accuracy, representativeness, comparability, and completeness (PARCC) criteria the laboratory reviewed the data package and the data also was independently reviewed and validated using the Naval Energy and Environmental and Support Activity (NEESA) guidance document 20.2-047B (1988) entitled, *Sampling and Chemical Analysis Quality Assurance Requirements for the Navy Installation Program*. Before the laboratory released the chemical analytical results, both the sample and laboratory QC data were carefully reviewed in order to verify sample identity, instrument calibration, detection limits, dilution factors, numerical computations, accuracy of transcriptions, and chemical interpretations. Additionally, the QC data were reduced and spike recoveries were included in control charts, and the resulting data were reviewed to ascertain whether they were within the laboratory defined limits for accuracy and precision. The data were compiled into a NEESA Level D data package and any nonconforming data were discussed in the data package cover letter and case narrative.

The Level D data package was then reviewed and validated by Heartland Environmental Services, Inc., Missouri (Heartland). Data validation is the technical review of a data package using criteria established in the data quality objectives, the quality assurance project plan and guidance documents prepared by the United States Environmental Protection Agency (USEPA) for the validation of organic and inorganic analytical data (USEPA 1990a and 1990b) as specified by NEESA document 20.2-047B. Samples that did not meet the acceptance limit criteria were qualified with a flag; single letter abbreviations that indicate a problem with the data. Data qualifiers used by the validators when amending the data include the following.

U — Undetected. The analyte was not detected above the contract required quantitation limit (CRQL) or the contract required detection limit (CRDL). The "U" designator also is used to qualify common laboratory contaminants. The "U" designator is applied to an environmental sample when the laboratory contaminant is detected in an environmental sample at a concentration less than 5 times (10 times for common laboratory contaminants) the value of the concentration detected in any corresponding field QC blank, method blank or preparation blanks.

J — Estimated. The analyte was present, but the reported value may not be accurate or precise. The "J" designator is used to qualify an analyte that was present at a concentration between the CRQL/CRDL and method detection limit (MDL) or the data "failed" some of the analytical validation criteria but not sufficient to reject the data and when combined with the U designator the quantitation limit is estimated.

R — Rejected. Data was rejected by the data validator during comparison of the NEESA Level C or D data package with the analytical functional guideline criteria. The "R" designator indicates a significant variance in acceptable laboratory performance. Either re-analysis or re-sampling and analysis would be necessary to determine the presence or absence of the target analyte(s).

Once the data were reviewed and validated according to the guidance presented in NEESA document 20.2-047B, the data were evaluated by Heartland using the PARCCs criteria included in the Data Quality Objectives (DQOs) of the Work Plan for NCBC Gulfport, Gulfport, Mississippi. The following sections present a brief description of PARCCs criteria.

Precision. Precision is a measure of the agreement or repeatability of a set of replicate results obtained from duplicate laboratory analyses of samples collected from the same location/depth interval. Precision was calculated from laboratory analytical data and cannot be measured directly. Precision is expressed as the Relative Percent Difference (RPD) between analytical values for two samples divided by the average of their analytical values. Precision is calculated using the expression:

$$RPD = (D1-D2) / (\tfrac{1}{2}(D1+D2)) \times 100$$

D1 and D2 are the reported values for the duplicate sample pair. Precision was evaluated using field duplicate samples and laboratory split samples (for example, MS/MSD samples).

Precision for environmental samples and their duplicates was assessed using a maximum RPD of 20 Percent for the water matrix. Precision for MS/MSD/MD samples was assessed by using the target analyte specific RPD criteria for the spiked compounds and the sample duplicates.

Accuracy. Accuracy is a measure of the agreement between an experimental determination and the true value of the parameter being measured. Accuracy can be calculated from the analytical data and was not measured directly. Accuracy is used to identify the bias in a given measurement system (i.e. laboratory conditions, sample matrix, and sampling conditions). Accuracy is assessed by reviewing the Percent Recovery (%R) between the true value of the spike analyte and the actual analytical value. Accuracy is calculated using the equation:

$$\%R = ((A-B)/C) \times 100$$

A = Measured concentration of the spiked analyte.
B = Measured concentration of the spiked compound in the unspiked sample.
C = True concentration of the spiked analyte.

For the organic analyses, each of the samples was spiked with a surrogate compound and a designated field sample was spiked in duplicate (MS/MSD) with a known mixture of target compounds; and for inorganic analyses, each chosen matrix spike and matrix duplicate pair was spiked with a known reference material before digestion. Each of these approaches provides a measure of the matrix effects on the analytical accuracy.

Representativeness. Representativeness is a qualitative measure of the degree to which sample data accurately and precisely represent a characteristic environmental condition. Representativeness is a subjective parameter and is used to evaluate the efficacy of the sampling plan design. Representativeness was evaluated using the field and laboratory QC blank sample results. QC blank samples are equipment rinseate blanks, field blanks, trip blanks, laboratory method blanks for organic analysis and laboratory preparation blanks for inorganic analysis. Positive detection of target analytes in the QC blank samples identify contaminants that possibly were introduced to the associated environmental sample during sample collection, transport or laboratory analysis. Representativeness was also evaluated using the defined extraction and analytical holding time requirements set forth in the Work Plan for NCBC Gulfport or the analytical methodology.

Comparability. Comparability is qualitative measure designed to express the confidence with which one data set may be compared to another. Factors that affect comparability are: sample collection and handling techniques, sample matrix type, and analytical method. Comparability is limited by the other PARCC parameters because only when precision and accuracy are known can data sets be compared with confidence.

Completeness. Completeness is defined as the percentage of measurements that are judged to be valid compared to the total number of measurements made. Valid usable data are values that were not qualified as rejected (R qualifier) during data validation. A goal of 85 percent usable data was established in the Work Plan for NCBC Gulfport. Completeness equals the total number of analytes for each matrix minus the total number of rejected analytes divided by the total number of analytes multiplied by 100.

2.0 PRECISION

The following section describes the evaluation of precision for 2,3,7,8-substituted. Duplicate samples are evaluated for precision only when contaminants are detected in both the environmental sample and the sample's duplicate. A ND in the RPD column of the spreadsheet indicates that a RPD calculation was not required because one result was a non-detect and the other result was less than the compound/analyte CRQL/CRDL. Environmental samples and their respective duplicates may not exhibit positive results for all compounds found at or near the CRQL or CRDL. Duplicates with Relative Percent Differences (RPDs) within control limits indicate adequate sampling practices and/or good analytical precision. Duplicates with RPDs outside the control limits may result from inappropriate sampling procedures, matrix interferences, or non-homogeneity of the sample matrix. In addition, poor precision can be attributed to deviation(s) from the analytical methodology or to poor reproducibility of target analyte concentrations at or near the required CRQLs or CRDLs. The acceptance criteria for evaluating precision of field duplicate analytical results is a RPD of 35 for the ash matrix.

A field duplicate was submitted for validation for dioxin/furan analysis. The percentage of duplicate samples collected for this project was ten percent. The following Sections summarize the evaluation of analytical precision for the water field samples for the following analytical groups:

- Dioxin/Furans (D/Fs)

Duplicate precision was assessed using both environmental sample and associated duplicates and matrix spike/matrix spike duplicates/matrix duplicates (MS/MSD/MDs).

Tabulation of the results of assessing duplicate precision and duplicate frequency is presented in Table 2-1 for the ash matrix. Tabulation of the results assessing precision based on the reproducibility between spike sample/duplicate sample pairs is presented in Table 2-2 for the ash matrix.

2.1 Ash Matrix

The assessment of ash matrix environmental samples and associated duplicates for precision is provided in Table 2-1. Two (2) congeners were detected, 2,3,7,8-TCDD and OCDD. 2,3,7,8-TCDD exhibited an acceptable RPD (16%); whereas OCDD exhibited an RPD of 53%. The non compliance for OCDD can be attributed to the low concentrations of OCDD detected (<15 pg/g).

The assessment of precision based on the reproducibility of results between matrix spike and matrix spike duplicate pairs is provided in Tables 2-2. The MS/MSD sample pair analyzed for dioxin/furans were "in-compliance" with RPD precision criteria for all congeners except OCDD (Tables 2-2).

Based on assessment of duplicate precision evaluation criteria, the ash sample matrix analytical data was acceptable for precision for each SDG.

TABLE 2 - 1
2,3,7,8-SUBSTITUTED DIOXIN/FURANS
ASH DUPLICATE PRECISION
NCBC GULFPORT SITE 8

SDG	SAMPLE ID	MATRIX	NO. ASSC. SAMPLES	COMPOUND	SAMPLE CONC.	DUP CONC	MAX RPD	RPD
9602258	GPT03F7	SOIL	10	2,3,7,8-TCDD	3.96	3.38	35%	16%
				OCDD	12.5	7.23	35%	53%
	TOTAL SAMPLES		10					

% OF DUPLICATES COLLECTED	RPD IN	RPD OUT	% WITHIN RPD LIMIT
10.0%	1	1	50.0%

TABLE 2 - 2
2,3,7,8-SUBSTITUTED DIOXIN/FURANS
ASH MATRIX SPIKE/MATRIX SPIKE DUPLICATES
NCBC GULFPORT SITE 8

MS = MATRIX SPIKE *SAMPLE GPT-03-E12*		SDG 9602258		
MSD = MATRIX SPIKE DUPLICATE		MS	MSD	
RPD = RELATIVE PERCENT DIFFERENCE		%R	%R	%RPD
DIOXIN/FURAN CONGENERS	UNITS			
2,3,7,8-TCDD	pg/L	101	102	1%
2,3,7,8-TCDF	pg/L	98	100	3%
1,2,3,7,8-PeCDD	pg/L	104	100	4%
1,2,3,7,8-PeCDF	pg/L	103	108	5%
2,3,4,7,8-PeCDF	pg/L	106	111	5%
1,2,3,4,7,8-HxCDD	pg/L	100	107	7%
1,2,3,6,7,8-HxCDD	pg/L	102	106	4%
1,2,3,7,8,9-HxCDD	pg/L	103	104	1%
1,2,3,4,7,8-HxCDF	pg/L	99	99	0%
1,2,3,6,7,8-HxCDF	pg/L	99	96	3%
2,3,4,6,7,8-HxCDF	pg/L	98	103	5%
1,2,3,7,8,9-HxCDF	pg/L	94	105	12%
1,2,3,4,6,7,8-HpCDD	pg/L	99	117	17%
1,2,3,4,6,7,8-HpCDF	pg/L	98	104	6%
1,2,3,4,7,8,9-HpCDF	pg/L	107	101	6%
OCDD	pg/L	100	187 *	61% *
OCDF	pg/L	106	113	6%

* DENOTES VALUE NOT WITHIN QA/QC ADVISORY LIMITS

CORRESPONDING SDG'S AND ASSOCIATED SAMPLES

9602258: GPT-03-G1, GPT-03-D3, GPT-03-B4, GPT-03-F7, GPT-03-F7D, GPT-03H8, GPT-03-D11, GPT-03-E12, GPT-03-G14, GPT-03-F15, GPT-03-A14

3.0 ACCURACY

The assessment of accuracy is evaluated by comparison of the percent recoveries (%R) computed from the known concentration of analyte spikes and their recovered concentration versus the analytical method acceptance criteria. Spike recoveries provide an indication of bias, where the reported data may either overestimate or underestimate the actual concentration of detected compounds and/or the detection limits. Recoveries outside acceptable criteria may be caused by factors such as matrix interference, poor analytical precision, or instrument calibration.

The following Sections summarize the evaluation of analytical accuracy for the field ash samples for the following analytical groups:

- Dioxin/Furans (D/Fs)

Accuracy was assessed using MS and MSD samples for organic analyses, as well as internal standard recoveries. The results of the evaluation of accuracy for the MS/MSD sample is provided in Table 2-2 for the ash matrix. The results of the evaluation of accuracy for the internal standard recoveries in the samples is provided in Table 3-1 for the ash matrix.

3.1 Ash Matrix

The MS/MSD sample pair analyzed for dioxin/furans (Table 2-2) exhibited "in-control" recovery results with the exception of OCDD in the MSD. The high OCDD result (187%) is considered to be an outlier. Based on the assessment of additional QC criteria, the analytical data did not require qualifications.

The dioxin/furan analysis of sample GPT-03-A14 exhibited a non-compliant internal standard recovery for $^{13}C_{12}$-1,2,3,4,6,7,8-HpCDF (Table 3-1). The low recovery may indicate a low bias in the positive and non detect results for 2,3,7,8-substituted heptafurans.

Based on an overall assessment of MS/MSD and internal standard recovery accuracy evaluation criteria, the ash matrix analytical data was acceptable for each SDG.

TABLE 3-1
INTERNAL STANDARD RECOVERIES
DIOXIN/FURAN CONGENERS
NCBC GULFPORT SITE 8

SDG	SAMPLE IDs	ISTD1	ISTD2	ISTD3	ISTD4	ISTD5	ISTD6	ISTD7	ISTD8	ISTD9	TOTAL OUT
9602258	GPT-03-G1	69.9%	73.5%	74.4%	73.8%	61.7%	59.6%	61.1%	60.6%	69.7%	0
	GPT-03-D3	72.3%	75.2%	73.9%	72.0%	64.4%	72.5%	75.7%	67.5%	73.4%	0
	GPT-03-B4	72.0%	74.1%	80.2%	79.3%	60.2%	70.4%	76.3%	68.2%	75.8%	0
	GPT-03-F7	73.6%	73.8%	76.3%	72.6%	58.7%	68.6%	76.3%	66.7%	76.0%	0
	GPT-03-F7D	63.3%	62.7%	62.5%	61.4%	52.7%	61.8%	63.7%	54.1%	65.1%	0
	GPT-03-H8	79.9%	85.2%	89.0%	87.0%	80.5%	76.7%	79.2%	74.2%	77.9%	0
	GPT-03-D11	72.4%	71.0%	72.9%	72.4%	66.4%	69.3%	67.9%	62.3%	67.4%	0
	GPT-03-E12	73.0%	76.1%	79.2%	78.5%	62.7%	70.2%	75.8%	68.2%	74.3%	0
	GPT-03-E12MS	75.4%	77.4%	84.8%	81.6%	76.6%	71.5%	76.1%	67.5%	75.6%	0
	GPT-03-E12MSD	75.2%	78.4%	70.7%	69.6%	73.8%	79.5%	89.2%	79.9%	91.2%	0
	GPT-03-G14	69.1%	67.9%	65.6%	63.0%	60.2%	66.3%	45.1%	40.0%	40.3%	0
	GPT-03-F15	79.4%	77.1%	86.4%	77.4%	77.4%	87.5%	117.0%	94.8%	118.0%	0
	GPT-03-A14	63.6%	55.0%	59.9%	57.6%	53.4%	44.8%	44.8%	37.4%	51.3%	1
	GPT-03-ER	88.7%	92.2%	83.5%	85.1%	70.3%	78.8%	87.9%	81.4%	101.0%	0
	GPT-03-DI	80.8%	81.1%	84.5%	83.0%	77.8%	70.5%	74.0%	77.6%	79.8%	0
9603136	GPT-03-F7 TCLP	82.2%	83.9%	81.2%	84.0%	77.5%	79.0%	76.7%	80.1%	63.7%	0
	GPT-03-A14 TCLP	69.1%	75.0%	80.1%	75.0%	78.2%	79.5%	70.8%	79.8%	63.8%	0

ISTD1 = 13C-2,3,7,8-TCDD
ISTD2 = 13C-2,3,7,8-TCDF
ISTD3 = 13C-1,2,3,7,8-PeCDD
ISTD4 = 13C-1,2,3,7,8-PeCDF
ISTD5 = 13C-1,2,3,6,7,8-HxCDD
ISTD6 = 13C-1,2,3,4,7,8-HxCDF
ISTD7 = 13C-1,2,3,4,6,7,8-HpCDD
ISTD8 = 13C-1,2,3,4,6,7,8-HpCDF
ISTD9 = 13C-OCDD

WATERS:

QC LIMITS 40% - 135%

* - INDICATES VALUE OUTSIDE QC LIMITS

# SAMPLES		% REC IN	%REC OUT	% TOTA IN
17		152	1	99.3%

4.0 REPRESENTATIVENESS

Representativeness of the environmental sample analytical data was assessed using field blanks, equipment rinseate blanks, laboratory method blanks and determining if holding time requirements were met. The environmental samples and associated blanks were analyzed for the following target analyte groups:

- Dioxin/Furans (D/Fs)

Field blanks, equipment rinseate blanks, and laboratory method blanks were analyzed for 2,3,7,8-substituted congeners. The assessment of representativeness is summarized in tabular form for each type of blank, method blank results are summarized in Table 4-1, equipment rinseate blank results are summarized in Table 4-2, and field blank results are summarized in Tables 4-3.

If contaminants were detected in a blank, corrective actions were made for the chemical analytical data during data validation by Heartland. The corrective action consisted of amending the laboratory reported results for dioxin/furan congeners by the criteria. The following describes the Validation Qualifier code in the blank summary tables.

Organic Target Analytes

- CRQL Validation Qualifier. If a sample result for the blank contaminant was less than the CRQL and less than 10 times (for common contaminants) or 5X (for all other contaminants) the blank value, the sample result was rejected and amended as estimated non-detected at the CRQL for the target compound.

- U Validation Qualifier. If a sample result for the blank contaminant was greater than the sample CRQL and less than 10 times (for common contaminants) or 5X (for all other contaminants) the blank value, the sample result for the blank contaminant was amended as non detect at the concentration reported in the sample results.

- No Action (NA). If a sample result for the blank contaminant was greater than the CRQL and 10 times (for common contaminants) or 5X (for all other contaminants) the blank value, the result was not amended.

4.1 Method Blanks

The method blanks were a sample of deionized water that is prepared by the laboratory at the time of analysis. Method blanks undergo the same analytical process as the corresponding environmental samples and associated field blanks. The purpose of the method blank is to assess the potential for target analytes to "contaminate" the sample during analysis. Dioxin/furan target congeners were not detected in method blank samples (Table 4-1). Based on the assessment of the trip blanks for representativeness, the analytical data was acceptable for each SDG.

4.2 Equipment Rinseate Blanks

The equipment rinseate blank was collected by rinsing a piece of sampling equipment with organic free deionized water. A sample of this water was collected and placed in sample containers similar to those used for the environmental samples. Dioxin/furans congeners were not detected in equipment rinseate blank sample (Tables 4-2).. Based on assessment of equipment rinseate blanks for representativeness, the analytical data was acceptable for each SDG.

TABLE 4 - 1
DIOXIN/FURAN CONGENERS DETECTED IN METHOD BLANKS
NCBC GULFPORT SITE 8

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	MB CONC.	UNITS	VALIDATION QUALIFIER
9602258	ABLK02226	ALL FIELD SAMPLES AND QC BLANKS	NO CONTAMINATION FOUND			
9603136	WBLK03116	ALL FIELD TCLP SAMPLES	NO CONTAMINATION FOUND			

TABLE 4 - 2
DIOXIN/FURAN CONGENERS DETECTED IN RINSEATE BLANKS
NCBC GULFPORT SITE 8

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	RB CONC.	UNITS	VALIDATION QUALIFIER
9602258	GPT-03-ER	ALL FIELD SAMPLES	NO CONTAMINATION FOUND			

TABLE 4 - 3
DIOXIN/FURAN CONGENERS DETECTED IN FIELD BLANKS
NCBC GULFPORT SITE 8

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	RB CONC.	UNITS	VALIDATION QUALIFIER
9602258	GPT-03-DI	ALL FIELD SAMPLES	NO CONTAMINATION FOUND			

4.3 Field Blanks

The field blank is a sample of deionized water and/or potable water used during equipment decontamination. The field blank was opened to ambient field conditions. Dioxin/furans congeners were not detected in the field blank sample (Table 4-3). Based on assessment of field blanks for representativeness, the analytical data was acceptable for each SDG.

4.5 Holding Times

Holding times requirements are utilized in an effort to minimize the degradation or concentration of constituents in a particular matrix over time. The stability of the constituents is determined to the best extent by the regulatory agencies. A reasonable time limit is imposed under which the samples must be extracted or prepared and then analyzed. The holding times regulations assume that the samples have been properly preserved according to the guidelines, either at the laboratory or in the field. Analytical results from samples with holding time violations are qualified as estimated, J/UJ, because of the potential of compromising the sample. If the holding time is grossly violated (>15 days) the results are qualified/rejected, J/R.

All holding time requirements, both extraction and analytical, were met by the laboratory for all fractions.

5.0 COMPARABILITY

Comparability is a qualitative measure designed to express the confidence with which one data set may be compared to another. The analytical samples were collected and transported to the chemical analytical laboratory in accordance with standard procedures and were analyzed in conformance with acceptable USEPA procedures (Refer to Table 5-1 below). The analytical data are reported in standard units (micrograms per liter, micrograms per kilogram, etc.).

The methods used to collect the environmental samples and the methods used to analyze the samples should assure comparability of the analytical data.

TABLE 5-1
USEPA Procedures (CLP and SW-846 Methodologies)

U.S. EPA Method	Description
SW846 8290	Dioxin/Furan Analysis by High Resolution GC/MS

6.0 COMPLETENESS

Completeness is the quantitative measure of the amount of data obtained from a measurement process compared with the amount expected to be obtained under the conditions of measurement. The completeness goal for laboratory analysis for this project was 85 percent useable data. Unusable analytical data are those results reported by the laboratory but rejected during the data validation process. A summary of the completeness goal for NCBC Gulfport Site 8 is provided in Table 6-1.

TABLE 6-1
COMPLETION GOAL (>85%)

	QC	ASH	OVERALL
Dioxin/Furans	100.0	100.0	100.0

MATRIX KEY
QC = QC Samples
ASH = Ash Samples

The completeness goal of 85% for each fraction of analytical data for each matrix was met.

7.0 PARCC SUMMARY

The purpose of evaluating the quality of the analytical data using the PARCC criteria was to address the qualification of the data in regards to evaluation of the presence, magnitude and characteristics of hazardous substances at NCBC Gulfport Site 8. Overall, the chemical analytical data are acceptable and exceeded the completion goal of 85 percent for all fractions except the Low Concentration volatile fraction. Table 7-1 provides a tabulation of the assessment of PARCC criteria each SDG for the quality control samples and ash samples, respectively.

7.1 QC Samples

No analytical data points were rejected. The completion goal was met.

7.2 Ash Boring Samples

No analytical data points were rejected. The completion goal was met.

TABLE 7 - 1
PARCC CRITERIA SUMMARY
ASH SAMPLES
NCBC GULFPORT, SITE 8

SDGs	PRECISION	ACCURACY	REPRESENT-ATIVENESS	COMPARABILITY	COMPLETENESS
9602258	ACCEPTABLE	ACCEPTABLE	ACCEPTABLE	ACCEPTABLE	ACCEPTABLE
9603136	ACCEPTABLE	ACCEPTABLE	ACCEPTABLE	ACCEPTABLE	ACCEPTABLE

REFERENCES

ABB-ES (ABB Environmental Services, Inc.) 1993. Naval Construction Battalion Center, Gulfport, Mississippi Work Plan, Site 8, Prepared for Southern Division Naval Facilities Engineering Command.

Geraghty & Miller, Inc., 1991b. Navy Installation Restoration Program Plan, Naval Air Station, Jacksonville, Florida. Volume 1: Organization and Planning, Prepared SOUTHNAVFACENGCOM. September.

Geraghty & Miller, Inc., 1991b. Navy Installation Restoration Program Plan, Naval Air Station, Jacksonville, Florida. Volume 4: Basic Site Work Plan. Prepared SOUTHNAVFACENGCOM. September. Updated 1992.

Naval Energy and Environmental Support Activity (NEESA), 1988., Sampling and Chemical Analysis Quality Assurance Requirements for the Navy Installation Restoration Program, Naval Energy and Environmental Support, 20.2-047B, June 1988.

USEPA, 1988a., Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses, United States Environmental Protection Agency, July 1988.

USEPA, 1991a., National Functional Guidelines for Organic Data Review, United States Environmental Protection Agency, June 1991.

USEPA, 1990a., Guidance for Data Usability in Risk Assessment, United States Environmental Protection Agency, EPA 540 G-90/008, October 1990.

USEPA, 1990b., Statement of Work for Organic Analysis, Multi-Media, Multi-Concentration, United States Environmental Protection Agency Contracts Laboratory Program, Document No. OLM01.8, June 1991.

USEPA, 1990c., Statement of Work for Inorganic Analysis, Multi-Media, Multi-Concentration, United States Environmental Protection Agency Contracts Laboratory Program, Document No. ILM02.1, March 1990.

APPENDIX D

GROUNDWATER ORGANIC AND INORGANIC DATA

Groundwater Sampling Event No. 1

Validated Groundwater Results

PROJECT: NCBC GULFPORT, MISSISSIPPI

VOLATILE AQUEOUS ANALYSES (ug/l)

Validation Table

	SAMPLE LOCATION:	GPTHOGW-1	GPTHOGW-1D	GPTHOGW-2	GPTHOGW-3	GPTHOGW-4
	LAB NUMBER:	27176005	27176006	27176007	27176008	27176009
	DATE SAMPLED:	05/17/94	05/17/94	05/17/94	05/17/94	05/17/94
	DATA ANALYZED:	05/23/94	05/23/94	05/23/94	05/23/94	05/23/94
	DILUTION FACTOR:	1.0	1.0	1.0	1.0	1.0
ANALYTE	CRQL					
Chloromethane	10	10 U	10 U	10 U	10 U	10 U
Bromomethane	10	10 U	10 U	10 U	10 U	10 U
Vinyl Chloride	10	10 U	10 U	10 U	10 U	10 U
Chloroethane	10	10 U	10 U	10 U	10 U	10 U
Methylene Chloride	5	5 U	5 U	5 U	5 U	5 U
Acetone	10	10 U	10 U	10 U	13 U	10 U
Carbon Disulfide	5	5 U	5 U	5 U	2 J	5 U
1,1-Dichloroethene	5	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethane	5	5 U	5 U	5 U	5 U	5 U
1,2-Dichloroethene (total)	5	5 U	5 U	5 U	5 U	5 U
Chloroform	5	5 U	5 U	5 U	5 U	5 U
1,2-Dichloroethane	5	5 U	5 U	5 U	5 U	5 U
2-Butanone	10	10 U	10 U	10 U	10 U	10 U
1,1,1-Trichloroethane	5	5 U	5 U	5 U	5 U	5 U
Carbon Tetrachloride	5	5 U	5 U	5 U	5 U	5 U
Bromodichloromethane	5	5 U	5 U	5 U	5 U	5 U
1,2-Dichloropropane	5	5 U	5 U	5 U	5 U	5 U
cis-1,3-Dichloropropene	5	5 U	5 U	5 U	5 U	5 U
Trichloroethene	5	5 U	5 U	5 U	5 U	5 U
Dibromochloromethane	5	5 U	5 U	5 U	5 U	5 U
1,1,2-Trichloroethane	5	5 U	5 U	5 U	5 U	5 U
Benzene	5	5 U	5 U	5 U	5 U	5 U
trans-1,3-Dichloropropene	5	5 U	5 U	5 U	5 U	5 U
Bromoform	5	5 U	5 U	5 U	5 U	5 U
4-Methyl-2-Pentanone	10	10 U	10 U	10 U	10 U	10 U
2-Hexanone	10	10 U	10 U	10 U	10 U	10 U
Tetrachloroethene	5	5 U	5 U	5 U	5 U	5 U
1,1,2,2-Tetrachloroethane	5	5 U	5 U	5 U	5 U	5 U
Toluene	5	5 U	5 U	5 U	5 U	5 U
Chlorobenzene	5	5 U	5 U	5 U	5 U	5 U
Ethylbenzene	5	5 U	5 U	5 U	5 U	5 U
Styrene	5	5 U	5 U	5 U	5 U	5 U
Xylene (total)	5	5 U	5 U	5 U	5 U	5 U
Dichlorodifluoromethane	10	10 U	10 U	10 U	10 U	10 U
Trichlorofluoromethane	5	5 U	5 U	5 U	5 U	5 U
Acrolein	100	100 U	100 U	100 U	100 U	100 U
Iodomethane	10	10 U	10 U	10 U	10 U	10 U
Acrylonitrile	100	100 U	100 U	100 U	100 U	100 U
Vinyl acetate	10	10 U	10 U	10 U	10 U	10 U
Dibromomethane	5	5 U	5 U	5 U	5 U	5 U
2-Chloroethyl vinyl ether	10	10 U	10 U	10 U	10 U	10 U
Ethyl methacrylate	5	5 U	5 U	5 U	5 U	5 U
1,2,3-Trichloropropene	5	5 U	5 U	5 U	5 U	5 U
trans-1,4-Dichloro-2-butene	5	5 U	5 U	5 U	5 U	5 U

PROJECT: NCBC GULFPORT, MISSISSIPPI — VOLATILE AQUEOUS ANALYSES (ug/l) — Validation Table

SAMPLE LOCATION:		GPTHOGW-1	GPTHOGW-1D	GPTHOGW-2	GPTHOGW-3	GPTHOGW-4
LAB NUMBER:		27176005	27176006	27176007	27176008	27176009
DATE SAMPLED:		05/17/94	05/17/94	05/17/94	05/17/94	05/17/94
DATA ANALYZED:		05/23/94	05/23/94	05/23/94	05/23/94	05/23/94
DILUTION FACTOR:		1.0	1.0	1.0	1.0	1.0
	CRQL					
Acetonitrile	100	100 U	100 U	100 U	100 U	100 U
3-Chloropropene	5	5 U	5 U	5 U	5 U	5 U
Chloroprene	200	200 U	200 U	200 U	200 U	200 U
Propionitrile	100	100 U	100 U	100 U	100 U	100 U
Methacrylonitrile	5	5 U	5 U	5 U	5 U	5 U
Isobutyl alcohol	200	200 R	200 R	200 R	200 R	200 R
Methyl methacrylate	10	10 U	10 U	10 U	10 U	10 U
1,4-Dioxane	200	200 R	200 R	200 R	200 R	200 R
1,2-Dibromoethane	5	5 U	5 U	5 U	5 U	5 U
1,1,1,2-Tetrachloroethane	5	5 U	5 U	5 U	5 U	5 U
Pentachloroethane	10	10 U	10 U	10 U	10 U	10 U
1,3-Dichlorobenzene	5	5 U	5 U	5 U	5 U	5 U
1,4-Dichlorobenzene	5	5 U	5 U	5 U	5 U	5 U
1,2-Dichlorobenzene	5	5 U	5 U	5 U	5 U	5 U
1,2-Dibromo-3-chloropropane	10	10 U	10 U	10 U	10 U	10 U

PROJECT: NCBC GULFPORT, MISSISSIPPI

SEMIVOLATILE AQUEOUS ANALYSES (ug/l)

Validation Table

	SAMPLE LOCATION:	GPTHOGW-1	GPTHOGW-1D	GPTHOGW-1DR	GPTHOGW-2	GPTHOGW-3	GPTHOGW-4
	LAB NUMBER:	27176005	27176006	27176006R	27176007	27176008	27176009
	DATE SAMPLED:	05/17/94	05/17/94	05/17/94	05/17/94	05/17/94	05/17/94
	DATE ANALYZED:	05/26/94	05/26/94	06/03/94	06/03/94	06/03/94	06/03/94
	DILUTION FACTOR:	1.0	1.0	1.0	1.0	2.0	1.0
ANALYTE	CRQL						
N-Nitrosodimethylamine	10	10 U	10 R	10 U	10 U	20 U	10 U
Phenol	10	10 U	120 R	10 U	10 U	53	10 U
Aniline	10	10 U	10 R	10 U	10 U	20 U	10 U
bis (2-Chloroethyl) Ether	10	10 U	10 R	10 U	10 U	20 U	10 U
2-Chlorophenol	10	10 U	120 R	10 U	10 U	10 J	10 U
1,3-Dichlorobenzene	10	10 U	10 R	10 U	10 U	20 U	10 U
1,4-Dichlorobenzene	10	10 U	10 R	10 U	10 U	20 U	10 U
Benzyl alcohol	10	10 U	10 R	10 U	10 U	20 U	10 U
1,2-Dichlorobenzene	10	10 U	10 R	10 U	10 U	20 U	10 U
2-Methylphenol	10	10 U	10 R	10 U	10 U	20 U	10 U
bis(2-Chloroisopropyl)ether	10	10 U	10 R	10 U	10 U	20 U	10 U
4-Methylphenol	10	10 U	10 R	10 U	10 U	8 J	10 U
N-Nitroso-Di-n-Propylamine	10	10 U	10 R	10 U	10 U	20 U	10 U
Hexachloroethane	10	10 U	10 R	10 U	10 U	20 U	10 U
Nitrobenzene	10	10 U	10 R	10 U	10 U	20 U	10 U
Isophorone	10	10 U	10 R	10 U	10 U	20 U	10 U
2-Nitrophenol	10	10 U	10 R	10 U	10 U	20 U	10 U
2,4-Dimethylphenol	10	10 U	10 R	10 U	10 U	20 U	10 U
Benzoic acid	50	50 U	50 R	50 U	50 U	13 J	50 U
bis (2-Chloroethoxy) Methane	10	10 U	10 R	10 U	10 U	20 U	10 U
2,4-Dichlorophenol	10	10 U	10 R	10 U	10 U	8 J	10 U
1,2,4-Trichlorobenzene	10	10 U	10 R	10 U	10 U	20 U	10 U
Naphthalene	10	10 U	10 R	10 U	10 U	430	10 U
4-Chloroaniline	10	10 U	10 R	10 U	10 U	20 U	10 U
Hexachlorobutadiene	10	10 U	10 R	10 U	10 U	20 U	10 U
4-Chloro-3-Methylphenol	10	10 U	92 R	10 U	10 U	20 U	10 U
2-Methylnaphthalene	10	10 U	10 R	10 U	10 U	20 U	10 U
Hexachlorocyclopentadiene	10	10 U	10 R	10 U	10 U	20 U	10 U
2,4,6-Trichlorophenol	10	10 U	10 R	10 U	10 U	20 U	10 U
2,4,5-Trichlorophenol	50	50 U	50 R	50 U	50 U	8 J	50 U
2-Chloronaphthalene	10	10 U	10 R	10 U	10 U	20 U	10 U
2-Nitroaniline	50	50 U	50 R	50 U	50 U	100 U	50 U
Dimethylphthalate	10	10 U	10 R	10 U	10 U	20 U	10 U
Acenaphthylene	10	10 U	10 R	10 U	10 U	20 U	10 U
2,6-Dinitrotoluene	10	10 U	10 R	10 U	10 U	20 U	10 U
3-Nitroaniline	50	50 U	50 R	50 U	50 U	100 U	50 U
Acenaphthene	10	10 U	10 R	10 U	10 U	20 U	10 U
2,4-Dinitrophenol	50	50 U	50 R	50 U	50 U	100 U	50 U
4-Nitrophenol	50	50 U	110 R	50 U	50 U	100 U	50 U
Dibenzofuran	10	10 U	10 R	10 U	10 U	20 U	10 U
2,4-Dinitrotoluene	10	10 U	10 R	10 U	10 U	20 U	10 U
Diethylphthalate	10	10 U	10 R	10 U	10 U	20 U	10 U
4-Chlorophenyl-phenylether	10	10 U	10 R	10 U	10 U	20 U	10 U
Fluorene	10	10 U	10 R	10 U	10 U	20 U	10 U
4-Nitroaniline	50	50 U	50 R	50 U	50 U	100 U	50 U
4,6-Dinitro-2-Methylphenol	50	50 U	50 R	50 U	50 U	100 U	50 U
N-Nitrosodiphenylamine	10	10 U	3 R	10 U	10 U	20 U	10 U

PROJECT: NCBC GULFPORT, MISSISSIPPI

SEMIVOLATILE AQUEOUS ANALYSES (ug/l)

Validation Table

	SAMPLE LOCATION:	GPTHOGW-1	GPTHOGW-1D	GPTHOGW-1DR	GPTHOGW-2	GPTHOGW-3	GPTHOGW-4
	LAB NUMBER:	27176005	27176006	27176006R	27176007	27176008	27176009
	DATE SAMPLED:	05/17/94	05/17/94	05/17/94	05/17/94	05/17/94	05/17/94
	DATE ANALYZED:	05/26/94	05/26/94	06/03/94	06/03/94	06/03/94	06/03/94
	DILUTION FACTOR:	1.0	1.0	1.0	1.0	2.0	1.0
ANALYTE	CRQL						
1,2-Diphenylhydrazine	10	10 U	10 R	10 U	10 U	20 U	10 U
4-Bromophenyl-phenylether	10	10 U	10 R	10 U	10 U	20 U	10 U
Hexachlorobenzene	10	10 U	10 R	10 U	10 U	20 U	10 U
Pentachlorophenol	50	50 U	120 R	50 U	50 U	100 U	50 U
Phenanthrene	10	10 U	10 R	10 U	10 U	20 U	10 U
Anthracene	10	10 U	10 R	10 U	10 U	20 U	10 U
Di-n-Butylphthalate	10	10 U	10 R	10 U	10 U	20 U	10 U
Fluoranthene	10	10 U	10 R	10 U	10 U	20 U	10 U
Benzidine	50	50 U	50 R	50 R	50 U	100 R	50 R
Pyrene	10	10 U	3 R	10 U	10 U	20 U	10 U
Butylbenzylphthalate	10	10 U	10 R	10 U	10 U	20 U	10 U
3,3'-Dichlorobenzidine	20	20 U	20 R	20 U	20 U	40 U	20 U
Benzo (a) Anthracene	10	10 U	10 R	10 U	10 U	20 U	10 U
Chrysene	10	10 U	10 R	10 U	10 U	20 U	10 U
bis (2-Ethylhexyl) Phthalate	10	10 U	10 R	10 U	10 U	38	10 U
Di-n-Octyl Phthalate	10	10 U	10 R	10 U	10 U	20 U	10 U
Benzo (b) Fluoranthene	10	10 U	10 R	10 U	10 U	20 U	10 U
Benzo (k) Fluoranthene	10	10 U	10 R	10 U	10 U	20 U	10 U
Benzo (a) Pyrene	10	10 U	10 R	10 U	10 U	20 U	10 U
Indeno (1,2,3-cd) Pyrene	10	10 U	10 R	10 U	10 U	20 U	10 U
Dibenz (a,h) Anthracene	10	10 U	10 R	10 U	10 U	20 U	10 U
Benzo (g,h,i) Perylene	10	10 U	10 R	10 U	10 U	20 U	10 U
2-Picoline	50	50 U	50 R	50 U	50 U	100 U	50 U
Methyl methanesulfonate	10	10 U	10 R	10 U	10 U	20 U	10 U
Ethyl Methansulfonate	10	10 U	10 R	10 U	10 U	20 U	10 U
Acetophenone	10	10 U	10 R	10 U	10 U	20 U	10 U
N-Nitrosopiperidine	10	10 U	10 R	10 U	10 U	20 U	10 U
Phenyl-tert-butlamine	50	50 U	50 R	50 U	50 U	100 U	50 U
2,6-Dichlorophenol	10	10 U	10 R	10 U	10 U	20 U	10 U
N-Nitrosodi-n-butylamine	10	10 U	10 R	10 U	10 U	20 U	10 U
1,2,4,5-Tetrachlorobenzene	50	50 U	50 R	50 U	50 U	100 U	50 U
Pentachlorobenzene	50	50 U	50 R	50 U	50 U	100 U	50 U
1-Naphthylamine	50	50 U	50 R	50 U	50 U	100 U	50 U
2-Naphthylamine	50	50 U	50 R	50 U	50 U	100 U	50 U
2,3,4,6-Tetrachlorophenol	10	10 U	10 R	10 U	10 U	20 U	10 U
Phenacetin	10	10 U	10 R	10 U	10 U	20 U	10 U
4-Aminobiphenyl	50	50 U	50 R	50 U	50 U	100 U	50 U
Pronamide	10	10 U	10 R	10 U	10 U	20 U	10 U
p-(Dimethylamino)azobenzene	10	10 U	10 R	10 U	10 U	20 U	10 U
7,12Dimethylbenz(a)anthracene	10	10 U	10 R	10 U	10 U	20 U	10 U
3-Methylcholanthrene	10	10 U	10 R	10 U	10 U	20 U	10 U
Pyridine	50	50 U	50 R	50 U	50 U	100 U	50 U
N-Nitrosomethylethylamine	10	10 U	10 R	10 U	10 U	20 U	10 U
N-Nitrosodiethylamine	10	10 U	10 R	10 U	10 U	20 U	10 U
N-Nitrosopyrrolidine	10	10 U	10 R	10 U	10 U	20 U	10 U
N-Nitrosomorpholine	10	10 U	10 R	10 U	10 U	20 U	10 U
o-Toluidine	10	10 U	10 R	10 U	10 U	20 U	10 U

PROJECT: NCBC GULFPORT, MISSISSIPPI

SEMIVOLATILE AQUEOUS ANALYSES (ug/l)

Validation Table

	SAMPLE LOCATION:	GPTHOGW-1	GPTHOGW-1D	GPTHOGW-1DR	GPTHOGW-2	GPTHOGW-3	GPTHOGW-4
	LAB NUMBER:	27176005	27176006	27176006R	27176007	27176008	27176009
	DATE SAMPLED:	05/17/94	05/17/94	05/17/94	05/17/94	05/17/94	05/17/94
	DATE ANALYZED:	05/26/94	05/26/94	06/03/94	06/03/94	06/03/94	06/03/94
	DILUTION FACTOR:	1.0	1.0	1.0	1.0	2.0	1.0
ANALYTE	CRQL						
Hexachloropropene	50	50 U	50 R	50 U	50 U	100 U	50 U
p-Phenylenediamine	50	500 U	500 R	500 U	500 U	1000 U	500 U
Safrole	50	50 U	50 R	50 U	50 U	100 U	50 U
Isosafrole	50	50 U	50 R	50 U	50 U	100 U	50 U
1,4-Napthoquinone	50	1000 U	1000 R	1000 U	1000 U	2000 U	1000 U
1,3-Dinitrobenzene	10	10 U	10 R	10 U	10 U	20 U	10 U
5-Nitro-o-toluidine	10	10 U	10 R	10 U	10 U	20 U	10 U
1,3,5-Trinitrobenzene	10	10 U	10 R	10 U	10 U	20 U	10 U
4-Nitroquinoline-1-oxide	10	500 U	500 R	500 U	500 U	1000 U	500 U
Methapyrilene	50	50 U	50 R	50 U	50 U	100 U	50 U
Aramite	50	50 U	50 R	50 U	50 U	100 U	50 U
3,3'-Dimethylbenzidine	10	10 U	10 R	10 U	10 U	20 UJ	10 UJ
Hexachlorophene	50	500 R	500 R	500 R	500 R	1000 R	500 R
2-Acetylaminofluorene	10	10 U	10 R	10 U	10 U	20 U	10 U
Pentachloronitrobenzene	50	50 U	50 R	50 U	50 U	100 U	50 U

PROJECT: NCBC GULFPORT, MISSISSIPPI

POLYNUCLEAR AROMATIC HYDROCARBONS AQUEOUS ANALYSES (ug/l)

Validation Table

SAMPLE LOCATION:	GPTHOGW-1	GPTHOGW-1RE	GPTHOGW-1D	GPTHOGW-1DRE	GPTHOGW-2	GPTHOGW-2RE	GPTHOGW-3
LAB NUMBER:	27176005	27176005-RE	27176006	27176006-RE	27176007	27176007-RE	27176008
DATE SAMPLED:	05/17/94	05/17/94	05/17/94	05/17/94	05/17/94	05/17/94	05/17/94
DATE ANALYZED:	05/31/94	06/01/94	05/31/94	06/01/94	05/31/94	06/01/94	05/31/94
ANALYTE							
Naphthalene	56 R	2.0 U	61 R	2.0 U	63 R	2.0 U	52 R
Acenaphthylene	69 R	2.0 U	66 R	2.0 U	72 R	2.0 U	59 R
Acenaphthene	70 R	2.0 U	71 R	2.0 U	74 R	2.0 U	66 R
Fluorene	77 R	1.0 U	74 R	1.0 U	77 R	1.0 U	72 R
Phenanthrene	91 R	1.0 U	87 R	1.0 U	90 R	1.0 U	86 R
Anthracene	61 R	0.20 U	58 R	0.20 U	61 R	0.20 U	86 R
Fluoranthene	8.5 R	0.20 U	7.9 R	0.20 U	8.3 R	0.20 U	7.9 R
Pyrene	9.2 R	2.0 U	8.5 R	2.0 U	8.7 R	2.0 U	8.2 R
Benzo(a)anthracene	8.4 R	0.20 U	7.5 R	0.20 U	8.1 R	0.20 U	7.6 R
Chrysene	8.4 R	2.0 U	7.2 R	2.0 U	7.9 R	2.0 U	8.4 R
Benzo(b)fluoranthene	8.5 R	0.10 U	7.6 R	0.10 U	8.1 R	0.10 U	7.7 R
Benzo(k)fluoranthene	4.0 R	0.10 U	3.6 R	0.10 U	3.9 R	0.10 U	3.6 R
Benzo(a)pyrene	8.3 R	0.10 U	7.7 R	0.10 U	8.1 R	0.10 U	7.3 R
Dibenzo(a,h)anthracene	9.6 R	0.20 U	8.9 R	0.20 U	9.6 R	0.20 U	9.2 R
Indeno(1,2,3-cd)pyrene	10 R	0.20 U	9.6 R	0.20 U	10 R	0.20 U	9.7 R
Benzo(g,h,i)perylene	8.7 R	0.20 U	8.0 R	0.20 U	8.6 R	0.20 U	8.1 R

PROJECT: NCBC GULFPORT, MISSISSIPPI — POLYNUCLEAR AROMATIC HYDROCARBONS AQUEOUS ANALYSES (ug/l) — Validation Table

SAMPLE LOCATION:	GPTHOGW-3RE	GPTHOGW-4	GPTHOGW-4RE
LAB NUMBER:	27176008-RE	27176009	27176009-RE
DATE SAMPLED:	05/17/94	05/17/94	05/17/94
DATE ANALYZED:	06/01/94	05/31/94	06/01/94
ANALYTE			
Naphthalene	2.0 U	60 R	2.0 U
Acenaphthylene	2.0 U	68 R	2.0 U
Acenaphthene	2.0 U	69 R	2.0 U
Fluorene	1.0 U	75 R	1.0 U
Phenanthrene	1.0 U	89 R	1.0 U
Anthracene	0.20 U	60 R	0.20 U
Fluoranthene	0.20 U	8.3 R	0.20 U
Pyrene	2.0 U	8.8 R	2.0 U
Benzo(a)anthracene	0.20 U	8.2 R	0.20 U
Chrysene	2.0 U	8.6 R	2.0 U
Benzo(b)fluoranthene	0.10 U	8.0 R	0.10 U
Benzo(k)fluoranthene	0.10 U	3.8 R	0.10 U
Benzo(a)pyrene	0.10 U	8.0 R	0.10 U
Dibenzo(a,h)anthracene	0.20 U	9.2 R	0.20 U
Indeno(1,2,3-cd)pyrene	0.20 U	10 R	0.20 U
Benzo(g,h,i)perylene	0.20 U	8.4 R	0.20 U

PROJECT: NCBC GULFPORT, MISSISSIPPI — PESTICIDE/PCB AQUEOUS ANALYSES (ug/l) — Validation Table

	SAMPLE LOCATION:	GPTHOGW-1	GPTHOGW-1D	GPTHOGW-2	GPTHOGW-3	GPTHOGW-4
	LAB NUMBER:	27176005	27176006	27176007	27176008	27176009
	DATE SAMPLED:	05/17/94	05/17/94	05/17/94	05/17/94	05/17/94
	DATE ANALYZED:	05/26/94	05/26/94	05/26/94	05/27/94	05/27/94
	DILUTION:	1.0	1.0	1.0	1.0	1.0
ANALYTE	PQL					
alpha-BHC	0.05	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
beta-BHC	0.05	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U
delta-BHC	0.05	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
gamma-BHC (Lindane)	0.05	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Heptachlor	0.05	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Aldrin	0.05	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Heptachlor Epoxide	0.05	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Endosulfan I	0.10	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Dieldrin	0.10	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
4,4'-DDE	0.10	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U
Endrin	0.10	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U
Endosulfan II	0.10	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U
4,4'-DDD	0.10	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U
Endrin Aldehyde	0.10	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U
Endosulfan Sulfate	0.10	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U
4,4'-DDT	0.10	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U
Methoxychlor	0.50	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U
Endrin Ketone	0.10	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U
Chlordane	0.5	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Toxaphene	1.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Aroclor-1016	0.8	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Aroclor-1221	2.0	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Aroclor-1232	2.0	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Aroclor-1242	0.8	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Aroclor-1248	0.5	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Aroclor-1254	1.0	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Aroclor-1260	1.0	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Chlorobenzilate	0.50	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Diallate	1.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Isodrin	0.02	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Kepone	1.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U

PROJECT: NCBC GULFPORT, MISSISSIPPI — ORGANOPHOSPHORUS PESTICIDE AQUEOUS ANALYSIS (ug/l) — Validation Table

	SAMPLE LOCATION:	GPTHOGW-1	GPTHOGW-1D	GPTHOGW-2	GPTHOGW-3	GPTHOGW-4
	LAB NUMBER:	27176005	27176006	27176007	27176008	27176009
	DATE SAMPLED:	05/17/94	05/17/94	05/17/94	05/17/94	05/17/94
	DATE ANALYZED:	06/01/94	06/01/94	06/01/94	06/01/94	06/01/94
ANALYTE	PQL					
Triethylphosphorothioate	1.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Thionazin	1.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Phorate	1.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Sulfotepp	1.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Dimethoate	5.0	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Disulfoton	1.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Methyl Parathion	1.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Ethyl Parathion	1.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Famphur	1.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U

PROJECT: NCBC GULFPORT, MISSISSIPPI — HERBICIDE AQUEOUS ANALYSES (ug/l) — Validation Table

	SAMPLE LOCATION:	GPTHOGW-1	GPTHOGW-1D	GPTHOGW-2	GPTHOGW-3	GPTHOGW-4
	LAB NUMBER:	27176005	27176006	27176007	27176008	27176009
	DATE SAMPLED:	05/17/94	05/17/94	05/17/94	05/17/94	05/17/94
	DATE ANALYZED:	05/24/94	05/24/94	05/24/94	05/24/94	05/24/94
ANALYTE	PQL					
2,4-D	2.5	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
2,4,5-T	0.5	0.5 U	0.5 U	1.5	2.7	0.5 U
2,4,5-TP	0.5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dinoseb	2.5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

PROJECT: NCBC GULFPORT, MISSISSIPPI — DIOXIN/FURANS AQUEOUS ANALYSES (pg/l) — Validation Table

	SAMPLE LOCATION:	GPTHOGW-1	GPTHOGW-1D	GPTHOGW-2	GPTHOGW-3	GPTHOGW-4
	LAB NUMBER:	9405219-04	9405219-07	9405219-08	9405219-09	9405219-10
	DATE SAMPLED:	05/17/94	05/17/94	05/17/94	05/17/94	05/17/94
	DATE ANALYZED:	05/28/94	05/28/94	05/28/94	05/28/94	05/28/94
ANALYTE						
2,3,7,8-TCDD		0.26 U	0.43 U	13.8 U	0.40 U	0.24 U
2,3,7,8-TCDF		0.18 U	0.24 U	2.35 U	0.23 U	0.21 U
1,2,3,7,8-PeCDD		0.50 U	0.79 UJ	1.63 U	0.41 U	0.48 UJ
1,2,3,7,8-PeCDF		0.16 U	0.29 U	2.07 UJ	0.23 U	0.22 U
2,3,4,7,8-PeCDF		0.20 U	0.30 UJ	1.49 U	0.19 U	0.22 U
1,2,3,4,7,8-HxCDD		0.34 U	0.62 U	1.40 U	0.28 U	0.31 U
1,2,3,6,7,8-HxCDD		0.28 U	0.54 U	1.98 U	0.35 U	0.34 U
1,2,3,7,8,9-HxCDD		0.34 U	0.47 U	2.30 U	0.43 U	0.27 U
1,2,3,4,7,8-HxCDF		0.18 U	0.42 U	0.69 U	0.17 U	4.30 (MPC)
1,2,3,6,7,8-HxCDF		0.16 U	0.47 U	0.77 U	0.19 U	0.16 U
2,3,4,6,7,8-HxCDF		0.23 U	0.34 U	1.81 U	0.15 U	0.19 U
1,2,3,7,8,9-HxCDF		0.30 U	0.38 U	1.16 U	0.40 U	0.23 U
1,2,3,4,6,7,8-HpCDD		0.55 U	2.25 U	2.36 U	2.05 U	7.28 (MPC)
1,2,3,4,6,7,8-HpCDF		0.39 U	0.27 U	0.45 U	0.43 U	0.32 U
1,2,3,4,7,8,9-HpCDF		0.33 U	0.47 U	1.31 U	0.26 U	0.30 U
OCDD		133	215 (MPC)	215	116	59.6
OCDF		0.72 U	1.10 U	5.44 U	1.15 U	0.51 U

PROJECT: NCBC GULFPORT, MISSISSIPPI — INORGANIC AQUEOUS ANALYSES (ug/l) — Validation Table

ANALYTE	CRQL	GPTHOGW-1	GPTHOGW-1D	GPTHOGW-2	GPTHOGW-3	GPTHOGW-4
SAMPLE LOCATION:		GPTHOGW-1	GPTHOGW-1D	GPTHOGW-2	GPTHOGW-3	GPTHOGW-4
LAB NUMBER:		M2717605	M2717606	M2717607	M2717608	M2717609
DATE SAMPLED:		05/17/94	05/17/94	05/17/94	05/17/94	05/17/94
Antimony	60	15.7 U	15.7 U	15.7 U	15.7 U	15.7 U
Arsenic	10	19.2 J	26.9 J	9.2 J	35.4 J	12.7 J
Barium	200	166 J	198 J	123 J	174 J	238
Beryllium	5	1.2 J	1.7 J	1.2 J	5.5	1.4 J
Cadmium	5	2.7 U	2.7 U	2.7 U	2.7 U	2.7 U
Chromium	10	26.6	56.3	30.7	83.5	81.0
Cobalt	50	12.1 J	22.2 J	5.2 J	30.1 J	12.9 J
Copper	25	24.1 U	24.1 U	23.4 U	24.1 U	24.1 U
Lead	3	19.8 J	25.5 J	14.3 J	28.4 J	36.8 J
Mercury	0.2	0.10 J	0.08 U	0.24	0.51	0.50
Nickel	40	37.0 J	52.5	23.0 J	79.2	35.0 J
Selenium	5	0.79 UJ	0.83 J	1.4 J	8.4 J	13.9 J
Silver	10	3.4 J	2.7 U	2.7 U	2.7 U	2.7 U
Thallium	10	1.1 UJ	1.1 UJ	1.1 UJ	1.1 UJ	1.1 UJ
Vanadium	50	49.1 J	74.7	42.6 J	153	122
Zinc	20	87.9	93.3	42.9	41.1	24.9
Tin	200	9.5 U	9.5 U	9.5 U	9.5 U	9.5 U
Cyanide	10	0.81 UJ	0.81 UJ	1.0 J	255 J	51.2 J
Sulfide	100	1.0	1.7	<0.1	9.3	9.2

Validated Quality Assurance and Quality Control Results

PROJECT: NCBC GULFPORT, MISSISSIPPI

VOLATILE AQUEOUS ANALYSES (ug/l)

Validation Table

	SAMPLE LOCATION:	BS-01-DI	BS-01-PI	BS-01-RI	BS-01-TB
	LAB NUMBER:	27176001	27176002	27176003	27176004
	DATE SAMPLED:	05/17/94	05/17/94	05/17/94	05/17/94
	DATA ANALYZED:	05/23/94	05/23/94	05/23/94	05/23/94
	DILUTION FACTOR:	1.0	1.0	1.0	1.0
ANALYTE	CRQL				
Chloromethane	10	10 U	10 U	10 U	10 U
Bromomethane	10	10 U	10 U	10 U	10 U
Vinyl Chloride	10	10 U	10 U	10 U	10 U
Chloroethane	10	10 U	10 U	10 U	10 U
Methylene Chloride	5	5 U	10 U	2 J	1 J
Acetone	10	38	7 J	14	8 J
Carbon Disulfide	5	5 U	5 U	5 U	5 U
1,1-Dichloroethene	5	5 U	5 U	5 U	5 U
1,1-Dichloroethane	5	5 U	5 U	5 U	5 U
1,2-Dichloroethene (total)	5	5 U	5 U	5 U	5 U
Chloroform	5	5 U	1 J	5 U	5 U
1,2-Dichloroethane	5	5 U	5 U	5 U	5 U
2-Butanone	10	10 U	10 U	10 U	10 U
1,1,1-Trichloroethane	5	5 U	5 U	5 U	5 U
Carbon Tetrachloride	5	5 U	5 U	5 U	5 U
Bromodichloromethane	5	5 U	5 U	5 U	5 U
1,2-Dichloropropane	5	5 U	5 U	5 U	5 U
cis-1,3-Dichloropropene	5	5 U	5 U	5 U	5 U
Trichloroethene	5	5 U	5 U	5 U	5 U
Dibromochloromethane	5	5 U	5 U	5 U	5 U
1,1,2-Trichloroethane	5	5 U	5 U	5 U	5 U
Benzene	5	5 U	5 U	5 U	5 U
trans-1,3-Dichloropropene	5	5 U	5 U	5 U	5 U
Bromoform	5	5 U	5 U	5 U	5 U
4-Methyl-2-Pentanone	10	10 U	10 U	10 U	10 U
2-Hexanone	10	10 U	10 U	10 U	10 U
Tetrachloroethene	5	5 U	5 U	5 U	5 U
1,1,2,2-Tetrachloroethane	5	5 U	5 U	5 U	5 U
Toluene	5	5 U	5 U	5 U	5 U
Chlorobenzene	5	5 U	5 U	5 U	5 U
Ethylbenzene	5	5 U	5 U	5 U	5 U
Styrene	5	5 U	5 U	5 U	5 U
Xylene (total)	5	5 U	5 U	5 U	5 U
Dichlorodifluoromethane	10	10 U	10 U	10 U	10 U
Trichlorofluoromethane	5	5 U	5 U	5 U	5 U
Acrolein	100	100 U	100 U	100 U	100 U
Iodomethane	10	10 U	10 U	10 U	10 U
Acrylonitrile	100	100 U	100 U	100 U	100 U
Vinyl acetate	10	10 U	10 U	10 U	10 U
Dibromomethane	5	5 U	5 U	5 U	5 U
2-Chloroethyl vinyl ether	10	10 U	10 U	10 U	10 U
Ethyl methacrylate	5	5 U	5 U	5 U	5 U
1,2,3-Trichloropropene	5	5 U	5 U	5 U	5 U
trans-1,4-Dichloro-2-butene	5	5 U	5 U	5 U	5 U

PROJECT: NCBC GULFPORT, MISSISSIPPI

VOLATILE AQUEOUS ANALYSES (ug/l)

Validation Table

SAMPLE LOCATION:		BS-01-DI	BS-01-PI	BS-01-RI	BS-01-TB
LAB NUMBER:		27176001	27176002	27176003	27176004
DATE SAMPLED:		05/17/94	05/17/94	05/17/94	05/17/94
DATA ANALYZED:		05/23/94	05/23/94	05/23/94	05/23/94
DILUTION FACTOR:		1.0	1.0	1.0	1.0
	CRQL				
Acetonitrile	100	34 J	100 U	100 U	100 U
3-Chloropropene	5	5 U	5 U	5 U	5 U
Chloroprene	200	200 U	200 U	200 U	200 U
Propionitrile	100	100 U	100 U	100 U	100 U
Methacrylonitrile	5	5 U	5 U	5 U	5 U
Isobutyl alcohol	200	200 R	200 R	200 R	200 R
Methyl methacrylate	10	10 U	10 U	10 U	10 U
1,4-Dioxane	200	200 R	200 R	200 R	200 R
1,2-Dibromoethane	5	5 U	5 U	5 U	5 U
1,1,1,2-Tetrachloroethane	5	5 U	5 U	5 U	5 U
Pentachloroethane	10	10 U	10 U	10 U	10 U
1,3-Dichlorobenzene	5	5 U	5 U	5 U	5 U
1,4-Dichlorobenzene	5	5 U	5 U	5 U	5 U
1,2-Dichlorobenzene	5	5 U	5 U	5 U	5 U
1,2-Dibromo-3-chloropropane	10	10 U	10 U	10 U	10 U

PROJECT: NCBC GULFPORT, MISSISSIPPI — SEMIVOLATILE AQUEOUS ANALYSES (ug/l) — Validation Table

	SAMPLE LOCATION:	BS-01-D	BS-01-PI	BS-01-PIRE	BS-01-RI
	LAB NUMBER:	27176001	27176002	27176002RE	27176003
	DATE SAMPLED:	05/17/94	05/17/94	05/17/94	05/17/94
	DATE ANALYZED:	05/26/94	05/26/94	06/06/94	05/26/94
	DILUTION FACTOR:	1.0	1.0	1.0	1.0
ANALYTE	CRQL				
N-Nitrosodimethylamine	10	10 U	10 U	10 R	10 U
Phenol	10	10 U	10 R	10 R	10 U
Aniline	10	10 U	10 U	10 R	10 U
bis (2-Chloroethyl) Ether	10	10 U	10 U	10 R	10 U
2- Chlorophenol	10	10 U	10 U	10 R	10 U
1,3- Dichlorobenzene	10	10 U	10 U	10 R	10 U
1,4- Dichlorobenzene	10	10 U	10 U	10 R	10 U
Benzyl alcohol	10	10 U	10 R	10 R	10 U
1,2- Dichlorobenzene	10	10 U	10 U	10 R	10 U
2- Methylphenol	10	10 U	10 R	10 R	10 U
bis(2-Chloroisopropyl)ether	10	10 U	10 U	10 R	10 U
4-Methylphenol	10	10 U	10 U	10 R	10 U
N-Nitroso-Di-n-Propylamine	10	10 U	10 U	10 R	10 U
Hexachloroethane	10	10 U	10 U	10 R	10 U
Nitrobenzene	10	10 U	10 U	10 R	10 U
Isophorone	10	10 U	10 U	10 R	10 U
2-Nitrophenol	10	10 U	10 R	10 R	10 U
2,4-Dimethylphenol	10	10 U	10 R	10 R	10 U
Benzoic acid	50	50 U	50 R	50 R	50 U
bis (2-Chloroethoxy) Methane	10	10 U	10 U	10 R	10 U
2,4-Dichlorophenol	10	10 U	10 R	10 R	10 U
1,2,4-Trichlorobenzene	10	10 U	10 U	10 R	10 U
Naphthalene	10	10 U	10 U	10 R	10 U
4-Chloroaniline	10	10 U	10 U	10 R	10 U
Hexachlorobutadiene	10	10 U	10 U	10 R	10 U
4-Chloro-3-Methylphenol	10	10 U	10 U	10 R	10 U
2-Methylnaphthalene	10	10 U	10 U	10 R	10 U
Hexachlorocyclopentadiene	10	10 U	10 U	10 R	10 U
2,4,6-Trichlorophenol	10	10 U	10 R	10 R	10 U
2,4,5-Trichlorophenol	50	50 U	50 R	50 R	50 U
2-Chloronaphthalene	10	10 U	10 U	10 R	10 U
2-Nitroaniline	50	50 U	50 U	50 R	50 U
Dimethylphthalate	10	10 U	10 U	10 R	10 U
Acenaphthylene	10	10 U	10 U	10 R	10 U
2,6-Dinitrotoluene	10	10 U	10 U	10 R	10 U
3-Nitroaniline	50	50 U	50 U	50 R	50 U
Acenaphthene	10	10 U	10 U	10 R	10 U
2,4-Dinitrophenol	50	50 U	50 R	50 R	50 U
4-Nitrophenol	50	50 U	50 R	50 R	50 U
Dibenzofuran	10	10 U	10 U	10 R	10 U
2,4-Dinitrotoluene	10	10 U	10 U	10 R	10 U
Diethylphthalate	10	10 U	10 U	10 R	10 U
4-Chlorophenyl-phenylether	10	10 U	10 U	10 R	10 U
Fluorene	10	10 U	10 U	10 R	10 U
4-Nitroaniline	50	50 U	50 U	50 R	50 U
4,6-Dinitro-2-Methylphenol	50	50 U	50 R	50 R	50 U
N-Nitrosodiphenylamine	10	10 U	2 J	2 R	10 U

PROJECT: NCBC GULFPORT, MISSISSIPPI

SEMIVOLATILE AQUEOUS ANALYSES (ug/l)

	SAMPLE LOCATION:	BS-01-DI	BS-01-PI	BS-01-PIRE	BS-01-RI
	LAB NUMBER:	27176001	27176002	27176002RE	27176003
	DATE SAMPLED:	05/17/94	05/17/94	05/17/94	05/17/94
	DATE ANALYZED:	05/26/94	05/26/94	06/06/94	05/26/94
	DILUTION FACTOR:	1.0	1.0	1.0	1.0
ANALYTE	CRQL				
1,2-Diphenylhydrazine	10	10 U	10 U	10 R	10 U
4-Bromophenyl-phenylether	10	10 U	10 U	10 R	10 U
Hexachlorobenzene	10	10 U	10 U	10 R	10 U
Pentachlorophenol	50	50 U	50 R	50 R	50 U
Phenanthrene	10	10 U	10 U	10 R	10 U
Anthracene	10	10 U	10 U	10 R	10 U
Di-n-Butylphthalate	10	10 U	10 U	10 R	10 U
Fluoranthene	10	10 U	10 U	10 R	10 U
Benzidine	50	50 U	50 U	50 R	50 U
Pyrene	10	10 U	10 U	10 R	10 U
Butylbenzylphthalate	10	10 U	10 U	10 R	10 U
3,3'-Dichlorobenzidine	20	20 U	20 U	20 R	20 U
Benzo (a) Anthracene	10	10 U	10 U	10 R	10 U
Chrysene	10	10 U	10 U	10 R	10 U
bis (2-Ethylhexyl) Phthalate	10	10 U	10 U	10 R	10 U
Di-n-Octyl Phthalate	10	10 U	10 U	10 R	10 U
Benzo (b) Fluoranthene	10	10 U	10 U	10 R	10 U
Benzo (k) Fluoranthene	10	10 U	10 U	10 R	10 U
Benzo (a) Pyrene	10	10 U	10 U	10 R	10 U
Indeno (1,2,3-cd) Pyrene	10	10 U	10 U	10 R	10 U
Dibenz (a,h) Anthracene	10	10 U	10 U	10 R	10 U
Benzo (g,h,i) Perylene	10	10 U	10 U	10 R	10 U
2-Picoline	50	50 U	50 U	50 R	50 U
Methyl methanesulfonate	10	10 U	10 U	10 R	10 U
Ethyl Methansulfonate	10	10 U	10 U	10 R	10 U
Acetophenone	10	10 U	10 U	10 R	10 U
N-Nitrosopiperidine	10	10 U	10 U	10 R	10 U
Phenyl-tert-butlamine	50	50 U	50 U	50 R	50 U
2,6-Dichlorophenol	10	10 U	10 U	10 R	10 U
N-Nitrosodi-n-butylamine	10	10 U	10 U	10 R	10 U
1,2,4,5-Tetrachlorobenzene	50	50 U	50 U	50 R	50 U
Pentachlorobenzene	50	50 U	50 U	50 R	50 U
1-Naphthylamine	50	50 U	50 U	50 R	50 U
2-Naphthylamine	50	50 U	50 U	50 R	50 U
2,3,4,6-Tetrachlorophenol	10	10 U	10 U	10 R	10 U
Phenacetin	10	10 U	10 U	10 R	10 U
4-Aminobiphenyl	50	50 U	50 U	50 R	50 U
Pronamide	10	10 U	10 U	10 R	10 U
p-(Dimethylamino)azobenzene	10	10 U	10 U	10 R	10 U
7,12Dimethylbenz(a)anthracene	10	10 U	10 U	10 R	10 U
3-Methylcholanthrene	10	10 U	10 U	10 R	10 U
Pyridine	50	50 U	50 U	50 R	50 U
N-Nitrosomethylethylamine	10	10 U	10 U	10 R	10 U
N-Nitrosodiethylamine	10	10 U	10 U	10 R	10 U
N-Nitrosopyrrolidine	10	10 U	10 U	10 R	10 U
N-Nitrosomorpholine	10	10 U	10 U	10 R	10 U
o-Toluidine	10	10 U	10 U	10 R	10 U

PROJECT: NCBC GULFPORT, MISSISSIPPI

SEMIVOLATILE AQUEOUS ANALYSES (ug/l)

	SAMPLE LOCATION:	BS-01-DI	BS-01-PI	BS-01-PIRE	BS-01-RI
	LAB NUMBER:	27176001	27176002	27176002RE	27176003
	DATE SAMPLED:	05/17/94	05/17/94	05/17/94	05/17/94
	DATE ANALYZED:	05/26/94	05/26/94	06/06/94	05/26/94
	DILUTION FACTOR:	1.0	1.0	1.0	1.0
ANALYTE	CRQL				
Hexachloropropene	50	50 U	50 U	50 R	50 U
p-Phenylenediamine	50	500 U	500 U	500 R	500 U
Safrole	50	50 U	50 U	50 R	50 U
Isosafrole	50	50 U	50 U	50 R	50 U
1,4-Napthoquinone	50	1000 U	1000 U	1000 R	1000 U
1,3-Dinitrobenzene	10	10 U	10 U	10 R	10 U
5-Nirtro-o-toluidine	10	10 U	10 U	10 R	10 U
1,3,5-Trinitrobenzene	10	10 U	10 U	10 R	10 U
4-Nitroquinoline-1-oxide	10	500 U	500 U	500 R	500 U
Methapyrilene	50	50 U	50 U	50 R	50 U
Aramite	50	50 U	50 U	50 R	50 U
3,3'-Dimethylbenzidine	10	10 U	10 U	10 R	10 U
Hexachlorophene	50	500 R	500 R	500 R	500 R
2-Acetylaminofluorene	10	10 U	10 U	10 R	10 U
Pentachloronitrobenzene	50	50 U	50 U	50 R	50 U

PROJECT: NCBC GULFPORT, MISSISSIPPI

POLYNUCLEAR AROMATIC HYDROCARBONS AQUEOUS ANALYSES (ug/l)

Validation Table

SAMPLE LOCATION:	BS-01-DI	BS-01-DIRE	BS-01-PI	BS-01-PIRE	BS-01-RI	BS-01-RIRE
LAB NUMBER:	27176001	27176001-RE	27176002	27176002-RE	27176003	27176003-RE
DATE SAMPLED:	05/17/94	05/17/94	05/17/94	05/17/94	05/17/94	05/17/94
DATE ANALYZED:	05/31/94	06/01/94	05/31/94	06/01/94	05/31/94	06/01/94
ANALYTE						
Naphthalene	65 R	2.0 U	59 R	2.0 U	56 R	2.0 U
Acenaphthylene	73 R	2.0 U	63 R	2.0 U	68 R	2.0 U
Acenaphthene	75 R	2.0 U	70 R	2.0 U	69 R	2.0 U
Fluorene	79 R	1.0 U	75 R	1.0 U	74 R	1.0 U
Phenanthrene	93 R	1.0 U	90 R	1.0 U	87 R	1.0 U
Anthracene	63 R	0.20 U	50 R	0.20 U	60 R	0.20 U
Fluoranthene	8.8 R	0.20 U	8.5 R	0.20 U	8.3 R	0.20 U
Pyrene	9.6 R	2.0 U	8.9 R	2.0 U	8.9 R	2.0 U
Benzo(a)anthracene	9.0 R	0.20 U	8.4 R	0.20 U	8.7 R	0.20 U
Chrysene	8.8 R	2.0 U	9.4 R	2.0 U	8.7 R	2.0 U
Benzo(b)fluoranthene	9.1 R	0.10 U	9.2 R	0.10 U	8.9 R	0.10 U
Benzo(k)fluoranthene	4.3 R	0.10 U	4.3 R	0.10 U	4.2 R	0.10 U
Benzo(a)pyrene	9.3 R	0.10 U	0.83 R	0.10 U	8.9 R	0.10 U
Dibenzo(a,h)anthracene	10 R	0.20 U	9.8 R	0.20 U	9.6 R	0.20 U
Indeno(1,2,3-cd)pyrene	11 R	0.20 U	11 R	0.20 U	11 R	0.20 U
Benzo(g,h,i)perylene	9.1 R	0.20 U	8.6 R	0.20 U	8.7 R	0.20 U

PROJECT: NCBC GULFPORT, MISSISSIPPI

PESTICIDE/PCB AQUEOUS ANALYSES (ug/l)

Validation Table

	SAMPLE LOCATION:	BS-01-DI	BS-01-PI	BS-01-RI
	LAB NUMBER:	27176001	27176002	37909003
	DATE SAMPLED:	05/17/94	05/17/94	04/19/94
	DATE ANALYZED:	05/26/94	05/26/94	04/26/94
	DILUTION:	1.0	2.0	1.0
ANALYTE	PQL			
alpha-BHC	0.05	0.020 U	0.040 U	0.020 U
beta-BHC	0.05	0.040 U	0.080 U	0.040 U
delta-BHC	0.05	0.020 U	0.040 U	0.020 U
gamma-BHC (Lindane)	0.05	0.020 U	0.040 U	0.020 U
Heptachlor	0.05	0.020 U	0.040 U	0.020 U
Aldrin	0.05	0.020 U	0.040 U	0.020 U
Heptachlor Epoxide	0.05	0.020 U	0.040 U	0.020 U
Endosulfan I	0.10	0.020 U	0.040 U	0.020 U
Dieldrin	0.10	0.020 U	0.040 U	0.020 U
4,4'- DDE	0.10	0.040 U	0.040 U	0.040 U
Endrin	0.10	0.040 U	0.080 U	0.040 U
Endosulfan II	0.10	0.040 U	0.080 U	0.040 U
4,4'- DDD	0.10	0.040 U	0.080 U	0.040 U
Endrin Aldehyde	0.10	0.040 U	0.080 U	0.040 U
Endosulfan Sulfate	0.10	0.040 U	0.080 U	0.040 U
4,4'- DDT	0.10	0.040 U	0.61	0.040 U
Methoxychlor	0.50	0.080 U	0.16 U	0.080 U
Endrin Ketone	0.10	0.040 U	0.080 U	0.040 U
Chlordane	0.5	0.20 U	0.40 U	0.20 U
Toxaphene	1.0	1.0 U	2.0 U	1.0 U
Aroclor-1016	0.8	1.0 U	2.0 U	1.0 U
Aroclor-1221	2.0	2.0 U	4.0 U	2.0 U
Aroclor-1232	2.0	2.0 U	4.0 U	2.0 U
Aroclor-1242	0.8	1.0 U	2.0 U	1.0 U
Aroclor-1248	0.5	1.0 U	2.0 U	1.0 U
Aroclor-1254	1.0	0.50 U	1.0 U	0.50 U
Aroclor-1260	1.0	0.50 U	1.0 U	0.50 U
Chlorobenzilate	0.50	0.50 U	1.0 U	0.50 U
Diallate	1.0	1.0 U	2.0 U	1.0 U
Isodrin	0.02	0.020 U	0.040 U	0.020 U
Kepone	1.0	1.0 U	1.0 U	1.0 U

PROJECT: NCBC GULFPORT, MISSISSIPPI — ORGANOPHOSPHORUS PESTICIDE AQUEOUS ANALYSIS (ug/l) — Validation Table

	SAMPLE LOCATION:	BS-01-DI	BS-01-PI	BS-01-PIRE	BS-01-RI
	LAB NUMBER:	27176001	27176002	27176002RE	27176003
	DATE SAMPLED:	05/17/94	05/17/94	05/17/94	05/17/94
	DATE ANALYZED:	06/01/94	06/01/94	06/02/94	06/01/94
ANALYTE	PQL				
Triethylphosphorothioate	1.0	1.0 U	1.0 UJ	1.0 UJ	1.0 U
Thionazin	1.0	1.0 U	1.0 UJ	1.0 UJ	1.0 U
Phorate	1.0	1.0 U	1.0 UJ	1.0 UJ	1.0 U
Sulfotepp	1.0	1.0 U	1.0 UJ	1.0 UJ	1.0 U
Dimethoate	5.0	2.0 U	2.0 UJ	2.0 UJ	2.0 U
Disulfoton	1.0	1.0 U	1.0 UJ	1.0 UJ	1.0 U
Methyl Parathion	1.0	1.0 U	1.0 UJ	1.0 UJ	1.0 U
Ethyl Parathion	1.0	1.0 U	1.0 UJ	1.0 UJ	1.0 U
Famphur	1.0	1.0 U	1.0 UJ	1.0 UJ	1.0 U

PROJECT: NCBC GULFPORT, MISSISSIPPI — HERBICIDE AQUEOUS ANALYSES (ug/l) — Validation Table

	SAMPLE LOCATION:	BS-01-DI	BS-01-PI	BS-01-RI
	LAB NUMBER:	27176001	27176002	27176003
	DATE SAMPLED:	05/17/94	05/17/94	05/17/94
	DATE ANALYZED:	05/24/94	05/24/94	05/24/94
ANALYTE	PQL			
2,4-D	2.5	2.5 U	2.5 U	2.5 U
2,4,5-T	0.5	0.5 U	0.5 U	0.5 U
2,4,5-TP	0.5	0.5 U	0.5 U	0.5 U
Dinoseb	2.5	0.5 U	0.5 U	0.5 U

PROJECT: NCBC GULFPORT, MISSISSIPPI — DIOXIN/FURANS AQUEOUS ANALYSES (mg/l) — Validation Table

	SAMPLE LOCATION:	BS-01-DI	BS-01-PI	BS-01-RI	BS-01-RIRE
	LAB NUMBER:	9405219-01	9405219-02	9405219-03	9405219-03
	DATE SAMPLED:	05/17/94	05/17/94	05/17/94	05/17/94
	DATE ANALYZED:	05/25/94	05/25/94	05/25/94	06/10/94
ANALYTE					
2,3,7,8-TCDD		1.0 U	1.42 U	0.40 UR	2.02 UR
2,3,7,8-TCDF		0.93 U	0.91 U	0.39 UR	1.94 UR
1,2,3,7,8-PeCDD		0.43 U	0.96 U	14.3 R	2.61 UR
1,2,3,7,8-PeCDF		0.27 U	1.26 U	10.4 R (MPC)	1.55 UR
2,3,4,7,8-PeCDF		0.23 U	0.96 U	6.17 R (MPC)	1.94 UR
1,2,3,4,7,8-HxCDD		0.24 U	0.76 U	21.0 R (MPC)	2.20 UR
1,2,3,6,7,8-HxCDD		0.23 U	0.77 U	15.8 R (MPC)	2.06 UR
1,2,3,7,8,9-HxCDD		0.87 U	0.85 U	15.9 R	2.17 UR
1,2,3,4,7,8-HxCDF		0.26 U	0.56 U	11.1 R	1.69 UR
1,2,3,6,7,8-HxCDF		0.29 U	0.81 U	12.3 R	1.51 UR
2,3,4,6,7,8-HxCDF		0.25 U	0.59 U	10.1 R (MPC)	1.63 UR
1,2,3,7,8,9-HxCDF		0.40 U	2.43 (MPC)	31.3 R (MPC)	1.85 UR
1,2,3,4,6,7,8-HpCDD		1.15 U	1.27 U	34.8 R	2.76 R
1,2,3,4,6,7,8-HpCDF		0.25 U	0.34 U	24.3 R (MPC)	4.65 R (MPC)
1,2,3,4,7,8,9-HpCDF		1.49 U	1.48 U	29.7 R	1.73 UR
OCDD		1.95 U	2.44 U	71.0 R	9.95 R
OCDF		3.32 U	2.05 U	69.3 R	98.2 R

PROJECT: NCBC GULFPORT, MISSISSIPPI — INORGANIC AQUEOUS ANALYSES (ug/l) — Validation Table

ANALYTE	CRQL	BS-01-DI	BS-01-PI	BS-01-RI
SAMPLE LOCATION:		BS-01-DI	BS-01-PI	BS-01-RI
LAB NUMBER:		M2717601	M2717602	M2717603
DATE SAMPLED:		05/17/94	05/17/94	05/17/94
Antimony	60	15.7 U	15.7 U	15.7 U
Arsenic	10	0.60 UJ	0.60 UJ	0.60 UJ
Barium	200	1.3 J	6.4 J	1.2 J
Beryllium	5	0.15 U	0.15 U	0.15 U
Cadmium	5	2.7 U	2.7 U	2.7 U
Chromium	10	2.8 U	2.8 U	2.8 U
Cobalt	50	3.6 U	3.6 U	3.6 U
Copper	25	4.2 U	10.2 U	3.2 U
Lead	3	1.8 R	1.8 R	1.8 R
Mercury	0.2	0.08 U	0.08 U	0.08 U
Nickel	40	9.7 U	9.7 U	9.7 U
Selenium	5	0.79 UJ	0.79 UJ	0.79 UJ
Silver	10	2.7 U	2.7 U	2.7 U
Thallium	10	1.1 UJ	1.1 UJ	1.1 UJ
Vanadium	50	2.1 U	2.1 U	2.1 U
Zinc	20	1.3 U	5.0 J	1.3 U
Tin	200	9.5 U	9.5 U	9.5 U
Cyanide	10	0.81 UJ	0.81 UJ	0.81 UJ
Sulfide	100	0.2	<0.1	<0.1

Groundwater Sampling Event No. 2

Validation Groundwater Results

PROJECT: NCBC GULFPORT, MISSISSIPPI — VOLATILE AQUEOUS ANALYSES (ug/l) — Validation Table

	SAMPLE NUMBER:	GPTHO2-1	GPTHO2-1D	GPTHO2-2	GPTHO2-3	GPTHO2-4
	LAB NUMBER:	R8548008	R8548004	R8548005	R8548006	R8548007
	DATE SAMPLED:	08/13/94	08/13/94	08/13/94	08/13/94	08/13/94
	DATA ANALYZED:	08/23/94	08/23/94	08/23/94	08/23/94	08/23/94
	DILUTION FACTOR:	1.0	1.0	1.0	1.0	1.0
ANALYTE	CRQL					
Chloromethane	10	10 U	10 U	10 U	10 U	10 U
Bromomethane	10	10 U	10 U	10 U	10 U	10 U
Vinyl Chloride	10	10 U	10 U	10 U	10 U	10 U
Chloroethane	10	10 U	10 U	10 U	10 U	10 U
Methylene Chloride	6	6 U	6 U	6 U	6 U	6 U
Acetone	10	6 J	10 U	10 U	9 J	11
Carbon Disulfide	6	6 U	6 U	6 U	6 U	5 U
Trichlorofluoromethane	5	5 U	2 J	1 J	1 J	5 U
1,1-Dichloroethene	5	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethane	5	5 U	5 U	5 U	5 U	5 U
1,2-Dichloroethene (total)	5	5 U	5 U	5 U	5 U	5 U
Chloroform	5	5 U	5 U	5 U	5 U	5 U
1,2-Dichloroethane	5	5 U	5 U	5 U	5 U	5 U
Isobutanol	200	200 UR	200 UR	200 UR	200 UR	200 UR
2-Butanone	10	10 U	10 U	10 U	10 U	10 U
1,1,1-Trichloroethane	5	5 U	5 U	5 U	5 U	5 U
Carbon Tetrachloride	5	5 U	5 U	5 U	5 U	5 U
Vinyl acetate	10	10 U	10 U	10 U	10 U	10 U
Bromodichloromethane	5	5 U	5 U	5 U	5 U	5 U
1,2-Dichloropropane	5	5 U	5 U	5 U	5 U	5 U
cis-1,3-Dichloropropene	5	5 U	5 U	5 U	5 U	5 U
Trichloroethene	6	6 U	6 U	5 U	6 U	6 U
Dibromochloromethane	5	5 U	5 U	5 U	5 U	5 U
1,1,2-Trichloroethane	6	6 U	6 U	5 U	6 U	6 U
Benzene	5	5 U	5 U	5 U	5 U	5 U
trans-1,3-Dichloropropene	6	6 U	6 U	6 U	6 U	6 U
2-Chloroethylvinylether	10	10 U	10 U	10 U	10 U	10 U
Bromoform	6	6 U	6 U	5 U	5 U	5 U
2-Hexanone	10	10 U	10 U	10 U	10 U	10 U
4-Methyl-2-Pentanone	10	10 U	10 U	10 U	10 U	10 U
Tetrachloroethene	5	5 U	5 U	5 U	5 U	5 U
1,1,2,2-Tetrachloroethane	6	6 U	6 U	6 U	6 U	6 U
Toluene	5	5 U	5 U	5 U	5 U	5 U
Chlorobenzene	6	6 U	6 U	5 U	6 U	6 U
Ethylbenzene	5	5 U	5 U	5 U	5 U	5 U
Styrene	5	5 U	5 U	5 U	5 U	5 U
Xylene (total)	5	5 U	5 U	5 U	5 U	5 U
1,3-Dichlorobenzene	5	5 U	5 U	5 U	5 U	5 U
1,4-Dichlorobenzene	5	5 U	5 U	5 U	5 U	5 U
1,2-Dichlorobenzene	5	5 U	5 U	5 U	5 U	5 U
Dichlorodifluoromethane	10	10 U	10 U	10 U	10 U	10 U
Acrolein	100	100 U	100 U	100 U	100 U	100 U
Iodomethane	10	10 U	10 U	10 U	10 U	10 U
Acrylonitrile	100	100 U	100 U	100 U	100 U	100 U
Dibromomethane	5	5 U	5 U	5 U	5 U	5 U
Ethyl methacrylate	5	5 U	5 U	5 U	5 U	5 U
1,2,3-Trichloropropene	5	5 U	5 U	5 U	5 U	5 U
trans-1,4-Dichloro-2-butene	5	5 U	5 U	5 U	5 U	5 U

PROJECT: NCBC GULFPORT, MISSISSIPPI

VOLATILE AQUEOUS ANALYSES (ug/l)

Validation Table

SAMPLE NUMBER:		GPTHO2-1	GPTHO2-1D	GPTHO2-2	GPTHO2-3	GPTHO2-4
LAB NUMBER:		R8548008	R8548004	R8548005	R8548006	R8548007
DATE SAMPLED:		08/13/94	08/13/94	08/13/94	08/13/94	08/13/94
DATA ANALYZED:		08/23/94	08/23/94	08/23/94	08/23/94	08/23/94
DILUTION FACTOR:		1.0	1.0	1.0	1.0	1.0
	CRQL					
Acetonitrile	100	100 U	100 U	100 U	100 U	100 U
3-Chloropropene	5	5 U	5 U	5 U	5 U	5 U
Propionitrile	100	100 U	100 U	100 U	100 U	100 U
Methacrylonitrile	5	5 U	5 U	5 U	5 U	5 U
1,4-Dioxane	200	200 UR	200 UR	200 UR	200 UR	200 UR
Methyl methacrylate	10	10 U	10 U	10 U	10 U	10 U
1,2-Dibromoethane	6	6 U	6 U	6 U	6 U	6 U
1,1,1,2-Tetrachloroethane	5	5 U	5 U	5 U	5 U	5 U
1,2-Dibromo-3-chloropropane	10	10 U	10 U	10 U	10 U	10 U
Pentachloroethane	10	10 U	10 U	10 U	10 U	10 U
Chloroprene	200	200 U	200 U	200 U	200 U	200 U

PROJECT: NCBC GULFPORT, MISSISSIPPI		SEMIVOLATILE AQUEOUS ANALYSES (ug/l)					Validation Table	
	SAMPLE LOCATION:	GPTHO2-1	GPTHO2-1RE	GPTHO2-1D	GPTHO2-1DRE	GPTHO2-2	GPTHO2-3	GPTHO2-4
	LAB NUMBER:	R8548008	R8543008RE	R8548004	R8548004RE	R8548005	R8548006	R8548007
	DATE SAMPLED:	08/13/94	08/13/94	08/13/94	08/13/94	08/13/94	08/13/94	08/13/94
	DATE ANALYZED:	09/03/94	09/06/94	09/02/94	09/06/94	09/02/94	09/03/94	09/03/94
	DILUTION FACTOR:	1.0	1.0	1.0	1.0	1.0	1.0	1.0
ANALYTE	CRQL							
N-Nitrosodimethylamine	10	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U
Phenol	10	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U
Aniline	10	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U
bis (2-Chloroethyl) Ether	10	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U
2- Chlorophenol	10	10 U	10 UR	10 U	10 UR	10 U	4 J	10 U
1,3- Dichlorobenzene	10	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U
1,4- Dichlorobenzene	10	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U
Benzyl alcohol	10	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U
1,2- Dichlorobenzene	10	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U
2- Methylphenol	10	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U
bis(2-Chloroisopropyl)ether	10	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U
4-Methylphenol	10	10 U	10 UR	10 U	10 UR	10 U	4 J	10 U
N-Nitroso-Di-n-Propylamine	10	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U
Hexachloroethane	10	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U
Nitrobenzene	10	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U
Isophorone	10	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U
2-Nitrophenol	10	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U
2,4-Dimethylphenol	10	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U
Benzoic acid	50	50 U	50 UR	50 U	50 UR	50 U	50 U	50 U
bis (2-Chloroethoxy) Methane	10	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U
2,4-Dichlorophenol	10	10 U	10 UR	10 U	10 UR	10 U	4 J	10 U
1,2,4-Trichlorobenzene	10	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U
Naphthalene	10	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U
4-Chloroaniline	10	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U
Hexachlorobutadiene	10	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U
4-Chloro-3-Methylphenol	10	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U
2-Methylnaphthalene	10	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U
Hexachlorocyclopentadiene	10	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U
2,4,6-Trichlorophenol	10	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U
2,4,5-Trichlorophenol	50	50 U	50 UR	50 U	50 UR	50 U	50 U	50 U
2-Chloronaphthalene	10	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U
2-Nitroaniline	50	50 U	50 UR	50 U	50 UR	50 U	50 U	50 U
Dimethylphthalate	10	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U
Acenaphthylene	10	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U
2,6-Dinitrotoluene	10	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U
3-Nitroaniline	50	50 U	50 UR	50 U	50 UR	50 U	50 U	50 U
Acenaphthene	10	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U
2,4-Dinitrophenol	50	50 U	50 UR	50 U	50 UR	50 U	50 U	50 U
4-Nitrophenol	50	50 U	50 UR	50 U	50 UR	50 U	50 U	50 U
Dibenzofuran	10	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U
2,4-Dinitrotoluene	10	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U
Diethylphthalate	10	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U
4-Chlorophenyl-phenylether	10	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U
Fluorene	10	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U
4-Nitroaniline	50	50 U	50 UR	50 U	50 UR	50 U	50 U	50 U
4,6-Dinitro-2-Methylphenol	50	50 U	50 UR	50 U	50 UR	50 U	50 U	50 U
N-Nitrosodiphenylamine	10	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U

PROJECT: NCBC GULFPORT, MISSISSIPPI

SEMIVOLATILE AQUEOUS ANALYSES (ug/l)

Validation Table

	SAMPLE LOCATION:	GPTHO2-1	GPTHO2-1RE	GPTHO2-1D	GPTHO2-1DRE	GPTHO2-2	GPTHO2-3	GPTHO2-4
	LAB NUMBER:	R8548008	R8548008RE	R8548004	R8548004RE	R8548005	R8548006	R8548007
	DATE SAMPLED:	08/13/94	08/13/94	08/13/94	08/13/94	08/13/94	08/13/94	08/13/94
	DATE ANALYZED:	09/03/94	09/06/94	09/02/94	09/06/94	09/02/94	09/03/94	09/03/94
	DILUTION FACTOR:	1.0	1.0	1.0	1.0	1.0	1.0	1.0
ANALYTE	CRQL							
1,2-Diphenylhydrazine	10	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U
4-Bromophenyl-phenylether	10	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U
Hexachlorobenzene	10	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U
Pentachlorophenol	50	50 U	50 UR	50 U	50 UR	50 U	50 U	50 U
Phenanthrene	10	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U
Anthracene	10	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U
Di-n-Butylphthalate	10	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U
Fluoranthene	10	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U
Benzidine	50	50 U	50 UR	50 U	50 UR	50 U	50 R	50 U
Pyrene	10	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U
Butylbenzylphthalate	10	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U
3,3'-Dichlorobenzidine	20	20 U	20 UR	20 U	20 UR	20 U	20 U	20 U
Benzo (a) Anthracene	10	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U
Chrysene	10	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U
bis (2-Ethylhexyl) Phthalate	10	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U
Di-n-Octyl Phthalate	10	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U
Benzo (b) Fluoranthene	10	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U
Benzo (k) Fluoranthene	10	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U
Benzo (a) Pyrene	10	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U
Indeno (1,2,3-cd) Pyrene	10	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U
Dibenz (a,h) Anthracene	10	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U
Benzo (g,h,i) Perylene	10	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U
2-Picoline	50	50 U	50 UR	50 U	50 UR	50 U	50 U	50 U
Methyl methanesulfonate	10	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U
Ethyl Methansulfonate	10	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U
Acetophenone	10	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U
N-Nitrosopiperidine	10	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U
Phenyl-tert-butlamine	60	60 U	60 UR	50 U	60 UR	50 U	50 U	50 U
2,6-Dichlorophenol	10	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U
N-Nitrosodi-n-butylamine	10	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U
1,2,4,5-Tetrachlorobenzene	50	50 U	50 UR	50 U	50 UR	50 U	50 U	50 U
Pentachlorobenzene	60	60 U	60 UR	50 U	50 UR	60 U	50 U	50 U
1-Naphthylamine	50	50 UR	50 UR	50 UR	50 UR	50 UR	50 UR	50 UR
2-Naphthylamine	60	60 UR	60 UR	50 UR	60 UR	60 UR	60 UR	60 UR
2,3,4,6-Tetrachlorophenol	10	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U
Phenacetin	10	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U
4-Aminobiphenyl	50	50 UR	50 UR	50 UR	50 UR	50 UR	50 UR	50 UR
Pronamide	10	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U
p-(Dimethylamino)azobenzene	10	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U
7,12Dimethylbenz(a)anthracene	10	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U
3-Methylcholanthrene	10	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U
Pyridine	50	50 U	50 UR	50 U	50 UR	50 U	50 U	50 U
N-Nitrosomethylethylamine	10	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U
N-Nitrosodiethylamine	10	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U
N-Nitrosopyrolidine	10	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U
N-Nitrosomorpholine	10	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U
o-Toluidine	10	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U

PROJECT: NCBC GULFPORT, MISSISSIPPI

SEMIVOLATILE AQUEOUS ANALYSES (ug/l)

Validation Table

	SAMPLE LOCATION:	GPTHO2-1	GPTHO2-1RE	GPTHO2-1D	GPTHO2-1DRE	GPTHO2-2	GPTHO2-3	GPTHO2-4
	LAB NUMBER:	R8548008	R8548008RE	R8548004	R8548004RE	R8548005	R8548006	R8548007
	DATE SAMPLED:	08/13/94	08/13/94	08/13/94	08/13/94	08/13/94	08/13/94	08/13/94
	DATE ANALYZED:	09/03/94	09/06/94	09/02/94	09/06/94	09/02/94	09/03/94	09/03/94
	DILUTION FACTOR:	1.0	1.0	1.0	1.0	1.0	1.0	1.0
ANALYTE	CRQL							
Hexachloropropene	50	50 UR	50 UR	50 UR	50 UR	50 UR	50 UR	50 UR
p-Phenylenediamine	50	500 U	500 UR	500 U	500 UR	500 U	500 U	500 U
Safrole	50	50 U	50 UR	50 U	50 UR	50 U	50 U	50 U
Isosafrole	50	50 U	50 UR	50 U	50 UR	50 U	50 U	50 U
1,4-Napthoquinone	50	1000 U	1000 UR	1000 U	1000 UR	1000 U	1000 U	1000 U
1,3-Dinitrobenzene	10	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U
5-Nitro-o-toluidine	10	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U
1,3,5-Trinitrobenzene	10	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U
4-Nitroquinoline-1-oxide	10	500 UR	500 UR	500 UR	500 UR	500 UR	500 UR	500 UR
Methapyrilene	50	50 U	50 UR	50 U	50 UR	50 U	50 U	50 U
Aramite	50	50 UJ	50 UR	50 UJ	50 UR	50 UJ	50 UJ	50 UJ
3,3'-Dimethylbenzidine	10	10 UR	10 UR	10 R	10 UR	10 R	10 R	10 R
Hexachlorophene	50	500 UR	500 UR	500 UR	500 UR	500 UR	500 UR	500 UR
2-Acetylaminofluorene	10	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U
Pentachloronitrobenzene	50	50 U	50 UR	50 U	50 UR	50 U	50 U	50 U

PROJECT: NCBC GULFPORT, MISSISSIPPI — POLYNUCLEAR AROMATIC HYDROCARBONS AQUEOUS ANALYSES (ug/l) — Validation Table

SAMPLE LOCATION:	GPTHO2-1	GPTHO2-1RE	GPTHO2-1D	GPTHO2-2	GPTHO2-3	GPTHO2-4
LAB NUMBER:	R8548008	R8548008RE	R8548004	R8548005	R8548006	R8548007
DATE SAMPLED:	08/13/94	08/13/94	08/13/94	08/13/94	08/13/94	08/13/94
DATE ANALYZED:	09/08/94	09/29/94	09/07/94	09/07/94	09/08/94	09/08/94
ANALYTE						
Naphthalene	2.0 U	2.0 UR	2.0 U	2.0 U	2.0 U	2.0 U
Acenaphthylene	2.0 U	2.0 UR	2.0 U	2.0 U	2.0 U	2.0 U
Acenaphthene	2.0 U	2.0 UR	2.0 U	2.0 U	2.0 U	2.0 U
Fluorene	1.0 U	1.0 UR	1.0 U	1.0 U	1.0 U	1.0 U
Phenanthrene	1.0 U	1.0 UR	1.0 U	1.0 U	1.0 U	1.0 U
Anthracene	0.20 U	0.20 UR	0.20 U	0.20 U	0.20 U	0.20 U
Fluoranthene	0.20 U	0.20 UR	0.20 U	0.20 U	0.20 U	0.20 U
Pyrene	2.0 U	2.0 UR	2.0 U	2.0 U	2.0 U	2.0 U
Benzo(a)anthracene	0.20 U	0.20 UR	0.20 U	0.20 U	0.20 U	0.20 U
Chrysene	2.0 U	2.0 UR	2.0 U	2.0 U	2.0 U	2.0 U
Benzo(b)fluoranthene	0.10 U	0.10 UR	0.10 U	0.10 U	0.10 U	0.10 U
Benzo(k)fluoranthene	0.10 UJ	0.10 UR	0.10 U	0.10 U	0.10 U	0.10 U
Benzo(a)pyrene	0.10 UJ	0.10 UR	0.10 U	0.10 U	0.10 U	0.10 U
Dibenzo(a,h)anthracene	0.20 UJ	0.20 UR	0.20 U	0.20 U	0.20 U	0.20 U
Indeno(1,2,3-cd)pyrene	0.20 UJ	0.20 UR	0.20 U	0.20 U	0.20 U	0.20 U
Benzo(g,h,i)perylene	0.20 UJ	0.20 UR	0.20 U	0.20 U	0.20 U	0.20 U

PROJECT: NCBC GULFPORT, MISSISSIPPI — PESTICIDE/PCB AQUEOUS ANALYSES (ug/l) — Validation Table

	SAMPLE LOCATION:	GPTHO2-1	GPTHO2-1D	GPTHO2-2	GPTHO2-3	GPTHO2-4
	LAB NUMBER:	R8548008	R8548004	R8548005	R8548006	R8548007
	DATE SAMPLED:	08/13/94	08/13/94	08/13/94	08/13/94	08/13/94
	DATE ANALYZED:	09/12/94	09/11/94	09/11/94	09/11/94	09/11/94
	DILUTION:	1.0	1.0	1.0	1.0	1.0
ANALYTE	PQL					
alpha-BHC	0.05	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
beta-BHC	0.05	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U
delta-BHC	0.05	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
gamma-BHC (Lindane)	0.05	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Heptachlor	0.05	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Aldrin	0.05	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Heptachlor Epoxide	0.05	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Endosulfan I	0.10	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Dieldrin	0.10	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
4,4'-DDE	0.10	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Endrin	0.10	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U
Endosulfan II	0.10	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U
4,4'-DDD	0.10	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U
Endrin Aldehyde	0.10	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U
Endosulfan Sulfate	0.10	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U
4,4'-DDT	0.10	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U
Methoxychlor	0.50	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U
Endrin Ketone	0.10	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U
Chlordane	0.5	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Toxaphene	1.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Aroclor-1016	0.8	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Aroclor-1221	2.0	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Aroclor-1232	2.0	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Aroclor-1242	0.8	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Aroclor-1248	0.5	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Aroclor-1254	1.0	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Aroclor-1260	1.0	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Chlorobenzilate	0.50	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Diallate	1.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Isodrin	0.02	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Kepone	1.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U

PROJECT: NCBC GULFPORT, MISSISSIPPI — ORGANOPHOSPHORUS PESTICIDE AQUEOUS ANALYSIS (ug/l) — Validation Table

SAMPLE LOCATION:		GPTHO2-1	GPTHO2-1D	GPTHO2-2	GPTHO2-3	GPTHO2-4
LAB NUMBER:		M8548008	M8548004	M8548005	M8548006	M8548007
DATE SAMPLED:		08/13/94	08/13/94	08/13/94	08/13/94	08/13/94
DATE ANALYZED:		08/29/94	08/29/94	08/29/94	08/29/94	08/29/94
ANALYTE	PQL					
Triethylphosphorothioate	1.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Thionazin	1.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Phorate	1.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Sulfotepp	1.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Dimethoate	5.0	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Disulfoton	1.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Methyl Parathion	1.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Ethyl Parathion	1.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Famphur	1.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U

PROJECT: NCBC GULFPORT, MISSISSIPPI — HERBICIDE AQUEOUS ANALYSES (ug/l) — Validation Table

SAMPLE LOCATION:		GPTHO2-1	GPTHO2-1D	GPTHO2-2	GPTHO2-2DL	GPTHO2-3	GPTHO2-4
LAB NUMBER:		R8548008	R8548004	R8548005	R8548005DL	R8548006	R8548007
DATE SAMPLED:		08/13/94	08/13/94	08/13/94	08/13/94	08/13/94	08/13/94
DATE ANALYZED:		09/07/94	09/07/94	09/07/94	09/09/94	09/07/94	09/07/94
ANALYTE	PQL						
2,4-D	2.5	2.5 U	2.5 U	2.5 U	13 UR	2.5 U	2.5 U
2,4,5-T	0.5	0.5 U	0.5 U	0.5 U	2.5 UR	1.3	0.5 U
2,4,5-TP	0.5	0.5 U	0.5 U	3.2 R	3.5	0.5 U	0.5 U
Dinoseb	2.5	0.5 U	0.5 U	0.5 U	2.5 UR	0.5 U	0.5 U

PROJECT: NCBC GULFPORT, MISSISSIPPI — DIOXIN/FURANS AQUEOUS ANALYSES (pg/l) — Validation Table

SAMPLE LOCATION:	GPTHO2-1	GPTHO2-1D	GPTHO2-2	GPTHO2-3	GPTHO2-4
LAB NUMBER:	9408181-08R	9408181-04DR	9408181-05R	9408181-06R	9408181-07R
DATE SAMPLED:	08/13/94	08/13/94	08/13/94	08/13/94	08/13/94
DATE ANALYZED:	10/25/94	10/25/94	10/25/94	10/25/94	10/25/94
ANALYTE					
2,3,7,8-TCDD	1.31 UJL	0.73 UJL	1.38 UJL	1.10 UJL	0.17 UJL
2,3,7,8-TCDF	0.96 UJL	0.12 UJL	0.15 UJL	0.12 UJL	0.52 UJL
1,2,3,7,8-PeCDD	1.03 UJL	1.37 UJL	0.99 UJL	1.21 UJL	1.09 UJL
1,2,3,7,8-PeCDF	0.91 UJL	0.34 UJL	0.66 UJL	0.43 UJL	0.65 UJL
2,3,4,7,8-PeCDF	0.83 UJL	0.67 UJL	0.60 UJL	0.79 UJL	0.62 UJL
1,2,3,4,7,8-HxCDD	1.66 UJL	0.19 UJL	0.84 UJL	0.16 UJL	0.15 UJL
1,2,3,6,7,8-HxCDD	1.92 UJL	0.25 UJL	0.96 UJL	0.20 UJL	0.16 UJL
1,2,3,7,8,9-HxCDD	2.33 UJL	0.30 UJL	1.20 UJL	0.24 UJL	0.21 UJL
1,2,3,4,7,8-HxCDF	1.86 UJL	0.66 UJL	0.66 UJL	0.76 UJL	0.08 UJL
1,2,3,6,7,8-HxCDF	1.66 UJL	0.55 UJL	0.53 UJL	0.60 UJL	0.08 UJL
2,3,4,6,7,8-HxCDF	2.13 UJL	0.86 UJL	0.86 UJL	0.84 UJL	0.16 UJL
1,2,3,7,8,9-HxCDF	1.97 UJL	0.89 UJL	0.59 UJL	0.88 UJL	0.19 UJL
1,2,3,4,6,7,8-HpCDD	1.55 UJL	0.25 UJL	11.6 JL	8.1 JL	0.94 UJL
1,2,3,4,6,7,8-HpCDF	1.82 UJL	0.82 UJL	0.69 UJL	0.65 UJL	0.53 UJL
1,2,3,4,7,8,9-HpCDF	1.77 UJL	0.19 UJL	0.66 UJL	0.75 UJL	0.56 UJL
OCDD	44.7 JL	5.1 UJL	182 JL	92 JL	36.7 JL
OCDF	15.9 UJL	1.27 UJL	4.13 UJL	0.91 UJL	4.04 UJL

PROJECT: NCBC GULFPORT, MISSISSIPPI — INORGANIC AQUEOUS ANALYSES (ug/l) — Validation Table

	SAMPLE LOCATION:	GPTHO2-1	GPTHO2-1D	GPTHO2-2	GPTHO2-3	GPTHO2-4
	LAB NUMBER:	R8548008	R8548004	R8548005	R8548006	R8548007
	DATE SAMPLED:	08/13/94	08/13/94	08/13/94	08/13/94	08/13/94
ANALYTE	CRQL					
Antimony	60	10.7 U	10.7 U	10.7 U	10.7 U	15.0 J
Arsenic	10	24.3	23.6	10.7	18.8	28.0 J
Barium	200	218	222	113 J	106 J	473
Beryllium	5	1.7 J	2.1 J	1.3 J	3.1 J	2.8 J
Cadmium	5	1.3 J	1.0 U	1.0 U	1.0 U	3.2 J
Chromium	10	58.0	65.0	7.4 J	45.8	189
Cobalt	50	16.9 J	16.9 J	3.1 U	11.1 J	26.6 J
Copper	25	25.2	23.8 J	4.0 J	22.9 J	59.4
Lead	3	23.2	24.7	5.7	19.7	67.9
Mercury	0.2	0.12 J	0.1. U	0.1 U	0.1 U	0.1 U
Nickel	40	38.7 J	45.6	5.9 U	23.5 J	78.4
Selenium	5	2.4 J	1.8 J	0.68 J	6.0 J	20.8 J
Silver	10	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U
Thallium	10	0.60 U	0.60 U	0.60 U	0.60 U	0.60 U
Vanadium	50	63.7	65.2	37.4 J	88.1	240
Zinc	20	67.7 J	66.2	22.3 J	23.2 J	58.7 J
Tin	200	8.0 U	8.0 U	8.0 U	8.0 U	8.0 U
Cyanide	10	<10	<10	<10	<10	<10
Sulfide (mg/l)	100	<2	<2	<2	<2	14.0

Validated Quality Assurance and Quality Control Results

PROJECT: NCBC GULFPORT, MISSISSIPPI

VOLATILE AQUEOUS ANALYSES (ug/l)

Validation Table

	SAMPLE NUMBER:	BS-01-DI2	BS-01-PI2	BS-01-RI2	BS-01-TB2	BS-02-TB2
	LAB NUMBER:	R8520001	R8520002	R8548002	R8520001	R8548006
	DATE SAMPLED:	08/11/94	08/11/94	08/13/94	08/11/94	08/13/94
	DATA ANALYZED:	08/18/94	08/18/94	08/23/94	08/18/94	08/23/94
	DILUTION FACTOR:	1.0	1.0	1.0	1.0	1.0
ANALYTE	CRQL					
Chloromethane	10	10 U	10 U	10 U	10 U	10 U
Bromomethane	10	10 U	10 U	10 U	10 U	10 U
Vinyl Chloride	10	10 U	10 U	10 U	10 U	10 U
Chloroethane	10	10 U	10 U	10 U	10 U	10 U
Methylene Chloride	5	5 U	5 U	5 U	5 U	5 U
Acetone	10	46 U	10 U	10 U	10 U	10 U
Carbon Disulfide	5	14	5 U	5 U	5 U	5 U
Trichlorofluoromethane	5	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethene	5	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethane	5	5 U	5 U	5 U	5 U	5 U
1,2-Dichloroethene (total)	5	5 U	5 U	5 U	5 U	5 U
Chloroform	5	5 U	5 U	5 U	5 U	5 U
1,2-Dichloroethane	5	5 U	5 U	5 U	5 U	5 U
Isobutanol	200	200 UR	200 UR	200 UR	200 UR	200 UR
2-Butanone	10	10 U	10 U	10 U	10 U	10 U
1,1,1-Trichloroethane	5	5 U	5 U	5 U	5 U	5 U
Carbon Tetrachloride	5	5 U	5 U	5 U	5 U	5 U
Vinyl acetate	10	10 U	10 U	10 U	10 U	10 U
Bromodichloromethane	5	5 U	5 U	5 U	5 U	5 U
1,2-Dichloropropane	5	5 U	5 U	5 U	5 U	5 U
cis-1,3-Dichloropropene	5	5 U	5 U	5 U	5 U	5 U
Trichloroethene	5	5 U	5 U	5 U	5 U	5 U
Dibromochloromethane	5	5 U	5 U	5 U	5 U	5 U
1,1,2-Trichloroethane	5	5 U	5 U	5 U	5 U	5 U
Benzene	5	5 U	5 U	5 U	5 U	5 U
trans-1,3-Dichloropropene	5	5 U	5 U	5 U	5 U	5 U
2-Chloroethylvinylether	10	10 U	10 U	10 U	10 U	10 U
Bromoform	5	5 U	5 U	5 U	5 U	5 U
2-Hexanone	10	10 U	10 U	10 U	10 U	10 U
4-Methyl-2-Pentanone	10	10 U	10 U	10 U	10 U	10 U
Tetrachloroethene	5	5 U	5 U	5 U	5 U	5 U
1,1,2,2-Tetrachloroethane	5	5 U	5 U	5 U	5 U	5 U
Toluene	5	5 U	5 U	5 U	5 U	5 U
Chlorobenzene	5	5 U	5 U	5 U	5 U	5 U
Ethylbenzene	5	5 U	5 U	5 U	5 U	5 U
Styrene	5	5 U	5 U	5 U	5 U	5 U
Xylene (total)	5	5 U	5 U	5 U	5 U	5 U
1,3-Dichlorobenzene	5	5 U	5 U	5 U	5 U	5 U
1,4-Dichlorobenzene	5	5 U	5 U	5 U	5 U	5 U
1,2-Dichlorobenzene	5	5 U	5 U	5 U	5 U	5 U
Dichlorodifluoromethane	10	10 U	10 U	10 U	10 U	10 U
Acrolein	100	100 U	100 U	100 U	100 U	100 U
Iodomethane	10	10 U	10 U	10 U	10 U	10 U
Acrylonitrile	100	100 U	100 U	100 U	100 U	100 U
Dibromomethane	5	5 U	5 U	5 U	5 U	5 U
Ethyl methacrylate	5	5 U	5 U	5 U	5 U	5 U
1,2,3-Trichloropropene	5	5 U	5 U	5 U	5 U	5 U
trans-1,4-Dichloro-2-butene	5	5 U	5 U	5 U	5 U	5 U

PROJECT: NCBC GULFPORT, MISSISSIPPI

VOLATILE AQUEOUS ANALYSES (ug/l)

Validation Table

SAMPLE NUMBER:		BS-01-DI2	BS-01-PI2	BS-01-RI2	BS-01-TB2	BS-02-TB2
LAB NUMBER:		R8520001	R8520002	R8548002	R8520001	R8548006
DATE SAMPLED:		08/11/94	08/11/94	08/13/94	08/11/94	08/13/94
DATA ANALYZED:		08/18/94	08/18/94	08/23/94	08/18/94	08/23/94
DILUTION FACTOR:		1.0	1.0	1.0	1.0	1.0
	CRQL					
Acetonitrile	100	100 U	100 U	100 U	100 U	100 U
3-Chloropropene	5	5 U	5 U	5 U	5 U	5 U
Propionitrile	100	100 U	100 U	100 U	100 U	100 U
Methacrylonitrile	5	5 U	5 U	5 U	5 U	5 U
1,4-Dioxane	200	200 UR	200 UR	200 UR	200 UR	200 UR
Methyl methacrylate	10	10 U	10 U	10 U	10 U	10 U
1,2-Dibromoethane	5	5 U	5 U	5 U	5 U	5 U
1,1,1,2-Tetrachloroethane	5	5 U	5 U	5 U	5 U	5 U
1,2-Dibromo-3-chloropropane	10	10 U	10 U	10 U	10 U	10 U
Pentachloroethane	10	10 U	10 U	10 U	10 U	10 U
Chloroprene	200	200 UR	200 UR	200 UR	200 UR	200 U

PROJECT: NCBC GULFPORT, MISSISSIPPI

SEMIVOLATILE AQUEOUS ANALYSES (ug/l)

Validation Table

	SAMPLE LOCATION:	BS-01-DI2	BS-01-PI2	BS-01-PI2RE	BS-01-RI2
	LAB NUMBER:	R8520001	R8520002	R8520002	R8548002
	DATE SAMPLED:	08/11/94	08/11/94	08/11/94	08/13/94
	DATE ANALYZED:	08/26/94	08/26/94	09/14/94	09/02/94
	DILUTION FACTOR:	1.0	1.0	1.0	1.0
ANALYTE	CRQL				
N-Nitrosodimethylamine	10	10 U	10 U	10 UR	10 U
Phenol	10	10 U	10 UR	10 UR	10 U
Aniline	10	10 U	10 U	10 UR	10 U
bis (2-Chloroethyl) Ether	10	10 U	10 U	10 UR	10 U
2- Chlorophenol	10	10 U	10 UR	10 UR	10 U
1,3- Dichlorobenzene	10	10 U	10 U	10 UR	10 U
1,4- Dichlorobenzene	10	10 U	10 U	10 UR	10 U
Benzyl alcohol	10	10 U	10 UR	10 UR	10 U
1,2- Dichlorobenzene	10	10 U	10 U	10 UR	10 U
2- Methylphenol	10	10 U	10 UR	10 UR	10 U
bis(2-Chloroisopropyl)ether	10	10 U	10 U	10 UR	10 U
4-Methylphenol	10	10 U	10 UR	10 UR	10 U
N-Nitroso-Di-n-Propylamine	10	10 U	10 UR	10 UR	10 U
Hexachloroethane	10	10 U	10 U	10 UR	10 U
Nitrobenzene	10	10 U	10 U	10 UR	10 U
Isophorone	10	10 U	10 U	10 UR	10 U
2-Nitrophenol	10	10 U	10 UR	10 UR	10 U
2,4-Dimethylphenol	10	10 U	10 UR	10 UR	10 U
Benzoic acid	50	50 U	50 UR	50 UR	50 U
bis (2-Chloroethoxy) Methane	10	10 U	10 U	10 UR	10 U
2,4-Dichlorophenol	10	10 U	10 UR	10 UR	10 U
1,2,4-Trichlorobenzene	10	10 U	10 U	10 UR	10 U
Naphthalene	10	10 U	10 U	10 UR	10 U
4-Chloroaniline	10	10 U	10 U	10 UR	10 U
Hexachlorobutadiene	10	10 U	10 U	10 UR	10 U
4-Chloro-3-Methylphenol	10	10 U	10 UR	10 UR	10 U
2-Methylnaphthalene	10	10 U	10 U	10 UR	10 U
Hexachlorocyclopentadiene	10	10 U	10 U	10 UR	10 U
2,4,6-Trichlorophenol	10	10 U	10 UR	10 UR	10 U
2,4,5-Trichlorophenol	50	50 U	50 UR	50 UR	50 U
2-Chloronaphthalene	10	10 U	10 U	10 UR	10 U
2-Nitroaniline	50	50 U	50 U	50 UR	50 U
Dimethylphthalate	10	10 U	10 U	10 UR	10 U
Acenaphthylene	10	10 U	10 U	10 UR	10 U
2,6-Dinitrotoluene	10	10 U	10 U	10 UR	10 U
3-Nitroaniline	50	50 UJ	50 UJ	50 UR	50 U
Acenaphthene	10	10 U	10 U	10 UR	10 U
2,4-Dinitrophenol	50	50 U	50 UR	50 UR	50 U
4-Nitrophenol	50	50 U	50 UR	50 UR	50 U
Dibenzofuran	10	10 U	10 U	10 UR	10 U
2,4-Dinitrotoluene	10	10 U	10 U	10 UR	10 U
Diethylphthalate	10	10 U	10 U	10 UR	10 U
4-Chlorophenyl-phenylether	10	10 U	10 U	10 UR	10 U
Fluorene	10	10 U	10 U	10 UR	10 U
4-Nitroaniline	50	50 U	50 U	50 UR	50 U
4,6-Dinitro-2-Methylphenol	50	50 U	50 UR	50 UR	50 U
N-Nitrosodiphenylamine	10	10 U	10 UR	10 UR	10 U

PROJECT: NCBC GULFPORT, MISSISSIPPI

SEMIVOLATILE AQUEOUS ANALYSES (ug/l)

Validation Table

	SAMPLE LOCATION:	BS-01-DI2	BS-01-PI2	BS-01-PI2RE	BS-01-RI2
	LAB NUMBER:	R8520001	R8520002	R8520002	R8548002
	DATE SAMPLED:	08/11/94	08/11/94	08/11/94	08/13/94
	DATE ANALYZED:	08/26/94	08/26/94	09/14/94	09/02/94
	DILUTION FACTOR:	1.0	1.0	1.0	1.0
ANALYTE	CRQL				
1,2-Diphenylhydrazine	10	10 U	10 U	10 UR	10 U
4-Bromophenyl-phenylether	10	10 U	10 U	10 UR	10 U
Hexachlorobenzene	10	10 U	10 U	10 UR	10 U
Pentachlorophenol	50	50 U	50 UR	50 UR	50 U
Phenanthrene	10	10 U	10 U	10 UR	10 U
Anthracene	10	10 U	10 U	10 UR	10 U
Di-n-Butylphthalate	10	10 U	10 U	10 UR	10 U
Fluoranthene	10	10 U	10 U	10 UR	10 U
Benzidine	50	50 UR	50 UR	50 UR	50 U
Pyrene	10	10 U	10 U	10 UR	10 U
Butylbenzylphthalate	10	10 U	10 U	10 UR	10 U
3,3'-Dichlorobenzidine	20	20 U	20 U	20 UR	20 U
Benzo (a) Anthracene	10	10 U	10 U	10 UR	10 U
Chrysene	10	10 U	10 U	10 UR	10 U
bis (2-Ethylhexyl) Phthalate	10	10 U	10 U	10 UR	10 U
Di-n-Octyl Phthalate	10	10 U	10 U	10 UR	10 U
Benzo (b) Fluoranthene	10	10 U	10 U	10 UR	10 U
Benzo (k) Fluoranthene	10	10 U	10 U	10 UR	10 U
Benzo (a) Pyrene	10	10 U	10 U	10 UR	10 U
Indeno (1,2,3-cd) Pyrene	10	10 U	10 U	10 UR	10 U
Dibenz (a,h) Anthracene	10	10 U	10 U	10 UR	10 U
Benzo (g,h,i) Perylene	10	10 U	10 U	10 UR	10 U
2-Picoline	50	50 U	50 U	50 UR	50 U
Methyl methanesulfonate	10	10 U	10 U	10 UR	10 U
Ethyl Methansulfonate	10	10 U	10 U	10 UR	10 U
Acetophenone	10	10 U	10 U	10 UR	10 U
N-Nitrosopiperidine	10	10 U	10 U	10 UR	10 U
Phenyl-tert-butlamine	50	50 U	50 UR	50 UR	50 U
2,6-Dichlorophenol	10	10 U	10 U	10 UR	10 U
N-Nitrosodi-n-butylamine	10	10 U	10 UR	10 UR	10 U
1,2,4,5-Tetrachlorobenzene	50	50 U	50 U	50 UR	50 U
Pentachlorobenzene	50	50 U	50 U	50 UR	50 U
1-Naphthylamine	50	50 U	50 U	50 UR	50 UR
2-Naphthylamine	50	50 U	50 U	50 UR	50 UR
2,3,4,6-Tetrachlorophenol	10	10 U	10 UR	10 UR	10 U
Phenacetin	10	10 U	10 U	10 UR	10 U
4-Aminobiphenyl	50	50 UJ	50 UJ	50 UR	50 UR
Pronamide	10	10 U	10 U	10 UR	10 U
p-(Dimethylamino)azobenzene	10	10 U	10 U	10 UR	10 U
7,12Dimethylbenz(a)anthracene	10	10 U	10 U	10 UR	10 U
3-Methylcholanthrene	10	10 U	10 U	10 UR	10 U
Pyridine	50	50 U	50 UR	50 UR	50 U
N-Nitrosomethylethylamine	10	10 U	10 UR	10 UR	10 U
N-Nitrosodiethylamine	10	10 U	10 UR	10 UR	10 U
N-Nitrosopyrrolidine	10	10 U	10 U	10 UR	10 U
N-Nitrosomorpholine	10	10 U	10 U	10 UR	10 U
o-Toluidine	10	10 U	10 U	10 UR	10 U

PROJECT: NCBC GULFPORT, MISSISSIPPI — SEMIVOLATILE AQUEOUS ANALYSES (ug/l) — Validation Table

	SAMPLE LOCATION:	BS-01-DI2	BS-01-PI2	BS-01-PI2RE	BS-01-RI2
	LAB NUMBER:	R8520001	R8520002	R8520002	R8548002
	DATE SAMPLED:	08/11/94	08/11/94	08/11/94	08/13/94
	DATE ANALYZED:	08/26/94	08/26/94	09/14/94	09/02/94
	DILUTION FACTOR:	1.0	1.0	1.0	1.0
ANALYTE	CRQL				
Hexachloropropene	50	50 U	50 U	50 UR	50 UR
p-Phenylenediamine	50	500 UJ	500 UR	500 UR	500 U
Safrole	50	50 U	50 U	50 UR	50 U
Isosafrole	50	50 U	50 U	50 UR	50 U
1,4-Napthoquinone	50	1000 U	1000 U	1000 UR	1000 U
1,3-Dinitrobenzene	10	10 U	10 U	10 UR	10 U
5-Nitro-o-toluidine	10	10 U	10 U	10 UR	10 U
1,3,5-Trinitrobenzene	10	10 U	10 U	10 UR	10 U
4-Nitroquinoline-1-oxide	10	500 UR	500 UR	500 UR	500 UR
Methapyrilene	50	50 U	50 U	50 UR	50 U
Aramite	50	50 U	50 U	50 UR	50 UJ
3,3'-Dimethylbenzidine	10	10 UJ	10 UJ	10 UR	10 R
Hexachlorophene	50	500 UR	500 UR	500 UR	500 UR
2-Acetylaminofluorene	10	10 U	10 U	10 UR	10 U
Pentachloronitrobenzene	50	50 U	50 U	50 UR	50 U

PROJECT: NCBC GULFPORT, MISSISSIPPI

POLYNUCLEAR AROMATIC HYDROCARBONS AQUEOUS ANALYSES (ug/l)

Validation Table

SAMPLE LOCATION:	BS-01-DI2	BS-01-DI2RE	BS-01-PI2	BS-01-PI2RE	BS-01-RI2	BS-01-RI2RE
LAB NUMBER:	R8520001	R8520001RE	R8520002	R8520002RE	R8548002	R8548002RE
DATE SAMPLED:	08/10/94	08/10/94	08/10/94	08/10/94	08/13/94	08/10/94
DATE ANALYZED:	09/06/94	09/06/94	09/06/94	09/06/94	09/07/94	09/06/94
ANALYTE						
Naphthalene	2.0 U	2.0 UR	2.0 U	2.0 UR	2.0 UJ	2.0 UR
Acenaphthylene	2.0 U	2.0 UR	2.0 U	2.0 UR	2.0 UJ	2.0 UR
Acenaphthene	2.0 U	2.0 UR	2.0 U	2.0 UR	2.0 UJ	2.0 UR
Fluorene	1.0 U	1.0 UR	1.0 U	1.0 UR	1.0 UJ	1.0 UR
Phenanthrene	1.0 U	1.0 UR	1.0 U	1.0 UR	1.0 UJ	1.0 UR
Anthracene	0.25 U	0.20 UR	0.25 U	0.20 UR	0.20 UJ	0.20 UR
Fluoranthene	0.20 U	0.20 UR	0.20 U	0.20 UR	0.20 UJ	0.20 UR
Pyrene	2.0 U	2.0 UR	2.0 U	2.0 UR	2.0 UJ	2.0 UR
Benzo(a)anthracene	0.20 U	0.20 UR	0.20 U	0.20 UR	0.20 UJ	0.20 UR
Chrysene	2.0 U	2.0 UR	2.0 U	2.0 UR	2.0 UJ	2.0 UR
Benzo(b)fluoranthene	0.10 U	0.10 UR	0.10 U	0.10 UR	0.10 UJ	0.10 UR
Benzo(k)fluoranthene	0.10 U	0.10 UR	0.10 U	0.10 UR	0.10 UJ	0.10 UR
Benzo(a)pyrene	0.10 U	0.10 UR	0.10 U	0.10 UR	0.10 UJ	0.10 UR
Dibenzo(a,h)anthracene	0.20 U	0.20 UR	0.20 U	0.20 UR	0.20 UJ	0.20 UR
Indeno(1,2,3-cd)pyrene	0.20 U	0.20 UR	0.20 U	0.20 UR	0.20 UJ	0.20 UR
Benzo(g,h,i)perylene	0.20 U	0.20 UR	0.20 U	0.20 UR	0.20 UJ	0.20 UR

PROJECT: NCBC GULFPORT, MISSISSIPPI — PESTICIDE/PCB AQUEOUS ANALYSES (ug/l) — Validation Table

	SAMPLE LOCATION:	BS-01-DI2	BS-01-PI2	BS-01-RI2
	LAB NUMBER:	R8520001	R8520002	R8548002
	DATE SAMPLED:	08/11/94	08/11/94	08/13/94
	DATE ANALYZED:	09/01/94	09/01/94	09/11/94
	DILUTION:	1.0	1.0	1.0
ANALYTE	PQL			
alpha-BHC	0.05	0.020 U	0.020 U	0.020 U
beta-BHC	0.05	0.040 U	0.040 U	0.040 U
delta-BHC	0.05	0.020 U	0.020 U	0.020 U
gamma-BHC (Lindane)	0.05	0.020 U	0.020 U	0.020 U
Heptachlor	0.05	0.020 U	0.020 U	0.020 U
Aldrin	0.05	0.020 U	0.020 U	0.020 U
Heptachlor Epoxide	0.05	0.020 U	0.020 U	0.020 U
Endosulfan I	0.10	0.020 U	0.020 U	0.020 U
Dieldrin	0.10	0.020 U	0.020 U	0.020 U
4,4'- DDE	0.10	0.020 U	0.020 U	0.020 U
Endrin	0.10	0.040 U	0.040 U	0.040 U
Endosulfan II	0.10	0.040 U	0.040 U	0.040 U
4,4'- DDD	0.10	0.040 U	0.040 U	0.040 U
Endrin Aldehyde	0.10	0.040 U	0.040 U	0.040 U
Endosulfan Sulfate	0.10	0.040 U	0.040 U	0.040 U
4,4'- DDT	0.10	0.040 U	0.040 U	0.040 U
Methoxychlor	0.50	0.080 U	0.080 U	0.080 U
Endrin Ketone	0.10	0.040 U	0.040 U	0.040 U
Chlordane	0.5	0.20 U	0.20 U	0.20 U
Toxaphene	1.0	1.0 U	1.0 U	1.0 U
Aroclor-1016	0.8	1.0 U	1.0 U	1.0 U
Aroclor-1221	2.0	2.0 U	2.0 U	2.0 U
Aroclor-1232	2.0	2.0 U	2.0 U	2.0 U
Aroclor-1242	0.8	1.0 U	1.0 U	1.0 U
Aroclor-1248	0.5	1.0 U	1.0 U	1.0 U
Aroclor-1254	1.0	0.50 U	0.50 U	0.50 U
Aroclor-1260	1.0	0.50 U	0.50 U	0.50 U
Chlorobenzilate	0.50	0.50 U	0.50 U	0.50 U
Diallate	1.0	1.0 U	1.0 U	1.0 U
Isodrin	0.02	0.020 U	0.020 U	0.020 U
Kepone	1.0	1.0 U	1.0 U	1.0 U

PROJECT: NCBC GULFPORT, MISSISSIPPI — ORGANOPHOSPHORUS PESTICIDE AQUEOUS ANALYSIS (ug/l) — Validation Table

	SAMPLE LOCATION:	BS-01-DI2	BS-01-PI2	BS-01-PI2RE	BS-01-RI2
	LAB NUMBER:	R8520001	R8520002	R8520002RE	R8548005DL
	DATE SAMPLED:	08/10/94	08/10/94	08/10/94	08/13/94
	DATE ANALYZED:	08/29/94	08/29/94	08/29/94	08/29/94
ANALYTE	PQL				
Triethylphosphorothioate	1.0	1.0 U	1.0 UJ	1.0 UR	1.0 U
Thionazin	1.0	1.0 U	1.0 UJ	1.0 UR	1.0 U
Phorate	1.0	1.0 U	1.0 UJ	1.0 UR	1.0 U
Sulfotepp	1.0	1.0 U	1.0 UJ	1.0 UR	1.0 U
Dimethoate	5.0	2.0 U	2.0 UJ	2.0 UR	2.0 U
Disulfoton	1.0	1.0 U	1.0 UJ	1.0 UR	1.0 U
Methyl Parathion	1.0	1.0 U	1.0 UJ	1.0 UR	1.0 U
Ethyl Parathion	1.0	1.0 U	1.0 UJ	1.0 UR	1.0 U
Famphur	1.0	1.0 U	1.0 UJ	1.0 UR	1.0 U

PROJECT: NCBC GULFPORT, MISSISSIPPI — HERBICIDE AQUEOUS ANALYSES (ug/l) — Validation Table

	SAMPLE LOCATION:	BS-01-DI2	BS-01-PI2	BS-01-RI2
	LAB NUMBER:	R8520001	R8520002	R8548005DL
	DATE SAMPLED:	08/10/94	08/10/94	08/13/94
	DATE ANALYZED:	09/05/94	09/05/94	09/07/94
ANALYTE	PQL			
2,4-D	2.5	2.5 U	2.5 U	2.5 U
2,4,5-T	0.5	0.5 U	0.5 U	0.5 U
2,4,5-TP	0.5	0.5 U	0.5 U	0.5 U
Dinoseb	2.5	0.5 U	0.5 U	0.5 U

PROJECT: NCBC GULFPORT, MISSISSIPPI — DIOXIN/FURANS AQUEOUS ANALYSES (pg/l) — Validation Table

	SAMPLE LOCATION:	BS-01-RI2
	LAB NUMBER:	9409191-02R
	DATE SAMPLED:	08/13/94
	DATE ANALYZED:	10/25/94
ANALYTE		
2,3,7,8-TCDD		3.38 UJL
2,3,7,8-TCDF		1.87 UJL
1,2,3,7,8-PeCDD		1.95 UJL
1,2,3,7,8-PeCDF		1.18 UJL
2,3,4,7,8-PeCDF		1.12 UJL
1,2,3,4,7,8-HxCDD		2.41 UJL
1,2,3,6,7,8-HxCDD		2.67 UJL
1,2,3,7,8,9-HxCDD		3.22 UJL
1,2,3,4,7,8-HxCDF		1.88 UJL
1,2,3,6,7,8-HxCDF		1.55 UJL
2,3,4,6,7,8-HxCDF		2.51 UJL
1,2,3,7,8,9-HxCDF		2.63 UJL
1,2,3,4,6,7,8-HpCDD		1.96 UJL
1,2,3,4,6,7,8-HpCDF		1.84 UJL
1,2,3,4,7,8,9-HpCDF		1.92 UJL
OCDD		9.15 UJL
OCDF		9.45 UJL

PROJECT: NCBC GULFPORT, MISSISSIPPI — INORGANIC AQUEOUS ANALYSES (ug/l) — Validation Table

	SAMPLE LOCATION:	BS-01-DI2	BS-01-PI2	BS-01-RI2
	LAB NUMBER:	R8520001	R8520002	R8548002
	DATE SAMPLED:	08/10/94	08/10/94	08/13/94
ANALYTE	CRQL			
Antimony	60	10.7 U	10.7 U	10.7 U
Arsenic	10	0.60 U	0.60 U	0.60 U
Barium	200	1.6 U	9.1 U	3.1 U
Beryllium	5	0.30 U	0.30 U	0.30 U
Cadmium	6	1.0 U	1.0 U	1.0 U
Calcium		50.9 J	2040 J	---
Chromium	10	2.6 U	2.6 U	2.6 U
Cobalt	50	3.1 U	3.1 U	3.1 U
Copper	26	0.90 U	2.2 J	1.6 J
Iron		19.3 J	75.7 J	---
Lead	3	0.60 U	0.60 U	0.60 U
Magnesium		31.4 U	106 J	---
Manganese		10.1 J	37.5	---
Mercury	0.2	0.10 U	0.10 U	0.10 U
Nickel	40	5.9 U	5.9 U	5.9 U
Selenium	5	0.60 UJ	0.60 UJ	0.60 U
Silver	10	2.1 U	2.1 U	2.1 U
Sodium		15.6 J	53600	---
Thallium	10	0.60 U	0.60 U	0.60 U
Vanadium	50	1.5 U	1.5 U	1.5 U
Zinc	20	1.7 U	3.6 U	2.2 U
Tin	200	8.0 U	8.0 U	8.0 U
Cyanide	10	<10	<10	<10
Sulfide (mg/l)	100	<2	<2	<2

Groundwater Sampling Event No. 3

Validation Groundwater Results

PROJECT: NCBC GULFPORT, MISSISSIPPI

VOLATILE AQUEOUS ANALYSES (ug/l)

Validation Table

	SAMPLE NUMBER:	GPTHO3-1	GPTHO3-2	GPTHO3-3	GPTHO3-3D	GPTHO3-4
	LAB NUMBER:	A1EVX103	A1EVV103	A1EVP103	A1EVR103	A1EVK103
	DATE SAMPLED:	11/18/94	11/18/94	11/18/94	11/18/94	11/18/94
	DATA ANALYZED:	11/27/94	11/27/94	11/27/94	11/27/94	11/27/94
	DILUTION FACTOR:	1.0	1.0	1.0	1.0	1.0
ANALYTE	PQL					
Chloromethane	10	10 U	10 U	10 U	10 U	10 U
Bromomethane	10	10 U	10 U	10 U	10 U	10 U
Vinyl Chloride	10	10 U	10 U	10 U	10 U	10 U
Chloroethane	10	10 U	10 U	10 U	10 U	10 U
Methylene Chloride	5	5 U	5 U	5 U	5 U	5 U
Acetone	10	10 U	12 U	10 U	15 U	10 U
Carbon Disulfide	5	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethene	5	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethane	5	5 U	5 U	5 U	5 U	5 U
trans-1,2-Dichloroethene	5	5 U	5 U	5 U	5 U	5 U
Chloroform	5	5 U	5 U	5 U	5 U	5 U
1,2-Dichloroethane	5	5 U	5 U	5 U	5 U	5 U
2-Butanone	10	10 U	10 U	10 U	10 U	10 U
1,1,1-Trichloroethane	5	5 U	5 U	5 U	5 U	5 U
Carbon Tetrachloride	5	5 U	5 U	5 U	5 U	5 U
Bromodichloromethane	5	5 U	5 U	5 U	5 U	5 U
1,2-Dichloropropane	5	5 U	5 U	5 U	5 U	5 U
cis-1,3-Dichloropropene	5	5 U	5 U	5 U	5 U	5 U
Trichloroethene	5	5 U	5 U	5 U	5 U	5 U
Dibromochloromethane	5	5 U	5 U	5 U	5 U	5 U
1,1,2-Trichloroethane	5	5 U	5 U	5 U	5 U	5 U
Benzene	5	5 U	5 U	5 U	5 U	5 U
trans-1,3-Dichloropropene	5	5 U	5 U	5 U	5 U	5 U
Bromoform	5	5 U	5 U	5 U	5 U	5 U
4-Methyl-2-Pentanone	10	10 U	10 U	10 U	10 U	10 U
2-Hexanone	10	10 U	10 U	10 U	10 U	10 U
Tetrachloroethene	5	5 U	5 U	5 U	5 U	5 U
1,1,2,2-Tetrachloroethane	5	5 U	5 U	5 U	5 U	5 U
Toluene	5	5 U	5 U	5 U	5 U	5 U
Chlorobenzene	5	5 U	5 U	5 U	5 U	5 U
Ethylbenzene	5	5 U	5 U	5 U	5 U	5 U
Styrene	5	5 U	5 U	5 U	5 U	5 U
Xylene (total)	5	5 U	5 U	5 U	5 U	5 U
cis-1,2,-Dichloroethene	5	5 U	5 U	5 U	5 U	5 U
2-Chloroethylvinylether	10	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ
Trichlorofluoromethane	5	5 U	5 U	5 U	5 U	5 U
Acrolein	100	100 U	100 U	100 U	100 U	100 U
Iodomethane	10	10 U	10 U	10 U	10 U	10 U
Acetonitrile	100	100 U	100 U	100 U	100 U	100 U
Chlorobutadiene	200	200 U	200 U	200 U	200 U	200 U

PROJECT: NCBC GULFPORT, MISSISSIPPI — VOLATILE AQUEOUS ANALYSES (ug/l) — Validation Table

	SAMPLE NUMBER:	GPTHO3-1	GPTHO3-2	GPTHO3-3	GPTHO3-3D	GPTHO3-4
	LAB NUMBER:	A1EVX103	A1EVV103	A1EVP103	A1EVR103	A1EVK103
	DATE SAMPLED:	11/18/94	11/18/94	11/18/94	11/18/94	11/18/94
	DATA ANALYZED:	11/27/94	11/27/94	11/27/94	11/27/94	11/27/94
	DILUTION FACTOR:	1.0	1.0	1.0	1.0	1.0
	PQL					
Acrylonitrile	100	100 U	100 U	100 U	100 U	100 U
3-Chloropropene	5	5 U	5 U	5 U	5 U	5 U
Vinyl acetate	10	10 U	10 U	10 U	10 U	10 U
Propionitrile	100	100 U	100 U	100 U	100 U	100 U
Methacrylonitrile	5	5 U	5 U	5 U	5 U	5 U
Isobutanol	200	200 UR	200 UR	200 UR	200 UR	200 UR
Dibromomethane	5	5 U	5 U	5 U	5 U	5 U
1,4-Dioxane	200	200 UR	200 UR	200 UR	200 UR	200 UR
Methyl methacrylate	10	10 U	10 U	10 U	10 U	10 U
Ethyl methacrylate	5	5 U	5 U	5 U	5 U	5 U
1,2-Dibromoethane	5	5 U	5 U	5 U	5 U	5 U
1,1,1,2-Tetrachloroethane	5	5 U	5 U	5 U	5 U	5 U
1,2,3-Trichloropropene	5	5 U	5 U	5 U	5 U	5 U
1,4-Dichloro-2-butene	5	5 U	5 U	5 U	5 U	5 U
1,2-Dibromo-3-chloropropane	10	10 U	10 U	10 U	10 U	10 U
1,3-Dichlorobenzene	5	5 U	5 U	5 U	5 U	5 U
1,4-Dichlorobenzene	5	5 U	5 U	5 U	5 U	5 U
1,2-Dichlorobenzene	5	5 U	5 U	5 U	5 U	5 U

PROJECT: NCBC GULFPORT, MISSISSIPPI

SEMIVOLATILE AQUEOUS ANALYSES (ug/l)

Validation Table

	SAMPLE LOCATION:	GPTHO3-1	GPTHO3-2	GPTHO3-3	GPTHO3-3D	GPTHO3-4
	LAB NUMBER:	A1EVX104	A1EVV104	A1EVP104	A1EVR104	A1EVK104
	DATE SAMPLED:	11/18/94	11/18/94	11/18/94	11/18/94	11/18/94
	DATE ANALYZED:	12/08/94	12/08/94	12/08/94	12/08/94	12/08/94
	DILUTION FACTOR:	1.0	1.0	1.0	1.0	1.0
ANALYTE	PQL					
Phenol	10	10 U	10 U	2 J	2 J	10 U
bis (2-Chloroethyl) Ether	10	10 U	10 U	10 U	10 U	10 U
2- Chlorophenol	10	10 U	10 U	1 J	1 J	10 U
1,3- Dichlorobenzene	10	10 U	10 U	10 U	10 U	10 U
1,4- Dichlorobenzene	10	10 U	10 U	10 U	10 U	10 U
1,2- Dichlorobenzene	10	10 U	10 U	10 U	10 U	10 U
2- Methylphenol	10	10 U	10 U	10 U	10 U	10 U
2,2'-oxybis(1-Chloropropane)	10	10 U	10 U	10 U	10 U	10 U
N-Nitroso-Di-n-Propylamine	10	10 U	10 U	10 U	10 U	10 U
4-Methylphenol	10	10 U	10 U	10 U	10 U	10 U
Hexachloroethane	10	10 U	10 U	10 U	10 U	10 U
Nitrobenzene	10	10 U	10 U	10 U	10 U	10 U
Isophorone	10	10 U	10 U	10 U	10 U	10 U
2-Nitrophenol	10	10 U	10 U	10 U	10 U	10 U
2,4-Dimethylphenol	10	10 U	10 U	10 U	10 U	10 U
bis (2-Chloroethoxy) Methane	10	10 U	10 U	10 U	10 U	10 U
2,4-Dichlorophenol	10	10 U	10 U	0.80 J	10 U	10 U
1,2,4-Trichlorobenzene	10	10 U	10 U	10 U	10 U	10 U
Naphthalene	10	10 U	10 U	14	27	10 U
4-Chloroaniline	10	10 U	10 U	10 U	10 U	10 U
Hexachlorobutadiene	10	10 U	10 U	10 U	10 U	10 U
4-Chloro-3-Methylphenol	10	10 U	10 U	10 U	10 U	10 U
2-Methylnaphthalene	10	10 U	10 U	10 U	10 U	10 U
Hexachlorocyclopentadiene	10	10 U	10 U	10 U	10 U	10 U
2,4,6-Trichlorophenol	10	10 U	10 U	10 U	10 U	10 U
2,4,5-Trichlorophenol	25	25 U	25 U	25 U	25 U	25 U
2-Chloronaphthalene	10	10 U	10 U	10 U	10 U	10 U
2-Nitroaniline	25	25 U	25 U	25 U	25 U	25 U
Acenaphthylene	10	10 U	10 U	10 U	10 U	10 U
2,6-Dinitrotoluene	10	10 U	10 U	10 U	10 U	10 U
3-Nitroaniline	25	25 U	25 U	25 U	25 U	25 U
Acenaphthene	10	10 U	10 U	10 U	10 U	10 U
2,4-Dinitrophenol	25	25 U	25 U	25 U	25 U	25 U
Dibenzofuran	10	10 U	10 U	10 U	10 U	10 U
4-Nitrophenol	25	25 U	25 U	25 U	25 U	25 U
2,4-Dinitrotoluene	10	10 U	10 U	10 U	10 U	10 U
Fluorene	10	10 U	10 U	10 U	10 U	10 U
Dimethylphthalate	10	10 U	10 U	10 U	10 U	10 U
Diethylphthalate	10	10 U	10 U	10 U	0.90J	0.90 J
4-Chlorophenyl-phenylether	10	10 U	10 U	10 U	10 U	10 U
4-Nitroaniline	25	25 U	25 U	25 U	25 U	25 U
4,6-Dinitro-2-Methylphenol	25	25 U	25 U	25 U	25 U	25 U
N-Nitrosodiphenylamine	10	10 U	10 U	10 U	10 U	10 U

PROJECT: NCBC GULFPORT, MISSISSIPPI — SEMIVOLATILE AQUEOUS ANALYSES (ug/l) — Validation Table

	SAMPLE LOCATION:	GPTHO3-1	GPTHO3-2	GPTHO3-3	GPTHO3-3D	GPTHO3-4
	LAB NUMBER:	A1EVX104	A1EVV104	A1EVP104	A1EVR104	A1EVK104
	DATE SAMPLED:	11/18/94	11/18/94	11/18/94	11/18/94	11/18/94
	DATE ANALYZED:	12/08/94	12/08/94	12/08/94	12/08/94	12/08/94
	DILUTION FACTOR:	1.0	1.0	1.0	1.0	1.0
ANALYTE	PQL					
4-Bromophenyl-phenylether	10	10 U	10 U	10 U	10 U	10 U
Hexachlorobenzene	10	10 U	10 U	10 U	10 U	10 U
Pentachlorophenol	25	25 U	25 U	25 U	25 U	25 U
Phenanthrene	10	10 U	10 U	10 U	10 U	10 U
Anthracene	10	10 U	10 U	10 U	10 U	10 U
Di-n-Butylphthalate	10	10 U	10 U	10 U	10 U	10 U
Fluoranthene	10	10 U	10 U	10 U	10 U	10 U
Pyrene	10	10 U	10 U	10 U	10 U	10 U
Butylbenzylphthalate	10	10 U	10 U	10 U	10 U	10 U
Benzo (a) Anthracene	10	10 U	10 U	10 U	10 U	10 U
3,3'-Dichlorobenzidine	10	10 U	10 U	10 U	10 U	10 U
Chrysene	10	10 U	10 U	10 U	10 U	10 U
bis (2-Ethylhexyl) Phthalate	10	3 J	10 U	10 U	10 U	10 U
Di-n-Octyl Phthalate	10	10 U	10 U	10 U	10 U	10 U
Benzo (b) Fluoranthene	10	10 U	10 U	10 U	10 U	10 U
Benzo (k) Fluoranthene	10	10 U	10 U	10 U	10 U	10 U
Benzo (a) Pyrene	10	10 U	10 U	10 U	10 U	10 U
Indeno (1,2,3-cd) Pyrene	10	10 U	10 U	10 U	10 U	10 U
Dibenz (a,h) Anthracene	10	10 U	10 U	10 U	10 U	10 U
Benzo (g,h,i) Perylene	10	10 U	10 U	10 U	10 U	10 U
Carbazole	10	10 U	10 U	10 U	10 U	10 U
Aniline	10	10 U	10 U	10 U	10 U	10 U
N-Nitrosodimethylamine	10	10 U	10 U	10 U	10 U	10 U
Benzyl alcohol	10	10 U	10 U	10 U	10 U	10 U
3&4-Methylphenol	20	20 U	20 U	20 U	20 U	20 U
Benzoic acid	50	50 U	50 U	50 U	50 U	50 U
2,3,4,6-Tetrachlorophenol	10	10 U	10 U	10 U	10 U	10 U
1,2-Diphenylhydrazine	10	10 U	10 U	10 U	10 U	10 U
Benzidine	50	50 U	50 U	50 U	50 U	50 U
Pyridine	50	50 U	50 U	50 U	50 U	50 U
p-Phenylenediamine	50	50 U	50 U	50 U	50 U	50 U
2-Picoline	50	50 U	50 U	50 U	50 U	50 U
N-Nitrosomethylethylamine	10	10 U	10 U	10 U	10 U	10 U
Methyl methanesulfonate	10	10 U	10 U	10 U	10 U	10 U
N-Nitrosodiethylamine	10	10 U	10 U	10 U	10 U	10 U
Ethyl Methansulfonate	10	10 U	10 U	10 U	10 U	10 U
Acetophenone	10	10 U	10 U	10 U	10 U	10 U
N-Nitrosopyrrolidine	10	10 U	10 U	10 U	10 U	10 U
N-Nitrosomorpholine	10	10 U	10 U	10 U	10 U	10 U
o-Toluidine	10	10 U	10 U	10 U	10 U	10 U
N-Nitrosopiperidine	10	10 U	10 U	10 U	10 U	10 U
a,a-Dimethyl-phenethylamine	50	50 U	50 U	50 U	50 U	50 U
2,6-Dichlorophenol	10	10 U	10 U	10 U	10 U	10 U
Hexachloropropene	50	50 U	50 U	50 U	50 U	50 U
N-Nitrosodi-n-butylamine	10	10 U	10 U	10 U	10 U	10 U
Safrole	50	50 U	50 U	50 U	50 U	50 U
1,2,4,5-Tetrachlorobenzene	50	50 U	50 U	50 U	50 U	50 U

PROJECT: NCBC GULFPORT, MISSISSIPPI — SEMIVOLATILE AQUEOUS ANALYSES (ug/l) — Validation Table

	SAMPLE LOCATION:	GPTHO3-1	GPTHO3-2	GPTHO3-3	GPTHO3-3D	GPTHO3-4
	LAB NUMBER:	A1EVX104	A1EVV104	A1EVP104	A1EVR104	A1EVK104
	DATE SAMPLED:	11/18/94	11/18/94	11/18/94	11/18/94	11/18/94
	DATE ANALYZED:	12/08/94	12/08/94	12/08/94	12/08/94	12/08/94
	DILUTION FACTOR:	1.0	1.0	1.0	1.0	1.0
ANALYTE	PQL					
Isosafrole 1	50	50 U	50 U	50 U	50 U	50 U
Isosafrole 2	50	50 U	50 U	50 U	50 U	50 U
1,4-Napthoquinone	50	50 U	50 U	50 U	50 U	50 U
1,3-Dinitrobenzene	10	10 U	10 U	10 U	10 U	10 U
Pentachlorobenzene	50	50 U	50 U	50 U	50 U	50 U
1-Naphthylamine	50	50 U	50 U	50 U	50 U	50 U
2-Naphthylamine	50	50 U	50 U	50 U	50 U	50 U
5-Nitro-o-toluidine	10	10 U	10 U	10 U	10 U	10 U
Diphenylamine	10	10 U	10 U	10 U	10 U	10 U
1,3,5-Trinitrobenzene	10	10 UR	10 UR	10 UR	10 UR	10 UR
Phenacetin	10	10 U	10 U	10 U	10 U	10 U
4-Aminobiphenyl	50	50 U	50 U	50 U	50 U	50 U
Pentachloronitrobenzene	50	50 U	50 U	50 U	50 U	50 U
Pronamide	10	10 U	10 U	10 U	10 U	10 U
4-Nitroquinoline-1-oxide	10	10 U	10 U	10 U	10 U	10 U
Methapyrilene	50	50 U	50 U	50 U	50 U	50 U
Aramite 1	50	50 UR	50 UR	50 UR	50 UR	50 UR
Aramite 2	50	50 UR	50 UR	50 UR	50 UR	50 UR
p-(Dimethylamino)azobenzene	10	10 U	10 U	10 U	10 U	10 U
3,3'-Dimethylbenzidine	10	10 U	10 U	10 U	10 U	10 U
2-Acetylaminofluorene	10	10 U	10 U	10 U	10 U	10 U
7,12-Dimethylbenz(a)anthracene	10	10 U	10 U	10 U	10 U	10 U
Hexachloropropene	50	50 UR	50 UR	50 UR	50 UR	50 UR
3-Methylcholanthrene	10	10 U	10 U	10 U	10 U	10 U

PROJECT: NCBC GULFPORT, MISSISSIPPI — POLYNUCLEAR AROMATIC HYDROCARBONS AQUEOUS ANALYSES (ug/l) — Validation Table

	SAMPLE LOCATION:	GPTHO3-1	GPTHO3-2	GPTHO3-3	GPTHO3-3D	GPTHO3-4
	LAB NUMBER:	A4K210020005	A4K210020004	A4K210020002	A4K210020003	A4K210020001
	DATE SAMPLED:	11/18/94	11/18/94	11/18/94	11/18/94	11/18/94
	DATE ANALYZED:	11/28/94	11/28/94	11/28/94	11/28/94	11/28/94
ANALYTE	PQL					
Naphthalene	2.0	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Acenaphthylene	2.0	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Acenaphthene	2.0	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Fluorene	1.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Phenanthrene	1.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Anthracene	1.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Fluoranthene	0.50	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Pyrene	0.50	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Benzo(a)anthracene	0.13	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
Chrysene	0.20	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Benzo(b)fluoranthene	0.18	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U
Benzo(k)fluoranthene	0.17	0.17 UJ	0.17 UJ	0.17 UJ	0.17 UJ	0.17 UJ
Benzo(a)pyrene	0.20	0.20 UJ	0.20 UJ	0.20 UJ	0.20 UJ	0.20 UJ
Dibenzo(a,h)anthracene	0.20	0.20 UJ	0.20 UJ	0.20 UJ	0.20 UJ	0.20 UJ
Indeno(1,2,3-cd)pyrene	0.20	0.20 UJ	0.20 UJ	0.20 UJ	0.20 UJ	0.20 UJ
Benzo(g,h,i)perylene	0.20	0.20 UJ	0.20 UJ	0.20 UJ	0.20 UJ	0.20 UJ

PROJECT: NCBC GULFPORT, MISSISSIPPI — PESTICIDE/PCB AQUEOUS ANALYSES (ug/l) — Validation Table

	SAMPLE LOCATION:	GPTHO3-1	GPTHO3-2	GPTHO3-3	GPTHO3-3D	GPTHO3-4
	LAB NUMBER:	A1EVX102	A1EVV102	A1EVP102	A1EVX102	A1EVK102
	DATE SAMPLED:	11/18/95	11/18/95	11/18/95	11/18/95	11/18/95
	DATE ANALYZED:	12/04/94	12/04/94	12/04/94	12/04/94	12/04/94
	DILUTION:	1.0	1.0	1.0	1.0	1.0
ANALYTE	PQL					
alpha-BHC	0.05	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
beta-BHC	0.05	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
delta-BHC	0.05	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
gamma-BHC (Lindane)	0.05	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
Heptachlor	0.05	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
Aldrin	0.05	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
Heptachlor Epoxide	0.05	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
Endosulfan I	0.05	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
Dieldrin	0.10	0.10 UJ	0.10 UJ	0.10 UJ	0.10 UJ	0.10 UJ
4,4'- DDE	0.10	0.10 UJ	0.10 UJ	0.10 UJ	0.10 UJ	0.10 UJ
Endrin	0.10	0.10 UJ	0.10 UJ	0.10 UJ	0.10 UJ	0.10 UJ
Endosulfan II	0.10	0.10 UJ	0.10 UJ	0.10 UJ	0.10 UJ	0.10 UJ
4,4'- DDD	0.10	0.10 UJ	0.10 UJ	0.10 UJ	0.10 UJ	0.10 UJ
Endosulfan Sulfate	0.10	0.10 UJ	0.10 UJ	0.10 UJ	0.10 UJ	0.10 UJ
4,4'- DDT	0.10	0.10 UJ	0.10 UJ	0.10 UJ	0.10 UJ	0.10 UJ
Methoxychlor	0.50	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Endrin Ketone	0.10	0.10 UJ	0.10 UJ	0.10 UJ	0.10 UJ	0.10 UJ
Endrin Aldehyde	0.10	0.10 UJ	0.10 UJ	0.10 UJ	0.10 UJ	0.10 UJ
alpha-Chlordane	0.05	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
gamma-Chlordane	0.05	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
Toxaphene	5.0	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Aroclor-1016	1.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Aroclor-1221	2.0	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Aroclor-1232	1.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Aroclor-1242	1.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Aroclor-1248	1.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Aroclor-1254	1.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Aroclor-1260	1.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Diallate	1.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Chlorobenzilate	0.10	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
Isodrin	0.10	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
Kepone	1.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U

PROJECT: NCBC GULFPORT, MISSISSIPPI — ORGANOPHOSPHORUS PESTICIDE AQUEOUS ANALYSIS (ug/l) — Validation Table

	SAMPLE LOCATION:	GPTHO3-1	GPTHO3-2	GPTHO3-3	GPTHO3-3D	GPTHO3-4
	LAB NUMBER:	A4K210020005	A4K210020004	A4K21002002	A4K21002003	A4K21002001
	DATE SAMPLED:	11/18/94	11/18/94	11/18/94	11/18/94	11/18/94
	DATE ANALYZED:	12/03/94	12/03/94	12/03/94	12/03/94	12/03/94
ANALYTE	PQL					
Triethylphosphorothioate	0.5 U	0.5 U	0.5 U	5.0 U	5.0 U	0.5 U
Thionazin	0.5 U	0.5 U	0.5 U	5.0 U	5.0 U	0.5 U
Phorate	0.5 U	0.5 U	0.5 U	5.0 U	5.0 U	0.5 U
Sulfotepp	0.5 U	0.5 U	0.5 U	5.0 U	5.0 U	0.5 U
Dimethoate	0.5 U	0.5 U	0.5 U	5.0 U	5.0 U	0.5 U
Disulfoton	0.5 U	0.5 U	0.5 U	5.0 U	5.0 U	0.5 U
Methyl Parathion	0.5 U	0.5 U	0.5 U	5.0 U	5.0 U	0.5 U
Ethyl Parathion (Parathion)	0.5 U	0.5 U	0.5 U	5.0 U	5.0 U	0.5 U
Famphur	0.5 U	0.5 U	0.5 U	5.0 U	5.0 U	0.5 U

PROJECT: NCBC GULFPORT, MISSISSIPPI — HERBICIDE AQUEOUS ANALYSES (ug/l) — Validation Table

	SAMPLE LOCATION:	GPTHO3-1	GPTHO3-2	GPTHO3-3	GPTHO3-3D	GPTHO3-4
	LAB NUMBER:	A4K21002005	A4K210020004	A4K210020002	A4K210020003	A4K210020001
	DATE SAMPLED:	11/18/94	11/18/94	11/18/94	11/18/94	11/18/94
	DATE ANALYZED:	12/03/94	12/03/94	12/03/94	12/03/94	12/03/94
ANALYTE	PQL					
2,4-D	0.5	0.5 U	0.6 U	1.5 U	1.5 U	0.5 U
2,4,5-TP	0.1	0.1 U	0.33	1.5	1.3	0.1 U
2,4,5-T	0.2	0.2 U	1.2	0.5 U	0.5 U	0.2 U
Dinoseb	0.7	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U

PROJECT: NCBC GULFPORT, MISSISSIPPI — DIOXIN/FURANS AQUEOUS ANALYSES (pg/l) — Validation Table

	SAMPLE LOCATION:	GPTHO3-1	GPTHO3-2	GPTHO3-3	GPTHO3-3D	GPTHO3-4
	LAB NUMBER:	078932-0005-SA	078932-0004-SA	078932-0002-SA	078932-0003-FD	078932-0001-SA
	DATE SAMPLED:	11/18/94	11/18/94	11/18/94	11/18/94	11/18/94
	DATE ANALYZED:	12/08/94	12/08/94	12/08/94	12/08/94	12/08/94
ANALYTE						
2,3,7,8-TCDD		0.51 U	18	4.6 U	6.2	1.4 U
2,3,7,8-TCDF		0.40 U	1.5 U	0.67 U	0.84 U	0.49 U
1,2,3,7,8-PeCDD		0.61 U	0.46 U	0.48 U	0.58 U	1.0 U
1,2,3,7,8-PeCDF		0.79 U	0.85 U	0.63 U	0.61 U	1.0 U
2,3,4,7,8-PeCDF		0.71 U	0.77 U	0.57 U	0.55 U	0.95 U
1,2,3,4,7,8-HxCDD		1.0 U	0.77 U	0.78 U	1.3 U	2.0 U
1,2,3,6,7,8-HxCDD		1.5 U	1.9 U	1.9 U	3.0 U	6.0 U
1,2,3,7,8,9-HxCDD		2.2 U	18 U	12 U	18 U	58
1,2,3,4,7,8-HxCDF		0.62 U	0.55 U	0.43 U	0.56 U	0.64 U
1,2,3,6,7,8-HxCDF		0.44 U	0.27 U	0.18 U	0.33 U	0.63 U
2,3,4,6,7,8-HxCDF		0.35 U	0.28 U	0.51 U	0.39 U	0.66 U
1,2,3,7,8,9-HxCDF		0.35 U	0.28 U	0.19 U	0.41 U	0.66 U
1,2,3,4,6,7,8-HpCDD		26 U	110	90	160	260
1,2,3,4,6,7,8-HpCDF		0.95 U	1.5 U	0.80 U	1.0 U	3.2 U
1,2,3,4,7,8,9-HpCDF		0.28 U	1.5 U	1.6 U	1.1 U	3.5 U
OCDD		560	3500 J	1700	3400 J	5000 J
OCDF		1.9 U	4.0 U	1.9 U	4.2 U	5.3 U

PROJECT: NCBC GULFPORT, MISSISSIPPI — INORGANIC AQUEOUS ANALYSES (ug/l) — Validation Table

	SAMPLE LOCATION:	GPTHO3-1	GPTHO3-2	GPTHO3-3	GPTHO3-3D	GPTHO3-4
	LAB NUMBER:	A1EVX	A1EVV	A1EVP	A1EVR	A1EVK
	DATE SAMPLED:	11/18/94	11/18/94	11/18/94	11/18/94	11/18/94
ANALYTE	CRDL					
Antimony	60	3.2 J	2.0 U	2.0 U	2.0 U	2.0 U
Arsenic	10	25.2 J	19.6 J	35.6 J	35.9 J	14.3 J
Barium	200	184 J	116 J	114 J	114 J	152 J
Beryllium	5	1.0 U	1.0 J	2.3 J	1.9 J	1.0 U
Cadmium	5	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Chromium	10	48.0	51.3	1044	94.7	85.3
Cobalt	50	11.6 J	5.0 J	18.8 J	16.7 J	10.6 J
Copper	25	11.2 J	20.5 J	25.5	23.6 J	19.1 J
Lead	3	19.3	15.1	37.0	32.5	29.3
Mercury	0.2	0.20 U	0.23	0.28	0.24	0.32
Nickel	40	34.1 J	21.2 J	39.4 J	34.3 J	37.0 J
Selenium	5	4.1 J	4.0 UJ	13.3 J	12.5 J	6.3 J
Silver	10	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Thallium	10	8.8 J	6.0 U	6.0 U	8.3 J	7.0 J
Vanadium	50	55.2	43.7 J	130	130	95.5
Zinc	20	72.5 J	46.2 J	37.0 J	317 J	54.2 J
Cyanide	10	10.0 U	10 U	10 U	10.0 U	10.0 U
Tin	200	20.9 U	19.5 U	19.3 U	24.4 U	28.6 U
Sulfide	1000	<1000	<1000	<1000	<1000	<1000

Validated Quality Assurance and Quality Control Results

PROJECT: NCBC GULFPORT, MISSISSIPPI

VOLATILE AQUEOUS ANALYSES (ug/l)

Validation Table

	SAMPLE NUMBER:	BS-01-DI3	BS-01-RI3	BS-01-TB3
	LAB NUMBER:	A1EW0103	A1EW3103	A1EW7101
	DATE SAMPLED:	11/18/94	11/18/94	11/18/94
	DATA ANALYZED:	11/27/94	11/27/94	11/27/94
	DILUTION FACTOR:	1.0	1.0	1.0
ANALYTE	PQL			
Chloromethane	10	10 U	10 U	10 U
Bromomethane	10	10 U	10 U	10 U
Vinyl Chloride	10	10 U	10 U	10 U
Chloroethane	10	10 U	10 U	10 U
Methylene Chloride	5	5 U	5 U	5 U
Acetone	10	4 J	8 J	6 J
Carbon Disulfide	5	5 U	5 U	5 U
1,1-Dichloroethene	5	5 U	5 U	5 U
1,1-Dichloroethane	5	5 U	5 U	5 U
trans-1,2-Dichloroethene	5	5 U	5 U	5 U
Chloroform	5	5 U	5 U	5 U
1,2-Dichloroethane	5	5 U	5 U	5 U
2-Butanone	10	10 U	10 U	10 U
1,1,1-Trichloroethane	5	5 U	5 U	5 U
Carbon Tetrachloride	5	5 U	5 U	5 U
Bromodichloromethane	5	5 U	5 U	5 U
1,2-Dichloropropane	5	5 U	5 U	5 U
cis-1,3-Dichloropropene	5	5 U	5 U	5 U
Trichloroethene	5	5 U	5 U	5 U
Dibromochloromethane	5	5 U	5 U	5 U
1,1,2-Trichloroethane	5	5 U	5 U	5 U
Benzene	5	5 U	5 U	5 U
trans-1,3-Dichloropropene	5	5 U	5 U	5 U
Bromoform	5	5 U	5 U	5 U
4-Methyl-2-Pentanone	10	10 U	10 U	10 U
2-Hexanone	10	10 U	10 U	10 U
Tetrachloroethene	5	5 U	5 U	5 U
1,1,2,2-Tetrachloroethane	5	5 U	5 U	5 U
Toluene	5	5 U	5 U	5 U
Chlorobenzene	5	5 U	5 U	5 U
Ethylbenzene	5	5 U	5 U	5 U
Styrene	5	5 U	5 U	5 U
Xylene (total)	5	5 U	5 U	5 U
cis-1,2,-Dichloroethene	5	5 U	5 U	5 U
2-Chloroethylvinylether	10	10 UJ	10 UJ	10 UJ
Trichlorofluoromethane	5	5 U	5 U	5 U
Acrolein	100	100 U	100 U	100 U
Iodomethane	10	10 U	10 U	10 U
Acetonitrile	100	100 U	100 U	100 U
Chlorobutadiene	200	200 U	200 U	200 U

PROJECT: NCBC GULFPORT, MISSISSIPPI

VOLATILE AQUEOUS ANALYSES (ug/l)

Validation Table

	SAMPLE NUMBER:	BS-01-DI3	BS-01-RI3	BS-01-TB3
	LAB NUMBER:	A1EW0103	A1EW3103	A1EW7101
	DATE SAMPLED:	11/18/94	11/18/94	11/18/94
	DATA ANALYZED:	11/27/94	11/27/94	11/27/94
	DILUTION FACTOR:	1.0	1.0	1.0
	PQL			
Acrylonitrile	100	100 U	100 U	100 U
3-Chloropropene	5	5 U	5 U	5 U
Vinyl acetate	10	10 U	10 U	10 U
Propionitrile	100	100 U	100 U	100 U
Methacrylonitrile	5	5 U	5 U	5 U
Isobutanol	200	200 UR	200 UR	200 UR
Dibromomethane	5	5 U	5 U	5 U
1,4-Dioxane	200	200 UR	200 UR	200 UR
Methyl methacrylate	10	10 U	10 U	10 U
Ethyl methacrylate	5	5 U	5 U	5 U
1,2-Dibromoethane	5	5 U	5 U	5 U
1,1,1,2-Tetrachloroethane	5	5 U	5 U	5 U
1,2,3-Trichloropropene	5	5 U	5 U	5 U
1,4-Dichloro-2-butene	5	5 U	5 U	5 U
1,2-Dibromo-3-chloropropane	10	10 U	10 U	10 U
1,3-Dichlorobenzene	5	5 U	5 U	5 U
1,4-Dichlorobenzene	5	5 U	5 U	5 U
1,2-Dichlorobenzene	5	5 U	5 U	5 U

PROJECT: NCBC GULFPORT, MISSISSIPPI

SEMIVOLATILE AQUEOUS ANALYSES (ug/l)

Validation Table

	SAMPLE LOCATION:	BS-01-DI3	BS-01-RI3
	LAB NUMBER:	A1EW0104	A1EW3104
	DATE SAMPLED:	11/18/94	11/18/94
	DATE ANALYZED:	11/30/94	11/30/94
	DILUTION FACTOR:	1.0	1.0
ANALYTE	PQL		
Phenol	10	10 U	10 U
bis (2-Chloroethyl) Ether	10	10 U	10 U
2- Chlorophenol	10	10 U	10 U
1,3- Dichlorobenzene	10	10 U	10 U
1,4- Dichlorobenzene	10	10 U	10 U
1,2- Dichlorobenzene	10	10 U	10 U
2- Methylphenol	10	10 U	10 U
2,2'-oxybis(1-Chloropropane)	10	10 U	10 U
N-Nitroso-Di-n-Propylamine	10	10 U	10 U
4-Methylphenol	10	10 U	10 U
Hexachloroethane	10	10 U	10 U
Nitrobenzene	10	10 U	10 U
Isophorone	10	10 U	10 U
2-Nitrophenol	10	10 U	10 U
2,4-Dimethylphenol	10	10 U	10 U
bis (2-Chloroethoxy) Methane	10	10 U	10 U
2,4-Dichlorophenol	10	10 U	10 U
1,2,4-Trichlorobenzene	10	10 U	10 U
Naphthalene	10	10 U	10 U
4-Chloroaniline	10	10 U	10 U
Hexachlorobutadiene	10	10 U	10 U
4-Chloro-3-Methylphenol	10	10 U	10 U
2-Methylnaphthalene	10	10 U	10 U
Hexachlorocyclopentadiene	10	10 U	10 U
2,4,6-Trichlorophenol	10	10 U	10 U
2,4,5-Trichlorophenol	25	25 U	25 U
2-Chloronaphthalene	10	10 U	10 U
2-Nitroaniline	25	25 U	25 U
Acenaphthylene	10	10 U	10 U
2,6-Dinitrotoluene	10	10 U	10 U
3-Nitroaniline	25	25 U	25 U
Acenaphthene	10	10 U	10 U
2,4-Dinitrophenol	25	25 U	25 U
Dibenzofuran	10	10 U	10 U
4-Nitrophenol	25	25 U	25 U
2,4-Dinitrotoluene	10	10 U	10 U
Fluorene	10	10 U	10 U
Dimethylphthalate	10	10 U	10 U
Diethylphthalate	10	10 U	10 U
4-Chlorophenyl-phenylether	10	10 U	10 U
4-Nitroaniline	25	25 U	25 U
4,6-Dinitro-2-Methylphenol	25	25 U	25 U
N-Nitrosodiphenylamine	10	10 U	10 U

PROJECT: NCBC GULFPORT, MISSISSIPPI

SEMIVOLATILE AQUEOUS ANALYSES (ug/l)

Validation Table

	SAMPLE LOCATION:	BS-01-DI3	BS-01-RI3
	LAB NUMBER:	A1EW0104	A1EW3104
	DATE SAMPLED:	11/18/94	11/18/94
	DATE ANALYZED:	11/30/94	11/30/94
	DILUTION FACTOR:	1.0	1.0
ANALYTE	PQL		
4-Bromophenyl-phenylether	10	10 U	10 U
Hexachlorobenzene	10	10 U	10 U
Pentachlorophenol	25	25 U	25 U
Phenanthrene	10	10 U	10 U
Anthracene	10	10 U	10 U
Di-n-Butylphthalate	10	10 U	10 U
Fluoranthene	10	10 U	10 U
Pyrene	10	10 U	10 U
Butylbenzylphthalate	10	10 U	10 U
Benzo (a) Anthracene	10	10 U	10 U
3,3'-Dichlorobenzidine	10	10 U	10 U
Chrysene	10	10 U	10 U
bis (2-Ethylhexyl) Phthalate	10	10 U	10 U
Di-n-Octyl Phthalate	10	10 U	10 U
Benzo (b) Fluoranthene	10	10 U	10 U
Benzo (k) Fluoranthene	10	10 U	10 U
Benzo (a) Pyrene	10	10 U	10 U
Indeno (1,2,3-cd) Pyrene	10	10 U	10 U
Dibenz (a,h) Anthracene	10	10 U	10 U
Benzo (g,h,i) Perylene	10	10 U	10 U
Carbazole	10	10 U	10 U
Aniline	10	10 U	10 U
N-Nitrosodimethylamine	10	10 U	10 U
Benzyl alcohol	10	10 U	10 U
3&4-Methylphenol	20	20 U	20 U
Benzoic acid	50	50 U	50 U
2,3,4,6-Tetrachlorophenol	10	10 U	10 U
1,2-Diphenylhydrazine	10	10 U	10 U
Benzidine	50	50 U	50 U
Pyridine	50	50 U	50 U
p-Phenylenediamine	50	50 U	50 U
2-Picoline	50	50 U	50 U
N-Nitrosomethylethylamine	10	10 U	10 U
Methyl methanesulfonate	10	10 U	10 U
N-Nitrosodiethylamine	10	10 U	10 U
Ethyl Methansulfonate	10	10 U	10 U
Acetophenone	10	10 U	10 U
N-Nitrosopyrrolidine	10	10 U	10 U
N-Nitrosomorpholine	10	10 U	10 U
o-Toluidine	10	10 U	10 U
N-Nitrosopiperidine	10	10 U	10 U
a,a-Dimethyl-phenethylamine	50	50 U	50 U
2,6-Dichlorophenol	10	10 U	10 U
Hexachloropropene	50	50 U	50 U
N-Nitrosodi-n-butylamine	10	10 U	10 U
Safrole	50	50 U	50 U
1,2,4,5-Tetrachlorobenzene	50	50 U	50 U

PROJECT: NCBC GULFPORT, MISSISSIPPI

SEMIVOLATILE AQUEOUS ANALYSES (ug/l)

Validation Table

	SAMPLE LOCATION:	BS-01-DI3	BS-01-RI3
	LAB NUMBER:	A1EW0104	A1EW3104
	DATE SAMPLED:	11/18/94	11/18/94
	DATE ANALYZED:	11/30/94	11/30/94
	DILUTION FACTOR:	1.0	1.0
ANALYTE	PQL		
Isosafrole 1	50	50 U	50 U
Isosafrole 2	50	50 U	50 U
1,4-Napthoquinone	50	50 U	50 U
1,3-Dinitrobenzene	10	10 U	10 U
Pentachlorobenzene	50	50 U	50 U
1-Naphthylamine	50	50 U	50 U
2-Naphthylamine	50	50 U	50 U
5-Nitro-o-toluidine	10	10 U	10 U
Diphenylamine	10	10 U	10 U
1,3,5-Trinitrobenzene	10	10 UR	10 UR
Phenacetin	10	10 U	10 U
4-Aminobiphenyl	50	50 U	50 U
Pentachloronitrobenzene	50	50 U	50 U
Pronamide	10	10 U	10 U
4-Nitroquinoline-1-oxide	10	10 U	10 U
Methapyrilene	50	50 U	50 U
Aramite 1	50	50 UR	50 UR
Aramite 2	50	50 UR	50 UR
p-(Dimethylamino)azobenzene	10	10 U	10 U
3,3'-Dimethylbenzidine	10	10 U	10 U
2-Acetylaminofluorene	10	10 U	10 U
7,12-Dimethylbenz(a)anthracene	10	10 U	10 U
Hexachloropropene	50	50 UR	50 UR
3-Methylcholanthrene	10	10 U	10 U

PROJECT: NCBC GULFPORT, MISSISSIPPI

POLYNUCLEAR AROMATIC HYDROCARBONS AQUEOUS ANALYSES (ug/l)

	SAMPLE LOCATION:	BS-01-DI3	BS-01-RI3
	LAB NUMBER:	AK4210020006	AK4210020007
	DATE SAMPLED:	11/18/94	11/18/94
	DATE ANALYZED:	11/29/94	11/29/94
ANALYTE	PQL		
Naphthalene	2.0	2.0 U	2.0 U
Acenaphthylene	2.0	2.0 U	2.0 U
Acenaphthene	2.0	2.0 U	2.0 U
Fluorene	1.0	1.0 U	1.0 U
Phenanthrene	1.0	1.0 U	1.0 U
Anthracene	1.0	1.0 U	1.0 U
Fluoranthene	0.50	0.50 U	0.50 U
Pyrene	0.50	0.50 U	0.50 U
Benzo(a)anthracene	0.13	0.13 U	0.13 U
Chrysene	0.20	0.20 U	0.20 U
Benzo(b)fluoranthene	0.18	0.18 U	0.18 U
Benzo(k)fluoranthene	0.17	0.17 U	0.17 U
Benzo(a)pyrene	0.20	0.20 U	0.20 U
Dibenzo(a,h)anthracene	0.20	0.20 U	0.20 U
Indeno(1,2,3-cd)pyrene	0.20	0.20 U	0.20 U
Benzo(g,h,i)perylene	0.20	0.20 U	0.20 U

PROJECT: NCBC GULFPORT, MISSISSIPPI — PESTICIDE/PCB AQUEOUS ANALYSES (ug/l) — Validation Table

	SAMPLE LOCATION:	BS-01-DI3	BS-01-RI3
	LAB NUMBER:	A1EW0102	A1EW3102
	DATE SAMPLED:	11/18/95	11/18/95
	DATE ANALYZED:	12/04/94	12/04/94
	DILUTION:	1.0	1.0
ANALYTE	PQL		
alpha-BHC	0.05	0.05 UJ	0.05 UJ
beta-BHC	0.05	0.05 UJ	0.05 UJ
delta-BHC	0.05	0.05 UJ	0.05 UJ
gamma-BHC (Lindane)	0.05	0.05 UJ	0.05 UJ
Heptachlor	0.05	0.05 UJ	0.05 UJ
Aldrin	0.05	0.05 UJ	0.05 UJ
Heptachlor Epoxide	0.05	0.05 UJ	0.05 UJ
Endosulfan I	0.05	0.05 UJ	0.05 UJ
Dieldrin	0.10	0.10 UJ	0.10 UJ
4,4'- DDE	0.10	0.10 UJ	0.10 UJ
Endrin	0.10	0.10 UJ	0.10 UJ
Endosulfan II	0.10	0.10 UJ	0.10 UJ
4,4'- DDD	0.10	0.10 UJ	0.10 UJ
Endosulfan Sulfate	0.10	0.10 UJ	0.10 UJ
4,4'- DDT	0.10	0.10 UJ	0.10 UJ
Methoxychlor	0.50	0.50 UJ	0.50 UJ
Endrin Ketone	0.10	0.10 UJ	0.10 UJ
Endrin Aldehyde	0.10	0.10 UJ	0.10 UJ
alpha-Chlordane	0.05	0.05 UJ	0.05 UJ
gamma-Chlordane	0.05	0.05 UJ	0.05 UJ
Toxaphene	5.0	5.0 U	5.0 U
Aroclor-1016	1.0	1.0 U	1.0 U
Aroclor-1221	2.0	2.0 U	2.0 U
Aroclor-1232	1.0	1.0 U	1.0 U
Aroclor-1242	1.0	1.0 U	1.0 U
Aroclor-1248	1.0	1.0 U	1.0 U
Aroclor-1254	1.0	1.0 U	1.0 U
Aroclor-1260	1.0	1.0 U	1.0 U
Diallate	1.0	1.0 U	1.0 U
Chlorobenzilate	0.10	0.10 U	0.10 U
Isodrin	0.10	0.10 U	0.10 U
Kepone	1.0	1.0 U	1.0 U

PROJECT: NCBC GULFPORT, MISSISSIPPI — ORGANOPHOSPHORUS PESTICIDE AQUEOUS ANALYSIS (ug/l) — Validation Table

	SAMPLE LOCATION:	BS-01-DI3	BS-01-RI3
	LAB NUMBER:	A4K210020006	A4K210020007
	DATE SAMPLED:	11/18/94	11/18/94
	DATE ANALYZED:	12/03/94	12/0394
ANALYTE	PQL		
Triethylphosphorothioate	0.5	0.5 U	0.5 U
Thionazin	0.5	0.5 U	0.5 U
Phorate	0.5	0.5 U	0.5 U
Sulfotepp	0.5	0.5 U	0.5 U
Dimethoate	0.5	0.5 U	0.5 U
Disulfoton	0.5	0.5 U	0.5 U
Methyl Parathion	0.5	0.5 U	0.5 U
Ethyl Parathion	0.5	0.5 U	0.5 U
Famphur	0.5	0.5 U	0.5 U

PROJECT: NCBC GULFPORT, MISSISSIPPI — HERBICIDE AQUEOUS ANALYSES (ug/l) — Validation Table

	SAMPLE LOCATION:	BS-01-DI3	BS-01-RI3
	LAB NUMBER:	A4K210020006	RA4K210020007
	DATE SAMPLED:	11/18/94	11/18/94
	DATE ANALYZED:	11/29/94	11/29/94
ANALYTE	PQL		
2,4-D	0.5	0.5 U	0.5 U
2,4,5-T	0.1	0.1 U	0.1 U
2,4,5-TP	0.2	0.2 U	0.2 U
Dinoseb	0.7	0.7 U	0.7 U

PROJECT: NCBC GULFPORT, MISSISSIPPI — DIOXIN/FURANS AQUEOUS ANALYSES (pg/l) — Validation Table

	SAMPLE LOCATION:	BS-01-DI3	BS-01-RI3
	LAB NUMBER:	078932-0006-SA	078932-0007-SA
	DATE SAMPLED:	11/18/94	11/18/94
	DATE ANALYZED:	12/09/94	12/09/94
ANALYTE			
2,3,7,8-TCDD		0.47 U	0.41 U
2,3,7,8-TCDF		0.47 U	0.30 U
1,2,3,7,8-PeCDD		0.56 U	0.32 U
1,2,3,7,8-PeCDF		0.65 U	0.72 U
2,3,4,7,8-PeCDF		0.52 U	0.65 U
1,2,3,4,7,8-HxCDD		1.0 U	0.83 U
1,2,3,6,7,8-HxCDD		0.89 U	0.71 U
1,2,3,7,8,9-HxCDD		0.88 U	0.73 U
1,2,3,4,7,8-HxCDF		0.62 U	0.51 U
1,2,3,6,7,8-HxCDF		0.59 U	0.23 U
2,3,4,6,7,8-HxCDF		0.36 U	0.25 U
1,2,3,7,8,9-HxCDF		0.27 U	0.25 U
1,2,3,4,6,7,8-HpCDD		1.3 U	1.1 U
1,2,3,4,6,7,8-HpCDF		1.4 U	1.0 U
1,2,3,4,7,8,9-HpCDF		1.5 U	1.1 U
OCDD		7.7 U	0.86 U
OCDF		1.2 U	0.63 U

PROJECT: NCBC GULFPORT, MISSISSIPPI — INORGANIC AQUEOUS ANALYSES (ug/l) — Validation Table

	SAMPLE LOCATION:	BS-01-DI3	BS-01-RI3
	LAB NUMBER:	A1EW0	A1EW3
	DATE SAMPLED:	11/18/94	11/18/94
ANALYTE	CRDL		
Antimony	60	2.0 U	2.0 U
Arsenic	10	3.0 UJ	3.0 UJ
Barium	200	1.0 J	1.0 U
Beryllium	5	1.0 U	1.0 U
Cadmium	5	1.0 U	1.0 U
Chromium	10	2.0 UJ	2.0 UJ
Cobalt	50	2.0 U	2.0 U
Copper	25	2.0 U	2.0 U
Lead	3	1.0 UJ	1.0 UJ
Mercury	0.2	0.20 U	0.20 U
Nickel	40	2.0 U	2.0 U
Selenium	5	4.0 UJ	4.0 UJ
Silver	10	1.0 U	1.0 U
Thallium	10	6.0 U	6.0 U
Vanadium	50	1.0 U	1.0 U
Zinc	20	7.5 U	1.4 U
Cyanide	10	10.0 U	10.0 U
Tin	200	15.1 U	14.7 U
Sulfide	1000	<1000	<1000

Groundwater Sampling Event No. 4

Validation Groundwater Results

PROJECT: NCBC GULFPORT, MISSISSIPPI — VOLATILE AQUEOUS ANALYSES (ug/l) — Validation Table

	SAMPLE NUMBER:	GPTHO4-1	GPTHO4-2	GPTHO4-2D	GPTHO4-3	GPTHO4-4
	LAB NUMBER:	A2TJ0103	A2TJ2103	A2TJ3103	A2TJ4103	A2TJ5103
	DATE SAMPLED:	2/15/95	2/15/95	2/15/95	2/15/95	2/15/95
	DATA ANALYZED:	2/21/95	2/21/95	2/21/95	2/22/95	2/22/95
	DILUTION FACTOR:	1.0	1.0	1.0	1.0	1.0
ANALYTE	PQL					
Chloromethane	10	10 U	10 U	10 U	10 U	10 U
Bromomethane	10	10 U	10 U	10 U	10 U	10 U
Vinyl Chloride	10	10 U	10 U	10 U	10 U	10 U
Chloroethane	10	10 U	10 U	10 U	10 UJ	10 UJ
Methylene Chloride	5	5 U	5 U	5 U	5 U	5 U
Acetone	10	41 U	10 U	10 U	10 U	10 U
Carbon Disulfide	5	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethene	5	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethane	5	5 U	5 U	5 U	5 U	5 U
trans-1,2-Dichloroethene	5	5 U	5 U	5 U	5 U	5 U
Chloroform	5	5 U	5 U	5 U	5 U	5 U
1,2-Dichloroethane	5	5 U	5 U	5 U	5 U	5 U
2-Butanone	10	10 U	10 U	10 U	10 U	10 U
1,1,1-Trichloroethane	5	5 U	5 U	5 U	5 U	5 U
Carbon Tetrachloride	5	5 U	5 U	5 U	5 U	5 U
Bromodichloromethane	5	5 U	5 U	5 U	5 U	5 U
1,2-Dichloropropane	5	5 U	5 U	5 U	5 U	5 U
cis-1,3-Dichloropropene	5	5 U	5 U	5 U	5 U	5 U
Trichloroethene	5	5 U	5 U	5 U	5 U	5 U
Dibromochloromethane	5	5 U	5 U	5 U	5 U	5 U
1,1,2-Trichloroethane	5	5 U	5 U	5 U	5 U	5 U
Benzene	5	5 U	5 U	5 U	5 U	5 U
trans-1,3-Dichloropropene	5	5 U	5 U	5 U	5 U	5 U
Bromoform	5	5 U	5 U	5 U	5 U	5 U
4-Methyl-2-Pentanone	10	10 U	10 U	10 U	10 U	10 U
2-Hexanone	10	10 U	10 U	10 U	10 U	10 U
Tetrachloroethene	5	5 U	5 U	5 U	5 U	5 U
1,1,2,2-Tetrachloroethane	5	5 U	5 U	5 U	5 U	5 U
Toluene	5	5 U	4 J	5 U	5 U	5 U
Chlorobenzene	5	5 U	5 U	5 U	5 U	5 U
Ethylbenzene	5	5 U	5 U	5 U	5 U	5 U
Styrene	5	5 U	5 U	5 U	5 U	5 U
Xylene (total)	5	5 U	7	5 U	5 U	5 U
2-Chloroethylvinylether	10	10 U	10 U	10 U	10 U	10 U
Trichlorofluoromethane	5	5 U	5 U	5 U	5 U	5 U
Acrolein	100	100 U	100 U	100 U	100 UR	100 UR
Iodomethane	10	10 U	10 U	10 U	10 U	10 U
Acetonitrile	100	100 U	100 U	100 U	100 U	100 U

PROJECT: NCBC GULFPORT, MISSISSIPPI — VOLATILE AQUEOUS ANALYSES (ug/l) — Validation Table

	SAMPLE NUMBER:	GPTHO4-1	GPTHO4-2	GPTHO4-2D	GPTHO4-3	GPTHO4-4
	LAB NUMBER:	A2TJ0103	A2TJ2103	A2TJ3103	A2TJ4103	A2TJ5103
	DATE SAMPLED:	2/15/95	2/15/95	2/15/95	2/15/95	2/15/95
	DATA ANALYZED:	2/21/95	2/21/95	2/21/95	2/22/95	2/22/95
	DILUTION FACTOR:	1.0	1.0	1.0	1.0	1.0
	POL					
Chlorobutadiene	200	200 U	200 U	200 U	200 U	200 U
Acrylonitrile	100	100 U	100 U	100 U	100 U	100 U
3-Chloropropene	5	5 U	5 U	5 U	5 U	5 U
Vinyl acetate	10	10 U	10 U	10 U	10 U	10 U
Propionitrile	100	100 U	100 U	100 U	100 U	100 U
Methacrylonitrile	5	5 U	5 U	5 U	5 U	5 U
Isobutanol	200	200 UR	200 UR	200 UR	200 U	200 U
Dibromomethane	5	5 U	5 U	5 U	5 U	5 U
1,4-Dioxane	200	200 UR	200 UR	200 UR	200 U	200 U
Methyl methacrylate	10	10 U	10 U	10 U	10 U	10 U
Ethyl methacrylate	5	5 U	5 U	5 U	5 U	5 U
1,2-Dibromoethane	5	5 U	5 U	5 U	5 U	5 U
1,1,1,2-Tetrachloroethane	5	5 U	5 U	5 U	5 U	5 U
1,2,3-Trichloropropane	5	5 U	5 U	5 U	5 U	5 U
1,4-Dichloro-2-butene	5	5 U	5 U	5 U	5 U	5 U
1,2-Dibromo-3-chloropropane	10	10 U	10 U	10 U	10 U	10 U
1,3-Dichlorobenzene	5	5 U	5 U	5 U	5 U	5 U
1,4-Dichlorobenzene	5	5 U	5 U	5 U	5 U	5 U
1,2-Dichlorobenzene	5	5 U	5 U	5 U	5 U	5 U

PROJECT: NCBC GULFPORT, MISSISSIPPI — SEMIVOLATILE AQUEOUS ANALYSES (ug/l) — Validation Table

	SAMPLE LOCATION:	GPTH04-1	GPTH04-2	GPTH04-2D	GPTH04-3	GPTH04-4
	LAB NUMBER:	A2TJ0104	A2TJ2104	A2TJ3104	A2TJ4104	A2TJ5104
	DATE SAMPLED:	2/15/95	2/15/95	2/15/95	2/15/95	2/15/95
	DATE ANALYZED:	2/28/95	2/27/95	2/27/95	2/28/95	2/27/95
	DILUTION FACTOR:	1.0	1.0	1.0	1.0	1.0
ANALYTE	PQL					
Phenol	10	10 U	10 U	10 U	0.9 J	10 U
bis (2-Chloroethyl) Ether	10	10 U	10 U	10 U	10 U	10 U
2- Chlorophenol	10	10 U	10 U	10 U	0.9 J	10 U
1,3- Dichlorobenzene	10	10 U	10 U	10 U	10 U	10 U
1,4- Dichlorobenzene	10	10 U	10 U	10 U	10 U	10 U
1,2- Dichlorobenzene	10	10 U	10 U	10 U	10 U	10 U
2- Methylphenol	10	10 U	10 U	10 U	10 U	10 U
2,2'-oxybis(1-Chloropropane)	10	10 U	10 U	10 U	10 U	10 U
N-Nitroso-Di-n-Propylamine	10	10 U	10 U	10 U	10 U	10 U
4-Methylphenol	10	10 U	10 U	10 U	1 J	10 U
Hexachloroethane	10	10 U	10 U	10 U	10 U	10 U
Nitrobenzene	10	10 U	10 U	10 U	10 U	10 U
Isophorone	10	10 U	10 U	10 U	10 U	10 U
2-Nitrophenol	10	10 U	10 U	10 U	10 U	10 U
2,4-Dimethylphenol	10	10 U	10 U	10 U	10 U	10 U
bis (2-Chloroethoxy) Methane	10	10 U	10 U	10 U	10 U	10 U
2,4-Dichlorophenol	10	10 U	10 U	10 U	1 J	10 U
1,2,4-Trichlorobenzene	10	10 U	10 U	10 U	10 U	10 U
Naphthalene	10	10 U	10 U	10 U	23	10 U
4-Chloroaniline	10	10 U	10 U	10 U	10 U	10 U
Hexachlorobutadiene	10	10 U	10 U	10 U	10 U	10 U
4-Chloro-3-Methylphenol	10	10 U	10 U	10 U	10 U	10 U
2-Methylnaphthalene	10	10 U	10 U	10 U	10 U	10 U
Hexachlorocyclopentadiene	10	10 U	10 U	10 U	10 U	10 U
2,4,6-Trichlorophenol	10	10 U	10 U	10 U	10 U	10 U
2,4,5-Trichlorophenol	25	25 U	25 U	25 U	25 U	25 U
2-Chloronaphthalene	10	10 U	10 U	10 U	10 U	10 U
2-Nitroaniline	25	25 U	25 U	25 U	25 U	25 U
Acenaphthylene	10	10 U	10 U	10 U	10 U	10 U
2,6-Dinitrotoluene	10	10 U	10 U	10 U	10 U	10 U
3-Nitroaniline	25	25 U	25 U	25 U	25 U	25 U
Acenaphthene	10	10 U	10 U	10 U	10 U	10 U
2,4-Dinitrophenol	25	25 U	25 U	25 U	25 U	25 U
Dibenzofuran	10	10 U	10 U	10 U	10 U	10 U
4-Nitrophenol	25	25 U	25 U	25 U	25 U	25 U
2,4-Dinitrotoluene	10	10 U	10 U	10 U	10 U	10 U
Fluorene	10	10 U	10 U	10 U	10 U	10 U
Dimethylphthalate	10	10 U	10 U	10 U	10 U	10 U
Diethylphthalate	10	10 U	10 U	10 U	10 U	10 U
4-Chlorophenyl-phenylether	10	10 U	10 U	10 U	10 U	10 U
4-Nitroaniline	25	25 U	25 U	25 U	25 U	25 U
4,6-Dinitro-2-Methylphenol	25	25 U	25 U	25 U	25 U	25 U
N-Nitrosodiphenylamine	10	10 U	10 U	10 U	10 U	10 U

PROJECT: NCBC GULFPORT, MISSISSIPPI — SEMIVOLATILE AQUEOUS ANALYSES (ug/l) — Validation Table

	SAMPLE LOCATION:	GPTHO4-1	GPTHO4-2	GPTHO4-2D	GPTHO4-3	GPTHO4-4
	LAB NUMBER:	A2TJ0104	A2TJ2104	A2TJ3104	A2TJ4104	A2TJ5104
	DATE SAMPLED:	2/15/95	2/15/95	2/15/95	2/15/95	2/15/95
	DATE ANALYZED:	2/28/95	2/27/95	2/27/95	2/28/95	2/27/95
	DILUTION FACTOR:	1.0	1.0	1.0	1.0	1.0
ANALYTE	PQL					
4-Bromophenyl-phenylether	10	10 U	10 U	10 U	10 U	10 U
Hexachlorobenzene	10	10 U	10 U	10 U	10 U	10 U
Pentachlorophenol	25	25 U	25 U	25 U	25 U	25 U
Phenanthrene	10	10 U	10 U	10 U	10 U	10 U
Anthracene	10	10 U	10 U	10 U	10 U	10 U
Di-n-Butylphthalate	10	10 U	10 U	10 U	10 U	10 U
Fluoranthene	10	10 U	10 U	10 U	10 U	10 U
Pyrene	10	10 U	10 U	10 U	10 U	10 U
Butylbenzylphthalate	10	10 U	10 U	10 U	10 U	10 U
Benzo (a) Anthracene	10	10 U	10 U	10 U	10 U	10 U
3,3'-Dichlorobenzidine	10	10 U	10 U	10 U	10 U	10 U
Chrysene	10	10 U	10 U	10 U	10 U	10 U
bis (2-Ethylhexyl) Phthalate	10	10 U	10 U	10 U	10 U	10 U
Di-n-Octyl Phthalate	10	10 U	10 U	10 U	10 U	10 U
Benzo (b) Fluoranthene	10	10 U	10 U	10 U	10 U	10 U
Benzo (k) Fluoranthene	10	10 U	10 U	10 U	10 U	10 U
Benzo (a) Pyrene	10	10 U	10 U	10 U	10 U	10 U
Indeno (1,2,3-cd) Pyrene	10	10 U	10 U	10 U	10 U	10 U
Dibenz (a,h) Anthracene	10	10 U	10 U	10 U	10 U	10 U
Benzo (g,h,i) Perylene	10	10 U	10 U	10 U	10 U	10 U
Carbazole	10	10 U	10 U	10 U	10 U	10 U
Aniline	10	10 U	10 U	10 U	10 U	10 U
N-Nitrosodimethylamine	10	10 U	10 U	10 U	10 U	10 U
Benzyl alcohol	10	10 U	10 U	10 U	10 U	10 U
3&4-Methylphenol	10	10 U	10 U	10 U	10 U	10 U
Benzoic acid	20	20 U	20 U	20 U	20 U	20 U
2,3,4,6-Tetrachlorophenol	50	50 U	50 U	50 U	50 U	50 U
1,2-Diphenylhydrazine	10	10 U	10 U	10 U	10 U	10 U
Benzidine	10	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ
Pyridine	10	10 U	10 U	10 U	10 U	10 U
2-Picoline	20	20 U	20 U	20 U	20 U	20 U
N-Nitrosomethylethylamine	10	10 U	10 U	10 U	10 U	10 U
Methyl methanesulfonate	10	10 U	10 U	10 U	10 U	10 U
N-Nitrosodiethylamine	10	10 U	10 U	10 U	10 U	10 U
Ethyl Methansulfonate	10	10 U	10 U	10 U	10 U	10 U
Acetophenone	10	10 U	10 U	10 U	10 U	10 U
N-Nitrosopyrrolidine	10	10 U	10 U	10 U	10 U	10 U
N-Nitrosomorpholine	10	10 U	10 U	10 U	10 U	10 U
o-Toluidine	10	10 U	10 U	10 U	10 U	10 U
N-Nitrosopiperidine	10	10 U	10 U	10 U	10 U	10 U
a,a-Dimethyl-phenethylamine	10	10 U	10 U	10 U	10 U	10 U
2,6-Dichlorophenol	10	10 U	10 U	10 U	10 U	10 U
Hexachloropropene	100	100 U	100 U	100 U	100 U	100 U
N-Nitrosodi-n-butylamine	10	10 U	10 U	10 U	10 U	10 U
Safrole	10	10 U	10 U	10 U	10 U	10 U
1,2,4,5-Tetrachlorobenzene	10	10 U	10 U	10 U	10 U	10 U

PROJECT: NCBC GULFPORT, MISSISSIPPI — SEMIVOLATILE AQUEOUS ANALYSES (ug/l) — Validation Table

	SAMPLE LOCATION:	GPTHO4-1	GPTHO4-2	GPTHO4-2D	GPTHO4-3	GPTHO4-4
	LAB NUMBER:	A2TJ0104	A2TJ2104	A2TJ3104	A2TJ4104	A2TJ5104
	DATE SAMPLED:	2/15/95	2/15/95	2/15/95	2/15/95	2/15/95
	DATE ANALYZED:	2/28/95	2/27/95	2/27/95	2/28/95	2/27/95
	DILUTION FACTOR:	1.0	1.0	1.0	1.0	1.0
ANALYTE	PQL					
Isosafrole (total)	10	10 U	10 U	10 U	10 U	10 U
1,4-Napthoquinone	200	200 U	200 U	200 U	200 U	200 U
1,3-Dinitrobenzene	10	10 U	10 U	10 U	10 U	10 U
Pentachlorobenzene	10	10 U	10 U	10 U	10 U	10 U
1-Naphthylamine	10	10 U	10 U	10 U	10 U	10 U
2-Naphthylamine	10	10 U	10 U	10 U	10 U	10 U
N-Nitro-o-toluidine	10	10 U	10 U	10 U	10 U	10 U
Diphenylamine	10	10 U	10 U	10 U	10 U	10 U
1,3,5-Trinitrobenzene	50	50 UR	50 UR	50 UR	50 UR	50 UR
Phenacetin	50	50 U	50 U	50 U	50 U	50 U
4-Aminobiphenyl	50	50 U	50 U	50 U	50 U	50 U
Pentachloronitrobenzene	50	50 U	50 U	50 U	50 U	50 U
Pronamide	20	20 U	20 U	20 U	20 U	20 U
4-Nitroquinoline-1-oxide	100	100 U	100 U	100 U	100 U	100 U
Methapyrilene	100	100 U	100 U	100 U	100 U	100 U
Aramite (total)	---	R	R	R	R	R
p-(Dimethylamino)azobenzene	20	20 U	20 U	20 U	20 U	20 U
3,3'-Dimethylbenzidine	50	50 U	50 U	50 U	50 U	50 U
2-Acetylaminofluorene	20	20 U	20 U	20 U	20 U	20 U
7,12-Dimethylbenz(a)anthracene	100	100 U	100 U	100 U	100 U	100 U
Hexachloropropene	10	10 UR	10 UR	10 UR	10 UR	10 UR
3-Methylcholanthrene	100	100 U	100 U	100 U	100 U	100 U

PROJECT: NCBC GULFPORT, MISSISSIPPI — PESTICIDE/PCB AQUEOUS ANALYSES (ug/l) — Validation Table

	SAMPLE LOCATION:	GPTHO4-1	GPTHO4-2	GPTHO4-2D	GPTHO4-3	GPTHO4-4
	LAB NUMBER:	A2TJ0102	A2TJ2102	A2TJ3102	A2TJ4102	A2TJ5102
	DATE SAMPLED:	2/15/95	2/15/95	2/15/95	2/15/95	2/15/95
	DATE ANALYZED:	3/4/95	3/4/95	3/4/95	3/4/95	3/4/95
	DILUTION:	1.0	1.0	1.0	1.0	1.0
ANALYTE	PQL					
alpha-BHC	0.05	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
beta-BHC	0.05	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
delta-BHC	0.05	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
gamma-BHC (Lindane)	0.05	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
Heptachlor	0.05	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
Aldrin	0.05	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
Heptachlor Epoxide	0.05	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
Endosulfan I	0.05	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
Dieldrin	0.10	0.10 UJ	0.10 UJ	0.10 UJ	0.10 UJ	0.10 UJ
4,4'- DDE	0.10	0.10 UJ	0.10 UJ	0.10 UJ	0.10 UJ	0.10 UJ
Endrin	0.10	0.10 UJ	0.10 UJ	0.10 UJ	0.10 UJ	0.10 UJ
Endosulfan II	0.10	0.10 UJ	0.10 UJ	0.10 UJ	0.10 UJ	0.10 UJ
4,4'- DDD	0.10	0.10 UJ	0.10 UJ	0.10 UJ	0.10 UJ	0.10 UJ
Endosulfan Sulfate	0.10	0.10 UJ	0.10 UJ	0.10 UJ	0.10 UJ	0.10 UJ
4,4'- DDT	0.10	0.10 UJ	0.10 UJ	0.10 UJ	0.10 UJ	0.10 UJ
Methoxychlor	0.50	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Endrin Ketone	0.10	0.10 UJ	0.10 UJ	0.10 UJ	0.10 UJ	0.10 UJ
Endrin Aldehyde	0.10	0.10 UJ	0.10 UJ	0.10 UJ	0.10 UJ	0.10 UJ
alpha-Chlordane	0.05	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
gamma-Chlordane	0.05	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
Toxaphene	5.0	5.0 UJ	5.0 UJ	5.0 UJ	5.0 UJ	5.0 UJ
Aroclor-1016	1.0	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ
Aroclor-1221	2.0	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
Aroclor-1232	1.0	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ
Aroclor-1242	1.0	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ
Aroclor-1248	1.0	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ
Aroclor-1254	1.0	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ
Aroclor-1260	1.0	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ
Dieflate	1.0	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ
Chlorobenzilate	0.5	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Isodrin	0.10	0.10 UJ	0.10 UJ	0.10 UJ	0.10 UJ	0.10 UJ
Kepone	1.0	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ

PROJECT: NCBC GULFPORT, MISSISSIPPI — ORGANOPHOSPHORUS PESTICIDE AQUEOUS ANALYSIS (ug/l) — Validation Table

	SAMPLE LOCATION:	GPTHO4-1	GPTHO4-2	GPTHO4-2D	GPTHO4-3	GPTHO4-4
	LAB NUMBER:	A5B160032003	A5B160032004	A5B160032005	A5B160032006	A5B160032007
	DATE SAMPLED:	2/15/95	2/15/95	2/15/95	2/15/95	2/15/95
	DATE ANALYZED:	3/1/95	3/1/95	3/1/95	3/2/95	3/1/95
ANALYTE	PQL					
Triethylphosphorothioate	0.5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Thionazin	0.5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Phorate	0.5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Sulfotepp	0.5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dimethoate	0.5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Disulfoton	0.5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Methyl Parathion	0.5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Ethyl Parathion (Parathion)	0.5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Famphur	0.5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

PROJECT: NCBC GULFPORT, MISSISSIPPI — HERBICIDE AQUEOUS ANALYSES (ug/l) — Validation Table

	SAMPLE LOCATION:	GPTHO4-1	GPTHO4-2	GPTHO4-2D	GPTHO4-3	GPTHO4-4
	LAB NUMBER:	A5B160032003	A5B160032004	A5B160032005	A5B160032006	A5B160032007
	DATE SAMPLED:	2/15/95	2/15/95	2/15/95	2/15/95	2/15/95
	DATE ANALYZED:	2/22/95	2/22/95	2/22/95	2/22/95	2/22/95
ANALYTE	PQL					
2,4-D	0.5	0.5 U	0.5 U	0.5 U	1.5 U	0.5 U
2,4,5-TP	0.1	0.1 U	0.1 U	0.1 U	1.7	0.1 U
2,4,5-T	0.2	0.2 U	0.2 U	0.2 U	0.5 U	0.2 U
Dinoseb	0.7	0.7 UJ	0.7 UJ	0.7 UJ	0.7 UJ	0.7 UJ

PROJECT: NCBC GULFPORT, MISSISSIPPI — DIOXIN/FURANS AQUEOUS ANALYSES (pg/l) — Validation Table

	SAMPLE LOCATION:	GPTHO4-1	GPTHO4-2	GPTHO4-2D	GPTHO4-3	GPTHO4-4
	LAB NUMBER:	080412-0003-SA	080412-0004-SA	080412-0005-SA	080412-0006-SA	080412-0007-SA
	DATE SAMPLED:	2/15/95	2/15/95	2/15/95	2/15/95	2/15/95
	DATE ANALYZED:	3/7/95	3/7/95	3/7/95	3/7/95	3/7/95
ANALYTE						
2,3,7,8-TCDD		1.3 U	11 J	27	6.2 J	2.6 U
2,3,7,8-TCDF		1.2 U	3.3 U	2.7 U	1.1 U	0.89 U
1,2,3,7,8-PeCDD		2.2 U	6.2 U	3.8 U	1.9 U	2.1 U
1,2,3,7,8-PeCDF		2.3 U	6.0 U	3.4 U	2.2 U	2.4 U
2,3,4,7,8-PeCDF		2.0 U	5.2 U	3.1 U	1.9 U	2.1 U
1,2,3,4,7,8-HxCDD		0.79 U	14 U	1.3 U	0.89 U	2.2 U
1,2,3,6,7,8-HxCDD		0.85 U	14 U	2.6 U	2.0 U	4.9 U
1,2,3,7,8,9-HxCDD		2.8 U	15 U	16 U	13 U	63
1,2,3,4,7,8-HxCDF		1.2 U	6.0 U	1.1 U	0.70 U	0.80 U
1,2,3,6,7,8-HxCDF		0.98 U	8.0 U	1.4 U	0.90 U	1.0 U
2,3,4,6,7,8-HxCDF		1.1 U	8.8 U	0.97 U	0.95 U	1.1 U
1,2,3,7,8,9-HxCDF		1.4 U	12 U	1.5 U	1.1 U	1.3 U
1,2,3,4,6,7,8-HpCDD		13 U	44 U	86	110	280
1,2,3,4,6,7,8-HpCDF		1.2 U	5.4 U	3.0 U	1.0 U	1.4 U
1,2,3,4,7,8,9-HpCDF		2.9 U	2.3 U	3.8 U	0.45 U	2.2 U
OCDD		240	1,300	2,500	1,800	5,200
OCDF		3.2 U	4.9 U	7.6 U	3.2 U	3.9 U

PROJECT: NCBC GULFPORT, MISSISSIPPI — POLYNUCLEAR AROMATIC HYDROCARBONS AQUEOUS ANALYSES (ug/l) — Validation Table

	SAMPLE LOCATION:	GPTHO4-1	GPTHO4-2	GPTHO4-2D	GPTHO4-3	GPTHO4-4
	LAB NUMBER:	A5B160032003	A5B160032004	A5B160032005	A5B160032006	A5B160032007
	DATE SAMPLED:	2/15/95	2/15/95	2/15/95	2/15/95	2/15/95
	DATE ANALYZED:	2/25/95	2/25/95	2/25/95	2/25/95	2/25/95
ANALYTE	PQL					
Naphthalene	2.0	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Acenaphthylene	2.0	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Acenaphthene	2.0	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Fluorene	1.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Phenanthrene	1.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Anthracene	1.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Fluoranthene	0.50	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Pyrene	0.50	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Benzo(a)anthracene	0.13	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
Chrysene	0.20	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Benzo(b)fluoranthene	0.18	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U
Benzo(k)fluoranthene	0.17	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
Benzo(a)pyrene	0.20	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Dibenzo(a,h)anthracene	0.20	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Indeno(1,2,3-cd)pyrene	0.20	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Benzo(g,h,i)perylene	0.20	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U

PROJECT: NCBC GULFPORT, MISSISSIPPI — INORGANIC AQUEOUS ANALYSES (ug/l) — Validation Table

	SAMPLE LOCATION:	GPTHO4-1	GPTHO4-2	GPTHO4-2D	GPTHO4-3	GPTHO4-4
	LAB NUMBER:	A2TJ0	A2TJ2	A2TJ3	A2TJ4	A2TJ5
	DATE SAMPLED:	2/15/95	2/15/95	2/15/95	2/15/95	2/15/95
ANALYTE	CRDL					
Antimony	60	3.0 J	2.0 U	2.0 U	3.3 J	2.2 J
Arsenic	10	17.6	11.7	12.6	45.5	23.9
Barium	200	147 J	64.1 J	52.9 J	103 J	167 J
Beryllium	5	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Cadmium	5	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Chromium	10	35.6	16.2 J	14.1 J	82.4	68.4 J
Cobalt	50	8.8 J	3.4 J	3.5 J	19.4 J	11.1 J
Copper	25	10.9 J	4.8 J	6.5 J	21.8 J	19.4 J
Lead	3	11.6	4.9	4.2	34.4	34.6
Mercury	0.2	0.20 U	0.20 U	0.20 U	0.48	0.56
Nickel	40	22.7 J	7.3 J	7.3 J	30.6 J	28.1 J
Selenium	5	4.0 U	4.0 U	4.0 U	16.5	9.1
Silver	10	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Thallium	10	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ
Vanadium	50	43.7 J	23.1 J	20.4 J	129	108
Zinc	20	54.8	26.2	40.5	45.3	41.9
Cyanide	10	10.0 UR	10.0 UR	10.0 UR	10.0 UR	10.0 UR
Tin	200	13.0 U	13.0 U	13.0 U	13.0 U	13.0 U
Sulfide	1000	<1000	1000 J	1000 J	18,000 J	27,000 J

Validated Quality Assurance and Quality Control Results

PROJECT: NCBC GULFPORT, MISSISSIPPI

VOLATILE AQUEOUS ANALYSES (ug/l)

Validation Table

	SAMPLE NUMBER:	BS-01-DI4	BS-01-RI4	BS-01-TB4
	LAB NUMBER:	A2THT103	A2THW103	A2TJ7103
	DATE SAMPLED:	2/15/95	2/15/95	2/15/95
	DATA ANALYZED:	2/21/95	2/21/95	2/24/95
	DILUTION FACTOR:	1.0	1.0	1.0
ANALYTE	PQL			
Chloromethane	10	10 U	10 U	10 U
Bromomethane	10	10 U	10 U	10 U
Vinyl Chloride	10	10 U	10 U	10 U
Chloroethane	10	10 U	10 U	10 U
Methylene Chloride	5	5 U	5 U	5 U
Acetone	10	10 U	9 J	10 UJ
Carbon Disulfide	5	5 U	5 U	5 U
1,1-Dichloroethene	5	5 U	5 U	5 U
1,1-Dichloroethane	5	5 U	5 U	5 U
trans-1,2-Dichloroethene	5	5 U	5 U	5 U
Chloroform	5	5 U	5 U	5 U
1,2-Dichloroethane	5	5 U	5 U	5 U
2-Butanone	10	10 U	10 U	10 UJ
1,1,1-Trichloroethane	5	5 U	5 U	5 U
Carbon Tetrachloride	5	5 U	5 U	5 U
Bromodichloromethane	5	5 U	5 U	5 U
1,2-Dichloropropane	5	5 U	5 U	5 U
cis-1,3-Dichloropropene	5	5 U	5 U	5 U
Trichloroethene	5	5 U	5 U	5 U
Dibromochloromethane	5	5 U	5 U	5 U
1,1,2-Trichloroethane	5	5 U	5 U	5 U
Benzene	5	5 U	5 U	5 U
trans-1,3-Dichloropropene	5	5 U	5 U	5 U
Bromoform	5	5 U	5 U	5 U
4-Methyl-2-Pentanone	10	10 U	10 U	10 U
2-Hexanone	10	10 U	10 U	10 U
Tetrachloroethene	5	5 U	5 U	5 U
1,1,2,2-Tetrachloroethane	5	5 U	5 U	5 U
Toluene	5	5 U	5 U	5 U
Chlorobenzene	5	5 U	5 U	5 U
Ethylbenzene	5	5 U	5 U	5 U
Styrene	5	5 U	5 U	5 U
Xylene (total)	5	5 U	5 U	5 U
2-Chloroethylvinylether	10	10 U	10 U	10 U
Trichlorofluoromethane	5	5 U	5 U	5 U
Acrolein	100	100 U	100 U	100 U
Iodomethane	10	10 U	10 U	10 U
Acetonitrile	100	100 U	100 U	100 U
Chlorobutadiene	200	200 U	200 U	200 U

PROJECT: NCBC GULFPORT, MISSISSIPPI

VOLATILE AQUEOUS ANALYSES (ug/l)

Validation Table

	SAMPLE NUMBER:	BS-01-DI4	BS-01-RI4	BS-01-TB4
	LAB NUMBER:	A2THT103	A2THW103	A2TJ7103
	DATE SAMPLED:	2/15/95	2/15/95	2/15/95
	DATA ANALYZED:	2/21/95	2/21/95	2/24/95
	DILUTION FACTOR:	1.0	1.0	1.0
	PQL			
Acrylonitrile	100	100 U	100 U	100 U
3-Chloropropene	5	5 U	5 U	5 U
Vinyl acetate	10	10 U	10 U	10 U
Propionitrile	100	100 U	100 U	100 U
Methacrylonitrile	5	5 U	5 U	5 U
Isobutanol	200	200 UR	200 UR	200 UJ
Dibromomethane	5	5 U	5 U	5 U
1,4-Dioxane	200	200 UR	200 UR	200 UJ
Methyl methacrylate	10	10 U	10 U	10 U
Ethyl methacrylate	5	5 U	5 U	5 U
1,2-Dibromoethane	5	5 U	5 U	5 U
1,1,1,2-Tetrachloroethane	5	5 U	5 U	5 U
1,2,3-Trichloropropane	5	5 U	5 U	5 U
1,4-Dichloro-2-butene	5	5 U	5 U	5 U
1,2-Dibromo-3-chloropropane	10	10 U	10 U	10 U
1,3-Dichlorobenzene	5	5 U	5 U	5 U
1,4-Dichlorobenzene	5	5 U	5 U	5 U
1,2-Dichlorobenzene	5	5 U	5 U	5 U

PROJECT: NCBC GULFPORT, MISSISSIPPI — SEMIVOLATILE AQUEOUS ANALYSES (ug/l) — Validation Table

SAMPLE LOCATION:		BS-01-DI4	BS-01-RI4
LAB NUMBER:		A2THT104	A2THW104
DATE SAMPLED:		2/15/95	2/15/95
DATE ANALYZED:		2/27/95	2/27/95
DILUTION FACTOR:		1.0	1.0
ANALYTE	PQL		
Phenol	10	10 U	10 U
bis (2-Chloroethyl) Ether	10	10 U	10 U
2- Chlorophenol	10	10 U	10 U
1,3- Dichlorobenzene	10	10 U	10 U
1,4- Dichlorobenzene	10	10 U	10 U
1,2- Dichlorobenzene	10	10 U	10 U
2- Methylphenol	10	10 U	10 U
2,2'-oxybis(1-Chloropropane)	10	10 U	10 U
N-Nitroso-Di-n-Propylamine	10	10 U	10 U
4-Methylphenol	10	10 U	10 U
Hexachloroethane	10	10 U	10 U
Nitrobenzene	10	10 U	10 U
Isophorone	10	10 U	10 U
2-Nitrophenol	10	10 U	10 U
2,4-Dimethylphenol	10	10 U	10 U
bis (2-Chloroethoxy) Methane	10	10 U	10 U
2,4-Dichlorophenol	10	10 U	10 U
1,2,4-Trichlorobenzene	10	10 U	10 U
Naphthalene	10	10 U	10 U
4-Chloroaniline	10	10 U	10 U
Hexachlorobutadiene	10	10 U	10 U
4-Chloro-3-Methylphenol	10	10 U	10 U
2-Methylnaphthalene	10	10 U	10 U
Hexachlorocyclopentadiene	10	10 U	10 U
2,4,6-Trichlorophenol	10	10 U	10 U
2,4,5-Trichlorophenol	25	25 U	25 U
2-Chloronaphthalene	10	10 U	10 U
2-Nitroaniline	25	25 U	25 U
Acenaphthylene	10	10 U	10 U
2,6-Dinitrotoluene	10	10 U	10 U
3-Nitroaniline	25	25 U	25 U
Acenaphthene	10	10 U	10 U
2,4-Dinitrophenol	25	25 U	25 U
Dibenzofuran	10	10 U	10 U
4-Nitrophenol	25	25 U	25 U
2,4-Dinitrotoluene	10	10 U	10 U
Fluorene	10	10 U	10 U
Dimethylphthalate	10	10 U	10 U
Diethylphthalate	10	10 U	10 U
4-Chlorophenyl-phenylether	10	10 U	10 U
4-Nitroaniline	25	25 U	25 U
4,6-Dinitro-2-Methylphenol	25	25 U	25 U
N-Nitrosodiphenylamine	10	10 U	10 U

PROJECT: NCBC GULFPORT, MISSISSIPPI — SEMIVOLATILE AQUEOUS ANALYSES (ug/l) — Validation Table

	SAMPLE LOCATION:	BS-01-DI4	BS-01-RI4
	LAB NUMBER:	A2THT104	A2THW104
	DATE SAMPLED:	2/15/95	2/15/95
	DATE ANALYZED:	2/27/95	2/27/95
	DILUTION FACTOR:	1.0	1.0
ANALYTE	POL		
4-Bromophenyl-phenylether	10	10 U	10 U
Hexachlorobenzene	10	10 U	10 U
Pentachlorophenol	25	25 U	25 U
Phenanthrene	10	10 U	10 U
Anthracene	10	10 U	10 U
Di-n-Butylphthalate	10	10 U	10 U
Fluoranthene	10	10 U	10 U
Pyrene	10	10 U	10 U
Butylbenzylphthalate	10	10 U	10 U
Benzo (a) Anthracene	10	10 U	10 U
3,3'-Dichlorobenzidine	10	10 U	10 U
Chrysene	10	10 U	10 U
bis (2-Ethylhexyl) Phthalate	10	10 U	10 U
Di-n-Octyl Phthalate	10	10 U	10 U
Benzo (b) Fluoranthene	10	10 U	10 U
Benzo (k) Fluoranthene	10	10 U	10 U
Benzo (a) Pyrene	10	10 U	10 U
Indeno (1,2,3-cd) Pyrene	10	10 U	10 U
Dibenz (a,h) Anthracene	10	10 U	10 U
Benzo (g,h,i) Perylene	10	10 U	10 U
Carbazole	10	10 U	10 U
Aniline	10	10 U	10 U
N-Nitrosodimethylamine	10	10 U	10 U
Benzyl alcohol	10	10 U	10 U
3&4-Methylphenol	10	10 U	10 U
Benzoic acid	20	20 U	20 U
2,3,4,6-Tetrachlorophenol	50	50 U	50 U
1,2-Diphenylhydrazine	10	10 U	10 U
Benzidine	10	10 UJ	10 UJ
Pyridine	10	10 U	10 U
2-Picoline	20	20 U	20 U
N-Nitrosomethylethylamine	10	10 U	10 U
Methyl methanesulfonate	10	10 U	10 U
N-Nitrosodiethylamine	10	10 U	10 U
Ethyl Methansulfonate	10	10 U	10 U
Acetophenone	10	10 U	10 U
N-Nitrosopyrrolidine	10	10 U	10 U
N-Nitrosomorpholine	10	10 U	10 U
o-Toluidine	10	10 U	10 U
N-Nitrosopiperidine	10	10 U	10 U
a,a-Dimethyl-phenethylamine	10	10 U	10 U
2,6-Dichlorophenol	10	10 U	10 U
Hexachloropropene	100	100 U	100 U
N-Nitrosodi-n-butylamine	10	10 U	10 U
Safrole	10	10 U	10 U
1,2,4,5-Tetrachlorobenzene	10	10 U	10 U

PROJECT: NCBC GULFPORT, MISSISSIPPI — SEMIVOLATILE AQUEOUS ANALYSES (ug/l) — Validation Table

	SAMPLE LOCATION:	BS-01-DI4	BS-01-RI4
	LAB NUMBER:	A2THT104	A2THW104
	DATE SAMPLED:	2/15/95	2/15/95
	DATE ANALYZED:	2/27/95	2/27/95
	DILUTION FACTOR:	1.0	1.0
ANALYTE	PQL		
Isosafrole (total)	10	10 U	10 U
1,4-Napthoquinone	200	200 U	200 U
1,3-Dinitrobenzene	10	10 U	10 U
Pentachlorobenzene	10	10 U	10 U
1-Naphthylamine	10	10 U	10 U
2-Naphthylamine	10	10 U	10 U
N-Nitro-o-toluidine	10	10 U	10 U
Diphenylamine	10	10 U	10 U
1,3,5-Trinitrobenzene	50	50 UR	50 UR
Phenacetin	50	50 U	50 U
4-Aminobiphenyl	50	50 U	50 U
Pentachloronitrobenzene	50	50 U	50 U
Pronamide	20	20 U	20 U
4-Nitroquinoline-1-oxide	100	100 U	100 U
Methapyrilene	100	100 U	100 U
Aramite (total)	---	R	R
p-(Dimethylamino)azobenzene	20	20 U	20 U
3,3'-Dimethylbenzidine	50	50 U	50 U
2-Acetylaminofluorene	20	20 U	20 U
7,12-Dimethylbenz(a)anthracene	100	100 U	100 U
Hexachloropropene	10	10 UR	10 UR
3-Methylcholanthrene	100	100 U	100 U

PROJECT: NCBC GULFPORT, MISSISSIPPI — PESTICIDE/PCB AQUEOUS ANALYSES (ug/l) — Validation Table

	SAMPLE LOCATION:	BS-01-DI3	BS-01-RI3
	LAB NUMBER:	A2THT102	A2THW102
	DATE SAMPLED:	2/15/95	2/15/95
	DATE ANALYZED:	3/4/95	3/4/95
	DILUTION:	1.0	1.0
ANALYTE	PQL		
alpha-BHC	0.05	0.05 U	0.05 U
beta-BHC	0.05	0.05 U	0.05 U
delta-BHC	0.05	0.05 UJ	0.05 UJ
gamma-BHC (Lindane)	0.05	0.05 U	0.05 U
Heptachlor	0.05	0.05 U	0.05 U
Aldrin	0.05	0.05 U	0.05 U
Heptachlor Epoxide	0.05	0.05 U	0.05 U
Endosulfan I	0.05	0.05 U	0.05 U
Dieldrin	0.10	0.10 U	0.10 U
4,4'- DDE	0.10	0.10 U	0.10 U
Endrin	0.10	0.10 U	0.10 U
Endosulfan II	0.10	0.10 U	0.10 U
4,4'- DDD	0.10	0.10 U	0.10 U
Endosulfan Sulfate	0.10	0.10 U	0.10 U
4,4'- DDT	0.10	0.10 U	0.10 U
Methoxychlor	0.50	0.50 U	0.50 U
Endrin Ketone	0.10	0.10 U	0.10 U
Endrin Aldehyde	0.10	0.10 U	0.10 U
alpha-Chlordane	0.05	0.05 U	0.05 U
gamma-Chlordane	0.05	0.05 U	0.05 U
Toxaphene	5.0	5.0 U	5.0 U
Aroclor-1016	1.0	1.0 U	1.0 U
Aroclor-1221	2.0	2.0 U	2.0 U
Aroclor-1232	1.0	1.0 U	1.0 U
Aroclor-1242	1	1.0 U	1.0 U
Aroclor-1248	1.0	1.0 U	1.0 U
Aroclor-1254	1.0	1.0 U	1.0 U
Aroclor-1260	1.0	1.0 U	1.0 U
Dicofol	1.0	1.0 U	1.0 U
Chlorobenzilate	0.5	0.50 U	0.50 U
Isodrin	0.10	0.10 U	0.10 U
Kepone	1.0	1.0 U	1.0 U

PROJECT: NCBC GULFPORT, MISSISSIPPI — ORGANOPHOSPHORUS PESTICIDE AQUEOUS ANALYSIS (ug/l) — Validation Table

	SAMPLE LOCATION:	BS-01-DI4	BS-01-RI4
	LAB NUMBER:	A5B160032001	A5B160032002
	DATE SAMPLED:	2/15/95	2/15/95
	DATE ANALYZED:	3/1/95	3/1/95
ANALYTE	PQL		
Triethylphosphorothioate	0.5	0.5 U	0.5 U
Thionazin	0.5	0.5 U	0.5 U
Phorate	0.5	0.5 U	0.5 U
Sulfotepp	0.5	0.5 U	0.5 U
Dimethoate	0.5	0.5 U	0.5 U
Disulfoton	0.5	0.5 U	0.5 U
Methyl Parathion	0.5	0.5 U	0.5 U
Ethyl Parathion	0.5	0.5 U	0.5 U
Famphur	0.5	0.5 U	0.5 U

PROJECT: NCBC GULFPORT, MISSISSIPPI — HERBICIDE AQUEOUS ANALYSES (ug/l) — Validation Table

	SAMPLE LOCATION:	BS-01-DI4	BS-01-RI4
	LAB NUMBER:	A5B160032001	A5B160032002
	DATE SAMPLED:	2/15/95	2/15/95
	DATE ANALYZED:	2/22/95	2/22/95
ANALYTE	PQL		
2,4-D	0.5	0.5 U	0.5 UJ
2,4,5-T	0.1	0.1 U	0.1 UJ
2,4,5-TP	0.2	0.2 U	0.2 UJ
Dinoseb	0.7	0.7 UJ	0.7 UJ

PROJECT: NCBC GULFPORT, MISSISSIPPI — DIOXIN/FURANS AQUEOUS ANALYSES (pg/l) — Validation Table

	SAMPLE LOCATION:	BS-01-DI4	BS-01-RI4
	LAB NUMBER:	080412-0001-SA	080412-0002-SA
	DATE SAMPLED:	2/15/95	2/15/95
	DATE ANALYZED:	3/7/95	3/7/95
ANALYTE			
2,3,7,8-TCDD		1.0 U	1.2 U
2,3,7,8-TCDF		0.77 U	0.88 U
1,2,3,7,8-PeCDD		1.9 U	2.1 U
1,2,3,7,8-PeCDF		1.8 U	1.6 U
2,3,4,7,8-PeCDF		1.8 U	1.4 U
1,2,3,4,7,8-HxCDD		0.98 U	0.84 U
1,2,3,6,7,8-HxCDD		0.75 U	0.84 U
1,2,3,7,8,9-HxCDD		1.1 U	0.88 U
1,2,3,4,7,8-HxCDF		0.77 U	0.49 U
1,2,3,6,7,8-HxCDF		0.93 U	0.63 U
2,3,4,6,7,8-HxCDF		0.90 U	0.67 U
1,2,3,7,8,9-HxCDF		1.0 U	0.80 U
1,2,3,4,6,7,8-HpCDD		1.7 U	1.8 U
1,2,3,4,6,7,8-HpCDF		1.0 U	1.0 U
1,2,3,4,7,8,9-HpCDF		2.8 U	0.71 U
OCDD		9.0 U	8.6 U
OCDF		2.4 U	2.1 U

PROJECT: NCBC GULFPORT, MISSISSIPPI — POLYNUCLEAR AROMATIC HYDROCARBONS AQUEOUS ANALYSES (ug/l) — Validation Table

	SAMPLE LOCATION:	BS-01-DI4	BS-01-RI4
	LAB NUMBER:	A5B160032001	A5B160032002
	DATE SAMPLED:	2/15/95	2/15/95
	DATE ANALYZED:	2/25/95	2/25/95
ANALYTE	PQL		
Naphthalene	2.0	2.0 U	2.0 U
Acenaphthylene	2.0	2.0 U	2.0 U
Acenaphthene	2.0	2.0 U	2.0 U
Fluorene	1.0	1.0 U	1.0 U
Phenanthrene	1.0	1.0 U	1.0 U
Anthracene	1.0	1.0 U	1.0 U
Fluoranthene	0.50	0.50 U	0.50 U
Pyrene	0.50	0.50 U	0.50 U
Benzo(a)anthracene	0.13	0.13 U	0.13 U
Chrysene	0.20	0.20 U	0.20 U
Benzo(b)fluoranthene	0.18	0.18 U	0.18 U
Benzo(k)fluoranthene	0.17	0.17 U	0.17 U
Benzo(a)pyrene	0.20	0.20 U	0.20 U
Dibenzo(a,h)anthracene	0.20	0.20 U	0.20 U
Indeno(1,2,3-cd)pyrene	0.20	0.20 U	0.20 U
Benzo(g,h,i)perylene	0.20	0.20 U	0.20 U

PROJECT: NCBC GULFPORT, MISSISSIPPI — INORGANIC AQUEOUS ANALYSES (ug/l) — Validation Table

ANALYTE	BS-01-DI4 A1EW0 11/18/94	BS-01-RI4 A1EW3 11/18/94
Antimony	2.0 U	2.0 U
Arsenic	5.0 U	5.0 U
Barium	1.0 U	1.0 U
Beryllium	1.0 U	1.0 U
Cadmium	1.0 U	1.0 U
Chromium	1.0 UJ	1.0 UJ
Cobalt	1.0 U	1.0 U
Copper	2.3 J	2.0 U
Lead	2.0 U	2.0 U
Mercury	0.20 U	0.20 U
Nickel	2.0 U	2.0 U
Selenium	4.0 U	4.0 U
Silver	1.0 U	1.0 U
Thallium	1.0 UJ	1.0 UJ
Vanadium	1.2 J	1.7 J
Zinc	15.7 J	7.5 J
Cyanide	10.0 UR	10.0 UR
Tin	13.0 U	13.0 U
Sulfide	1,000 J	< 1,000

Groundwater Sampling Event No. 5

Validation Groundwater Results

PROJECT: NCBC GULFPORT, MISSISSIPPI DIOXIN/FURANS AQUEOUS ANALYSES (pg/l): QUANTERRA

SAMPLE LOCATION:	GPTH05-1	GPTH05-2	GPTH05-2D	GPTH05-3	GPTH05-4
LAB NUMBER:	082031-0001-SA	082031-0002-SA	082031-0003-SA	082031-0004-SA	082031-0005-SA
DATE SAMPLED:	5/19/95	5/19/95	5/19/95	5/19/95	5/19/95
DATE ANALYZED:	6/1/95	6/1/95	6/1/95	6/1/95	6/1/95
2,3,7,8-TCDD	1.3 U	56	17	2.6 U	5.0 U
2,3,7,8-TCDF	1.2 U	4.3 U	4.0 U	1.7 U	3.2 U
1,2,3,7,8-PeCDD	1.8 U	11 U	7.2 U	4.5 U	8.0 U
1,2,3,7,8-PeCDF	1.9 U	4.2 U	8.6 U	3.2 U	9.6 U
2,3,4,7,8-PeCDF	1.7 U	3.7 U	7.7 U	2.8 U	8.6 U
1,2,3,4,7,8-HxCDD	1.4 U	2.8 U	12 U	3.4 U	9.9 U
1,2,3,6,7,8-HxCDD	1.1 U	3.3 U	9.6 U	2.6 U	8.2 U
1,2,3,7,8,9-HxCDD	3.8 U	18 U	10 U	5.9 U	33 U
1,2,3,4,7,8-HxCDF	0.47 U	1.0 U	7.0 U	0.48 U	3.8 U
1,2,3,6,7,8-HxCDF	0.50 U	1.1 U	9.6 U	0.51 U	5.3 U
2,3,4,6,7,8-HxCDF	0.61 U	1.4 U	10 U	0.62 U	5.8 U
1,2,3,7,8,9-HxCDF	0.77 U	1.7 U	12 U	0.79 U	6.9 U
1,2,3,4,6,7,8-HpCDD	25 U	110	29 U	47	130
1,2,3,4,6,7,8-HpCDF	1.4 U	8.7 U	3.6 U	0.53 U	4.0 U
1,2,3,4,7,8,9-HpCDF	0.65 U	0.90 U	1.4 U	0.79 U	1.9 U
OCDD	520	2900 J	670	840	2800
OCDF	7.0 U	18 U	7.0 U	3.0 U	6.8 U

PROJECT: NCBC GULFPORT, MISSISSIPPI	DIOXIN/FURANS AQUEOUS ANALYSES (pg/l): QAL				
SAMPLE LOCATION:	GPTH05-1	GPTH05-2	GPTH05-2D	GPTH05-3	GPTH05-4
LAB NUMBER:	9505320-01	9505320-04	9505320-05	9505320-06	9505320-07
DATE SAMPLED:	5/19/95	5/19/95	5/19/95	5/19/95	5/19/95
DATE ANALYZED:	6/6/95	6/6/95	6/6/95	6/6/95	6/6/95
2,3,7,8-TCDD	1.45 U	31.8	45.2	1.63 U	1.70 U
2,3,7,8-TCDF	0.89 U	1.24 U	0.22 U	0.76 U	0.83 U
1,2,3,7,8-PeCDD	1.62 U	2.0 U	1.49 U	1.53 U	1.49 U
1,2,3,7,8-PeCDF	1.25 U	1.71 U	1.16 U	1.37 U	1.23 U
2,3,4,7,8-PeCDF	1.22 U	1.66 U	1.14 U	1.34 U	1.20 U
1,2,3,4,7,8-HxCDD	0.79 U	0.88 U	0.93 U	0.79 U	0.58 U
1,2,3,6,7,8-HxCDD	0.73 U	0.82 U	0.87 U	0.73 U	0.54 U
1,2,3,7,8,9-HxCDD	0.77 U	0.27 U	0.28 U	0.77 U	0.17 U
1,2,3,4,7,8-HxCDF	0.43 U	0.63 U	0.48 U	0.55 U	0.38 U
1,2,3,6,7,8-HxCDF	0.39 U	0.57 U	0.43 U	0.49 U	0.34 U
2,3,4,6,7,8-HxCDF	0.46 U	0.67 U	0.51 U	0.58 U	0.41 U
1,2,3,7,8,9-HxCDF	0.19 U	0.26 U	0.20 U	0.22 U	0.16 U
1,2,3,4,6,7,8-HpCDD	0.21 U	30.1	36.8	0.23 U	30.2
1,2,3,4,6,7,8-HpCDF	0.54 U	0.20 U	0.24 U	0.73 U	0.67 U
1,2,3,4,7,8,9-HpCDF	0.85 U	1.10 U	1.36 U	1.17 U	1.06 U
OCDD	63.6	468	620	153	343
OCDF	3.48 U	5.11 U	4.24 U	3.98 U	3.79 U

Validated Quality Assurance and Quality Control Results

PROJECT: NCBC GULFPORT, MISSISSIPPI	DIOXIN/FURANS AQUEOUS ANALYSES (pg/l): QUANTERRA	
SAMPLE LOCATION:	BS-01-DI5	BS-01-RI5
LAB NUMBER:	082031-0006-SA	082031-0007-SA
DATE SAMPLED:	5/19/95	5/19/95
DATE ANALYZED:	6/7/95	6/1/95
2,3,7,8-TCDD	3.9 U	2.0 U
2,3,7,8-TCDF	2.9 U	0.63 U
1,2,3,7,8-PeCDD	7.8 U	4.0 U
1,2,3,7,8-PeCDF	6.8 U	4.9 U
2,3,4,7,8-PeCDF	6.1 U	4.2 U
1,2,3,4,7,8-HxCDD	7.0 U	3.8 U
1,2,3,6,7,8-HxCDD	5.8 U	2.9 U
1,2,3,7,8,9-HxCDD	6.2 U	3.3 U
1,2,3,4,7,8-HxCDF	3.3 U	0.83 U
1,2,3,6,7,8-HxCDF	4.5 U	0.88 U
2,3,4,6,7,8-HxCDF	4.9 U	1.1 U
1,2,3,7,8,9-HxCDF	5.8 U	1.4 U
1,2,3,4,6,7,8-HpCDD	4.8 U	6.8 U
1,2,3,4,6,7,8-HpCDF	2.3 U	1.2 U
1,2,3,4,7,8,9-HpCDF	1.3 U	1.7 U
OCDD	15 U	12 UJ
OCDF	5.2 U	22 U

PROJECT: NCBC GULFPORT, MISSISSIPPI	DIOXIN/FURANS AQUEOUS ANALYSES (pg/l): QAL		
SAMPLE LOCATION:	BS-01-DI5	BS-01-RI5	TRVLBLK
LAB NUMBER:	9505320-08	9505320-09	95095320-10
DATE SAMPLED:	5/19/95	5/19/95	5/19/95
DATE ANALYZED:	6/6/95	1/5/00	6/6/96
2,3,7,8-TCDD	1.35 U	1.39 U	1.41 U
2,3,7,8-TCDF	0.59 U	0.69 U	0.67 U
1,2,3,7,8-PeCDD	1.14 U	0.84 U	1.07 U
1,2,3,7,8-PeCDF	1.07 U	1.08 U	0.99 U
2,3,4,7,8-PeCDF	1.04 U	1.05 U	0.96 U
1,2,3,4,7,8-HxCDD	0.64 U	0.50 U	0.51 U
1,2,3,6,7,8-HxCDD	0.60 U	0.46 U	0.47 U
1,2,3,7,8,9-HxCDD	0.63 U	0.49 U	0.50 U
1,2,3,4,7,8-HxCDF	0.31 U	0.33 U	0.26 U
1,2,3,6,7,8-HxCDF	0.23 U	0.30 U	0.23 U
2,3,4,6,7,8-HxCDF	0.33 U	0.13 U	0.28 U
1,2,3,7,8,9-HxCDF	0.13 U	0.15 U	0.11 U
1,2,3,4,6,7,8-HpCDD	0.76 U	0.20 U	0.59 U
1,2,3,4,6,7,8-HpCDF	0.55 U	0.16 U	0.51 U
1,2,3,4,7,8,9-HpCDF	0.87 U	0.96 U	0.80 U
OCDD	1.42 U	0.55 U	1.84 U
OCDF	2.15 U	3.77 U	3.04 U

Groundwater Sampling Event No. 6

Validation Groundwater Results

PROJECT: NCBC GULFPORT, MISSISSIPPI

DIOXIN/FURANS AQUEOUS ANALYSES: (pg/l)

SAMPLE LOCATION:	G6W001	G6W002	G6W002D	G6W003	G6W004
LAB NUMBER:	K1009-0013	K1009-0016	K1009-0017	K1009-0018	K1009-0019
DATE SAMPLED:	08/15/95	08/15/95	08/15/95	08/15/95	08/15/95
DATE ANALYZED:	09/11/95	09/11/95	09/11/95	09/11/95	09/11/95
2,3,7,8-TCDD	3.74U	3.62U	3.00U	3.09U	3.13U
2,3,7,8-TCDF	3.15U	3.36U	2.60U	3.01U	2.21U
1,2,3,7,8-PeCDD	4.38U	4.78U	3.96U	4.27U	3.85U
1,2,3,7,8-PeCDF	2.59U	2.80U	2.71U	2.58U	1.88U
2,3,4,7,8-PeCDF	2.81U	3.03U	2.94U	2.80U	2.04U
1,2,3,4,7,8-HxCDD	3.13U	3.20U	3.67U	3.55U	3.15U
1,2,3,6,7,8-HxCDD	2.73U	2.79U	3.19U	3.09U	2.75U
1,2,3,7,8,9-HxCDD	2.99U	3.01U	3.49U	3.38U	3.00U
1,2,3,4,7,8-HxCDF	1.37U	1.34U	1.83U	1.56U	1.10U
1,2,3,6,7,8-HxCDF	1.21U	1.19U	1.62U	1.38U	0.97U
2,3,4,6,7,8-HxCDF	1.46U	1.43U	1.96U	1.66U	1.17U
1,2,3,7,8,9-HxCDF	1.76U	1.73U	2.36U	2.01U	1.42U
1,2,3,4,6,7,8-HpCDD	2.95U	0.54U	0.89U	185	0.55U
1,2,3,4,6,7,8-HpCDF	1.36U	1.37U	1.62U	1.58U	1.60U
1,2,3,4,7,8,9-HpCDF	1.85U	1.86U	2.20U	2.15U	2.18U
OCDD	110	147	112	783	298
OCDF	4.79U	6.45U	6.07U	1.52U	6.36U

Validated Quality Assurance and Quality Control Results

PROJECT: NCBC GULFPORT, MISSISSIPPI	DIOXIN/FURANS AQUEOUS ANALYSES: (pg/l)
SAMPLE LOCATION:	G6WRI
LAB NUMBER:	K1009-0012
DATE SAMPLED:	08/15/95
DATE ANALYZED:	09/11/95
2,3,7,8-TCDD	3.98U
2,3,7,8-TCDF	2.68U
1,2,3,7,8-PeCDD	4.57U
1,2,3,7,8-PeCDF	2.41U
2,3,4,7,8-PeCDF	2.62U
1,2,3,4,7,8-HxCDD	3.19U
1,2,3,6,7,8-HxCDD	2.78U
1,2,3,7,8,9-HxCDD	3.04U
1,2,3,4,7,8-HxCDF	1.16U
1,2,3,6,7,8-HxCDF	1.02U
2,3,4,6,7,8-HxCDF	1.23U
1,2,3,7,8,9-HxCDF	1.49U
1,2,3,4,6,7,8-HpCDD	1.85U
1,2,3,4,6,7,8-HpCDF	1.23U
1,2,3,4,7,8,9-HpCDF	1.67U
OCDD	3.52U
OCDF	5.24U

APPENDIX E

GROUNDWATER PRECISION, ACCURACY, REPRESENTATIVENESS, COMPARABILITY, AND COMPLETENESS REPORTS

Groundwater Sampling Event 1

PRECISION, ACCURACY, REPRESENTATIVENESS, COMPARABILITY, AND COMPLETENESS FOR NCBC GULFPORT HO

NAVAL CONSTRUCTION BATTALION CENTER GULFPORT, MISSISSIPPI

Prepared by:
Heartland Environmental Services, Inc.
P.O. Box 163
St. Peters, Missouri 63376

Prepared for:

ABB Environmental Services, Inc.
1400 Centerpoint Blvd., Suite 158
Knoxville, Tennessee 37922-1968

July 1994

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NCBC Gulfport HO

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Appendix A
Calibration Criteria Summary

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Appendix B
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Appendix C
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NCBC Gulfport HO

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1.0 INTRODUCTION

Prior to evaluating the data for precision, accuracy, representativeness, comparability, and completeness (PARCC) criteria the laboratory reviewed the data package and the data also were independently reviewed and validated using the Naval Energy and Environmental and Support Activity (NEESA) guidance document 20.2-047B (1988) entitled, *Sampling and Chemical Analysis Quality Assurance Requirements for the Navy Installation Program*. Before the laboratory released the chemical analytical results, both the sample and laboratory QC data were carefully reviewed in order to verify sample identity, instrument calibration, detection limits, dilution factors, numerical computations, accuracy of transcriptions, and chemical interpretations. Additionally, the QC data were reduced and spike recoveries were included in control charts, and the resulting data were reviewed to ascertain whether they were within the laboratory defined limits for accuracy and precision. The data were compiled into a NEESA Level D data package and any nonconforming data were discussed in the data package cover letter and case narrative.

The Level D data packages were then reviewed and validated by Heartland Environmental Services, Inc., Missouri (Heartland). Data validation is the technical review of a data package using criteria established in the data quality objectives, the quality assurance project plan and guidance documents prepared by the United States Environmental Protection Agency (USEPA) for the validation of organic and inorganic analytical data (USEPA 1990a and 1990b) as specified by NEESA document 20.2-047B. The data review and validation process is independent of the laboratory's checks because it is impossible to repeat the review conducted by the laboratory.

Samples that did not meet the acceptance limit criteria were qualified with a flag; single letter abbreviations that indicate a problem with the data. Data qualifiers used by the validators when amending the data include the following.

U — Undetected. The analyte was not detected above the contract required quantitation limit (CRQL). The "U" designator also is used to qualify laboratory contaminants. The "U" designator is applied to an environmental sample when the laboratory contaminant is detected in an environmental sample at a concentration less than 5 times (10 X for common contaminants) the value of the concentration detected in any corresponding field QC blank, method blank or preparation blanks.

J — Estimated. The analyte was present, but the reported value may not be accurate or precise. The "J" designator is used to qualify an analyte that was present at a concentration between the CRQL and method detection limit (MDL) or the data "failed" some of the analytical validation criteria but did not require rejections of the data. When combined with the U designator, the quantitation limit is estimated.

R — Rejected. Data was rejected by the data validator during comparison of the NEESA Level D data package with the analytical functional guideline criteria. The "R" designator indicates a significant variance in acceptable laboratory performance. Either re-analysis or re-sampling and analysis would be necessary to determine the presence or absence of the target analyte(s).

Once the data were reviewed and validated according to the guidance presented in NEESA document 20.2-047B, the data were evaluated by Heartland using the PARCCs criteria included in the Data Quality Objectives (DQOs) of the Work Plan for Naval Construction Battalion Center (NCBC) Gulfport, Mississippi, dated October 1993. The following sections present a brief description of PARCCs criteria.

Precision. Precision is a measure of the agreement or repeatability of a set of replicate results obtained from duplicate laboratory analyses of samples collected from the same location/depth interval. Precision was calculated from laboratory analytical data and cannot be measured directly. Precision is expressed as the Relative Percent Difference (RPD) between analytical values for two samples divided by the average of their analytical values. Precision is calculated using the expression:

$$RPD = (D1-D2) / (\tfrac{1}{2}(D1+D2)) \times 100$$

D1 and D2 are the reported values for the duplicate sample pair. Precision was evaluated using field duplicate samples and laboratory split samples (for example, MS/MSD samples).

Precision for environmental samples and their duplicates was assessed using a maximum RPD of 20 Percent for water matrices. Precision for MS/MSD/MD samples was assessed by using the target analyte specific RPD criteria for the spiked compounds and the sample duplicates.

Accuracy. Accuracy is a measure of the agreement between an experimental determination and the true value of the parameter being measured. Accuracy can be calculated from the analytical data and was not measured directly. Accuracy is used to identify the bias in a given measurement system (i.e. laboratory conditions, sample matrix, and sampling conditions). Accuracy is assessed by reviewing the Percent Recovery (%R) between the true value of the spike analyte and the actual analytical value. Accuracy is calculated using the equation:

$$\%R = ((A-B)/C) \times 100$$

A = Measured concentration of the spiked analyte.
B = Measured concentration of the spiked compound in the unspiked sample.
C = True concentration of the spiked analyte.

For the organic analyses, each of the samples was spiked with a surrogate compound; and for inorganic analyses, each chosen matrix spike and matrix duplicate pair was spiked with a known reference material before digestion. The recovery of the internals standards was used to assess accuracy for the Dioxin/Furan fraction. Each of these approaches provides a measure of the matrix effects on the analytical accuracy.

Representativeness. Representativeness is a qualitative measure of the degree to which sample data accurately and precisely represent a characteristic environmental condition. Representativeness is a subjective parameter and is used to evaluate the efficacy of the sampling plan design. Representativeness was evaluated using the field and laboratory QC blank sample results. QC blank samples are equipment rinseate blanks, field blanks, trip blanks, laboratory method blanks for organic analysis and laboratory preparation blanks for inorganic analysis. Positive detection of target analytes in the QC blank samples identify contaminants that possibly were introduced to the associated environmental sample during sample collection, transport or laboratory analysis. Representativeness was also evaluated used the defined extraction and analytical holding time requirements set forth in the Work Plan for NCBC Gulfport or the analytical methodology.

Comparability. Comparability is qualitative measure designed to express the confidence with which one data set may be compared to another. Factors that affect comparability are: sample collection and handling techniques, sample matrix type, and analytical method. Comparability is limited by

the other PARCC parameters because only when precision and accuracy are known can data sets be compared with confidence.

Completeness. Completeness is defined as the percentage of measurements that are judged to be valid compared to the total number of measurements made. Valid usable data are values that were not qualified as rejected (R qualifier) during data validation. A goal of 85 percent usable data was established in the Work Plan for NCBC, Gulfport, Mississippi. Completeness equals the total number of analytes for each matrix minus the total number of rejected analytes divided by the total number of analytes multiplied by 100.

2.0 PRECISION

The following section describes the evaluation of precision for volatile organic compounds, dioxin/furans, semivolatile organic compounds, polynuclear aromatic hydrocarbons, pesticides and polychlorinated biphenyls (PCBs), organophosphorous pesticides, herbicides, metals and cyanide, and the wet chemistry parameter sulfide. Duplicate samples are evaluated for precision only when contaminants are detected in both the environmental sample and the sample's duplicate. A ND in the RPD column of the spreadsheet indicates that a RPD calculation was not required because one result was a non-detect and the other result was less than the compound/analyte CRQL/CRDL. Environmental samples and their respective duplicates may not exhibit positive results for all compounds found at or near the contract required quantitation limit (CRQL) or detection limit (CRDL) because of low levels of contamination found at a site. Duplicates with Relative Percent Differences (RPDs) within control limits indicate adequate sampling practices and/or good analytical precision. Duplicates with RPDs outside the control limits may result from inappropriate sampling procedures, matrix interferences, or non-homogeneity of the sample matrix. In addition, poor precision can be attributed to deviation(s) from the analytical methodology or to poor reproducibility of target analyte concentrations at or near the required quantitation or detection limits (CRQLs or CRDLs). The acceptance criteria for evaluating precision of field duplicates analytical results is a RPD of 20 for water matrices.

The percent of duplicate samples collected for the analytical parameters and sample matrices was greater than ten percent (10%) for the water matrix as specified in the Work Plan for NCBC Gulfport, Mississippi. The following Sections summarize the evaluation of analytical precision for the water matrix for the following analytical groups:

- GC/MS volatile organic compounds (GC/MS VOCs);
- dioxin/furan compounds (D/Fs);
- semivolatile organic compounds (SVOCs);
- polynuclear aromatic hydrocarbons (PAHs);
- pesticides, PCBs,;
- organophosphorous pesticides;
- herbicides; and
- inorganics, cyanide, & sulfide.

Duplicate precision was assessed using both environmental sample and associated duplicates and matrix spike (MS)/matrix spike duplicates (MSDs) pairs for organic fractions, and matrix duplicate pairs (MD pairs) for the metals/cyanide, and sulfide fractions.

Tabulation of the results of assessing duplicate precision and duplicate frequency are presented in Tables 2-1 and 2-2 for the water matrix. The results of the evaluation of precision for MS/MSD samples is provided in Tables 2-3 through 2-11 for the water matrix.

In addition, to assess whether instrument calibration for volatile and semivolatile analytical methods resulted in non-compliant duplicate precision, tables were made of initial and continuing calibration outliers for each sample delivery group (SDG) and are included in Appendix A. Calibration criteria was met in the other organic fractions. Therefore, tables of calibration criteria were not prepared for those fractions. To assess the potential for non-compliance in metals analytical data, caused by physical and/or chemical interferences and indicated by non-compliant serial dilution results, tables were prepared of serial dilution results. These are included in Appendix B.

TABLE 2 - 1

ORGANIC FRACTIONS
WATER SAMPLE AND DUPLICATE PRECISION
NCBC GULFPORT HO

VOLATILES

SDG	SAMPLE ID	MATRIX	NO. ASSC. SAMPLES	COMPOUND	SAMPLE CONC.	DUP CONC	MAX RPD	RPD
27176	GPTHOGW-1	WATER	4	NO COMPOUNDS DETECTED				
	TOTAL SAMPLES		4					

SEMIVOLATILES

SDG	SAMPLE ID	MATRIX	NO. ASSC. SAMPLES	COMPOUND	SAMPLE CONC.	DUP CONC	MAX RPD	RPD
27176	GPTHOGW-1	WATER	4	NO COMPOUNDS DETECTED				
	TOTAL SAMPLES		4					

DIOXIN/FURANS

SDG	SAMPLE ID	MATRIX	NO. ASSC. SAMPLES	COMPOUND	SAMPLE CONC.	DUP CONC	MAX RPD	RPD
27176	GPTHOGW1	WATER	4	TOTAL TCDD	0	24.5	20%	200%
				TOTAL OCDD *	133	215	20%	479
	TOTAL SAMPLES		4					

* - MPC; MAXIMUM POSSIBLE CONCENTRATION REPORTED IN SAMPLE AND /OR DUPLICATE SAMPLE. REPORTED AS MPC DUE TO THE PRESENCE OF POTENTIAL INTERFERENCES WHICH DO NOT SATISFY IDENTIFICATION CRITERIA (I.E., ION RATIOS).

POLYNUCLEAR AROMATIC HYDROCARBONS

SDG	SAMPLE ID	MATRIX	NO. ASSC. SAMPLES	COMPOUND	SAMPLE CONC.	DUP CONC	MAX RPD	RPD
27176	GPTHOGW1	WATER	4	NO COMPOUNDS DETECTED				
	TOTAL SAMPLES		4					

PESTICIDES/PCBS/KEPONE

SDG	SAMPLE ID	MATRIX	NO. ASSC. SAMPLES	COMPOUND	SAMPLE CONC.	DUP CONC	MAX RPD	RPD
27176	GPTHOGW1	WATER	4	NO COMPOUNDS DETECTED				
	TOTAL SAMPLES		4					

TABLE 2 - 1, CONTINUED

ORGANIC FRACTIONS

WATER SAMPLE AND DUPLICATE PRECISION

NCBC GULFPORT HO

ORGANOPHOSPHOROUS PESTICIDES

SDG	SAMPLE ID	MATRIX	NO. ASSC. SAMPLES	COMPOUND	SAMPLE CONC.	DUP CONC	MAX RPD	RPD
27176	GPTHOGW1	WATER	4	NO COMPOUNDS DETECTED			20%	
	TOTAL SAMPLES		4					

CHLORINATED HERBICIDES

SDG	SAMPLE ID	MATRIX	NO. ASSC. SAMPLES	COMPOUND	SAMPLE CONC.	DUP CONC	MAX RPD	RPD
27176	GPTHOGW1	WATER	4	NO COMPOUNDS DETECTED			20%	
	TOTAL SAMPLES		4					

TABLE 2 - 1, CONTINUED

ORGANIC FRACTIONS
WATER SAMPLE AND DUPLICATE PRECISION
NCBC GULFPORT HO

VOLATILES

% OF DUPLICATES COLLECTED	RPD IN	RPD OUT	% WITHIN RPD LIMIT
25.0%	1	0	100.0%

SEMI VOLATILES

% OF DUPLICATES COLLECTED	RPD IN	RPD OUT	% WITHIN RPD LIMIT
25.0%	1	0	100.0%

DIOXIN/FURANS

% OF DUPLICATES COLLECTED	RPD IN	RPD OUT	% WITHIN RPD LIMIT
25.0%	0	2	0.0%

POLYNUCLEAR AROMATIC HYDROCARBONS

% OF DUPLICATES COLLECTED	RPD IN	RPD OUT	% WITHIN RPD LIMIT
25.0%	1	0	100.0%

PESTICIDES/PCBS

% OF DUPLICATES COLLECTED	RPD IN	RPD OUT	% WITHIN RPD LIMIT
25.0%	1	0	100.0%

ND - INDICATES RPD CALCULATION NOT REQUIRED BECAUSE ONE (1) RESULT IS NON-DETECT AND THE OTHER RESULT IS BELOW THE CRQL.

TABLE 2 - 1, CONTINUED

ORGANIC FRACTIONS
WATER SAMPLE AND DUPLICATE PRECISION
NCBC GULFPORT HO

ORGANOPHOSPHOROUS PESTICIDES

% OF DUPLICATES COLLECTED	RPD IN	RPD OUT	% WITHIN RPD LIMIT
25.0%	1	0	100.0%

CHLORINATED HERBICIDES

% OF DUPLICATES COLLECTED	RPD IN	RPD OUT	% WITHIN RPD LIMIT
25.0%	1	0	100.0%

ND - INDICATES RPD CALCULATION NOT REQUIRED BECAUSE ONE (1) RESULT IS NON-DETECT AND THE OTHER RESULT IS BELOW THE CRQL.

TABLE 2 - 2

INORGANIC FRACTIONS
WATER SAMPLE AND DUPLICATE PRECISION
NCBC GULFPORT HO

METALS

SDG	SAMPLE ID	MATRIX	NO. ASSC. SAMPLES	COMPOUND	SAMPLE CONC.	DUP CONC	MAX RPD	RPD
27176	GPTHOGW-1	WATER	4	ARSENIC	19.2	26.9	20%	33%
				BARIUM	166.0	198.0	20%	18%
				BERYLLIUM	1.2	1.7	20%	34%
				CHROMIUM	26.6	56.3	20%	72%
				COBALT	12.1	22.2	20%	59%
				LEAD	19.8	25.5	20%	25%
				MERCURY	0.1	0	20%	200%
				NICKEL	37	52.5	20%	35%
				SELENIUM	0	0 83	20%	ND
				SILVER	3.4	0	20%	ND
				VANADIUM	49.1	74.7	20%	41%
				ZINC	87.9	93.3	20%	6%
	TOTAL SAMPLES		4					

SULFIDE

SDG	SAMPLE ID	MATRIX	NO. ASSC. SAMPLES	COMPOUND	SAMPLE CONC.	DUP CONC	MAX RPD	RPD
27176	GPTHOGW-1	WATER	4	SULFIDE	1	1.7	20%	52%
	TOTAL SAMPLES		4					

TABLE 2 - 2
INORGANIC FRACTIONS
WATER SAMPLE AND DUPLICATE PRECISION
NCBC GULFPORT HO

METALS

% OF DUPLICATE COLLECTED	RPD IN	RPD OUT	% WITHIN RPD LIMIT
25.0%	4	8	33%

SULFIDE

% OF DUPLICATE COLLECTED	RPD IN	RPD OUT	% WITHIN RPD LIMIT
25.0%	0	1	0.0%

ND - INDICATES RPD CALCULATION NOT REQUIRED BECAUSE ONE (1) RESULT IS NON-DETECT AND THE OTHER RESULT IS BELOW THE CRDL.

TABLE 2 - 3

GC/MS VOLATILE ORGANICS COMPOUNDS
WATER SAMPLE MATRIX SPIKE/MATRIX SPIKE DUPLICATES
NCBC GULFPORT HO

MS = MATRIX SPIKE *SAMPLE GPTHOGW1D*		SDG 27176		
MSD = MATRIX SPIKE DUPLICATE		MS	MSD	
RPD = RELATIVE PERCENT DIFFERENCE		%R	%R	%RPD
VOA COMPOUNDS	UNITS			
1,1-DICHLOROETHENE	ug/L	104	102	2
TRICHLOROETHENE	ug/L	100	94	6
BENZENE	ug/L	992	90	2
TOLUENE	ug/L	98	98	0
CHLOROBENZENE	ug/L	104	102	2

*** DENOTES VALUE NOT WITHIN QA/QC ADVISORY LIMITS**

CORRESPONDING SDG'S AND ASSOCIATED SAMPLES

27176: GPTHOGW-1, GPTHOGW-1D, GPTHOGW-2, GPTHOGW-3, GPTHOGW-4

COMPOUND	ADVISORY LIMITS		RPD
	%R WATER		WATER
1,1-DICHLOROETHENE	61%-145%		14
TRICHLOROETHENE	71%-120%		14
BENZENE	76%-127%		11
TOLUENE	76%-125%		13
CHLOROBENZENE	75%-130%		13

TABLE 2 - 4

DIOXIN/FURAN
WATER SAMPLE MATRIX SPIKE/ DUPLICATES
NCBC GULFPORT HO

MS = MATRIX SPIKE *SAMPLE GPTHOGW-1*		SDG 27176		
MSD = MATRIX SPIKE DUPLICATE		MS	MSD	
RPD = RELATIVE PERCENT DIFFERENCE		%R	%R	RPD
DIOXIN/FURAN CONGENERS	UNITS			
2378-TCDD	ug/L	85.3	80.7	5.5
2378-TCDF	ug/L	118	116	1.7
12378-P5CDD	ug/L	117	132	12.4
12378-P5CDF	ug/L	150	108	32.5
23478-P5CDF	ug/L	104	118	12.1
123478-H6CDD	ug/L	129	163	23.0
123789-H6CDD	ug/L	123	160	25.7
123678-H6CDD	ug/L	113	129	13.2
123478-H6CDF	ug/L	130	154	16.7
123678-H6CDF	ug/L	121	121	0.5
123789-H6CDF	ug/L	127	151	16.8
234678-H6CDF	ug/L	133	111	17.5
1234678-H7CDD	ug/L	152	120	23.7
1234678-H7CDF	ug/L	153	142	7.6
1234789-H7CDF	ug/L	145	114	23.6
OCDD	ug/L	121	122	0.8
OCDF	ug/L	108	108	0.0

*** DENOTES VALUE NOT WITHIN QA/QC ADVISORY LIMITS**

CORRESPONDING SDG'S AND ASSOCIATED SAMPLES

27176: GPTHOGW-1, GPTHOGW-1D, GPTHOGW-2, GPTHOGW-3, GPTHOGW-4

QC LIMITS WERE NOT PROVIDED BY THE LABORATORY.
%R AND RPDS WERE DEEMED IN CONTROL BY THE DATA REVIEWER.

TABLE 2 - 5

SEMIVOLATILE ORGANICS COMPOUNDS
WATER SAMPLE MATRIX SPIKE/MATRIX SPIKE DUPLICATES
NCBC GULFPORT HO

MS = MATRIX SPIKE *SAMPLE GPTHOGW1D*		SDG 27176		
MSD = MATRIX SPIKE DUPLICATE		MS	MSD	
RPD = RELATIVE PERCENT DIFFERENCE		%R	%R	%RPD
SVOA COMPOUNDS	UNITS			
PHENOL	ug/L	* -50	20	* 467
2-CHLOROPHENOL	ug/L	* -58	* 15	*340
1,4-DICHLOROBENZENE	ug/L	96	89	8
N-NITROSO-DI-N-PROP.(1)	ug/L	92	95	-3
1,2,4-TRICHLOROBENZENE	ug/L	* 102	98	4
4-CHLORO-3-METHYLPHENOL	ug/L	* -12	43	* -355
ACENAPHTHENE	ug/L	100	96	4
4-NITROPHENOL	ug/L	* -56	18	* 389
2,4-DINITROTOLUENE	ug/L	67	76	-13
PENTACHLOROPHENOL	ug/L	* -62	16	* 339
PYRENE	ug/L	93	101	-8

*** DENOTES VALUE NOT WITHIN QA/QC ADVISORY LIMITS**

CORRESPONDING SDG'S AND ASSOCIATED SAMPLES

27176: GPTHOGW-1, GPTHOGW-1D, GPTHOGW-2, GPTHOGW-3, GPTHOGW-4

COMPOUND	ADVISORY LIMITS	RPD
	% R WATER	WATER
PHENOL	12%-89%	42
2-CHLOROPHENOL	27%-123%	40
1,4-DICHLOROBENZENE	36%-97%	28
N-NITROSO-DI-N-PROP.(1)	41%-116%	38
1,2,4-TRICHLOROBENZENE	39%-98%	28
4-CHLORO-3-METHYLPHENOL	23%-97%	42
ACENAPHTHENE	46%-118%	31
4-NITROPHENOL	10%-80%	50
2,4-DINITROTOLUENE	24%-96%	38
PENTACHLOROPHENOL	9%-103%	50
PYRENE	26%-127%	31

TABLE 2 - 5, CONTINUED

SEMIVOLATILE ORGANICS COMPOUNDS
WATER SAMPLE MATRIX SPIKE/MATRIX SPIKE DUPLICATES
NCBC GULFPORT HO

MS = MATRIX SPIKE *SAMPLE GPTHOGW1DR*		SDG 27176		
MSD = MATRIX SPIKE DUPLICATE		MS	MSD	
RPD = RELATIVE PERCENT DIFFERENCE		%R	%R	%RPD
SVOA COMPOUNDS	UNITS			
PHENOL	ug/L	60	78	26
2-CHLOROPHENOL	ug/L	62	77	22
1,4-DICHLOROBENZENE	ug/L	95	89	7
N-NITROSO-DI-N-PROP.(1)	ug/L	94	95	1
1,2,4-TRICHLOROBENZENE	ug/L	* 99	98	1
4-CHLORO-3-METHYLPHENOL	ug/L	71	89	22
ACENAPHTHENE	ug/L	93	96	3
4-NITROPHENOL	ug/L	40	73	* 58
2,4-DINITROTOLUENE	ug/L	69	76	10
PENTACHLOROPHENOL	ug/L	56	77	32
PYRENE	ug/L	98	104	6

*** DENOTES VALUE NOT WITHIN QA/QC ADVISORY LIMITS**

CORRESPONDING SDG'S AND ASSOCIATED SAMPLES

27176: GPTHOGW-1DR

COMPOUND	ADVISORY LIMITS	RPD
	% R WATER	WATER
PHENOL	12%-89%	42
2-CHLOROPHENOL	27%-123%	40
1,4-DICHLOROBENZENE	36%-97%	28
N-NITROSO-DI-N-PROP.(1)	41%-116%	38
1,2,4-TRICHLOROBENZENE	39%-98%	28
4-CHLORO-3-METHYLPHENOL	23%-97%	42
ACENAPHTHENE	46%-118%	31
4-NITROPHENOL	10%-80%	50
2,4-DINITROTOLUENE	24%-96%	38
PENTACHLOROPHENOL	9%-103%	50
PYRENE	26%-127%	31

TABLE 2 - 6

POLYNUCLEAR AROMATIC HYDROCARBONS
WATER SAMPLE MATRIX SPIKE/MATRIX SPIKE DUPLICATES
NCBC GULFPORT HO

MS = MATRIX SPIKE *SAMPLE GPTHOGW1DRX*		SDG 27176		
MSD = MATRIX SPIKE DUPLICATE		MS	MSD	
RPD = RELATIVE PERCENT DIFFERENCE		%R	%R	%RPD
PAH COMPOUNDS	UNITS			
NAPTHALENE	ug/L	57	56	1.8
ACENAPHTHYLENE	ug/L	75	75	0.0
ACENAPHTHENE	ug/L	81	79	2.5
FLUORENE	ug/L	83	82	1.2
PHENANTHRENE	ug/L	100	100	0.0
ANTHRACENE	ug/L	73	72	1.4
FLUORANTHENE	ug/L	92	90	2.2
PYRENE	ug/L	98	95	3.1
BENZO(A)ANTHRACENE	ug/L	94	90	4.3
CHRYSENE	ug/L	92	92	0
BENZO(B)FLUORANTHENE	ug/L	96	93	3.2
BENZO(K)FLUORANTHENE	ug/L	92	88	4.4
BENZO(A)PYRENE	ug/L	94	91	3.2
DIBENZO(A,H)ANTHRACENE	ug/L	100	100	0
INDENO(1,2,3-CD)PYRENE	ug/L	120	110	8.7
BENZO(G,H,I)PERYLENE	ug/L	91	88	3.4

*** DENOTES VALUE NOT WITHIN QA/QC ADVISORY LIMITS**

CORRESPONDING SDG AND ASSOCIATED SAMPLES

27176: GPTHOGW-1RX, GPTHOGW-1DRX, GPTHOGW-2RX, GPTHOGW-3RX, GPTHOGW-4RX

QC LIMITS WERE NOT PROVIDED BY THE LABORATORY.
RECOVERIES AND RPDS WERE DEEMED IN CONTROL BY THE DATA VALIDATOR.

TABLE 2 - 7

PESTICIDES/PCBS
WATER SAMPLE MATRIX SPIKE/MATRIX SPIKE DUPLICATES
NCBC GULFPORT HO

MS = MATRIX SPIKE *SAMPLE GPTHOGW1D*		SDG 27176		
MSD = MATRIX SPIKE DUPLICATE		MS	MSD	
RPD = RELATIVE PERCENT DIFFERENCE		%R	%R	%RPD
PEST COMPOUNDS	UNITS			
gamma-BHC (Lindane)	ug/L	80	83	4
Heptachlor	ug/L	78	80	3
Aldrin	ug/L	78	81	4
Dieldrin	ug/L	90	92	2
Endrin	ug/L	94	96	2
4,4'-DDT	ug/L	79	78	1

*** DENOTES VALUE NOT WITHIN QA/QC ADVISORY LIMITS**

CORRESPONDING SDG AND ASSOCIATED SAMPLES

27176: GPTHOGW-1, GPTHOGW-1D, GPTHOGW-2, GPTHOGW-3, GPTHOGW-4

COMPOUND	ADVISORY LIMITS		RPD
	% R WATER		WATER
gamma-BHC(Lindane)	56%-123%		15
HEPTACHLOR	40%-131%		20
ALDRIN	40%-120%		22
DIELDRIN	52%-126%		18
ENDRIN	56%-121%		21
4,4'-DDT	38%-127%		27

TABLE 2 - 8

ORGANOPHOSPHOROUS PESTICIDES
WATER SAMPLE MATRIX SPIKE.MATRIX SPIKE DUPLICATES
NCBC GULFPORT HO

MS = MATRIX SPIKE *SAMPLE GPTHOGW1D*		SDG 27176		
MSD = MATRIX SPIKE DUPLICATE		MS	MSD	
RPD = RELATIVE PERCENT DIFFERENCE		%R	%R	%RPD
OPP COMPOUNDS	UNITS			
PHORATE	ug/L	72	69	4
DISULFOTON	ug/L	68	62	8
METHYL PARATHION	ug/L	83	75	9
ETHYL PARATHION	ug/L	79	71	10

*** DENOTES VALUE NOT WITHIN QA/QC ADVISORY LIMITS**

CORRESPONDING SDG AND ASSOCIATED SAMPLES

27176: GPTHOGW-1, GPTHOGW-1D, GPTHOGW-2, GPTHOGW-3, GPTHOGW-4

NO QC LIMITS WERE REPORTED BY THE LABORATORY.
RECOVERIES WERE DEEMED IN CONTROL BY THE DATA VALIDATOR.

TABLE 2 - 9

HERBICIDES

WATER SAMPLE MATRIX SPIKE.MATRIX SPIKE DUPLICATES

NCBC GULFPORT HO

MS = MATRIX SPIKE *SAMPLE GPTHOGW1D*		SDG 27176		
MSD = MATRIX SPIKE DUPLICATE		MS	MSD	
RPD = RELATIVE PERCENT DIFFERENCE		%R	%R	%RPD
HERB COMPOUNDS	UNITS			
2,4-D	ug/L	98	82	17
SILVEX	ug/L	91	80	13
2,4,5-T	ug/L	91	80	14
DINOSEB	ug/L	46	34	31

*** DENOTES VALUE NOT WITHIN QA/QC ADVISORY LIMITS**

CORRESPONDING SDG AND ASSOCIATED SAMPLES

27176: GPTHOGW-1, GPTHOGW-1D, GPTHOGW-2, GPTHOGW-3, GPTHOGW-4

NO QC LIMITS WERE REPORTED BY THE LABORATORY.
RECOVERIES AND RPDS WERE DEEMED IN CONTROL BY DATA VALIDATOR.

TABLE 2 - 10

METALS AND CYANIDE
WATER SAMPLE MATRIX SPIKE/ DUPLICATES
NCBC GULFPORT HO

MS = MATRIX SPIKE *SAMPLE GPTHOGW-1*		SDG 27176	
MD = MATRIX DUPLICATE *SAMPLE GPTHOGW-1*		MS	MD
RPD = RELATIVE PERCENT DIFFERENCE		%R	RPD
METALS COMPOUNDS	UNITS		
ALUMINUM	ug/L	NA	NA
ANTIMONY	ug/L	82.2	NC
ARSENIC	ug/L	* 67.1	* 34.9
BARIUM	ug/L	102	5.5
BERYLLIUM	ug/L	95.9	13.6
CADMIUM	ug/L	96.5	NC
CALCIUM	ug/L	NA	NA
CHROMIUM	ug/L	111	19.5
COBALT	ug/L	102	1.8
COPPER	ug/L	104	0.0
IRON	ug/L	NA	NA
LEAD	ug/L	* 25.0	* 23.7
MAGNESIUM	ug/L	NA	NA
MANGANESE	ug/L	NA	NA
MERCURY	ug/L	89	200
NICKEL	ug/L	102	4.9
POTASSIUM	ug/L	NA	NA
SELENIUM	ug/L	* 52.8	47.0
SILVER	ug/L	103	200
SODIUM	ug/L	NR	NA
THALLIUM	ug/L	* 66.3	NC
VANADIUM	ug/L	107	11.0
ZINC	ug/L	108	3.2
CYANIDE	ug/L	* 63.2	NC
TIN	ug/L	97.1	NC

*** DENOTES VALUE NOT WITHIN QA/QC ADVISORY LIMITS**

NC DENOTES THAT BOTH SAMPLES ARE NON-DETECT AND A RPD CANNOT BE CALCULATED.
NR DENOTES THAT A MATRIX SPIKE RECOVERY CALCULATION IS NOT REQUIRED.

CORRESPONDING SDG'S AND ASSOCIATED SAMPLES

27176: GPTHOGW-1, GPTHOGW-1D, GPTHOGW-2, GPTHOGW-3, GPTHOGW-4

COMPOUND	ADVISORY LIMITS		RPD
	%R WATER		WATER
ALL COMPOUNDS	75%-125%		+/-20 OR +/-CRDL

+/- CRDL = RPD Limits applicable only on values 5 times the Contract Required Detection Limit (CRDL)

TABLE 2 - 11

SULFIDE
WATER SAMPLE MATRIX SPIKE/ DUPLICATES
NCBC GULFPORT HO

MS = MATRIX SPIKE *SAMPLE GPTHOGW-1D*		SDG 27176	
MD = MATRIX DUPLICATE *SAMPLE GPTHOGW-1D*		MS	MD
RPD = RELATIVE PERCENT DIFFERENCE		%R	RPD
	UNITS		
SULFIDE	ug/L	91.3	* 83.3

*** DENOTES VALUE NOT WITHIN QA/QC ADVISORY LIMITS**

NC DENOTES THAT BOTH SAMPLES ARE NON-DETECT AND A RPD CANNOT BE CALCULATED.

CORRESPONDING SDG'S AND ASSOCIATED SAMPLES

27176: GPTHOGW-1, GPTHOGW-1D, GPTHOGW-2, GPTHOGW-3, GPTHOGW-4

COMPOUND	ADVISORY LIMITS		RPD
	%R WATER		WATER
ALL COMPOUNDS	80%-120%		+/-20

2.1 Water Matrix

No target compounds requiring RPD calculation were detected in either the water samples or associated duplicates for the volatiles, semivolatiles, polynuclear aromatic hydrocarbons, pesticides/PCB/kepone, organophosphorous pesticides, and herbicides (Table 2-1). Therefore, no precision assessment was conducted for those parameters.

The dioxin/furan analysis of the field duplicate pair of sample GPTHOGW1 exhibited a non-compliant RPD for the two (2) congeners detected (Table 2-1). The non-compliant congeners were total TCDD, and total OCDD. A total TCDD concentration was detected in the field duplicate sample, but was not detected in the original sample. The TCDD result is biased high due to laboratory contamination. The contamination was due to the presence of trace amounts of the 1,2,3,4-TCDD marker compound, previously used by the laboratory, that remain in the system. All total TCDD results in the samples can be attributed to this contamination since there were no positive results in the samples for 2,3,7,8-TCDD. The non-compliance for total TCDD can be attributed to laboratory contamination. The congener total OCDD was detected as a MPC in the field duplicate sample. A MPC (maximum possible concentration) value is reported when not all identification criteria; i.e. ion ratios, is satisfied. The concentration may be less than the reported concentration, but not higher. The non-compliance for the congener total OCDD may be attributed to laboratory inconsistencies.

Eight (8) of the twelve (12) target analytes detected in the metals analysis of the field duplicate pair of sample GPTHOGW-1 exhibited non-compliant RPDs (Table 2-2). The target analytes with non-compliant RPDs were arsenic, beryllium, chromium, cobalt, lead, mercury, nickel, and vanadium. The non-compliance for the analytes beryllium, cobalt, nickel, and vanadium can be attributed to the low concentrations detected. Results were less than the CRDL in both of the samples. The analyte lead was also non-compliant for matrix spike and matrix duplicate criteria. This could be indicative of a matrix interference. The non-compliance for lead may be attributed to field inconsistencies. The analyte mercury was detected in the original sample at a concentration above the CRDL of 0.08 ug/L at 0.1 ug/L. The analyte was not detected in the field duplicate sample. The non-compliance for mercury could be attributed to the low concentration detected. The non-compliance for the analytes chromium and arsenic may be attributed to laboratory and/or field inconsistencies. Assessment of the non-compliant analytes for serial dilution criteria indicates that they were in-control (Appendix B).

The field duplicate pair of sample GPTHOGW-1 analyzed for sulfide exhibited a non-compliant RPD value (Table 2-2). Sulfide was detected in the DI field blank associated with the field duplicate pair (Table 4-11). Although the analytical data did not require qualification due to the field blank result, the contamination could affect precision results. The non-compliance for sulfide can be attributed to field contamination.

The evaluation of precision of the water matrix for the MS/MSD samples is provided in Tables 2-3 through 2-11. All MS/MSD sample pairs analyzed for volatiles, dioxin/furans, polynuclear aromatic hydrocarbons, pesticides/PCBs, organophosphorous pesticides and herbicides exhibited acceptable RPDs between spike compounds (Tables 2-3, 2-4, 2-6, 2-7, 2-8, and 2-9).

The semivolatile analysis of the MS/MSD pair of sample GPTHPGW1D exhibited non-compliant RPDs for five (5) of the eleven (11) spike compounds (Table 2-5, page 2-10). The non-compliance resulted from the negative recoveries of the compounds in the MS sample. The sample and the MS/MSD were reanalyzed and exhibited only one non-compliant RPD (Table 2-5, page 2-11). The analytical data did not require qualification.

The target analytes arsenic and lead exhibited non-compliant RPDs between the MD pair analyzed of sample GPTHOGW-1. All positive and non-detect results for arsenic in all field samples were appropriately qualified as estimated, J/UJ. The non-compliance for lead was less than 35%, so the analytical results did not require qualification.

The MD pair analyzed for sulfide exhibited a non-compliant RPD value (Table 2-11). However, based on the assessment of additional QC criteria, the analytical data did not require qualification.

Based on assessment of duplicate precision evaluation criteria, the water matrix analytical data was acceptable for each SDG with the noted potential for bias in the metals analytes arsenic and lead.

3.0 ACCURACY

The assessment of accuracy is evaluated by comparison of the percent recovery (%R) computed from the known concentration of analyte spikes and their recovered concentration versus the analytical method acceptance criteria. Spike recoveries provide an indication of bias, where the reported data may either overestimate or underestimate the actual concentration of detected compounds and/or the detection limits. Recoveries outside acceptable criteria may be caused by factors such as matrix interference, poor analytical precision, or instrument calibration.

The following Sections summarize the evaluation of analytical accuracy for the water matrix for the following analytical groups:

- GC/MS volatile organic compounds (GC/MS VOCs);
- dioxin/furan compounds (D/Fs);
- semivolatile organic compounds (SVOCs);
- polynuclear aromatic hydrocarbons (PAHs);
- pesticides, PCBs,;
- organophosphorous pesticides;
- herbicides; and
- inorganics, cyanide, & sulfide.

Accuracy was assessed using MS and MSD samples for organic analyses and MS samples for inorganic analyses for each matrix, as well as surrogate compound recoveries for those analytical fraction which utilize them. Accuracy for the dioxin/furan fraction was assessed using the recovery of internal standards. The results of the evaluation of accuracy for the MS/MSD samples is provided in Tables 2-3 through 2-11 for water matrix. The results of the evaluation of accuracy for the surrogates in the samples are provided in Table 3-1 through 3-8 for the water matrix.

3.1 Water Matrix

All MS/MSD sample pairs analyzed for volatiles, dioxin/furans, polynuclear aromatic hydrocarbons, pesticides/PCBs, organophosphorous pesticides, herbicides, and sulfide exhibited acceptable recoveries of spike compounds (Tables 2-3, 2-4, 2-6, 2-7, 2-8, 2-9, and 2-11).

The surrogate recoveries for volatiles, polynuclear aromatic hydrocarbons, pesticide/PCBs, kepone, and herbicides were acceptable (Tables 3-1, 3-4, 3-5, 3-6, 3-7, and 3-8).

The internal standard (IS) recoveries for the dioxin/furan fraction were acceptable with the exception of one (1) IS in three (3) samples and two (2) IS in one (1) sample. The reported result for 1,2,3,7,8-PeCDF in sample GPTHOGW-2 was appropriately qualified as estimated, J/UJ, and should be considered potentially underestimated. The reported result for 2,3,4,7,8-PeCDF in sample GPTHOGW1D was appropriately qualified as estimated, J/UJ, and should be considered potentially underestimated. The reported result for 1,2,3,7,8-PeCDD in samples GPTHOGW1D and GPTHOGW-4 were appropriately qualified as estimated, J/UJ, and should be considered potentially underestimated.

The MS/MSD of sample GPTHOGW1D analyzed for semivolatile organics had non-compliant %Rs for six (6) of the eleven (11) spike compounds (Table 2-5, page 2-10). The non-compliant recoveries were due to an error by the laboratory. The MS/MSD pair was re-extracted and reanalyzed and exhibited one (1) compound, 1,2,4-trichlorobenzene, with a non-compliant %R (Table 2-5, page 2-11). Based on the assessment of additional QC criteria the analytical data did not require qualification.

TABLE 3 - 1

SURROGATE % RECOVERIES
GC/MS VOLATILE WATER SAMPLES
NCBC GULFPORT HO

SDG	SAMPLE ID	SMC1	SMC2	SMC3	TOTAL OUT
27176	BS-01-TB	103	90	87	0
	BS-01-DI	103	90	91	0
	BS-01-PI	90	91	89	0
	BS-01-RI	104	92	91	0
	GPTHOGW-1	103	90	92	0
	GPTHOGW1D	104	92	92	0
	GPTHOGW-2	105	90	94	0
	GPTHOGW-3	102	91	92	0
	GPTHOGW-4	103	89	96	0
	GPTHOGW1DMS	104	91	92	0
	GPTHOGW1DMSD	104	87	94	0

SMC1 = TOLUENE-D8 QC LIMITS 88% - 110%
SMC2 = BROMOFLUOROBENZENE QC LIMITS 86% - 115%
SMC3 = 1,2-DICHLOROETHANE-D4 QC LIMITS 76% - 114%

# SAMPLES	% REC IN	%REC OUT	% TOTAL IN
11	33	0	100.0%

TABLE 3 - 2

WATER SAMPLE INTERNAL STANDARDS % RECOVERIES

DIOXIN/FURAN

NCBC GULFPORT HO

	BS-01-DI	BS-01-PI	BS-01-RI	BS-01-RIRE	GPTHOGW-1	GPTHOGW-1MS	GPTHOGW-1MD	GPTHOGW-1D	GPTHOGW-2	GPTHOGW-3	GPTHOGW-4
I.S. COMPOUND											
13C-2378-TCDD	69.5	63.6	64.9	63.7	74.6	61.7	90.5	54.8	42.7	71.6	66.8
13C-2378-TCDF	44	49.6	59.6	53.3	54.7	44.8	67.5	42.6	54.3	48.8	52.6
13C-12378-PeCDD	45.5	44.5	49.3	58.5	45.3	44.8	57.6	38.0 *	47.1	48	38.7 *
13C-12378-PeCDF	51.5	47.8	55.2	48.8	45.7	33.7	76.7	40.9	36.7 *	43.3	53.5
13C-23478-PeCDF	58.6	54.6	68.2	43.4	50.3	52.4	71.5	39.8 *	51.3	47.9	53
13C-123478-HxCDD	63.3	91.2	70.5	73.3	62.4	63.4	50.4	61	53	68.8	87.9
13C-123678-HxCDD	103	109	126	64.7	102	81.6	72.6	73.6	78.4	98.1	109
13C-123478-HxCDF	84.4	106	100	61.2	62.7	63.5	61.6	61.3	82.3	82	75.3
13C-123678-HxCDF	105	** 140	131	59.1	109	86.1	106	84.2	139	90.5	112
13C-234678-HxCDF	100	122	119	58.5	87	73.3	66.5	79.4	75.2	97.4	95.7
13C-123789-HXCDF	91.2	111	85.8	60.1	81.7	71.4	94.4	54	83.1	69.1	96.3
13C-1234678-HpCDD	83.6	74.5	72.1	68.2	62.3	59.8	83.9	63.8	92.3	85.2	86.2
13C-1234678-HpCDF	73.5	100	89.8	58.3	57.3	68.5	83.8	68	92.7	73.2	84.5
13C-1234789-HpCDF	79.7	93.5	82.1	64.5	60.4	68.2	95.4	55.4	67.9	72.3	83.7
13C-OCDD	90.5	95.1	67	79.3	77.6	81.7	81.3	56.4	71.9	74.4	85.5
TOTAL OUT	0	1	0	0	0	0	0	2	1	0	1

QC LIMITS: 40% - 120%

* - VALUE OUTSIDE OF QC LIMITS

# SAMPLE	% REC IN	% REC OUT	% TOTAL IN
11	160	5	97.0%

TABLE 3 - 3

SURROGATE % RECOVERIES
SEMIVOLATILE WATER SAMPLES
NCBC GULFPORT HO

SDG	SAMPLE ID	S1	S2	S3	S4	S5	S6	TOTAL OUT
27176	BS-01-DI	99	97	119	82	79	92	0
	BS-01-PI	97	102	114	*6	*19	46	2
	BS-01-PIRE	78	81	92	*4	31	52	1
	BS-01-RI	97	101	118	83	78	84	0
	GPTHOGW-2	91	100	103	79	73	90	0
	GPTHOGW-3	63	89	60	83	78	92	0
	GPTHOGW-4	83	88	86	77	70	95	0
	GPTHOGW1	95	95	106	82	72	88	0
	GPTHOGW1D	96	99	97	73	61	75	0
	GPTHOGW1DR	79	83	80	80	72	82	0
	GPTHOGW1DMS	99	102	81	74	69	84	0
	GPTHOGW1DMSD	100	100	96	81	72	82	0
	GPTHOGW1DMSR	83	91	71	62	55	64	0

S1 = NITROBENZENE-D5 QC LIMITS = 35% - 114%
S2 = 2-FLUOROBIPHENYL QC LIMITS = 43% - 116%
S3 = TERPHENYL-D14 QC LIMITS = 33% - 141%
S4 = PHENOL D-5 QC LIMITS = 10% - 94%
S5 = 2-FLUOROPHENOL QC LIMITS = 21% - 110%
S6 = 2,4,6-TRIBROMOPHENOL QC LIMITS = 10% - 123%

# SAMPLES	% REC IN	%REC OUT	% TOTAL IN
13	75	3	96.2%

TABLE 3 - 4

SURROGATE % RECOVERIES
POLYNUCLEAR AROMATIC HYDROCARBONS WATER SAMPLES
NCBC GULFPORT HO

SDG	SAMPLE ID	TD-14	TOTAL OUT
27176	BS-01-DI	NA	0
	BS-01-DIRE	86	0
	BS-01-PI	NA	0
	BS-01-PIRE	101	0
	BS-01-RI	NA	0
	BS-01-RIRE	83	0
	GPTHOGW-2	NA	0
	GPTHOGW-2RE	93	0
	GPTHOGW-3	NA	0
	GPTHOGW-3RE	96	0
	GPTHOGW-4	NA	0
	GPTHOGW-4RE	103	0
	GPTHOGW1	NA	0
	GPTHOGW1RE	102	0
	GPTHOGW1D	NA	0
	GPTHOGW1DRE	100	0
	GPTHOGW1DMS	NA	0
	GPTHOGW1DRX1	105	0
	GPTHOGW1DMSD	NA	0
	GPTHOGW1DRX2	102	0

TERPHENYL-d14 QC LIMITS NOT PROVIDED

NA - INDICATES SURROGATE COMPOUND NOT SPIKED
RECOVERIES DEEMED IN-CONTROL BY DATA VALIDATOR

# SAMPLE	% REC IN	%REC OUT	% TOTAL IN
20	15	0	100.0%

TABLE 3 - 5

SURROGATE % RECOVERIES
PESTICIDES/PCB WATER SAMPLES
NCBC GULFPORT HO

SDG	SAMPLE ID	DCB	TOTAL OUT
27176	BS-01-DI	75	0
	BS-01-PI	50	0
	BS-01-RI	85	0
	GPTHOGW-1	41	0
	GPTHOGW1D	33	0
	GPTHOGW-2	45	0
	GPTHOGW-3	44	0
	GPTHOGW-4	43	0
	GPTHOGW1DMS	44	0
	GPTHOGW1DMSD	43	0

DCB = DECACHLOROBIPHENYL QC LIMITS = 17% - 123%

# SAMPLES	% REC IN	%REC OUT	% TOTAL IN
10	10	0	100.0%

TABLE 3 - 6

SURROGATE % RECOVERIES
KEPONE WATER SAMPLES
NCBC GULFPORT HO

SDG	SAMPLE ID	DCB	TOTAL OUT
27176	BS-01-DI	96	0
	BS-01-PI	69	0
	BS-01-RI	110	0
	GPTHOGW-1	49	0
	GPTHOGW1D	42	0
	GPTHOGW-2	54	0
	GPTHOGW-3	57	0
	GPTHOGW-4	50	0

DCB = DECACHLOROBIPHENYL QC LIMITS = 14% - 132%

# SAMPLES	% REC IN	%REC OUT	% TOTAL IN
8	8	0	100.0%

TABLE 3 - 7

SURROGATE % RECOVERIES
ORGANOPHOSPHOROUS PESTICIDES WATER SAMPLES
NCBC GULFPORT HO

SDG	SAMPLE ID	ASPON	TOTAL OUT
27176	BS-01-DI	55	0
	BS-01-PI	22 *	1
	BS-01-PIRE	47	0
	BS-01-RI	69	0
	GPTHOGW-1	50	0
	GPTHOGW1D	64	0
	GPTHOGW-2	66	0
	GPTHOGW-3	45	0
	GPTHOGW-4	82	0
	GPTHOGW1DMS	65	0
	GPTHOGW1DMSD	62	0

ASPON QC LIMITS = 38% - 131%

# SAMPLES	% REC IN	%REC OUT	% TOTAL IN
11	10	1	90.9%

TABLE 3 - 8

SURROGATE % RECOVERIES
CHLORINATED HERBICIDES WATER SAMPLES
NCBC GULFPORT

SDG	SAMPLE ID	DCBA	TOTAL OUT
27176	BS-01-DI	88	0
	BS-01-PI	88	0
	BS-01-RI	85	0
	GPTHOGW-1	81	0
	GPTHOGW1D	70	0
	GPTHOGW-2	83	0
	GPTHOGW-3	71	0
	GPTHOGW-4	89	0
	GPTHOGW1DMS	77	0
	GPTHOGW1DMSD	69	0

DCBA - 3,5-DICHLOROBENZOIC ACID QC LIMITS = 25% - 127%

# SAMPLES	% REC IN	%REC OUT	% TOTAL IN
10	10	0	100.0%

Two (2) semivolatile samples exhibited acid surrogate recoveries which were outside the minimum acceptable criteria for accuracy (Table 3-3). The surrogate compound phenol-d_5 was recovered less than 10% in samples BS-01-PI and BS-01-PIRE. The surrogate compound 2-fluorophenol was recovered less than 10% in sample BS-01-PI. This indicates that positive results for the acid fraction in these two (2) samples may be underestimated and that non-detect results are unreliable. All positive results for acid fraction compounds in samples BS-01-PI and BS-01-PIRE were appropriately qualified as estimated, J, and non-detect results for acid fraction compounds were rejected, R. This constituted a rejection of thirteen (13) data points in the QC blank sample.

The organophosphorous pesticide surrogate recovery for one (1) field QC sample, BS-01-PI, was below the acceptable minimum criteria for accuracy (Table 3-7). This indicates that reported positive and non-detect results for target compounds in the sample may be underestimated. The reported results in sample BS-01-PI were appropriately qualified as estimated, J/UJ.

The MS/MD analyzed for inorganic analytes exhibited five (5) compounds with non-compliant %Rs (Table 2-10). The non-compliant target analytes were arsenic, lead, selenium, thallium, and cyanide the MS sample GPTHOGW-1. The %Rs for all non-compliant analytes were below the minimum criteria for accuracy, which indicates that the quantified values for these analytes may be underestimated. Positive and non-detect results for arsenic, selenium, thallium and cyanide were appropriately qualified as estimated, J/UJ. The %R for lead was less than 30%. This indicates that positive results for lead in associated samples are underestimated, and non-detect results are unreliable. The positive results for lead in the samples in SDG 27176 were qualified as estimated, J, and the non-detect results for lead were rejected, R. This constituted a rejection of three (3) data points in QC blank samples. The completion goal for the metals fraction was still met.

Based on assessment of MS/MSD and surrogate sample accuracy evaluation criteria, the water matrix analytical data was acceptable for each SDG with the exception of the semivolatile fraction and the metals fraction. Some of the analytical results may be overestimated or underestimated. For the semivolatile fraction, thirteen (13) data points in a field QC blank were rejected, R, due to surrogate %R below 10%. For the metals fraction, three (3) data points for lead in the QC blanks were rejected due to MS %R less than 30%.

4.0 REPRESENTATIVENESS

Representativeness of the environmental sample analytical data was assessed using trip blanks, field blanks, equipment rinseate blanks, and laboratory method blanks. The environmental samples and associated blanks were analyzed for the following target analyte groups:

- GC/MS volatile organic compounds (GC/MS VOCs);
- dioxin/furan compounds (D/Fs);
- semivolatile organic compounds (SVOCs);
- polynuclear aromatic hydrocarbons (PAHs);
- pesticides, PCBs,;
- organophosphorous pesticides;
- herbicides; and
- inorganics, cyanide, & sulfide.

The trip blank samples were analyzed for only GC/MS volatile organic target analytes. Field blanks, equipment rinseate blanks, and laboratory method blanks were analyzed for target analytes in each listed category. The assessment of representativeness is summarized in tabular form for each type of blank, trip blank results are summarized in Table 4-1, field blank results are summarized in Tables 4-2 through 4-11, equipment rinseate blank results are summarized in Tables 4-12 through 4-21 and method blank results are summarized in Tables 4-22 through 4-30.

If contaminants were detected in a blank, corrective actions were made for the chemical analytical data during data validation by Heartland. The corrective action consisted of amending the laboratory reported results for organic and inorganic target analytes by the criteria. The following describes the Validation Qualifier code in the blank summary tables.

Organic Target Analytes

- CRDL Validation Qualifier. If a sample result for the blank contaminant was less than the CRQL and less than 5 times the blank value (10 times for common laboratory contaminants), the sample result was rejected and amended as estimated non-detected at the CRQL for the target compound.

- U Validation Qualifier. If a sample result for the blank contaminant was greater than the sample CRQL and less than 5 times the blank value (10 times for common laboratory contaminants), the sample result for the blank contaminant was amended as non detect at the concentration reported in the sample results.

- No Action (NA). If a sample result for the blank contaminant was greater than the CRQL and 5 time the blank value (10 times for common laboratory contaminants), the result was not amended.

Inorganic Target Analytes

- U Validation Qualifier. If a sample result for the blank contaminant was less than the IDL and less than 5 times the blank value, the sample result was amended as non-detected.

- UJ Validation Qualifier. If a sample result for the blank contaminant was less than the sample IDL when the absolute value of the negative blank value was greater

TABLE 4 - 1

GC/MS VOLATILE COMPOUNDS DETECTED IN TRIP BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	TB CONC.	UNITS	VALIDATION QUALIFIER
27176	BS-01-TB	GPTHOGW-1, GPTHOGW-4	ACETONE	8	ug/L	CRQL
		GPTHOGW-3	ACETONE	8	ug/L	U
		GPTHOGW-2, GPTHOGW1D	ACETONE	8	ug/L	

TABLE 4 - 2

GC/MS VOLATILES DETECTED IN FIELD BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	FB CONC.	UNITS	VALIDATION QUALIFIER
27176	BS01DI	GPTHOGW-1, GPTHOGW-1D, GPTHOGW-2, GPTHOGW-3, GPTHOGW-4	ACETONE	38	ug/L	
	BS01PI	GPTHOGW-1, GPTHOGW-1D, GPTHOGW-2, GPTHOGW-3, GPTHOGW-4	CHLOROFORM	1	ug/L	
		GPTHOGW-1, GPTHOGW-1D, GPTHOGW-2, GPTHOGW-3, GPTHOGW-4	ACETONE	7	ug/L	

TABLE 4 - 3

DIOXIN/FURANS DETECTED IN FIELD BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	FB CONC.	UNITS	VALIDATION QUALIFIER
27176	BS01DI	GPTHOGW-1, GPTHOGW-1D, GPTHOGW-2, GPTHOGW-3, GPTHOGW-4	TOTAL TCDD	15.4	pg/L	
	BS01PI	GPTHOGW-1, GPTHOGW-1D, GPTHOGW-2, GPTHOGW-3, GPTHOGW-4	1,2,3,7,8,9-HxCDF *	2.43	pg/L	
		GPTHOGW-1, GPTHOGW-1D, GPTHOGW-2, GPTHOGW-3, GPTHOGW-4	TOTAL TCDD	8.38	pg/L	
		GPTHOGW-1, GPTHOGW-1D, GPTHOGW-2, GPTHOGW-3, GPTHOGW-4	TOTAL HxCDF *	2.43	pg/L	

TABLE 4 - 4

SEMIVOLATILES DETECTED IN FIELD BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	FB CONC.	UNITS	VALIDATION QUALIFIER
27176	BS01DI	GPTHOGW-1, GPTHOGW-1D, GPTHOGW-2, GPTHOGW-3, GPTHOGW-4	NO CONTAMINATION FOUND			
	BS01PI	GPTHOGW1D, GPTHOGW1DR, GPTHOGW1DM GPTHOGW1DMSR	N-NITROSODIPHENYLAMINE	2	ug/L	CRQL
		GPTHOGW-1, GPTHOGW-2, GPTHOGW-3, GPTHOGW-4	N-NITROSODIPHENYLAMINE	2	ug/L	

TABLE 4 - 5

POLYNUCLEAR AROMATIC HYDROCARBONS DETECTED IN FIELD BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	FB CONC.	UNITS	VALIDATION QUALIFIER
27176	BS01DI	GPTHOGW-1, GPTHOGW-1D, GPTHOGW-2, GPTHOGW-3, GPTHOGW-4	NO CONTAMINATION FOUND			
	BS01PI	GPTHOGW-1, GPTHOGW1D, GPTHOGW-2, GPTHOGW-3, GPTHOGW-4	NO CONTAMINATION FOUND			

TABLE 4 - 6

PESTICIDES/PCBS DETECTED IN FIELD BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	FB CONC.	UNITS	VALIDATION QUALIFIER
27176	BS01DI	GPTHOGW-1, GPTHOGW-1D, GPTHOGW-2, GPTHOGW-3, GPTHOGW-4	NO CONTAMINATION FOUND			
	BS01PI	GPTHOGW-1, GPTHOGW1D, GPTHOGW-2, GPTHOGW-3, GPTHOGW-4	NO CONTAMINATION FOUND			

TABLE 4 - 7

KEPONE DETECTED IN FIELD BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	FB CONC.	UNITS	VALIDATION QUALIFIER
27176	BS01DI	GPTHOGW-1, GPTHOGW-1D, GPTHOGW-2, GPTHOGW-3, GPTHOGW-4	NO CONTAMINATION FOUND			
	BS01PI	GPTHOGW-1, GPTHOGW1D, GPTHOGW-2, GPTHOGW-3, GPTHOGW-4	NO CONTAMINATION FOUND			

TABLE 4 - 8

ORGANOPHOSPHOROUS PESTICIDES DETECTED IN FIELD BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	FB CONC.	UNITS	VALIDATION QUALIFIER
27176	BS01DI	GPTHOGW-1, GPTHOGW-1D, GPTHOGW-2, GPTHOGW-3, GPTHOGW-4	NO CONTAMINATION FOUND			
	BS01PI	GPTHOGW-1, GPTHOGW1D, GPTHOGW-2, GPTHOGW-3, GPTHOGW-4	NO CONTAMINATION FOUND			

TABLE 4 - 9

HERBICIDES DETECTED IN FIELD BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	FB CONC.	UNITS	VALIDATION QUALIFIER
27176	BS01DI	GPTHOGW-1, GPTHOGW-1D, GPTHOGW-2, GPTHOGW-3, GPTHOGW-4	NO CONTAMINATION FOUND			
	BS01PI	GPTHOGW-1, GPTHOGW1D, GPTHOGW-2, GPTHOGW-3, GPTHOGW-4	NO CONTAMINATION FOUND			

TABLE 4 - 10

TOTAL METALS/CYANIDE DETECTED IN FIELD BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	FB CONC.	UNITS	VALIDATION QUALIFIER
27176	BS01DI	GPTHOGW-1, GPTHOGW-1D, GPTHOGW-2, GPTHOGW-3, GPTHOGW-4	BARIUM	1.3	ug/L	
	BS01PI	GPTHOGW-1, GPTHOGW1D, GPTHOGW-2, GPTHOGW-3, GPTHOGW-4	BARIUM	6.4	ug/L	
		GPTHOGW-1, GPTHOGW1D, GPTHOGW-2, GPTHOGW-3, GPTHOGW-4	ZINC	5.0	ug/L	

TABLE 4 - 11

SULFIDE DETECTED IN FIELD BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	FB CONC.	UNITS	VALIDATION QUALIFIER
27176	BS01DI	GPTHOGW-1, GPTHOGW-1D, GPTHOGW-2, GPTHOGW-3, GPTHOGW-4	SULFIDE	0.2	mg/L	
	BS01PI	GPTHOGW-1, GPTHOGW1D, GPTHOGW-2, GPTHOGW-3, GPTHOGW-4	NO CONTAMINATION FOUND			

TABLE 4 - 12

GC/MS VOLATILES DETECTED IN EQUIPMENT RINSEATE BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	RB CONC.	UNITS	VALIDATION QUALIFIER
27176	BS-01-RI	GPTHOGW-1, GPTHOGW-1D, GPTHOGW-2, GPTHOGW-3, GPTHOGW-4	ACETONE	14	ug/L	

TABLE 4 - 13

DIOXIN/FURANS DETECTED IN EQUIPMENT RINSEATE BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	RB CONC.	UNITS	VALIDATION QUALIFIER
27176	BS-01-RI	GPTHOGW-1, GPTHOGW-1D, GPTHOGW-GPTHOGW-3, GPTHOGW-4	GROSS CONTAMINATION FOUND **			
	BS-01-RI RE	GPTHOGW-1, GPTHOGW-1D, GPTHOGW-GPTHOGW-3, GPTHOGW-4	GROSS CONTAMINATION FOUND **			

** - GROSS CONTAMINATION FOUND IN THE EQUIPMENT RINSEATE BLANK AND ITS RE-EXTRACTION AND REANALYSIS, WHICH WAS DETERMINED BY THE DATA VALIDATOR TO BE THE LIKELY RESULT OF LABORATORY CONTAMINATION. THE FIELD SAMPLES WERE NOT QUALIFIED. HOWEVER, THE RINSEATE BLANKS WERE REJECTED, R.

TABLE 4 - 14

SEMIVOLATILES DETECTED IN EQUIPMENT RINSEATE BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	RB CONC.	UNITS	VALIDATION QUALIFIER
27176	BS01RI	GPTHOGW-1, GPTHOGW-1D, GPTHOGW-2, GPTHOGW-3, GPTHOGW-4	NO CONTAMINATION FOUND			

TABLE 4 - 15

POLYNUCLEAR AROMATIC HYDROCARBONS DETECTED IN EQUIPMENT RINSEATE BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	RB CONC.	UNITS	VALIDATION QUALIFIER
27176	BS01RI	GPTHOGW-1, GPTHOGW-1D, GPTHOGW-2, GPTHOGW-3, GPTHOGW-4	NO CONTAMINATION FOUND			

TABLE 4 - 16

PESTICIDES/PCBS DETECTED IN EQUIPMENT RINSEATE BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	RB CONC.	UNITS	VALIDATION QUALIFIER
27176	BS01RI	GPTHOGW-1, GPTHOGW-1D, GPTHOGW-2, GPTHOGW-3, GPTHOGW-4	NO CONTAMINATION FOUND			

TABLE 4 - 17

KEPONE DETECTED IN EQUIPMENT RINSEATE BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	RB CONC.	UNITS	VALIDATION QUALIFIER
27176	BS01RI	GPTHOGW-1, GPTHOGW-1D, GPTHOGW-2, GPTHOGW-3, GPTHOGW-4	NO CONTAMINATION FOUND			

TABLE 4 - 18

ORGANOPHOSPHOROUS PESTICIDES DETECTED IN EQUIPMENT RINSEATE BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	RB CONC	UNITS	VALIDATION QUALIFIER
27176	BS01RI	GPTHOGW-1, GPTHOGW-1D, GPTHOGW-2, GPTHOGW-3, GPTHOGW-4	NO CONTAMINATION FOUND			

TABLE 4 - 19

HERBICIDES DETECTED IN EQUIPMENT RINSEATE BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	RB CONC.	UNITS	VALIDATION QUALIFIER
27176	BS01RI	GPTHOGW-1, GPTHOGW-1D, GPTHOGW-2, GPTHOGW-3, GPTHOGW-4	NO CONTAMINATION FOUND			

TABLE 4 - 20

TOTAL METALS/CYANIDE DETECTED IN EQUIPMENT RINSEATE BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	RB CONC.	UNITS	VALIDATION QUALIFIER
27176	BS01RI	GPTHOGW-1, GPTHOGW-1D, GPTHOGW-2, GPTHOGW-3, GPTHOGW-4	BARIUM	1.2	ug/L	

TABLE 4 - 21

SULFIDE DETECTED IN EQUIPMENT RINSEATE BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	RB CONC.	UNITS	VALIDATION QUALIFIER
27176	BS01RI	GPTHOGW-1, GPTHOGW-1D, GPTHOGW-2, GPTHOGW-3, GPTHOGW-4	NO CONTAMINATION FOUND			

TABLE 4 - 22

GC/MS VOLATILES DETECTED IN METHOD BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	MB CONC.	UNITS	VALIDATION QUALIFIER
27176	VBLK5Q	BS-01-PI, BS-01-RI, GPTHOGW1, GPTHOGW-3, GPTHOGW-4, BS-01-TB	METHYLENE CHLORIDE	1	ug/L	CRQL
		GPTHOGW1D, GPTHOGW-2, BS-01-RI	METHYLENE CHLORIDE	1	ug/L	

TABLE 4 - 23

DIOXIN/FURANS DETECTED IN METHOD BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	MB CONC.	UNITS	VALIDATION QUALIFIER
27176	WBL05254	BS-01-PI, BS-01-RI, GPTHOGW1, GPTHOGW-3, GPTHOGW-4, GPTHOGW1D, GPTHOGW-2, BS-01-RI	2,3,4,7,8-PeCDF	8.07	pg/L	

TABLE 4 - 24

SEMIVOLATILES DETECTED IN METHOD BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	MB CONC.	UNITS	VALIDATION QUALIFIER
27176	SBLK1	BS-01-DI, BS-01-PI, BS-01-PIRE, BS-01-RI, GPTHOGW-2, GPTHOGW1, GPTHOGW1D, GPTHOGW1DR, GPTHOGW1DMS, GPTHOGW1DMSD, GPTHOGW1DMSR	NO CONTAMINATION FOUND			
	SBLK2	GPTHOGW-3, GPTHOGW-4	N-NITROSODIPHENYLAMINE	2	ug/L	CRQL

TABLE 4 - 25

POLYNUCLEAR AROMATIC HYDROCARBONS DETECTED IN METHOD BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	MB CONC.	UNITS	VALIDATION QUALIFIER
27176	NWB10523	BS-01-DI, BS-01-PI, BS-01-RI, GPTHOGW-2, GPTHOGW1, GPTHOGW-3, GPTHOGW1D, GPTHOGW-4, GPTHOGW1DMS, GPTHOGW1DMSD	GROSS CONTAMINATION FOUND **			
	NWB10527	BS-01-DIRE, BS-01-PIRE, BS-01-RIRE, GPTHOGW2RE, GPTHOGW1RE, GPTHOGW3R GPTHOGW1DRE, GPTHOGW4RE, GPTHOGW1 GPTHOGW1DRX2	NO CONTAMINATION FOUND			

** - ALL FIELD AND QC SAMPLES FROM ORIGINAL EXTRACTION REJECTED, R, DUE TO A SPIKING ERROR.

TABLE 4 - 26

PESTICIDE/PCBS DETECTED IN METHOD BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	MB CONC.	UNITS	VALIDATION QUALIFIER
27176	W05204B1	BS-01-DI, BS-01-PI, BS-01-RI, GPTHOGW-2, GPTHOGW1, GPTHOGW-3, GPTHOGW1D, GPTHOGW-4, GPTHOGW1DMS, GPTHOGW1DMSD	NO CONTAMINATION FOUND			

TABLE 4 - 27

KEPONE DETECTED IN METHOD BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	MB CONC.	UNITS	VALIDATION QUALIFIER
27176	WJ5204B1 K	BS-01-DI, BS-01-PI, BS-01-RI, GPTHOGW-2, GPTHOGW1, GPTHOGW-3, GPTHOGW1D, GPTHOGW-4, GPTHOGW1DMS, GPTHOGW1DMSD	NO CONTAMINATION FOUND			

TABLE 4 - 28

ORGANOPHOSPHOROUS PESTICIDES DETECTED IN METHOD BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	MB CONC.	UNITS	VALIDATION QUALIFIER
27176	W05204B1	BS-01-DI, BS-01-PI, BS-01-RI, GPTHOGW-2, GPTHOGW1, GPTHOGW-3, GPTHOGW1D, GPTHOGW-4, GPTHOGW1DMS, GPTHOGW1DMSD	NO CONTAMINATION FOUND			
	W06014B1	BS-01-PIRE	NO CONTAMINATION FOUND			

TABLE 4 - 29

HERBICIDES DETECTED IN METHOD BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	MB CONC.	UNITS	VALIDATION QUALIFIER
27176	W05194B1	BS-01-DI, BS-01-PI, BS-01-RI, GPTHOGW-2, GPTHOGW1, GPTHOGW-3, GPTHOGW1D, GPTHOGW-4, GPTHOGW1DMS, GPTHOGW1DMSD	NO CONTAMINATION FOUND			

TABLE 4 - 30

TOTAL METALS/CYANIDE DETECTED IN METHOD BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	MB CONC.	UNITS	VALIDATION QUALIFIER
27176	W05194B1	BS-01-DI, BS-01-PI, BS-01-RI, GPTHOGW-2, GPTHOGW1, GPTHOGW-3, GPTHOGW1D, GPTHOGW-4, GPTHOGW1DMS, GPTHOGW1DMSD	COPPER	7.9	ug/L	U
			SELENIUM	-1.4	ug/L	J/UJ
			THALLIUM	-1.4	ug/L	J/UJ

than the IDL, the sample result for the blank contaminant was amended as estimated non-detected.

- J Validation Qualifier. If a sample result for the blank contaminant was greater than the IDL and less than 10 times the blank value, when the absolute of the negative blank value id greater than the IDL the result was amended as estimated at the laboratory value.

4.1 Trip Blanks

Trip blanks contained deionized water from the laboratory and consisted of samples bottles which were similar to the environmental sample containers. The trip blanks were prepared and packaged at the laboratory prior to the sampling event and traveled with the sample bottles to the site. The trip blank bottles were not opened at the site or anytime prior to laboratory analysis.

Target compounds detected in the trip blank sample (Table 4-1) consisted of:

- GC/MS Volatiles (Table 4-1)
  acetone

The compound acetone is a common laboratory contaminant and its presence in the trip blank may be attributed to laboratory contamination. Some analytical results required qualification due to the trip blank contamination. However, based on the assessment of the trip blank results for representativeness, the analytical data is acceptable.

4.2 Field Blanks

The field blank, BS-01-PI, was a sample of potable water from the source at the field staging area and the deionized water blank, BS-01-DI, was prepared from the source potable water. The field blanks were prepared at the site and placed in containers that were similar to those used for the environmental samples. Polynuclear aromatic hydrocarbons, pesticide/PCBs, kepone, organophosphorous pesticides, and herbicides target compounds were not detected in the field blank samples (Tables 4-5, 4-6, 4-7, 4-8, and 4-9). Target compounds and analytes detected in the field blank samples consisted of:

- GC/MS Volatiles (Table 4-2)
  acetone
  chloroform

- Dioxin/Furan (Table 4-3)
  Total TCDD
  1,2,3,7,8,9-HxCDF
  Total HxCDF

- Semivolatiles (Table 4-4)
  n-nitrosodiphenylamine

- Inorganics (Table 4-10)
  barium
  zinc

- Sulfide (Table 4-11)

The detected acetone result in both field blanks is attributed to laboratory contamination because acetone is a common laboratory contaminant. The chloroform detected in the potable water field blank is a trihalomethane, which can be formed when "free" chloride ions are present. It is an artifact of the water source. The dioxin/furan compounds detected in the field blanks are not common blank contaminants. The results detected are most likely the result of laboratory contamination, i.e., glassware used by the laboratory for the extraction process. The inorganic analytes can be attributed to the water source, the water treatment system that was used to make the water or laboratory artifacts. The metals analytes were detected below the CRDL, and none of the sample data required qualification due to the metals analytes in the field blanks.

Target analytes were detected in some of the field blanks. Some of the analytical data required qualification. However, based on assessment of field blanks for representativeness the analytical data was acceptable for the SDG.

4.3 Equipment Rinseate Blanks

The equipment rinseate blank was prepared by rinsing a piece of decontaminated sampling equipment with deionized water from a field DI unit. A sample of this water was collected and placed in sample containers similar to those used for the environmental samples. Semivolatile organics, polynuclear aromatic hydrocarbons, pesticides/PCBs, kepone, organophosphorous pesticides, herbicides, and sulfide target compounds were not detected in equipment rinseate blank samples (Tables 4-14, 4-15, 4-16, 4-17, 4-18, 4-19, and 4-21). Target analytes detected in the equipment rinseate blank samples consisted of:

- GC/MS Volatiles (Table 4-12)
  acetone
- Dioxin/Furan (Table 4-13)
  ***
- Metals (Table 4-20)
  barium

The detected acetone is a common laboratory contaminant and may be attributed to laboratory contamination. The dioxin/furan analysis of the equipment rinseate blank exhibited gross contamination in both the original extraction and analysis, and the re-extraction and analysis. This contamination could be due to laboratory contamination since this type of field contamination is not usual. The field samples did not require qualification. However, the rinseate blanks were rejected, R, due to gross contamination. The inorganic analyte can be attributed to the water source, the water treatment system that was used to make the water or laboratory artifacts. The metals analyte was detected below the CRDL. The data did not require qualification due to the detected barium in the rinseate blank.

Based on assessment of equipment rinseate blanks for representativeness the analytical data was acceptable for the SDG, with the exception of the dioxin/furan fraction. Twenty-seven (27) dioxin/furan data points were rejected due to the contaminated equipment rinseate blanks. The completeness goal for the QC samples fell below the goal of 85% (Appendix C). However, the completion goal for the fraction was still met.

4.4 Method Blanks

The method blanks were a sample of deionized water that is prepared by the laboratory at the time of analysis. Method blanks undergo the same analytical process as the corresponding environmental samples and associated field blanks. The purpose of the method blank is to assess the potential for target compounds and analytes to "contaminate" the sample during analysis. pesticides/PCBs, kepone, organophosphorous pesticides, and herbicides target compounds were not detected in method blank samples (Tables 4-26, 4-27, 4-28, and 4-29). Target analytes detected in the method blank samples consisted of:

- GC/MS Volatiles (Table 4-22)
  - methylene chloride
- Dioxin/Furans (Table 4-23)
  - 2,3,4,7,8-PeCDF
- Semivolatile Organics (Table 4-24)
  - n-nitrosodiphenylamine
- Polynuclear Aromatic Hydrocarbons (PAH) (Table 4-25)
  - all compounds
- Inorganics (Table 4-30)
  - copper
  - selenium
  - thallium

The detectable acetone results are common laboratory contaminants and are attributed to laboratory contamination. The dioxin/furan congener is an unusual laboratory contaminant and is likely an artifact from glassware used during the extraction process. The n-nitrosodiphenylamine is possibly due to carry over from the instrument calibration or dirty glassware encountered during the extraction process. The PAH compounds in the method blank were the result of a spiking error by the laboratory. All samples and QC were re-extracted and analyzed with acceptable results. The copper can be attributed to the water source, the water treatment system that was used to make the water or laboratory artifacts. The selenium and thallium were negative in concentration and can be attributed to instrumentation anomalies.

Because target analytes were detected in some of the method blanks, some of the analytical results were qualified. However, based on assessment of method blanks for representativeness the analytical data was acceptable for each SDG.

4.5 Holding Times

Holding times requirements are utilized in an effort to minimize the degradation or concentration of constituents in a particular matrix over time. The stability of the constituents is determined to the best extent and then a reasonable time limit is imposed under which the samples must be extracted or prepared and then analyzed. The holding times regulations assume that the samples have been properly preserved according to the guidelines, either at the laboratory or in the field. Analytical results from samples with holding time violations are qualified as estimated, J/UJ, due to the potential for compromising the integrity of the samples.

All holding times requirements, extraction and analytical, were met with the exception of sample BS-01-PIRE for semivolatiles and organophosphorous pesticides, and all samples for the PAH fraction. All results qualified for holding times non-compliance are considered to be useable. The positive results are qualified as estimated, J, in samples with holding times exceeded by up to five (5) days. The non-detect and positive results are qualified as estimated, J/UJ, in samples with holding times exceeded from six (6) to fifteen (15) days. No analytical data was rejected due to holding times violations.

5.0 COMPARABILITY

Comparability is qualitative measure designed to express the confidence with which one data set may be compared to another. The analytical samples were collected and transported to the chemical analytical laboratory in accordance with standard procedures and were analyzed in conformance with acceptable USEPA procedures (Refer to Table 5-1 below). The analytical data are reported in standard units (micrograms per liter, micrograms per kilogram, etc.).

The methods used to collect the environmental samples and the methods used to analyze the samples should assure comparability of the analytical data.

TABLE 5-1
USEPA Procedures (CLP or SW-846 Methodologies)

U.S. EPA Method	Description
SW-846, Method 8240	Volatile Organics
SW-846, Method 8290	Dioxin/Furans
SW-846, Method 8270	Semivolatile Organics
SW-846, Method 8310	Polynuclear Aromatic Hydrocarbons
SW-846, Method 8080	Pesticides/PCBs/Kepone
SW-846, Method 8140	Organophosphorous Pesticides
SW-846, Method 8140	Chlorinated Herbicides
CLP, ILMO2.1	Metals
CLP, ILMO2.1	Cyanide
SW-846, Method 9030	Sulfide

6.0 COMPLETENESS

Completeness is the quantitative measure of the amount of data obtained from a measurement process compared with the amount expected to be obtained under the conditions of measurement. The completeness goal for laboratory analysis for this project was 85 percent useable data. Unusable analytical data are those results reported by the laboratory but rejected during the data validation process. A summary of the completeness goal for NCBC Gulfport is provided in Table 6-1. For more detailed completeness goal tables, please refer to Appendix C.

TABLE 6-1
COMPLETION GOAL (>85%)

	QC	GW	OVERALL
GC/MS Volatiles	96.6	96.6	96.6
Dioxin/Furans	75.0	100.0	87.5
Semivolatiles	86.9	98.6	92.8
PAHs	100.0	100.0	100.0
Pesticide/PCBs	100.0	100.0	100.0
Organophos. Pest.	100.0	100.0	100.0
Herbicides	100.0	100.0	100.0
Kepone	100.0	100.0	100.0
Metals	95.6	100.0	97.8
Cyanide	100.0	100.0	100.0
Sulfide	100.0	100.0	100.0

MATRIX KEY

QC = QC Samples
GW = Ground Water Samples

The analytical data met the 85 percent completeness goal for every fraction. The narrative following describes any extenuating factors involved in the data resolution.

GC/MS Volatiles, Non-Compliant RRFs Two (2) volatile compounds; isobutyl alcohol and 1,4-dioxane, did not always meet the initial and continuing calibration criteria of >0.05 for RRF (Relative Response Factor). The RRF values fell below 0.05 in analyses affecting the SDG associated with this project. All non-detect sample results associated with the initial and continuing calibrations that exhibited either of the two (2) compounds with non-compliant RRFs are rejected, R, (Table A-1). All positive sample results associated with the initial and continuing calibrations that exhibited either of the two (2) compounds with non-compliant RRFs are qualified as estimated, J/UJ, (Table A-1). The non-compliant calibrations resulted in the rejection of eighteen (18) data points. The completeness goal for the fraction was still met.

Non-detect results that were rejected for the compounds may be evaluated by adjusting the CRQL to the concentration of the continuing calibration standard and qualifying the results as not detected at an estimated concentration, UJ. The non-detect qualification at the concentration of the continuing calibration standard insures that the instrumentation is capable of detecting the compound at a known concentration.

Semivolatiles, Non-Compliant RRFs and/or %Ds Two (2) semivolatile compounds; hexachlorophene and benzidine, did not always meet the initial and continuing calibration criteria of

>0.05 for RRF (Relative Response Factor) or %D (Percent Difference). The RRF values fell below 0.05 or the %D value was above 90% in analyses affecting the SDG associated with this project. All non-detect sample results associated with the initial and continuing calibrations that exhibited either of the two (2) compounds with non-compliant RRFs or %Ds are rejected, R, (Table A-1). All positive sample results associated with the initial and continuing calibrations that exhibited either of the two (2) compounds with non-compliant RRFs or %Ds are qualified as estimated, J/UJ, (Table A-1). The non-compliant calibrations resulted in the rejection of eighteen (18) data points. The completeness goal for the fraction was still met.

Non-detect results that were rejected for the compounds may be evaluated by adjusting the CRQL to the concentration of the continuing calibration standard and qualifying the results as not detected at an estimated concentration, UJ. The non-detect qualification at the concentration of the continuing calibration standard insures that the instrumentation is capable of detecting the compound at a known concentration.

Semivolatiles, Appendix IX Calibration The Appendix IX compound results for samples GPTHOGW1DR and GPTHOGW1DMSR were rejected because the laboratory did not analyze a continuing calibration standard with the Appendix IX compounds in it. This constituted a rejection of forty (40) data points. The completion goal was still met for the fraction.

GC/MS Volatiles/Semivolatiles Target compounds for both the volatile and semivolatile fractions were qualified because of non-compliant calibrations. Volatile and semivolatile compounds did not always meet the initial and/or continuing calibration criteria for RSD (Relative Standard Deviation), and %D (Percent Difference). All results qualified for calibration % RSD and % D deficiencies (J/UJ) are considered to be useable. For the compounds in the GC/MS volatile and semivolatile analyses that did not meet calibration criteria, all positive results are qualified as estimated (J) (%Ds >25%) and all non detect results are qualified as estimated (UJ) (>50% D <90%) due to calibration deficiencies.

Semivolatiles Two (2) samples; GPTHOGW1D & GPTHOGW1DMS, were rejected, R, in favor of the re-extracted and analyzed results due to a laboratory error. There was no impact on the completion goal due to these rejections since viable data points were obtained from the reanalysis results.

Polynuclear Aromatic Hydrocarbons The laboratory spiked matrix spike solution into all QC and field samples in the initial extraction batch of samples for this SDG. Therefore, all of the original results were rejected. However, the re-extraction and analysis provided acceptable results for all data points. Therefore, there was no impact on the completion goal due to the error.

Metals Target analytes lead and selenium were qualified as estimated, J/UJ, due to unacceptable graphite furnace MSA results in samples from the SDG. All results qualified for non-compliant MSA recoveries are considered to be useable. If the recovery was above the QC limits, only the positive results for the analyte were qualified. If the recovery was below the QC limits, or the correlation coefficient of an MSA curve was below the QC limits, positive and non-detect results were qualified as estimated, J/UJ.

7.0 PARCC SUMMARY

The purpose of evaluating the quality of the analytical data using the PARCC criteria was to address the qualification of the data in regards to evaluation of the presence, magnitude and characteristics of hazardous substances at NCBC Gulfport. Overall, the chemical analytical data are acceptable and exceeded the completion goal of 85 percent. Tables 7-1 and 7-2 provides a tabulation of the assessment of PARCC criteria each SDG for water samples and quality control samples, respectively.

7.1 Water Samples

The analytical data for this matrix was acceptable for all PARCC criteria categories except completeness. Eight (8) volatile data points were rejected due to initial and/or continuing calibration standards which did not meet QC criteria. The completion goal was met. Six (6) semivolatile data points were rejected due to initial and/or continuing calibration standards which did not meet QC criteria. The completion goal was met.

7.2 QC Samples

The analytical data for this matrix was acceptable for the PARCC criteria of precision and comparability. Thirteen (13) semivolatile data points in the potable water field blank were rejected due to surrogate recovery less than 10%. The completion goal was met. Ten (10) volatile data points were rejected due to initial and/or continuing calibration standards which did not meet QC criteria. The completion goal was met. Four (4) semivolatile data points were rejected due to initial and/or continuing calibration standards which did not meet QC criteria. The completion goal was met. Forty (40) semivolatile data points were rejected in the field duplicate sample reanalysis due to the lack of a continuing calibration standard containing the Appendix IX compounds. The completion goal was met. Twenty-seven (27) dioxin/furan congeners were rejected in the rinseate blank due to gross contamination. The completion goal was met. Three (3) metals data points for lead were rejected in the QC blanks due to MS %R which was below 30%. The completaion goal was met.

TABLE 7-1
PARCC CRITERIA SUMMARY
WATER SAMPLES
NCBC GULFPORT

SDGs	PRECISION	ACCURACY	REPRESENT-ATIVENESS	COMPARABILITY	COMPLETENESS
27176	ACCEPTABLE	ACCEPTABLE	ACCEPTABLE	ACCEPTABLE	ACCEPTABLE (1) (2) WITH REJECTIONS

(1) Eight (8) volatile data points were rejected due to initial and/or continuing calibration standards which did not meet QC criteria. Completion goal was met.
(2) Six (6) semivolatile data points were rejected due to initial and/or continuing calibration standards which did not meet QC criteria. Completion goal was met.

TABLE 7 - 2
PARCC CRITERIA SUMMARY
QUALITY CONTROL SAMPLES
NCBC GULFPORT HO

SDGs	PRECISION	ACCURACY	REPRESENT-ATIVENESS	COMPARABILITY	COMPLETENESS
27176	ACCEPTABLE	ACCEPTABLE (1) (6) WITH REJECTIONS	ACCEPTABLE (5) WITH REJECTIONS	ACCEPTABLE	ACCEPTABLE (1 - 6) WITH REJECTIONS

(1) Thirteen (13) semivolatile data points in the potable water blank were rejected due to surrogate recovery less than 10%. Completion goal was met.

(2) Ten (10) volatile data points were rejected due to initial and/or continuing calibration standards which did not meet QC criteria. Completion goal was met.

(3) Four (4) semivolatile data points were rejected due to initial and/or continuing calibration standards which did not meet QC criteria. Completion goal was met.

(4) Forty (40) semivolatile data points were rejected in the field duplicate sample reanalysis due to the lack of a continuing calibration standard containing the Appendix IX compounds. Completion goal was met.

(5) Twenty-seven (27) dioxin/furan congeners were rejected in the rinseate blank due to gross contamination. Completion goal was met.

(6) Three (3) metals data points for lead were rejected due to matrix spike recovery less than 30% in the QC blanks.

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APPENDIX A

CALIBRATION SUMMARY

TABLE A-1

INITIAL AND CONTINUING CALIBRATION
VOLATILE ORGANIC COMPOUNDS
NCBC GULFPORT HO

ICAL = INITIAL CALIBRATION = %RSD	SDG 27176	
CCAL = CONTINUING CALIBRATION = %	**ICAL1**	**CCAL1**
DATE	050594	052394
INSTRUMENT ID	HP1	HP1
CALIBRATION CRITERIA	RRF	RRF/%D
ISOBUTYL ALCOHOL	0.047	0.044
1,4-DIOXANE	0.003	0.003
BROMOMETHANE		27.8

SDGS, STANDARDS, AND ASSOCIATED SAMPLES

SDG 27176

ICAL1: NONE

CCAL1: BS-01-DI, BS-01-PI, BS-01-RI, BS-01-TB, GPTHOGW-1, GPTHOGW-1D, GPTHOGW-2, GPTHOGW-3, GPTHOGW-4

TABLE A - 2

INITIAL AND CONTINUING CALIBRATION
SEMIVOLATILE ORGANIC COMPOUNDS
NCBC GULFPORT HO

ICAL = INITIAL CALIBRATION = %RSD	SDG 27176					
CCAL = CONTINUING CALIBRATION = %D	ICAL1	CCAL1	CCAL2	CCAL3	CCAL4	CCAL5
DATE	051394	052694	052794	060194	060394	060694
INSTRUMENT ID	4600	4600	4600	4600	4600	4600
CALIBRATION CRITERIA	RRF/%RSD	RRF/%D	%D	%D	%D	%D
HEXACHLOROPHENE	0.019/44.4	0.005/73.7	-99.9			
3,3'-DIMETHYLBENZIDINE	51.1	-45.9	-66.7			
4-CHLOROANILINE		32.0				26.1
4-NITROPHENOL		37.6				
BENZOIC ACID		26.7		26.7		
1,3,5-TRINITROBENZENE		33.1				
4-NITROQUINOLINE-1-OXIDE		41.8				
BENZYL ALCOHOL			-27.2			
2,4-DINITROPHENOL			31.2		33.2	
BENZIDINE			-99.9		-99.9	-40.2
2,4,6-TRIBROMOPHENOL					32.8	34.4

SDGS, CALIBRATIONS AND ASSOCIATED SAMPLES:

SDG 27176

ICAL1: NONE

CCAL1: BS-01-DI, BS-01-PI, BS-01-RI, GPTHOGW1, GPTHOGW1D, **GPTHOGW-1DMS, GPTHOGW-1DMSD, GPTHOGW-2**

CCAL2: GPTHOGW-3, GPTHOGW-4

CCAL3: GPTHOGW1DMSR

CCAL4: GPTHOGW1DR

CCAL5: BS-01-PIRE

APPENDIX B

SERIAL DILUTION SUMMARY

TABLE B - 1

WATER SAMPLE SERIAL DILUTION
METALS SUMMARY TABLE
NCBC GULFPORT HO

SAMPLE GPTHOGW-4		SDG 27176
%D = PERCENT DIFFERENCE		%D
METALS ANALYTES	UNITS	
ANTIMONY	ug/L	NC
ARSENIC	ug/L	NA
BARIUM	ug/L	1.1
BERYLLIUM	ug/L	100
CADMIUM	ug/L	NC
CHROMIUM	ug/L	2.1
COBALT	ug/L	100
COPPER	ug/L	150
LEAD	ug/L	NA
MERCURY	ug/L	NA
NICKEL	ug/L	100
SELENIUM	ug/L	NA
SILVER	ug/L	NC
THALLIUM	ug/L	NA
VANADIUM	ug/L	3.4
ZINC	ug/L	1.4
TIN	ug/L	NC
CYANIDE	ug/L	NR

*** - INDICATES VALUE OUTSIDE QC LIMITS**
NC DENOTES NO CALCULATION DUE TO NON-DETECT RESULTS IN BOTH SAMPLES
NA DENOTES COMPOUND NOT ANALYZED FOR

CORRESPONDING SDG'S AND ASSOCIATED SAMPLES

27176: GPTHOGW-1, GPTHOGW-1D, GPTHOGW-2, GPTHOGW-3, GPTHOGW-4

ANALYTE	RPD
	WATER
ALL ICP ANALYTES	+/-10%

+/-10% RULE ONLY APPLIES TO RESULTS GREATER THAN 50 TIMES THE IDL
(SOME VALUES ROUNDED TO LIMIT %Ds TO THREE (3) SIGNIFICANT FIGURES)

APPENDIX C

REJECTED DATA SUMMARY

TABLE C-1
GC/MS VOLATILES - REJECTED DATA
NCBC GULFPORT HO

				# OF COMPOUNDS REJECTED PER MATIX	
SDG	# SAMPLES/MATRIX			QC	GW
	QC	GW			
27176	5	4		10	8
GRAND TOTAL	5	4		10	8
COMPLETION GOAL (>85%)				96.6%	96.6%

OVERALL COMPLETENESS
96.6%

MATRIX KEY

QC = QC SAMPLES
GW = GROUND WATER SAMPLES

*** 59 TARGET COMPOUNDS PER SAMPLE**

TABLE C - 2
DIOXIN/FURANS - REJECTED DATA
NCBC GULFPORT HO

SDG	# SAMPLES/MATRIX			# OF COMPOUNDS REJECTED PER MATIX	
	QC	GW		QC	GW
27176	4	4		27	0
GRAND TOTAL	4	4		27	0
COMPLETION GOAL (>85%)				75.0%	100.0%

OVERALL COMPLETENESS
87.5%

MATRIX KEY

QC = QC SAMPLES
GW = GROUND WATER SAMPLES

*** 27 TARGET CONGENERS/ISOMERS PER SAMPLE**

TABLE C - 3
SEMIVOLATILES - REJECTED DATA
NCBC GULFPORT HO

SDG	# SAMPLES/MATRIX			# OF COMPOUNDS REJECTED PER MATIX	
	QC	GW		QC	GW
27176	4	4		57	6
GRAND TOTAL	4	4		57	6
COMPLETION GOAL (>85%)				86.9%	98.6%

OVERALL COMPLETENESS
92.8%

MATRIX KEY

QC = QC SAMPLES
GW = GROUND WATER SAMPLES

*** 109 TARGET COMPOUNDS PER SAMPLE**

TABLE C - 4
POLYNUCLEAR AROMATIC HYDROCARBONS - REJECTED DATA
NCBC GULFPORT HO

SDG	# SAMPLES/MATRIX			# OF COMPOUNDS REJECTED PER MATIX	
	QC	GW		QC	GW
27176	4	4		0	0
GRAND TOTAL	4	4		0	0
COMPLETION GOAL (>85%)				100.0%	100.0%

OVERALL COMPLETENESS
100.0%

MATRIX KEY

QC = QC SAMPLES
GW = GROUND WATER SAMPLES

*** 16 TARGET CONGENERS/ISOMERS PER SAMPLE**

TABLE C - 5
PESTICIDE/PCBS - REJECTED DATA
NCBC GULFPORT HO

				# OF COMPOUNDS REJECTED PER MATIX	
SDG	# SAMPLES/MATRIX			QC	GW
	QC	GW			
27176	4	4		0	0
GRAND TOTAL	4	4		0	0
COMPLETION GOAL (>85%)				100.0%	100.0%

OVERALL COMPLETENESS
100.0%

MATRIX KEY

QC = QC SAMPLES
GW = GROUND WATER SAMPLES

*** 30 TARGET COMPOUNDS PER SAMPLE**

TABLE C - 6
ORGANOPHOSPHOROUS PESTICIDES - REJECTED DATA
NCBC GULFPORT HO

SDG	# SAMPLES/MATRIX			# OF COMPOUNDS REJECTED PER MATIX	
	QC	GW		QC	GW
27176	4	4		0	0
GRAND TOTAL	4	4		0	0
COMPLETION GOAL (>85%)				100.0%	100.0%

OVERALL COMPLETENESS
100.0%

MATRIX KEY

QC = QC SAMPLES
GW = GROUND WATER SAMPLES

*** 9 TARGET COMPOUNDS PER SAMPLE**

TABLE C - 7
HERBICIDES - REJECTED DATA
NCBC GULFPORT HO

SDG	# SAMPLES/MATRIX			# OF COMPOUNDS REJECTED PER MATIX	
	QC	GW		QC	GW
27176	4	4		0	0
GRAND TOTAL	4	4		0	0
COMPLETION GOAL (>85%)				100.0%	100.0%

OVERALL COMPLETENESS
100.0%

MATRIX KEY

QC = QC SAMPLES
GW = GROUND WATER SAMPLES

*** 4 TARGET COMPOUNDS PER SAMPLE**

TABLE C - 8
KEPONE - REJECTED DATA
NCBC GULFPORT HO

SDG	# SAMPLES/MATRIX			# OF COMPOUNDS REJECTED PER MATIX	
	QC	GW		QC	GW
27176	4	4		0	0
GRAND TOTAL	4	4		0	0
COMPLETION GOAL (>85%)				100.0%	100.0%

OVERALL COMPLETENESS
100.0%

MATRIX KEY

QC = QC SAMPLES
GW = GROUND WATER SAMPLES

*** 1 TARGET COMPOUND PER SAMPLE**

TABLE C - 9
TOTAL METALS - REJECTED DATA
NCBC GULFPORT HO

SDG	# SAMPLES/MATRIX			# OF COMPOUNDS REJECTED PER MATIX	
	QC	GW		QC	GW
27176	4	4		3	0
GRAND TOTAL	4	4		3	0
COMPLETION GOAL (>85%)				95.6%	100.0%

OVERALL COMPLETENESS
97.8%

MATRIX KEY

QC = QC SAMPLES
GW = GROUND WATER SAMPLES

*** 17 TARGET ANALYTES PER SAMPLE**

TABLE C - 11
SULFIDE - REJECTED DATA
NCBC GULFPORT HO

SDG	# SAMPLES/MATRIX			# OF COMPOUNDS REJECTED PER MATIX	
	QC	GW		QC	GW
27176	4	4		0	0
GRAND TOTAL	4	4		0	0
COMPLETION GOAL (>85%)				100.0%	100.0%

OVERALL COMPLETENESS
100.0%

MATRIX KEY

QC = QC SAMPLES
GW = GROUND WATER SAMPLES

*** 1 TARGET COMPOUND PER SAMPLE**

Groundwater Sampling Event No. 2

PRECISION, ACCURACY, REPRESENTATIVENESS, COMPARABILITY, AND COMPLETENESS FOR NCBC GULFPORT HERBICIDE ORANGE STORAGE FACILITY

NAVAL CONSTRUCTION BATTALION CENTER GULFPORT, MISSISSIPPI

Prepared by:
Heartland Environmental Services, Inc.
P.O. Box 163
St. Peters, Missouri 63376

Prepared for:

ABB Environmental Services, Inc.
1400 Centerpoint Blvd., Suite 158
Knoxville, Tennessee 37922-1968

November 1994

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NCBC Gulfport HO

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Calibration Criteria Summary

NCBC Gulfport HO

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NCBC Gulfport HO

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Rejected Data Summary

NCBC Gulfport HO

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1.0 INTRODUCTION

Prior to evaluating the data for precision, accuracy, representativeness, comparability, and completeness (PARCC) criteria the laboratory reviewed the data package and the data also were independently reviewed and validated using the Naval Energy and Environmental and Support Activity (NEESA) guidance document 20.2-047B (1988) entitled, *Sampling and Chemical Analysis Quality Assurance Requirements for the Navy Installation Program*. Before the laboratory released the chemical analytical results, both the sample and laboratory QC data were carefully reviewed in order to verify sample identity, instrument calibration, detection limits, dilution factors, numerical computations, accuracy of transcriptions, and chemical interpretations. Additionally, the QC data were reduced and spike recoveries were included in control charts, and the resulting data were reviewed to ascertain whether they were within the laboratory defined limits for accuracy and precision. The data were compiled into a NEESA Level D data package and any nonconforming data were discussed in the data package cover letter and case narrative.

The Level D data packages were then reviewed and validated by Heartland Environmental Services, Inc., Missouri (Heartland). Data validation is the technical review of a data package using criteria established in the data quality objectives, the quality assurance project plan and guidance documents prepared by the United States Environmental Protection Agency (USEPA) for the validation of organic and inorganic analytical data (USEPA 1990a and 1990b) as specified by NEESA document 20.2-047B. The data review and validation process is independent of the laboratory's checks because it is impossible to repeat the review conducted by the laboratory.

Samples that did not meet the acceptance limit criteria were qualified with a flag; single letter abbreviations that indicate a problem with the data. Data qualifiers used by the validators when amending the data include the following.

U — Undetected. The analyte was not detected above the contract required quantitation limit (CRQL). The "U" designator also is used to qualify laboratory contaminants. The "U" designator is applied to an environmental sample when the laboratory contaminant is detected in an environmental sample at a concentration less than 5 times (10 X for common contaminants) the value of the concentration detected in any corresponding field QC blank, method blank or preparation blanks.

J — Estimated. The analyte was present, but the reported value may not be accurate or precise. The "J" designator is used to qualify an analyte that was present at a concentration between the CRQL and method detection limit (MDL) or the data "failed" some of the analytical validation criteria but did not require rejections of the data. When combined with the U designator, the quantitation limit is estimated.

R — Rejected. Data was rejected by the data validator during comparison of the NEESA Level D data package with the analytical functional guideline criteria. The "R" designator indicates a significant variance in acceptable laboratory performance. Either re-analysis or re-sampling and analysis would be necessary to determine the presence or absence of the target analyte(s).

Once the data were reviewed and validated according to the guidance presented in NEESA document 20.2-047B, the data were evaluated by Heartland using the PARCCs criteria included in the Data Quality Objectives (DQOs) of the Work Plan for Naval Construction Battalion Center (NCBC) Gulfport, Mississippi, dated October 1993. The following sections present a brief description of PARCCs criteria.

Precision. Precision is a measure of the agreement or repeatability of a set of replicate results obtained from duplicate laboratory analyses of samples collected from the same location/depth interval. Precision was calculated from laboratory analytical data and cannot be measured directly. Precision is expressed as the Relative Percent Difference (RPD) between analytical values for two samples divided by the average of their analytical values. Precision is calculated using the expression:

$$RPD = (D1-D2) / (\tfrac{1}{2}(D1+D2)) \times 100$$

D1 and D2 are the reported values for the duplicate sample pair. Precision was evaluated using field duplicate samples and laboratory split samples (for example, MS/MSD samples).

Precision for environmental samples and their duplicates was assessed using a maximum RPD of 20 Percent for water matrices. Precision for MS/MSD/MD samples was assessed by using the target analyte specific RPD criteria for the spiked compounds and the sample duplicates.

Accuracy. Accuracy is a measure of the agreement between an experimental determination and the true value of the parameter being measured. Accuracy can be calculated from the analytical data and was not measured directly. Accuracy is used to identify the bias in a given measurement system (i.e. laboratory conditions, sample matrix, and sampling conditions). Accuracy is assessed by reviewing the Percent Recovery (%R) between the true value of the spike analyte and the actual analytical value. Accuracy is calculated using the equation:

$$\%R = ((A-B)/C) \times 100$$

A = Measured concentration of the spiked analyte.
B = Measured concentration of the spiked compound in the unspiked sample.
C = True concentration of the spiked analyte.

For the organic analyses, each of the samples was spiked with a surrogate compound; and for inorganic analyses, each chosen matrix spike and matrix duplicate pair was spiked with a known reference material before digestion. The recovery of the internals standards was used to assess accuracy for the Dioxin/Furan fraction. Each of these approaches provides a measure of the matrix effects on the analytical accuracy.

Representativeness. Representativeness is a qualitative measure of the degree to which sample data accurately and precisely represent a characteristic environmental condition. Representativeness is a subjective parameter and is used to evaluate the efficacy of the sampling plan design. Representativeness was evaluated using the field and laboratory QC blank sample results. QC blank samples are equipment rinseate blanks, field blanks, trip blanks, laboratory method blanks for organic analysis and laboratory preparation blanks for inorganic analysis. Positive detection of target analytes in the QC blank samples identify contaminants that possibly were introduced to the associated environmental sample during sample collection, transport or laboratory analysis. Representativeness was also evaluated used the defined extraction and analytical holding time requirements set forth in the Work Plan for NCBC Gulfport or the analytical methodology.

Comparability. Comparability is qualitative measure designed to express the confidence with which one data set may be compared to another. Factors that affect comparability are: sample collection and handling techniques, sample matrix type, and analytical method. Comparability is limited by the other PARCC parameters because only when precision and accuracy are known can data sets be compared with confidence.

Completeness. Completeness is defined as the percentage of measurements that are judged to be valid compared to the total number of measurements made. Valid usable data are values that were not qualified as rejected (R qualifier) during data validation. A goal of 85 percent usable data was established in the Work Plan for NCBC, Gulfport, Mississippi. Completeness equals the total number of analytes for each matrix minus the total number of rejected analytes divided by the total number of analytes multiplied by 100.

2.0 PRECISION

The following section describes the evaluation of precision for volatile organic compounds, dioxin/furans, semivolatile organic compounds, polynuclear aromatic hydrocarbons, pesticides and polychlorinated biphenyls (PCBs), organophosphorous pesticides, herbicides, metals and cyanide, and the wet chemistry parameter sulfide. Duplicate samples are evaluated for precision only when contaminants are detected in both the environmental sample and the sample's duplicate. A ND in the RPD column of the spreadsheet indicates that a RPD calculation was not required because one result was a non-detect and the other result was less than the compound/analyte CRQL/CRDL. Environmental samples and their respective duplicates may not exhibit positive results for all compounds found at or near the contract required quantitation limit (CRQL) or detection limit (CRDL) because of low levels of contamination found at a site. Duplicates with Relative Percent Differences (RPDs) within control limits indicate adequate sampling practices and/or good analytical precision. Duplicates with RPDs outside the control limits may result from inappropriate sampling procedures, matrix interferences, or non-homogeneity of the sample matrix. In addition, poor precision can be attributed to deviation(s) from the analytical methodology or to poor reproducibility of target analyte concentrations at or near the required quantitation or detection limits (CRQLs or CRDLs). The acceptance criteria for evaluating precision of field duplicates analytical results is a RPD of 20 for water matrices.

The percent of duplicate samples collected for the analytical parameters and sample matrices was greater than ten percent (10%) for the water matrix as specified in the Work Plan for NCBC Gulfport, Mississippi. The following Sections summarize the evaluation of analytical precision for the water matrix for the following analytical groups:

- GC/MS volatile organic compounds (GC/MS VOCs);
- dioxin/furan compounds (D/Fs);
- semivolatile organic compounds (SVOCs);
- polynuclear aromatic hydrocarbons (PAHs);
- pesticides, PCBs (P/Ps);
- organophosphorous pesticides (OPPs);
- herbicides; and
- metals, cyanide, & sulfide.

Duplicate precision was assessed using both environmental sample and associated duplicates and matrix spike (MS)/matrix spike duplicates (MSDs) pairs for organic fractions, and matrix duplicate pairs (MD pairs) for the metals/cyanide, and sulfide fractions.

Tabulation of the results of assessing duplicate precision and duplicate frequency are presented in Tables 2-1 and 2-2 for the water matrix. The results of the evaluation of precision for MS/MSD samples is provided in Tables 2-3 through 2-12 for the water matrix.

In addition, to assess whether instrument calibration for volatile and semivolatile analytical methods resulted in non-compliant duplicate precision, tables were made of initial and continuing calibration outliers for each sample delivery group (SDG) and are included in Appendix A. Calibration criteria was met or the non-compliance did not result in data qualification in the other organic fractions. Therefore, tables of calibration criteria were not prepared for those fractions. To assess the potential for non-compliance in metals analytical data, caused by physical and/or chemical interferences and indicated by non-compliant serial dilution results, tables were prepared of serial dilution results. These are included in Appendix B.

TABLE 2 - 1

ORGANIC FRACTIONS
WATER SAMPLE AND DUPLICATE PRECISION
NCBC GULFPORT HO

VOLATILES

SDG	SAMPLE ID	MATRIX	NO. ASSC. SAMPLES	COMPOUND	SAMPLE CONC.	DUP CONC	MAX RPD	RPD
R8548	GPTH02-1	WATER	4	ACETONE	6	0	20%	ND
				TRICHLOROFLUOROMETHANE	0	2	20%	ND
	TOTAL SAMPLES		4					

SEMIVOLATILES

SDG	SAMPLE ID	MATRIX	NO. ASSC. SAMPLES	COMPOUND	SAMPLE CONC.	DUP CONC	MAX RPD	RPD
R8548	GPTH02-1	WATER	4	NO COMPOUNDS DETECTED				
	TOTAL SAMPLES		4					

DIOXIN/FURANS

SDG	SAMPLE ID	MATRIX	NO. ASSC. SAMPLES	COMPOUND	SAMPLE CONC.	DUP CONC	MAX RPD	RPD
R8548	GPTH02-1	WATER	4	OCDD	44.7	0	20%	200%
	TOTAL SAMPLES		4					

POLYNUCLEAR AROMATIC HYDROCARBONS

SDG	SAMPLE ID	MATRIX	NO. ASSC. SAMPLES	COMPOUND	SAMPLE CONC.	DUP CONC	MAX RPD	RPD
R8548	GPTH02-1	WATER	4	NO COMPOUNDS DETECTED				
	TOTAL SAMPLES		4					

PESTICIDES/PCBS/KEPONE

SDG	SAMPLE ID	MATRIX	NO. ASSC. SAMPLES	COMPOUND	SAMPLE CONC.	DUP CONC	MAX RPD	RPD
R8548	GPTH02-1	WATER	4	NO COMPOUNDS DETECTED				
	TOTAL SAMPLES		4					

TABLE 2 - 1, CONTINUED

ORGANIC FRACTIONS
WATER SAMPLE AND DUPLICATE PRECISION
NCBC GULFPORT HO

ORGANOPHOSPHOROUS PESTICIDES

SDG	SAMPLE ID	MATRIX	NO. ASSC. SAMPLES	COMPOUND	SAMPLE CONC.	DUP CONC	MAX RPD	RPD
R8548	GPTH02-1	WATER	4	NO COMPOUNDS DETECTED			20%	
	TOTAL SAMPLES		4					

CHLORINATED HERBICIDES

SDG	SAMPLE ID	MATRIX	NO. ASSC. SAMPLES	COMPOUND	SAMPLE CONC.	DUP CONC	MAX RPD	RPD
R8548	GPTH02-1	WATER	4	NO COMPOUNDS DETECTED			20%	
	TOTAL SAMPLES		4					

TABLE 2 - 1, CONTINUED

ORGANIC FRACTIONS
WATER SAMPLE AND DUPLICATE PRECISION
NCBC GULFPORT HO

VOLATILES

% OF DUPLICATES COLLECTED	RPD IN	RPD OUT	% WITHIN RPD LIMIT
25.0%	2	0	100.0%

SEMI VOLATILES

% OF DUPLICATES COLLECTED	RPD IN	RPD OUT	% WITHIN RPD LIMIT
25.0%	1	0	100.0%

DIOXIN/FURANS

% OF DUPLICATES COLLECTED	RPD IN	RPD OUT	% WITHIN RPD LIMIT
25.0%	0	1	0.0%

POLYNUCLEAR AROMATIC HYDROCARBONS

% OF DUPLICATES COLLECTED	RPD IN	RPD OUT	% WITHIN RPD LIMIT
25.0%	1	0	100.0%

PESTICIDES/PCBS

% OF DUPLICATES COLLECTED	RPD IN	RPD OUT	% WITHIN RPD LIMIT
25.0%	1	0	100.0%

ND - INDICATES RPD CALCULATION NOT REQUIRED BECAUSE ONE (1) RESULT IS NON-DETECT AND THE OTHER RESULT IS BELOW THE CRQL

TABLE 2 - 1, CONTINUED

ORGANIC FRACTIONS
WATER SAMPLE AND DUPLICATE PRECISION
NCBC GULFPORT HO

ORGANOPHOSPHOROUS PESTICIDES

% OF DUPLICATES COLLECTED	RPD IN	RPD OUT	% WITHIN RPD LIMIT
25.0%	1	0	100.0%

CHLORINATED HERBICIDES

% OF DUPLICATES COLLECTED	RPD IN	RPD OUT	% WITHIN RPD LIMIT
25.0%	1	0	100.0%

ND - INDICATES RPD CALCULATION NOT REQUIRED BECAUSE ONE (1) RESULT IS NON-DETECT AND THE OTHER RESULT IS BELOW THE CRQL

TABLE 2 - 2

INORGANIC FRACTIONS
WATER SAMPLE AND DUPLICATE PRECISION
NCBC GULFPORT HO

METALS

SDG	SAMPLE ID	MATRIX	NO. ASSC. SAMPLES	COMPOUND	SAMPLE CONC.	DUP CONC	MAX RPD	RPD
R8548	GPTH02-1	WATER	4	ARSENIC	24.3	23.6	20%	3%
				BARIUM	218	222	20%	2%
				BERYLLIUM	1.7	2.1	20%	21%
				CADMIUM	1.3	0	20%	ND
				CHROMIUM	58	65	20%	11%
				COBALT	15.9	15.8	20%	1%
				COPPER	23.8	25.2	20%	6%
				LEAD	23.2	24.7	20%	6%
				MERCURY	0.12	0	20%	ND
				NICKEL	38.7	45.6	20%	16%
				SELENIUM	2.4	1.8	20%	29%
				VANADIUM	63.7	65.2	20%	2%
				ZINC	67.7	66.2	20%	2%
	TOTAL SAMPLES		4					

CYANIDE

SDG	SAMPLE ID	MATRIX	NO. ASSC. SAMPLES	COMPOUND	SAMPLE CONC.	DUP CONC	MAX RPD	RPD
R8548	GPTH02-1	WATER	4	NO COMPOUND DETECTED				
	TOTAL SAMPLES		4					

SULFIDE

SDG	SAMPLE ID	MATRIX	NO. ASSC. SAMPLES	COMPOUND	SAMPLE CONC.	DUP CONC	MAX RPD	RPD
R8548	GPTH02-1	WATER	4	NO COMPOUND DETECTED				
	TOTAL SAMPLES		4					

TABLE 2 - 2

INORGANIC FRACTIONS
WATER SAMPLE AND DUPLICATE PRECISION
NCBC GULFPORT HO

METALS

% OF DUPLICATE COLLECTED	RPD IN	RPD OUT	% WITHIN RPD LIMIT
25.0%	11	2	85%

CYANIDE

% OF DUPLICATE COLLECTED	RPD IN	RPD OUT	% WITHIN RPD LIMIT
25.0%	1	0	100.0%

SULFIDE

% OF DUPLICATE COLLECTED	RPD IN	RPD OUT	% WITHIN RPD LIMIT
25.0%	1	0	100.0%

ND - INDICATES RPD CALCULATION NOT REQUIRED BECAUSE ONE (1) RESULT IS NON-DETECT AND THE OTHER RESULT IS BELOW THE CRDL.

TABLE 2 - 3

GC/MS VOLATILE ORGANICS COMPOUNDS
WATER SAMPLE MATRIX SPIKE/MATRIX SPIKE DUPLICATES
NCBC GULFPORT HO

MS = MATRIX SPIKE *SAMPLE GPTH02-1*		SDG R8548		
MSD = MATRIX SPIKE DUPLICATE		MS	MSD	
RPD = RELATIVE PERCENT DIFFERENCE		%R	%R	%RPD
VOA COMPOUNDS	UNITS			
1,1-DICHLOROETHENE	ug/L	90	101	12
TRICHLOROETHENE	ug/L	90	99	10
BENZENE	ug/L	91	102	11
TOLUENE	ug/L	87	102	15*
CHLOROBENZENE	ug/L	88	100	13

*** DENOTES VALUE NOT WITHIN QA/QC ADVISORY LIMITS**

CORRESPONDING SDG'S AND ASSOCIATED SAMPLES

R8548: GPTH02-1, GPTH02-2, GPTH02-3, GPTH02-4, GPTH02-1D

COMPOUND	ADVISORY LIMITS		RPD
	%R WATER		WATER
1,1-DICHLOROETHENE	61%-145%		14
TRICHLOROETHENE	71%-120%		14
BENZENE	76%-127%		11
TOLUENE	76%-125%		13
CHLOROBENZENE	75%-130%		13

TABLE 2 - 4

DIOXIN/FURAN
WATER SAMPLE MATRIX SPIKE/ DUPLICATES
NCBC GULFPORT HO

MS = MATRIX SPIKE *SAMPLE GPTH02-1*		SDG R8548		
MSD = MATRIX SPIKE DUPLICATE		MS	MSD	
RPD = RELATIVE PERCENT DIFFERENCE		%R	%R	RPD
DIOXIN/FURAN CONGENERS	UNITS			
2378-TCDD	ug/L	157	102	*42.4
2378-TCDF	ug/L	106	116	9.5
12378-P5CDD	ug/L	94.8	94.8	0.1
12378-P5CDF	ug/L	87.6	97.6	10.8
23478-P5CDF	ug/L	103	91.2	12.2
123478-H6CDD	ug/L	112	100	11.9
123789-H6CDD	ug/L	89.2	101	12.6
123678-H6CDD	ug/L	132	102	26.3
123478-H6CDF	ug/L	93.6	104	10.3
123678-H6CDF	ug/L	86.4	92.8	7.1
123789-H6CDF	ug/L	95.6	94.4	1.3
234678-H6CDF	ug/L	100	100	0.6
1234678-H7CDD	ug/L	99.2	97.2	1.9
1234678-H7CDF	ug/L	91.6	112	20.3
1234789-H7CDF	ug/L	104	114	9.5
OCDD	ug/L	89.8	101	15.3
OCDF	ug/L	*256	*318	21.6

*** DENOTES VALUE NOT WITHIN QA/QC ADVISORY LIMITS**

CORRESPONDING SDG'S AND ASSOCIATED SAMPLES

R8548: GPTH02-1, GPTH02-1D, GPTH02-2, GPTH02-3, GPTH02-4

QC LIMITS WERE NOT PROVIDED BY THE LABORATORY.

TABLE 2 - 5

SEMIVOLATILE ORGANICS COMPOUNDS
WATER SAMPLE MATRIX SPIKE/MATRIX SPIKE DUPLICATES
NCBC GULFPORT HO

MS = MATRIX SPIKE *SAMPLE GPTHO2-1*		SDG R8548		
MSD = MATRIX SPIKE DUPLICATE		MS	MSD	
RPD = RELATIVE PERCENT DIFFERENCE		%R	%R	%RPD
SVOA COMPOUNDS	UNITS			
PHENOL	ug/L	70	77	10
2-CHLOROPHENOL	ug/L	74	82	10
1,4-DICHLOROBENZENE	ug/L	80	71	12
N-NITROSO-DI-N-PROP.(1)	ug/L	75	73	3
1,2,4-TRICHLOROBENZENE	ug/L	80	77	4
4-CHLORO-3-METHYLPHENOL	ug/L	74	90	20
ACENAPHTHENE	ug/L	84	79	6
4-NITROPHENOL	ug/L	103*	124*	19
2,4-DINITROTOLUENE	ug/L	45	47	4
PENTACHLOROPHENOL	ug/L	59	69	16
PYRENE	ug/L	68	65	5

*** DENOTES VALUE NOT WITHIN QA/QC ADVISORY LIMITS**

CORRESPONDING SDG'S AND ASSOCIATED SAMPLES

R8548: GPTH02-1, GPTH02-2, GPTH02-3, GPTH02-4, GPTH02-1D

COMPOUND	ADVISORY LIMITS	RPD
	% R WATER	WATER
PHENOL	12%-89%	42
2-CHLOROPHENOL	27%-123%	40
1,4-DICHLOROBENZENE	36%-97%	28
N-NITROSO-DI-N-PROP.(1)	41%-116%	38
1,2,4-TRICHLOROBENZENE	39%-98%	28
4-CHLORO-3-METHYLPHENOL	23%-97%	42
ACENAPHTHENE	46%-118%	31
4-NITROPHENOL	10%-80%	50
2,4-DINITROTOLUENE	24%-96%	38
PENTACHLOROPHENOL	9%-103%	50
PYRENE	26%-127%	31

TABLE C - 9
TOTAL METALS - REJECTED DATA
NCBC GULFPORT HO

				# OF COMPOUNDS REJECTED PER MATIX	
SDG	# SAMPLES/MATRIX			QC	GW
	QC	GW			
27176	4	4		3	0
GRAND TOTAL	4	4		3	0
COMPLETION GOAL (>85%)				95.6%	100.0%

OVERALL COMPLETENESS
97.8%

MATRIX KEY

QC = QC SAMPLES
GW = GROUND WATER SAMPLES

*** 17 TARGET ANALYTES PER SAMPLE**

TABLE C - 10
CYANIDE - REJECTED DATA
NCBC GULFPORT HO

SDG	# SAMPLES/MATRIX			# OF COMPOUNDS REJECTED PER MATIX	
	QC	GW		QC	GW
27176	4	4		0	0
GRAND TOTAL	4	4		0	0
COMPLETION GOAL (>85%)				100.0%	100.0%

OVERALL COMPLETENESS
100.0%

MATRIX KEY

QC = QC SAMPLES
GW = GROUND WATER SAMPLES

*** 1 TARGET COMPOUND PER SAMPLE**

TABLE C - 11
SULFIDE - REJECTED DATA
NCBC GULFPORT HO

SDG	# SAMPLES/MATRIX			# OF COMPOUNDS REJECTED PER MATIX	
	QC	GW		QC	GW
27176	4	4		0	0
GRAND TOTAL	4	4		0	0
COMPLETION GOAL (>85%)				100.0%	100.0%

OVERALL COMPLETENESS
100.0%

MATRIX KEY

QC = QC SAMPLES
GW = GROUND WATER SAMPLES

*** 1 TARGET COMPOUND PER SAMPLE**

Groundwater Sampling Event No. 2

PRECISION, ACCURACY, REPRESENTATIVENESS, COMPARABILITY, AND COMPLETENESS FOR NCBC GULFPORT HERBICIDE ORANGE STORAGE FACILITY

NAVAL CONSTRUCTION BATTALION CENTER GULFPORT, MISSISSIPPI

Prepared by:
Heartland Environmental Services, Inc.
P.O. Box 163
St. Peters, Missouri 63376

Prepared for:

ABB Environmental Services, Inc.
1400 Centerpoint Blvd., Suite 158
Knoxville, Tennessee 37922-1968

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Calibration Criteria Summary

NCBC Gulfport HO

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Serial Dilution Summary

NCBC Gulfport HO

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NCBC Gulfport HO

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C-4	Polynuclear Aromatic Hydrocarbons, Rejected Data Summary	Appendix C
C-5	Pesticide/PCBs, Rejected Data Summary	Appendix C
C-6	Organophosphorous Pesticides, Rejected Data Summary	Appendix C
C-7	Herbicides, Rejected Data Summary	Appendix C
C-8	Kepone, Rejected Data Summary	Appendix C
C-9	Metals, Rejected Data Summary	Appendix C
C-10	Cyanide, Rejected Data Summary	Appendix C
C-11	Sulfide, Rejected Data Summary	Appendix C

1.0 INTRODUCTION

Prior to evaluating the data for precision, accuracy, representativeness, comparability, and completeness (PARCC) criteria the laboratory reviewed the data package and the data also were independently reviewed and validated using the Naval Energy and Environmental and Support Activity (NEESA) guidance document 20.2-047B (1988) entitled, *Sampling and Chemical Analysis Quality Assurance Requirements for the Navy Installation Program*. Before the laboratory released the chemical analytical results, both the sample and laboratory QC data were carefully reviewed in order to verify sample identity, instrument calibration, detection limits, dilution factors, numerical computations, accuracy of transcriptions, and chemical interpretations. Additionally, the QC data were reduced and spike recoveries were included in control charts, and the resulting data were reviewed to ascertain whether they were within the laboratory defined limits for accuracy and precision. The data were compiled into a NEESA Level D data package and any nonconforming data were discussed in the data package cover letter and case narrative.

The Level D data packages were then reviewed and validated by Heartland Environmental Services, Inc., Missouri (Heartland). Data validation is the technical review of a data package using criteria established in the data quality objectives, the quality assurance project plan and guidance documents prepared by the United States Environmental Protection Agency (USEPA) for the validation of organic and inorganic analytical data (USEPA 1990a and 1990b) as specified by NEESA document 20.2-047B. The data review and validation process is independent of the laboratory's checks because it is impossible to repeat the review conducted by the laboratory.

Samples that did not meet the acceptance limit criteria were qualified with a flag; single letter abbreviations that indicate a problem with the data. Data qualifiers used by the validators when amending the data include the following.

U — Undetected. The analyte was not detected above the contract required quantitation limit (CRQL). The "U" designator also is used to qualify laboratory contaminants. The "U" designator is applied to an environmental sample when the laboratory contaminant is detected in an environmental sample at a concentration less than 5 times (10 X for common contaminants) the value of the concentration detected in any corresponding field QC blank, method blank or preparation blanks.

J — Estimated. The analyte was present, but the reported value may not be accurate or precise. The "J" designator is used to qualify an analyte that was present at a concentration between the CRQL and method detection limit (MDL) or the data "failed" some of the analytical validation criteria but did not require rejections of the data. When combined with the U designator, the quantitation limit is estimated.

R — Rejected. Data was rejected by the data validator during comparison of the NEESA Level D data package with the analytical functional guideline criteria. The "R" designator indicates a significant variance in acceptable laboratory performance. Either re-analysis or re-sampling and analysis would be necessary to determine the presence or absence of the target analyte(s).

Once the data were reviewed and validated according to the guidance presented in NEESA document 20.2-047B, the data were evaluated by Heartland using the PARCCs criteria included in the Data Quality Objectives (DQOs) of the Work Plan for Naval Construction Battalion Center (NCBC) Gulfport, Mississippi, dated October 1993. The following sections present a brief description of PARCCs criteria.

Precision. Precision is a measure of the agreement or repeatability of a set of replicate results obtained from duplicate laboratory analyses of samples collected from the same location/depth interval. Precision was calculated from laboratory analytical data and cannot be measured directly. Precision is expressed as the Relative Percent Difference (RPD) between analytical values for two samples divided by the average of their analytical values. Precision is calculated using the expression:

$$RPD = (D1-D2) / (\tfrac{1}{2}(D1 + D2)) \times 100$$

D1 and D2 are the reported values for the duplicate sample pair. Precision was evaluated using field duplicate samples and laboratory split samples (for example, MS/MSD samples).

Precision for environmental samples and their duplicates was assessed using a maximum RPD of 20 Percent for water matrices. Precision for MS/MSD/MD samples was assessed by using the target analyte specific RPD criteria for the spiked compounds and the sample duplicates.

Accuracy. Accuracy is a measure of the agreement between an experimental determination and the true value of the parameter being measured. Accuracy can be calculated from the analytical data and was not measured directly. Accuracy is used to identify the bias in a given measurement system (i.e. laboratory conditions, sample matrix, and sampling conditions). Accuracy is assessed by reviewing the Percent Recovery (%R) between the true value of the spike analyte and the actual analytical value. Accuracy is calculated using the equation:

$$\%R = ((A-B)/C) \times 100$$

A = Measured concentration of the spiked analyte.
B = Measured concentration of the spiked compound in the unspiked sample.
C = True concentration of the spiked analyte.

For the organic analyses, each of the samples was spiked with a surrogate compound; and for inorganic analyses, each chosen matrix spike and matrix duplicate pair was spiked with a known reference material before digestion. The recovery of the internals standards was used to assess accuracy for the Dioxin/Furan fraction. Each of these approaches provides a measure of the matrix effects on the analytical accuracy.

Representativeness. Representativeness is a qualitative measure of the degree to which sample data accurately and precisely represent a characteristic environmental condition. Representativeness is a subjective parameter and is used to evaluate the efficacy of the sampling plan design. Representativeness was evaluated using the field and laboratory QC blank sample results. QC blank samples are equipment rinseate blanks, field blanks, trip blanks, laboratory method blanks for organic analysis and laboratory preparation blanks for inorganic analysis. Positive detection of target analytes in the QC blank samples identify contaminants that possibly were introduced to the associated environmental sample during sample collection, transport or laboratory analysis. Representativeness was also evaluated used the defined extraction and analytical holding time requirements set forth in the Work Plan for NCBC Gulfport or the analytical methodology.

Comparability. Comparability is qualitative measure designed to express the confidence with which one data set may be compared to another. Factors that affect comparability are: sample collection and handling techniques, sample matrix type, and analytical method. Comparability is limited by the other PARCC parameters because only when precision and accuracy are known can data sets be compared with confidence.

Completeness. Completeness is defined as the percentage of measurements that are judged to be valid compared to the total number of measurements made. Valid usable data are values that were not qualified as rejected (R qualifier) during data validation. A goal of 85 percent usable data was established in the Work Plan for NCBC, Gulfport, Mississippi. Completeness equals the total number of analytes for each matrix minus the total number of rejected analytes divided by the total number of analytes multiplied by 100.

2.0 PRECISION

The following section describes the evaluation of precision for volatile organic compounds, dioxin/furans, semivolatile organic compounds, polynuclear aromatic hydrocarbons, pesticides and polychlorinated biphenyls (PCBs), organophosphorous pesticides, herbicides, metals and cyanide, and the wet chemistry parameter sulfide. Duplicate samples are evaluated for precision only when contaminants are detected in both the environmental sample and the sample's duplicate. A ND in the RPD column of the spreadsheet indicates that a RPD calculation was not required because one result was a non-detect and the other result was less than the compound/analyte CRQL/CRDL. Environmental samples and their respective duplicates may not exhibit positive results for all compounds found at or near the contract required quantitation limit (CRQL) or detection limit (CRDL) because of low levels of contamination found at a site. Duplicates with Relative Percent Differences (RPDs) within control limits indicate adequate sampling practices and/or good analytical precision. Duplicates with RPDs outside the control limits may result from inappropriate sampling procedures, matrix interferences, or non-homogeneity of the sample matrix. In addition, poor precision can be attributed to deviation(s) from the analytical methodology or to poor reproducibility of target analyte concentrations at or near the required quantitation or detection limits (CRQLs or CRDLs). The acceptance criteria for evaluating precision of field duplicates analytical results is a RPD of 20 for water matrices.

The percent of duplicate samples collected for the analytical parameters and sample matrices was greater than ten percent (10%) for the water matrix as specified in the Work Plan for NCBC Gulfport, Mississippi. The following Sections summarize the evaluation of analytical precision for the water matrix for the following analytical groups:

- GC/MS volatile organic compounds (GC/MS VOCs);
- dioxin/furan compounds (D/Fs);
- semivolatile organic compounds (SVOCs);
- polynuclear aromatic hydrocarbons (PAHs);
- pesticides, PCBs (P/Ps);
- organophosphorous pesticides (OPPs);
- herbicides; and
- metals, cyanide, & sulfide.

Duplicate precision was assessed using both environmental sample and associated duplicates and matrix spike (MS)/matrix spike duplicates (MSDs) pairs for organic fractions, and matrix duplicate pairs (MD pairs) for the metals/cyanide, and sulfide fractions.

Tabulation of the results of assessing duplicate precision and duplicate frequency are presented in Tables 2-1 and 2-2 for the water matrix. The results of the evaluation of precision for MS/MSD samples is provided in Tables 2-3 through 2-12 for the water matrix.

In addition, to assess whether instrument calibration for volatile and semivolatile analytical methods resulted in non-compliant duplicate precision, tables were made of initial and continuing calibration outliers for each sample delivery group (SDG) and are included in Appendix A. Calibration criteria was met or the non-compliance did not result in data qualification in the other organic fractions. Therefore, tables of calibration criteria were not prepared for those fractions. To assess the potential for non-compliance in metals analytical data, caused by physical and/or chemical interferences and indicated by non-compliant serial dilution results, tables were prepared of serial dilution results. These are included in Appendix B.

TABLE 2 - 1

ORGANIC FRACTIONS
WATER SAMPLE AND DUPLICATE PRECISION
NCBC GULFPORT HO

VOLATILES

SDG	SAMPLE ID	MATRIX	NO. ASSC. SAMPLES	COMPOUND	SAMPLE CONC.	DUP CONC	MAX RPD	RPD
R8548	GPTH02-1	WATER	4	ACETONE	6	0	20%	ND
				TRICHLOROFLUOROMETHANE	0	2	20%	ND
	TOTAL SAMPLES		4					

SEMIVOLATILES

SDG	SAMPLE ID	MATRIX	NO. ASSC. SAMPLES	COMPOUND	SAMPLE CONC.	DUP CONC	MAX RPD	RPD
R8548	GPTH02-1	WATER	4	NO COMPOUNDS DETECTED				
	TOTAL SAMPLES		4					

DIOXIN/FURANS

SDG	SAMPLE ID	MATRIX	NO. ASSC. SAMPLES	COMPOUND	SAMPLE CONC.	DUP CONC	MAX RPD	RPD
R8548	GPTH02-1	WATER	4	OCDD	44.7	0	20%	200%
	TOTAL SAMPLES		4					

POLYNUCLEAR AROMATIC HYDROCARBONS

SDG	SAMPLE ID	MATRIX	NO. ASSC. SAMPLES	COMPOUND	SAMPLE CONC.	DUP CONC	MAX RPD	RPD
R8548	GPTH02-1	WATER	4	NO COMPOUNDS DETECTED				
	TOTAL SAMPLES		4					

PESTICIDES/PCBS/KEPONE

SDG	SAMPLE ID	MATRIX	NO. ASSC. SAMPLES	COMPOUND	SAMPLE CONC.	DUP CONC	MAX RPD	RPD
R8548	GPTH02-1	WATER	4	NO COMPOUNDS DETECTED				
	TOTAL SAMPLES		4					

TABLE 2 - 1, CONTINUED

ORGANIC FRACTIONS
WATER SAMPLE AND DUPLICATE PRECISION
NCBC GULFPORT HO

ORGANOPHOSPHOROUS PESTICIDES

SDG	SAMPLE ID	MATRIX	NO. ASSC. SAMPLES	COMPOUND	SAMPLE CONC.	DUP CONC	MAX RPD	RPD
R8548	GPTH02-1	WATER	4	NO COMPOUNDS DETECTED			20%	
	TOTAL SAMPLES		4					

CHLORINATED HERBICIDES

SDG	SAMPLE ID	MATRIX	NO. ASSC. SAMPLES	COMPOUND	SAMPLE CONC.	DUP CONC	MAX RPD	RPD
R8548	GPTH02-1	WATER	4	NO COMPOUNDS DETECTED			20%	
	TOTAL SAMPLES		4					

TABLE 2 - 1, CONTINUED

ORGANIC FRACTIONS
WATER SAMPLE AND DUPLICATE PRECISION
NCBC GULFPORT HO

VOLATILES

% OF DUPLICATES COLLECTED	RPD IN	RPD OUT	% WITHIN RPD LIMIT
25.0%	2	0	100.0%

SEMI VOLATILES

% OF DUPLICATES COLLECTED	RPD IN	RPD OUT	% WITHIN RPD LIMIT
25.0%	1	0	100.0%

DIOXIN/FURANS

% OF DUPLICATES COLLECTED	RPD IN	RPD OUT	% WITHIN RPD LIMIT
25.0%	0	1	0.0%

POLYNUCLEAR AROMATIC HYDROCARBONS

% OF DUPLICATES COLLECTED	RPD IN	RPD OUT	% WITHIN RPD LIMIT
25.0%	1	0	100.0%

PESTICIDES/PCBS

% OF DUPLICATES COLLECTED	RPD IN	RPD OUT	% WITHIN RPD LIMIT
25.0%	1	0	100.0%

ND - INDICATES RPD CALCULATION NOT REQUIRED BECAUSE ONE (1) RESULT IS NON-DETECT AND THE OTHER RESULT IS BELOW THE CRQL

TABLE 2 - 1, CONTINUED

ORGANIC FRACTIONS
WATER SAMPLE AND DUPLICATE PRECISION
NCBC GULFPORT HO

ORGANOPHOSPHOROUS PESTICIDES

% OF DUPLICATES COLLECTED	RPD IN	RPD OUT	% WITHIN RPD LIMIT
25.0%	1	0	100.0%

CHLORINATED HERBICIDES

% OF DUPLICATES COLLECTED	RPD IN	RPD OUT	% WITHIN RPD LIMIT
25.0%	1	0	100.0%

ND - INDICATES RPD CALCULATION NOT REQUIRED BECAUSE ONE (1) RESULT IS NON-DETECT AND THE OTHER RESULT IS BELOW THE CRQL

TABLE 2 - 2

INORGANIC FRACTIONS
WATER SAMPLE AND DUPLICATE PRECISION
NCBC GULFPORT HO

METALS

SDG	SAMPLE ID	MATRIX	NO. ASSC. SAMPLES	COMPOUND	SAMPLE CONC.	DUP CONC	MAX RPD	RPD
R8548	GPTH02-1	WATER	4	ARSENIC	24.3	23.6	20%	3%
				BARIUM	218	222	20%	2%
				BERYLLIUM	1.7	2.1	20%	21%
				CADMIUM	1.3	0	20%	ND
				CHROMIUM	58	65	20%	11%
				COBALT	15.9	15.8	20%	1%
				COPPER	23.8	25.2	20%	6%
				LEAD	23.2	24.7	20%	6%
				MERCURY	0.12	0	20%	ND
				NICKEL	38.7	45.6	20%	16%
				SELENIUM	2.4	1.8	20%	29%
				VANADIUM	63.7	65.2	20%	2%
				ZINC	67.7	66.2	20%	2%
	TOTAL SAMPLES		4					

CYANIDE

SDG	SAMPLE ID	MATRIX	NO. ASSC. SAMPLES	COMPOUND	SAMPLE CONC.	DUP CONC	MAX RPD	RPD
R8548	GPTH02-1	WATER	4	NO COMPOUND DETECTED				
	TOTAL SAMPLES		4					

SULFIDE

SDG	SAMPLE ID	MATRIX	NO. ASSC. SAMPLES	COMPOUND	SAMPLE CONC.	DUP CONC	MAX RPD	RPD
R8548	GPTH02-1	WATER	4	NO COMPOUND DETECTED				
	TOTAL SAMPLES		4					

TABLE 2 - 2

INORGANIC FRACTIONS
WATER SAMPLE AND DUPLICATE PRECISION
NCBC GULFPORT HO

METALS

% OF DUPLICATE COLLECTED	RPD IN	RPD OUT	% WITHIN RPD LIMIT
25.0%	11	2	85%

CYANIDE

% OF DUPLICATE COLLECTED	RPD IN	RPD OUT	% WITHIN RPD LIMIT
25.0%	1	0	100.0%

SULFIDE

% OF DUPLICATE COLLECTED	RPD IN	RPD OUT	% WITHIN RPD LIMIT
25.0%	1	0	100.0%

ND - INDICATES RPD CALCULATION NOT REQUIRED BECAUSE ONE (1) RESULT IS NON-DETECT AND THE OTHER RESULT IS BELOW THE CRDL.

TABLE 2 - 3

GC/MS VOLATILE ORGANICS COMPOUNDS
WATER SAMPLE MATRIX SPIKE/MATRIX SPIKE DUPLICATES
NCBC GULFPORT HO

MS = MATRIX SPIKE *SAMPLE GPTH02-1*		SDG R8548		
MSD = MATRIX SPIKE DUPLICATE		MS	MSD	
RPD = RELATIVE PERCENT DIFFERENCE		%R	%R	%RPD
VOA COMPOUNDS	UNITS			
1,1-DICHLOROETHENE	ug/L	90	101	12
TRICHLOROETHENE	ug/L	90	99	10
BENZENE	ug/L	91	102	11
TOLUENE	ug/L	87	102	15*
CHLOROBENZENE	ug/L	88	100	13

*** DENOTES VALUE NOT WITHIN QA/QC ADVISORY LIMITS**

CORRESPONDING SDG'S AND ASSOCIATED SAMPLES

R8548: GPTH02-1, GPTH02-2, GPTH02-3, GPTH02-4, GPTH02-1D

COMPOUND	ADVISORY LIMITS		RPD
	%R WATER		WATER
1,1-DICHLOROETHENE	61%-145%		14
TRICHLOROETHENE	71%-120%		14
BENZENE	76%-127%		11
TOLUENE	76%-125%		13
CHLOROBENZENE	75%-130%		13

TABLE 2 - 4

DIOXIN/FURAN
WATER SAMPLE MATRIX SPIKE/ DUPLICATES
NCBC GULFPORT HO

MS = MATRIX SPIKE *SAMPLE GPTH02-1*		SDG R8548		
MSD = MATRIX SPIKE DUPLICATE		MS	MSD	
RPD = RELATIVE PERCENT DIFFERENCE		%R	%R	RPD
DIOXIN/FURAN CONGENERS	UNITS			
2378-TCDD	ug/L	157	102	*42.4
2378-TCDF	ug/L	106	116	9.5
12378-P5CDD	ug/L	94.8	94.8	0.1
12378-P5CDF	ug/L	87.6	97.6	10.8
23478-P5CDF	ug/L	103	91.2	12.2
123478-H6CDD	ug/L	112	100	11.9
123789-H6CDD	ug/L	89.2	101	12.6
123678-H6CDD	ug/L	132	102	26.3
123478-H6CDF	ug/L	93.6	104	10.3
123678-H6CDF	ug/L	86.4	92.8	7.1
123789-H6CDF	ug/L	95.6	94.4	1.3
234678-H6CDF	ug/L	100	100	0.6
1234678-H7CDD	ug/L	99.2	97.2	1.9
1234678-H7CDF	ug/L	91.6	112	20.3
1234789-H7CDF	ug/L	104	114	9.5
OCDD	ug/L	89.8	101	15.3
OCDF	ug/L	*256	*318	21.6

*** DENOTES VALUE NOT WITHIN QA/QC ADVISORY LIMITS**

CORRESPONDING SDG'S AND ASSOCIATED SAMPLES

R8548: GPTH02-1, GPTH02-1D, GPTH02-2, GPTH02-3, GPTH02-4

QC LIMITS WERE NOT PROVIDED BY THE LABORATORY.

TABLE 2 - 5

SEMIVOLATILE ORGANICS COMPOUNDS
WATER SAMPLE MATRIX SPIKE/MATRIX SPIKE DUPLICATES
NCBC GULFPORT HO

MS = MATRIX SPIKE *SAMPLE GPTHO2-1*		SDG R8548		
MSD = MATRIX SPIKE DUPLICATE		MS	MSD	
RPD = RELATIVE PERCENT DIFFERENCE		%R	%R	%RPD
SVOA COMPOUNDS	UNITS			
PHENOL	ug/L	70	77	10
2-CHLOROPHENOL	ug/L	74	82	10
1,4-DICHLOROBENZENE	ug/L	80	71	12
N-NITROSO-DI-N-PROP.(1)	ug/L	75	73	3
1,2,4-TRICHLOROBENZENE	ug/L	80	77	4
4-CHLORO-3-METHYLPHENOL	ug/L	74	90	20
ACENAPHTHENE	ug/L	84	79	6
4-NITROPHENOL	ug/L	103*	124*	19
2,4-DINITROTOLUENE	ug/L	45	47	4
PENTACHLOROPHENOL	ug/L	59	69	16
PYRENE	ug/L	68	65	5

*** DENOTES VALUE NOT WITHIN QA/QC ADVISORY LIMITS**

CORRESPONDING SDG'S AND ASSOCIATED SAMPLES

R8548: GPTH02-1, GPTH02-2, GPTH02-3, GPTH02-4, GPTH02-1D

COMPOUND	ADVISORY LIMITS	RPD
	% R WATER	WATER
PHENOL	12%-89%	42
2-CHLOROPHENOL	27%-123%	40
1,4-DICHLOROBENZENE	36%-97%	28
N-NITROSO-DI-N-PROP.(1)	41%-116%	38
1,2,4-TRICHLOROBENZENE	39%-98%	28
4-CHLORO-3-METHYLPHENOL	23%-97%	42
ACENAPHTHENE	46%-118%	31
4-NITROPHENOL	10%-80%	50
2,4-DINITROTOLUENE	24%-96%	38
PENTACHLOROPHENOL	9%-103%	50
PYRENE	26%-127%	31

TABLE 2 - 5, CONTINUED

SEMIVOLATILE ORGANICS COMPOUNDS
WATER SAMPLE MATRIX SPIKE/MATRIX SPIKE DUPLICATES
NCBC GULFPORT HO

MS = MATRIX SPIKE MSD = MATRIX SPIKE DUPLICATE RPD = RELATIVE PERCENT DIFFERENCE	*SAMPLE GPTHO2-1RE*	SDG R8548		
		MS	MSD	
		%R	%R	%RPD
SVOA COMPOUNDS	UNITS			
PHENOL	ug/L	74	84	13
2-CHLOROPHENOL	ug/L	78	88	12
1,4-DICHLOROBENZENE	ug/L	70	81	15
N-NITROSO-DI-N-PROP.(1)	ug/L	71	85	18
1,2,4-TRICHLOROBENZENE	ug/L	76	86	12
4-CHLORO-3-METHYLPHENOL	ug/L	81	92	13
ACENAPHTHENE	ug/L	81	92	13
4-NITROPHENOL	ug/L	110*	126*	14
2,4-DINITROTOLUENE	ug/L	61	66	8
PENTACHLOROPHENOL	ug/L	77	90	16
PYRENE	ug/L	86	97	12

*** DENOTES VALUE NOT WITHIN QA/QC ADVISORY LIMITS**

CORRESPONDING SDG'S AND ASSOCIATED SAMPLES

R8548: GPTH02-1RE, GPTH02-1DRE

COMPOUND	ADVISORY LIMITS	RPD
	% R WATER	WATER
PHENOL	12%-89%	42
2-CHLOROPHENOL	27%-123%	40
1,4-DICHLOROBENZENE	36%-97%	28
N-NITROSO-DI-N-PROP.(1)	41%-116%	38
1,2,4-TRICHLOROBENZENE	39%-98%	28
4-CHLORO-3-METHYLPHENOL	23%-97%	42
ACENAPHTHENE	46%-118%	31
4-NITROPHENOL	10%-80%	50
2,4-DINITROTOLUENE	24%-96%	38
PENTACHLOROPHENOL	9%-103%	50
PYRENE	26%-127%	31

TABLE 2 - 6

POLYNUCLEAR AROMATIC HYDROCARBONS
WATER SAMPLE MATRIX SPIKE/MATRIX SPIKE DUPLICATES
NCBC GULFPORT HO

MS = MATRIX SPIKE *SAMPLE GPTH02-1*		SDG R8548		
MSD = MATRIX SPIKE DUPLICATE		MS	MSD	
RPD = RELATIVE PERCENT DIFFERENCE		%R	%R	%RPD
PAH COMPOUNDS	UNITS			
NAPTHALENE	ug/L	36	50	33
ACENAPHTHYLENE	ug/L	36*	55	42
ACENAPHTHENE	ug/L	46	65	34
FLUORENE	ug/L	41*	55	29
PHENANTHRENE	ug/L	49*	65	29
ANTHRACENE	ug/L	33*	46	33
FLUORANTHENE	ug/L	41*	55	30
PYRENE	ug/L	39*	62	46
BENZO(A)ANTHRACENE	ug/L	38	50	29
CHRYSENE	ug/L	38	51	29
BENZO(B)FLUORANTHENE	ug/L	29*	38	27
BENZO(K)FLUORANTHENE	ug/L	24*	32*	29
BENZO(A)PYRENE	ug/L	23*	28*	20
DIBENZO(A,H)ANTHRACENE	ug/L	21*	28*	29
INDENO(1,2,3-CD)PYRENE	ug/L	17*	24*	34
BENZO(G,H,I)PERYLENE	ug/L	*14	20*	36

*** DENOTES VALUE NOT WITHIN QA/QC ADVISORY LIMITS**

CORRESPONDING SDG AND ASSOCIATED SAMPLES

R8548: GPTH02-1, GPTH02-2, GPTH02-3, GPTH02-4, GPTH02-1D

QC LIMITS WERE NOT PROVIDED BY THE LABORATORY.

TABLE 2 - 7

PESTICIDES/PCBS
WATER SAMPLE MATRIX SPIKE/MATRIX SPIKE DUPLICATES
NCBC GULFPORT HO

MS = MATRIX SPIKE *SAMPLE GPTH02-1*		SDG R8548		
MSD = MATRIX SPIKE DUPLICATE		MS	MSD	
RPD = RELATIVE PERCENT DIFFERENCE		%R	%R	%RPD
PEST COMPOUNDS	UNITS			
gamma-BHC (Lindane)	ug/L	105	99	6.0
Heptachlor	ug/L	82	77	5.5
Aldrin	ug/L	64	62	2.5
Dieldrin	ug/L	100	95	5.2
Endrin	ug/L	109	104	5.2
4,4'-DDT	ug/L	71	66	6.6

*** DENOTES VALUE NOT WITHIN QA/QC ADVISORY LIMITS**

CORRESPONDING SDG AND ASSOCIATED SAMPLES

R8548: GPTH02-1, GPTH02-2, GPTH02-3, GPTH02-4, GPTH02-1D

COMPOUND	ADVISORY LIMITS		RPD
	% R WATER		WATER
gamma-BHC(Lindane)	56%-123%		15
HEPTACHLOR	40%-131%		20
ALDRIN	40%-120%		22
DIELDRIN	52%-126%		18
ENDRIN	56%-121%		21
4,4'-DDT	38%-127%		27

TABLE 2 - 8

ORGANOPHOSPHOROUS PESTICIDES
WATER SAMPLE MATRIX SPIKE/MATRIX SPIKE DUPLICATES
NCBC GULFPORT HO

MS = MATRIX SPIKE *SAMPLE GPTH02-01*		SDG R8548		
MSD = MATRIX SPIKE DUPLICATE		MS	MSD	
RPD = RELATIVE PERCENT DIFFERENCE		%R	%R	%RPD
OPP COMPOUNDS	UNITS			
PHORATE	ug/L	80	73	10
DISULFOTON	ug/L	97	96	1
METHYL PARATHION	ug/L	97	88	9
ETHYL PARATHION	ug/L	101	94	7

*** DENOTES VALUE NOT WITHIN QA/QC ADVISORY LIMITS**

CORRESPONDING SDG AND ASSOCIATED SAMPLES

R8548: GPTH02-1, GPTH02-2, GPTH02-3, GPTH02-4, GPTH02-1D

NO QC LIMITS WERE REPORTED BY THE LABORATORY.
RECOVERIES WERE DEEMED IN CONTROL BY THE DATA VALIDATOR.

TABLE 2 - 9

HERBICIDES
WATER SAMPLE MATRIX SPIKE.MATRIX SPIKE DUPLICATES
NCBC GULFPORT HO

MS = MATRIX SPIKE *SAMPLE GPTH02-1*		SDG R8548		
MSD = MATRIX SPIKE DUPLICATE		MS	MSD	
RPD = RELATIVE PERCENT DIFFERENCE		%R	%R	%RPD
HERB COMPOUNDS	UNITS			
2,4-D	ug/L	75	65	14
SILVEX	ug/L	80	65	21
2,4,5-T	ug/L	80	65	21
DINOSEB	ug/L	38	32	17

* DENOTES VALUE NOT WITHIN QA/QC ADVISORY LIMITS

CORRESPONDING SDG AND ASSOCIATED SAMPLES

R8548: GPTH02-1, GPTH02-2, GPTH02-3, GPTH02-4, GPTH02-1D

NO QC LIMITS WERE REPORTED BY THE LABORATORY.
RECOVERIES AND RPDS WERE DEEMED IN CONTROL BY DATA VALIDATOR.

TABLE 2 - 10

METALS AND CYANIDE
WATER SAMPLE MATRIX SPIKE/ DUPLICATES
NCBC GULFPORT HO

MS = MATRIX SPIKE *SAMPLE GPTH02-1*		SDG R8548	
MD = MATRIX DUPLICATE *SAMPLE GPTHOGW-1D*		MS	MD
RPD = RELATIVE PERCENT DIFFERENCE		%R	RPD
METALS COMPOUNDS	UNITS		
ANTIMONY	ug/L	83.7	NC
ARSENIC	ug/L	89.2	0.0
BARIUM	ug/L	103.2	3.2
BERYLLIUM	ug/L	104	0.6
CADMIUM	ug/L	104.5	200
CHROMIUM	ug/L	105.3	4.9
COBALT	ug/L	103.7	15
COPPER	ug/L	100.9	12
LEAD	ug/L	97	1.3
MERCURY	ug/L	95	0
NICKEL	ug/L	102.7	0
SELENIUM	ug/L	71.4*	3.8
SILVER	ug/L	101.7	NC
THALLIUM	ug/L	89.4	NC
VANADIUM	ug/L	101.7	6.0
ZINC	ug/L	99.4	9.4
TIN	ug/L	98.6	NC

*** DENOTES VALUE NOT WITHIN QA/QC ADVISORY LIMITS**

NC DENOTES THAT BOTH SAMPLES ARE NON-DETECT AND A RPD CANNOT BE CALCULATED.
NR DENOTES THAT A MATRIX SPIKE RECOVERY CALCULATION IS NOT REQUIRED.

CORRESPONDING SDG'S AND ASSOCIATED SAMPLES

R8548: GPTH02-1, GPTH02-2, GPTH02-3, GPTH02-4, GPTH02-1D

COMPOUND	ADVISORY LIMITS		RPD
	%R WATER		WATER
ALL COMPOUNDS	75%-125%		+/-20 OR +/-CRDL

+/- CRDL = RPD Limits applicable only on values 5 times the Contract Required Detection Limit (CRDL)

TABLE 2 - 11

CYANIDE
WATER SAMPLE MATRIX SPIKE/ DUPLICATES
NCBC GULFPORT HO

MS = MATRIX SPIKE *SAMPLE GPTH02-1*		SDG R8548	
MD = MATRIX DUPLICATE *SAMPLE GPTH02-1*		MS	MD
RPD = RELATIVE PERCENT DIFFERENCE		%R	RPD
	UNITS		
CYANIDE	ug/L	92.6	NC

*** DENOTES VALUE NOT WITHIN QA/QC ADVISORY LIMITS**

NC DENOTES THAT BOTH SAMPLES ARE NON-DETECT AND A RPD CANNOT BE CALCULATED.

CORRESPONDING SDG'S AND ASSOCIATED SAMPLES

R8548: GPTH02-1, GPTH02-2, GPTH02-3, GPTH02-4, GPTH02-1D

MS = MATRIX SPIKE *SAMPLE BS-01-D12*		SDG R8520	
MD = MATRIX DUPLICATE *SAMPLE BS-01-D12*		MS	MD
RPD = RELATIVE PERCENT DIFFERENCE		%R	RPD
	UNITS		
CYANIDE	ug/L	90.7	NC

*** DENOTES VALUE NOT WITHIN QA/QC ADVISORY LIMITS**

NC DENOTES THAT BOTH SAMPLES ARE NON-DETECT AND A RPD CANNOT BE CALCULATED.

CORRESPONDING SDG'S AND ASSOCIATED SAMPLES

R8520: BS-01-D12, BS-01-P12

COMPOUND	ADVISORY LIMITS		RPD
	%R WATER		WATER
CYANIDE	75%-125%		+/-20

TABLE 2 - 12

SULFIDE
WATER SAMPLE MATRIX SPIKE/ DUPLICATES
NCBC GULFPORT HO

MS = MATRIX SPIKE *SAMPLE GPTH02-1*		SDG R8548	
MD = MATRIX DUPLICATE *SAMPLE GPTHO2-1*		MS	MD
RPD = RELATIVE PERCENT DIFFERENCE		%R	RPD
	UNITS		
SULFIDE	ug/L	92.6	NC

* DENOTES VALUE NOT WITHIN QA/QC ADVISORY LIMITS

NC DENOTES THAT BOTH SAMPLES ARE NON-DETECT AND A RPD CANNOT BE CALCULATED.

CORRESPONDING SDG'S AND ASSOCIATED SAMPLES

R8548: GPTH02-1, GPTH02-2, GPTH02-3, GPTH02-4, GPTH02-1D

COMPOUND	ADVISORY LIMITS		RPD
	%R WATER		WATER
SULFIDE	75%-125%		+/-20

2.1 Water Matrix

No target compounds requiring RPD calculation were detected in either the water samples or associated duplicates for the volatiles, semivolatiles, polynuclear aromatic hydrocarbons, pesticides/PCB/kepone, organophosphorous pesticides, herbicides, cyanide, and sulfide (Tables 2-1 & 2-2). Therefore, no precision assessment based on field duplicate results was conducted for those parameters.

The dioxin/furan analysis of the field duplicate pair of sample GPTH02-1 exhibited a non-compliant RPD for the one (1) congener detected (Table 2-1). The non-compliant congener was OCDD. An OCDD concentration was detected in the original sample, but was not detected in the duplicate sample. The non-compliance for the congener OCDD can be attributed to poor analytical and/or sampling precision. The reported positive result for OCDD in sample GPTH02-1 was appropriately qualified as estimated, J.

Two (2) of the thirteen (13) target analytes detected in the metals analysis of the field duplicate pair of sample GPTH02-1 exhibited non-compliant RPDs (Table 2-2). The target analytes with non-compliant RPDs were beryllium and selenium. The non-compliance for the analytes beryllium and selenium can be attributed to the low concentrations detected. Results were less than the CRDL in both of the samples. Assessment of the non-compliant analytes for serial dilution criteria indicates that they were in-control (Appendix B).

The evaluation of precision of the water matrix for the MS/MSD samples is provided in Tables 2-3 through 2-12. All MS/MSD sample pairs analyzed for semivolatiles, polynuclear aromatic hydrocarbons, pesticides/PCBs, organophosphorous pesticides, herbicides, metals, cyanide, and sulfide exhibited acceptable RPDs between spike compounds (Tables 2-5 through 2-12).

The volatile analysis of the MS/MSD pair of sample GPTH02-1 exhibited a non-compliant RPDs for one (1) of the five (5) spike compounds (Table 2-3, page 2-8). The non-compliance for the compound toluene was slight and resulted from a disparity in the recoveries between the MS and the MSD. However, the recoveries were within QC limits. The analytical data did not require qualification.

The dioxin/furan analysis of the MS/MSD pair of sample GPTH02-1 exhibited a non-compliant RPD for one congener, 2,3,7,8-TCDD (Table 2-4, page 2-9). The non-compliance resulted from a disparity in the recoveries between the MS and the MSD. However, the recoveries for the congener were within reasonable limits. The analytical data did not require qualification.

Based on assessment of duplicate precision evaluation criteria, the water matrix analytical data was acceptable for each SDG with the noted potential for bias in the dioxin/furan congener OCDD in one sample.

3.0 ACCURACY

The assessment of accuracy is evaluated by comparison of the percent recovery (%R) computed from the known concentration of analyte spikes and their recovered concentration versus the analytical method acceptance criteria. Spike recoveries provide an indication of bias, where the reported data may either overestimate or underestimate the actual concentration of detected compounds and/or the detection limits. Recoveries outside acceptable criteria may be caused by factors such as matrix interference, poor analytical precision, or instrument calibration.

The following Sections summarize the evaluation of analytical accuracy for the water matrix for the following analytical groups:

- GC/MS volatile organic compounds (GC/MS VOCs);
- dioxin/furan compounds (D/Fs);
- semivolatile organic compounds (SVOCs);
- polynuclear aromatic hydrocarbons (PAHs);
- pesticides, PCBs, (P/Ps);
- organophosphorous pesticides (OPPs);
- herbicides; and
- inorganics, cyanide, & sulfide.

Accuracy was assessed using MS and MSD samples for organic analyses and MS samples for inorganic analyses for each matrix, as well as surrogate compound recoveries for those analytical fraction which utilize them. Accuracy for the dioxin/furan fraction was assessed using the recovery of internal standards. The results of the evaluation of accuracy for the MS/MSD samples is provided in Tables 2-3 through 2-12 for water matrix. The results of the evaluation of accuracy for the surrogates in the samples are provided in Table 3-1 through 3-8 for the water matrix.

3.1 Water Matrix

All MS/MSD sample pairs analyzed for volatiles, pesticides/PCBs, organophosphorous pesticides, herbicides, cyanide, and sulfide exhibited acceptable recoveries of spike compounds (Tables 2-3, 2-7, 2-8, 2-9, 2-11 and 2-12).

The surrogate recoveries for volatiles, pesticide/PCBs, kepone, and herbicides were acceptable (Tables 3-1, 3-5, 3-6, and 3-8).

The MS/MSD pair analyzed for the dioxin/furan fraction exhibited one (1) congener with a non-compliant recovery (Table 2-4, page 2-9). The non-compliant congener was OCDF. The recovery was above reasonable QC limits. However, there were no positive results reported in the samples for this congener. The analytical data did not require qualification.

The internal standards (IS) for the dioxin/furan fraction were above or below the QC limits in thirty-one percent (31%) of the recoveries. Qualification of the analytical data was required for only four (4) field samples. The reported result for 1,2,3,7,8-HpCDD in samples GPTHO2-2 and GPTHO2-3 were appropriately qualified as estimated, J, and should be considered potentially overestimated. The reported result for OCDD in samples GPTHO2-1 and GPTHO2-4 were appropriately qualified as estimated, J, and should be considered potentially overestimated.

The MS/MSD of sample GPTHO2-1 analyzed for semivolatile organics had non-compliant %Rs for one (1) of the eleven (11) spike compounds (Table 2-5, page 2-10). The non-compliant recoveries

TABLE 3 - 1

SURROGATE % RECOVERIES
GC/MS VOLATILE WATER SAMPLES
NCBC GULFPORT HO

SDG	SAMPLE ID	SMC1	SMC2	SMC3	TOTAL OUT
R8548	BS-01-RI2	99	96	90	0
	BS-02-TB2	99	95	96	0
	GPTH02-1	99	95	94	0
	GPTH02-1D	98	97	98	0
	GPTH02-2	99	96	97	0
	GPTH02-3	98	95	97	0
	GPTH02-4	95	94	90	0
	GPTH02-1MS	97	99	92	0
	GPTH02-1MSD	103	100	94	0
R8520	BS-01-DI2	97	98	98	0
	BS-01-PI2	89	97	99	0
	BS-01-TB2	96	97	100	0

SMC1 = TOLUENE-D8 QC LIMITS 88% - 110%
SMC2 = BROMOFLUOROBENZENE QC LIMITS 86% - 115%
SMC3 = 1,2-DICHLOROETHANE-D4 QC LIMITS 76% - 114%

# SAMPLES	% REC IN	%REC OUT	% TOTAL IN
12	36	0	100.0%

TABLE 3 - 2

WATER SAMPLE INTERNAL STANDARDS % RECOVERIES
DIOXIN/FURAN
NCBC GULFPORT HO

	BS-01-RI2	GPTH02-1	GPTH02-1D	GPTH02-2	GPTH02-3	GPTH02-4	GPTH02-1MS	GPTH02-1MSD	BS-01R-RI
I.S. COMPOUND									
13C-2378-TCDD	121	115	127	120	128	122	*49.0	109	42.7
13C-2378-TCDF	118	100	121	106	112	109	69.7	91	54.3
13C-12378-PeCDD	112	89	111	112	107	110	*31.8	96.7	47.1
13C-12378-PeCDF	126	104	132	117	116	120	*8.6	98.9	36.7 *
13C-23478-PeCDF	121	107	132	121	117	121	*28.8	108	51.3
13C-123478-HxCDD	*161	128	*188	*154	*152	*150	*156	*151	53
13C-123678-HxCDD	106	102	113	112	102	111	104	115	78.4
13C-123478-HxCDF	130	120	134	*151	114	134	*236	134	82.3
13C-123678-HxCDF	124	108	109	129	115	120	*169	116	139
13C-234678-HxCDF	125	96.3	129	*138	125	129	114	126	75.2
13C-123789-HXCDF	147	*137	*150	*166	*145	*150	*264	141	83.1
13C-1234678-HpCDD	145	96.9	124	*149	125	131	*1330	117	92.3
13C-1234678-HpCDF	137	96.1	123	*140	120	124	*927	112	92.7
13C-1234789-HpCDF	*196	*144	*186	*195	*160	*173	*1874	*153	67.9
13C-OCDD	*59.3	*21.6	*44.8	*57.4	*54.4	*37.2	*709	*44.7	71.9
TOTAL OUT	3	3	4	8	4	4	12	3	1

QC LIMITS: 60% - 135%
* - VALUE OUTSIDE OF QC LIMITS

# SAMPL	% REC IN	% REC OUT	% TOTAL IN
9	93	42	68.9%

TABLE 3 - 3

SURROGATE % RECOVERIES
SEMIVOLATILE WATER SAMPLES
NCBC GULFPORT HO

SDG	SAMPLE ID	S1	S2	S3	S4	S5	S6	TOTAL OUT
R8548	BS-01-RI2	72	74	85	68	74	60	0
	GPTH02-1	74	77	30*	73	74	67	1
	GPTH02-1D	72	74	30*	71	75	65	1
	GPTH02-1DRE	81	81	55	88	91	86	0
	GPTH02-1RE	79	80	53	91	93	84	0
	GPTH02-2	70	74	48	76	76	70	0
	GPTH02-3	92	72	34	74	74	70	0
	GPTH02-4	70	73	53	76	74	69	0
	GPTH02-1MS	70	73	31*	79	78	75	1
	GPTH02-1MSD	70	72	23*	87	86	81	1
	GPTH02-1MSDRE	70	84	40	*95	92	90	1
	GPTH02-1MSRE	82	73	58	90	84	79	0
R8520	BS-01-DI2	80	77	88	70	68	70	0
	BS-01-PI2	79	74	89	4*	38	48	1
	BS-01-PI2RE	81	77	91	5*	38	57	1

S1 = NITROBENZENE-D5 QC LIMITS = 35% - 114%
S2 = 2-FLUOROBIPHENYL QC LIMITS = 43% - 116%
S3 = TERPHENYL-D14 QC LIMITS = 33% - 141%
S4 = PHENOL D-5 QC LIMITS = 10% - 94%
S5 = 2-FLUOROPHENOL QC LIMITS = 21% - 100%
S6 = 2,4,6-TRIBROMOPHENOL QC LIMITS = 10% - 123%

# SAMPLES	% REC IN	%REC OUT	% TOTAL IN
15	83	7	92.2%

TABLE 3 - 4

SURROGATE % RECOVERIES
POLYNUCLEAR AROMATIC HYDROCARBONS WATER SAMPLES
NCBC GULFPORT HO

SDG	SAMPLE ID	TD-14	TOTAL OUT
R8548	BS-01-RI2	28*	1
	BS-01-RI2RE	32	0
	GPTH02-1	53	0
	GPTH02-1RE	52	0
	GPTH02-1D	72	0
	GPTH02-2	64	0
	GPTH02-3	56	0
	GPTH02-4	84	0
	GPTH02-1MS	36	0
	GPTH02-1MSD	48	0
	GPTH02-1MSRE	51	0
	GPTH02-1MSDRE	59	0
R8520	BS-01-DI2	81	0
	BS-01-DI2	67	0
	BS-01-PI2	65	0
	BS-01-PI2RE	39	0

TERPHENYL-d14 QC LIMITS NOT PROVIDED

* - INDICATES RECOVERY IS OUTSIDE CONTROL LIMITS.

# SAMPL	% REC IN	%REC OUT	% TOTAL IN
16	15	1	93.8%

TABLE 3 - 5

SURROGATE % RECOVERIES
PESTICIDES/PCB WATER SAMPLES
NCBC GULFPORT HO

SDG	SAMPLE ID	TCX	DCB	TOTAL OUT
R8548	BS-01-RI2	78	38	0
	GPTH02-1	79	20	0
	GPTH02-1D	77	21	0
	GPTH02-2	74	23	0
	GPTH02-3	57	19	0
	GPTH02-4	73	22	0
	GPTH02-1MS	80	22	0
	GPTH02-1MSD	80	20	0
R8520	BS-01-DI2	73	27	0
	BS-01-PI2	79	79	0

TCX = TETRACHLORO-M-XYLENE QC LIMITS = 47% - 101%
DCB = DECACHLOROBIPHENYL QC LIMITS = 0% - 113%

# SAMPLES	% REC IN	%REC OUT	% TOTAL IN
10	20	0	100.0%

TABLE 3 - 6

SURROGATE % RECOVERIES
KEPONE WATER SAMPLES
NCBC GULFPORT HO

SDG	SAMPLE ID	TCX	DCB	TOTAL OUT
R8548	BS-01-RI2	63	26	0
	GPTH02-1	80	18	0
	GPTH02-1D	75	15	0
	GPTH02-2	65	18	0
	GPTH02-3	80	12	0
	GPTH02-4	60	17	0
R8520	BS-01-DI2	85	21	0
	BS-01-PI2	83	28	0

TCX = TETRACHLORO-M-XYLENE QC LIMITS = 26% - 126%
DCB = DECACHLOROBIPHENYL QC LIMITS = 7% - 137%

# SAMPLES	% REC IN	%REC OUT	% TOTAL IN
8	16	0	100.0%

TABLE 3 - 7

SURROGATE % RECOVERIES
ORGANOPHOSPHOROUS PESTICIDES WATER SAMPLES
NCBC GULFPORT HO

SDG	SAMPLE ID	ASPON	TOTAL OUT
R8548	BS-01-RI2	74	0
	GPTH02-1	65	0
	GPTH02-1D	56	0
	GPTH02-2	73	0
	GPTH02-3	60	0
	GPTH02-4	68	0
	GPTH02-1MS	75	0
	GPTH02-1MSD	68	0
R8520	BS-01-DI2	71	0
	BS-01-PI2	28*	1
	BS-01-PI2RE	66	0

ASPON QC LIMITS = 38% - 131%

# SAMPLES	% REC IN	%REC OUT	% TOTAL IN
11	10	1	90.9%

TABLE 3 - 8

SURROGATE % RECOVERIES
CHLORINATED HERBICIDES WATER SAMPLES
NCBC GULFPORT

SDG	SAMPLE ID	DCBA	DCPA	TOTAL OUT
R8548	BS-01-RI2	79	79	0
	GPTH02-1	81	82	0
	GPTH02-1D	78	80	0
	GPTH02-2	80	81	0
	GPTH02-2DL	97	93	0
	GPTH02-3	84	89	0
	GPTH02-4	81	81	0
	GPTH02-1MS	88	89	0
	GPTH02-1MSD	86	86	0
R8520	BS-01-DI2	93	93	0
	BS-01-PI2	96	101	0

DCBA - 3,5-DICHLOROBENZOIC ACID QC LIMITS = 41% - 124%
DCPA - 2,4-DICHLOROPHENYLACETIC ACID QC LIMITS = 50% - 122%

# SAMPLES	% REC IN	%REC OUT	% TOTAL IN
11	22	0	100.0%

for the compound 4-nitrophenol were slightly above the QC limits. The laboratory re-extracted and analyzed the MS/MSD pair, with similar results. There were no positive results reported in the samples for the compound 4-nitrophenol. The analytical data did not require qualification.

Four (4) semivolatile samples exhibited non-compliant recovery of one surrogate compound, terphenyl-D14 (Table 3-3). The analytical data did not require qualification because the functional guidelines allows one recovery per fraction to exceed QC limits as long as the recovery is above 10%. The surrogate compound phenol-d_6 was recovered less than 10% in samples BS-01-PI2 and BS-01-PI2RE. This indicates that positive results for the acid fraction in these two (2) samples may be underestimated and that non-detect results are unreliable. All positive results for acid fraction compounds in samples BS-01-PI and BS-01-PIRE were appropriately qualified as estimated, J, and non-detect results for acid fraction compounds were rejected, R. Sample BS-01-PIRE was rejected in favor of the original analysis, so those data points were not considered in the total. This constituted a rejection of twenty-five (25) data points in the QC blank sample. The completion goal was still met.

The PAH analysis of the MS/MSD pair of sample GPTH02-1 exhibited non-compliant recoveries for twelve (12) compounds in the MS and five (5) compounds in the MSD. All non-compliant recoveries were below the QC limits. The compounds which were non-compliant in both the MS and the MSD were appropriately qualified as estimated, UJ, in the original sample GPTH02-1.

The PAH surrogate recovery for one (1) field QC blank was below the acceptable minimum for accuracy. This indicates that reported positive and non-detect results for target compounds in the sample may be underestimated. The reported results in sample BS-01-RI2 were appropriately qualified as estimated, J/UJ.

The organophosphorous pesticide surrogate recovery for one (1) field QC sample, BS-01-PI, was below the acceptable minimum criteria for accuracy (Table 3-7). This indicates that reported positive and non-detect results for target compounds in the sample may be underestimated. The reported results in sample BS-01-PI2 were appropriately qualified as estimated, J/UJ.

The MS/MD analyzed for inorganic analytes exhibited one (1) compound with a non-compliant %Rs (Table 2-10). The non-compliant target analyte was selenium. The %Rs was below the minimum criteria for accuracy, which indicates that the quantified values for selenium in associated samples may be underestimated. Positive and non-detect results for selenium were appropriately qualified as estimated, J/UJ.

Based on assessment of MS/MSD and surrogate sample accuracy evaluation criteria, the water matrix analytical data was acceptable for each SDG with the exception of the semivolatile fraction. Some of the analytical results may be overestimated or underestimated. For the semivolatile fraction, twenty-five (25) data points in a field QC blank were rejected, R, due to surrogate %R below 10%.

4.0 REPRESENTATIVENESS

Representativeness of the environmental sample analytical data was assessed using trip blanks, field blanks, equipment rinseate blanks, and laboratory method blanks. The environmental samples and associated blanks were analyzed for the following target analyte groups:

- GC/MS volatile organic compounds (GC/MS VOCs);
- dioxin/furan compounds (D/Fs);
- semivolatile organic compounds (SVOCs);
- polynuclear aromatic hydrocarbons (PAHs);
- pesticides, PCBs, (P/Ps);
- organophosphorous pesticides (OPPs);
- herbicides; and
- inorganics, cyanide, & sulfide.

The trip blank samples were analyzed for only GC/MS volatile organic target analytes. Field blanks, equipment rinseate blanks, and laboratory method blanks were analyzed for target analytes in each listed category. The assessment of representativeness is summarized in tabular form for each type of blank; trip blank results are summarized in Table 4-1, field blank results are summarized in Tables 4-2 through 4-12, equipment rinseate blank results are summarized in Tables 4-13 through 4-23, and method blank results are summarized in Tables 4-24 through 4-32.

If contaminants were detected in a blank, corrective actions were made for the chemical analytical data during data validation by Heartland. The corrective action consisted of amending the laboratory reported results for organic and inorganic target analytes by the criteria. The following describes the Validation Qualifier code in the blank summary tables.

Organic Target Analytes

- CRDL Validation Qualifier. If a sample result for the blank contaminant was less than the CRQL and less than 5 times the blank value (10 times for common laboratory contaminants), the sample result was rejected and amended as estimated non-detected at the CRQL for the target compound.

- U Validation Qualifier. If a sample result for the blank contaminant was greater than the sample CRQL and less than 5 times the blank value (10 times for common laboratory contaminants), the sample result for the blank contaminant was amended as non detect at the concentration reported in the sample results.

- No Action (NA). If a sample result for the blank contaminant was greater than the CRQL and 5 time the blank value (10 times for common laboratory contaminants), the result was not amended.

Inorganic Target Analytes

- U Validation Qualifier. If a sample result for the blank contaminant was less than the IDL and less than 5 times the blank value, the sample result was amended as non-detected.

- UJ Validation Qualifier. If a sample result for the blank contaminant was less than the sample IDL when the absolute value of the negative blank value was greater

TABLE 4 - 1

GC/MS VOLATILE COMPOUNDS DETECTED IN TRIP BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	TB CONC.	UNITS	VALIDATION QUALIFIER
R8520	BS-01-TB2	BS-01-PI2, BS-01-DI2	ACETONE	10	ug/L	U
R8548	BS-02-TB2	GPTH02-1, GPTH02-1D, GPTH02-2, GPTH02-3, GPTH02-4, GPTH02-1MS, GPTH02-1MSD	NO CONTAMINATION FOUND			

TABLE 4 - 2

GC/MS VOLATILES DETECTED IN FIELD BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	FB CONC.	UNITS	VALIDATION QUALIFIER
R8520	BS-01-DI2	GPTH02-1, GPTH02-1D, GPTH02-2, GPTH02-4, GPTH02-1MS, GPTH02-1MSD	CARBON DISULFIDE	14	ug/L	CRQL
		GPTH02-3	CARBON DISULFIDE	14	ug/L	
R8520	BS-01-PI2	GPTH02-1, GPTH02-1D, GPTH02-2, GPTH02-4, GPTH02-1MS, GPTH02-1MSD	CARBON DISULFIDE	5	ug/L	CRQL
		GPTH02-3	CARBON DISULFIDE	5	ug/L	

TABLE 4 - 3

DIOXIN FURANS DETECTED IN FIELD BLANKS
NCBC GULFPORT HO

THIS TABLE WAS LEFT INTENTIONALLY BLANK.

TABLE 4 - 4

SEMIVOLATILES DETECTED IN FIELD BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	FB CONC.	UNITS	VALIDATION QUALIFIER
R8520	BS-01-DI2	GPTH02-1, GPTH02-1D, GPTH02-2, GPTH02-4, GPTH02-3, GPTH02-1MS, GPTH02-1MSD	NO CONTAMINATION FOUND			
R8520	BS-01-PI2	GPTH02-1, GPTH02-1D, GPTH02-2, GPTH02-4, GPTH02-3, GPTH02-1MS, GPTH02-1MSD	NO CONTAMINATION FOUND			

TABLE 4 - 5

POLYNUCLEAR AROMATIC HYDROCARBONS DETECTED IN FIELD BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	FB CONC.	UNITS	VALIDATION QUALIFIER
R8520	BS-01-DI2	GPTH02-1, GPTH02-1D, GPTH02-2, GPTH02-4, GPTH02-3, GPTH02-1MS, GPTH02-1MSD	NO CONTAMINATION FOUND			
R8520	BS-01-PI2	GPTH02-1, GPTH02-1D, GPTH02-2, GPTH02-4, GPTH02-3, GPTH02-1MS, GPTH02-1MSD	NO CONTAMINATION FOUND			

TABLE 4 - 6

PESTICIDES/AROCLORS DETECTED IN FIELD BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	FB CONC.	UNITS	VALIDATION QUALIFIER
R8520	BS-01-DI2	GPTH02-1, GPTH02-1D, GPTH02-2, GPTH02-4, GPTH02-3, GPTH02-1MS, GPTH02-1MSD	NO CONTAMINATION FOUND			
R8520	BS-01-PI2	GPTH02-1, GPTH02-1D, GPTH02-2, GPTH02-4, GPTH02-3, GPTH02-1MS, GPTH02-1MSD	NO CONTAMINATION FOUND			

TABLE 4 - 7

KEPONE DETECTED IN FIELD BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	FB CONC.	UNITS	VALIDATION QUALIFIER
R8520	BS-01-DI2	GPTH02-1, GPTH02-1D, GPTH02-2, GPTH02-4, GPTH02-3	NO CONTAMINATION FOUND			
R8520	BS-01-PI2	GPTH02-1, GPTH02-1D, GPTH02-2, GPTH02-4, GPTH02-3	NO CONTAMINATION FOUND			

TABLE 4 - 8

ORGANOPHOSPHOROUS PESTICIDES DETECTED IN FIELD BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	FB CONC.	UNITS	VALIDATION QUALIFIER
R8520	BS-01-DI2	GPTH02-1, GPTH02-1D, GPTH02-2, GPTH02-4, GPTH02-3, GPTH02-1MS, GPTH02-1MSD	NO CONTAMINATION FOUND			
R8520	BS-01-PI2	GPTH02-1, GPTH02-1D, GPTH02-2, GPTH02-4, GPTH02-3, GPTH02-1MS, GPTH02-1MSD	NO CONTAMINATION FOUND			

TABLE 4 - 9

CHLORINATED HERBICIDES DETECTED IN FIELD BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	FB CONC.	UNITS	VALIDATION QUALIFIER
R8520	BS-01-DI2	GPTH02-1, GPTH02-1D, GPTH02-2, GPTH02-4, GPTH02-3, GPTH02-2DL GPTH02-1MSD, GPTH02-1MS	NO CONTAMINATION FOUND			
R8520	BS-01-PI2	GPTH02-1, GPTH02-1D, GPTH02-2, GPTH02-4, GPTH02-3, GPTH02-2DL GPTH02-1MSD, GPTH02-1MS	NO CONTAMINATION FOUND			

TABLE 4 - 10

METALS DETECTED IN FIELD BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	FB CONC.	UNITS	VALIDATION QUALIFIER
R8520	BS-01-DI2	GPTH02-1, GPTH02-1D, GPTH02-2, GPTH02-4, GPTH02-3, GPTH02-1MS, GPTH02-1MD	NO CONTAMINATION FOUND			
R8520	BS-01-PI2	GPTH02-02, GPTH02-1, GPTH02-1D GPTH02-3, GPTH02-4, GPTH02-1MS GPTH02-1MD	COPPER	2.2	ug/L	

Positive results noted in field blanks for calcium, iron, magnesium, manganese, and sodium. These analytes were not target compounds for the field samples, so they were not included in the table.

TABLE 4 - 11

CYANIDE DETECTED IN FIELD BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	FB CONC.	UNITS	VALIDATION QUALIFIER
R8520	BS-01-DI2	GPTH02-1, GPTH02-1D, GPTH02-2, GPTH02-4, GPTH02-3, GPTH02-1MS, GPTH02-1MD	NO CONTAMINATION FOUND			
R8520	BS-01-PI2	GPTH02-1, GPTH02-1D, GPTH02-2, GPTH02-4, GPTH02-3, GPTH02-1MS, GPTH02-1MD	NO CONTAMINATION FOUND			

TABLE 4 - 12

SULFIDE DETECTED IN FIELD BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	FB CONC.	UNITS	VALIDATION QUALIFIER
R8520	BS-01-DI2	GPTH02-1, GPTH02-1D, GPTH02-2, GPTH02-4, GPTH02-3, GPTH02-1MS, GPTH02-1MD	NO CONTAMINATION FOUND			
R8520	BS-01-PI2	GPTH02-1, GPTH02-1D, GPTH02-2, GPTH02-4, GPTH02-3, GPTH02-1MS, GPTH02-1MD	NO CONTAMINATION FOUND			

TABLE 4 - 13

GC/MS VOLATILES DETECTED IN EQUIPMENT RINSEATE BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	RB CONC.	UNITS	VALIDATION QUALIFIER
R8548	BS-01-RI2	GPTH02-1, GPTH02-1D, GPTH02-2, GPTH02-4, GPTH02-3, GPTH02-1MS, GPTH02-1MSD	NO CONTAMINATION FOUND			

TABLE 4 - 14

DIOXIN/FURANS DETECTED IN EQUIPMENT RINSEATE BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	RB CONC.	UNITS	VALIDATION QUALIFIER
R8548	BS-01-RI2	GPTH02-1, GPTH02-1D, GPTH02-2, GPTH02-4, GPTH02-3, GPTH02-1MS, GPTH02-1MSD	NO CONTAMINATION FOUND			

TABLE 4 - 15

SEMIVOLATILES DETECTED IN EQUIPMENT RINSEATE BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	RB CONC.	UNITS	VALIDATION QUALIFIER
R8548	BS-01-RI2	GPTH02-1, GPTH02-1D, GPTH02-2, GPTH02-4, GPTH02-3, GPTH02-1MS, GPTH02-1MSD	NO CONTAMINATION FOUND			

TABLE 4 - 16

POLYNUCLEAR AROMATIC HYDROCARBONS DETECTED IN EQUIPMENT RINSEATE BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	RB CONC.	UNITS	VALIDATION QUALIFIER
R8548	BS-01-RI2	GPTH02-1, GPTH02-1D, GPTH02-2, GPTH02-4, GPTH02-3, GPTH02-1MS, GPTH02-1MSD	NO CONTAMINATION FOUND			

TABLE 4 - 17

PESTICIDES/AROCLORS DETECTED IN EQUIPMENT RINSEATE BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	RB CONC.	UNITS	VALIDATION QUALIFIER
R8548	BS-01-RI2	GPTH02-1, GPTH02-1D, GPTH02-2, GPTH02-4, GPTH02-3, GPTH02-1MS, GPTH02-1MSD	NO CONTAMINATION FOUND			

TABLE 4 - 18

KEPONE DETECTED IN EQUIPMENT RINSEATE BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	RB CONC.	UNITS	VALIDATION QUALIFIER
R8548	BS-01-RI2	GPTH02-1, GPTH02-1D, GPTH02-2, GPTH02-4, GPTH02-3	NO CONTAMINATION FOUND			

TABLE 4 - 19

ORGANOPHOSPHOROUS PESTICIDES DETECTED IN EQUIPMENT RINSEATE BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	RB CONC.	UNITS	VALIDATION QUALIFIER
R8548	BS-01-RI2	GPTH02-1, GPTH02-1D, GPTH02-2, GPTH02-4, GPTH02-3, GPTH02-1MS, GPTH02-1MSD	NO CONTAMINATION FOUND			

TABLE 4 - 20

CHLORINATED HERBICIDES DETECTED IN EQUIPMENT RINSEATE BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	RB CONC.	UNITS	VALIDATION QUALIFIER
R6548	BS-01-RI2	GPTH02-1, GPTH02-1D, GPTH02-2, GPTH02-4, GPTH02-3, GPTH02-2DL, GPTH02-1MS, GPTH02-1MSD	NO CONTAMINATION FOUND			

TABLE 4 - 21

METALS DETECTED IN EQUIPMENT RINSEATE BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	RB CONC.	UNITS	VALIDATION QUALIFIER
R8548	BS-01-RI2	GPTH02-1, GPTH02-1D, GPTH02-2, GPTH02-4, GPTH02-3, GPTH02-1MS, GPTH02-1MD	COPPER	1.5	ug/L	

TABLE 4 - 22

CYANIDE DETECTED IN EQUIPMENT RINSEATE BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	RB CONC.	UNITS	VALIDATION QUALIFIER
R8548	BS-01-RI2	GPTH02-1, GPTH02-1D, GPTH02-2, GPTH02-4, GPTH02-3, GPTH02-1MS, GPTH02-1MD	NO CONTAMINATION FOUND			

TABLE 4 - 23

SULFIDE DETECTED IN EQUIPMENT RINSEATE BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	RB CONC.	UNITS	VALIDATION QUALIFIER
R8548	BS-01-RI2	GPTH02-1, GPTH02-1D, GPTH02-2, GPTH02-4, GPTH02-3, GPTH02-1MS, GPTH02-1MD	NO CONTAMINATION FOUND			

TABLE 4 - 24

GC/MS VOLATILES DETECTED IN METHOD BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	MB CONC.	UNITS	VALIDATION QUALIFIER
R8520	V0817W02-BLK	BS-01-DI2, BS-01-PI2, BS-01-TB2	NO CONTAMINATION FOUND			
R8548	V0818W01-BLK	BS-01-RI2	NO CONTAMINATION FOUND			
	V0823W01-BLK	BS-02-TB2, GPTH02-1, GPTH02-1D, GPTH02-2, GPTH02-3, GPTH02-4, GPTH02-1MS	NO CONTAMINATION FOUND			
	V0824W01-BLK	GPTH02-1MSD	NO CONTAMINATION FOUND			

TABLE 4 - 25

DIOXIN/FURANS DETECTED IN METHOD BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	MB CONC.	UNITS	VALIDATION QUALIFIER
R8548	K745_0006	BS-01-RI2, GPTH02-1D, GPTH02-2, GPTH02-3, GPTH02-4, GPTH02-1, GPTH02-1MS, GPTH02-1MSD	NO CONTAMINATION FOUND			

TABLE 4 - 26

SEMIVOLATILES DETECTED IN METHOD BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	MB CONC.	UNITS	VALIDATION QUALIFIER
R8520	B0815WB1-BLK	BS-01-DI2, BS-01-PI2	NO CONTAMINATION FOUND			
	B0909WA1-BLK	BS-01-PI2RE	NO CONTAMINATION FOUND			
R8548	B0819WA1-BLK	BS-01-RI2, GPTH02-1, GPTH02-1D, GPTH02-2, GPTH02-3, GPTH02-4, GPTH02-1MS, GPTH02-1MSD	NO CONTAMINATION FOUND			
	B0826WA1-BLK	GPTH02-1DRE, GPTH02-1RE, GPTH02-1MSDRE, GPTH02-1MSRE	NO CONTAMINATION FOUND			

TABLE 4 - 27

POLYNUCLEAR AROMATIC HYDROCARBONS DETECTED IN METHOD BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	MB CONC.	UNITS	VALIDATION QUALIFIER
R8520	NWB10815	BS-01-DI2, BS-01-PI2	ANTHRACENE	0.21	ug/L	U
	NWB10912	BS-01-PI2RE, BS-01-DI2RE	NO CONTAMINATION FOUND			
R8548	NWB10817	BS-01-RI2, GPTH02-1, GPTH02-1D, GPTH02-2, GPTH02-3, GPTH02-4, GPTH02-1MS, GPTH02-1MSD	NO CONTAMINATION FOUND			
	NWB10908	BS-01-RI2RE	NO CONTAMINATION FOUND			
	NWB10915	GPTH02-1RE, GPTH02-1MSDRE, GPTH02-1MSRE	NO CONTAMINATION FOUND			
	NWB20915	GPTH02-1RE, GPTH02-1MSDRE, GPTH02-1MSRE	NO CONTAMINATION FOUND			

TABLE 4 - 28

PESTICIDE/PCBS DETECTED IN METHOD BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	MB CONC.	UNITS	VALIDATION QUALIFIER
R8520	9WB10813	BS-01-DI2, BS-01-PI2	NO CONTAMINATION FOUND			
R8548	9WB10818	GPTHO2-1, GPTHO2-1D, GPTHO2-2, GPTHO2-3, GPTHO2-4, GPTH02-1MS, GPTHO2-1MSD, BS-01-RI2	NO CONTAMINATION FOUND			

TABLE 4 - 29

KEPONE DETECTED IN METHOD BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	MB CONC.	UNITS	VALIDATION QUALIFIER
R8520	9WB10813	BS-01-DI2, BS-01-PI2	NO CONTAMINATION FOUND			
R8548	9WB10818	GPTHO2-1, GPTHO2-1D, GPTHO2-2, GPTHO2-3, GPTHO2-4, GPTH02-1MS, GPTHO2-1MSD, BS-01-RI2	NO CONTAMINATION FOUND			

TABLE 4 - 30

ORGANOPHOSPHOROUS PESTICIDES DETECTED IN METHOD BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	MB CONC.	UNITS	VALIDATION QUALIFIER
R8520	W08164B1	BS-01-DI2, BS-01-PI2	NO CONTAMINATION FOUND			
R8548	W08164B1	GPTHO2-1, GPTHO2-1D, GPTHO2-2, GPTHO2-3, GPTHO2-4, GPTH02-1MS, GPTHO2-1MSD, BS-01-RI2	NO CONTAMINATION FOUND			

TABLE 4 - 31

CHLORINATED HERBICIDES DETECTED IN METHOD BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	MB CONC.	UNITS	VALIDATION QUALIFIER
R8520	HWB10817	BS-01-DI2, BS-01-PI2	NO CONTAMINATION FOUND			
R8548	HWB10818	GPTHO2-1, GPTHO2-1D, GPTHO2-2, GPTHO2-3, GPTHO2-4, GPTH02-1MS, GPTHO2-1MSD, BS-01-RI2	NO CONTAMINATION FOUND			

TABLE 4 - 32

METALS DETECTED IN METHOD BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	MB CONC.	UNITS	VALIDATION QUALIFIER
R8520	PBLK	BS-01-PI2, BS-01-DI2	BARIUM	3.07	ug/L	U
		BS-01-PI2, BS-01-DI2	ZINC	3.20	ug/L	U
R8548	PBLK	BS-01-RI2	BARIUM	3.07	ug/L	U
		BS-01-RI2	ZINC	3.20	ug/L	U
		GPTH02-1, GPTH02-1D, GPTH02-2, GPTH02-3, GPTH02-4, GPTH02-4MS, GPTH02-4MD	BARIUM	3.07	ug/L	
		GPTH02-1, GPTH02-1D, GPTH02-2, GPTH02-3, GPTH02-4, GPTH02-4MS, GPTH02-4MD	ZINC	3.20	ug/L	

than the IDL, the sample result for the blank contaminant was amended as estimated non-detected.

- J Validation Qualifier. If a sample result for the blank contaminant was greater than the IDL and less than 10 times the blank value, when the absolute of the negative blank value id greater than the IDL the result was amended as estimated at the laboratory value.

4.1 Trip Blanks

Trip blanks contained deionized water from the laboratory and consisted of samples bottles which were similar to the environmental sample containers. The trip blanks were prepared and packaged at the laboratory prior to the sampling event and traveled with the sample bottles to the site. The trip blank bottles were not opened at the site or anytime prior to laboratory analysis.

Target compounds detected in the trip blank sample (Table 4-1) consisted of:

- GC/MS Volatiles (Table 4-1)
  acetone

The compound acetone is a common laboratory contaminant and its presence in the trip blank may be attributed to laboratory contamination. Some analytical results required qualification due to the trip blank contamination. However, based on the assessment of the trip blank results for representativeness, the analytical data is acceptable.

4.2 Field Blanks

The field blank, BS-01-PI2, was a sample of potable water from the source at the field staging area and the deionized water blank, BS-01-DI2, was prepared from the source potable water. The field blanks were prepared at the site and placed in containers that were similar to those used for the environmental samples. Semivolatiles, polynuclear aromatic hydrocarbons, pesticide/PCBs, kepone, organophosphorous pesticides, herbicides, cyanide and sulfide target compounds were not detected in the field blank samples (Tables 4-4, 4-5, 4-6, 4-7, 4-8, 4-9, 4-11 and 4-12). The field blanks that were analyzed for the dioxin/furan fraction were rejected due to gross laboratory contamination. The results were not reported with the dioxin/furan fraction due to gross laboratory method blank contamination. However, the lack of a field blank does not impact the analytical data because there was no contamination in other associated QC blanks. The data points from the rejected field blanks were not considered in the total data points, so their rejection does not impact the overall completion goal for the fraction. Target compounds and analytes detected in the field blank samples consisted of:

- GC/MS Volatiles (Table 4-2)
  carbon disulfide

- Metals (Table 4-10)
  copper

The detected carbon disulfide result in both field blanks may be attributed to laboratory contamination. The metals analyte can be attributed to the water source, the water treatment system that was used to make the water or laboratory artifacts.

Target analytes were detected in some of the field blanks. Some of the analytical data required qualification. However, based on assessment of field blanks for representativeness the analytical data was acceptable for each SDG.

4.3 Equipment Rinseate Blanks

The equipment rinseate blank was prepared by rinsing a piece of decontaminated sampling equipment with deionized water from a field DI unit. A sample of this water was collected and placed in sample containers similar to those used for the environmental samples. Volatile organics, dioxin/furan compounds, semivolatile organics, polynuclear aromatic hydrocarbons, pesticides/PCBs, kepone, organophosphorous pesticides, herbicides, cyanide, and sulfide target compounds were not detected in equipment rinseate blank samples (Tables 4-13, 4-14, 4-15, 4-16, 4-17, 4-18, 4-19, 4-20, 4-22, and 4-23). Target analytes detected in the equipment rinseate blank samples consisted of:

- Metals (Table 4-20)
  - copper

The inorganic analyte can be attributed to the water source, the water treatment system that was used to make the water or laboratory artifacts. The metals analyte was detected below the CRDL. The data did not require qualification due to the detected copper in the rinseate blank.

Based on assessment of equipment rinseate blanks for representativeness the analytical data was acceptable for all SDGs.

4.4 Method Blanks

The method blanks were a sample of deionized water that is prepared by the laboratory at the time of analysis. Method blanks undergo the same analytical process as the corresponding environmental samples and associated field blanks. The purpose of the method blank is to assess the potential for target compounds and analytes to "contaminate" the sample during analysis. Volatiles, dioxin/furans, semivolatiles, pesticides/PCBs, kepone, organophosphorous pesticides, and and herbicide target compounds were not detected in method blank samples (Tables 4-24, 4-25, 4-26, 4-28, 4-29, 4-30, and 4-31). Target analytes detected in the method blank samples consisted of:

- Polynuclear Aromatic Hydrocarbons (PAH) (Table 4-27)
  - anthracene

- Metals (Table 4-32)
  - barium
  - zinc

The PAH compounds in the method blank was the result of laboratory contamination. The barium and zinc can be attributed to the water source, the water treatment system that was used to make the water or laboratory artifacts.

Because target analytes were detected in some of the method blanks, some of the analytical results were qualified. However, based on assessment of method blanks for representativeness the analytical data was acceptable for each SDG.

4.5 Holding Times

Holding times requirements are utilized in an effort to minimize the degradation or concentration of constituents in a particular matrix over time. The stability of the constituents is determined to the best extent and then a reasonable time limit is imposed under which the samples must be extracted or prepared and then analyzed. The holding times regulations assume that the samples have been properly preserved according to the guidelines, either at the laboratory or in the field. Analytical results from samples with holding time violations are qualified as estimated, J/UJ, due to the potential for compromising the integrity of the samples. All results qualified for holding times non-compliance are considered to be useable. The positive results are qualified as estimated, J, in samples with holding times exceeded by up to five (5) days. The non-detect and positive results are qualified as estimated, J/UJ, in samples with holding times exceeded from six (6) days. No analytical data was rejected due to holding times violations.

All holding times requirements, extraction and analytical, were met with the exception of dioxin/furans, samples BS-01-PI2RE and GPTH02-1RE for semivolatiles, and BS-01-PI2RE and BS-01-DI2RE for organophosphorous pesticides, and all RE samples for the polynuclear aromatic hydrocarbons fraction. The samples noted were re-extracted and reanalyzed for various reasons. However, all re-extractions for these fractions were rejected in favor of the original analysis. These rejections do not impact the completion goals because viable data points were obtained from the original analyses. All of the dioxin/furan samples were reextracted outside of the extraction holding time due to gross laboratory contamination observed in the original extraction. All results, positive and non detect, were qualified as estimated (J/UJ) with a potential low bias (L).

5.0 COMPARABILITY

Comparability is qualitative measure designed to express the confidence with which one data set may be compared to another. The analytical samples were collected and transported to the chemical analytical laboratory in accordance with standard procedures and were analyzed in conformance with acceptable USEPA procedures (Refer to Table 5-1 below). The analytical data are reported in standard units (micrograms per liter, micrograms per kilogram, etc.).

The methods used to collect the environmental samples and the methods used to analyze the samples should assure comparability of the analytical data.

TABLE 5-1
USEPA Procedures (CLP or SW-846 Methodologies)

U.S. EPA Method	Description
SW-846, Method 8240	Volatile Organics
SW-846, Method 8290	Dioxin/Furans
SW-846, Method 8270	Semivolatile Organics
SW-846, Method 8310	Polynuclear Aromatic Hydrocarbons
SW-846, Method 8080	Pesticides/PCBs/Kepone
SW-846, Method 8140	Organophosphorous Pesticides
SW-846, Method 8140	Chlorinated Herbicides
CLP, ILMO2.1	Metals
CLP, ILMO2.1	Cyanide
SW-846, Method 9030	Sulfide

6.0 COMPLETENESS

Completeness is the quantitative measure of the amount of data obtained from a measurement process compared with the amount expected to be obtained under the conditions of measurement. The completeness goal for laboratory analysis for this project was 85 percent useable data. Unusable analytical data are those results reported by the laboratory but rejected during the data validation process. A summary of the completeness goal for NCBC Gulfport is provided in Table 6-1. For more detailed completeness goal tables, please refer to Appendix C.

TABLE 6-1
COMPLETION GOAL (>85%)

	QC	GW	OVERALL
GC/MS Volatiles	95.5	96.6	96.0
Dioxin/Furans	100.0	100.0	100.0
Semivolatiles	89.7	93.6	91.6
PAHs	100.0	100.0	100.0
Pesticide/PCBs	100.0	100.0	100.0
Organophos. Pest.	100.0	100.0	100.0
Herbicides	100.0	100.0	100.0
Kepone	100.0	100.0	100.0
Metals	100.0	100.0	100.0
Cyanide	100.0	100.0	100.0
Sulfide	100.0	100.0	100.0

MATRIX KEY

QC = QC Samples
GW = Ground Water Samples

The analytical data met the 85 percent completeness goal for every fraction. The narrative following describes any extenuating factors involved in the data resolution.

GC/MS Volatiles, Non-Compliant RRFs and %Ds Four (4) volatile compounds, did not always meet the continuing calibration criteria of >0.05 for RRF (Relative Response Factor) or 90% for %D (Percent Difference). The RRF values fell below 0.05 and the %D values exceeded 90% in analyses affecting the SDGs associated with this project. All non-detect sample results associated with the continuing calibrations that exhibited these non-compliant RRFs and %Ds are rejected, R, (Table A-1). All positive sample results associated with the continuing calibrations that exhibited these non-compliant RRFs or %Ds are qualified as estimated, J, (Table A-1). The non-compliant calibrations resulted in the rejection of twenty-four (24) data points. The completeness goal for the fraction was still met.

Non-detect results that were rejected for the compounds may be evaluated by adjusting the CRQL to the concentration of the continuing calibration standard and qualifying the results as not detected at an estimated concentration, UJ. The non-detect qualification at the concentration of the continuing calibration standard insures that the instrumentation is capable of detecting the compound at a known concentration.

Semivolatiles, Non-Compliant RRFs and/or %Ds Seven (7) semivolatile compounds; did not always meet the initial and continuing calibration criteria of >0.05 for RRF (Relative Response Factor) or

90% for %D (Percent Difference). The RRF values fell below 0.05 or the %D value was above 90% in analyses affecting the SDGs associated with this project. All non-detect sample results associated with continuing calibrations that exhibited these non-compliant RRFs or %Ds are rejected, R, (Table A-1). All positive sample results associated with the continuing calibrations that exhibited these non-compliant RRFs or %Ds are qualified as estimated, J, (Table A-1). The non-compliant calibrations resulted in the rejection of forty-eight (48) data points. The completeness goal for the fraction was still met.

Non-detect results that were rejected for the compounds may be evaluated by adjusting the CRQL to the concentration of the continuing calibration standard and qualifying the results as not detected at an estimated concentration, UJ. The non-detect qualification at the concentration of the continuing calibration standard insures that the instrumentation is capable of detecting the compound at a known concentration.

GC/MS Volatiles/Semivolatiles Target compounds for both the volatile and semivolatile fractions were qualified because of non-compliant calibrations. Volatile and semivolatile compounds did not always meet the initial and/or continuing calibration criteria for RSD (Relative Standard Deviation), and %D (Percent Difference). All results qualified for calibration % RSD and % D deficiencies (J/UJ) are considered to be useable. For the compounds in the GC/MS volatile and semivolatile analyses that did not meet calibration criteria, all positive results are qualified as estimated (J) (%Ds >25%) and all non detect results are qualified as estimated (UJ) (>50% D <90%) due to calibration deficiencies.

Metals The positive results for the target analyte zinc was qualified as estimated, J, due to non-compliant serial dilution result.

7.0 PARCC SUMMARY

The purpose of evaluating the quality of the analytical data using the PARCC criteria was to address the qualification of the data in regards to evaluation of the presence, magnitude and characteristics of hazardous substances at NCBC Gulfport. Overall, the chemical analytical data are acceptable and exceeded the completion goal of 85 percent. Tables 7-1 and 7-2 provides a tabulation of the assessment of PARCC criteria each SDG for water samples and quality control samples, respectively.

7.1 Water Samples

The analytical data for this matrix was acceptable for all PARCC criteria categories. Eight (8) volatile data points were rejected due to continuing calibration standards which did not meet QC criteria. The completion goal was met. Twenty-eight (28) semivolatile data points were rejected due to continuing calibration standards which did not meet QC criteria. The completion goal was met.

7.2 QC Samples

The analytical data for this matrix was acceptable for all PARCC criteria categories. Sixteen (16) volatile data points were rejected due to continuing calibration standards which did not meet QC criteria. The completion goal was met. Twenty (20) semivolatile data points were rejected due to continuing calibration standards which did not meet QC criteria. The completion goal was met. Twenty-five (25) semivolatile data points were rejected due to surrogate recovery less than 10%. The completion goal was met.

TABLE 7 - 1
PARCC CRITERIA SUMMARY
GROUNDWATER SAMPLES
NCBC GULFPORT HO

SDGs	PRECISION	ACCURACY	REPRESENT-ATIVENESS	COMPARABILITY	COMPLETENESS
R8520	ACCEPTABLE	ACCEPTABLE	ACCEPTABLE	ACCEPTABLE	ACCEPTABLE (2) WITH REJECTIONS
R8548	ACCEPTABLE	ACCEPTABLE	ACCEPTABLE	ACCEPTABLE	ACCEPTABLE (1) (2) WITH REJECTIONS

(1) Eight (8) volatile data points were rejected due to initial and/or continuing calibration standards which did not meet QC criteria. Completion goal was met.

(2) Twenty-eight (28) semivolatile data points were rejected due to initial and/or continuing calibration standards which did not meet QC criteria. Completion goal was met.

TABLE 7 - 2
PARCC CRITERIA SUMMARY
QUALITY CONTROL SAMPLES
NCBC GULFPORT HO

SDGs	PRECISION	ACCURACY	REPRESENT-ATIVENESS	COMPARABILITY	COMPLETENESS
R8520	ACCEPTABLE	ACCEPTABLE (3) WITH REJECTIONS	ACCEPTABLE	ACCEPTABLE	ACCEPTABLE (1) (2) WITH REJECTIONS
R8548	ACCEPTABLE	ACCEPTABLE (3) WITH REJECTIONS	ACCEPTABLE	ACCEPTABLE	ACCEPTABLE (1) (2) WITH REJECTIONS

(1) Sixteen (16) volatile data points were rejected due to initial and/or continuing calibration standards which did not meet QC criteria. Completion goal was met.

(2) Twenty (20) semivolatile data points were rejected due to initial and/or continuing calibration standards which did not meet QC criteria. Completion goal was met.

(3) Twenty-five (25) semivolatile data points were rejected in one sample, due to surrogate recovery less than 10%. Completion goal was met.

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APPENDIX A

CALIBRATION SUMMARY

TABLE A-1

INITIAL AND CONTINUING CALIBRATION
VOLATILE ORGANIC COMPOUNDS
NCBC GULFPORT HO

ICAL = INITIAL CALIBRATION = %RSD	SDG R8520	SDG R8548		
CCAL = CONTINUING CALIBRATION = %D	CCAL1	CCAL1	CCAL2	CCAL3
DATE	081794	08/18/94	8/23/94	8/24/94
INSTRUMENT ID	5100	5100	5100	5100
CALIBRATION CRITERIA	RRF/%D	RRF/%D	RRF/%D	RRF/%D
ACETONE				45.2
DICHLORODIFLOUROMETHANE	33.8	35.8	35.8	
2-BUTANONE				0.041/28.1
DIBROMOCHLOROMETHANE			28.5	
BROMOFORM			46.6	27.4
TETRACHLORETHENE			32.8	
IODOMETHANE			33.20	34.2
ISOBUTANOL	0.018/50.0	0.015	0.017	0.007/68.2
PROPIONITRILE				42.9
METHACRYLONITRILE				33.4
ACETONITRILE	32.4			
1,4-DIOXANE	0.003	0.002/50.0	0.006	0.002/66.7
METHYL METHACRYLATE				29.0
1,2-DIBROMO-3-CHLOROPROPANE		38.9		36.4
PENTACHLOROETHANE	35.9	49.4		
CHLOROPRENE	97.4	99.9		

SDGS, STANDARDS, AND ASSOCIATED SAMPLES

SDG R8520

CCAL1: BS-01-DI2, BS-01-PI2

SDG R8548

CCAL1: BS-01-RI2

CCAL2: BS-02-TB2, GPTH02-1D, GPTH02-2, GPTH02-3, GPTH02-4, GPTH02-1, GPTH02-1MS

CCAL3: GPTH02-1MSD

TABLE A - 2

INITIAL AND CONTINUING CALIBRATION
SEMIVOLATILE ORGANIC COMPOUNDS
NCBC GULFPORT HO

ICAL = INITIAL CALIBRATION = %RSD	SDG R8520		SDG 8548	
CCAL = CONTINUING CALIBRATION = %D	CCAL1	CCAL2	CCAL1	CCAL2
DATE	082694	091494	090294	090694
INSTRUMENT ID	4600	4600	4600	4600
CALIBRATION CRITERIA	RRF/%D	RRF/%D	RRF/%D	RRF/%D
3-NITROANILINE	54.1			
4-NITROANILINE	31.0			
4-NITROPHENOL		41.1		
BENZIDINE	99.9			
4-AMINOBIPHENYL	63.4			
P-PHENYLENEDIAMINE	56.4	47.9		
HEXACHLOROPROPENE			99.9	99.9
SAFROLE			32.7	
ARAMITE-1			28.7	
ARAMITE-2				61.3
1,3,5-TRINITROBENZENE	30.0	68.0	35.2	40.4
4-NITROQUINOLINE-1-OXIDE	0.046/56.6	0.037	0.034/67.9	0.034/67.9
3,3'-DIMETHYLBENZIDINE	67.1	-45.9	99.9	99.9
PHENYL-TERT-BUTYLAMINE			46.6	32.6
1-NAPHTHYLAMINE			90.7	71.3
2-NAPHTHYLAMINE			99.9	99.9
2,3,4,6-TETRACHLOROPHENOL			31.6	
4-AMINOBIPHENYL			99.9	99.9
HEXACHLOROPHENE	0.031/75.8	0.026/40.9	0.023/82.0	0.020/84.4

SDGS, CALIBRATIONS AND ASSOCIATED SAMPLES:

SDG R8520

CCAL1: BS-01-DI2, BS-01-PI2
CCAL2: BS-01-PI2RE

SDG 8548

CCAL1: BS-01-RI2, GPTH02-1D, GPTH02-2, GPTH02-3, GPTH02-4, GPTH02-1, GPTH02-1MS, GPTH02-1MSD
CCAL2: GPTH02-1DRE, GPTH02-1RE, GPTH02-1MSRE, GPTH02-1MSDRE

APPENDIX B

SERIAL DILUTION SUMMARY

TABLE B - 1

WATER SAMPLE SERIAL DILUTION
METALS SUMMARY TABLE
NCBC GULFPORT HO

SAMPLE GPTHO2-1		SDG R8548
%D = PERCENT DIFFERENCE		%D
METALS ANALYTES	UNITS	
ANTIMONY	ug/L	NC
ARSENIC	ug/L	NA
BARIUM	ug/L	0.5
BERYLLIUM	ug/L	100
CADMIUM	ug/L	100
CALCIUM	ug/L	4.3
CHROMIUM	ug/L	10.3
COBALT	ug/L	11.5
COPPER	ug/L	1.8
IRON	ug/L	1.6
LEAD	ug/L	NA
MAGNESIUM	ug/L	0.6
MANGANESE	ug/L	1.5
MERCURY	ug/L	NA
NICKEL	ug/L	100
SELENIUM	ug/L	NA
SILVER	ug/L	NC
SODIUM	ug/L	2.70
THALLIUM	ug/L	NA
VANADIUM	ug/L	4.3
ZINC	ug/L	*10.2
TIN	ug/L	NC

*** - INDICATES VALUE OUTSIDE QC LIMITS**
NC DENOTES NO CALCULATION DUE TO NON-DETECT RESULTS IN BOTH SAMPLES
NA DENOTES COMPOUND NOT ANALYZED FOR

CORRESPONDING SDG'S AND ASSOCIATED SAMPLES

R8548: GPTH02-1, GPTH02-1D, GPTH02-2, GPTH02-3, GPTH02-4, BS-01-RI2
R8520: BS-01-DI2, BS-01-PI2

ANALYTE	RPD
	WATER
ALL ICP ANALYTES	+/-10%

+/-10% RULE ONLY APPLIES TO RESULTS GREATER THAN 50 TIMES THE IDL
(SOME VALUES ROUNDED TO LIMIT %Ds TO THREE (3) SIGNIFICANT FIGURES)

APPENDIX C

REJECTED DATA SUMMARY

TABLE C-1
GC/MS VOLATILES - REJECTED DATA
NCBC GULFPORT HO

SDG	# SAMPLES/MATRIX			# OF COMPOUNDS REJECTED PER MATIX	
	QC	GW		QC	GW
R8548	3	4		7	8
R8520	3	0		9	0
GRAND TOTAL	6	4		16	8
COMPLETION GOAL (>85%)				95.5%	96.6%

OVERALL COMPLETENESS
96.0%

MATRIX KEY

QC = QC SAMPLES
GW = GROUND WATER SAMPLES

*** 59 TARGET COMPOUNDS PER SAMPLE**

TABLE C - 2
DIOXIN/FURANS - REJECTED DATA
NCBC GULFPORT HO

SDG	# SAMPLES/MATRIX			# OF COMPOUNDS REJECTED PER MATIX	
	QC	GW		QC	GW
R8548	2	4		0	0
GRAND TOTAL	2	4		0	0
COMPLETION GOAL (>85%)				100.0%	100.0%

OVERALL COMPLETENESS
100.0%

MATRIX KEY

QC = QC SAMPLES
GW = GROUND WATER SAMPLES

*** 17 TARGET CONGENERS PER SAMPLE**

TABLE C - 3
SEMIVOLATILES - REJECTED DATA
NCBC GULFPORT HO

SDG	# SAMPLES/MATRIX			# OF COMPOUNDS REJECTED PER MATIX	
	QC	GW		QC	GW
R8548	2	4		14	28
R8520	2	0		31	0
GRAND TOTAL	4	4		45	28
COMPLETION GOAL (>85%)				89.7%	93.6%

OVERALL COMPLETENESS
91.6%

MATRIX KEY

QC = QC SAMPLES
GW = GROUND WATER SAMPLES

*** 109 TARGET COMPOUNDS PER SAMPLE**

TABLE C - 4
POLYNUCLEAR AROMATIC HYDROCARBONS - REJECTED DATA
NCBC GULFPORT HO

SDG	# SAMPLES/MATRIX		# OF COMPOUNDS REJECTED PER MATIX	
	QC	GW	QC	GW
R8548	2	4	0	0
R8520	2	0	0	0
GRAND TOTAL	4	4	0	0
COMPLETION GOAL (>85%)			100.0%	100.0%

OVERALL COMPLETENESS
100.0%

MATRIX KEY

QC = QC SAMPLES
GW = GROUND WATER SAMPLES

* 16 TARGET CONGENERS/ISOMERS PER SAMPLE

TABLE C - 5
PESTICIDE/PCBS - REJECTED DATA
NCBC GULFPORT HO

SDG	# SAMPLES/MATRIX			# OF COMPOUNDS REJECTED PER MATIX	
	QC	GW		QC	GW
R8548	2	4		0	0
R8520	2	0		0	0
GRAND TOTAL	4	4		0	0
COMPLETION GOAL (>85%)				100.0%	100.0%

OVERALL COMPLETENESS
100.0%

MATRIX KEY

QC = QC SAMPLES
GW = GROUND WATER SAMPLES

*** 30 TARGET COMPOUNDS PER SAMPLE**

TABLE C - 6
ORGANOPHOSPHOROUS PESTICIDES - REJECTED DATA
NCBC GULFPORT HO

				# OF COMPOUNDS REJECTED PER MATIX	
SDG	# SAMPLES/MATRIX			QC	GW
	QC	GW			
R8548	2	4		0	0
R8520	2	0		0	0
GRAND TOTAL	4	4		0	0
COMPLETION GOAL (>85%)				100.0%	100.0%

OVERALL COMPLETENESS
100.0%

MATRIX KEY

QC = QC SAMPLES
GW = GROUND WATER SAMPLES

*** 9 TARGET COMPOUNDS PER SAMPLE**

TABLE C - 7
HERBICIDES - REJECTED DATA
NCBC GULFPORT HO

SDG	# SAMPLES/MATRIX			# OF COMPOUNDS REJECTED PER MATIX	
	QC	GW		QC	GW
R8548	2	4		0	0
R8520	2	0		0	0
GRAND TOTAL	4	4		0	0
COMPLETION GOAL (>85%)				100.0%	100.0%

OVERALL COMPLETENESS
100.0%

MATRIX KEY

QC = QC SAMPLES
GW = GROUND WATER SAMPLES

*** 4 TARGET COMPOUNDS PER SAMPLE**

TABLE C - 8
KEPONE - REJECTED DATA
NCBC GULFPORT HO

SDG	# SAMPLES/MATRIX		# OF COMPOUNDS REJECTED PER MATIX	
	QC	GW	QC	GW
R8548	2	4	0	0
R8520	2	0	0	0
GRAND TOTAL	4	4	0	0
COMPLETION GOAL (>85%)			100.0%	100.0%

OVERALL COMPLETENESS
100.0%

MATRIX KEY

QC = QC SAMPLES
GW = GROUND WATER SAMPLES

*** 1 TARGET COMPOUND PER SAMPLE**

TABLE C - 9
TOTAL METALS - REJECTED DATA
NCBC GULFPORT HO

SDG	# SAMPLES/MATRIX			# OF COMPOUNDS REJECTED PER MATIX	
	QC	GW		QC	GW
R8548	2	4		0	0
R8520	2	0		0	0
GRAND TOTAL	4	4		0	0
COMPLETION GOAL (>85%)				100.0%	100.0%

OVERALL COMPLETENESS
100.0%

MATRIX KEY

QC = QC SAMPLES
GW = GROUND WATER SAMPLES

*** 22 TARGET ANALYTES PER SAMPLE**

TABLE C - 10
CYANIDE - REJECTED DATA
NCBC GULFPORT HO

SDG	# SAMPLES/MATRIX		# OF COMPOUNDS REJECTED PER MATIX	
	QC	GW	QC	GW
R8548	2	4	0	0
R8520	2	0	0	0
GRAND TOTAL	4	4	0	0
COMPLETION GOAL (>85%)			100.0%	100.0%

OVERALL COMPLETENESS
100.0%

MATRIX KEY

QC = QC SAMPLES
GW = GROUND WATER SAMPLES

*** 1 TARGET COMPOUND PER SAMPLE**

TABLE C - 11
SULFIDE - REJECTED DATA
NCBC GULFPORT HO

SDG	# SAMPLES/MATRIX		# OF COMPOUNDS REJECTED PER MATIX	
	QC	GW	QC	GW
R8548	2	4	0	0
R8520	2	0	0	0
GRAND TOTAL	4	4	0	0
COMPLETION GOAL (>85%)			100.0%	100.0%

OVERALL COMPLETENESS
100.0%

MATRIX KEY

QC = QC SAMPLES
GW = GROUND WATER SAMPLES

* 1 TARGET COMPOUND PER SAMPLE

Groundwater Sampling Event 3

PRECISION, ACCURACY, REPRESENTATIVENESS, COMPARABILITY, AND COMPLETENESS FOR NCBC GULFPORT HO

NAVAL CONSTRUCTION BATTALION CENTER GULFPORT, MISSISSIPPI

Prepared by:
Heartland Environmental Services, Inc.
P.O. Box 163
St. Peters, Missouri 63376

Prepared for:

ABB Environmental Services, Inc.
1400 Centerpoint Blvd., Suite 158
Knoxville, Tennessee 37922-1968

February 1995

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NCBC Gulfport HO

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NCBC Gulfport HO

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Serial Dilution Summary

NCBC Gulfport HO

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NCBC Gulfport HO

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1.0 INTRODUCTION

Prior to evaluating the data for precision, accuracy, representativeness, comparability, and completeness (PARCC) criteria the laboratory reviewed the data package and the data also were independently reviewed and validated using the Naval Energy and Environmental and Support Activity (NEESA) guidance document 20.2-047B (1988) entitled, *Sampling and Chemical Analysis Quality Assurance Requirements for the Navy Installation Program*. Before the laboratory released the chemical analytical results, both the sample and laboratory QC data were carefully reviewed in order to verify sample identity, instrument calibration, detection limits, dilution factors, numerical computations, accuracy of transcriptions, and chemical interpretations. Additionally, the QC data were reduced and spike recoveries were included in control charts, and the resulting data were reviewed to ascertain whether they were within the laboratory defined limits for accuracy and precision. The data were compiled into a NEESA Level D data package and any nonconforming data were discussed in the data package cover letter and case narrative.

The Level D data packages were then reviewed and validated by Heartland Environmental Services, Inc., Missouri (Heartland). Data validation is the technical review of a data package using criteria established in the data quality objectives, the quality assurance project plan and guidance documents prepared by the United States Environmental Protection Agency (USEPA) for the validation of organic and inorganic analytical data (USEPA 1990a and 1990b) as specified by NEESA document 20.2-047B. The data review and validation process is independent of the laboratory's checks because it is impossible to repeat the review conducted by the laboratory.

Samples that did not meet the acceptance limit criteria were qualified with a flag; single letter abbreviations that indicate a problem with the data. Data qualifiers used by the validators when amending the data include the following.

U — Undetected. The analyte was not detected above the contract required quantitation limit (CRQL). The "U" designator also is used to qualify laboratory contaminants. The "U" designator is applied to an environmental sample when the laboratory contaminant is detected in an environmental sample at a concentration less than 5 times (10 X for common contaminants) the value of the concentration detected in any corresponding field QC blank, method blank or preparation blanks.

J — Estimated. The analyte was present, but the reported value may not be accurate or precise. The "J" designator is used to qualify an analyte that was present at a concentration between the CRQL and method detection limit (MDL) or the data "failed" some of the analytical validation criteria but did not require rejections of the data. When combined with the U designator, the quantitation limit is estimated.

R — Rejected. Data was rejected by the data validator during comparison of the NEESA Level D data package with the analytical functional guideline criteria. The "R" designator indicates a significant variance in acceptable laboratory performance. Either re-analysis or re-sampling and analysis would be necessary to determine the presence or absence of the target analyte(s).

Once the data were reviewed and validated according to the guidance presented in NEESA document 20.2-047B, the data were evaluated by Heartland using the PARCCs criteria included in the Data Quality Objectives (DQOs) of the Work Plan for Naval Construction Battalion Center (NCBC) Gulfport, Mississippi, dated October 1993. The following sections present a brief description of PARCCs criteria.

Precision. Precision is a measure of the agreement or repeatability of a set of replicate results obtained from duplicate laboratory analyses of samples collected from the same location/depth interval. Precision was calculated from laboratory analytical data and cannot be measured directly. Precision is expressed as the Relative Percent Difference (RPD) between analytical values for two samples divided by the average of their analytical values. Precision is calculated using the expression:

$$RPD = (D1-D2) / (\tfrac{1}{2}(D1+D2)) \times 100$$

D1 and D2 are the reported values for the duplicate sample pair. Precision was evaluated using field duplicate samples and laboratory split samples (for example, MS/MSD samples).

Precision for environmental samples and their duplicates was assessed using a maximum RPD of 20 Percent for water matrices. Precision for MS/MSD/MD samples was assessed by using the target analyte specific RPD criteria for the spiked compounds and the sample duplicates.

Accuracy. Accuracy is a measure of the agreement between an experimental determination and the true value of the parameter being measured. Accuracy can be calculated from the analytical data and was not measured directly. Accuracy is used to identify the bias in a given measurement system (i.e. laboratory conditions, sample matrix, and sampling conditions). Accuracy is assessed by reviewing the Percent Recovery (%R) between the true value of the spike analyte and the actual analytical value. Accuracy is calculated using the equation:

$$\%R = ((A-B)/C) \times 100$$

A = Measured concentration of the spiked analyte.
B = Measured concentration of the spiked compound in the unspiked sample.
C = True concentration of the spiked analyte.

For the organic analyses, each of the samples was spiked with a surrogate compound; and for inorganic analyses, each chosen matrix spike and matrix duplicate pair was spiked with a known reference material before digestion. The recovery of the internals standards was used to assess accuracy for the Dioxin/Furan fraction. Each of these approaches provides a measure of the matrix effects on the analytical accuracy.

Representativeness. Representativeness is a qualitative measure of the degree to which sample data accurately and precisely represent a characteristic environmental condition. Representativeness is a subjective parameter and is used to evaluate the efficacy of the sampling plan design. Representativeness was evaluated using the field and laboratory QC blank sample results. QC blank samples are equipment rinseate blanks, field blanks, trip blanks, laboratory method blanks for organic analysis and laboratory preparation blanks for inorganic analysis. Positive detection of target analytes in the QC blank samples identify contaminants that possibly were introduced to the associated environmental sample during sample collection, transport or laboratory analysis. Representativeness was also evaluated used the defined extraction and analytical holding time requirements set forth in the Work Plan for NCBC Gulfport or the analytical methodology.

Comparability. Comparability is qualitative measure designed to express the confidence with which one data set may be compared to another. Factors that affect comparability are: sample collection and handling techniques, sample matrix type, and analytical method. Comparability is limited by the other PARCC parameters because only when precision and accuracy are known can data sets be compared with confidence.

Completeness. Completeness is defined as the percentage of measurements that are judged to be valid compared to the total number of measurements made. Valid usable data are values that were not qualified as rejected (R qualifier) during data validation. A goal of 85 percent usable data was established in the Work Plan for NCBC, Gulfport, Mississippi. Completeness equals the total number of analytes for each matrix minus the total number of rejected analytes divided by the total number of analytes multiplied by 100.

2.0 PRECISION

The following section describes the evaluation of precision for volatile organic compounds, dioxin/furans, semivolatile organic compounds, polynuclear aromatic hydrocarbons, pesticides and polychlorinated biphenyls (PCBs), organophosphorous pesticides, herbicides, metals and cyanide, and the wet chemistry parameter sulfide. Duplicate samples are evaluated for precision only when contaminants are detected in both the environmental sample and the sample's duplicate. A ND in the RPD column of the spreadsheet indicates that a RPD calculation was not required because one result was a non-detect and the other result was less than the compound/analyte CRQL/CRDL. Environmental samples and their respective duplicates may not exhibit positive results for all compounds found at or near the contract required quantitation limit (CRQL) or detection limit (CRDL) because of low levels of contamination found at a site. Duplicates with Relative Percent Differences (RPDs) within control limits indicate adequate sampling practices and/or good analytical precision. Duplicates with RPDs outside the control limits may result from inappropriate sampling procedures, matrix interferences, or non-homogeneity of the sample matrix. In addition, poor precision can be attributed to deviation(s) from the analytical methodology or to poor reproducibility of target analyte concentrations at or near the required quantitation or detection limits (CRQLs or CRDLs). The acceptance criteria for evaluating precision of field duplicates analytical results is a RPD of 20 for water matrices.

The percent of duplicate samples collected for the analytical parameters and sample matrices was greater than ten percent (10%) for the water matrix as specified in the Work Plan for NCBC Gulfport, Mississippi. The following Sections summarize the evaluation of analytical precision for the water matrix for the following analytical groups:

- GC/MS volatile organic compounds (GC/MS VOCs);
- dioxin/furan compounds (D/Fs);
- semivolatile organic compounds (SVOCs);
- polynuclear aromatic hydrocarbons (PAHs);
- pesticides, PCBs,;
- organophosphorous pesticides;
- herbicides; and
- inorganics, cyanide, & sulfide.

Duplicate precision was assessed using both environmental sample and associated duplicates and matrix spike (MS)/matrix spike duplicates (MSDs) pairs for organic fractions, and matrix duplicate pairs (MD pairs) for the metals/cyanide, and sulfide fractions.

Tabulation of the results of assessing duplicate precision and duplicate frequency are presented in Tables 2-1 and 2-2 for the water matrix. The results of the evaluation of precision for MS/MSD samples is provided in Tables 2-3 through 2-11 for the water matrix.

In addition, to assess whether instrument calibration for volatile, semivolatile, and pesticides/PCBs analytical methods resulted in non-compliant duplicate precision, tables were made of initial and continuing calibration outliers for each sample delivery group (SDG) and are included in Appendix A. Calibration criteria was met in the other organic fractions. Therefore, tables of calibration criteria were not prepared for those fractions. To assess the potential for non-compliance in metals analytical data, caused by physical and/or chemical interferences and indicated by non-compliant serial dilution results, tables were prepared of serial dilution results. These are included in Appendix B.

TABLE 2 - 1

ORGANIC FRACTIONS
WATER SAMPLE AND DUPLICATE PRECISION
NCBC GULFPORT HO

VOLATILES

SDG	SAMPLE ID	MATRIX	NO. ASSC. SAMPLES	COMPOUND	SAMPLE CONC.	DUP CONC	MAX RPD	RPD
BS01D13	GPTH03-3	WATER	4	NO COMPOUNDS DETECTED				
	TOTAL SAMPLES		4					

SEMIVOLATILES

SDG	SAMPLE ID	MATRIX	NO. ASSC. SAMPLES	COMPOUND	SAMPLE CONC.	DUP CONC	MAX RPD	RPD
BS01D13	GPTH03-3	WATER	4	PHENOL	2	2	20%	0%
				2-CHLOROPHENOL	1	1	20%	0%
				2,4-DICHLOROPHENOL	0.8	0	20%	ND
				NAPHTHALENE	14	27	20%	63%
	TOTAL SAMPLES		4					

DIOXIN/FURANS

SDG	SAMPLE ID	MATRIX	NO. ASSC. SAMPLES	COMPOUND	SAMPLE CONC.	DUP CONC	MAX RPD	RPD
BS01D13	GPTH03-3	WATER	4	TCDFs (TOTAL)	10	12	20%	18%
				TCDDs (TOTAL)	44	55	20%	22%
				2,3,7,8-TCDD	0	6.2	20%	200%
				HxCDDS (TOTAL)	180	260	20%	36%
				HpCDDs (TOTAL)	270	450	20%	50%
				1,2,3,4,6,7,8-HpCDD	90	160	20%	56%
				OCDD	1700	3400	20%	67%
	TOTAL SAMPLES		4					

POLYNUCLEAR AROMATIC HYDROCARBONS

SDG	SAMPLE ID	MATRIX	NO. ASSC. SAMPLES	COMPOUND	SAMPLE CONC.	DUP CONC	MAX RPD	RPD
BS01D13	GPTH03-3	WATER	4	NO COMPOUNDS DETECTED				
	TOTAL SAMPLES		4					

PESTICIDES/PCBS

SDG	SAMPLE ID	MATRIX	NO. ASSC. SAMPLES	COMPOUND	SAMPLE CONC.	DUP CONC	MAX RPD	RPD
BS01D13	GPTH03-3	WATER	4	NO COMPOUNDS DETECTED				
	TOTAL SAMPLES		4					

TABLE 2 - 1, CONTINUED

ORGANIC FRACTIONS

WATER SAMPLE AND DUPLICATE PRECISION

NCBC GULFPORT HO

ORGANOPHOSPHOROUS PESTICIDES

SDG	SAMPLE ID	MATRIX	NO. ASSC. SAMPLES	COMPOUND	SAMPLE CONC.	DUP CONC	MAX RPD	RPD
BS01D13	GPTH03-3	WATER	4	NO COMPOUNDS DETECTED				
	TOTAL SAMPLES		4					

CHLORINATED HERBICIDES

SDG	SAMPLE ID	MATRIX	NO. ASSC. SAMPLES	COMPOUND	SAMPLE CONC.	DUP CONC	MAX RPD	RPD
BS01D13	GPTH03-3	WATER	4	SILVEX	1.5	1.3	20%	14%
	TOTAL SAMPLES		4					

TABLE 2 - 1, CONTINUED

ORGANIC FRACTIONS
WATER SAMPLE AND DUPLICATE PRECISION
NCBC GULFPORT HO

VOLATILES

% OF DUPLICATES COLLECTED	RPD IN	RPD OUT	% WITHIN RPD LIMIT
25.0%	1	0	100.0%

SEMI VOLATILES

% OF DUPLICATES COLLECTED	RPD IN	RPD OUT	% WITHIN RPD LIMIT
25.0%	3	1	75.0%

DIOXIN/FURANS

% OF DUPLICATES COLLECTED	RPD IN	RPD OUT	% WITHIN RPD LIMIT
25.0%	1	5	16.7%

POLYNUCLEAR AROMATIC HYDROCARBONS

% OF DUPLICATES COLLECTED	RPD IN	RPD OUT	% WITHIN RPD LIMIT
25.0%	1	0	100.0%

PESTICIDES/PCBS

% OF DUPLICATES COLLECTED	RPD IN	RPD OUT	% WITHIN RPD LIMIT
25.0%	1	0	100.0%

ND - INDICATES RPD CALCULATION NOT REQUIRED BECAUSE ONE (1) RESULT IS NON-DETECT AND THE OTHER RESULT IS BELOW THE CRQL.

TABLE 2 - 1, CONTINUED

ORGANIC FRACTIONS
WATER SAMPLE AND DUPLICATE PRECISION
NCBC GULFPORT HO

ORGANOPHOSPHOROUS PESTICIDES

% OF DUPLICATES COLLECTED	RPD IN	RPD OUT	% WITHIN RPD LIMIT
25.0%	1	0	100.0%

CHLORINATED HERBICIDES

% OF DUPLICATES COLLECTED	RPD IN	RPD OUT	% WITHIN RPD LIMIT
25.0%	1	0	100.0%

ND - INDICATES RPD CALCULATION NOT REQUIRED BECAUSE ONE (1) RESULT IS NON-DETECT AND THE OTHER RESULT IS BELOW THE CRQL.

TABLE 2 - 2

INORGANIC FRACTIONS
WATER SAMPLE AND DUPLICATE PRECISION
NCBC GULFPORT HO

METALS

SDG	SAMPLE ID	MATRIX	NO. ASSC. SAMPLES	COMPOUND	SAMPLE CONC.	DUP CONC	MAX RPD	RPD
BS01D13	GPTH03-3	WATER	4	ARSENIC	35.6	35.9	20%	1%
				BARIUM	114.0	114.0	20%	0%
				BERYLLIUM	2.3	1.9	20%	19%
				CHROMIUM	104	94.7	20%	9%
				COBALT	18.8	16.7	20%	12%
				COPPER	25.5	23.6	20%	8%
				LEAD	37	32.5	20%	13%
				MERCURY	0.28	0.24	20%	15%
				NICKEL	39.4	34.3	20%	14%
				SELENIUM	13.3	12.5	20%	6%
				THALLIUM	0	8.3	20%	ND
				VANADIUM	130	130	20%	0%
				ZINC	37	317	20%	158%
	TOTAL SAMPLES		4					

SULFIDE

SDG	SAMPLE ID	MATRIX	NO. ASSC. SAMPLES	COMPOUND	SAMPLE CONC.	DUP CONC	MAX RPD	RPD
BS01D13	GPTH03-3	WATER	4	SULFIDE	1	1	20%	0%
	TOTAL SAMPLES		4					

TABLE 2 - 2
INORGANIC FRACTIONS
WATER SAMPLE AND DUPLICATE PRECISION
NCBC GULFPORT HO

METALS

% OF DUPLICATE COLLECTED	RPD IN	RPD OUT	% WITHIN RPD LIMIT
25.0%	12	1	92%

SULFIDE

% OF DUPLICATE COLLECTED	RPD IN	RPD OUT	% WITHIN RPD LIMIT
25.0%	1	0	100.0%

ND - INDICATES RPD CALCULATION NOT REQUIRED BECAUSE ONE (1) RESULT IS NON-DETECT AND THE OTHER RESULT IS BELOW THE CRDL.

TABLE 2 - 3

GC/MS VOLATILE ORGANICS COMPOUNDS
WATER SAMPLE MATRIX SPIKE/MATRIX SPIKE DUPLICATES
NCBC GULFPORT HO

MS = MATRIX SPIKE *SAMPLE GPTH03-1*		SDG BS01D13		
MSD = MATRIX SPIKE DUPLICATE		MS	MSD	
RPD = RELATIVE PERCENT DIFFERENCE		%R	%R	%RPD
VOA COMPOUNDS	UNITS			
1,1-DICHLOROETHENE	ug/L	94	100	6
TRICHLOROETHENE	ug/L	92	98	6
BENZENE	ug/L	94	98	4
TOLUENE	ug/L	94	100	6
CHLOROBENZENE	ug/L	94	98	4

*** DENOTES VALUE NOT WITHIN QA/QC ADVISORY LIMITS**

CORRESPONDING SDG'S AND ASSOCIATED SAMPLES

BS01D13: GPTH03-1, GPTH03-2, GPTH03-3, GPTH03-3D, GPTH03-4

COMPOUND	ADVISORY LIMITS		RPD
	%R WATER		WATER
1,1-DICHLOROETHENE	61%-145%		14
TRICHLOROETHENE	71%-120%		14
BENZENE	76%-127%		11
TOLUENE	76%-125%		13
CHLOROBENZENE	75%-130%		13

TABLE 2 - 4

DIOXIN/FURAN
WATER SAMPLE MATRIX SPIKE/ DUPLICATES
NCBC GULFPORT HO

MS = MATRIX SPIKE *SAMPLE GPTH03-1*		SDG BS01D13		
MSD = MATRIX SPIKE DUPLICATE		MS	MSD	
RPD = RELATIVE PERCENT DIFFERENCE		%R	%R	RPD
DIOXIN/FURAN CONGENERS	UNITS			
2378-TCDF	ug/L	93.0	92.0	1.0
12378-PeCDF	ug/L	96	94	2.0
23478-PeCDF	ug/L	91	90	0.0
123478-HxCDF	ug/L	96	96	0.0
123678-HxCDF	ug/L	99	101	1.0
234678-HxCDF	ug/L	87	94	8.0
123789-HxCDF	ug/L	76	84	10.0
1234678-HpCDF	ug/L	100	102	3.0
1234789-HpCDF	ug/L	88	94	6.0
OCDF	ug/L	110	100	9.0
2378-TCDD	ug/L	94	97	3.0
12378-PeCDD	ug/L	101	106	5.0
123478-HxCDD	ug/L	95	9	2.0
123678-HxCDD	ug/L	106	108	2.0
123789-HxCDD	ug/L	84	90	7.0
1234678-HpCDD	ug/L	98	97	1.0
OCDD	ug/L	111	88	*23

*** DENOTES VALUE NOT WITHIN QA/QC ADVISORY LIMITS**

CORRESPONDING SDG'S AND ASSOCIATED SAMPLES

BS01D13: GPTH03-1, GPTH03-2, GPTH03-3, GPTH03-3D, GPTH03-4

QC LIMITS WERE NOT PROVIDED BY THE LABORATORY.
%R AND RPDS WERE DEEMED IN CONTROL BY THE DATA REVIEWER.

TABLE 2 - 5

SEMIVOLATILE ORGANICS COMPOUNDS
WATER SAMPLE MATRIX SPIKE/MATRIX SPIKE DUPLICATES
NCBC GULFPORT HO

MS = MATRIX SPIKE *SAMPLE GPTH03-1*		SDG BS01D13		
MSD = MATRIX SPIKE DUPLICATE		MS	MSD	
RPD = RELATIVE PERCENT DIFFERENCE		%R	%R	%RPD
SVOA COMPOUNDS	UNITS			
PHENOL	ug/L	69	67	3
2-CHLOROPHENOL	ug/L	71	64	10
1,4-DICHLOROBENZENE	ug/L	60	50	18
N-NITROSO-DI-N-PROP.(1)	ug/L	64	56	13
1,2,4-TRICHLOROBENZENE	ug/L	66	58	13
4-CHLORO-3-METHYLPHENOL	ug/L	75	67	11
ACENAPHTHENE	ug/L	64	56	13
4-NITROPHENOL	ug/L	69	52	28
2,4-DINITROTOLUENE	ug/L	74	58	24
PENTACHLOROPHENOL	ug/L	80	57	34
PYRENE	ug/L	38	*20	*62

*** DENOTES VALUE NOT WITHIN QA/QC ADVISORY LIMITS**

CORRESPONDING SDG'S AND ASSOCIATED SAMPLES

BS01D13: GPTH03-1, GPTH03-2, GPTH03-3, GPTH03-3D, GPTH03-4

COMPOUND	ADVISORY LIMITS	RPD
	% R WATER	WATER
PHENOL	12%-110%	42
2-CHLOROPHENOL	27%-123%	40
1,4-DICHLOROBENZENE	36%-97%	28
N-NITROSO-DI-N-PROP.(1)	41%-116%	38
1,2,4-TRICHLOROBENZENE	39%-98%	28
4-CHLORO-3-METHYLPHENOL	23%-97%	42
ACENAPHTHENE	46%-118%	31
4-NITROPHENOL	10%-80%	50
2,4-DINITROTOLUENE	24%-96%	38
PENTACHLOROPHENOL	9%-103%	50
PYRENE	26%-127%	31

TABLE 2 - 6

POLYNUCLEAR AROMATIC HYDROCARBONS
WATER SAMPLE MATRIX SPIKE/MATRIX SPIKE DUPLICATES
NCBC GULFPORT HO

MS = MATRIX SPIKE *SAMPLE GPTH03-1*		SDG BS01D13		
MSD = MATRIX SPIKE DUPLICATE		MS	MSD	
RPD = RELATIVE PERCENT DIFFERENCE		%R	%R	%RPD
PAH COMPOUNDS	UNITS			
ACENAPHTHENE	ug/L	75	74	0.5
ACENAPHTHYLENE	ug/L	72	71	0.5
ANTHRACENE	ug/L	96	96	0.0
BENZO(A)ANTHRACENE	ug/L	82	82	0.0
BENZO(A)PYRENE	ug/L	67	68	1.5
BENZO(B)FLUORANTHENE	ug/L	73	73	0.0
BENZO(GHI)PERYLENE	ug/L	51	51	0.49
BENZO(K)FLUORANTHENE	ug/L	74	74	0
CHRYSENE	ug/L	58	58	1.7
DIBENZO(AH)ANTHRACENE	ug/L	59	59	0.42
FLUORANTHENE	ug/L	84	84	0
FLUORENE	ug/L	88	88	0.28
INDENO(123-CD)PYRENE	ug/L	56	55	0.9
NAPHTHALENE	ug/L	73	72	0.13
PHENANTHRENE	ug/L	109	109	0
PYRENE	ug/L	88	88	0.56

*** DENOTES VALUE NOT WITHIN QA/QC ADVISORY LIMITS**

CORRESPONDING SDG AND ASSOCIATED SAMPLES

BS01D13: GPTH03-1, GPTH03-2, GPTH03-3, GPTH03-3D, GPTH03-4

QC LIMITS WERE NOT PROVIDED BY THE LABORATORY.
RECOVERIES AND RPDS WERE DEEMED IN CONTROL BY THE DATA VALIDATOR.

TABLE 2 - 7

PESTICIDES/PCBS
WATER SAMPLE MATRIX SPIKE/MATRIX SPIKE DUPLICATES
NCBC GULFPORT HO

MS = MATRIX SPIKE *SAMPLE GPTH03-1*		SDG BS01D13		
MSD = MATRIX SPIKE DUPLICATE		MS	MSD	
RPD = RELATIVE PERCENT DIFFERENCE		%R	%R	%RPD
PEST COMPOUNDS	UNITS			
gamma-BHC (Lindane)	ug/L	64	78	*20
Heptachlor	ug/L	80	74	8
Aldrin	ug/L	72	70	3
Dieldrin	ug/L	91	86	6
Endrin	ug/L	95	89	7
4,4'-DDT	ug/L	83	79	5

*** DENOTES VALUE NOT WITHIN QA/QC ADVISORY LIMITS**

CORRESPONDING SDG AND ASSOCIATED SAMPLES

BS01D13: GPTH03-1, GPTH03-2, GPTH03-3, GPTH03-3D, GPTH03-4

COMPOUND	ADVISORY LIMITS		RPD
	% R WATER		WATER
gamma-BHC(Lindane)	56%-123%		15
HEPTACHLOR	40%-131%		20
ALDRIN	40%-120%		22
DIELDRIN	52%-126%		18
ENDRIN	56%-121%		21
4,4'-DDT	38%-127%		27

TABLE 2 - 8

ORGANOPHOSPHOROUS PESTICIDES
WATER SAMPLE MATRIX SPIKE.MATRIX SPIKE DUPLICATES
NCBC GULFPORT HO

MS = MATRIX SPIKE *SAMPLE GPTHO3-1*		SDG BS01D13		
MSD = MATRIX SPIKE DUPLICATE		MS	MSD	
RPD = RELATIVE PERCENT DIFFERENCE		%R	%R	%RPD
OPP COMPOUNDS	UNITS			
THIONAZIN	ug/L	*124	115	8
SULFOTEPP	ug/L	113	102	11
PHORATE	ug/L	*128	*116	10
DISULFOTON	ug/L	108	102	6
METHYLPARATTHION	ug/L	*112	101	11
PARATHION	ug/L	*120	110	8
FAMPHUR	ug/L	109	101	7
O,O,O-TRIETHYLL PHOSPHATE	ug/L	111	101	9
DIMETHOATE	ug/L	112	105	6

*** DENOTES VALUE NOT WITHIN QA/QC ADVISORY LIMITS**

CORRESPONDING SDG AND ASSOCIATED SAMPLES

BS01D13: GPTH03-1, GPTH03-2, GPTH03-3, GPTH03-3D, GPTH03-4

COMPOUND	ADVISORY LIMITS		RPD
	% R WATER		WATER
THIONAZIN	57%-123%		14
SULFOTEPP	41%-137%		30
PHORATE	24%-115%		36
DISULFOTON	18%-120%		43
METHYLPARATTHION	27%-111%		28
PARATHION	19%-110%		54
FAMPHUR	43%-144%		42
O,O,O-TRIETHYLL PHOS	41%-128%		24
DIMETHOATE	55%-123%		34

TABLE 2 - 9

HERBICIDES
WATER SAMPLE MATRIX SPIKE/MATRIX SPIKE DUPLICATES
NCBC GULFPORT HO

MS = MATRIX SPIKE *SAMPLE GPTHO3-1*		SDG BS01D13		
MSD = MATRIX SPIKE DUPLICATE		MS	MSD	
RPD = RELATIVE PERCENT DIFFERENCE		%R	%R	%RPD
HERB COMPOUNDS	UNITS			
2,4-D	ug/L	85	79	7
SILVEX	ug/L	81	70	14
2,4,5-T	ug/L	83	70	17
DINOSEB	ug/L	*38	*36	3

*** DENOTES VALUE NOT WITHIN QA/QC ADVISORY LIMITS**

CORRESPONDING SDG AND ASSOCIATED SAMPLES

BS01D13: GPTH03-1, GPTH03-2, GPTH03-3, GPTH03-3D, GPTH03-4

COMPOUND	ADVISORY LIMITS	RPD
	% R WATER	WATER
2,4-D	33%-137%	32
SILVEX	35%-139%	39
2,4,5-T	22%-139%	29
DINOSEB	74%-98%	50

TABLE 2 - 10

METALS AND CYANIDE
WATER SAMPLE MATRIX SPIKE/ DUPLICATES
NCBC GULFPORT HO

MS = MATRIX SPIKE *SAMPLE GPTHO3-1*		SDG BS01D13	
MD = MATRIX DUPLICATE *SAMPLE GPTHO3-1*		MS	MD
RPD = RELATIVE PERCENT DIFFERENCE		%R	RPD
METALS COMPOUNDS	UNITS		
ANTIMONY	ug/L	82.2	200
ARSENIC	ug/L	101	11.4
BARIUM	ug/L	100	0.8
BERYLLIUM	ug/L	110	NC
CADMIUM	ug/L	102	NC
CHROMIUM	ug/L	100	0.6
COBALT	ug/L	101	0.3
COPPER	ug/L	100	1.3
LEAD	ug/L	99	4.1
MERCURY	ug/L	112	7.2
NICKEL	ug/L	101	4.9
SELENIUM	ug/L	*70	200
SILVER	ug/L	97.4	NC
THALLIUM	ug/L	93.7	200
VANADIUM	ug/L	99.2	1.7
ZINC	ug/L	103	5.8
CYANIDE	ug/L	102	NC
TIN	ug/L	104	5.7

*** DENOTES VALUE NOT WITHIN QA/QC ADVISORY LIMITS**

NC DENOTES THAT BOTH SAMPLES ARE NON-DETECT AND A RPD CANNOT BE CALCULATED.
NR DENOTES THAT A MATRIX SPIKE RECOVERY CALCULATION IS NOT REQUIRED.

CORRESPONDING SDG'S AND ASSOCIATED SAMPLES

BS01D13: GPTH03-1, GPTH03-2, GPTH03-3, GPTH03-3D, GPTH03-4

COMPOUND	ADVISORY LIMITS		RPD
	%R WATER		WATER
ALL COMPOUNDS	75%-125%		+/-20 OR +/-CRDL

+/- CRDL = RPD Limits applicable only on values 5 times the Contract Required Detection Limit (CRDL)

TABLE 2 - 11

SULFIDE

WATER SAMPLE MATRIX SPIKE/ DUPLICATES

NCBC GULFPORT HO

MS = MATRIX SPIKE *SAMPLE GPTHO3-1*		SDG BS01D13		
MD = MATRIX DUPLICATE *SAMPLE GPTHO3-1*		MS	MSD	
RPD = RELATIVE PERCENT DIFFERENCE		%R	%R	RPD
	UNITS			
SULFIDE	ug/L	76.0	76.0	0.0

*** DENOTES VALUE NOT WITHIN QA/QC ADVISORY LIMITS**

NC DENOTES THAT BOTH SAMPLES ARE NON-DETECT AND A RPD CANNOT BE CALCULATED.

CORRESPONDING SDG'S AND ASSOCIATED SAMPLES

BS01D13: GPTH03-1, GPTH03-2, GPTH03-3, GPTH03-3D, GPTH03-4

COMPOUND	ADVISORY LIMITS		RPD
	%R WATER		WATER
ALL COMPOUNDS	25%-197%		11

2.1 Water Matrix

No target compounds requiring RPD calculation were detected in either the water samples or associated duplicates for the volatiles, polynuclear aromatic hydrocarbons, pesticides/PCBs, and organophosphorous pesticides (Table 2-1). Therefore, no precision assessment was conducted for those parameters.

The dioxin/furan analysis of the field duplicate pair of sample GPTH03-3 exhibited non-compliant RPDs six (6) of the seven (7) congeners detected (Table 2-1). The non-compliant congeners were total TCDD, 2,3,7,8-TCDD, total HxCDD, total HpCDD, 1,2,3,4,6,7,8-HpCDD, and OCDD. The disparity in the results may be attributed to the high turbidity of the samples, and the amount of suspended solids present when the analyst extracted the samples. The samples were not decanted prior to extraction.

The semivolatile analysis of the field duplicate pair of sample GPTH03-3 exhibited a non-compliant RPD for one (1) of the four (4) compounds detected (Table 2-1). The non-compliant compound was naphthalene. The non-compliance for naphthalene could be also be attributed to the high turbidity of the samples. Assessment of the calibration data indicates that criteria was met for the non-compliant compound (Appendix A, Table A-2).

One (1) of the twelve (12) target analytes detected in the metals analysis of the field duplicate pair of sample GPTH03-1 which required RPD calculation exhibited a non-compliant RPD (Table 2-2). The target analyte with a non-compliant RPD was zinc. The analyte was also non-compliant for serial dilution criteria (Appendix B). This may be indicative of a matrix interference. The non-compliance for zinc may be attributed to potential matrix interferences. All positive results for zinc in the associated samples were appropriately qualified as estimated, J, due to the serial dilution non-compliance.

The field duplicate pair of sample GPTH03-3 analyzed for sulfide exhibited a compliant RPD (Table 2-2).

The evaluation of precision of the water matrix for the MS/MSD samples is provided in Tables 2-3 through 2-11. All MS/MSD sample pairs analyzed for volatiles, polynuclear aromatic hydrocarbons, organophosphorous pesticides, herbicides, metals and cyanide, and sulfide exhibited acceptable RPDs between spike compounds (Tables 2-3, 2-6, 2-8, 2-9, 2-10, and 2-11).

The dioxin/furan analysis of the MS/MSD pair of samples GPTH03-1 exhibited a non-compliant RPD for the congener OCDD (Table 2-4). However, based on the assessment of additional QC criteria the analytical data did not require qualification.

The semivolatile analysis of the MS/MSD pair of sample GPTH03-1 exhibited a non-compliant RPDs for the compound pyrene (Table 2-5). The non-compliance resulted from the recovery below the QC limits in the MSD sample. However, based on the assessment of additional QC criteria, the analytical data did not require qualification.

The pesticides/PCBs analysis of the MS/MSD pair of sample GPTH03-1 exhibited a non-compliant RPDs for the compound lindane (Table 2-7). However, based on the assessment of additional QC criteria, the analytical data did not require qualification.

Based on assessment of duplicate precision evaluation criteria, the water matrix analytical data was acceptable for each SDG with the noted potential for bias in the metals analyte zinc.

3.0 ACCURACY

The assessment of accuracy is evaluated by comparison of the percent recovery (%R) computed from the known concentration of analyte spikes and their recovered concentration versus the analytical method acceptance criteria. Spike recoveries provide an indication of bias, where the reported data may either overestimate or underestimate the actual concentration of detected compounds and/or the detection limits. Recoveries outside acceptable criteria may be caused by factors such as matrix interference, poor analytical precision, or instrument calibration.

The following Sections summarize the evaluation of analytical accuracy for the water matrix for the following analytical groups:

- GC/MS volatile organic compounds (GC/MS VOCs);
- dioxin/furan compounds (D/Fs);
- semivolatile organic compounds (SVOCs);
- polynuclear aromatic hydrocarbons (PAHs);
- pesticides, PCBs,;
- organophosphorous pesticides;
- herbicides; and
- inorganics, cyanide, & sulfide.

Accuracy was assessed using MS and MSD samples for organic analyses and MS samples for inorganic analyses for each matrix, as well as surrogate compound recoveries for those analytical fraction which utilize them. Accuracy for the dioxin/furan fraction was assessed using the recovery of internal standards. The results of the evaluation of accuracy for the MS/MSD samples is provided in Tables 2-3 through 2-11 for water matrix. The results of the evaluation of accuracy for the surrogates in the samples are provided in Table 3-1 through 3-7 for the water matrix.

3.1 Water Matrix

All MS/MSD sample pairs analyzed for volatiles, dioxin/furans, polynuclear aromatic hydrocarbons, pesticides/PCBs, and sulfide exhibited acceptable recoveries of spike compounds (Tables 2-3, 2-4, 2-6, 2-7, and 2-11).

The surrogate recoveries for volatiles, polynuclear aromatic hydrocarbons, organophosphorous pesticides, and herbicides were acceptable (Tables 3-1, 3-4, 3-6, and 3-7).

The internal standard (IS) recoveries for the dioxin/furan fraction were acceptable with the exception of one (1) IS in three (3) samples (Table 3-2). The reported results for OCDD in samples GPTH03-2, GPTH03-3D, and GPTH03-4 were appropriately qualified as estimated, J/UJ, and should be considered potentially underestimated.

The MS/MSD of sample GPTH03-1 analyzed for semivolatile organics had a non-compliant %R for pyrene in the MSD (Table 2-5). Based on the assessment of additional QC criteria the analytical data did not require qualification.

Four (4) semivolatile samples exhibited acid surrogate recoveries which were outside the minimum acceptable criteria for accuracy (Table 3-3). The surrogate compound terphenyl-D_4 was recovered below the QC limits. However, the National Functional Guidelines and the SOW allow one (1) surrogate compound per fraction to exceed the QC limits as long as the recovery is above 10%. Therefore, the analytical data did not require qualification.

TABLE 3 - 1

SURROGATE % RECOVERIES
GC/MS VOLATILE WATER SAMPLES
NCBC GULFPORT HO

SDG	SAMPLE ID	SMC1	SMC2	SMC3	TOTAL OUT
BS01D13	BS-01-D1	97	97	94	0
	BS-01-RI	101	99	91	0
	BS-01-TB3	99	96	95	0
	GPTH03-1	97	96	91	0
	GPTH03-1MS	100	96	92	0
	GPTH03-1MSD	100	97	92	0
	GPTH03-2	101	98	93	0
	GPTH03-3	99	93	94	0
	GPTH03-3D	99	96	91	0
	GPTH03-4	100	98	94	0

SMC1 = TOLUENE-D8 QC LIMITS 88% - 110%
SMC2 = BROMOFLUOROBENZENE QC LIMITS 86% - 115%
SMC3 = 1,2-DICHLOROETHANE-D4 QC LIMITS 76% - 114%

# SAMPLES	% REC IN	%REC OUT	% TOTAL IN
1	30	0	100.0%

TABLE 3 - 2

WATER SAMPLE INTERNAL STANDARDS % RECOVERIES
DIOXIN/FURAN
NCBC GULFPORT HO

	BS-01-DI	BS-01-RI	GPTHO3-1	GPTHO3-1MS	GPTHO3-1MD	GPTHO3-2	GPTHO3-3	GPTHO3-3D	GPTHO3-4
I.S. COMPOUND									
13C-2378-TCDF	75	77	88	86	93	68	75	78	78
13C-2378-TCDD	78	79	88	87	96	64	73	80	72
13C-12378-PeCDF	79	76	81	80	91	63	75	69	69
13C-12378-PeCDD	76	73	76	77	84	59	68	66	60
13C-123478-HxCDF	90	91	95	100	99	93	94	73	107
13C-123678-HxCDD	94	94	96	99	101	94	96	78	102
13C-1234678-HpCDF	71	69	70	75	79	70	78	56	76
13C-1234678-HpCDD	71	70	62	68	78	61	74	57	68
13C-OCDD	49	50	45	41	55	*31	51	*34	*39
TOTAL OUT	0	0	0	0	0	1	0	1	1

QC LIMITS: 40% - 120%
* - VALUE OUTSIDE OF QC LIMITS

# SAMPL	% REC IN	% REC OUT	% TOTAL IN
9	78	3	96.3%

TABLE 3 - 3

SURROGATE % RECOVERIES
SEMIVOLATILE WATER SAMPLES
NCBC GULFPORT HO

SDG	SAMPLE ID	S1	S2	S3	S4	S5	S6	S7	S8	TOTAL OUT
BS01D13	BS-01-D13	89	87	85	73	76	99	84	69	0
	BS-01-RI3	72	72	68	59	59	84	71	61	0
	GPTH03-1	76	76	78	65	77	38	75	64	0
	GPTH03-1MS	78	82	70	64	75	36	77	61	0
	GPTH03-1MSD	73	73	70	57	61	*17	69	53	1
	GPTH03-2	77	63	79	69	78	46	76	66	0
	GPTH03-3	68	68	58	53	67	*14	68	57	1
	GPTH03-3D	76	75	65	57	69	*14	74	64	1
	GPTH03-4	78	77	78	64	71	*17	74	66	1

S1 = 2-FLUOROPHENOL QC LIMITS = 21% - 110%
S2 = PHENOL-D5 QC LIMITS = 10% - 110%
S3 = NITROBENZENE-D5 QC LIMITS = 35% - 114%
S4 = 2-FLUOROBIPHENYL QC LIMITS = 43% - 116%
S5 = 2,4,6-TRIBROMOPHENOL QC LIMITS = 10% - 123%
S6 = TERPHENYL-D14 QC LIMITS = 33% - 141%
S7 = 2-CHLOROPHENOL-D4 QC LIMITS = 33% - 110% (ADVISORY)
S8 = 1,2-DICHLOROBENZENE-D4 QC LIMITS = 16% - 110% (ADVISORY)

# SAMPLES	% REC IN	%REC OUT	% TOTAL IN
9	68	4	94.4%

TABLE 3 - 4

SURROGATE % RECOVERIES
POLYNUCLEAR AROMATIC HYDROCARBONS WATER SAMPLES
NCBC GULFPORT HO

SDG	SAMPLE ID	S1	S2	TOTAL OUT
BS01D13	BS-01-D13	83	83	0
	BS-01-RI3	85	84	0
	GPTH03-1	57	83	0
	GPTH03-2	35	59	0
	GPTH03-3	22	47	0
	GPTH03-3D	46	86	0
	GPTH03-4	30	62	0

S1 = BENZO(E)PYRENE QC LIMITS = 10%-132%
S2 = TERPHENYL-D14 QC LIMITS = 10%-132%

# SAMPLES	% REC IN	%REC OUT	% TOTAL IN
7	14	0	100.0%

TABLE 3 - 5

SURROGATE % RECOVERIES
PESTICIDES/PCB WATER SAMPLES
NCBC GULFPORT HO

SDG	SAMPLE ID	TCX1	TCX2	DCB1	DCB2	TOTAL OUT
BS01D13	BS-01-D13	*43	65	80	90	1
	BS-01-RI3	*50	75	85	100	1
	GPTH03-1	*49	105	*19	*23	3
	GPTH03-1MS	*39	95	*37	*48	3
	GPTH03-1MSD	*47	80	*33	*35	3
	GPTH03-2	*45	145	*33	*37	3
	GPTH03-3	*44	85	*31	*37	3
	GPTH03-3D	*43	75	*36	*40	3
	GPTH03-4	*42	135	*30	*29	3

TCX = TETRACHLORO-M-XYLENE QC LIMITS = 60%-150%
DCB = DECACHLOROBIPHENYL QC LIMITS = 60%-150%

TCX1 = COLUMN 1 DCB 1 = COLUMN 1
TCX2 = COLUMN 2 DCB 2 = COLUMN 2

# SAMPLES	% REC IN	%REC OUT	% TOTAL IN
9	13	23	36.1%

TABLE 3 - 6

SURROGATE % RECOVERIES
ORGANOPHOSPHOROUS PESTICIDES WATER SAMPLES
NCBC GULFPORT HO

SDG	SAMPLE ID	TPP (1)	TPP (2)	TOTAL OUT
BS01D13	BS-01-D13	102	102	0
	BS-01-RI3	102	100	0
	GPTH03-1	97	94	0
	GPTH03-1MS	121	124	0
	GPTH03-1MSD	113	110	0
	GPTH03-2	105	104	0
	GPTH03-3	100	106	0
	GPTH03-3D	97	97	0
	GPTH03-4	87	87	0

TPP = TRIPHENYLPHOSPHATE QC LIMITS = 38% - 146%

# SAMPLES	% REC IN	%REC OUT	% TOTAL IN
9	18	0	100.0%

TABLE 3 - 7

SURROGATE % RECOVERIES
HERBICIDES WATER SAMPLES
NCBC GULFPORT HO

SDG	SAMPLE ID	DCAA (1)	DCAA (2)	TOTAL OUT
BS01D13	BS-01-D13	99	108	0
	BS-01-RI3	94	100	0
	GPTH03-1	97	94	0
	GPTH03-1MS	96	91	0
	GPTH03-1MSD	91	85	0
	GPTH03-2	89	85	0
	GPTH03-3	91	83	0
	GPTH03-3D	92	82	0
	GPTH03-4	91	88	0

DCAA QC LIMITS = 50% - 150%

# SAMPLES	% REC IN	%REC OUT	% TOTAL IN
9	18	0	100.0%

The pesticides/PCB surrogate recoveries were below the QC limits in all samples for TCMX and below the QC limits in all but two (2) samples for DCB (Table (3-5). This indicates that all reported results for the target compounds could be biased low. Therefore, all reported positive and non-detect results in the field samples were appropriately qualified as estimated, J/UJ.

The MS/MSD of sample GPTHO3-1 analyzed for organophosphorous pesticides exhibited recoveries above the QC limits in the MS for four (4) compounds and in the MSD for one (1) compound (Table 2-8). Qualifications were not required because there were no positive results for target compounds reported in the field samples.

The MS/MSD of sample GPTHO3-1 analyzed for herbicides exhibited recoveries below the QC limits in both the MS and the MSD for dinoseb (Table 2-9). The compound dinoseb exhibited low recoveries in the blank spike associated with the samples also. For this reason and for historical evidence of low recoveries for the compound, all positive and non-detect results reported for dinoseb in the field samples were qualified as estimated, J/UJ.

The MS/MD analyzed for inorganic analytes exhibited one (1) compound with a non-compliant %Rs (Table 2-10). The non-compliant target analyte was selenium. The %Rs for the non-compliant analyte was below the minimum criteria for accuracy, which indicates that the quantified values for this analyte may be underestimated. Positive and non-detect results for selenium were appropriately qualified as estimated, J/UJ.

Based on assessment of MS/MSD and surrogate sample accuracy evaluation criteria, the water matrix analytical data was acceptable for each SDG. Some of the analytical results may be overestimated or underestimated.

4.0 REPRESENTATIVENESS

Representativeness of the environmental sample analytical data was assessed using trip blanks, field blanks, equipment rinseate blanks, and laboratory method blanks. The environmental samples and associated blanks were analyzed for the following target analyte groups:

- GC/MS volatile organic compounds (GC/MS VOCs);
- dioxin/furan compounds (D/Fs);
- semivolatile organic compounds (SVOCs);
- polynuclear aromatic hydrocarbons (PAHs);
- pesticides, PCBs,;
- organophosphorous pesticides;
- herbicides; and
- inorganics, cyanide, & sulfide.

The trip blank samples were analyzed for only GC/MS volatile organic target analytes. Field blanks, equipment rinseate blanks, and laboratory method blanks were analyzed for target analytes in each listed category. The assessment of representativeness is summarized in tabular form for each type of blank, trip blank results are summarized in Table 4-1, field blank results are summarized in Tables 4-2 through 4-10, equipment rinseate blank results are summarized in Tables 4-11 through 4-19 and method blank results are summarized in Tables 4-20 through 4-27.

If contaminants were detected in a blank, corrective actions were made for the chemical analytical data during data validation by Heartland. The corrective action consisted of amending the laboratory reported results for organic and inorganic target analytes by the criteria. The following describes the Validation Qualifier code in the blank summary tables.

Organic Target Analytes

- CRDL Validation Qualifier. If a sample result for the blank contaminant was less than the CRQL and less than 5 times the blank value (10 times for common laboratory contaminants), the sample result was rejected and amended as estimated non-detected at the CRQL for the target compound.

- U Validation Qualifier. If a sample result for the blank contaminant was greater than the sample CRQL and less than 5 times the blank value (10 times for common laboratory contaminants), the sample result for the blank contaminant was amended as non detect at the concentration reported in the sample results.

- No Action (NA). If a sample result for the blank contaminant was greater than the CRQL and 5 time the blank value (10 times for common laboratory contaminants), the result was not amended.

Inorganic Target Analytes

- U Validation Qualifier. If a sample result for the blank contaminant was less than the IDL and less than 5 times the blank value, the sample result was amended as non-detected.

- UJ Validation Qualifier. If a sample result for the blank contaminant was less than the sample IDL when the absolute value of the negative blank value was greater

TABLE 4 - 1

GC/MS VOLATILE COMPOUNDS DETECTED IN TRIP BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	TB CONC.	UNITS	VALIDATION QUALIFIER
BS01D13	BS-01-TB3	GPTH03-1, GPTH03-3, GPTH03-1MSD	ACETONE	6	ug/L	CRQL
		GPTH03-2, GPTH03-3D, GPTH03-4, GPTH03-1MS	ACETONE	6	ug/L	U

TABLE 4 - 2

GC/MS VOLATILES DETECTED IN FIELD BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	FB CONC.	UNITS	VALIDATION QUALIFIER
BS01D13	BS-01-DI3	GPTHO3-1, GPTHO3-2, GPTHO3-3, GPTH03-3D, GPTH03-4	METHYLENE CHLORIDE	4	ug/L	

TABLE 4 - 3

DIOXIN/FURANS DETECTED IN FIELD BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	FB CONC.	UNITS	VALIDATION QUALIFIER
BS01D13	BS-01-DI3	GPTH03-1, GPTH03-2, GPTH03-3, GPTH03-3D, GPTH03-4	NO COMPOUNDS DETECTED			

TABLE 4 - 4

SEMIVOLATILES DETECTED IN FIELD BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	FB CONC.	UNITS	VALIDATION QUALIFIER
BS01D13	BS-01-DI3	GPTH03-1, GPTH03-2, GPTH03-3, GPTH03-3D, GPTH03-4	NO CONTAMINATION FOUND			

TABLE 4 - 5

POLYNUCLEAR AROMATIC HYDROCARBONS DETECTED IN FIELD BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	FB CONC.	UNITS	VALIDATION QUALIFIER
BS01D13	BS-01-DI3	GPTH03-1, GPTH03-2, GPTH03-3, GPTH03-3D, GPTH03-4	NO CONTAMINATION FOUND			

TABLE 4 - 6

PESTICIDES/PCBS DETECTED IN FIELD BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	FB CONC.	UNITS	VALIDATION QUALIFIER
BS01D13	BS-01-DI3	GPTH03-1, GPTH03-2, GPTH03-3, GPTH03-3D, GPTH03-4	NO CONTAMINATION FOUND			

TABLE 4 - 7

ORGANOPHOSPHOROUS PESTICIDES DETECTED IN FIELD BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	FB CONC.	UNITS	VALIDATION QUALIFIER
BS01D13	BS-01-DI3	GPTH03-1, GPTH03-2, GPTH03-3, GPTH03-3D, GPTH03-4	NO CONTAMINATION FOUND			

TABLE 4 - 8

HERBICIDES DETECTED IN FIELD BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	FB CONC.	UNITS	VALIDATION QUALIFIER
BS01D13	BS-01-DI3	GPTH03-1, GPTH03-2, GPTH03-3, GPTH03-3D, GPTH03-4	NO CONTAMINATION FOUND			

TABLE 4 - 9

TOTAL METALS/CYANIDE DETECTED IN FIELD BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	FB CONC.	UNITS	VALIDATION QUALIFIER
BS01D13	BS-01-DI3	GPTH03-1, GPTH03-2, GPTH03-3, GPTH03-3D, GPTH03-4	BARIUM	1	ug/L	

TABLE 4 - 10

SULFIDE DETECTED IN FIELD BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	FB CONC.	UNITS	VALIDATION QUALIFIER
BS01D13	BS-01-DI3	GPTH03-1, GPTH03-2, GPTH03-3, GPTH03-3D, GPTH03-4	NO CONTAMINATION FOUND			

TABLE 4 - 11

GC/MS VOLATILES DETECTED IN EQUIPMENT RINSEATE BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	RB CONC.	UNITS	VALIDATION QUALIFIER
BS01D13	BS-01-RI3	GPTH03-1, GPTH03-2, GPTH03-3, GPTH03-3D, GPTH03-4	ACETONE	8	ug/L	

TABLE 4 - 12

DIOXIN/FURANS DETECTED IN EQUIPMENT RINSEATE BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	RB CONC.	UNITS	VALIDATION QUALIFIER
BS01D13	BS-01-RI	GPTHOGW-1, GPTHOGW-1D, GPTHOGW-GPTHOGW-3, GPTHOGW-4	NO CONTAMINATION FOUND			

TABLE 4 - 13

SEMIVOLATILES DETECTED IN EQUIPMENT RINSEATE BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	RB CONC.	UNITS	VALIDATION QUALIFIER
BS01D13	BS-01-RI3	GPTH03-1, GPTH03-2, GPTH03-3, GPTH03-3D, GPTH03-4	NO CONTAMINATION FOUND			

TABLE 4 - 14

POLYNUCLEAR AROMATIC HYDROCARBONS DETECTED IN EQUIPMENT RINSEATE BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	RB CONC.	UNITS	VALIDATION QUALIFIER
BS01D13	BS-01-RI3	GPTH03-1, GPTH03-2, GPTH03-3, GPTH03-3D, GPTH03-4	NO CONTAMINATION FOUND			

TABLE 4 - 15

PESTICIDES/PCBS DETECTED IN EQUIPMENT RINSEATE BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	RB CONC.	UNITS	VALIDATION QUALIFIER
BS01D13	BS-01-RI3	GPTH03-1, GPTH03-2, GPTH03-3, GPTH03-3D, GPTH03-4	NO CONTAMINATION FOUND			

TABLE 4 - 16

ORGANOPHOSPHOROUS PESTICIDES DETECTED IN EQUIPMENT RINSEATE BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	RB CONC.	UNITS	VALIDATION QUALIFIER
BS01D13	BS-01-RI3	GPTH03-1, GPTH03-2, GPTH03-3, GPTH03-3D, GPTH03-4	NO CONTAMINATION FOUND			

TABLE 4 - 17

HERBICIDES DETECTED IN EQUIPMENT RINSEATE BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	RB CONC.	UNITS	VALIDATION QUALIFIER
BS01D13	BS-01-RI3	GPTH03-1, GPTH03-2, GPTH03-3, GPTH03-3D, GPTH03-4	NO CONTAMINATION FOUND			

TABLE 4 - 18

TOTAL METALS/CYANIDE DETECTED IN EQUIPMENT RINSEATE BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	RB CONC.	UNITS	VALIDATION QUALIFIER
BS01D13	BS-01-DI3	GPTH03-1, GPTH03-2, GPTH03-3, GPTH03-3D, GPTH03-4	NO CONTAMINATION FOUND			

TABLE 4 - 19

SULFIDE DETECTED IN EQUIPMENT RINSEATE BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	RB CONC.	UNITS	VALIDATION QUALIFIER
BS01D13	BS-01-RI3	GPTH03-1, GPTH03-2, GPTH03-3, GPTH03-3D, GPTH03-4	NO CONTAMINATION FOUND			

TABLE 4 - 20

GC/MS VOLATILES DETECTED IN METHOD BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	MB CONC.	UNITS	VALIDATION QUALIFIER
BS01D13	VBLK1	BS-01-DI3, BS-01-RI3, BS-01-TB3, GPTH03-1, GPTH03-1MS, GPTH03-1MSD, GPTH03-2, GPTH03-3, GPTH03-3D, GPTH03-4	NO CONTAMINATION FOUND			

TABLE 4 - 21

DIOXIN/FURANS DETECTED IN METHOD BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	MB CONC.	UNITS	VALIDATION QUALIFIER
BS01D13	METHOD BLANK	BS-01-DI3, BS-01-RI3, BS-01-TB3, GPTH03-1, GPTH03-1MS, GPTH03-1MSD, GPTH03-2, GPTH03-3, GPTH03-3D,	NO CONTAMINATION FOUND			

TABLE 4 - 22

SEMIVOLATILES DETECTED IN METHOD BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	MB CONC.	UNITS	VALIDATION QUALIFIER
BS01D13	SBLK1	BS-01-DI3, BS-01-RI3, BS-01-TB3, GPTH03-1, GPTH03-1MS, GPTH03-1MSD, GPTH03-2, GPTH03-3, GPTH03-3D, GPTH03-4	NO CONTAMINATION FOUND			

TABLE 4 - 23

POLYNUCLEAR AROMATIC HYDROCARBONS DETECTED IN METHOD BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	MB CONC.	UNITS	VALIDATION QUALIFIER
BS01D13	METHOD BLANK	BS-01-DI3, BS-01-RI3, BS-01-TB3, GPTH03-1, GPTH03-1MS, GPTH03-1MSD, GPTH03-2, GPTH03-3, GPTH03-3D.	NO CONTAMINATION FOUND			

TABLE 4 - 24

PESTICIDES/PCBS DETECTED IN METHOD BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	MB CONC.	UNITS	VALIDATION QUALIFIER
BS01D13	METHOD BLANK	BS-01-DI3, BS-01-RI3, BS-01-TB3, GPTH03-1, GPTH03-1MS, GPTH03-1MSD, GPTH03-2, GPTH03-3, GPTH03-3D,	NO CONTAMINATION FOUND			

TABLE 4 - 25

ORGANOPHOSPHOROUS PESTICIDES DETECTED IN METHOD BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	MB CONC.	UNITS	VALIDATION QUALIFIER
BS01D13	METHOD BLANK	BS-01-DI3, BS-01-RI3, BS-01-TB3, GPTH03-1, GPTH03-1MS, GPTH03-1MSD, GPTH03-2, GPTH03-3, GPTH03-3D,	NO CONTAMINATION FOUND			

TABLE 4 - 26

HERBICIDES DETECTED IN METHOD BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	MB CONC.	UNITS	VALIDATION QUALIFIER
BS01D13	METHOD BLANK	BS-01-DI3, BS-01-RI3, BS-01-TB3, GPTH03-1, GPTH03-1MS, GPTH03-1MSD, GPTH03-2, GPTH03-3, GPTH03-3D,	NO CONTAMINATION FOUND			

TABLE 4 - 27

TOTAL METALS/CYANIDE DETECTED IN METHOD BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	MB CONC.	UNITS	VALIDATION QUALIFIER
BS01D13	PBW	BS-01-DI3, BS-01-RI3	ZINC	5.15	ug/L	U
		BS-01-DI3, BS-01-RI3, GPTH03-1, GPTH03-2, GPTH03-3, GPTH03-3D, GPTH03-4	TIN	15.3	ug/L	U
		BS-01-DI3, BS-01-RI3	CHROMIUM	-2.46	ug/L	UJ
			LEAD	-1.40	ug/L	UJ
		BS-01-DI3, BS-01-RI3, GPTH03-1, GPTH03-1MS, GPTH03-1MSD, GPTH03-2, GPTH03-3, GPTH03-3D,	ARSENIC	-3.96	ug/L	J/UJ

than the IDL, the sample result for the blank contaminant was amended as estimated non-detected.

- J Validation Qualifier. If a sample result for the blank contaminant was greater than the IDL and less than 10 times the blank value, when the absolute of the negative blank value id greater than the IDL the result was amended as estimated at the laboratory value.

4.1 Trip Blanks

Trip blanks contained deionized water from the laboratory and consisted of samples bottles which were similar to the environmental sample containers. The trip blanks were prepared and packaged at the laboratory prior to the sampling event and traveled with the sample bottles to the site. The trip blank bottles were not opened at the site or anytime prior to laboratory analysis.

Target compounds detected in the trip blank sample (Table 4-1) consisted of:

- GC/MS Volatiles (Table 4-1)
  acetone

The compound acetone is a common laboratory contaminant and its presence in the trip blank may be attributed to laboratory contamination. Some analytical results required qualification due to the trip blank contamination. However, based on the assessment of the trip blank results for representativeness, the analytical data is acceptable.

4.2 Field Blanks

The field blank, BS-01-DI, was a sample of DI water. It was prepared from the source potable water. The field blank were prepared at the site and placed in containers that were similar to those used for the environmental samples. Dioxin/furans, semivolatiles, polynuclear aromatic hydrocarbons, pesticide/PCBs, organophosphorous pesticides, herbicides, and sulfide target compounds were not detected in the field blank samples (Tables 4-3, 4-4, 4-5, 4-6, 4-7, 4-8, and 4-10). Target compounds and analytes detected in the field blank samples consisted of:

- GC/MS Volatiles (Table 4-2)
  methylene chloride

- Inorganics (Table 4-9)
  barium

The detected methylene chloride result in the field blank is attributed to laboratory contamination because methylene chloride is a common laboratory contaminant. The metals analyte was detected below the CRDL. None of the sample data required qualification due to the field blank contamination.

Target analytes were detected in some of the field blanks. None of the analytical data required qualification. Based on assessment of field blanks for representativeness the analytical data was acceptable for the SDG.

4.3 Equipment Rinseate Blanks

The equipment rinseate blank was prepared by rinsing a piece of decontaminated sampling equipment with deionized water from a field DI unit. A sample of this water was collected and placed in sample containers similar to those used for the environmental samples. Dioxin/furans, semivolatiles, polynuclear aromatic hydrocarbons, pesticide/PCBs, organophosphorous pesticides, herbicides, metals/cyanide, and sulfide target compounds were not detected in the field blank samples (Tables 4-12, 4-13, 4-14, 4-15, 4-16, 4-17, 4-18, and 4-19). Target analytes detected in the equipment rinseate blank samples consisted of:

- GC/MS Volatiles (Table 4-12)
  - acetone

The detected acetone is a common laboratory contaminant and may be attributed to laboratory contamination. The field samples did not require qualification.

Based on assessment of equipment rinseate blanks for representativeness the analytical data was acceptable for the SDG.

4.4 Method Blanks

The method blanks were samples of deionized water prepared by the laboratory at the time of analysis. Method blanks undergo the same analytical process as the corresponding environmental samples and associated field blanks. The purpose of the method blank is to assess the potential for target compounds and analytes to "contaminate" the sample during analysis. Volatiles, dioxin/furans, semivolatiles, polynuclear aromatic hydrocarbons, pesticides/PCBs, organophosphorous pesticides, and herbicides target compounds were not detected in method blank samples (Tables 4-20, 4-21, 4-22, 4-23, 4-24, 4-25, and 4-26). Target analytes detected in the method blank samples consisted of:

- Inorganics (Table 4-27)
  - zinc
  - tin
  - chromium
  - lead
  - arsenic

The zinc and tin can be attributed to the water source, the water treatment system that was used to make the water or laboratory artifacts. The chromium, lead and arsenic were negative in concentration and can be attributed to instrumentation anomalies.

Because target analytes were detected in some of the method blanks, some of the analytical results were qualified. However, based on assessment of method blanks for representativeness the analytical data was acceptable for each SDG.

4.5 Holding Times

Holding times requirements are utilized in an effort to minimize the degradation or concentration of constituents in a particular matrix over time. The stability of the constituents is determined to the best extent and then a reasonable time limit is imposed under which the samples must be extracted or prepared and then analyzed. The holding times regulations assume that the samples have been properly preserved according to the guidelines, either at the laboratory or in the field. Analytical results from samples with holding time violations are qualified as estimated, J/UJ, due to the potential for compromising the integrity of the samples.

All holding times requirements, extraction and analytical, were met for all samples, for all analytical fractions.

5.0 COMPARABILITY

Comparability is qualitative measure designed to express the confidence with which one data set may be compared to another. The analytical samples were collected and transported to the chemical analytical laboratory in accordance with standard procedures and were analyzed in conformance with acceptable USEPA procedures (Refer to Table 5-1 below). The analytical data are reported in standard units (micrograms per liter, micrograms per kilogram, etc.).

The methods used to collect the environmental samples and the methods used to analyze the samples should assure comparability of the analytical data.

TABLE 5-1
USEPA Procedures (CLP or SW-846 Methodologies)

U.S. EPA Method	Description
SW-846, Method 8240	Volatile Organics
SW-846, Method 8290	Dioxin/Furans
SW-846, Method 8270	Semivolatile Organics
SW-846, Method 8310	Polynuclear Aromatic Hydrocarbons
CLP, OLM01.8, SOW 3/90	Pesticides/PCBs
SW-846, Method 8140	Organophosphorous Pesticides
SW-846, Method 8150	Chlorinated Herbicides
CLP, ILMO2.1	Metals
CLP, ILMO2.1	Cyanide
SW-846, Method 9030	Sulfide

6.0 COMPLETENESS

Completeness is the quantitative measure of the amount of data obtained from a measurement process compared with the amount expected to be obtained under the conditions of measurement. The completeness goal for laboratory analysis for this project was 85 percent useable data. Unusable analytical data are those results reported by the laboratory but rejected during the data validation process. A summary of the completeness goal for NCBC Gulfport is provided in Table 6-1. For more detailed completeness goal tables, please refer to Appendix C.

TABLE 6-1
COMPLETION GOAL (>85%)

	QC	GW	OVERALL
GC/MS Volatiles	96.6	96.6	96.6
Dioxin/Furans	100.0	100.0	100.0
Semivolatiles	95.1	95.1	95.1
PAHs	100.0	100.0	100.0
Pesticide/PCBs	100.0	100.0	100.0
Organophos. Pest.	100.0	100.0	100.0
Herbicides	100.0	100.0	100.0
Metals	100.0	100.0	100.0
Cyanide	100.0	100.0	100.0
Sulfide	100.0	100.0	100.0

MATRIX KEY

QC = QC Samples
GW = Ground Water Samples

The analytical data met the 85 percent completeness goal for every fraction. The narrative following describes any extenuating factors involved in the data resolution.

GC/MS Volatiles, Non-Compliant RRFs Two (2) volatile compounds; isobutanol and 1,4-dioxane, did not always meet the initial and continuing calibration criteria of >0.05 for RRF (Relative Response Factor). The RRF values fell below 0.05 in analyses affecting the SDG associated with this project. All non-detect sample results associated with the initial and continuing calibrations that exhibited either of the two (2) compounds with non-compliant RRFs are rejected, R, (Table A-1). All positive sample results associated with the initial and continuing calibrations that exhibited either of the two (2) compounds with non-compliant RRFs are qualified as estimated, J, (Table A-1). The non-compliant calibrations resulted in the rejection of sixteen (16) data points. The completeness goal for the fraction was still met.

Non-detect results that were rejected for the compounds may be evaluated by adjusting the CRQL to the concentration of the continuing calibration standard and qualifying the results as not detected at an estimated concentration, UJ. The non-detect qualification at the concentration of the continuing calibration standard insures that the instrumentation is capable of detecting the compound at a known concentration.

Semivolatiles, Non-Compliant RRFs Four (4) semivolatile compounds; hexachlorophene, aramite 1, aramite 2, and 1,3,5-trinitrobenzene, did not always meet the initial and continuing calibration criteria of >0.05 for RRF (Relative Response Factor). The RRF values fell below 0.05 in analyses

affecting the SDG associated with this project. All non-detect sample results associated with the initial and continuing calibrations that exhibited any of the four (4) compounds with non-compliant RRFs are rejected, R, (Table A-2). All positive sample results associated with the initial and continuing calibrations that exhibited any of the four (4) compounds with non-compliant RRFs or %Ds are qualified as estimated, J, (Table A-2). The non-compliant calibrations resulted in the rejection of twenty-eight (28) data points. The completeness goal for the fraction was still met.

Non-detect results that were rejected for the compounds may be evaluated by adjusting the CRQL to the concentration of the continuing calibration standard and qualifying the results as not detected at an estimated concentration, UJ. The non-detect qualification at the concentration of the continuing calibration standard insures that the instrumentation is capable of detecting the compound at a known concentration.

<u>GC/MS Volatiles/Semivolatiles/Pesticides/PCBs</u> Target compounds for the volatile, semivolatile, and pesticide/PCBs fractions were qualified because of non-compliant calibrations. Volatile, semivolatile, and pesticide/PCB compounds did not always meet the initial and/or continuing calibration criteria for RSD (Relative Standard Deviation), and %D (Percent Difference). All results qualified for calibration % RSD and % D deficiencies (J/UJ) are considered to be useable. For the compounds in the GC/MS volatile and semivolatile analyses that did not meet calibration criteria, all positive results are qualified as estimated (J) (%Ds >25%) and all non detect results are qualified as estimated (UJ) (>50% D <90%) due to calibration deficiencies. For the pesticide/PCB analyses that did not meet calibration criteria, positive and non-detect results are qualified as estimated, (J or UJ) (%RSDs >20% and %Ds >25%).

7.0 PARCC SUMMARY

The purpose of evaluating the quality of the analytical data using the PARCC criteria was to address the qualification of the data in regards to evaluation of the presence, magnitude and characteristics of hazardous substances at NCBC Gulfport. Overall, the chemical analytical data are acceptable and exceeded the completion goal of 85 percent. Tables 7-1 and 7-2 provides a tabulation of the assessment of PARCC criteria each SDG for water samples and quality control samples, respectively.

7.1 Water Samples

The analytical data for this matrix was acceptable for all PARCC criteria categories except completeness. Eight (8) volatile data points were rejected due to initial and/or continuing calibration standards which did not meet QC criteria. The completion goal was met. Sixteen (16) semivolatile data points were rejected due to initial and/or continuing calibration standards which did not meet QC criteria. The completion goal was met.

7.2 QC Samples

The analytical data for this matrix was acceptable for the PARCC criteria of precision and comparability. Eight (8) volatile data points were rejected due to initial and/or continuing calibration standards which did not meet QC criteria. The completion goal was met. Twelve (12) semivolatile data points were rejected due to initial and/or continuing calibration standards which did not meet QC criteria. The completion goal was met.

TABLE 7 - 1
PARCC CRITERIA SUMMARY
GROUNDWATER SAMPLES
NCBC GULFPORT HO

SDGs	PRECISION	ACCURACY	REPRESENT-ATIVENESS	COMPARABILITY	COMPLETENESS
BS01D13	ACCEPTABLE	ACCEPTABLE	ACCEPTABLE	ACCEPTABLE	ACCEPTABLE (1, 2) WITH REJECTIONS

(1) Eight (8) volatile data points were rejected due to initial and/or continuing calibration standards which did not meet QC criteria. Completion goal was met.

(2) Sixteen (16) semivolatile data points were rejected due to initial and/or continuing calibration standards which did not meet QC criteria. Completion goal was met.

TABLE 7 - 2
PARCC CRITERIA SUMMARY
QUALITY CONTROL SAMPLES
NCBC GULFPORT HO

SDGs	PRECISION	ACCURACY	REPRESENT-ATIVENESS	COMPARABILITY	COMPLETENESS
BS01D13	ACCEPTABLE	ACCEPTABLE	ACCEPTABLE	ACCEPTABLE	ACCEPTABLE (1, 2) WITH REJECTIONS

(1) Eight (8) volatile data points were rejected due to initial and/or continuing calibration standards which did not meet QC criteria. Completion goal was met.

(2) Twelve (12) semivolatile data points were rejected due to initial and/or continuing calibration standards which did not meet QC criteria. Completion goal was met.

REFERENCES

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APPENDIX A

CALIBRATION SUMMARY

TABLE A-1

INITIAL AND CONTINUING CALIBRATION
VOLATILE ORGANIC COMPOUNDS
NCBC GULFPORT HO

ICAL = INITIAL CALIBRATION = %RSD	SDG BS01D13	
CCAL = CONTINUING CALIBRATION = %D	**ICAL1**	**CCAL1**
DATE	090994	112794
INSTRUMENT ID	INCOS 50-2	INCOS 50-2
CALIBRATION CRITERIA	RRF	RRF/%D
ISOBUTANOL	0.009	0.010
1,4-DIOXANE	0.004	0.002/50.0
ACETONE		34.1
ACROLEIN		39.0
ACRYLONITRILE		30.4
TRICHLOROFLUOROMETHANE		34.7
2-CHLOROETHYL VINYL ETHER		57.6
1,4-DICHLORO-2-BUTENE		37.9
PROPIONITRILE		43.2

SDGS, STANDARDS, AND ASSOCIATED SAMPLES

SDG BS01D13

ICAL1: NONE

CCAL1: GPTH03-4, GPTH03-3, GPTH03-3D, GPTH03-1, GPTH03-1MS, GPTH03-1MSD, BS-01-DI3, BS-01-RI3, BS-01-TB3

TABLE A - 2

INITIAL AND CONTINUING CALIBRATION
SEMIVOLATILE ORGANIC COMPOUNDS
NCBC GULFPORT HO

ICAL = INITIAL CALIBRATION = %RSD	SDG BS01D13	
CCAL = CONTINUING CALIBRATION = %D	**ICAL1**	**CCAL1**
DATE	102594	120894
INSTRUMENT ID	A4EXT3	A4EXT3
CALIBRATION CRITERIA	RRF/%RSD	RRF/%D
1,3,5-TRINITROBENZENE	0.037	0.026/28.9
ARAMITE-1	0.035	0.03
ARAMITE-2	0.035	0.03
HEXACHLOROPHENE	0.00/0.0	0.00/0.0
1,2,3,5-TETRACHLOROBENZENE		27.1
PENTACHLOROBENZENE		25.7
PRONAMIDE		28.3
1,4-NAPHTHOQUINONE		34.0
PENTACHLORONITROBENZENE		35.3

SDGS, CALIBRATIONS AND ASSOCIATED SAMPLES:

SDG BS01D13

ICAL1: NONE

CCAL1: GPTH03-3D, GPTH03-2, GPTH03-4, GPTH03-1, GPTH03-1MS, GPTH03-1MSD, GPTH03-3, BS01RI3, BS01DI3

TABLE A-3

INITIAL AND CONTINUING CALIBRATION
PESTICIDES/AROCLORS
NCBC GULFPORT HO

ICAL = INITIAL CALIBRATION = %RSD	SDG BS01D13	
CCAL = CONTINUING CALIBRATION = %D	**ICAL1**	**CCAL1**
DATE	112894	120394
INSTRUMENT ID	HP5890B1A/BAB	HP5890B1A/BAB
CALIBRATION CRITERIA	%RSD	%D
ALPHA-BHC	24.3	
DELTA-BHC	22.0	
CHLOROBENZILATE	28.6	32.5/50.0
KEPONE	78.2	67.5

SDGS, STANDARDS, AND ASSOCIATED SAMPLES

SDG BS01D13

ICAL1: BS-01-DI3, BS-01-RI3, GPTH03-1, GPTH03-1MS, GPTH03-1MSD, GPTH03-2, GPTH03-3, GPTH03-3D, GPTH03-4

CCAL1: BS-01-DI3, BS-01-RI3, GPTH03-1, GPTH03-1MS, GPTH03-1MSD, GPTH03-2, GPTH03-3, GPTH03-3D, GPTH03-4

APPENDIX B

SERIAL DILUTION SUMMARY

TABLE B - 1

WATER SAMPLE SERIAL DILUTION
METALS SUMMARY TABLE
NCBC GULFPORT HO

SAMPLE GPTH03-1		SDG BS01D13
%D = PERCENT DIFFERENCE		%D
METALS ANALYTES	UNITS	
ANTIMONY	ug/L	100
ARSENIC	ug/L	100
BARIUM	ug/L	4.3
BERYLLIUM	ug/L	NC
CADMIUM	ug/L	NC
CHROMIUM	ug/L	5.7
COBALT	ug/L	14.8
COPPER	ug/L	100
LEAD	ug/L	5.2
NICKEL	ug/L	2.2
SELENIUM	ug/L	100
SILVER	ug/L	NC
THALLIUM	ug/L	100
VANADIUM	ug/L	7.1
ZINC	ug/L	*43.1
TIN	ug/L	198
CYANIDE	ug/L	NR

*** - INDICATES VALUE OUTSIDE QC LIMITS**
NC DENOTES NO CALCULATION DUE TO NON-DETECT RESULTS IN BOTH SAMPLES
NA DENOTES COMPOUND NOT ANALYZED FOR

CORRESPONDING SDG'S AND ASSOCIATED SAMPLES

BS01D13: GPTH03-1, GPTH03-2, GPTH03-3, GPTH03-4, GPTH03-3D

ANALYTE	RPD
	WATER
ALL ICP ANALYTES	+/-10%

+/-10% RULE ONLY APPLIES TO RESULTS GREATER THAN 50 TIMES THE IDL
(SOME VALUES ROUNDED TO LIMIT %Ds TO THREE (3) SIGNIFICANT FIGURES)

APPENDIX C

REJECTED DATA SUMMARY

C-1

GC/MS VOLATILES - REJECTED DATA
NCBC GULFPORT HO

SDG	# SAMPLES/MATRIX			# OF COMPOUNDS REJECTED PER MATIX	
	QC	GW		QC	GW
BS01D13	4	4		8	8
GRAND TOTAL	4	4		8	8
COMPLETION GOAL (>85%)				96.6%	96.6%

OVERALL COMPLETENESS
96.6%

MATRIX KEY

QC = QC SAMPLES
GW = GROUND WATER SAMPLES

*** 58 TARGET COMPOUNDS PER SAMPLE**

TABLE C - 2
DIOXIN/FURANS - REJECTED DATA
NCBC GULFPORT HO

SDG	# SAMPLES/MATRIX			# OF COMPOUNDS REJECTED PER MATIX	
	QC	GW		QC	GW
BS01D13	3	4		0	0
GRAND TOTAL	3	4		0	0
COMPLETION GOAL (>85%)				100.0%	100.0%

OVERALL COMPLETENESS
100.0%

MATRIX KEY

QC = QC SAMPLES
GW = GROUND WATER SAMPLES

*** 25 TARGET CONGENERS/ISOMERS PER SAMPLE**

TABLE C - 3
SEMIVOLATILES - REJECTED DATA
NCBC GULFPORT HO

SDG	# SAMPLES/MATRIX			# OF COMPOUNDS REJECTED PER MATIX	
	QC	GW		QC	GW
BS01D13	3	4		12	16
GRAND TOTAL	3	4		12	16
COMPLETION GOAL (>85%)				95.1%	95.1%

OVERALL COMPLETENESS
95.1%

MATRIX KEY

QC = QC SAMPLES
GW = GROUND WATER SAMPLES

*** 81 TARGET COMPOUNDS PER SAMPLE**

TABLE C - 4
POLYNUCLEAR AROMATIC HYDROCARBONS - REJECTED DATA
NCBC GULFPORT HO

SDG	# SAMPLES/MATRIX			# OF COMPOUNDS REJECTED PER MATIX	
	QC	GW		QC	GW
BS01D13	3	4		0	0
GRAND TOTAL	3	4		0	0
COMPLETION GOAL (>85%)				100.0%	100.0%

OVERALL COMPLETENESS
100.0%

MATRIX KEY

QC = QC SAMPLES
GW = GROUND WATER SAMPLES

*** 16 TARGET COMPOUNDS PER SAMPLE**

TABLE C - 5
PESTICIDE/PCBS - REJECTED DATA
NCBC GULFPORT HO

SDG	# SAMPLES/MATRIX			# OF COMPOUNDS REJECTED PER MATIX	
	QC	GW		QC	GW
BS01D13	3	4		0	0
GRAND TOTAL	3	4		0	0
COMPLETION GOAL (>85%)				100.0%	100.0%

OVERALL COMPLETENESS
100.0%

MATRIX KEY

QC = QC SAMPLES
GW = GROUND WATER SAMPLES

*** 32 TARGET COMPOUNDS PER SAMPLE**

TABLE C - 6
ORGANOPHOSPHOROUS PESTICIDES - REJECTED DATA
NCBC GULFPORT HO

SDG	# SAMPLES/MATRIX			# OF COMPOUNDS REJECTED PER MATIX	
	QC	GW		QC	GW
BS01D13	3	4		0	0
GRAND TOTAL	3	4		0	0
COMPLETION GOAL (>85%)				100.0%	100.0%

OVERALL COMPLETENESS
100.0%

MATRIX KEY

QC = QC SAMPLES
GW = GROUND WATER SAMPLES

*** 9 TARGET COMPOUNDS PER SAMPLE**

TABLE C - 7
HERBICIDES - REJECTED DATA
NCBC GULFPORT HO

SDG	# SAMPLES/MATRIX			# OF COMPOUNDS REJECTED PER MATIX	
	QC	GW		QC	GW
BS01D13	3	4		0	0
GRAND TOTAL	3	4		0	0
COMPLETION GOAL (>85%)				100.0%	100.0%

OVERALL COMPLETENESS
100.0%

MATRIX KEY

QC = QC SAMPLES
GW = GROUND WATER SAMPLES

*** 4 TARGET COMPOUNDS PER SAMPLE**

TABLE C - 8
TOTAL METALS - REJECTED DATA
NCBC GULFPORT HO

SDG	# SAMPLES/MATRIX			# OF COMPOUNDS REJECTED PER MATIX	
	QC	GW		QC	GW
BS01D13	3	4		0	0
GRAND TOTAL	3	4		0	0
COMPLETION GOAL (>85%)				100.0%	100.0%

OVERALL COMPLETENESS
100.0%

MATRIX KEY

QC = QC SAMPLES
GW = GROUND WATER SAMPLES

*** 17 TARGET ANALYTES PER SAMPLE**

TABLE C - 9
CYANIDE - REJECTED DATA
NCBC GULFPORT HO

SDG	# SAMPLES/MATRIX			# OF COMPOUNDS REJECTED PER MATIX	
	QC	GW		QC	GW
BS01D13	3	4		0	0
GRAND TOTAL	3	4		0	0
COMPLETION GOAL (>85%)				100.0%	100.0%

OVERALL COMPLETENESS
100.0%

MATRIX KEY

QC = QC SAMPLES
GW = GROUND WATER SAMPLES

*** 1 TARGET COMPOUND PER SAMPLE**

TABLE C - 10
SULFIDE - REJECTED DATA
NCBC GULFPORT HO

				# OF COMPOUNDS REJECTED PER MATIX	
SDG	# SAMPLES/MATRIX			QC	GW
	QC	GW			
BS01D13	3	4		0	0
GRAND TOTAL	3	4		0	0
COMPLETION GOAL (>85%)				100.0%	100.0%

OVERALL COMPLETENESS
100.0%

MATRIX KEY

QC = QC SAMPLES
GW = GROUND WATER SAMPLES

*** 1 TARGET COMPOUND PER SAMPLE**

Groundwater Sampling Event 4

PRECISION, ACCURACY, REPRESENTATIVENESS, COMPARABILITY, AND COMPLETENESS FOR NCBC GULFPORT HO

NAVAL CONSTRUCTION BATTALION CENTER GULFPORT, MISSISSIPPI

Prepared by:
Heartland Environmental Services, Inc.
P.O. Box 163
St. Peters, Missouri 63376

Prepared for:

ABB Environmental Services, Inc.
1400 Centerpoint Blvd., Suite 158
Knoxville, Tennessee 37922-1968

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NCBC Gulfport HO

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1.0 INTRODUCTION

Prior to evaluating the data for precision, accuracy, representativeness, comparability, and completeness (PARCC) criteria the laboratory reviewed the data package and the data also were independently reviewed and validated using the Naval Energy and Environmental and Support Activity (NEESA) guidance document 20.2-047B (1988) entitled, *Sampling and Chemical Analysis Quality Assurance Requirements for the Navy Installation Program*. Before the laboratory released the chemical analytical results, both the sample and laboratory QC data were carefully reviewed in order to verify sample identity, instrument calibration, detection limits, dilution factors, numerical computations, accuracy of transcriptions, and chemical interpretations. Additionally, the QC data were reduced and spike recoveries were included in control charts, and the resulting data were reviewed to ascertain whether they were within the laboratory defined limits for accuracy and precision. The data were compiled into a NEESA Level D data package and any nonconforming data were discussed in the data package cover letter and case narrative.

The Level D data packages were then reviewed and validated by Heartland Environmental Services, Inc., Missouri (Heartland). Data validation is the technical review of a data package using criteria established in the data quality objectives, the quality assurance project plan and guidance documents prepared by the United States Environmental Protection Agency (USEPA) for the validation of organic and inorganic analytical data (USEPA 1990a and 1990b) as specified by NEESA document 20.2-047B. The data review and validation process is independent of the laboratory's checks because it is impossible to repeat the review conducted by the laboratory.

Samples that did not meet the acceptance limit criteria were qualified with a flag; single letter abbreviations that indicate a problem with the data. Data qualifiers used by the validators when amending the data include the following.

U — Undetected. The analyte was not detected above the contract required quantitation limit (CRQL). The "U" designator also is used to qualify laboratory contaminants. The "U" designator is applied to an environmental sample when the laboratory contaminant is detected in an environmental sample at a concentration less than 5 times (10 X for common contaminants) the value of the concentration detected in any corresponding field QC blank, method blank or preparation blanks.

J — Estimated. The analyte was present, but the reported value may not be accurate or precise. The "J" designator is used to qualify an analyte that was present at a concentration between the CRQL and method detection limit (MDL) or the data "failed" some of the analytical validation criteria but did not require rejections of the data. When combined with the U designator, the quantitation limit is estimated.

R — Rejected. Data was rejected by the data validator during comparison of the NEESA Level D data package with the analytical functional guideline criteria. The "R" designator indicates a significant variance in acceptable laboratory performance. Either re-analysis or re-sampling and analysis would be necessary to determine the presence or absence of the target analyte(s).

Once the data were reviewed and validated according to the guidance presented in NEESA document 20.2-047B, the data were evaluated by Heartland using the PARCCs criteria included in the Data Quality Objectives (DQOs) of the Work Plan for Naval Construction Battalion Center (NCBC) Gulfport, Mississippi, dated October 1993. The following sections present a brief description of PARCCs criteria.

Precision. Precision is a measure of the agreement or repeatability of a set of replicate results obtained from duplicate laboratory analyses of samples collected from the same location/depth interval. Precision was calculated from laboratory analytical data and cannot be measured directly. Precision is expressed as the Relative Percent Difference (RPD) between analytical values for two samples divided by the average of their analytical values. Precision is calculated using the expression:

$$RPD = (D1-D2) / (\frac{1}{2}(D1 + D2)) \times 100$$

D1 and D2 are the reported values for the duplicate sample pair. Precision was evaluated using field duplicate samples and laboratory split samples (for example, MS/MSD samples).

Precision for environmental samples and their duplicates was assessed using a maximum RPD of 20 Percent for water matrices. Precision for MS/MSD/MD samples was assessed by using the target analyte specific RPD criteria for the spiked compounds and the sample duplicates.

Accuracy. Accuracy is a measure of the agreement between an experimental determination and the true value of the parameter being measured. Accuracy can be calculated from the analytical data and was not measured directly. Accuracy is used to identify the bias in a given measurement system (i.e. laboratory conditions, sample matrix, and sampling conditions). Accuracy is assessed by reviewing the Percent Recovery (%R) between the true value of the spike analyte and the actual analytical value. Accuracy is calculated using the equation:

$$\%R = ((A-B)/C) \times 100$$

A = Measured concentration of the spiked analyte.
B = Measured concentration of the spiked compound in the unspiked sample.
C = True concentration of the spiked analyte.

For the organic analyses, each of the samples was spiked with a surrogate compound; and for inorganic analyses, each chosen matrix spike and matrix duplicate pair was spiked with a known reference material before digestion. Each of these approaches provides a measure of the matrix effects on the analytical accuracy.

Representativeness. Representativeness is a qualitative measure of the degree to which sample data accurately and precisely represent a characteristic environmental condition. Representativeness is a subjective parameter and is used to evaluate the efficacy of the sampling plan design. Representativeness was evaluated using the field and laboratory QC blank sample results. QC blank samples are equipment rinseate blanks, field blanks, trip blanks, laboratory method blanks for organic analysis and laboratory preparation blanks for inorganic analysis. Positive detection of target analytes in the QC blank samples identify contaminants that possibly were introduced to the associated environmental sample during sample collection, transport or laboratory analysis. Representativeness was also evaluated used the defined extraction and analytical holding time requirements set forth in the Work Plan for NCBC Gulfport or the analytical methodology.

Comparability. Comparability is qualitative measure designed to express the confidence with which one data set may be compared to another. Factors that affect comparability are: sample collection and handling techniques, sample matrix type, and analytical method. Comparability is limited by the other PARCC parameters because only when precision and accuracy are known can data sets be compared with confidence.

Completeness. Completeness is defined as the percentage of measurements that are judged to be valid compared to the total number of measurements made. Valid usable data are values that were not qualified as rejected (R qualifier) during data validation. A goal of 85 percent usable data was established in the Work Plan for NCBC, Gulfport, Mississippi. Completeness equals the total number of analytes for each matrix minus the total number of rejected analytes divided by the total number of analytes multiplied by 100.

2.0 PRECISION

The following section describes the evaluation of precision for volatile organic compounds, semivolatile organic compounds, polynuclear aromatic hydrocarbons, pesticides and polychlorinated biphenyls (PCBs), organophosphorus pesticides, herbicides, metals and cyanide, and the wet chemistry parameter sulfide. Duplicate samples are evaluated for precision only when contaminants are detected in both the environmental sample and the sample's duplicate. A ND in the RPD column of the spreadsheet indicates that a RPD calculation was not required because one result was a non-detect and the other result was less than the compound/analyte CRQL/CRDL. Environmental samples and their respective duplicates may not exhibit positive results for all compounds found at or near the contract required quantitation limit (CRQL) or detection limit (CRDL) because of low levels of contamination found at a site. Duplicates with Relative Percent Differences (RPDs) within control limits indicate adequate sampling practices and/or good analytical precision. Duplicates with RPDs outside the control limits may result from inappropriate sampling procedures, matrix interferences, or non-homogeneity of the sample matrix. In addition, poor precision can be attributed to deviation(s) from the analytical methodology or to poor reproducibility of target analyte concentrations at or near the required quantitation or detection limits (CRQLs or CRDLs). The acceptance criteria for evaluating precision of field duplicates analytical results is a RPD of 20 for water matrices.

The percent of duplicate samples collected for the analytical parameters and sample matrices was greater than ten percent (10%) for the water matrix as specified in the Work Plan for NCBC Gulfport, Mississippi. The following Sections summarize the evaluation of analytical precision for the water matrix for the following analytical groups:

- GC/MS volatile organic compounds (GC/MS VOCs);
- Dioxin/Furan compounds (D/F);
- semivolatile organic compounds (SVOCs);
- polynuclear aromatic hydrocarbons (PAHs);
- pesticides, PCBs,;
- organophosphorus pesticides;
- herbicides; and
- inorganics, cyanide, & sulfide.

Duplicate precision was assessed using both environmental sample and associated duplicates and matrix spike (MS)/matrix spike duplicates (MSDs) pairs for organic fractions, and matrix duplicate pairs (MD pairs) for the metals/cyanide, and sulfide fractions.

Tabulation of the results of assessing duplicate precision and duplicate frequency are presented in Tables 2-1 and 2-2 for the water matrix. The results of the evaluation of precision for MS/MSD samples is provided in Tables 2-3 through 2-10 for the water matrix.

In addition, to assess whether instrument calibration for volatile, semivolatile, and pesticides/PCBs analytical methods resulted in non-compliant duplicate precision, tables were made of initial and continuing calibration outliers for each sample delivery group (SDG) and are included in Appendix A. Calibration criteria was met in the other organic fractions or the non-compliances did not result in qualification of the analytical data. Therefore, tables of calibration criteria were not prepared for those fractions. To assess the potential for non-compliance in metals analytical data, caused by physical and/or chemical interferences and indicated by non-compliant serial dilution results, tables were prepared of serial dilution results. These are included in Appendix B.

TABLE 2 - 1
ORGANIC FRACTIONS
WATER SAMPLE AND DUPLICATE PRECISION
NCBC GULFPORT HO

VOLATILES

SDG	SAMPLE ID	MATRIX	NO. ASSC. SAMPLES	COMPOUND	SAMPLE CONC.	DUP CONC	MAX RPD	RPD
GPTH04-1	GPTH04-2	WATER	4	TOLUENE	4	0	20%	ND
				XYLENES (TOTAL)	7	0	20%	200%
	TOTAL SAMPLES		4					

DIOXIN FURANS

SDG	SAMPLE ID	MATRIX	NO. ASSC. SAMPLES	COMPOUND	SAMPLE CONC.	DUP CONC	MAX RPD	RPD
080412	GPTH04-2	WATER	4	TCDFs (TOTAL)	0	11	20%	200%
				TCDDs (TOTAL)	11	35	20%	104%
				2,3,7,8-TCDD	11	27	20%	84%
				HxCDDs (TOTAL)	0	61	20%	200%
				HpCDDs (TOTAL)	66	230	20%	111%
				1,2,3,4,6,7,8-HpCDD	0	86	20%	200%
				OCDD	1300	2500	20%	63%
	TOTAL SAMPLES		4					

SEMIVOLATILES

SDG	SAMPLE ID	MATRIX	NO. ASSC. SAMPLES	COMPOUND	SAMPLE CONC.	DUP CONC	MAX RPD	RPD
GPTH04-1	GPTH04-2	WATER	4	NO COMPOUNDS DETECTED				
	TOTAL SAMPLES		4					

POLYNUCLEAR AROMATIC HYDROCARBONS

SDG	SAMPLE ID	MATRIX	NO. ASSC. SAMPLES	COMPOUND	SAMPLE CONC.	DUP CONC	MAX RPD	RPD
GPTH04-1	GPTH04-2	WATER	4	NO COMPOUNDS DETECTED				
	TOTAL SAMPLES		4					

PESTICIDES/PCBS

SDG	SAMPLE ID	MATRIX	NO. ASSC. SAMPLES	COMPOUND	SAMPLE CONC.	DUP CONC	MAX RPD	RPD
GPTH04-1	GPTH04-2	WATER	4	NO COMPOUNDS DETECTED				
	TOTAL SAMPLES		4					

ORGANOPHOSPHOROUS PESTICIDES

SDG	SAMPLE ID	MATRIX	NO. ASSC. SAMPLES	COMPOUND	SAMPLE CONC.	DUP CONC	MAX RPD	RPD
GPTH04-1	GPTH04-2	WATER	4	NO COMPOUNDS DETECTED				
	TOTAL SAMPLES		4					

CHLORINATED HERBICIDES

SDG	SAMPLE ID	MATRIX	NO. ASSC. SAMPLES	COMPOUND	SAMPLE CONC.	DUP CONC	MAX RPD	RPD
GPTH04-1	GPTH04-2	WATER	4	NO COMPOUNDS DETECTED				
	TOTAL SAMPLES		4					

TABLE 2 - 1, CONTINUED
ORGANIC FRACTIONS
WATER SAMPLE AND DUPLICATE PRECISION
NCBC GULFPORT MO

VOLATILES

% OF DUPLICATES COLLECTED	RPD IN	RPD OUT	% WITHIN RPD LIMIT
25.0%	1	1	50.0%

DIOXIN FURANS

% OF DUPLICATES COLLECTED	RPD IN	RPD OUT	% WITHIN RPD LIMIT
25.0%	0	7	0.0%

SEMI VOLATILES

% OF DUPLICATES COLLECTED	RPD IN	RPD OUT	% WITHIN RPD LIMIT
25.0%	1	0	100.0%

POLYNUCLEAR AROMATIC HYDROCARBONS

% OF DUPLICATES COLLECTED	RPD IN	RPD OUT	% WITHIN RPD LIMIT
25.0%	1	0	100.0%

PESTICIDES/PCBS

% OF DUPLICATES COLLECTED	RPD IN	RPD OUT	% WITHIN RPD LIMIT
25.0%	1	0	100.0%

ORGANOPHOSPHOROUS PESTICIDES

% OF DUPLICATES COLLECTED	RPD IN	RPD OUT	% WITHIN RPD LIMIT
25.0%	1	0	100.0%

CHLORINATED HERBICIDES

% OF DUPLICATES COLLECTED	RPD IN	RPD OUT	% WITHIN RPD LIMIT
25.0%	1	0	100.0%

ND - INDICATES RPD CALCULATION NOT REQUIRED BECAUSE ONE (1) RESULT IS NON-DETECT AND THE OTHER RESULT IS BELOW THE CRQL.

TABLE 2 - 2
INORGANIC FRACTIONS
WATER SAMPLE AND DUPLICATE PRECISION
NCBC GULFPORT HO

METALS

SDG	SAMPLE ID	MATRIX	NO. ASSC. SAMPLES	COMPOUND	SAMPLE CONC.	DUP CONC	MAX RPD	RPD
GPTH04-1	GPTH04-2	WATER	4	ARSENIC	11.7	12.6	20%	7%
				BARIUM	64.1	52.9	20%	19%
				CHROMIUM	16.2	14.1	20%	14%
				COBALT	3.4	3.5	20%	3%
				COPPER	4.8	6.5	20%	30%
				LEAD	4.9	4.2	20%	15%
				NICKEL	7.3	7.3	20%	0%
				VANADIUM	23.1	20.4	20%	12%
				ZINC	26.2	40.5	20%	43%
	TOTAL SAMPLES		4					

CYANIDE

SDG	SAMPLE ID	MATRIX	NO. ASSC. SAMPLES	COMPOUND	SAMPLE CONC.	DUP CONC	MAX RPD	RPD
GPTH04-1	GPTH04-2	WATER	4	NO COMPOUND DETECTED				
	TOTAL SAMPLES		4					

SULFIDE

SDG	SAMPLE ID	MATRIX	NO. ASSC. SAMPLES	COMPOUND	SAMPLE CONC.	DUP CONC	MAX RPD	RPD
GPTH04-1	GPTH04-2	WATER	4	SULFIDE	1	1	20%	0%
	TOTAL SAMPLES		4					

TABLE 2 - 2, CONTINUED
INORGANIC FRACTIONS
WATER SAMPLE AND DUPLICATE PRECISION
NCBC GULFPORT HO

METALS

% OF DUPLICATES COLLECTED	RPD IN	RPD OUT	% WITHIN RPD LIMIT
25.0%	7	2	78%

CYANIDE

% OF DUPLICATES COLLECTED	RPD IN	RPD OUT	% WITHIN RPD LIMIT
25.0%	1	0	100.0%

SULFIDE

% OF DUPLICATES COLLECTED	RPD IN	RPD OUT	% WITHIN RPD LIMIT
25.0%	1	0	100.0%

ND - INDICATES RPD CALCULATION NOT REQUIRED BECAUSE ONE (1) RESULT IS NON-DETECT AND THE OTHER RESULT I BELOW THE CRDL.

TABLE 2 - 3A
DIOXIN/FURAN
WATER SAMPLE MATRIX SPIKE/ DUPLICATES
NCBC GULFPORT HO

MS = MATRIX SPIKE *SAMPLE GPTH04-1*		SDG 080412		
MSD = MATRIX SPIKE DUPLICATE		MS	MSD	
RPD = RELATIVE PERCENT DIFFERENCE		%R	%R	RPD
DIOXIN/FURAN CONGENERS	UNITS			
2378-TCDF	ug/L	99	96	4
12378-PeCDF	ug/L	95	92	4
23478-PeCDF	ug/L	94	89	6
123478-HxCDF	ug/L	94	94	0
123678-HxCDF	ug/L	98	96	2
234678-HxCDF	ug/L	102	95	7
123789-HxCDF	ug/L	110	108	1
1234678-HpCDF	ug/L	96	95	1
1234789-HpCDF	ug/L	110	115	5
OCDF	ug/L	105	97	8
2378-TCDD	ug/L	87	82	6
12378-PeCDD	ug/L	96	94	2
123478-HxCDD	ug/L	84	81	3
123678-HxCDD	ug/L	84	84	0
123789-HxCDD	ug/L	96	82	15
1234678-HpCDD	ug/L	111	111	0
OCDD	ug/L	126	148	16

*** DENOTES VALUE NOT WITHIN QA/QC ADVISORY LIMITS**

CORRESPONDING SDG'S AND ASSOCIATED SAMPLES

080412: GPTH04-1, GPTH04-2, GPTH04-2D, GPTH04-3D, GPTH04-4

QC LIMITS WERE NOT PROVIDED BY THE LABORATORY.
%R AND RPDS WERE DEEMED IN CONTROL BY THE DATA REVIEWER.

TABLE 2 - 3
GC/MS VOLATILE ORGANICS COMPOUNDS
WATER SAMPLE MATRIX SPIKE/MATRIX SPIKE DUPLICATES
NCBC GULFPORT HO

MS = MATRIX SPIKE *SAMPLE GPTH04-1*		SDG GPTH04-1		
MSD = MATRIX SPIKE DUPLICATE		MS	MSD	
RPD = RELATIVE PERCENT DIFFERENCE		%R	%R	%RPD
VOA COMPOUNDS	UNITS			
1,1-DICHLOROETHENE	ug/L	86	86	0
TRICHLOROETHENE	ug/L	90	92	2
BENZENE	ug/L	90	90	0
TOLUENE	ug/L	92	92	0
CHLOROBENZENE	ug/L	94	92	2

*** DENOTES VALUE NOT WITHIN QA/QC ADVISORY LIMITS**

CORRESPONDING SDG'S AND ASSOCIATED SAMPLES

GPTH04-1: GPTH04-1, GPTH04-2, GPTH04-2D, GPTH04-3, GPTH04-4

COMPOUND	ADVISORY LIMITS		RPD
	%R WATER		WATER
1,1-DICHLOROETHENE	61%-145%		14
TRICHLOROETHENE	71%-120%		14
BENZENE	76%-127%		11
TOLUENE	76%-125%		13
CHLOROBENZENE	75%-130%		13

TABLE 2 - 4
SEMIVOLATILE ORGANICS COMPOUNDS
WATER SAMPLE MATRIX SPIKE/MATRIX SPIKE DUPLICATES
NCBC GULFPORT HO

MS = MATRIX SPIKE *SAMPLE GPTH04-1*		SDG GPTH04-1		
MSD = MATRIX SPIKE DUPLICATE		MS	MSD	
RPD = RELATIVE PERCENT DIFFERENCE		%R	%R	%RPD
SVOA COMPOUNDS	UNITS			
PHENOL	ug/L	73	81	10
2-CHLOROPHENOL	ug/L	76	81	6
1,4-DICHLOROBENZENE	ug/L	72	76	5
N-NITROSO-DI-N-PROP.(1)	ug/L	78	84	7
1,2,4-TRICHLOROBENZENE	ug/L	78	82	5
4-CHLORO-3-METHYLPHENOL	ug/L	88	91	3
ACENAPHTHENE	ug/L	86	88	2
4-NITROPHENOL	ug/L	*111	*117	5
2,4-DINITROTOLUENE	ug/L	*106	*106	0
PENTACHLOROPHENOL	ug/L	103	*108	5
PYRENE	ug/L	54	60	10

*** DENOTES VALUE NOT WITHIN QA/QC ADVISORY LIMITS**

CORRESPONDING SDG'S AND ASSOCIATED SAMPLES

GPTH04-1: GPTH04-1, GPTH04-2, GPTH04-2D, GPTH04-3, GPTH04-4

COMPOUND	ADVISORY LIMITS		RPD
	% R WATER		WATER
PHENOL	12%-110%		42
2-CHLOROPHENOL	27%-123%		40
1,4-DICHLOROBENZENE	36%-97%		28
N-NITROSO-DI-N-PROP.(1)	41%-116%		38
1,2,4-TRICHLOROBENZENE	39%-98%		28
4-CHLORO-3-METHYLPHENO	23%-97%		42
ACENAPHTHENE	46%-118%		31
4-NITROPHENOL	10%-80%		50
2,4-DINITROTOLUENE	24%-96%		38
PENTACHLOROPHENOL	9%-103%		50
PYRENE	26%-127%		31

TABLE 2 - 5
POLYNUCLEAR AROMATIC HYDROCARBONS
WATER SAMPLE MATRIX SPIKE/MATRIX SPIKE DUPLICATES
NCBC GULFPORT HO

MS = MATRIX SPIKE *SAMPLE GPTH04-1*		SDG GPTH04-1		
MSD = MATRIX SPIKE DUPLICATE		MS	MSD	
RPD = RELATIVE PERCENT DIFFERENCE		%R	%R	%RPD
PAH COMPOUNDS	UNITS			
NAPHTHALENE	ug/L	80	77	4
ACENAPHTHYLENE	ug/L	70	69	2
ACENAPHTHENE	ug/L	75	86	14
FLUORENE	ug/L	85	89	5
PHENANTHRENE	ug/L	106	101	5
ANTHRACENE	ug/L	80	72	10
CHRYSENE	ug/L	91	82	11
FLUORANTHENE	ug/L	90	82	9
PYRENE	ug/L	74	68	7
BENZO(A)ANTHRACENE	ug/L	84	77	10
BENZO(B)FLUORANTHENE	ug/L	86	78	10
BENZO(K)FLUORANTHENE	ug/L	86	78	10
BENZO(A)PYRENE	ug/L	76	68	12
DIBENZO(A,H)ANTHRACENE	ug/L	80	75	7
BENZO(G,H,I)PERYLENE	ug/L	81	75	7
INDENO(1,2,3-CD)PYRENE	ug/L	84	79	7

*** DENOTES VALUE NOT WITHIN QA/QC ADVISORY LIMITS**

CORRESPONDING SDG AND ASSOCIATED SAMPLES

GPTH04-1: GPTH04-1, GPTH04-2, GPTH04-2D, GPTH04-3, GPTH04-4

COMPOUND	ADVISORY LIMITS		RPD
	%R WATER		WATER
NAPHTHALENE	10%-122%		50
ACENAPHTHYLENE	10%-139%		50
ACENAPHTHENE	10%-124%		50
FLUORENE	10%-142%		50
PHENANTHRENE	10%-155%		50
ANTHRACENE	10%-126%		50
CHRYSENE	10%-199%		50
FLUORANTHENE	14%-123%		50
PYRENE	10%-140%		50
BENZO(A)ANTHRACENE	12%-135%		50
BENZO(B)FLUORANTHENE	6%-150%		50
BENZO(K)FLUORANTHENE	10%-159%		50
BENZO(A)PYRENE	10%-128%		50
DIBENZO(A,H)ANTHRACENE	10%-110%		50
BENZO(G,H,I)PERYLENE	10%-116%		50
INDENO(1,2,3-CD)PYRENE	10%-116%		50

TABLE 2 - 6
PESTICIDES/PCBS
WATER SAMPLE MATRIX SPIKE/MATRIX SPIKE DUPLICATES
NCBC GULFPORT HO

MS = MATRIX SPIKE *SAMPLE GPTH04-1* MSD = MATRIX SPIKE DUPLICATE RPD = RELATIVE PERCENT DIFFERENCE		SDG GPTH04-1		
		MS	MSD	
		%R	%R	%RPD
PEST COMPOUNDS	UNITS			
gamma-BHC (Lindane)	ug/L	102	98	4
Heptachlor	ug/L	84	74	13
Aldrin	ug/L	96	72	*29
Dieldrin	ug/L	98	93	5
Endrin	ug/L	100	94	6
4,4'-DDT	ug/L	86	55	*44

*** DENOTES VALUE NOT WITHIN QA/QC ADVISORY LIMITS**

CORRESPONDING SDG AND ASSOCIATED SAMPLES

GPTH04-1: GPTH04-1, GPTH04-2, GPTH04-2D, GPTH04-3, GPTH04-4

COMPOUND	ADVISORY LIMITS		RPD
	% R WATER		WATER
gamma-BHC(Lindane)	56%-123%		15
HEPTACHLOR	40%-131%		20
ALDRIN	40%-120%		22
DIELDRIN	52%-126%		18
ENDRIN	56%-121%		21
4,4'-DDT	38%-127%		27

TABLE 2 - 7
ORGANOPHOSPHOROUS PESTICIDES
WATER SAMPLE MATRIX SPIKE.MATRIX SPIKE DUPLICATES
NCBC GULFPORT HO

MS = MATRIX SPIKE *SAMPLE GPTH04-1*		SDG GPTH04-1		
MSD = MATRIX SPIKE DUPLICATE		MS	MSD	
RPD = RELATIVE PERCENT DIFFERENCE		%R	%R	%RPD
OPP COMPOUNDS	UNITS			
O,O,O-TRIETHYLPHSOPHATE	ug/L	62	60	3
THIONAZIN	ug/L	82	80	2
PHORATE	ug/L	82	81	1
DIMETHOATE	ug/L	76	76	0
DISULFOTON	ug/L	68	68	0
METHYL PARATHION	ug/L	76	75	1
PARATHION	ug/L	77	76	1
FAMPHUR	ug/L	90	91	1
SULFOTEPP	ug/L	74	72	3

*** DENOTES VALUE NOT WITHIN QA/QC ADVISORY LIMITS**

CORRESPONDING SDG AND ASSOCIATED SAMPLES

BS01D13: GPTH03-1, GPTH03-2, GPTH03-3, GPTH03-3D, GPTH03-4

COMPOUND	ADVISORY LIMITS		RPD
	% R WATER		WATER
O,O,O-TRIETHYLPHSOPHATE	41%-128%		24
THIONAZIN	57%-123%		14
PHORATE	24%-115%		36
DIMETHOATE	32%-137%		34
DISULFOTON	18%-120%		43
METHYL PARATHION	27%-111%		28
PARATHION	19%-110%		54
FAMPHUR	43%-144%		42
SULFOTEPP	41%-137%		30

TABLE 2 - 8
HERBICIDES
WATER SAMPLE MATRIX SPIKE/MATRIX SPIKE DUPLICATES
NCBC GULFPORT HO

MS = MATRIX SPI *SAMPLE GPTHO4-1*		SDG GPTH04-1		
MSD = MATRIX SPIKE DUPLICATE		MS	MSD	
RPD = RELATIVE PERCENT DIFFERENCE		%R	%R	%RPD
HERB COMPOUNDS	UNITS			
2,4-D	ug/L	63	67	5
SILVEX	ug/L	78	81	4
2,4,5-T	ug/L	77	71	7
DINOSEB	ug/L	*57	*52	9

*** DENOTES VALUE NOT WITHIN QA/QC ADVISORY LIMITS**

CORRESPONDING SDG AND ASSOCIATED SAMPLES

GPTH04-1: GPTH04-1, GPTH04-2, GPTH04-2D, GPTH04-3, GPTH04-4

COMPOUND	ADVISORY LIMITS		RPD
	% R WATER		WATER
2,4-D	33%-137%		32
SILVEX	35%-139%		39
2,4,5-T	22%-139%		29
DINOSEB	74%-98%		50

TABLE 2 - 9
METALS AND CYANIDE
WATER SAMPLE MATRIX SPIKE/ DUPLICATES
NCBC GULFPORT HO

MS = MATRIX SPIKE *SAMPLE GPTHO4-1*		SDG GPTHO4-1	
MD = MATRIX DUPLICATE *SAMPLE GPTHO4-1*		MS	MD
RPD = RELATIVE PERCENT DIFFERENCE		%R	RPD
METALS COMPOUNDS	UNITS		
ANTIMONY	ug/L	89.4	200
ARSENIC	ug/L	122	0.9
BARIUM	ug/L	100	3.3
BERYLLIUM	ug/L	108	NC
CADMIUM	ug/L	101	NC
CHROMIUM	ug/L	98.9	10.4
COBALT	ug/L	99.1	5.6
COPPER	ug/L	96.7	36.2
LEAD	ug/L	105	8.2
MERCURY	ug/L	104	NC
NICKEL	ug/L	98.4	8.5
SELENIUM	ug/L	118	NC
SILVER	ug/L	97.6	NC
THALLIUM	ug/L	88.6	NC
VANADIUM	ug/L	100	9.6
ZINC	ug/L	96.7	7.7
CYANIDE	ug/L	*0	NC
TIN	ug/L	97.8	NC

*** DENOTES VALUE NOT WITHIN QA/QC ADVISORY LIMITS**

NC DENOTES THAT BOTH SAMPLES ARE NON-DETECT AND A RPD CANNOT BE CALCULATED.
NR DENOTES THAT A MATRIX SPIKE RECOVERY CALCULATION IS NOT REQUIRED.

CORRESPONDING SDG'S AND ASSOCIATED SAMPLES

GPTHO4-1: GPTHO4-1, GPTHO4-2, GPTHO4-2D, GPTHO4-3, GPTHO4-4

COMPOUND	ADVISORY LIMITS		RPD
	%R WATER		WATER
ALL COMPOUNDS	75%-125%		+/-20 OR +/-CR

+/- CRDL = RPD Limits applicable only on values 5 times the Contract Required Detection Limit (CRDL)

TABLE 2 - 10
SULFIDE
WATER SAMPLE MATRIX SPIKE/ DUPLICATES
NCBC GULFPORT HO

MS = MATRIX SPIKE *SAMPLE GPTH04-1*		SDG GPTH04-1		
MD = MATRIX DUPLICATE *SAMPLE GPTH04-1*		MS	MSD	
RPD = RELATIVE PERCENT DIFFERENCE		%R	%R	RPD
	UNITS			
SULFIDE	ug/L	*208	*208	0.0

* DENOTES VALUE NOT WITHIN QA/QC ADVISORY LIMITS

NC DENOTES THAT BOTH SAMPLES ARE NON-DETECT AND A RPD CANNOT BE CALCULATED.

CORRESPONDING SDG'S AND ASSOCIATED SAMPLES

GPTH04-1: GPTH04-1, GPTH04-2, GPTH04-2D, GPTH04-3, GPTH04-4

COMPOUND	ADVISORY LIMITS		RPD
	%R WATER		WATER
ALL COMPOUNDS	25%-197%		11

2.1 Water Matrix

No target compounds requiring RPD calculation were detected in either the water samples or associated duplicates for the semivolatiles, polynuclear aromatic hydrocarbons, pesticides/PCBs, organophosphorus pesticides, chlorinated herbicides (Table 2-1) or the cyanide fraction (Table 2-2). Therefore, no precision assessment was conducted for those parameters.

The volatile analysis of the field duplicate pair of sample GPTH04-2 exhibited a non-compliant RPD for one (1) of the two (2) compounds detected (Table 2-1). The non-compliant compound was xylene (total). The compound was detected in the original sample at a concentration below the CRQL, and was not detected in the field duplicate sample. The non-compliance for xylene (total) can be attributed to the low concentrations detected in the sample. Assessment of the calibration data indicates that criteria was met for the non-compliant compound (Appendix A, Table A-2).

The dioxin/furan analysis of the field duplicate pair of sample GPTH04-2 exhibited non-compliant RPDs for all seven (7) reported compounds (Table 2-1). Two (2) of the compounds were not detected in the original sample, but were detected in the field duplicate sample. The other compounds were detected above the sample detection limits in both samples. The disparity in the results may be attributed to the high turbidity of the samples and the amount of suspended solids present when the analyst extracted the samples.

Two (2) of the nine (9) target analytes detected in the metals analysis of the field duplicate pair of sample GPTH04-2 exhibited non-compliant RPDs (Table 2-2). The target analytes with non-compliant RPDs were copper and zinc. The analyte copper was detected at concentrations below the CRDL in both the original sample and the field duplicate sample. The non-compliance for copper can be attributed to the low concentrations detected. The non-compliance for the analyte zinc may be attributed to laboratory and/or field inconsistencies. Assessment of the serial dilution data indicates that criteria was met for the non-compliant compounds (Appendix B).

The field duplicate pair of sample GPTH04-2 analyzed for sulfide exhibited a compliant RPD (Table 2-2).

The evaluation of precision of the water matrix for the MS/MSD samples is provided in Tables 2-3 through 2-10. All MS/MSD sample pairs analyzed for volatiles, semivolatiles, polynuclear aromatic hydrocarbons, organophosphorus pesticides, herbicides, metals and cyanide, and sulfide exhibited acceptable RPDs between spike compounds (Tables 2-3, 2-4, 2-5, 2-7, 2-8, 2-9 and 2-10).

The pesticides/PCBs analysis of the MS/MSD pair of sample GPTH04-1 exhibited non-compliant RPDs for the compounds aldrin and 4,4'-DDT (Table 2-6). However, based on the assessment of additional QC criteria, the analytical data did not require qualification.

Based on assessment of duplicate precision evaluation criteria, the water matrix analytical data was acceptable for each SDG.

3.0 ACCURACY

The assessment of accuracy is evaluated by comparison of the percent recovery (%R) computed from the known concentration of analyte spikes and their recovered concentration versus the analytical method acceptance criteria. Spike recoveries provide an indication of bias, where the reported data may either overestimate or underestimate the actual concentration of detected compounds and/or the detection limits. Recoveries outside acceptable criteria may be caused by factors such as matrix interference, poor analytical precision, or instrument calibration.

The following Sections summarize the evaluation of analytical accuracy for the water matrix for the following analytical groups:

- GC/MS volatile organic compounds (GC/MS VOCs);
- Dioxin/Furan compounds (D/F);
- semivolatile organic compounds (SVOCs);
- polynuclear aromatic hydrocarbons (PAHs);
- pesticides, PCBs,;
- organophosphorus pesticides;
- herbicides; and
- inorganics, cyanide, & sulfide.

Accuracy was assessed using MS and MSD samples for organic analyses and MS samples for inorganic analyses for each matrix, as well as surrogate compound recoveries for those analytical fraction which utilize them. The results of the evaluation of accuracy for the MS/MSD samples is provided in Tables 2-3 through 2-10 for water matrix. The results of the evaluation of accuracy for the surrogates in the samples are provided in Table 3-1 through 3-6 for the water matrix.

3.1 Water Matrix

All MS/MSD sample pairs analyzed for volatiles, dioxin/furans, polynuclear aromatic hydrocarbons, pesticides/PCBs, organophosphorus pesticides, and metals exhibited acceptable recoveries of spike compounds (Tables 2-3, 2-3A, 2-5, 2-6, 2-7, and 2-9).

The surrogate recoveries for volatiles and polynuclear aromatic hydrocarbons were acceptable (Tables 3-1 and 3-3).

One (1) sample analyzed for dioxin/furans exhibited a high internal standard recovery for 1234678-HpCDF (Table 3-1A). This would indicate that positive results for hepta-substituted furans were biased high. However, there were no hepta-substituted furans reported in the samples, so the analytical data did not require qualifications.

The MS/MSD of sample GPTH04-1 analyzed for semivolatile organics had non-compliant %Rs for 4-nitrophenol and 2,4-dinitrotoluene in the MS and MSD, and for pentachlorophenol in the MSD (Table 2-5). The non-compliances were slight. Based on the assessment of additional QC criteria the analytical data did not require qualification.

Two (2) semivolatile samples exhibited acid surrogate recoveries which were outside the minimum acceptable criteria for accuracy (Table 3-2). The surrogate compound terphenyl-D_4 was recovered below the QC limits. However, the National Functional Guidelines and the SOW allows one (1) surrogate compound per fraction to exceed the QC limits as long as the recovery is above 10%. Therefore, the analytical data did not require qualification.

TABLE 3 - 1
SURROGATE % RECOVERIES
GC/MS VOLATILE WATER SAMPLES
NCBC GULFPORT HO

SDG	SAMPLE ID	SMC1	SMC2	SMC3	TOTAL OUT
GPTH04-1	BS-01-D14	104	102	93	0
	BS-01-RI4	105	102	93	0
	BS-01-TB4	102	97	94	0
	GPTH04-1	102	104	93	0
	GPTH04-1MS	99	99	94	0
	GPTH04-1MSD	99	98	94	0
	GPTH04-2	103	101	93	0
	GPTH04-2D	104	101	92	0
	GPTH04-3	104	104	95	0
	GPTH04-4	106	104	95	0

SMC1 = TOLUENE-D8 QC LIMITS 88% - 110%
SMC2 = BROMOFLUOROBENZENE QC LIMITS 86% - 115%
SMC3 = 1,2-DICHLOROETHANE-D4 QC LIMITS 76% - 114%

# SAMPLES	% REC IN	%REC OUT	% TOTAL IN
10	30	0	100.0%

TABLE 3 - 1A
WATER SAMPLE INTERNAL STANDARDS % RECOVERIES
DIOXIN/FURAN
NCBC GULFPORT HO

	BS-01-DI4	BS-01-RI4	GPTHO4-1	GPTHO4-2	GPTHO4-2D	GPTHO4-3	GPTHO4-4	GPTHO4-1MS	GPTHO4-1MSD
I.S. COMPOUND									
13C-2378-TCDF	64	61	71	96	59	70	66	66	59
13C-2378-TCDD	87	69	77	85	65	79	68	71	66
13C-12378-PeCDF	63	83	63	84	50	56	44	68	52
13C-12378-PeCDD	65	63	69	84	59	66	46	67	51
13C-123478-HxCDF	59	60	56	100	48	60	45	69	54
13C-123678-HxCDD	79	79	67	98	66	71	58	70	68
13C-1234678-HpCDF	68	60	50	*140	43	57	41	58	52
13C-1234678-HpCDD	59	63	51	131	49	58	44	58	58
13C-OCDD	67	65	54	116	56	64	55	65	65
TOTAL OUT	0	0	0	1	0	0	0	0	0

QC LIMITS NOT PROVIDED BY THE LABORATORY
* - VALUE OUTSIDE OF QC LIMITS APPLIED BY REVIEWER

# SAMPLES	% REC IN	% REC OUT	% TOTAL IN
9	80	1	98.8%

TABLE 3 - 2
SURROGATE % RECOVERIES
SEMIVOLATILE WATER SAMPLES
NCBC GULFPORT HO

SDG	SAMPLE ID	S1	S2	S3	S4	S5	S6	S7	S8	TOTAL OUT
GPTH04-1	BS-01-D14	91	86	102	86	78	102	79	77	0
	BS-01-RI4	85	80	97	81	73	92	74	70	0
	GPTH04-1	93	86	60	85	80	102	82	78	0
	GPTH04-1MS	86	85	42	87	79	110	81	75	0
	GPTH04-1MSD	91	86	50	95	86	110	88	82	0
	GPTH04-2	87	80	46	86	76	104	79	73	0
	GPTH04-2D	93	92	75	92	81	121	86	78	0
	GPTH04-3	82	71	*24	82	75	94	78	72	1
	GPTH04-4	76	67	*25	73	67	96	70	66	1

S1 = NITROBENZENE-d4 QC LIMITS = 35% - 114%
S2 = 2-FLUOROBIPHENYL QC LIMITS = 43% - 116%
S3 = TERPHENYL-d14 QC LIMITS = 33% - 114%
S4 = PHENOL-d5 QC LIMITS = 10% - 110%
S5 = 2-FLUOROPHENOL QC LIMITS = 21% - 110%
S6 = 2,4,6-TRIBROMOPHENOL QC LIMITS = 10% - 123%
S7 = 2-CHLOROPHENOL-D4 QC LIMITS = 33% - 110% (ADVISORY)
S8 = 1,2-DICHLOROBENZENE-D4 QC LIMITS = 16% - 110% (ADVISORY)

# SAMPLES	% REC IN	%REC OUT	% TOTAL IN
9	70	2	97.2%

TABLE 3-3
SURROGATE % RECOVERIES
POLYNUCLEAR AROMATIC HYDROCARBONS
NCBC GULFPORT HO

SDG	SAMPLE ID	S1	S1	S2	S2	TOTAL OUT
GPTH04-1	BS-01-D14	102	105	90	106	0
	BS-01-RI4	100	101	95	116	0
	GPTH04-1	102	102	68	79	0
	GPTH04-1MS	100	103	93	92	0
	GPTH04-1MSD	92	95	83	86	0
	GPTH04-2	96	98	85	106	0
	GPTH04-2D	97	101	78	97	0
	GPTH04-3	83	86	31	38	0
	GPTH04-4	67	69	30	37	0

S1 = TERPHENYL-D14 QC LIMITS = 10%-124%
S2 = BENZO(E)PYRENE QC LIMITS = 10%-132%

# SAMPLES	% REC IN	%REC OUT	% TOTAL IN
9	18	0	100.0%

TABLE 3-4
SURROGATE % RECOVERIES
PESTICIDES/PCBs
NCBC GULFPORT HO

SDG	SAMPLE ID	TCX1	TCX2	DCB1	DCB2	TOTAL OUT
GPTH04-1	BS-01-D14	75	75	90	95	0
	BS-01-RI4	75	75	85	90	0
	GPTH04-1	75	75	*35	*36	2
	GPTH04-1MS	*495	*475	*46	*48	4
	GPTH04-1MSD	*440	*470	*28	*29	4
	GPTH04-2	75	80	*45	*46	2
	GPTH04-2D	70	80	*44	*43	2
	GPTH04-3	60	65	*28	*29	2
	GPTH04-4	65	70	*31	*32	2

TCX = TETRACHLORO-M-XYLENE QC LIMITS = 60%-150%
DCB = DECACHLOROBIPHENYL QC LIMITS = 60%-150%

# SAMPLES	% REC IN	%REC OUT	% TOTAL IN
9	18	18	50.0%

TABLE 3-5
SURROGATE % RECOVERIES
ORGANOPHOSPHOROUS PESTICIDES
NCBC GULFPORT HO

SDG	SAMPLE ID	S1 1	S1 2	TOTAL OUT
GPTH04-1	BS-01-D14	78	80	0
	BS-01-RI4	90	95	0
	GPTH04-1	97	100	0
	GPTH04-1MS	92	98	0
	GPTH04-1MSD	90	96	0
	GPTH04-2	114	118	0
	GPTH04-2D	99	102	0
	GPTH04-3	104	108	0
	GPTH04-4	130	*167	1

S1 = TRIPHENYLPHOSPHATE QC LIMITS = 38%-146%

# SAMPLES	% REC IN	%REC OUT	% TOTAL IN
9	17	1	94.4%

TABLE 3-6
SURROGATE % RECOVERIES
CHLORINATED HERBICIDES
NCBC GULFPORT HO

SDG	SAMPLE ID	DCAA 1	DCAA 2	TOTAL OUT
GPTH04-1	BS-01-D14	74	112	0
	BS-01-RI4	*41	63	1
	GPTH04-1	127	126	0
	GPTH04-1MS	83	82	0
	GPTH04-1MSD	72	64	0
	GPTH04-2	*42	54	1
	GPTH04-2D	91	91	0
	GPTH04-3	82	77	0
	GPTH04-4	119	107	0

DCAA QC LIMITS = 50%-150%

# SAMPLES	% REC IN	%REC OUT	% TOTAL IN
9	16	2	88.9%

The pesticides/PCB surrogate recoveries were above the QC limits in all samples for TCMX in two (2) laboratory QC samples and below the QC limits for DCB in all field water samples (Table (3-4). This indicates that all reported results for the target compounds in the field water samples could be biased low. Therefore, all reported positive and non-detect results in the field samples were appropriately qualified as estimated, J/UJ.

The organophosphorus pesticides surrogate recoveries were within criteria with the exception of one (1) recovery in sample GPTH04-4 (Table 3-5). The surrogate compound triphenylphosphate was recovered above the QC limit. This indicates that reported positive results in the sample could be overestimated. However, there were no positive results reported in the sample. Therefore, the analytical data did not require qualification.

The MS/MSD of sample GPTH04-1 analyzed for herbicides exhibited recoveries below the QC limits in both the MS and the MSD for dinoseb (Table 2-8). The compound dinoseb exhibited low recoveries in the blank spike associated with the samples also. For this reason and for historical evidence of low recoveries for the compound, all positive and non-detect results reported for dinoseb in the field samples were qualified as estimated, J/UJ.

The herbicide surrogate recoveries were within criteria with the exception of two (2) samples (Table 3-6). The surrogate compound DCAA was recovered below the QC limits in samples BS-01-RI4 and GPTH04-2. This indicates that reported positive and non-detect results for target compounds in the two (2) samples could be underestimated. Therefore, positive and non-detect results in the two (2) samples were appropriately qualified as estimated, J/UJ.

The MS/MD analyzed for inorganic analytes exhibited a zero percent (0%) recovery for the compound cyanide (Table 2-9). This indicates that positive results reported for the compound in associated samples are underestimated, and that non-detect results reported for the compound in associated samples are unreliable. Therefore, all non-detect results in associated samples were rejected, R, and all positive results were appropriately qualified as estimated, J. The completion goal for the cyanide fraction was not met.

The MS/MSD pair analyzed for the sulfide fraction exhibited non-compliant recoveries in the MS and the MSD (Table 2-10). The compound was recovered above the QC limits in both spike samples. This indicates that reported positive results in associated samples may be overestimated. Therefore, all positive results reported in associated samples were qualified as estimated, J.

Based on assessment of MS/MSD and surrogate sample accuracy evaluation criteria, the water matrix analytical data was acceptable for each SDG with the exception of the cyanide fraction. Some of the analytical results may be overestimated or underestimated. The cyanide fraction exhibited 0% completeness due to the 0% recovery in the MS sample.

4.0 REPRESENTATIVENESS

Representativeness of the environmental sample analytical data was assessed using trip blanks, field blanks, equipment rinseate blanks, and laboratory method blanks. The environmental samples and associated blanks were analyzed for the following target analyte groups:

- GC/MS volatile organic compounds (GC/MS VOCs);
- Dioxin/Furan compounds (D/F);
- semivolatile organic compounds (SVOCs);
- polynuclear aromatic hydrocarbons (PAHs);
- pesticides, PCBs,;
- organophosphorus pesticides;
- herbicides; and
- inorganics, cyanide, & sulfide.

The trip blank samples were analyzed for only GC/MS volatile organic target analytes. Field blanks, equipment rinseate blanks, and laboratory method blanks were analyzed for target analytes in each listed category. The assessment of representativeness is summarized in tabular form for each type of blank, trip blank results are summarized in Table 4-1, field blank results are summarized in Tables 4-2 through 4-10, equipment rinseate blank results are summarized in Tables 4-11 through 4-19 and method blank results are summarized in Tables 4-20 through 4-26.

If contaminants were detected in a blank, corrective actions were made for the chemical analytical data during data validation by Heartland. The corrective action consisted of amending the laboratory reported results for organic and inorganic target analytes by the criteria. The following describes the Validation Qualifier code in the blank summary tables.

Organic Target Analytes

- CRDL Validation Qualifier. If a sample result for the blank contaminant was less than the CRQL and less than 5 times the blank value (10 times for common laboratory contaminants), the sample result was rejected and amended as estimated non-detected at the CRQL for the target compound.

- U Validation Qualifier. If a sample result for the blank contaminant was greater than the sample CRQL and less than 5 times the blank value (10 times for common laboratory contaminants), the sample result for the blank contaminant was amended as non detect at the concentration reported in the sample results.

- No Action (NA). If a sample result for the blank contaminant was greater than the CRQL and 5 time the blank value (10 times for common laboratory contaminants), the result was not amended.

Inorganic Target Analytes

- U Validation Qualifier. If a sample result for the blank contaminant was less than the IDL and less than 5 times the blank value, the sample result was amended as non-detected.

- UJ Validation Qualifier. If a sample result for the blank contaminant was less than the sample IDL when the absolute value of the negative blank value was greater

TABLE 4 - 1
GC/MS VOLATILE COMPOUNDS DETECTED IN TRIP BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	TB CONC.	UNITS	VALIDATION QUALIFIER
GPTH04-1	BS-01-TB4	GPTH04-1, GPTH04-2, GPTH04-2D, GPTH04-3, GPTH04-4, GPTH04-1MS, GPTH04-1MSD	NO CONTAMINATION FOUND			

TABLE 4 - 2
GC/MS VOLATILE COMPOUNDS DETECTED IN FIELD BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	FB CONC.	UNITS	VALIDATION QUALIFIER
GPTH04-1	BS-01-DI4	GPTH04-1, GPTH04-2, GPTH04-2D, GPTH04-3, GPTH04-4, GPTH04-1MS, GPTH04-1MSD	ACETONE	10	ug/L	

TABLE 4 - 2A
DIOXIN FURAN COMPOUNDS DETECTED IN FIELD BLANKS
NCSC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	FB CONC.	UNITS	VALIDATION QUALIFER
080412	BS-01-D14	GPTH04-1, GPTH04-1MS, GPTH04-1MSD, GPTH04-2, GPTH04-2D, GPTH04-3, GPTH04-4	NO CONTAMINATION FOUND			

TABLE 4 - 3
GC/MS SEMIVOLATILE COMPOUNDS DETECTED IN FIELD BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	FB CONC.	UNITS	VALIDATION QUALIFIER
GPTH04-1	BS-01-DI4	GPTH04-1, GPTH04-2, GPTH04-2D, GPTH04-3, GPTH04-4, GPTH04-1MS, GPTH04-1MSD	NO CONTAMINATION FOUND			

TABLE 4 - 4
POLYNUCLEAR AROMATIC HYDROCARBONS DETECTED IN FIELD BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	FB CONC.	UNITS	VALIDATION QUALIFIER
GPTH04-1	BS-01-DI4	GPTH04-1, GPTH04-2, GPTH04-2D, GPTH04-3, GPTH04-4, GPTH04-1MS, GPTH04-1MSD	NO CONTAMINATION FOUND			

TABLE 4 - 5
PESTICIDES/PCBs DETECTED IN FIELD BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	FB CONC.	UNITS	VALIDATION QUALIFIER
GPTH04-1	BS-01-DI4	GPTH04-1, GPTH04-2, GPTH04-2D, GPTH04-3, GPTH04-4, GPTH04-1MS, GPTH04-1MSD	NO CONTAMINATION FOUND			

TABLE 4 - 6
ORGANOPHOSPHOROUS PESTICIDES DETECTED IN FIELD BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	FB CONC.	UNITS	VALIDATION QUALIFIER
GPTH04-1	BS-01-DI4	GPTH04-1, GPTH04-2, GPTH04-2D, GPTH04-3, GPTH04-4, GPTH04-1MS, GPTH04-1MSD	NO CONTAMINATION FOUND			

TABLE 4 - 7
CHLORINATED HERBICIDES DETECTED IN FIELD BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	FB CONC.	UNITS	VALIDATION QUALIFIER
GPTH04-1	BS-01-DI4	GPTH04-1, GPTH04-2, GPTH04-2D, GPTH04-3, GPTH04-4, GPTH04-1MS, GPTH04-1MSD	NO CONTAMINATION FOUND			

TABLE 4 - 8
TOTAL METALS DETECTED IN FIELD BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	FB CONC.	UNITS	VALIDATION QUALIFIER
GPTH04-1	BS-01-DI4	GPTH04-1, GPTH04-2, GPTH04-2D, GPTH04-3, GPTH04-4, GPTH04-1MS, GPTH04-1MSD	COPPER	2.3	ug/L	
			VANADIUM	1.2	ug/L	
			ZINC	15.7	ug/L	

TABLE 4 - 9
CYANIDE DETECTED IN FIELD BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	FB CONC.	UNITS	VALIDATION QUALIFIER
GPTH04-1	BS-01-DI4	GPTH04-1, GPTH04-2, GPTH04-2D, GPTH04-3, GPTH04-4, GPTH04-1MS, GPTH04-1MSD	NO CONTAMINATION FOUND			

TABLE 4 - 10
SULFIDE DETECTED IN FIELD BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	FB CONC.	UNITS	VALIDATION QUALIFIER
GPTH04-1	BS-01-DI4	GPTH04-1, GPTH04-2, GPTH04-2D, GPTH04-3, GPTH04-4, GPTH04-1MS, GPTH04-1MSD	SULFIDE	1	mg/L	

TABLE 4 - 11
GC/MS VOLATILE COMPOUNDS DETECTED IN RINSEATE BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	RB CONC.	UNITS	VALIDATION QUALIFIER
GPTH04-1	BS-01-RI4	GPTH04-1, GPTH04-1MS	ACETONE	9	ug/L	U
		GPTH04-1MSD				CRQL
		GPTH04-2, GPTH04-2D, GPTH04-3, GPTH04-4				

TABLE 4 - 11A
DIOXIN FURAN COMPOUNDS DETECTED IN RINSEATE BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	RE CONC.	UNITS	VALIDATION QUALIFER
080412	BS-01-R14	GPTH04-1, GPTH04-1MS, GPTH04-1MSD, GPTH04-2, GPTH04-2D, GPTH04-3, GPTH04-4	NO CONTAMINATION FOUND			

TABLE 4 - 12
GC/MS SEMIVOLATILE COMPOUNDS DETECTED IN RINSEATE BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	RB CONC.	UNITS	VALIDATION QUALIFIER
GPTH04-1	BS-01-RI4	GPTH04-1, GPTH04-2, GPTH04-2D, GPTH04-3, GPTH04-4, GPTH04-1MS, GPTH04-1MSD	NO CONTAMINATION FOUND			

TABLE 4 - 13
POLYNUCLEAR AROMATIC HYDROCARBONS DETECTED IN RINSEATE BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	RB CONC.	UNITS	VALIDATION QUALIFIER
GPTH04-1	BS-01-RI4	GPTH04-1, GPTH04-2, GPTH04-2D, GPTH04-3, GPTH04-4, GPTH04-1MS, GPTH04-1MSD	NO CONTAMINATION FOUND			

TABLE 4 - 14
PESTICIDES/PCBs DETECTED IN RINSEATE BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	RB CONC.	UNITS	VALIDATION QUALIFIER
GPTH04-1	BS-01-RI4	GPTH04-1, GPTH04-2, GPTH04-2D, GPTH04-3, GPTH04-4, GPTH04-1MS, GPTH04-1MSD	NO CONTAMINATION FOUND			

TABLE 4 - 15
ORGANOPHOSPHOROUS PESTICIDES DETECTED IN RINSEATE BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	RB CONC.	UNITS	VALIDATION QUALIFIER
GPTH04-1	BS-01-RI4	GPTH04-1, GPTH04-2, GPTH04-2D, GPTH04-3, GPTH04-4, GPTH04-1MS, GPTH04-1MSD	NO CONTAMINATION FOUND			

TABLE 4 - 16
CHLORINATED HERBICIDES DETECTED IN RINSEATE BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	RB CONC.	UNITS	VALIDATION QUALIFIER
GPTH04-1	BS-01-RI4	GPTH04-1, GPTH04-2, GPTH04-2D, GPTH04-3, GPTH04-4, GPTH04-1MS, GPTH04-1MSD	NO CONTAMINATION FOUND			

TABLE 4 - 17
TOTAL METALS DETECTED IN RINSEATE BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	RB CONC.	UNITS	VALIDATION QUALIFIER
GPTH04-1	BS-01-RI4	GPTH04-1, GPTH04-2, GPTH04-2D, GPTH04-3, GPTH04-4, GPTH04-1MS, GPTH04-1MSD	VANADIUM	2.3	ug/L	
			ZINC	1.2	ug/L	

TABLE 4 - 18
CYANIDE DETECTED IN RINSEATE BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	RB CONC.	UNITS	VALIDATION QUALIFIER
GPTH04-1	BS-01-RI4	GPTH04-1, GPTH04-2, GPTH04-2D, GPTH04-3, GPTH04-4, GPTH04-1MS, GPTH04-1MSD	NO CONTAMINATION FOUND			

TABLE 4 - 19
SULFIDE DETECTED IN RINSEATE BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	RB CONC.	UNITS	VALIDATION QUALIFIER
GPTH04-1	BS-01-RI4	GPTH04-1, GPTH04-2, GPTH04-2D, GPTH04-3, GPTH04-4, GPTH04-1MS, GPTH04-1MSD	NO CONTAMINATION FOUND			

TABLE 4 - 20
GC/MS VOLATILE COMPOUNDS DETECTED IN METHOD BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	MB CONC.	UNITS	VALIDATION QUALIFIER
GPTH04-1	VBLK59	BS-01-D14	METHYLENE CHLORIDE	5	ug/L	CRQL
		BS-01-R14, GPTH04-1, GPTH04-2, GPTH04-2D				
	VBLK60	GPTH04-1MS, GPTH04-1MSD, GPTH04-3, GPTH04-4	NO CONTAMINATION FOUND			
	VBLK71	BS-01-TB4	NO CONTAMINATION FOUND			

TABLE 4 - 20A
DIOXIN FURAN COMPOUNDS DETECTED IN METHOD BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	MB CONC.	UNITS	VALIDATION QUALIFIER
080412	METHOD BLANK	B5-01-D14, B5-01-R14, GPTH04-1, GPTH04-2, GPTH04-2D, GPTH04-3, GPTH04-4, GPTH04-1MS, GPTH04-1MSD	NO CONTAMINATION FOUND			

TABLE 4 - 21
SEMIVOLATILE COMPOUNDS DETECTED IN METHOD BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	MB CONC.	UNITS	VALIDATION QUALIFIER
GPTH04-1	SBLK1	BS-01-DI4, BS-01-RI4, GPTH04-1, GPTH04-2, GPTH04-2D, GPTH04-3, GPTH04-4, GPTH04-1MS, GPTH04-1MSD	DI-N-OCTYLPHTHALATE	5	ug/L	

TABLE 4 - 22
POLYNUCLEAR AROMATIC HYDROCARBONS DETECTED IN METHOD BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	MB CONC.	UNITS	VALIDATION QUALIFIER
GPTH04-1	A2TP2101	BS-01-D14, BS-01-R14, GPTH04-1, GPTH04-2, GPTH04-2D, GPTH04-3, GPTH04-4, GPTH04-1MS, GPTH04-1MSD	NO CONTAMINATION FOUND			

TABLE 4 - 23
PESTICIDES/PCBs DETECTED IN METHOD BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	MB CONC.	UNITS	VALIDATION QUALIFIER
GPTH04-1	PBLK1	BS-01-DI4, BS-01-RI4, GPTH04-1, GPTH04-2, GPTH04-2D, GPTH04-3, GPTH04-4, GPTH04-1MS, GPTH04-1MSD	NO CONTAMINATION FOUND			

TABLE 4 - 24
ORGANOPHOSPHOROUS PESTICIDES DETECTED IN METHOD BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	MB CONC.	UNITS	VALIDATION QUALIFIER
GPTH04-1	A2TNW-101	BS-01-D14, BS-01-R14, GPTH04-1, GPTH04-2, GPTH04-2D, GPTH04-3, GPTH04-4, GPTH04-1MS, GPTH04-1MSD	NO CONTAMINATION FOUND			

TABLE 4 - 25
CHLORINATED HERBICIDES DETECTED IN METHOD BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	MB CONC.	UNITS	VALIDATION QUALIFIER
GPTH04-1	A2TPF-101	BS-01-D14, BS-01-R14, GPTH04-1, GPTH04-2, GPTH04-2D, GPTH04-3, GPTH04-4, GPTH04-1MS, GPTH04-1MSD	NO CONTAMINATION FOUND			

TABLE 4 - 26
TOTAL METALS DETECTED IN METHOD BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	RB CONC.	UNITS	VALIDATION QUALIFIER
GPTH04-1	PBLKW	BS01RI4, BS01DI4, GPTH04-2, GPTH04-2D	CHROMIUM	-1.93	ug/L	J/UJ
		BS01DI4, BS01RI4, GPTH04-1, GPTH04-2, GPTH04-2D, GPTH04-3, GPTH04-4	THALLIUM	-1.10	ug/L	UJ

than the IDL, the sample result for the blank contaminant was amended as estimated non-detected.

- J Validation Qualifier. If a sample result for the blank contaminant was greater than the IDL and less than 10 times the blank value, when the absolute of the negative blank value id greater than the IDL the result was amended as estimated at the laboratory value.

4.1 Trip Blanks

Trip blanks contained deionized water from the laboratory and consisted of samples bottles which were similar to the environmental sample containers. The trip blanks were prepared and packaged at the laboratory prior to the sampling event and traveled with the sample bottles to the site. The trip blank bottles were not opened at the site or anytime prior to laboratory analysis.

No target compounds were detected in the trip blank sample (Table 4-1). No analytical results required qualification due to the trip blank contamination. Based on the assessment of the trip blank results for representativeness, the analytical data is acceptable.

4.2 Field Blanks

The field blank, BS-01-DI4, was a sample of DI water. It was prepared from the source potable water. The field blank was prepared at the site and placed in containers that were similar to those used for the environmental samples. Dioxin/Furans, semivolatiles, polynuclear aromatic hydrocarbons, pesticide/PCBs, organophosphorus pesticides, herbicides, and cyanide target compounds were not detected in the field blank samples (Tables 4-2A, 4-3, 4-4, 4-5, 4-6, 4-7, and 4-9). Target compounds and analytes detected in the field blank samples consisted of:

- GC/MS Volatiles (Table 4-2)
  - acetone
- Inorganics (Table 4-8)
  - copper
  - vanadium
  - zinc
- Sulfide (Table 4-10)

The detected acetone result in the field blank is attributed to laboratory contamination because acetone is a common laboratory contaminant. The metals analytes were detected below the CRDL. The sulfide result in the field blank may be attributed to laboratory and/or field contamination. None of the sample data required qualification due to the field blank contamination.

Target analytes were detected in some of the field blanks. None of the analytical data required qualification. Based on assessment of field blanks for representativeness the analytical data was acceptable for the SDG.

4.3 Equipment Rinseate Blanks

The equipment rinseate blank was prepared by rinsing a piece of decontaminated sampling equipment with deionized water from a field DI unit. A sample of this water was collected and placed in sample containers similar to those used for the environmental samples. Dioxin/Furans,

semivolatiles, polynuclear aromatic hydrocarbons, pesticide/PCBs, organophosphorus pesticides, herbicides, cyanide, and sulfide target compounds were not detected in the field blank samples (Tables 4-11A, 4-12, 4-13, 4-14, 4-15, 4-16, 4-18, and 4-19). Target analytes detected in the equipment rinseate blank samples consisted of:

- GC/MS Volatiles (Table 4-11)
  acetone

- Metals (Table 4-20)
  vanadium
  zinc

The detected acetone is a common laboratory contaminant and may be attributed to laboratory contamination. Some of the field samples required qualification. The metals analytes were detected below the CRDL. None of the metals sample data required qualification due to the field blank contamination.

Based on assessment of equipment rinseate blanks for representativeness the analytical data was acceptable for the SDG.

4.4 Method Blanks

The method blanks were samples of deionized water prepared by the laboratory at the time of analysis. Method blanks undergo the same analytical process as the corresponding environmental samples and associated field blanks. The purpose of the method blank is to assess the potential for target compounds and analytes to "contaminate" the sample during analysis. Dioxin/Furans, polynuclear aromatic hydrocarbons, pesticides/PCBs, organophosphorus pesticides, and herbicides target compounds were not detected in method blank samples (Tables 4-20A, 4-22, 4-23, 4-24, and 4-25). Target analytes detected in the method blank samples consisted of:

- GC/MS Volatiles (Table 4-20)
  methylene chloride

- GC/MS Semivolatiles (Table 4-21)
  di-n-octylphthalate

- Inorganics (Table 4-26)
  chromium
  thallium

The volatile compound methylene chloride and the semivolatile compound di-n-octylphthalate are common laboratory contaminants. The chromium and thallium were negative in concentration and can be attributed to instrumentation anomalies.

Because target analytes were detected in some of the method blanks, some of the analytical results were qualified. However, based on assessment of method blanks for representativeness the analytical data was acceptable for each SDG.

4.5 Holding Times

Holding times requirements are utilized in an effort to minimize the degradation or concentration of constituents in a particular matrix over time. The stability of the constituents is determined to the

best extent and then a reasonable time limit is imposed under which the samples must be extracted or prepared and then analyzed. The holding times regulations assume that the samples have been properly preserved according to the guidelines, either at the laboratory or in the field. Analytical results from samples with holding time violations are qualified as estimated, J/UJ, due to the potential for compromising the integrity of the samples.

All holding times requirements, extraction and analytical, were met for all samples, for all analytical fractions.

5.0 COMPARABILITY

Comparability is qualitative measure designed to express the confidence with which one data set may be compared to another. The analytical samples were collected and transported to the chemical analytical laboratory in accordance with standard procedures and were analyzed in conformance with acceptable USEPA procedures (Refer to Table 5-1 below). The analytical data are reported in standard units (micrograms per liter, micrograms per kilogram, etc.).

The methods used to collect the environmental samples and the methods used to analyze the samples should assure comparability of the analytical data.

TABLE 5-1
USEPA Procedures (CLP or SW-846 Methodologies)

U.S. EPA Method	Description
SW-846, Method 8240	Volatile Organics
SW-846, Method 8290	Dioxin/Furans
SW-846, Method 8270	Semivolatile Organics
SW-846, Method 8310	Polynuclear Aromatic Hydrocarbons
CLP, OLM01.8, SOW 3/90	Pesticides/PCBs
SW-846, Method 8140	Organophosphorus Pesticides
SW-846, Method 8150	Chlorinated Herbicides
CLP, ILM02.1	Metals
CLP, ILM02.1	Cyanide
SW-846, Method 9030	Sulfide

6.0 COMPLETENESS

Completeness is the quantitative measure of the amount of data obtained from a measurement process compared with the amount expected to be obtained under the conditions of measurement. The completeness goal for laboratory analysis for this project was 85 percent useable data. Unusable analytical data are those results reported by the laboratory but rejected during the data validation process. A summary of the completeness goal for NCBC Gulfport is provided in Table 6-1. For more detailed completeness goal tables, please refer to Appendix C.

TABLE 6-1
COMPLETION GOAL (>85%)

	QC	GW	OVERALL
GC/MS Volatiles	97.4	97.8	97.6
Dioxin/Furans	100.0	100.0	100.0
Semivolatiles	97.3	97.3	97.3
PAHs	100.0	100.0	100.0
Pesticide/PCBs	100.0	100.0	100.0
Organophos. Pest.	100.0	100.0	100.0
Herbicides	100.0	100.0	100.0
Metals	100.0	100.0	100.0
Cyanide	0.0	0.0	0.0
Sulfide	100.0	100.0	100.0

MATRIX KEY

QC = QC Samples
GW = Ground Water Samples

The analytical data met the 85 percent completeness goal for every fraction with the exception of the cyanide fraction. The completeness for the cyanide fraction was 0% because of 0% recoveries in the matrix spike sample associated with the samples. There were no positive results for cyanide detected in the samples. Therefore, in accordance with the functional guidelines, the cyanide non-detect results in all sample were rejected. The narrative following describes any extenuating factors involved in the data resolution.

GC/MS Volatiles, Non-Compliant RRFs. Three (3) volatile compounds; isobutanol, 1,4-dioxane, and acrolein, did not always meet the initial and continuing calibration criteria of >0.05 for RRF (Relative Response Factor). The RRF values fell below 0.05 in analyses affecting the SDG associated with this project. All non-detect sample results associated with the initial and continuing calibrations that exhibited any of the three (3) compounds with non-compliant RRFs are rejected, R, (Table A-1). All positive sample results associated with the initial and continuing calibrations that exhibited any of the three (3) compounds with non-compliant RRFs are qualified as estimated, J, (Table A-1). The non-compliant calibrations resulted in the rejection of eleven (11) data points. The completeness goal for the fraction was still met.

Non-detect results that were rejected for the compounds may be evaluated by adjusting the CRQL to the concentration of the continuing calibration standard and qualifying the results as not detected at an estimated concentration, UJ. The non-detect qualification at the concentration of the continuing calibration standard insures that the instrumentation is capable of detecting the compound at a known concentration.

Semivolatiles, Non-Compliant RRFs Three (3) semivolatile compounds; hexachlorophene, aramite, and 1,3,5-trinitrobenzene, did not always meet the initial and continuing calibration criteria of >0.05 for RRF (Relative Response Factor). The RRF values fell below 0.05 in analyses affecting the SDG associated with this project. All non-detect sample results associated with the initial and continuing calibrations that exhibited any of the three (3) compounds with non-compliant RRFs are rejected, R, (Table A-2). All positive sample results associated with the initial and continuing calibrations that exhibited any of the three (3) compounds with non-compliant RRFs or %Ds are qualified as estimated, J, (Table A-2). The non-compliant calibrations resulted in the rejection of twenty-one (21) data points. The completeness goal for the fraction was still met.

Non-detect results that were rejected for the compounds may be evaluated by adjusting the CRQL to the concentration of the continuing calibration standard and qualifying the results as not detected at an estimated concentration, UJ. The non-detect qualification at the concentration of the continuing calibration standard insures that the instrumentation is capable of detecting the compound at a known concentration.

GC/MS Volatiles/Semivolatiles/Pesticides/PCBs Target compounds for the volatile, semivolatile, and pesticide/PCBs fractions were qualified because of non-compliant calibrations. Volatile, semivolatile, and pesticide/PCB compounds did not always meet the initial and/or continuing calibration criteria for RSD (Relative Standard Deviation), and %D (Percent Difference). All results qualified for calibration % RSD and % D deficiencies (J/UJ) are considered to be useable. For the compounds in the GC/MS volatile and semivolatile analyses that did not meet calibration criteria, all positive results are qualified as estimated (J) (%Ds >25%) and all non detect results are qualified as estimated (UJ) (>50% D <90%) due to calibration deficiencies. For the pesticide/PCB analyses that did not meet calibration criteria, positive and non-detect results are qualified as estimated, (J or UJ) (%RSDs >20% and %Ds >25%).

7.0 PARCC SUMMARY

The purpose of evaluating the quality of the analytical data using the PARCC criteria was to address the qualification of the data in regards to evaluation of the presence, magnitude and characteristics of hazardous substances at NCBC Gulfport. Overall, the chemical analytical data are acceptable and exceeded the completion goal of 85 percent for all fractions except cyanide. Tables 7-1 and 7-2 provides a tabulation of the assessment of PARCC criteria each SDG for water samples and quality control samples, respectively.

7.1 Water Samples

Five (5) volatile data points were rejected due to initial and/or continuing calibration standards which did not meet QC criteria. The completion goal was met. Twelve (12) semivolatile data points were rejected due to initial and/or continuing calibration standards which did not meet QC criteria. The completion goal was met. Four (4) cyanide data points were rejected due to 0% matrix spike recovery. The completion goal for the cyanide fraction was not met.

7.2 QC Samples

Six (6) volatile data points were rejected due to initial and/or continuing calibration standards which did not meet QC criteria. The completion goal was met. Nine (9) semivolatile data points were rejected due to initial and/or continuing calibration standards which did not meet QC criteria. The completion goal was met. Three (3) cyanide data points were rejected due to 0% matrix spike recovery. The completion goal for the cyanide fraction was not met.

TABLE 7 - 1
PARCC CRITERIA SUMMARY
WATER SAMPLES
NCBC GULFPORT HO

SDGs	PRECISION	ACCURACY	REPRESENT-ATIVENESS	COMPARABILITY	COMPLETENESS
GPTH04-1 (080412)	ACCEPTABLE	UNACCEPTABLE (3) WITH REJECTIONS	ACCEPTABLE	ACCEPTABLE	ACCEPTABLE (1, 2) WITH REJECTIONS UNACCEPTABLE (3) WITH REJECTIONS

(1) Five (5) volatile data points were rejected due to initial and/or continuing calibration standards which did not meet QC criteria. Completion goal was met.
(2) Twelve (12) semivolatile data points were rejected due to initial and/or continuing calibration standards which did not meet QC criteria. Completion goal was met.
(3) Four (4) cyanide data points were rejected due to 0% Matrix Spike recovery. The completion goal for the cyanide fraction was not met.

TABLE 7 - 2
PARCC CRITERIA SUMMARY
QUALITY CONTROL SAMPLES
NCBC GULFPORT HO

SDGs	PRECISION	ACCURACY	REPRESENT-ATIVENESS	COMPARABILITY	COMPLETENESS
GPTH04-1 (080412)	ACCEPTABLE	UNACCEPTABLE (3) WITH REJECTIONS	ACCEPTABLE	ACCEPTABLE	ACCEPTABLE (1, 2) WITH REJECTIONS UNACCEPTABLE (3) WITH REJECTIONS

(1) Six (6) volatile data points were rejected due to initial and/or continuing calibration standards which did not meet QC criteria. Completion goal was met.
(2) Nine (9) semivolatile data points were rejected due to initial and/or continuing calibration standards which did not meet QC criteria. Completion goal was met.
(3) Three (3) cyanide data points were rejected due to 0% Matrix Spike recovery. The completion goal for the cyanide fraction was not met.

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APPENDIX A

CALIBRATION SUMMARY

TABLE A-1
INITIAL AND CONTINUING CALIBRATION
VOLATILE ORGANIC COMPOUNDS
NCBC GULFPORT HO

ICAL = INITIAL CALIBRATION = %RSD	SDG GPTH04-1		
CCAL = CONTINUING CALIBRATION = %D	CCAL1	CCAL2	CCAL3
DATE	022195	022195	022495
INSTRUMENT ID	A3I502	A3I502	A3I502
CALIBRATION CRITERIA	RRF/%D	RRF/%D	RRF/%D
BROMOMETHANE	25.55	32.73	
CARBON DISULFIDE	43.99		
TRICHLOROFLUOROMETHANE	41.83	31.64	
1,4-DICHLORO-2-BUTENE	32.94		43.42
ISOBUTANOL	0.0144		54.24
1,4-DIOXANE	0.0032		75.00
CHLOROETHANE		60.64	
ACROLEIN		0.044/40.53	39.51
2-BUTANONE			62.23
2-HEXANONE			38.45
ACETONE			89.48
ACRYLONITRILE			25.50
PROPIONITRILE			45.12
DICHLORODIFLUOROMETHANE		49.165	40.07

SDGS, STANDARDS, AND ASSOCIATED SAMPLES

SDG GPTH04-1
CCAL1: BS-01-DI4, BS-01-RI4, GPTH04-1, GPTH04-2, GPTH04-2D
CCAL2: GPTH04-1MS, GPTH04-1MSD, GPTH04-3, GPTH04-4
CCAL3: BS-01-TB4

TABLE A-2
INITIAL AND CONTINUING CALIBRATION
SEMIVOLATILE ORGANIC COMPOUNDS
NCBC GULFPORT HO

ICAL = INITIAL CALIBRATION = %RSD	SDG GPTH04-1
CCAL = CONTINUING CALIBRATION = %D	**CCAL1**
DATE	02/27-28/95
INSTRUMENT ID	A4EXT3
CALIBRATION CRITERIA	RRF/%D
DIETHYLPHTHALATE	26.6
DI-N-OCTYLPHTHALATE	32.8
ANILINE	26.4
BENZIDINE	69.8
1,3,5-TRINITROBENZENE	0.0377
ARAMITE-1	0.00
HEXACHLOROPHENE	0.00

SDGS, STANDARDS, AND ASSOCIATED SAMPLES

SDG GPTH04-1

CCAL1: BS-01-DI4, BS-01-RI4, GPTH04-1, GPTH04-1MS, GPTH04-1MSD, GPTH04-2, GPTH04-2D, GPTH04-3, GPTH04-4

TABLE A-3
INITIAL AND CONTINUING CALIBRATION
PESTICIDES/PCBs ORGANIC COMPOUNDS
NCBC GULFPORT HO

ICAL = INITIAL CALIBRATION = %RSD	SDG GPTH04-1
CCAL = CONTINUING CALIBRATION = %D	**ICAL1**
DATE	03/03/95
INSTRUMENT ID	HP5890YA/YB
CALIBRATION CRITERIA	%RSD
DELTA-BHC	23.4

SDGS, STANDARDS, AND ASSOCIATED SAMPLES

SDG GPTH04-1

CCAL1: BS-01-DI4, BS-01-RI4, GPTH04-1, GPTH04-1MS, GPTH04-1MSD, GPTH04-2, GPTH04-2D, GPTH04-3, GPTH04-4

APPENDIX B

SERIAL DILUTION SUMMARY

TABLE B - 1
WATER SAMPLE SERIAL DILUTION
METALS SUMMARY TABLE
NCBC GULFPORT HO

SAMPLE GPTH04-1		SDG GPTH04-1
%D = PERCENT DIFFERENCE		%D
METALS ANALYTES	UNITS	
ANTIMONY	ug/L	100
ARSENIC	ug/L	44.1
BARIUM	ug/L	6.1
BERYLLIUM	ug/L	NC
CADMIUM	ug/L	NC
CHROMIUM	ug/L	5.2
COBALT	ug/L	100
COPPER	ug/L	1.1
LEAD	ug/L	147
NICKEL	ug/L	19.8
SELENIUM	ug/L	NC
SILVER	ug/L	NC
VANADIUM	ug/L	25.4
ZINC	ug/L	9.3
TIN	ug/L	NC

*** - INDICATES VALUE OUTSIDE QC LIMITS**
NC DENOTES NO CALCULATION DUE TO NON-DETECT RESULTS IN BOTH SAMPLES
NA DENOTES COMPOUND NOT ANALYZED FOR

CORRESPONDING SDG'S AND ASSOCIATED SAMPLES

GPTH04-1: GPTH04-1, GPTH04-2, GPTH04-2D, GPTH04-3, GPTH04-4, BS-01-D14, BS-01-R14

ANALYTE	RPD
	WATER
ALL ICP ANALYTES	+/-10%

+/-10% RULE ONLY APPLIES TO RESULTS GREATER THAN 50 TIMES THE IDL
(SOME VALUES ROUNDED TO LIMIT %Ds TO THREE (3) SIGNIFICANT FIGURES)

APPENDIX C

REJECTED DATA SUMMARY

TABLE C-1
GC/MS VOLATILES - REJECTED DATA
NCBC GULFPORT HO

				# OF COMPOUNDS REJECTED PER MATIX	
SDG	# SAMPLES/MATRIX			QC	GW
	QC	GW			
GPTH04-1	4	4		6	5
GRAND TOTAL	4	4		6	5
COMPLETION GOAL (>85%)				97.4%	97.8%

OVERALL COMPLETENESS
97.6%

MATRIX KEY

QC = QC SAMPLES
GW = GROUND WATER SAMPLES

* 57 TARGET COMPOUNDS PER SAMPLE

TABLE C - 1A
DIOXIN/FURANS - REJECTED DATA
NCBC GULFPORT HO

SDG	# SAMPLES/MATRIX			# OF COMPOUNDS REJECTED PER MATIX	
	QC	GW		QC	GW
080412	3	4		0	0
GRAND TOTAL	3	4		0	0
COMPLETION GOAL (> 85%)				100.0%	100.0%

OVERALL COMPLETENESS
100.0%

MATRIX KEY

QC = QC SAMPLES
GW = GROUND WATER SAMPLES

* **24 TARGET CONGENERS/ISOMERS PER SAMPLE**

TABLE C-2
GC/MS SEMIVOLATILES - REJECTED DATA
NCBC GULFPORT HO

SDG	# SAMPLES/MATRIX		# OF COMPOUNDS REJECTED PER MATIX	
	QC	GW	QC	GW
GPTH04-1	3	4	9	12
GRAND TOTAL	3	4	9	12
COMPLETION GOAL (>85%)			97.3%	97.3%

OVERALL COMPLETENESS
97.3%

MATRIX KEY

QC = QC SAMPLES
GW = GROUND WATER SAMPLES

* 113 TARGET COMPOUNDS PER SAMPLE

TABLE C-3
POLYNUCLEAR AROMATIC HYDROCARBONS - REJECTED DATA
NCBC GULFPORT HO

SDG	# SAMPLES/MATRIX			# OF COMPOUNDS REJECTED PER MATIX	
	QC	GW		QC	GW
GPTH04-1	3	4		0	0
GRAND TOTAL	3	4		0	0
COMPLETION GOAL (>85%)				100.0%	100.0%

OVERALL COMPLETENESS
100.0%

MATRIX KEY

QC = QC SAMPLES
GW = GROUND WATER SAMPLES

* **16 TARGET COMPOUNDS PER SAMPLE**

TABLE C-4
PESTICIDES/PCBs - REJECTED DATA
NCBC GULFPORT HO

SDG	# SAMPLES/MATRIX			# OF COMPOUNDS REJECTED PER MATIX	
	QC	GW		QC	GW
GPTH04-1	3	4		0	0
GRAND TOTAL	3	4		0	0
COMPLETION GOAL (>85%)				100.0%	100.0%

OVERALL COMPLETENESS
100.0%

MATRIX KEY

QC = QC SAMPLES
GW = GROUND WATER SAMPLES

* 32 TARGET COMPOUNDS PER SAMPLE

TABLE C-5
ORGANOPHOSPHOROUS PESTICIDES - REJECTED DATA
NCBC GULFPORT HO

				# OF COMPOUNDS REJECTED PER MATIX	
SDG	# SAMPLES/MATRIX			QC	GW
	QC	GW			
GPTH04-1	3	4		0	0
GRAND TOTAL	3	4		0	0
COMPLETION GOAL (>85%)				100.0%	100.0%

OVERALL COMPLETENESS
100.0%

MATRIX KEY

QC = QC SAMPLES
GW = GROUND WATER SAMPLES

* 9 TARGET COMPOUNDS PER SAMPLE

TABLE C-6
CHLORINATED HERBICIDES - REJECTED DATA
NCBC GULFPORT HO

				# OF COMPOUNDS REJECTED PER MATIX	
SDG	# SAMPLES/MATRIX			QC	GW
	QC	GW			
GPTH04-1	3	4		0	0
GRAND TOTAL	3	4		0	0
COMPLETION GOAL (>85%)				100.0%	100.0%

OVERALL COMPLETENESS
100.0%

MATRIX KEY

QC = QC SAMPLES
GW = GROUND WATER SAMPLES

* 4 TARGET COMPOUNDS PER SAMPLE

TABLE C-7
TOTAL METALS - REJECTED DATA
NCBC GULFPORT HO

				# OF COMPOUNDS REJECTED PER MATIX	
SDG	# SAMPLES/MATRIX			QC	GW
	QC	GW			
GPTH04-1	3	4		0	0
GRAND TOTAL	3	4		0	0
COMPLETION GOAL (>85%)				100.0%	100.0%

OVERALL COMPLETENESS
100.0%

MATRIX KEY

QC = QC SAMPLES
GW = GROUND WATER SAMPLES

* 17 TARGET ANALYTES PER SAMPLE

TABLE C-8
CYANIDE - REJECTED DATA
NCBC GULFPORT HO

SDG	# SAMPLES/MATRIX			# OF COMPOUNDS REJECTED PER MATIX	
	QC	GW		QC	GW
GPTH04-1	3	4		3	4
GRAND TOTAL	3	4		3	4
COMPLETION GOAL (>85%)				0.0%	0.0%

OVERALL COMPLETENESS
0.0%

MATRIX KEY

QC = QC SAMPLES
GW = GROUND WATER SAMPLES

* 1 TARGET COMPOUND PER SAMPLE

TABLE C-9
SULFIDE - REJECTED DATA
NCBC GULFPORT HO

SDG	# SAMPLES/MATRIX			# OF COMPOUNDS REJECTED PER MATIX	
	QC	GW		QC	GW
GPTH04-1	3	4		0	0
GRAND TOTAL	3	4		0	0
COMPLETION GOAL (>85%)				100.0%	100.0%

OVERALL COMPLETENESS
100.0%

MATRIX KEY

QC = QC SAMPLES
GW = GROUND WATER SAMPLES

* 1 TARGET COMPOUND PER SAMPLE

Groundwater Sampling Event 5

PRECISION, ACCURACY, REPRESENTATIVENESS, COMPARABILITY, AND COMPLETENESS FOR NCBC GULFPORT HO

NAVAL CONSTRUCTION BATTALION CENTER GULFPORT, MISSISSIPPI

Prepared by:
Heartland Environmental Services, Inc.
P.O. Box 163
St. Peters, Missouri 63376

Prepared for:

ABB Environmental Services, Inc.
1400 Centerpoint Blvd., Suite 158
Knoxville, Tennessee 37922-1968

August 1995

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Comparability, and Completeness
NCBC Gulfport HO

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NCBC Gulfport HO

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Appendix A
Calibration Criteria Summary

NCBC Gulfport HO

Tables	Title	Page No.
NO TABLES REQUIRED		

Appendix B
Serial Dilution Summary

NCBC Gulfport HO

Tables	Title	Page No.
NO TABLES REQUIRED		

Appendix C
Rejected Data Summary

NCBC Gulfport HO

Tables	Title	Page No.
C-1	Dioxin/Furan Fraction, Rejected Data Summary	Appendix C

1.0 INTRODUCTION

Prior to evaluating the data for precision, accuracy, representativeness, comparability, and completeness (PARCC) criteria the laboratory reviewed the data package and the data also were independently reviewed and validated using the Naval Energy and Environmental and Support Activity (NEESA) guidance document 20.2-047B (1988) entitled, *Sampling and Chemical Analysis Quality Assurance Requirements for the Navy Installation Program*. Before the laboratory released the chemical analytical results, both the sample and laboratory QC data were carefully reviewed in order to verify sample identity, instrument calibration, detection limits, dilution factors, numerical computations, accuracy of transcriptions, and chemical interpretations. Additionally, the QC data were reduced and spike recoveries were included in control charts, and the resulting data were reviewed to ascertain whether they were within the laboratory defined limits for accuracy and precision. The data were compiled into a NEESA Level D data package and any nonconforming data were discussed in the data package cover letter and case narrative.

The Level D data packages were then reviewed and validated by Heartland Environmental Services, Inc., Missouri (Heartland). Data validation is the technical review of a data package using criteria established in the data quality objectives, the quality assurance project plan and guidance documents prepared by the United States Environmental Protection Agency (USEPA) for the validation of organic and inorganic analytical data (USEPA 1990a and 1990b) as specified by NEESA document 20.2-047B. The data review and validation process is independent of the laboratory's checks because it is impossible to repeat the review conducted by the laboratory.

Samples that did not meet the acceptance limit criteria were qualified with a flag; single letter abbreviations that indicate a problem with the data. Data qualifiers used by the validators when amending the data include the following.

U — Undetected. The analyte was not detected above the contract required quantitation limit (CRQL). The "U" designator also is used to qualify laboratory contaminants. The "U" designator is applied to an environmental sample when the laboratory contaminant is detected in an environmental sample at a concentration less than 5 times (10 X for common contaminants) the value of the concentration detected in any corresponding field QC blank, method blank or preparation blanks.

J — Estimated. The analyte was present, but the reported value may not be accurate or precise. The "J" designator is used to qualify an analyte that was present at a concentration between the CRQL and method detection limit (MDL) or the data "failed" some of the analytical validation criteria but did not require rejections of the data. When combined with the U designator, the quantitation limit is estimated.

R — Rejected. Data was rejected by the data validator during comparison of the NEESA Level D data package with the analytical functional guideline criteria. The "R" designator indicates a significant variance in acceptable laboratory performance. Either re-analysis or re-sampling and analysis would be necessary to determine the presence or absence of the target analyte(s).

Once the data were reviewed and validated according to the guidance presented in NEESA document 20.2-047B, the data were evaluated by Heartland using the PARCCs criteria included in the Data Quality Objectives (DQOs) of the Work Plan for Naval Construction Battalion Center (NCBC) Gulfport, Mississippi, dated October 1993. The following sections present a brief description of PARCCs criteria.

Precision. Precision is a measure of the agreement or repeatability of a set of replicate results obtained from duplicate laboratory analyses of samples collected from the same location/depth interval. Precision was calculated from laboratory analytical data and cannot be measured directly. Precision is expressed as the Relative Percent Difference (RPD) between analytical values for two samples divided by the average of their analytical values. Precision is calculated using the expression:

$$RPD = (D1-D2) / (\tfrac{1}{2}(D1+D2)) \times 100$$

D1 and D2 are the reported values for the duplicate sample pair. Precision was evaluated using field duplicate samples and laboratory split samples (for example, MS/MSD samples).

Precision for environmental samples and their duplicates was assessed using a maximum RPD of 20 Percent for water matrices. Precision for MS/MSD/MD samples was assessed by using the target analyte specific RPD criteria for the spiked compounds and the sample duplicates.

Accuracy. Accuracy is a measure of the agreement between an experimental determination and the true value of the parameter being measured. Accuracy can be calculated from the analytical data and was not measured directly. Accuracy is used to identify the bias in a given measurement system (i.e. laboratory conditions, sample matrix, and sampling conditions). Accuracy is assessed by reviewing the Percent Recovery (%R) between the true value of the spike analyte and the actual analytical value. Accuracy is calculated using the equation:

$$\%R = ((A-B)/C) \times 100$$

A = Measured concentration of the spiked analyte.
B = Measured concentration of the spiked compound in the unspiked sample.
C = True concentration of the spiked analyte.

For the dioxin/furan analysis, each of the samples was spiked with internal standard compounds, and each chosen matrix spike and matrix duplicate pair was spiked with a known reference material before digestion. Each of these approaches provides a measure of the matrix effects on the analytical accuracy.

Representativeness. Representativeness is a qualitative measure of the degree to which sample data accurately and precisely represent a characteristic environmental condition. Representativeness is a subjective parameter and is used to evaluate the efficacy of the sampling plan design. Representativeness was evaluated using the field and laboratory QC blank sample results. QC blank samples are equipment rinseate blanks, field blanks, trip blanks, laboratory method blanks for organic analysis and laboratory preparation blanks for inorganic analysis. Positive detection of target analytes in the QC blank samples identify contaminants that possibly were introduced to the associated environmental sample during sample collection, transport or laboratory analysis. Representativeness was also evaluated used the defined extraction and analytical holding time requirements set forth in the Work Plan for NCBC Gulfport or the analytical methodology.

Comparability. Comparability is qualitative measure designed to express the confidence with which one data set may be compared to another. Factors that affect comparability are: sample collection and handling techniques, sample matrix type, and analytical method. Comparability is limited by the other PARCC parameters because only when precision and accuracy are known can data sets be compared with confidence.

Completeness. Completeness is defined as the percentage of measurements that are judged to be valid compared to the total number of measurements made. Valid usable data are values that were not qualified as rejected (R qualifier) during data validation. A goal of 85 percent usable data was established in the Work Plan for NCBC, Gulfport, Mississippi. Completeness equals the total number of analytes for each matrix minus the total number of rejected analytes divided by the total number of analytes multiplied by 100.

2.0 PRECISION

The following section describes the evaluation of precision for volatile organic compounds, semivolatile organic compounds, polynuclear aromatic hydrocarbons, pesticides and polychlorinated biphenyls (PCBs), organophosphorus pesticides, herbicides, metals and cyanide, and the wet chemistry parameter sulfide. Duplicate samples are evaluated for precision only when contaminants are detected in both the environmental sample and the sample's duplicate. A ND in the RPD column of the spreadsheet indicates that a RPD calculation was not required because one result was a non-detect and the other result was less than the compound/analyte CRQL/CRDL. Environmental samples and their respective duplicates may not exhibit positive results for all compounds found at or near the contract required quantitation limit (CRQL) or detection limit (CRDL) because of low levels of contamination found at a site. Duplicates with Relative Percent Differences (RPDs) within control limits indicate adequate sampling practices and/or good analytical precision. Duplicates with RPDs outside the control limits may result from inappropriate sampling procedures, matrix interferences, or non-homogeneity of the sample matrix. In addition, poor precision can be attributed to deviation(s) from the analytical methodology or to poor reproducibility of target analyte concentrations at or near the required quantitation or detection limits (CRQLs or CRDLs). The acceptance criteria for evaluating precision of field duplicates analytical results is a RPD of 20 for water matrices.

The percent of duplicate samples collected for the analytical parameters and sample matrices was greater than ten percent (10%) for the water matrix as specified in the Work Plan for NCBC Gulfport, Mississippi. The following Sections summarize the evaluation of analytical precision for the water matrix for the following analytical groups:

- Dioxin/Furan congeners

Duplicate precision was assessed using both environmental sample and associated duplicates and matrix spike (MS)/matrix spike duplicates (MSDs) pairs for the dioxin/furan fraction.

Tabulation of the results of assessing duplicate precision and duplicate frequency are presented in Table 2-1. The results of the evaluation of precision for MS/MSD samples is provided in Table 2-2.

In addition, to assess whether instrument calibration for dioxin/furan analytical method resulted in non-compliant duplicate precision, tables were made of initial and continuing calibration outliers for each sample delivery group (SDG) and are included in Appendix A. Calibration criteria was met in the dioxin/furan fraction. Therefore, tables of calibration criteria were not required.

TABLE 2 - 1
DIOXIN/FURAN FRACTION
WATER SAMPLE AND DUPLICATE PRECISION
NCBC GULFPORT HO

DIOXIN/FURANS

SDG	SAMPLE ID	MATRIX	NO. ASSC. SAMPLES	COMPOUND	SAMPLE CONC.	DUP CONC	MAX RPD	RPD
082031	GPTH05-2	WATER	4	TCDFs (TOTAL)	38	0	20%	200%
				PeCDFs (TOTAL)	39	0	20%	200%
				TCDDs (TOTAL)	68	17	20%	120%
				2,3,7,8-TCDD	56	17	20%	107%
				HxCDDs (TOTAL)	82	0	20%	200%
				HpCDDs (TOTAL)	250	0	20%	200%
				1,2,3,4,6,7,8-HpCDD	110	0	20%	200%
				OCDD	2900	670	20%	125%
	TOTAL SAMPLES		4					

DIOXIN FURANS

% OF DUPLICATES COLLECTED	RPD IN	RPD OUT	% WITHIN RPD LIMIT
25.0%	0	8	0.0%

ND - INDICATES RPD CALCULATION NOT REQUIRED BECAUSE ONE (1) RESULT IS NON-DETECT AND THE OTHER RESULT IS BELOW THE CRQL.

TABLE 2 - 2
DIOXIN/FURAN FRACTION
WATER SAMPLE MATRIX SPIKE/ DUPLICATES
NCBC GULFPORT HO

MS = MATRIX SPIKE *SAMPLE GPTH05-1*		SDG 082031		
MSD = MATRIX SPIKE DUPLICATE		MS	MSD	
RPD = RELATIVE PERCENT DIFFERENCE		%R	%R	RPD
DIOXIN/FURAN CONGENERS	UNITS			
2378-TCDF	ug/L	97	91	5.8
12378-PeCDF	ug/L	83	96	14
23478-PeCDF	ug/L	91	93	2.4
123478-HxCDF	ug/L	87	96	9.3
123678-HxCDF	ug/L	94	83	12
234678-HxCDF	ug/L	86	76	13
123789-HxCDF	ug/L	85	76	11
1234678-HpCDF	ug/L	91	90	1.1
1234789-HpCDF	ug/L	94	86	8.0
OCDF	ug/L	97	112	14
2378-TCDD	ug/L	85	100	16
12378-PeCDD	ug/L	97	96	0.41
123478-HxCDD	ug/L	104	106	1.7
123678-HxCDD	ug/L	95	90	6.0
123789-HxCDD	ug/L	92	78	16
1234678-HpCDD	ug/L	103	98	4.9
OCDD	ug/L	79	73	8.5

*** DENOTES VALUE NOT WITHIN QA/QC ADVISORY LIMITS**

CORRESPONDING SDG'S AND ASSOCIATED SAMPLES

082031: GPTH05-1, GPTH05-2, GPTH05-2D, GPTH05-3D, GPTH05-4

QC LIMITS WERE NOT PROVIDED BY THE LABORATORY.
%R AND RPDS WERE DEEMED IN CONTROL BY THE DATA REVIEWER.

2.1 Water Matrix

The dioxin/furan analysis of the field duplicate pair of sample GPTH05-2 exhibited non-compliant RPDs for the eight (8) congeners detected (Table 2-1). The non-compliant congeners were TCDF (total), PeCDF (total), TCDD (total), 2,3,7,8-TCDD, HxCDD (total), HpCDD (total), 1,2,3,4,6,7,8-HpCDD, and OCDD. The congeners were detected in the original sample at concentration above the reporting limits. The congeners TCDF (total), PeCDF (total), HxCDD (total), HpCDD (total), and 1,2,3,4,6,7,8-HpCDD were not detected in the field duplicate sample. The congeners TCDD (total), 2,3,7,8-TCDD, and OCDD were detected in the field duplicate sample at concentrations significantly less than in the original sample. The disparity in the results may be due to laboratory inconsistencies or field sampling techniques.

The dioxin/furan analysis of the MS/MSD pair of sample GPTH05-2 exhibited acceptable RPDs for all congeners.

Based on assessment of duplicate precision evaluation criteria, the water matrix analytical data was acceptable for each SDG.

3.0 ACCURACY

The assessment of accuracy is evaluated by comparison of the percent recovery (%R) computed from the known concentration of analyte spikes and their recovered concentration versus the analytical method acceptance criteria. Spike recoveries provide an indication of bias, where the reported data may either overestimate or underestimate the actual concentration of detected compounds and/or the detection limits. Recoveries outside acceptable criteria may be caused by factors such as matrix interference, poor analytical precision, or instrument calibration.

The following Sections summarize the evaluation of analytical accuracy for the water matrix for the following analytical groups:

- Dioxin/Furan Fraction

Accuracy was assessed using MS and MSD samples as well as internal standard recoveries for the dioxin/furan fraction. The results of the evaluation of accuracy for the MS/MSD samples is provided in Table 2-2 for water matrix. The results of the evaluation of accuracy for the internal standard recoveries in the samples are provided in Table 3-1for the water matrix.

3.1 Water Matrix

The MS/MSD pair of sample GPTH05-1 analyzed for the dioxin/furan fraction exhibited acceptable recoveries for all spiked congeners (Table 2-2).

Two (2) samples analyzed for the dioxin/furan fraction exhibited 13C-OCDD recoveries which were below the QC limits (Table 3-1). This indicates that reported results in the two (2) samples for the congener OCDD may be underestimated. Therefore, reported positive and non-detect results for the congener OCDD in samples BS-01-RI5 and GPTH05-2 were appropriately qualified as estimated, J/UJ.

Based on assessment of MS/MSD and internal standard accuracy evaluation criteria, the water matrix analytical data was acceptable for the SDG.

TABLE 3 - 1
WATER SAMPLE INTERNAL STANDARDS % RECOVERIES
DIOXIN/FURAN
NCBC GULFPORT HO

	BS-01-DI5	BS-01-RI5	GPTHO5-1	GPTHO5-2	GPTHO5-2D	GPTHO5-3	GPTHO5-4	GPTHO5-1MS	GPTHO5-1MSD
I.S. COMPOUND									
13C-2378-TCDF	71	61	83	68	69	79	69	73	80
13C-2378-TCDD	80	54	76	62	76	74	79	78	73
13C-12378-PeCDF	85	51	83	59	78	73	74	81	77
13C-12378-PeCDD	84	49	81	62	78	68	73	80	76
13C-123478-HxCDF	81	124	76	84	79	95	75	88	99
13C-123678-HxCDD	100	113	77	85	89	91	85	92	100
13C-1234678-HpCDF	87	87	71	72	91	85	81	74	88
13C-1234678-HpCDD	80	63	73	66	77	76	75	70	81
13C-OCDD	68	*23	65	*39	72	52	63	66	50
TOTAL OUT	0	1	0	1	0	0	0	0	0

QC LIMITS 40% - 135%
* - VALUE OUTSIDE OF QC LIMITS

# SAMPLES	% REC IN	% REC OUT	% TOTAL IN
9	79	2	97.5%

4.0 REPRESENTATIVENESS

Representativeness of the environmental sample analytical data was assessed using trip blanks, field blanks, equipment rinseate blanks, and laboratory method blanks. The environmental samples and associated blanks were analyzed for the following target analyte groups:

- Dioxin/Furan Fraction

Field blanks, equipment rinseate blanks, and laboratory method blanks were analyzed for target analytes in each listed category. The assessment of representativeness is summarized in tabular form for each type of blank, field blank results are summarized in Table 4-1, equipment rinseate blank results are summarized in Table 4-2, and method blank results are summarized in Table 4-3.

If contaminants were detected in a blank, corrective actions were made for the chemical analytical data during data validation by Heartland. The corrective action consisted of amending the laboratory reported results for organic and inorganic target analytes by the criteria. The following describes the Validation Qualifier code in the blank summary tables.

Organic Target Analytes

- CRDL Validation Qualifier. If a sample result for the blank contaminant was less than the CRQL and less than 5 times the blank value (10 times for common laboratory contaminants), the sample result was rejected and amended as estimated non-detected at the CRQL for the target compound.

- U Validation Qualifier. If a sample result for the blank contaminant was greater than the sample CRQL and less than 5 times the blank value (10 times for common laboratory contaminants), the sample result for the blank contaminant was amended as non detect at the concentration reported in the sample results.

- No Action (NA). If a sample result for the blank contaminant was greater than the CRQL and 5 time the blank value (10 times for common laboratory contaminants), the result was not amended.

Inorganic Target Analytes

- U Validation Qualifier. If a sample result for the blank contaminant was less than the IDL and less than 5 times the blank value, the sample result was amended as non-detected.

- UJ Validation Qualifier. If a sample result for the blank contaminant was less than the sample IDL when the absolute value of the negative blank value was greater than the IDL, the sample result for the blank contaminant was amended as estimated non-detected.

- J Validation Qualifier. If a sample result for the blank contaminant was greater than the IDL and less than 10 times the blank value, when the absolute of the negative blank value id greater than the IDL the result was amended as estimated at the laboratory value.

TABLE 4 - 1
DIOXIN FURAN COMPOUNDS DETECTED IN FIELD BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	FB CONC.	UNITS	VALIDATION QUALIFIER
082031	BS-01-DI5	GPTH05-1, GPTH05-1MS, GPTH05-1MSD, GPTH05-2, GPTH05-2D, GPTH05-3, GPTH05-4	NO CONTAMINATION FOUND			

TABLE 4 - 2
DIOXIN FURAN COMPOUNDS DETECTED IN RINSEATE BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	RB CONC.	UNITS	VALIDATION QUALIFIER
082031	BS-01-RI5	GPTH05-1, GPTH05-1MS, GPTH05-1MSD, GPTH05-2, GPTH05-2D, GPTH05-3, GPTH05-4	NO CONTAMINATION FOUND			

TABLE 4 - 3
DIOXIN FURAN COMPOUNDS DETECTED IN METHOD BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	MB CONC.	UNITS	VALIDATION QUALIFIER
082031	METHOD BLANK	GPTH05-1, GPTH05-2, GPTH05-3, BS-01-RI5, GPTH05-1MS, GPTH05-1MSD	NO CONTAMINATION FOUND			
	METHOD BLANK	GPTH05-2D, GPTH05-4, BS-01-DI5	NO CONTAMINATION FOUND			

4.1 Field Blanks

The field blank, BS-01-DI5, was a sample of DI water. It was prepared from the source potable water. The field blank was prepared at the site and placed in containers that were similar to those used for the environmental samples. Dioxin/Furan target congeners were not detected in the field blank samples (Table 4-1).

No target congeners were detected in the field blank. None of the analytical data required qualification. Based on assessment of field blanks for representativeness the analytical data was acceptable for the SDG.

4.2 Equipment Rinseate Blanks

The equipment rinseate blank was prepared by rinsing a piece of decontaminated sampling equipment with deionized water from a field DI unit. A sample of this water was collected and placed in sample containers similar to those used for the environmental samples. Dioxin/Furan target congeners were not detected in the rinseate blank sample (Table 4-2).

No target congeners were detected in the rinseate blank. None of the analytical data required qualification. Based on assessment of rinseate blanks for representativeness the analytical data was acceptable for the SDG.

4.3 Method Blanks

The method blanks were samples of deionized water prepared by the laboratory at the time of analysis. Method blanks undergo the same analytical process as the corresponding environmental samples and associated field blanks. The purpose of the method blank is to assess the potential for target compounds and analytes to "contaminate" the sample during analysis. Dioxin/Furan congeners were not detected in method blank samples (Tables 4-3).

No target congeners were detected in the method blanks. None of the analytical data required qualification. Based on assessment of method blanks for representativeness the analytical data was acceptable for the SDG.

4.4 Holding Times

Holding times requirements are utilized in an effort to minimize the degradation or concentration of constituents in a particular matrix over time. The stability of the constituents is determined to the best extent and then a reasonable time limit is imposed under which the samples must be extracted or prepared and then analyzed. The holding times regulations assume that the samples have been properly preserved according to the guidelines, either at the laboratory or in the field. Analytical results from samples with holding time violations are qualified as estimated, J/UJ, due to the potential for compromising the integrity of the samples.

All holding times requirements, extraction and analytical, were met for all samples, for the analytical fractions.

APPENDIX C

REJECTED DATA SUMMARY

TABLE C-1
GC/MS VOLATILES - REJECTED DATA
NCBC GULFPORT HO

SDG	# SAMPLES/MATRIX			# OF COMPOUNDS REJECTED PER MATIX	
	QC	GW		QC	GW
GPTH04-1	4	4		6	5
GRAND TOTAL	4	4		6	5
COMPLETION GOAL (>85%)				97.4%	97.8%

OVERALL COMPLETENESS
97.6%

MATRIX KEY

QC = QC SAMPLES
GW = GROUND WATER SAMPLES

* 57 TARGET COMPOUNDS PER SAMPLE

TABLE C - 1A
DIOXIN/FURANS - REJECTED DATA
NCBC GULFPORT HO

SDG	# SAMPLES/MATRIX			# OF COMPOUNDS REJECTED PER MATIX	
	QC	GW		QC	GW
080412	3	4		0	0
GRAND TOTAL	3	4		0	0
COMPLETION GOAL (> 85%)				100.0%	100.0%

OVERALL COMPLETENESS
100.0%

MATRIX KEY

QC = QC SAMPLES
GW = GROUND WATER SAMPLES

* 24 TARGET CONGENERS/ISOMERS PER SAMPLE

TABLE C-2
GC/MS SEMIVOLATILES - REJECTED DATA
NCBC GULFPORT HO

SDG	# SAMPLES/MATRIX			# OF COMPOUNDS REJECTED PER MATIX	
	QC	GW		QC	GW
GPTH04-1	3	4		9	12
GRAND TOTAL	3	4		9	12
COMPLETION GOAL (>85%)				97.3%	97.3%

OVERALL COMPLETENESS
97.3%

MATRIX KEY

QC = QC SAMPLES
GW = GROUND WATER SAMPLES

* 113 TARGET COMPOUNDS PER SAMPLE

TABLE C-3
POLYNUCLEAR AROMATIC HYDROCARBONS - REJECTED DATA
NCBC GULFPORT HO

				# OF COMPOUNDS REJECTED PER MATIX	
SDG	# SAMPLES/MATRIX			QC	GW
	QC	GW			
GPTH04-1	3	4		0	0
GRAND TOTAL	3	4		0	0
COMPLETION GOAL (>85%)				100.0%	100.0%

OVERALL COMPLETENESS
100.0%

MATRIX KEY

QC = QC SAMPLES
GW = GROUND WATER SAMPLES

*** 16 TARGET COMPOUNDS PER SAMPLE**

TABLE C-4
PESTICIDES/PCBs - REJECTED DATA
NCBC GULFPORT HO

SDG	# SAMPLES/MATRIX			# OF COMPOUNDS REJECTED PER MATIX	
	QC	GW		QC	GW
GPTH04-1	3	4		0	0
GRAND TOTAL	3	4		0	0
COMPLETION GOAL (>85%)				100.0%	100.0%

OVERALL COMPLETENESS
100.0%

MATRIX KEY

QC = QC SAMPLES
GW = GROUND WATER SAMPLES

* 32 TARGET COMPOUNDS PER SAMPLE

TABLE C-5
ORGANOPHOSPHOROUS PESTICIDES - REJECTED DATA
NCBC GULFPORT HO

				# OF COMPOUNDS REJECTED PER MATIX	
SDG	# SAMPLES/MATRIX			QC	GW
	QC	GW			
GPTH04-1	3	4		0	0
GRAND TOTAL	3	4		0	0
COMPLETION GOAL (>85%)				100.0%	100.0%

OVERALL COMPLETENESS
100.0%

MATRIX KEY

QC = QC SAMPLES
GW = GROUND WATER SAMPLES

* 9 TARGET COMPOUNDS PER SAMPLE

TABLE C-6
CHLORINATED HERBICIDES - REJECTED DATA
NCBC GULFPORT HO

				# OF COMPOUNDS REJECTED PER MATIX	
SDG	# SAMPLES/MATRIX			QC	GW
	QC	GW			
GPTH04-1	3	4		0	0
GRAND TOTAL	3	4		0	0
COMPLETION GOAL (>85%)				100.0%	100.0%

OVERALL COMPLETENESS
100.0%

MATRIX KEY

QC = QC SAMPLES
GW = GROUND WATER SAMPLES

* 4 TARGET COMPOUNDS PER SAMPLE

TABLE C-7
TOTAL METALS - REJECTED DATA
NCBC GULFPORT HO

SDG	# SAMPLES/MATRIX			# OF COMPOUNDS REJECTED PER MATIX	
	QC	GW		QC	GW
GPTH04-1	3	4		0	0
GRAND TOTAL	3	4		0	0
COMPLETION GOAL (>85%)				100.0%	100.0%

OVERALL COMPLETENESS
100.0%

MATRIX KEY

QC = QC SAMPLES
GW = GROUND WATER SAMPLES

* 17 TARGET ANALYTES PER SAMPLE

TABLE C-8
CYANIDE - REJECTED DATA
NCBC GULFPORT HO

SDG	# SAMPLES/MATRIX			# OF COMPOUNDS REJECTED PER MATIX	
	QC	GW		QC	GW
GPTH04-1	3	4		3	4
GRAND TOTAL	3	4		3	4
COMPLETION GOAL (>85%)				0.0%	0.0%

OVERALL COMPLETENESS
0.0%

MATRIX KEY

QC = QC SAMPLES
GW = GROUND WATER SAMPLES

* 1 TARGET COMPOUND PER SAMPLE

TABLE C-9
SULFIDE - REJECTED DATA
NCBC GULFPORT HO

SDG	# SAMPLES/MATRIX			# OF COMPOUNDS REJECTED PER MATIX	
	QC	GW		QC	GW
GPTH04-1	3	4		0	0
GRAND TOTAL	3	4		0	0
COMPLETION GOAL (>85%)				100.0%	100.0%

OVERALL COMPLETENESS
100.0%

MATRIX KEY

QC = QC SAMPLES
GW = GROUND WATER SAMPLES

* 1 TARGET COMPOUND PER SAMPLE

Groundwater Sampling Event 5

PRECISION, ACCURACY, REPRESENTATIVENESS, COMPARABILITY, AND COMPLETENESS FOR NCBC GULFPORT HO

NAVAL CONSTRUCTION BATTALION CENTER GULFPORT, MISSISSIPPI

Prepared by:
Heartland Environmental Services, Inc.
P.O. Box 163
St. Peters, Missouri 63376

Prepared for:

ABB Environmental Services, Inc.
1400 Centerpoint Blvd., Suite 158
Knoxville, Tennessee 37922-1968

August 1995

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NCBC Gulfport HO

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Calibration Criteria Summary

NCBC Gulfport HO

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Serial Dilution Summary

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Appendix C
Rejected Data Summary

NCBC Gulfport HO

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1.0 INTRODUCTION

Prior to evaluating the data for precision, accuracy, representativeness, comparability, and completeness (PARCC) criteria the laboratory reviewed the data package and the data also were independently reviewed and validated using the Naval Energy and Environmental and Support Activity (NEESA) guidance document 20.2-047B (1988) entitled, *Sampling and Chemical Analysis Quality Assurance Requirements for the Navy Installation Program*. Before the laboratory released the chemical analytical results, both the sample and laboratory QC data were carefully reviewed in order to verify sample identity, instrument calibration, detection limits, dilution factors, numerical computations, accuracy of transcriptions, and chemical interpretations. Additionally, the QC data were reduced and spike recoveries were included in control charts, and the resulting data were reviewed to ascertain whether they were within the laboratory defined limits for accuracy and precision. The data were compiled into a NEESA Level D data package and any nonconforming data were discussed in the data package cover letter and case narrative.

The Level D data packages were then reviewed and validated by Heartland Environmental Services, Inc., Missouri (Heartland). Data validation is the technical review of a data package using criteria established in the data quality objectives, the quality assurance project plan and guidance documents prepared by the United States Environmental Protection Agency (USEPA) for the validation of organic and inorganic analytical data (USEPA 1990a and 1990b) as specified by NEESA document 20.2-047B. The data review and validation process is independent of the laboratory's checks because it is impossible to repeat the review conducted by the laboratory.

Samples that did not meet the acceptance limit criteria were qualified with a flag; single letter abbreviations that indicate a problem with the data. Data qualifiers used by the validators when amending the data include the following.

U — Undetected. The analyte was not detected above the contract required quantitation limit (CRQL). The "U" designator also is used to qualify laboratory contaminants. The "U" designator is applied to an environmental sample when the laboratory contaminant is detected in an environmental sample at a concentration less than 5 times (10 X for common contaminants) the value of the concentration detected in any corresponding field QC blank, method blank or preparation blanks.

J — Estimated. The analyte was present, but the reported value may not be accurate or precise. The "J" designator is used to qualify an analyte that was present at a concentration between the CRQL and method detection limit (MDL) or the data "failed" some of the analytical validation criteria but did not require rejections of the data. When combined with the U designator, the quantitation limit is estimated.

R — Rejected. Data was rejected by the data validator during comparison of the NEESA Level D data package with the analytical functional guideline criteria. The "R" designator indicates a significant variance in acceptable laboratory performance. Either re-analysis or re-sampling and analysis would be necessary to determine the presence or absence of the target analyte(s).

Once the data were reviewed and validated according to the guidance presented in NEESA document 20.2-047B, the data were evaluated by Heartland using the PARCCs criteria included in the Data Quality Objectives (DQOs) of the Work Plan for Naval Construction Battalion Center (NCBC) Gulfport, Mississippi, dated October 1993. The following sections present a brief description of PARCCs criteria.

Precision. Precision is a measure of the agreement or repeatability of a set of replicate results obtained from duplicate laboratory analyses of samples collected from the same location/depth interval. Precision was calculated from laboratory analytical data and cannot be measured directly. Precision is expressed as the Relative Percent Difference (RPD) between analytical values for two samples divided by the average of their analytical values. Precision is calculated using the expression:

$$RPD = (D1-D2) / (\tfrac{1}{2}(D1+D2)) \times 100$$

D1 and D2 are the reported values for the duplicate sample pair. Precision was evaluated using field duplicate samples and laboratory split samples (for example, MS/MSD samples).

Precision for environmental samples and their duplicates was assessed using a maximum RPD of 20 Percent for water matrices. Precision for MS/MSD/MD samples was assessed by using the target analyte specific RPD criteria for the spiked compounds and the sample duplicates.

Accuracy. Accuracy is a measure of the agreement between an experimental determination and the true value of the parameter being measured. Accuracy can be calculated from the analytical data and was not measured directly. Accuracy is used to identify the bias in a given measurement system (i.e. laboratory conditions, sample matrix, and sampling conditions). Accuracy is assessed by reviewing the Percent Recovery (%R) between the true value of the spike analyte and the actual analytical value. Accuracy is calculated using the equation:

$$\%R = ((A-B)/C) \times 100$$

A = Measured concentration of the spiked analyte.
B = Measured concentration of the spiked compound in the unspiked sample.
C = True concentration of the spiked analyte.

For the dioxin/furan analysis, each of the samples was spiked with internal standard compounds, and each chosen matrix spike and matrix duplicate pair was spiked with a known reference material before digestion. Each of these approaches provides a measure of the matrix effects on the analytical accuracy.

Representativeness. Representativeness is a qualitative measure of the degree to which sample data accurately and precisely represent a characteristic environmental condition. Representativeness is a subjective parameter and is used to evaluate the efficacy of the sampling plan design. Representativeness was evaluated using the field and laboratory QC blank sample results. QC blank samples are equipment rinseate blanks, field blanks, trip blanks, laboratory method blanks for organic analysis and laboratory preparation blanks for inorganic analysis. Positive detection of target analytes in the QC blank samples identify contaminants that possibly were introduced to the associated environmental sample during sample collection, transport or laboratory analysis. Representativeness was also evaluated used the defined extraction and analytical holding time requirements set forth in the Work Plan for NCBC Gulfport or the analytical methodology.

Comparability. Comparability is qualitative measure designed to express the confidence with which one data set may be compared to another. Factors that affect comparability are: sample collection and handling techniques, sample matrix type, and analytical method. Comparability is limited by the other PARCC parameters because only when precision and accuracy are known can data sets be compared with confidence.

Completeness. Completeness is defined as the percentage of measurements that are judged to be valid compared to the total number of measurements made. Valid usable data are values that were not qualified as rejected (R qualifier) during data validation. A goal of 85 percent usable data was established in the Work Plan for NCBC, Gulfport, Mississippi. Completeness equals the total number of analytes for each matrix minus the total number of rejected analytes divided by the total number of analytes multiplied by 100.

2.0 PRECISION

The following section describes the evaluation of precision for volatile organic compounds, semivolatile organic compounds, polynuclear aromatic hydrocarbons, pesticides and polychlorinated biphenyls (PCBs), organophosphorus pesticides, herbicides, metals and cyanide, and the wet chemistry parameter sulfide. Duplicate samples are evaluated for precision only when contaminants are detected in both the environmental sample and the sample's duplicate. A ND in the RPD column of the spreadsheet indicates that a RPD calculation was not required because one result was a non-detect and the other result was less than the compound/analyte CRQL/CRDL. Environmental samples and their respective duplicates may not exhibit positive results for all compounds found at or near the contract required quantitation limit (CRQL) or detection limit (CRDL) because of low levels of contamination found at a site. Duplicates with Relative Percent Differences (RPDs) within control limits indicate adequate sampling practices and/or good analytical precision. Duplicates with RPDs outside the control limits may result from inappropriate sampling procedures, matrix interferences, or non-homogeneity of the sample matrix. In addition, poor precision can be attributed to deviation(s) from the analytical methodology or to poor reproducibility of target analyte concentrations at or near the required quantitation or detection limits (CRQLs or CRDLs). The acceptance criteria for evaluating precision of field duplicates analytical results is a RPD of 20 for water matrices.

The percent of duplicate samples collected for the analytical parameters and sample matrices was greater than ten percent (10%) for the water matrix as specified in the Work Plan for NCBC Gulfport, Mississippi. The following Sections summarize the evaluation of analytical precision for the water matrix for the following analytical groups:

- Dioxin/Furan congeners

Duplicate precision was assessed using both environmental sample and associated duplicates and matrix spike (MS)/matrix spike duplicates (MSDs) pairs for the dioxin/furan fraction.

Tabulation of the results of assessing duplicate precision and duplicate frequency are presented in Table 2-1. The results of the evaluation of precision for MS/MSD samples is provided in Table 2-2.

In addition, to assess whether instrument calibration for dioxin/furan analytical method resulted in non-compliant duplicate precision, tables were made of initial and continuing calibration outliers for each sample delivery group (SDG) and are included in Appendix A. Calibration criteria was met in the dioxin/furan fraction. Therefore, tables of calibration criteria were not required.

TABLE 2 - 1
DIOXIN/FURAN FRACTION
WATER SAMPLE AND DUPLICATE PRECISION
NCBC GULFPORT HO

DIOXIN/FURANS

SDG	SAMPLE ID	MATRIX	NO. ASSC. SAMPLES	COMPOUND	SAMPLE CONC.	DUP CONC	MAX RPD	RPD
082031	GPTH05-2	WATER	4	TCDFs (TOTAL)	38	0	20%	200%
				PeCDFs (TOTAL)	39	0	20%	200%
				TCDDs (TOTAL)	68	17	20%	120%
				2,3,7,8-TCDD	56	17	20%	107%
				HxCDDs (TOTAL)	82	0	20%	200%
				HpCDDs (TOTAL)	250	0	20%	200%
				1,2,3,4,6,7,8-HpCDD	110	0	20%	200%
				OCDD	2900	670	20%	125%
	TOTAL SAMPLES		4					

DIOXIN FURANS

% OF DUPLICATES COLLECTED	RPD IN	RPD OUT	% WITHIN RPD LIMIT
25.0%	0	8	0.0%

ND - INDICATES RPD CALCULATION NOT REQUIRED BECAUSE ONE (1) RESULT IS NON-DETECT AND THE OTHER RESULT IS BELOW THE CRQL.

TABLE 2 - 2
DIOXIN/FURAN FRACTION
WATER SAMPLE MATRIX SPIKE/ DUPLICATES
NCBC GULFPORT HO

MS = MATRIX SPIKE *SAMPLE GPTH05-1*		SDG 082031		
MSD = MATRIX SPIKE DUPLICATE		MS	MSD	
RPD = RELATIVE PERCENT DIFFERENCE		%R	%R	RPD
DIOXIN/FURAN CONGENERS	UNITS			
2378-TCDF	ug/L	97	91	5.8
12378-PeCDF	ug/L	83	96	14
23478-PeCDF	ug/L	91	93	2.4
123478-HxCDF	ug/L	87	96	9.3
123678-HxCDF	ug/L	94	83	12
234678-HxCDF	ug/L	86	76	13
123789-HxCDF	ug/L	85	76	11
1234678-HpCDF	ug/L	91	90	1.1
1234789-HpCDF	ug/L	94	86	8.0
OCDF	ug/L	97	112	14
2378-TCDD	ug/L	85	100	16
12378-PeCDD	ug/L	97	96	0.41
123478-HxCDD	ug/L	104	106	1.7
123678-HxCDD	ug/L	95	90	6.0
123789-HxCDD	ug/L	92	78	16
1234678-HpCDD	ug/L	103	98	4.9
OCDD	ug/L	79	73	8.5

*** DENOTES VALUE NOT WITHIN QA/QC ADVISORY LIMITS**

CORRESPONDING SDG'S AND ASSOCIATED SAMPLES

082031: GPTH05-1, GPTH05-2, GPTH05-2D, GPTH05-3D, GPTH05-4

QC LIMITS WERE NOT PROVIDED BY THE LABORATORY.
%R AND RPDS WERE DEEMED IN CONTROL BY THE DATA REVIEWER.

2.1 Water Matrix

The dioxin/furan analysis of the field duplicate pair of sample GPTH05-2 exhibited non-compliant RPDs for the eight (8) congeners detected (Table 2-1). The non-compliant congeners were TCDF (total), PeCDF (total), TCDD (total), 2,3,7,8-TCDD, HxCDD (total), HpCDD (total), 1,2,3,4,6,7,8-HpCDD, and OCDD. The congeners were detected in the original sample at concentration above the reporting limits. The congeners TCDF (total), PeCDF (total), HxCDD (total), HpCDD (total), and 1,2,3,4,6,7,8-HpCDD were not detected in the field duplicate sample. The congeners TCDD (total), 2,3,7,8-TCDD, and OCDD were detected in the field duplicate sample at concentrations significantly less than in the original sample. The disparity in the results may be due to laboratory inconsistencies or field sampling techniques.

The dioxin/furan analysis of the MS/MSD pair of sample GPTH05-2 exhibited acceptable RPDs for all congeners.

Based on assessment of duplicate precision evaluation criteria, the water matrix analytical data was acceptable for each SDG.

3.0 ACCURACY

The assessment of accuracy is evaluated by comparison of the percent recovery (%R) computed from the known concentration of analyte spikes and their recovered concentration versus the analytical method acceptance criteria. Spike recoveries provide an indication of bias, where the reported data may either overestimate or underestimate the actual concentration of detected compounds and/or the detection limits. Recoveries outside acceptable criteria may be caused by factors such as matrix interference, poor analytical precision, or instrument calibration.

The following Sections summarize the evaluation of analytical accuracy for the water matrix for the following analytical groups:

- Dioxin/Furan Fraction

Accuracy was assessed using MS and MSD samples as well as internal standard recoveries for the dioxin/furan fraction. The results of the evaluation of accuracy for the MS/MSD samples is provided in Table 2-2 for water matrix. The results of the evaluation of accuracy for the internal standard recoveries in the samples are provided in Table 3-1for the water matrix.

3.1 Water Matrix

The MS/MSD pair of sample GPTH05-1 analyzed for the dioxin/furan fraction exhibited acceptable recoveries for all spiked congeners (Table 2-2).

Two (2) samples analyzed for the dioxin/furan fraction exhibited 13C-OCDD recoveries which were below the QC limits (Table 3-1). This indicates that reported results in the two (2) samples for the congener OCDD may be underestimated. Therefore, reported positive and non-detect results for the congener OCDD in samples BS-01-RI5 and GPTH05-2 were appropriately qualified as estimated, J/UJ.

Based on assessment of MS/MSD and internal standard accuracy evaluation criteria, the water matrix analytical data was acceptable for the SDG.

TABLE 3 - 1
WATER SAMPLE INTERNAL STANDARDS % RECOVERIES
DIOXIN/FURAN
NCBC GULFPORT HO

	BS-01-DI5	BS-01-RI5	GPTHO5-1	GPTHO5-2	GPTHO5-2D	GPTHO5-3	GPTHO5-4	GPTHO5-1MS	GPTHO5-1MSD
I.S. COMPOUND									
13C-2378-TCDF	71	61	83	68	69	79	69	73	80
13C-2378-TCDD	80	54	76	62	76	74	79	78	73
13C-12378-PeCDF	85	51	83	59	78	73	74	81	77
13C-12378-PeCDD	84	49	81	62	78	68	73	80	76
13C-123478-HxCDF	81	124	76	84	79	95	75	88	99
13C-123678-HxCDD	100	113	77	85	89	91	85	92	100
13C-1234678-HpCDF	87	87	71	72	91	85	81	74	88
13C-1234678-HpCDD	80	63	73	66	77	76	75	70	81
13C-OCDD	68	*23	65	*39	72	52	63	66	50
TOTAL OUT	0	1	0	1	0	0	0	0	0

QC LIMITS 40% - 135%
* - VALUE OUTSIDE OF QC LIMITS

# SAMPLES	% REC IN	% REC OUT	% TOTAL IN
9	79	2	97.5%

4.0 REPRESENTATIVENESS

Representativeness of the environmental sample analytical data was assessed using trip blanks, field blanks, equipment rinseate blanks, and laboratory method blanks. The environmental samples and associated blanks were analyzed for the following target analyte groups:

- Dioxin/Furan Fraction

Field blanks, equipment rinseate blanks, and laboratory method blanks were analyzed for target analytes in each listed category. The assessment of representativeness is summarized in tabular form for each type of blank, field blank results are summarized in Table 4-1, equipment rinseate blank results are summarized in Table 4-2, and method blank results are summarized in Table 4-3.

If contaminants were detected in a blank, corrective actions were made for the chemical analytical data during data validation by Heartland. The corrective action consisted of amending the laboratory reported results for organic and inorganic target analytes by the criteria. The following describes the Validation Qualifier code in the blank summary tables.

Organic Target Analytes

- CRDL Validation Qualifier. If a sample result for the blank contaminant was less than the CRQL and less than 5 times the blank value (10 times for common laboratory contaminants), the sample result was rejected and amended as estimated non-detected at the CRQL for the target compound.

- U Validation Qualifier. If a sample result for the blank contaminant was greater than the sample CRQL and less than 5 times the blank value (10 times for common laboratory contaminants), the sample result for the blank contaminant was amended as non detect at the concentration reported in the sample results.

- No Action (NA). If a sample result for the blank contaminant was greater than the CRQL and 5 time the blank value (10 times for common laboratory contaminants), the result was not amended.

Inorganic Target Analytes

- U Validation Qualifier. If a sample result for the blank contaminant was less than the IDL and less than 5 times the blank value, the sample result was amended as non-detected.

- UJ Validation Qualifier. If a sample result for the blank contaminant was less than the sample IDL when the absolute value of the negative blank value was greater than the IDL, the sample result for the blank contaminant was amended as estimated non-detected.

- J Validation Qualifier. If a sample result for the blank contaminant was greater than the IDL and less than 10 times the blank value, when the absolute of the negative blank value id greater than the IDL the result was amended as estimated at the laboratory value.

TABLE 4 - 1
DIOXIN FURAN COMPOUNDS DETECTED IN FIELD BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	FB CONC.	UNITS	VALIDATION QUALIFIER
082031	BS-01-DI5	GPTH05-1, GPTH05-1MS, GPTH05-1MSD, GPTH05-2, GPTH05-2D, GPTH05-3, GPTH05-4	NO CONTAMINATION FOUND			

TABLE 4 - 2
DIOXIN FURAN COMPOUNDS DETECTED IN RINSEATE BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	RB CONC.	UNITS	VALIDATION QUALIFIER
082031	BS-01-R15	GPTH05-1, GPTH05-1MS, GPTH05-1MSD, GPTH05-2, GPTH05-2D, GPTH05-3, GPTH05-4	NO CONTAMINATION FOUND			

TABLE 4 - 3
DIOXIN FURAN COMPOUNDS DETECTED IN METHOD BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	MB CONC.	UNITS	VALIDATION QUALIFIER
082031	METHOD BLANK	GPTH05-1, GPTH05-2, GPTH05-3, BS-01-RI5, GPTH05-1MS, GPTH05-1MSD	NO CONTAMINATION FOUND			
	METHOD BLANK	GPTH05-2D, GPTH05-4, BS-01-DI5	NO CONTAMINATION FOUND			

4.1 Field Blanks

The field blank, BS-01-DI5, was a sample of DI water. It was prepared from the source potable water. The field blank was prepared at the site and placed in containers that were similar to those used for the environmental samples. Dioxin/Furan target congeners were not detected in the field blank samples (Table 4-1).

No target congeners were detected in the field blank. None of the analytical data required qualification. Based on assessment of field blanks for representativeness the analytical data was acceptable for the SDG.

4.2 Equipment Rinseate Blanks

The equipment rinseate blank was prepared by rinsing a piece of decontaminated sampling equipment with deionized water from a field DI unit. A sample of this water was collected and placed in sample containers similar to those used for the environmental samples. Dioxin/Furan target congeners were not detected in the rinseate blank sample (Table 4-2).

No target congeners were detected in the rinseate blank. None of the analytical data required qualification. Based on assessment of rinseate blanks for representativeness the analytical data was acceptable for the SDG.

4.3 Method Blanks

The method blanks were samples of deionized water prepared by the laboratory at the time of analysis. Method blanks undergo the same analytical process as the corresponding environmental samples and associated field blanks. The purpose of the method blank is to assess the potential for target compounds and analytes to "contaminate" the sample during analysis. Dioxin/Furan congeners were not detected in method blank samples (Tables 4-3).

No target congeners were detected in the method blanks. None of the analytical data required qualification. Based on assessment of method blanks for representativeness the analytical data was acceptable for the SDG.

4.4 Holding Times

Holding times requirements are utilized in an effort to minimize the degradation or concentration of constituents in a particular matrix over time. The stability of the constituents is determined to the best extent and then a reasonable time limit is imposed under which the samples must be extracted or prepared and then analyzed. The holding times regulations assume that the samples have been properly preserved according to the guidelines, either at the laboratory or in the field. Analytical results from samples with holding time violations are qualified as estimated, J/UJ, due to the potential for compromising the integrity of the samples.

All holding times requirements, extraction and analytical, were met for all samples, for the analytical fractions.

5.0 COMPARABILITY

Comparability is qualitative measure designed to express the confidence with which one data set may be compared to another. The analytical samples were collected and transported to the chemical analytical laboratory in accordance with standard procedures and were analyzed in conformance with acceptable USEPA procedures (Refer to Table 5-1 below). The analytical data are reported in standard units (micrograms per liter, micrograms per kilogram, etc.).

The methods used to collect the environmental samples and the methods used to analyze the samples should assure comparability of the analytical data.

TABLE 5-1
USEPA Procedures (CLP or SW-846 Methodologies)

U.S. EPA Method	Description
SW-846, Method 8290	Dioxin/Furan Fraction

6.0 COMPLETENESS

Completeness is the quantitative measure of the amount of data obtained from a measurement process compared with the amount expected to be obtained under the conditions of measurement. The completeness goal for laboratory analysis for this project was 85 percent useable data. Unusable analytical data are those results reported by the laboratory but rejected during the data validation process. A summary of the completeness goal for NCBC Gulfport is provided in Table 6-1. For more detailed completeness goal tables, please refer to Appendix C.

TABLE 6-1
COMPLETION GOAL (>85%)

	QC	GW	OVERALL
Dioxin/Furans	100.0	100.0	100.0

MATRIX KEY

QC = QC Samples
GW = Ground Water Samples

The analytical data met the 85 percent completeness goal for the fraction.

7.0 PARCC SUMMARY

The purpose of evaluating the quality of the analytical data using the PARCC criteria was to address the qualification of the data in regards to evaluation of the presence, magnitude and characteristics of hazardous substances at NCBC Gulfport. Overall, the chemical analytical data are acceptable and exceeded the completion goal of 85 percent for the dioxin/furan fraction. Tables 7-1 and 7-2 provides a tabulation of the assessment of PARCC criteria for the SDG for water samples and quality control samples, respectively.

7.1 Water Samples

No data points were rejected. The completion goal was met.

7.2 QC Samples

No data points were rejected. The completion goal was met.

TABLE C - 1
DIOXIN/FURANS - REJECTED DATA
NCBC GULFPORT HO

SDG	# SAMPLES/MATRIX			# OF COMPOUNDS REJECTED PER MATIX	
	QC	GW		QC	GW
082031	3	4		0	0
GRAND TOTAL	3	4		0	0
COMPLETION GOAL (>85%)				100.0%	100.0%

OVERALL COMPLETENESS
100.0%

MATRIX KEY

QC = QC SAMPLES
GW = GROUND WATER SAMPLES

* 24 TARGET CONGENERS/ISOMERS PER SAMPLE

Groundwater Sampling Event 6

PRECISION, ACCURACY, REPRESENTATIVENESS, COMPARABILITY, AND COMPLETENESS FOR NCBC GULFPORT, SITE 8

NCBC GULFPORT
GULFPORT, MISSISSIPPI

Prepared by:
Heartland Environmental Services, Inc.
6716 Mexico Road
St. Peters, Missouri 63376

Prepared for:

ABB Environmental Services, Inc.
1400 Center Point Blvd., Suite 158
Knoxville, TN 37932

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1.0 INTRODUCTION

Prior to evaluating the data for precision, accuracy, representativeness, comparability, and completeness (PARCC) criteria the laboratory reviewed the data package and the data also was independently reviewed and validated using the Naval Energy and Environmental and Support Activity (NEESA) guidance document 20.2-047B (1988) entitled, *Sampling and Chemical Analysis Quality Assurance Requirements for the Navy Installation Program*. Before the laboratory released the chemical analytical results, both the sample and laboratory QC data were carefully reviewed in order to verify sample identity, instrument calibration, detection limits, dilution factors, numerical computations, accuracy of transcriptions, and chemical interpretations. Additionally, the QC data were reduced and spike recoveries were included in control charts, and the resulting data were reviewed to ascertain whether they were within the laboratory defined limits for accuracy and precision. The data were compiled into a NEESA Level D data package and any nonconforming data were discussed in the data package cover letter and case narrative.

The Level D data package was then reviewed and validated by Heartland Environmental Services, Inc., Missouri (Heartland). Data validation is the technical review of a data package using criteria established in the data quality objectives, the quality assurance project plan and guidance documents prepared by the United States Environmental Protection Agency (USEPA) for the validation of organic and inorganic analytical data (USEPA 1990a and 1990b) as specified by NEESA document 20.2-047B. Samples that did not meet the acceptance limit criteria were qualified with a flag; single letter abbreviations that indicate a problem with the data. Data qualifiers used by the validators when amending the data include the following.

U — Undetected. The analyte was not detected above the contract required quantitation limit (CRQL) or the contract required detection limit (CRDL). The "U" designator also is used to qualify common laboratory contaminants. The "U" designator is applied to an environmental sample when the laboratory contaminant is detected in an environmental sample at a concentration less than 5 times (10 times for common laboratory contaminants) the value of the concentration detected in any corresponding field QC blank, method blank or preparation blanks.

J — Estimated. The analyte was present, but the reported value may not be accurate or precise. The "J" designator is used to qualify an analyte that was present at a concentration between the CRQL/CRDL and method detection limit (MDL) or the data "failed" some of the analytical validation criteria but not sufficient to reject the data and when combined with the U designator the quantitation limit is estimated.

R — Rejected. Data was rejected by the data validator during comparison of the NEESA Level C or D data package with the analytical functional guideline criteria. The "R" designator indicates a significant variance in acceptable laboratory performance. Either re-analysis or re-sampling and analysis would be necessary to determine the presence or absence of the target analyte(s).

Once the data were reviewed and validated according to the guidance presented in NEESA document 20.2-047B, the data were evaluated by Heartland using the PARCCs criteria included in the Data Quality Objectives (DQOs) of the Work Plan for NCBC Gulfport, Gulfport, Mississippi. The following sections present a brief description of PARCCs criteria.

Precision. Precision is a measure of the agreement or repeatability of a set of replicate results obtained from duplicate laboratory analyses of samples collected from the same location/depth interval. Precision was calculated from laboratory analytical data and cannot be measured directly. Precision is expressed as the Relative Percent Difference (RPD) between analytical values for two samples divided by the average of their analytical values. Precision is calculated using the expression:

$$RPD = (D1-D2) / (\frac{1}{2}(D1+D2)) \times 100$$

D1 and D2 are the reported values for the duplicate sample pair. Precision was evaluated using field duplicate samples and laboratory split samples (for example, MS/MSD samples).

Precision for environmental samples and their duplicates was assessed using a maximum RPD of 20 Percent for the water matrix. Precision for MS/MSD/MD samples was assessed by using the target analyte specific RPD criteria for the spiked compounds and the sample duplicates.

Accuracy. Accuracy is a measure of the agreement between an experimental determination and the true value of the parameter being measured. Accuracy can be calculated from the analytical data and was not measured directly. Accuracy is used to identify the bias in a given measurement system (i.e. laboratory conditions, sample matrix, and sampling conditions). Accuracy is assessed by reviewing the Percent Recovery (%R) between the true value of the spike analyte and the actual analytical value. Accuracy is calculated using the equation:

$$\%R = ((A-B)/C) \times 100$$

A = Measured concentration of the spiked analyte.
B = Measured concentration of the spiked compound in the unspiked sample.
C = True concentration of the spiked analyte.

For the organic analyses, each of the samples was spiked with a surrogate compound and a designated field sample was spiked in duplicate (MS/MSD) with a known mixture of target compounds; and for inorganic analyses, each chosen matrix spike and matrix duplicate pair was spiked with a known reference material before digestion. Each of these approaches provides a measure of the matrix effects on the analytical accuracy.

Representativeness. Representativeness is a qualitative measure of the degree to which sample data accurately and precisely represent a characteristic environmental condition. Representativeness is a subjective parameter and is used to evaluate the efficacy of the sampling plan design. Representativeness was evaluated using the field and laboratory QC blank sample results. QC blank samples are equipment rinseate blanks, field blanks, trip blanks, laboratory method blanks for organic analysis and laboratory preparation blanks for inorganic analysis. Positive detection of target analytes in the QC blank samples identify contaminants that possibly were introduced to the associated environmental sample during sample collection, transport or laboratory analysis. Representativeness was also evaluated using the defined extraction and analytical holding time requirements set forth in the Work Plan for NCBC Gulfport or the analytical methodology.

Comparability. Comparability is qualitative measure designed to express the confidence with which one data set may be compared to another. Factors that affect comparability are: sample collection and handling techniques, sample matrix type, and analytical method. Comparability is limited by the other PARCC parameters because only when precision and accuracy are known can data sets be compared with confidence.

Completeness. Completeness is defined as the percentage of measurements that are judged to be valid compared to the total number of measurements made. Valid usable data are values that were not qualified as rejected (R qualifier) during data validation. A goal of 85 percent usable data was established in the Work Plan for NCBC Gulfport. Completeness equals the total number of analytes for each matrix minus the total number of rejected analytes divided by the total number of analytes multiplied by 100.

2.0 PRECISION

The following section describes the evaluation of precision for volatile organic compounds, semivolatile organic compounds, pesticides and polychlorinated biphenyls (PCBs), metals/cyanide, and sulfide. Duplicate samples are evaluated for precision only when contaminants are detected in both the environmental sample and the sample's duplicate. A ND in the RPD column of the spreadsheet indicates that a RPD calculation was not required because one result was a non-detect and the other result was less than the compound/analyte CRQL/CRDL. Environmental samples and their respective duplicates may not exhibit positive results for all compounds found at or near the CRQL or CRDL. Duplicates with Relative Percent Differences (RPDs) within control limits indicate adequate sampling practices and/or good analytical precision. Duplicates with RPDs outside the control limits may result from inappropriate sampling procedures, matrix interferences, or non-homogeneity of the sample matrix. In addition, poor precision can be attributed to deviation(s) from the analytical methodology or to poor reproducibility of target analyte concentrations at or near the required CRQLs or CRDLs. The acceptance criteria for evaluating precision of field duplicate analytical results is a RPD of 35 for the groundwater matrix.

Field duplicates were submitted for validation for all analytical fractions. The percentage of duplicate samples collected for this project was greater than ten percent. The following Sections summarize the evaluation of analytical precision for the water field samples for the following analytical groups:

- 2,3,7,8-Substituted Dioxin/Furans (D/Fs)

Duplicate precision was assessed using both environmental sample and associated duplicates and matrix spike/matrix spike duplicates (MS/MSD).

Tabulation of the results of assessing duplicate precision and duplicate frequency is presented in Table 2-1. Tabulation of the results assessing precision based on the reproducibility between spike sample/duplicate sample pairs is presented in Table 2-2.

2.1 Groundwater Matrix

The assessment of groundwater matrix environmental samples and associated duplicates for precision is provided in Table 2-1. The dioxin/furan analysis of the field duplicate pair, G6W002/G6W002D exhibited a compliant RPD for the only congener detected, OCDD. The assessment of precision based on the reproducibility of results between matrix spike and matrix spike duplicate pairs is provided in Table 2-2. The MS/MSD pair, G6W001, were in compliance with RPD precision criteria.

Based on assessment of duplicate precision evaluation criteria, the soil boring sample matrix analytical data was acceptable for precision for each SDG.

TABLE 2 - 1
2,3,7,8-SUBSTITUTED DIOXIN/FURANS
GROUNDWATER DUPLICATE PRECISION
NCBC GULFPORT SITE 8

SDG	SAMPLE ID	MATRIX	NO. ASSC. SAMPLES	COMPOUND	SAMPLE CONC.	DUP CONC	MAX RPD	RPD
G8231	G6W002	WATER	3	OCDD	147	112	35%	27%
	TOTAL SAMPLES		3					

% OF DUPLICATES COLLECTED	RPD IN	RPD OUT	% WITHIN RPD LIMIT
33.3%	1	0	100.0%

TABLE 2 - 2

2,3,7,8-SUBSTITUTED DIOXIN/FURANS
GROUNDWATER MATRIX SPIKE/MATRIX SPIKE DUPLICATES
NCBC GULFPORT SITE 8

MS = MATRIX SPIKE *SAMPLE G6W001*		SDG G8231		
MSD = MATRIX SPIKE DUPLICATE		MS	MSD	
RPD = RELATIVE PERCENT DIFFERENCE		%R	%R	%RPD
DIOXIN/FURAN CONGENERS	UNITS			
2,3,7,8-TCDD	pg/L	96	93	3%
2,3,7,8-TCDF	pg/L	98	103	5%
1,2,3,7,8-PeCDD	pg/L	94	101	7%
1,2,3,7,8-PeCDF	pg/L	99	103	4%
2,3,4,7,8-PeCDF	pg/L	94	97	3%
1,2,3,4,7,8-HxCDD	pg/L	100	108	8%
1,2,3,6,7,8-HxCDD	pg/L	102	103	1%
1,2,3,7,8,9-HxCDD	pg/L	114	117	3%
1,2,3,4,7,8-HxCDF	pg/L	104	105	1%
1,2,3,6,7,8-HxCDF	pg/L	106	107	1%
2,3,4,6,7,8-HxCDF	pg/L	109	108	1%
1,2,3,7,8,9-HxCDF	pg/L	107	107	0%
1,2,3,4,6,7,8-HpCDD	pg/L	103	101	2%
1,2,3,4,6,7,8-HpCDF	pg/L	115	104	10%
1,2,3,4,7,8,9-HpCDF	pg/L	122	104	16%
OCDD	pg/L	101	92	9%
OCDF	pg/L	100	97	3%

* DENOTES VALUE NOT WITHIN QA/QC ADVISORY LIMITS

CORRESPONDING SDG'S AND ASSOCIATED SAMPLES

G8231: G6WRI, G6W001, G6W002, G6W002D, G6W003, G6W004

3.0 ACCURACY

The assessment of accuracy is evaluated by comparison of the percent recoveries (%R) computed from the known concentration of analyte spikes and their recovered concentration versus the analytical method acceptance criteria. Spike recoveries provide an indication of bias, where the reported data may either overestimate or underestimate the actual concentration of detected compounds and/or the detection limits. Recoveries outside acceptable criteria may be caused by factors such as matrix interference, poor analytical precision, or instrument calibration.

The following Sections summarize the evaluation of analytical accuracy for the field groundwater samples for the following analytical groups:

- 2,3,7,8-Substituted Dioxin/Furans (D/Fs)

Accuracy was assessed using MS and MSD samples for dioxin/furan analyses as well as internal standard recoveries. The results of the evaluation of accuracy for the MS/MSD sample is provided in Tables 2-2. The results of the evaluation of accuracy for the internal standard recoveries in the field samples is provided in Table 3-1.

3.1 Groundwater Matrix

The MS/MSD sample pair analyzed for dioxin/furans (Table 2-2) exhibited "in-control" recovery results. In addition, all internal standard recoveries for the dioxin/furans were acceptable (Table 3-1).

Based on an overall assessment of MS/MSD and internal standard sample accuracy evaluation criteria, the groundwater matrix analytical data was acceptable for each SDG.

TABLE 3-1
INTERNAL STANDARD RECOVERIES
DIOXIN/FURAN CONGENERS
NCBC GULFPORT SITE 8

SDG	SAMPLE IDs	ISTD1	ISTD2	ISTD3	ISTD4	ISTD5	ISTD6	ISTD7	ISTD8	ISTD9	TOTAL OUT
G8231	G6WRI	77.4%	63.4%	81.9%	98.6%	75.6%	89.1%	96.5%	96.4%	99.3%	0
	G6W001	76.9%	65.9%	73.0%	91.1%	80.0%	93.0%	99.5%	103.0%	105.0%	0
	G6W001MS	77.9%	91.6%	85.0%	84.6%	73.9%	76.5%	100.0%	86.7%	97.9%	0
	G6W001MSD	76.3%	78.0%	82.3%	79.5%	79.6%	85.1%	111.0%	105.0%	107.0%	0
	G6W002	91.1%	73.8%	90.4%	112.0%	88.9%	112.0%	104.0%	105.0%	99.8%	0
	G6W002D	85.4%	81.2%	88.6%	103.0%	86.6%	99.9%	102.0%	103.0%	93.4%	0
	G6W003	87.1%	74.6%	90.1%	110.0%	81.1%	102.0%	101.0%	107.0%	94.5%	0
	G6W004	86.3%	80.4%	82.4%	116.0%	94.8%	101.0%	98.4%	103.0%	95.1%	0

ISTD1 = 13C-2,3,7,8-TCDD
ISTD2 = 13C-2,3,7,8-TCDF
ISTD3 = 13C-1,2,3,7,8-PeCDD
ISTD4 = 13C-1,2,3,7,8-PeCDF
ISTD5 = 13C-1,2,3,6,7,8-HxCDD
ISTD6 = 13C-1,2,3,4,7,8-HxCDF
ISTD7 = 13C-1,2,3,4,6,7,8-HpCDD
ISTD8 = 13C-1,2,3,4,6,7,8-HpCDF
ISTD9 = 13C-OCDD

WATERS:

QC LIMITS 40% - 135%

*** - INDICATES VALUE OUTSIDE QC LIMITS**

# SAMPLES	[illegible]	% REC IN	%REC OUT	% TOTAL IN
8	[illegible]	72	0	100.0%

4.0 REPRESENTATIVENESS

Representativeness of the environmental sample analytical data was assessed using method blanks and rinseate blanks and determining if holding time requirements were met. The environmental samples and associated blanks were analyzed for the following target analyte groups:

- 2,3,7,8-Substituted Dioxin/Furans (D/Fs)

Equipment rinseate blanks and laboratory method blanks were analyzed for dioxin/furans. The assessment of representativeness is summarized in tabular form for each type of blank, method blank results are summarized in Table 4-1 and equipment rinseate blank results are summarized in Table 4.2.

If contaminants were detected in a blank, corrective actions were made for the chemical analytical data during data validation by Heartland. The corrective action consisted of amending the laboratory reported results for organic and inorganic target analytes by the criteria. The following describes the Validation Qualifier code in the blank summary tables.

Organic Target Analytes

- CRQL Validation Qualifier. If a sample result for the blank contaminant was less than the CRQL and less than 10 times (for common contaminants) or 5X (for all other contaminants) the blank value, the sample result was rejected and amended as estimated non-detected at the CRQL for the target compound.

- U Validation Qualifier. If a sample result for the blank contaminant was greater than the sample CRQL and less than 10 times (for common contaminants) or 5X (for all other contaminants) the blank value, the sample result for the blank contaminant was amended as non detect at the concentration reported in the sample results.

- No Action (NA). If a sample result for the blank contaminant was greater than the CRQL and 10 times (for common contaminants) or 5X (for all other contaminants) the blank value, the result was not amended.

4.1 Method Blanks

The method blanks were a sample of deionized water that is prepared by the laboratory at the time of analysis. Method blanks undergo the same analytical process as the corresponding environmental samples and associated field blanks. The purpose of the method blank is to assess the potential for target analytes to "contaminate" the sample during analysis. Dioxin/furan target congeners were not detected in method blank samples (Table 4-1).

Based on the assessment of the trip blanks for representativeness, the analytical data was acceptable for each SDG.

4.2 Equipment Rinseate Blanks

The equipment rinseate blank was collected by rinsing a piece of sampling equipment with organic free deionized water. A sample of this water was collected and placed in sample containers similar to those used for the environmental samples. Dioxin/furans were not detected in equipment rinseate blank sample (Table 4-2).

Based on assessment of equipment rinseate blanks for representativeness, the analytical data was acceptable for each SDG.

TABLE 4 - 1
DIOXIN/FURAN CONGENERS DETECTED IN METHOD BLANKS
NCBC GULFPORT SITE 8

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	MB CONC.	UNITS	VALIDATION QUALIFIER
G8231	WBLK09055	ALL SAMPLES	NO CONTAMINATION FOUND			

TABLE 4 - 2
DIOXIN/FURAN CONGENERS DETECTED IN RINSEATE BLANKS
NCBC GULFPORT SITE 8

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	RB CONC.	UNITS	VALIDATION QUALIFIER
G8231	G6WRI	ALL SAMPLES	NO CONTAMINATION FOUND			

4.3 Holding Times

Holding times requirements are utilized in an effort to minimize the degradation or concentration of constituents in a particular matrix over time. The stability of the constituents is determined to the best extent by the regulatory agencies. A reasonable time limit is imposed under which the samples must be extracted or prepared and then analyzed. The holding times regulations assume that the samples have been properly preserved according to the guidelines, either at the laboratory or in the field. Analytical results from samples with holding time violations are qualified as estimated, J/UJ, because of the potential of compromising the sample. If the holding time is grossly violated (>15 days) the results are qualified/rejected, J/R.

All holding time requirements, both extraction and analytical, were met by the laboratory for all fractions.

5.0 COMPARABILITY

Comparability is a qualitative measure designed to express the confidence with which one data set may be compared to another. The analytical samples were collected and transported to the chemical analytical laboratory in accordance with standard procedures and were analyzed in conformance with acceptable USEPA procedures (Refer to Table 5-1 below). The analytical data are reported in standard units (micrograms per liter, micrograms per kilogram, etc.).

The methods used to collect the environmental samples and the methods used to analyze the samples should assure comparability of the analytical data.

TABLE 5-1
USEPA Procedures (SW-846 Methodologies)

U.S. EPA Method	Description
SW846 8290	High Resolution Dioxin/Furans

6.0 COMPLETENESS

Completeness is the quantitative measure of the amount of data obtained from a measurement process compared with the amount expected to be obtained under the conditions of measurement. The completeness goal for laboratory analysis for this project was 95 percent useable data. Unusable analytical data are those results reported by the laboratory but rejected during the data validation process. A summary of the completeness goal for NCBC Gulfport, Site 8 is provided in Table 6-1.

TABLE 6-1
COMPLETION GOAL (>85%)

	QC	GW	OVERALL
Dioxin/Furans	100.0	100.0	100.0

MATRIX KEY
QC = QC Samples
GW = Groundwater Samples

The completeness goal of 95% for each fraction of analytical data for each matrix was met.

7.0 PARCC SUMMARY

The purpose of evaluating the quality of the analytical data using the PARCC criteria was to address the qualification of the data in regards to evaluation of the presence, magnitude and characteristics of hazardous substances at NCBC Gulfport, Site 8. Overall, the chemical analytical data are acceptable and exceeded the completion goal of 95 percent for the Dioxin/Furan fraction. Tables 7-1 and 7-2 provides a tabulation of the assessment of PARCC criteria each SDG for the water samples and quality control samples, respectively.

7.1 QC Samples

No analytical data points were rejected. The completion goal was met.

7.2 Soil Boring Samples

No analytical data points were rejected. The completion goal was met.

TABLE 7 - 1
PARCC CRITERIA SUMMARY
GROUNDWATER SAMPLES
NCBC GULFPORT, SITE 8

SDGs	PRECISION	ACCURACY	REPRESENT-ATIVENESS	COMPARABILITY	COMPLETENESS
G8231	ACCEPTABLE	ACCEPTABLE	ACCEPTABLE	ACCEPTABLE	ACCEPTABLE

TABLE 7 - 2
PARCC CRITERIA SUMMARY
QUALITY CONTROL SAMPLES
NCBC GULFPORT, SITE 8

SDGs	PRECISION	ACCURACY	REPRESENT-ATIVENESS	COMPARABILITY	COMPLETENESS
G8231	ACCEPTABLE	ACCEPTABLE	ACCEPTABLE	ACCEPTABLE	ACCEPTABLE

REFERENCES

ABB-ES, (ABB Environmental Services, Inc.) 1993. Monitoring Well Installation Program Herbicide Orange Site A, Naval Construction Battalion Center, Gulfport, Mississippi Work Plan; Prepared for Southern Division Naval Facilities Engineering Command; November 1993.

ABB Environmental Services, Inc. (ABB-ES), 1991. Quality Assurance Program Plan, Navy CLEAN Program, District I, March.

ABB-ES, 1992. RI/FS Sampling and Analysis plan, Naval Construction Battalion Center, Gulfport, Mississippi, June.

NEESA, 1988., Sampling and Chemical Analysis Quality Assurance Requirements for the Navy Installation Restoration Program, Naval Energy and Environmental Support, 20.2-047B, June 1988.

USEPA, 1989., Risk Assessment Guidance for Superfund Volume I Human Health Manual (Part a), Interim Final, United States Environmental Protection Agency, 1989.

USEPA, 1988b., National Functional Guidelines for Organic Data Review, United States Environmental Protection Agency, July 1988.

USEPA, 1990a., Guidance for Data Usability in Risk Assessment, United States Environmental Protection Agency, EPA 540 G-90/008, October 1990.

USEPA, 1986., Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, September 1986.

APPENDIX F

CALCULATIONS FOR HEALTH THREAT ANALYSIS

APPENDIX F

HUMAN HEALTH RISK EVALUATION

Standard risk assessment equations, rearranged to solve for media chemical concentration, are used to calculate soil contaminant concentrations associated with ELCRs of 1×10^{-6}. Health risks to soil exposure are primarily due to incidental ingestions, dermal absorption, and inhalation of particulates. The general equation for calculating total health risks associated with residential exposure to surface soil is:

$$Total\ Risk = Ingestion\ Risk + Dermal\ Risk + Inhalation\ Risk$$

For carcinogenic chemicals, adding the appropriate exposure parameters and rearranging this equation to solve for soil concentrations (C_{Soil}) associated with a target cancer risk (TR) results in the complex equation

$$C_{SOIL} = \frac{TR\times BW\times AT}{CFS_O\times IR_S\times FI\times CF\times EF\times ED}$$

$$+\frac{TR\times BW\times AT}{CSF_D\times SA\times AF\times ABS\times CF\times EV\times ED}$$

$$+\frac{TR\times BW\times AT}{CSF_I\times 1/PEF\times IR_a\times CF\times EF\times ED}$$

Table F-1 provides the values for each of the parameters used in this equation. Also provided are the reference sources for each of these exposure parameters.

Table F-1
Equation Parameters for Estimating Exposure

Addendum to Delisting Petition 0759
Site A, Former Herbicide Orange Storage Area
Naval Construction Battalion Center
Gulfport, Mississippi

	Symbol	Value	Source
Parameters for Estimating Ingestion Exposure			
Parameter - Receptor			
Oral Slope Factor $(mg/kg\text{-}dy)^{-1}$	SF_o	1.5×10^5	USEPA, 1993
Soil Ingestion Rate - adult trespasser (mg/dy)	IR	100	USEPA, 1991
Soil Ingestion Rate - site worker (mg/dy)	IR	100	USEPA, 1991
Soil Ingestion Rate - occupational worker (mg/dy)	IR	50	USEPA, 1991
Soil Ingestion Rate - excavation worker (mg/dy)	IR	480	USEPA, 1991
Exposure Frequency - adult trespasser (dy/yr)	EF	24	USEPA, 1991
Exposure Frequency - site worker (dy/yr)	EF	12	USEPA, 1991
Exposure Frequency - occupational worker (dy/yr)	EF	250	USEPA, 1991
Exposure Frequency - excavation worker (dy/yr)	EF	30	USEPA, 1991
Exposure Duration - adult trespasser (years)	ED	19	USEPA, 1991
Exposure Duration - site worker (years)	ED	25	USEPA, 1991
Exposure Duration - occupational worker (years)	ED	25	USEPA, 1991
Exposure Duration - excavation worker (years)	ED	1	USEPA, 1991
Conversion Factor (kg/mg)	CF	0.000001	
Body Weight - (kg)	BW	70	USEPA, 1991
Parameters for Estimating Inhalation Exposure			
Parameter - Receptor			
Inhalation Slope Factor $(mg/kg\text{-}dy)^{-1}$	SF_o	1.5×10^5	USEPA, 1993
Inhalation Rate - adult trespasser (m^3/hr)	InhR	0.833	USEPA, 1991
Inhalation Rate - site worker (m^3/hr)	InhR	0.833	USEPA, 1991
Inhalation Rate - occupational worker (m^3/hr)	InhR	0.833	USEPA, 1991
Inhalation Rate - excavation worker (m^3/hr)	InhR	2.5	USEPA, 1991
Exposure Time - adult trespasser (hr/dy)	ET	4	Assumption
Exposure Time - site worker (hr/dy)	ET	8	Assumption
Exposure Time - occupational worker (hr/dy)	ET	8	Assumption
Exposure Time - excavation worker (hr/dy)	ET	8	Assumption
Exposure Frequency - adult trespasser (dy/yr)	EF	24	USEPA, 1991
Exposure Frequency - site worker (dy/yr)	EF	12	USEPA, 1991
Exposure Frequency - occupational worker (dy/yr)	EF	250	USEPA, 1991
Exposure Frequency - excavation worker (dy/yr)	EF	30	USEPA, 1991
Exposure Duration - adult trespasser (years)	ED	19	USEPA, 1991
Exposure Duration - site worker (years)	ED	25	USEPA, 1991
Exposure Duration - occupational worker (years)	ED	25	USEPA, 1991
Exposure Duration - excavation worker (years)	ED	1	USEPA, 1991
Particulate Emission Factor (m^3/kg)	PEF	47,900,000	Calculated
Body Weight - adult resident (kg)	BW	70	USEPA, 1991

See notes at end of table.

Table F-1 (Continued)
Equation Parameters for Estimating Exposure

Addendum to Delisting Petition 0759
Site A, Former Herbicide Orange Storage Area
Naval Construction Battalion Center
Gulfport, Mississippi

	Symbol	Value	Source
Parameters for Estimating Dermal Exposure			
Parameter - Receptor			
Dermal Slope Factor $(mg/kg\text{-}dy)^{-1}$	SF_o	1.5×10^5	USEPA, 1993
Surface Area - adult trespasser (cm^2)	SA	5,750	USEPA, 1992
Surface Area - site worker (cm^2)	SA	5,750	USEPA, 1992
Surface Area - occupational worker (cm^2)	SA	2,300	USEPA, 1992
Surface Area - excavation worker (cm^2)	SA	5,750	USEPA, 1992
Soil to Skin Adherence Factor - (mg/cm^2-event)	AF	1	USEPA, 1992
Absorption Fraction - organics	Abs	0.01	USEPA, 1995
Event Frequency - adult trespasser (event/yr)	EV	24	USEPA, 1991
Event Frequency - site worker (event/yr)	EV	12	USEPA, 1991
Event Frequency - occupational worker (event/yr)	EV	250	USEPA, 1991
Event Frequency - excavation worker (event/yr)	EV	30	USEPA, 1991
Exposure Duration - adult trespasser (years)	ED	19	USEPA, 1991
Exposure Duration - site worker (years)	ED	25	USEPA, 1991
Exposure Duration - occupational worker (years)	ED	25	USEPA, 1991
Exposure Duration - excavation worker (years)	ED	1	USEPA, 1991
Conversion Factor (kg/mg)	CF	0.000001	
Body Weight - (kg)	BW	70	USEPA, 1991

Sources: USEPA, 1991, Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Parameters."
USEPA, 1992, Dermal Exposure Assessment: Principles and Applications: EPA/600/8-91/011B; January, 1992.
USEPA, 1993, Health Effects Assessment Summary Tables, 1993, EPA 540-R-93-058.
USEPA, 1995, USEPA Region IV Supplemental Guidance to RAGS, Region 4 Bulletins,Human Health Risk Assessment.

Notes:
mg/kg-dy = milligrams per kilogram per day.
SF_o = oral slope factor.
USEPA = U.S. Environmental Protection Agency.
mg/dy = milligrams per day.
IR = ingestion rate.
dy/yr = day per year.
EF = exposure efficiency.
ED = exposure duration.
kg/mg = kilograms per milligram.
CF = conversion factor.
kg = kilogram(s).
BW = body weight.
m^3/hr = cubic meter per hour.
InhR = inhalation rate.
hr/dy = hour per day.
ET = exposure time.
PEF = particulate emission factor.
cm^2 centimeters squared.
SA = surface area.
mg/cm^2-event = milligrams per centimeters squared per day.
AF = adherence factor.
Abs = Absorption.
event/yr = event per year.
EV = event frequency.

APPENDIX G

STATISTICAL ANALYSIS OF GROUNDWATER DATA

APPENDIX G
STATISTICAL ANALYSIS OF GROUNDWATER DATA

A statistical analysis of the 22 groundwater samples taken between November 18, 1994, and August 15, 1995, was conducted to determine if any unexpectedly large values were included. All analytical values for various dioxins were converted to TCDD toxicity equivalents (TEQs).

Initial examination of the distribution of TEQs confirmed that TEQ is log-normally distributed. Natural logarithms for each TEQ were calculated and their distribution was plotted. From Figure G-1 (histogram of ln(TEQ)) it is apparent that TEQ appears to be log-normally distributed.

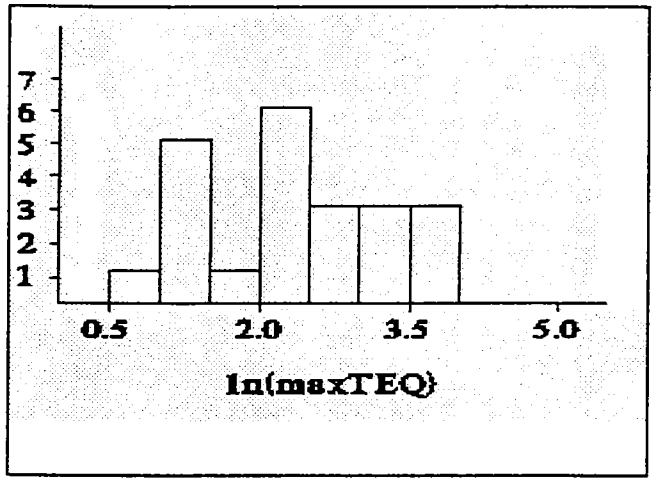

Figure G-1 Histogram of lm(TEQ)

Table G-1
Descriptive Statistics of Both TEQ and ln(TEQ)

Addendum to Delisting Petition 0759
Site A, Former Herbicide Orange Storage Area
Naval Construction Battalion Center
Gulfport, Mississippi

Statistic	ln(TEQ)	TEQ
MINIMUM	0.998	2.712
MAXIMUM	3.871	47.973
RANGE	2.873	45.262
MEAN	2.308	14.49
VARIANCE	0.808	160.322
STANDARD DEV (SD)	0.899	12.662
2 SD ABOVE MEAN	4.106	39.814
TOTAL OBSERVATIONS = 22		

Next, the data was tested for outliers. First, probability plot of ln(TEQ) was generated (Figure G-2).

In this plot, the actual value is plotted against the number of standard deviations the value is above or below the mean. The straight line reinforces the log normal distribution of the data. All values fall within +2 and -2 standard deviations of the mean, which are the values between which approximately 95 percent of the values are expected fall. This indicates no significant outliers.

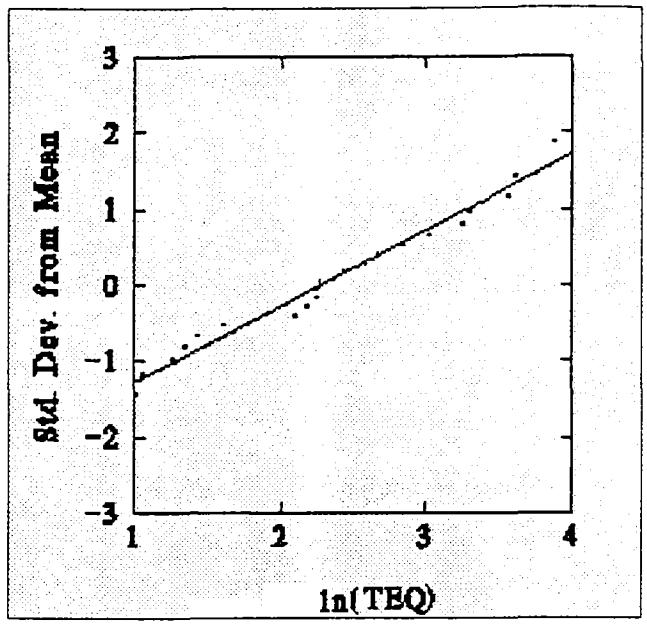

Figure G-2 Probability plot of ln(TEQ)

Figure G-3 is a cumulative distribution plot of the log of TEQ values. In this plot, the left hand side is the total fraction of values lower than the current value. For instance, approximate 0.4 of the data is less than 2.0 and more than 0.9 is less than 3.4 (the natural log of 30. TEQ). Again, no significant outliers are identified.

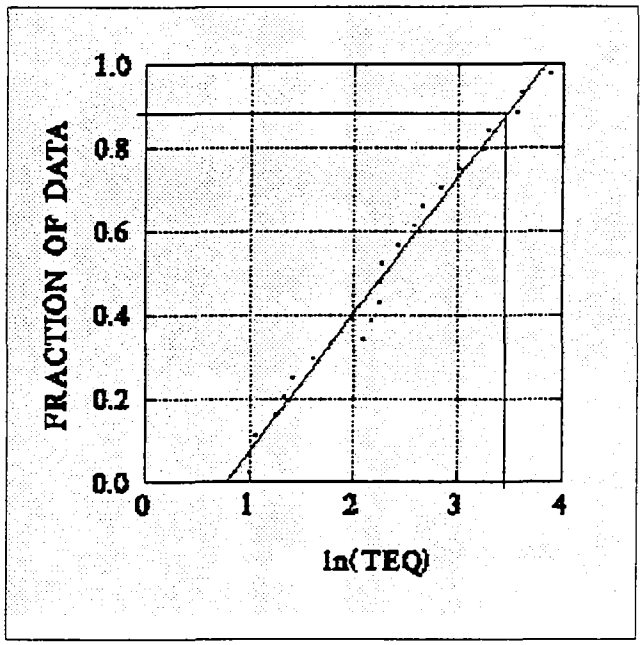

Figure G-3 A Cumulative distribution of the log of TEQ values

As a final check forextreme values (and as an independent check for outliers without assuming normal or log-normal distributions), a box and whisker plot of the ln(TEQ) was prepared.

Box and whisker plots are a simple, graphical summary of a parameter's values for a batch of data. To make a box and whisker plot, a set of data is sorted in ascending order. A few key values are determined from the sorted data set. Then these key values are plotted on a graph to form a figure called a box and whisker plot.

A box and whisker plot consists of a central box, two "whiskers", one on each side of the box and possibly some circles and/or stars beyond the ends of the whiskers (see Figure G-4).

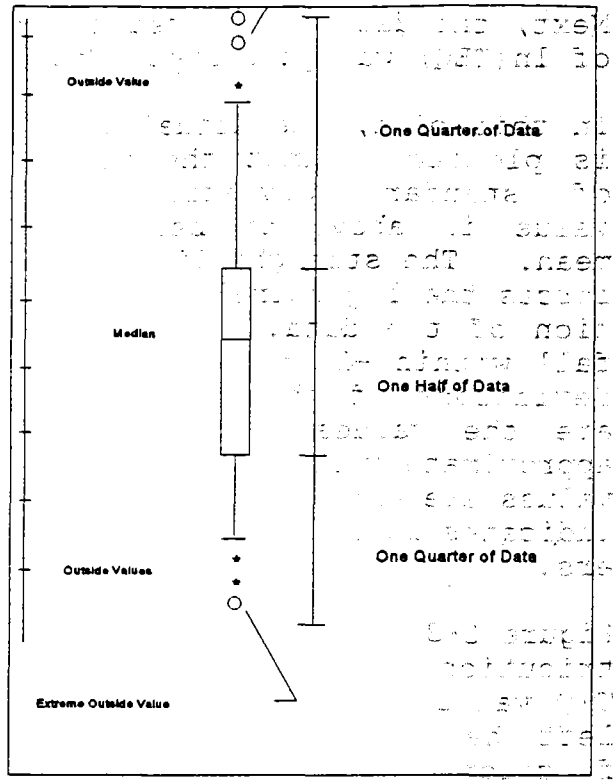

Figure G-4 Standard box and whisker plot

The box is a graphical representation of the middle half of the values within a set of data. One quarter of the data falls above the upper edge of the box (the upper hinge) while one quarter of the data falls below the lower edge (the lower hinge). A horizontal line within the box represents the "middle" data value (called the median). Exactly one half of data falls above this line and one half falls below it.

To understand the whiskers above and below the box, an understanding of some key terminology is required. Almostall data sets consist of a number of different values — not all have exactly the same value. This difference of values is the inherent variability or "spread" of the data set. This spread is unique for each data set. A good description of this spread is the difference in values of the upper and lower hinges (as described above). This difference is determined by subtracting the value for which exactly 25 percent of the data set is less from the value for which exactly 25 percent is greater. This value is called the "hinge spread".

For most data sets, almost all values for the set will be less than the upper hinge value plus 1.5 times the hinge spread and greater than the lower hinge value minus 1.5 times the hinge spread. These are called the inner fences because they contain all of the well-behaved data points for a data set. The whiskers extending above and below the box mark all the points that fall outside the box but between the inner fences.

For many reasons, data points may fall outside inner fences. These points are not necessarily "bad" points and may actually belong to the data set. However, they may be considered outliers. Points that fall outside the inner fences are further classified by the calculation of "outer fences". Outer fences are defined much as inner fences, except they are moved out to three times the hinge spread above and below the hinges. Points that fall outside the outer fences are generally considered outliers.

In a box and whisker plot, points that fall outside the outer fences are designated individually with small circles, while points that fall between the inner and outer fence are marked with stars. As can be seen from the Figure G-5 there are no apparent extreme values in this data set.

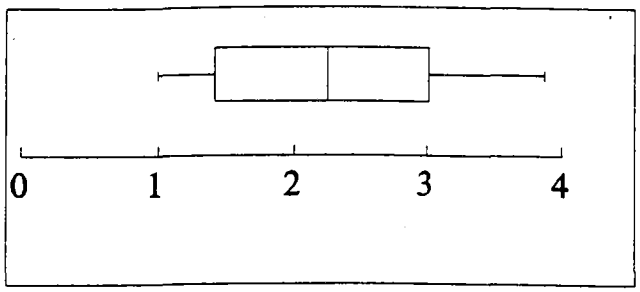

Figure G-5 Box and whisker plot of ln(TEQ)