N62604.AR.001572
NCBC GULFPORT
5090.3a

TECHNICAL MEMORANDUM NUMBER 4 AT SITE 8A GROUNDWATER SAMPLING TO DETERMINE EXTENT OF CONTAMINATION FROM ASH STORAGE IN GROUNDWATER

NCBC GULFPORT MS

8/1/1995

ABB ENVIRONMENTAL

TECHNICAL MEMORANDUM NO. 4
SITE A, FORMER HERBICIDE ORANGE STORAGE AREA, GROUNDWATER SAMPLING EVENT NO. 4

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 1995

CERTIFICATION OF TECHNICAL
DATA CONFORMITY (MAY 1987)

The Contractor, ABB Environmental Services, Inc., hereby certifies that, to the best of its knowledge and belief, the technical data delivered herewith under Contract No. N62467-89-D-0317/092 is complete, accurate, and complies with all requirements of this contract.

DATE: August 15, 1995

NAME AND TITLE OF CERTIFYING OFFICIAL: Penny Baxter
Project Manager

NAME AND TITLE OF CERTIFYING OFFICIAL: Kurt Sichelstiel
Project Technical Lead

(DFAR 252.227-7036)

DISTRIBUTION

	Draft
Southern Division, Naval Facilities Engineering Command	1
U.S. Air Force	1
Naval Construction Battalion Center, Gulfport, Mississippi	1

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 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA). The acts, passed by Congress in 1980 and 1986, respectively, established the means to assess and cleanup hazardous waste sites for both private-sector and Federal facilities. These acts are the basis for what is commonly known as the Superfund program.

A second program to address present hazardous material management is the Resource Conservation and Recovery Act (RCRA) corrective action program. This program is designed to identify and cleanup releases of hazardous substances at RCRA-permitted facilities. RCRA is the law that ensures that solid and hazardous wastes are managed in an environmentally sound manner. The law applies primarily to facilities that generate or handle hazardous waste.

Investigations at this site focus on characterizing groundwater quality and are in support of a petition to delist the ash located at the site under the RCRA program. This report discusses the findings of the fourth round of groundwater sampling at Site A, Former Herbicide Orange Storage Area, Naval Construction Battalion Center, Gulfport, Mississippi.

Southern Division, Naval Facilities Engineering Command (SOUTHNAVFACENGCOM), has the responsibility for implementation of the Navy and Marine Corps RCRA program in the southeastern and midwestern United States. Questions regarding this report should be addressed to the SOUTHNAVFACENGCOM Remedial Project Manager, Mr. Dan Owens, at (803) 743-0331.

EXECUTIVE SUMMARY

ABB Environmental Services, Inc. (ABB-ES), under contract to Southern Division, Naval Facilities Engineering Command (SOUTHNAVFACENGCOM), conducted site investigative activities at Site A, Former Herbicide Orange Storage Area, located at Naval Construction Battalion Center (NCBC), Gulfport, Mississippi. This technical memorandum was prepared under the Comprehensive Long-Term Environmental Action, Navy (CLEAN) Contract No. N62467-89-D-0317 as Contract Task Order No. 092.

Groundwater sampling event No. 4 at Site A included collection of five groundwater samples, including one duplicate sample. Groundwater samples were analyzed and validated for full Appendix IX list contaminant analyses (U.S. Environmental Protection Agency [USEPA], 1986) and sulfide, polynuclear aromatic hydrocarbons (PAHs) (USEPA Method 8310), and dioxin and furans (USEPA Method 8290). Samples were collected following the procedures outlined in the addendum to the Versar sampling and analysis plan (ABB-ES, 1993). This sampling event is the fourth of four quarterly sampling events that are part of the ongoing delisting process for the ash located at Site A.

Before the ash on Site A can be considered for delisting, determination of whether or not it is a source of groundwater contamination is necessary. Analytical results indicated little organic contamination. Octachlorodibenzodioxin was detected in samples from all four wells. Twenty-seven picograms per liter (pg/ℓ) of 2,3,7,8-tetrachlorodibenzo-p-dioxin was detected in the duplicate sample GPTH04-2D collected from well GPT-A-2. The toxic equivalency (TEQ) of this sample is 30.4 pg/ℓ, which is above the maximum contaminant level (MCL) of 30 pg/ℓ. All other samples had TEQs below the MCL. The ash is not believed to be the source of dioxin to the groundwater. Soils remaining at the site may contain 2,3,7,8 tetrachlorodibenzo-p-dioxin at concentrations of up to 1 part per billion (ppb). The soil and not the ash is thought to be the source of dioxin in the groundwater. Additionally, several organic and inorganic compounds were detected in samples from the wells. Lead is the only one of these compounds detected above its MCL.

The ash on Site A does not appear to be a major source of contamination to the groundwater based on initial monitoring data. The next sampling event is scheduled for February 1995.

TABLE OF CONTENTS

Technical Memorandum No. 4
Site A, Former Herbicide Orange Storage Area
Groundwater Sampling Event No. 4
Naval Construction Battalion Center
Gulfport, Mississippi

Chapter	Title	Page No.
1.0	INTRODUCTION	1-1
2.0	GROUNDWATER SAMPLING FIELD PROGRAM	2-1
3.0	ANALYTICAL PROGRAM	3-1
3.1	CHEMICAL ANALYSES	3-1
3.2	DATA QUALITY ASSESSMENT	3-1
3.2.1	Analytical Performance	3-1
3.2.2	Precision	3-10
3.2.3	Accuracy	3-10
3.2.4	Representativeness	3-10
3.2.5	Comparability	3-10
3.2.6	Completeness	3-10
4.0	RESULTS OF INVESTIGATIONS	4-1
4.1	SITE A, FORMER HERBICIDE ORANGE STORAGE AREA	4-1
4.1.1	Dioxin and Furan Compounds in Groundwater Samples	4-1
4.1.2	Organic Compounds Detected in Groundwater Samples	4-6
4.1.3	Inorganics Detected in Groundwater Samples	4-6
4.2	CONCLUSIONS	4-6
5.0	SUMMARY	5-1
REFERENCES		
APPENDICES:		
APPENDIX A:	ANALYTICAL DATA VALIDATION TABLES	
APPENDIX B:	PRECISION, ACCURACY, REPRESENTATIVENESS, COMPARABILITY, AND COMPLETENESS REPORT	

LIST OF FIGURES

Technical Memorandum No. 4
Site A, Former Herbicide Orange Storage Area
Groundwater Sampling Event No. 4
Naval Construction Battalion Center
Gulfport, Mississippi

Figures	Title	Page No.
4-1	Potentiometric Surface Map, February 14, 1995	4-2
4-2	Groundwater Quality Map	4-7

LIST OF TABLES

Tables	Title	Page No.
3-1	Appendix IX Compound List and Practical Quantitation Limits for Corresponding SW-846 Methods	3-2
4-1	Summary of Field Measurements for Monitoring Wells at Site A	4-3
4-2	Dioxins and Furans Detected in Groundwater Samples	4-3
4-3	Organic Compounds Detected in Groundwater Samples	4-4
4-4	Inorganics Detected in Groundwater Samples	4-5
4-5	Maximum Chemical Concentrations Detected in Groundwater Samples	4-8

GLOSSARY

ABB-ES	ABB Environmental Services, Inc.
CLEAN	Comprehensive Long-Term Environmental Action, Navy
4,4'-DDT	4,4'-dichlorodiphenyltrichloroethane
DQO	data quality objective
FID	flame ionization detector
1,2,3,4,6,7,8-HpCDD	1,2,3,4,6,7,8-heptachlorodibenzo-p-dioxin
1,2,3,7,8,9-HxCDD	1,2,3,7,8,9-hexachlorodibenzo-p-dioxin
HO	Herbicide Orange
$\mu g/\ell$	micrograms per liter
MCL	maximum contaminant level
MS/MSDs	matrix spike and matrix spike duplicates
MSDEQ	Mississippi State Department of Environmental Quality
NCBC	Naval Construction Battalion Center
NEESA	Naval Energy and Environmental Support Activity
OCDD	Octachlorodibenzodioxin
PAHs	polynuclear aromatic hydrocarbons
PARCC	precision, accuracy, representativeness, comparability, and completeness
PCB	polychlorinated biphenyl
PCDD/PCDF	polychlorinated dibenzodioxin and polychlorinated dibenzofuran
pg/ℓ	picograms per liter
ppb	parts per billion
QA	quality assurance
QC	quality control
Quanterra	Quanterra Environmental Services
RCRA	Resource Conservation and Recovery Act
SOUTHNAVFACENGCOM	Southern Division, Naval Facilities Engineering Command
SVOC	semivolatile organic compound
2,3,7,8-TCDD	2,3,7,8-tetrachlorodibenzo-p-dioxin
TEF	toxicity equivalency factor
TEQ	toxicity equivalent
USEPA	U.S. Environmental Protection Agency
VOC	volatile organic compound

1.0 INTRODUCTION

ABB Environmental Services, Inc. (ABB-ES), under contract to Southern Division, Naval Facilities Engineering Command (SOUTHNAVFACENGCOM), conducted site investigative activities at Site A, Former Herbicide Orange (HO) Storage Area, at the Naval Construction Battalion Center (NCBC) in Gulfport, Mississippi. This technical memorandum is the fourth of four technical memoranda (ABB-ES, 1994, 1995a, and 1995b) associated with the groundwater investigation to supplement the ongoing Resource Conservation and Recovery Act (RCRA) delisting process that is continuing into calendar year 1995. The field program and preparation of this report were completed under the Comprehensive Long-Term Environmental Action, Navy (CLEAN) contract (Contract Number N62467-89-D-0317, Contract Task Order Number 092) between SOUTHNAVFACENGCOM and ABB-ES.

Site A covers approximately 12 acres of nearly flat land and comprises Areas A, B, and C where approximately 850,000 gallons of HO were stored from 1965 to 1977. Between 1986 and 1988, soil contaminated with 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD) at concentrations greater than 1 part per billion (ppb) were incinerated and returned to selected areas within Site A. The contaminated soil was classified as RCRA-listed waste F027; however, following incineration of the soil, it is now classified as F028.

Prior to disposition, the ash must be approved for delisting by the Mississippi State Department of Environmental Quality (MSDEQ). A petition for final exclusion of the incinerated residue was submitted in November 1988. Additional information was requested by the regulators to sufficiently characterize the groundwater. The objective of the quarterly groundwater sampling is to determine whether the groundwater is contaminated with dioxins or other inorganic contaminants at levels higher than background. Results from four groundwater sampling events and from the ash sampling will be incorporated into an addendum report for submittal to U.S. Environmental Protection Agency (USEPA) Region IV and the MSDEQ to support delisting the ash at Site A.

This technical memorandum summarizes the findings and results based on information and data collected from Site A as a result of groundwater sampling event No. 4, which was performed from February 14 through 16, 1995.

2.0 GROUNDWATER SAMPLING FIELD PROGRAM

Groundwater sampling was performed on February 15, 1995. Groundwater samples were collected from the four wells installed at Site A during the April 1994 field effort. Analyses of the samples included full Appendix IX (USEPA, 1986) analyses plus sulfides, polynuclear aromatic hydrocarbons (PAHs) (USEPA Method 8310), and dioxins and furans (USEPA Method 8290). Laboratory services were provided by Quanterra Environmental Services (Quanterra) in North Canton, Ohio. Naval Energy and Environmental Support Activity (NEESA) Level D data quality objectives and deliverables were specified for the analytical program (NEESA, 1988). Results of groundwater sample analyses are discussed in Chapters 3.0 and 4.0.

Upon opening each monitoring well, the headspace was screened for volatile organic compounds (VOCs) using a flame ionization detector (FID). Prior to sample collection, each well was purged of at least three well volumes. Samples were collected within 24 hours following purging. Decontaminated Teflon™ bailers were used to purge the monitoring wells and to collect samples. ABB-ES personnel placed the filled containers on ice in ice chests immediately after collection. Chain-of-custody procedures were initiated in the field at the time of sample collection. Samples were shipped via overnight courier service to the laboratory on the date of collection.

Appropriate preservatives were added to the sample containers by ABB-ES personnel immediately after collecting the samples.

Field parameter measurements for groundwater samples included pH, conductivity, and temperature.

3.0 ANALYTICAL PROGRAM

This chapter summarizes the analytical program for groundwater samples collected from monitoring wells at Site A during groundwater sampling event No. 4 at NCBC Gulfport. In addition, it presents an assessment of data quality and useability.

3.1 CHEMICAL ANALYSES. Sampling activities during the fourth groundwater sampling event at NCBC Gulfport included collection of five groundwater samples, including one duplicate sample. All samples were collected in accordance with procedures outlined in the addendum to the Versar sampling and analysis plan (ABB-ES, 1993). Samples were submitted to Quanterra in North Canton, Ohio, 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 a list of Appendix IX (USEPA, 1986) VOCs, semivolatile organic compounds (SVOCs), pesticides and polychlorinated biphenyls (PCBs), organophosphorus pesticides, herbicides, dioxin and furans, and inorganic analytes (including total cyanide and sulfide). Table 3-1 is a list of Appendix IX (USEPA, 1986) compounds and corresponding USEPA analytical method numbers.

3.2 DATA QUALITY ASSESSMENT. All groundwater samples collected 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. All samples were shipped, complete with chain-of-custody forms, to Quanterra within 24 hours for analyses. Upon arrival, Quanterra personnel checked the chain of custody and preservation of the samples with the contents of each cooler, signed the chain-of-custody form, and accepted the samples for analysis.

Review of the field notebook and chain-of-custody forms did not indicate any non-conformance 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 (QA) plans and the June 1988 NEESA *Sampling and Chemical Analysis Quality Assurance Requirements for the Navy Installation Restoration Program* (NEESA, 1988) (Document 20.2-047B). 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 collected during groundwater sampling event No. 4 were evaluated and validated according to NEESA Level D QC criteria to determine data quality and useability. The data tables included in Appendix A reflect validation according to Level D criteria. These criteria are described in NEESA Document 20.2-047B (NEESA, 1988). The following subsections discuss analytical performance and the evaluation of field and laboratory QC samples.

3.2.1 Analytical Performance The data review and validation were performed under subcontract to Heartland Environmental Services, Inc., St. Peters, Missouri. Review of analytical data indicated that the laboratory generally met applicable analytical QC criteria for all chemical analyses. Extraction and holding times for all sample lots were met.

Table 3-1
Appendix IX Compound List and Practical Quantitation Limits for Corresponding SW-846 Methods

Technical Memorandum No. 4
Site A, Former Herbicide Orange Storage Area
Groundwater Sampling Event No. 4
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 3-1 (Continued)
Appendix IX Compound List and Practical Quantitation Limits for Corresponding SW-846 Methods

Technical Memorandum No. 4
Site A, Former Herbicide Orange Storage Area
Groundwater Sampling Event No. 4
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 3-1 (Continued)
Appendix IX Compound List and Practical Quantitation Limits for Corresponding SW-846 Methods

Technical Memorandum No. 4
Site A, Former Herbicide Orange Storage Area
Groundwater Sampling Event No. 4
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 3-1 (Continued)
Appendix IX Compound List and Practical Quantitation Limits for Corresponding SW-846 Methods

Technical Memorandum No. 4
Site A, Former Herbicide Orange Storage Area
Groundwater Sampling Event No. 4
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 3-1 (Continued)
Appendix IX Compound List and Practical Quantitation Limits for Corresponding SW-846 Methods

Technical Memorandum No. 4
Site A, Former Herbicide Orange Storage Area
Groundwater Sampling Event No. 4
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-Toluidne	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 3-1 (Continued)
Appendix IX Compound List and Practical Quantitation Limits for Corresponding SW-846 Methods

Technical Memorandum No. 4
Site A, Former Herbicide Orange Storage Area
Groundwater Sampling Event No. 4
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'-Dichlorodiphenyldichloroethylene	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 3-1 (Continued)
Appendix IX Compound List and Practical Quantitation Limits for Corresponding SW-846 Methods

Technical Memorandum No. 4
Site A, Former Herbicide Orange Storage Area
Groundwater Sampling Event No. 4
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
Beryllium	(Method 6010)	5

See notes at end of table.

Table 3-1 (Continued)
Appendix IX Compound List and Practical Quantitation Limits for Corresponding SW-846 Methods

Technical Memorandum No. 4
Site A, Former Herbicide Orange Storage Area
Groundwater Sampling Event No. 4
Naval Construction Battalion Center
Gulfport, Mississippi

		PQL Water ($\mu g/\ell$)
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.

3.2.2 Precision Precision of the water matrix data was acceptable based on the assessment of duplicate precision criteria with a few minor exceptions. SVOCs, PAHs, pesticides and PCBs, organophosphorus pesticides, herbicides, and cyanide were not detected in either the sample or the duplicate; therefore, no relative percent differences could be calculated. Xylene, one of the two VOCs detected, exhibited a noncompliant relative percent difference which can be attributed to the low concentrations detected. Two inorganic analytes, copper and zinc, exhibited noncompliant relative percent differences. The noncompliance for copper can be attributed to the low concentrations detected; the noncompliance for zinc can be attributed to laboratory and/or field inconsistencies. The field duplicate pair analyzed for sulfide exhibited an acceptable relative percent difference.

Relative percent differences for the matrix spike and matrix spike duplicates (MS/MSDs) fell within acceptable ranges for all compounds evaluated except for two of the pesticides and PCBs. Noncompliant relative percent differences were exhibited for aldrin and 4,4'-dichlorodiphenyltrichloroethane (4,4'-DDT); however, the data did not require qualification based on additional QC criteria.

3.2.3 Accuracy Accuracy criteria were met for all data with the following exceptions. The MS/MSD exhibited noncompliant percent recoveries for 4-nitrophenol, 2,4-dinitrotoluene, pentachlorophenol, dinoseb, cyanide, and sulfide. Dinoseb, sulfide, and positive cyanide detections were qualified as estimated; nondetect cyanide results were rejected. Surrogate recoveries were outside QC limits in two semivolatile samples, all pesticides and PCB samples, one organophosphorus pesticide sample, and two herbicide samples. The pesticide and PCB results and the herbicide results were qualified as estimated. The accuracy of the groundwater matrix analytical data was acceptable for each fraction with the exception of cyanide.

3.2.4 Representativeness Representativeness of the analytical data was assessed, and corrective action was taken when necessary. Acetone, copper, vanadium, zinc, and sulfide were detected in the field blank. Acetone, vanadium, and zinc were detected in the equipment rinsate blank. Methylene chloride, di-n-octylphthalate, chromium, and thallium were detected in the method blanks. Data were appropriately qualified due to rinsate blank and method blank detections. The assessment of the method blank for representativeness was acceptable even though some of the analytical results required qualification. Holding times for extraction and analysis were met for all fractions.

3.2.5 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. This should assure comparability of the analytical data.

3.2.6 Completeness Overall, the analytical data met the completeness goal of 85 percent for every fraction with the exception of cyanide. The cyanide fraction had a zero percent completeness due to the zero percent recovery in the matrix spike associated with the samples. Appendix B contains the complete precision, accuracy, representativeness, comparability, and completeness (PARCC) report.

4.0 RESULTS OF INVESTIGATIONS

Chapter 4.0 presents the analytical results of groundwater samples collected during the fourth groundwater sampling event at Site A, Former HO Storage Area, in August 1994. Technical Memorandum No. 1 (ABB-ES, 1994) presented discussion of the field program, including well installation, soil samples, and groundwater sampling event No. 1. Technical Memorandum No. 2 (ABB-ES, 1995a) presented the results from groundwater sampling event No. 2. Technical Memorandum No. 3 (ABB-ES, 1995b) presented the results from groundwater sampling event No. 3.

The following sections discuss comparisons of analytical data with data associated with previous sampling events at Site A. Appendix A contains tables of validated analytical data for samples collected in February 1995 at Site A. Analyses were performed by Quanterra under subcontract to ABB-ES.

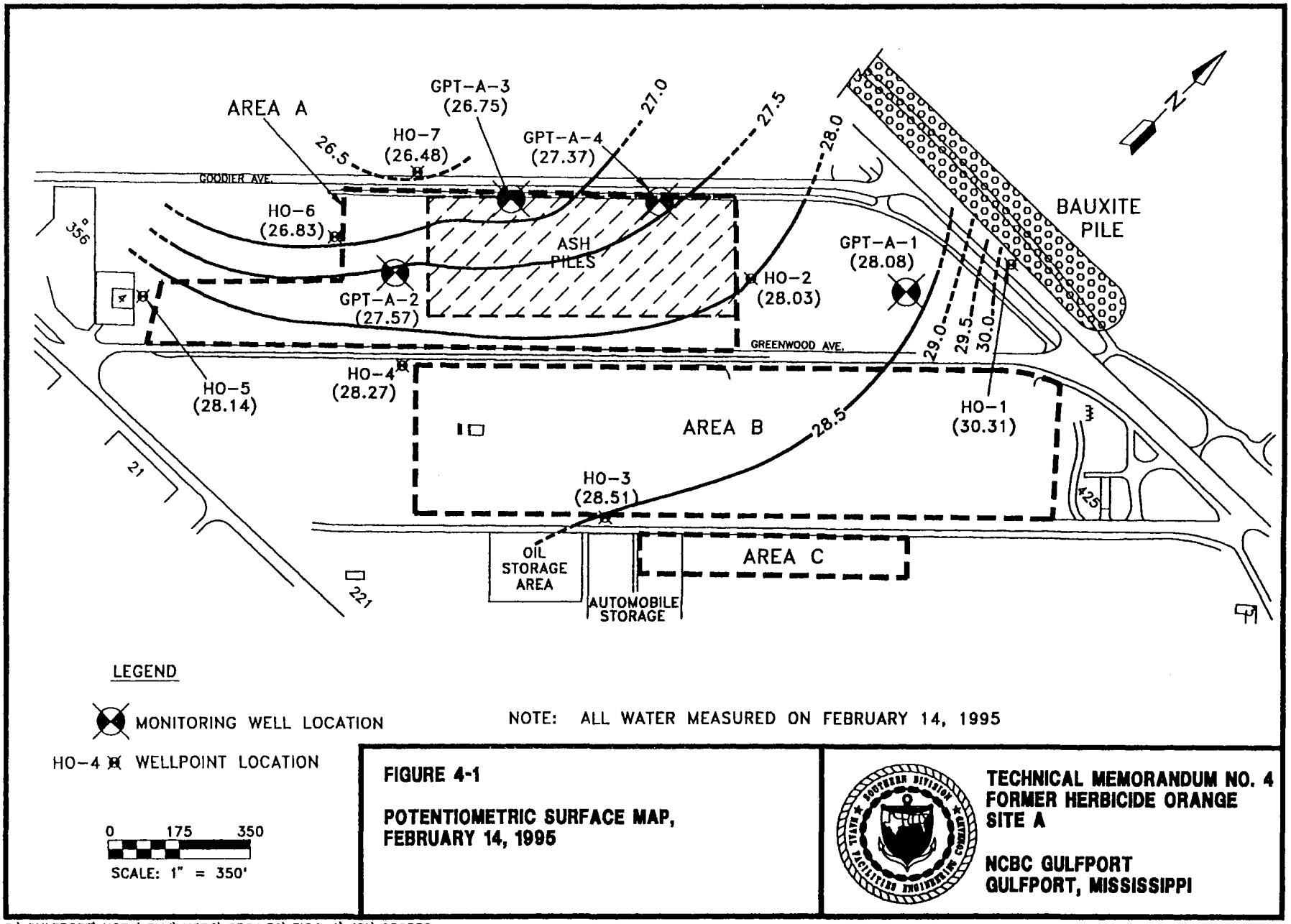
4.1 SITE A, FORMER HERBICIDE ORANGE STORAGE AREA. On February 14, 1995, groundwater level measurements were taken from four monitoring wells and seven well points at Site A. Figure 4-1 is a groundwater potentiometric surface map developed from these measurements. The configuration of the potentiometric surface and the groundwater flow direction are generally unchanged from previous sampling events.

The headspace of monitoring wells at Site A was measured for VOCs using an FID; however, no VOCs were detected. Field measurements of pH, specific conductance, and temperature were collected during purging of monitoring wells. Table 4-1 summarizes field measurements collected during purging of monitoring wells at Site A. Purging continued until at least three well volumes were removed and field parameters stabilized to within 10 percent. The final measurements of pH, specific conductance, and temperature are considered the measurements of record for the monitoring wells (USEPA, 1991).

Five groundwater samples, including a duplicate sample, were analyzed for VOCs, SVOCs, pesticides and PCBs, organophosphorus pesticides, herbicides, dioxins and furans, and inorganic analytes. Table 3-1 lists specific compounds analyzed in groundwater samples collected during sampling event No. 4. Tables 4-2, 4-3, and 4-4 summarize analytical data for compounds detected in groundwater samples collected from Site A.

4.1.1 Dioxin and Furan Compounds in Groundwater Samples Octachlorodibenzodioxin (OCDD) was detected in all four groundwater samples collected. Sample GPTHO4-4 collected from the downgradient well GPT-A-4 resulted in the highest concentration of OCDD, at 5,200 picograms per liter (pg/ℓ). Also, sample GPTHO4-4 was the only sample that had a positive detection (63 pg/ℓ) for 1,2,3,7,8,9-hexachlorodibenzo-p-dioxin (1,2,3,7,8,9-HxCDD). All three downgradient well samples had positive detections of 1,2,3,4,6,7,8-heptachlorodibenzo-p-dioxin (1,2,3,4,6,7,8-HpCDD). Samples GPTHO4-2 and GPTHO4-2D from well GPT-A-2 and sample GPTHO4-3 from well GPT-A-3 had positive detections for 2,3,7,8-TCDD of 11, 27, and 6.2 pg/ℓ, respectively.

2,3,7,8-TCDD is considered to be the most potent carcinogen in the dioxin and furan families. Toxicologists believe that polychlorinated dibenzodioxins and polychlorinated dibenzofurans (PCDDs/PCDFs) with chlorine atoms at the 2, 3, 7,



NOTE: ALL WATER MEASURED ON FEBRUARY 14, 1995

FIGURE 4-1

POTENTIOMETRIC SURFACE MAP, FEBRUARY 14, 1995

TECHNICAL MEMORANDUM NO. 4
FORMER HERBICIDE ORANGE SITE A

NCBC GULFPORT
GULFPORT, MISSISSIPPI

C:\GULFPORT\HOTM\TM4\NCBC\8504.50\FIG4-1\JSL\950530

GIfpt IMS_SITEA.TM4)
mlv.08.95

Table 4-1
Summary of Field Measurements for Monitoring Wells at Site A

Technical Memorandum No. 4
Site A, Former Herbicide Orange Storage Area
Groundwater Sampling Event No. 4
Naval Construction Battalion Center
Gulfport, Mississippi

Monitoring Well No.	FID Headspace Data (ppm)	Field Data	Well Volume No. 1	Well Volume No. 2	Well Volume No. 3	Total Purge Volume (gallons)
GPT-A-1	0	pH	5.20	5.20	5.20	8
		Conductivity	90	70	70	
		Temperature	16	15	15	
GPT-A-2	3	pH	6.67	6.75	6.76	8
		Conductivity	130	130	130	
		Temperature	14	14	14	
GPT-A-3	10	pH	5.78	5.82	5.73	8
		Conductivity	140	120	110	
		Temperature	17	17	17	
GPT-A-4	0	pH	5.95	6.05	6.04	8
		Conductivity	130	130	130	
		Temperature	16.5	16	16	

Notes: Units are standard units (su) for pH, micromhos per centimeter (μmhos/cm) for specific conductance, and degrees Celsius (°C) for temperature.

FID = flame ionization detector.
ppm = parts per million.

Table 4-2
Dioxins and Furans Detected in Groundwater Samples

Technical Memorandum No. 4
Site A, Former Herbicide Orange Storage Area
Groundwater Sampling Event No. 4
Naval Construction Battalion Center
Gulfport, Mississippi

Analyte	GPTH04-1	GPTH04-2	GPTH04-2D	GPTH04-3	GPTH04-4
2,3,7,8-Tetrachlorodibenzo-p-dioxin	ND	11 J	27	6.2 J	ND
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	ND	ND	ND	ND	63
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	ND	110	86	110	280
Octachlorodibenzo-p-dioxin	240	1,300	2,500	1,800	5,200
TEQ	0.2	12.3	30.4	9.1	14.3

Notes: All concentrations are reported in picograms per liter.

ND = not detected. J = reported concentrations are estimated.
TEQ = toxicity equivalent.

Table 4-3
Organic Compounds Detected in Groundwater Samples

Technical Memorandum No. 4
Site A, Former Herbicide Orange Storage Area
Groundwater Sampling Event No. 4
Naval Construction Battalion Center
Gulfport, Mississippi

Analyte	GPTHO4-1	GPTHO4-2	GPTHO4-2D	GPTHO4-3	GPTHO4-4
Volatile Organic Compounds					
Toluene	ND	4 J	ND	ND	ND
Xylenes (total)	ND	7	ND	ND	ND
Semivolatile Organic Compounds					
Phenol	ND	ND	ND	0.9 J	ND
2-Chlorophenol	ND	ND	ND	0.9 J	ND
2-Methylphenol	ND	ND	ND	1 J	ND
2,4-Dichlorophenol	ND	ND	ND	1 J	ND
Naphthalene	ND	ND	ND	23	ND
Polynuclear Aromatic Hydrocarbons					
None detected					
Pesticides and PCBs					
None detected					
Organophosphorus Pesticide					
None detected					
Herbicides					
(2,4,5-trichlorophenoxy)propionic acid	ND	ND	ND	1.7	ND

Notes: All concentrations are reported in micrograms per liter.

ND = not detected. J = estimated value.
PCB = polychlorinated biphenyls.

Table 4-4
Inorganics Detected in Groundwater Samples

Technical Memorandum No. 4
Site A, Former Herbicide Orange Storage Area
Groundwater Sampling Event No. 4
Naval Construction Battalion Center
Gulfport, Mississippi

Analyte	GPTHO4-1	GPTHO4-2	GPTHO4-2D	GPTHO4-3	GPTHO4-4
Antimony	3.0 J	ND	ND	3.3 J	2.2 J
Arsenic	17.6	11.7	12.6	45.5	23.9
Barium	147 J	64.1 J	52.9 J	103 J	167 J
Chromium	35.6	16.2	14.1	82.4	68.4
Cobalt	8.8 J	3.4 J	3.5 J	19.4 J	11.1 J
Copper	10.9 J	4.8 J	6.5 J	21.9 J	19.4 J
Lead	11.6	4.9	4.2	34.4	34.6
Mercury	ND	ND	ND	0.48	0.56
Nickel	22.7 J	7.3 J	7.3 J	30.6 J	28.1 J
Selenium	ND	ND	ND	16.5	9.1
Vanadium	43.7 J	23.1 J	20.4 J	129	108
Zinc	54.8	26.2	40.5	45.3	41.9
Sulfide	ND	1,000 J	1,000 J	18,000 J	27,000 J

Notes: All concentrations are reported in micrograms per liter.

J = estimated value.
ND = not detected.

and 8 positions (2,3,7,8 substituted compounds) in their molecules can mimic the toxic properties of 2,3,7,8-TCDD. The USEPA developed toxicity equivalency factors (TEFs) to quantify the carcinogenicity of these compounds relative to 2,3,7,8-TCDD. Concentrations of PCDDs/PCDFs in a sample are multiplied by TEFs to determine a 2,3,7,8-TCDD equivalent (toxicity equivalent [TEQ]) concentration. The TEQ for each sample is also shown in Table 4-2.

4.1.2 Organic Compounds Detected in Groundwater Samples PAHs, pesticides, PCBs, and organophosphorus pesticides were not detected in any of the samples. Figure 4-2 illustrates which group of compounds was detected and representative values of those compounds. VOCs detected in sample GPTHO4-2 from well GPT-A-2 include toluene at an estimated 4 micrograms per liter ($\mu g/\ell$) and total xylenes at 7 $\mu g/\ell$. Several SVOCs were detected in sample GPTHO4-3 collected from well GPT-A-3. One herbicide, (2,4,5-trichlorophenoxyl)propionic acid, was detected at 1.7 $\mu g/\ell$ in this same sample. Table 4-3 details all of the organic compounds detected in the samples.

4.1.3 Inorganics Detected in Groundwater Samples Inorganics were detected in all of the samples. Table 4-4 details the inorganics detected and their associated values. Mercury, selenium, and sulfide were the only inorganics detected in downgradient well samples that were not detected in the upgradient well. Overall, samples collected from well GPT-A-3 exhibited the highest detections of inorganics with the exceptions of barium, lead, mercury, and sulfide. The samples collected from well GPT-A-4 had the highest detections of these four inorganics.

4.2 CONCLUSIONS. In Table 4-5, the maximum concentration detected for each analyte is compared to the maximum contaminant level (MCL) for each analyte. In Table 4-5, the maximum concentration for each PCDD/PCDF compound detected and the maximum TEQ are shown. The maximum TEQ, 30.4 pg/ℓ in sample GPTHO4-2D, is above the MCL of 30 pg/ℓ. None of the other samples had TEQs above the MCL.

Detections of dioxins and furans in the groundwater may be attributed to contamination within the soil instead of the ash. Only soils that exceeded concentrations of 1 ppb for 2,3,7,8-TCDD were excavated and incinerated. It is believed that concentrations in the soil greatly exceed concentrations in the ash.

Two VOCs, five SVOCs, and one herbicide were detected; no pesticides, PCBs, organophosphorus pesticides, or PAHs were detected. None of the maximum concentrations detected in the groundwater samples for organic compounds exceeded their associated MCLs.

Inorganics are present in both upgradient and downgradient groundwater wells at Site A. Mercury, selenium, and sulfide were the only inorganics detected in downgradient well samples that were not detected in the upgradient well sample. Lead is the only inorganic compound detected that exceeds the established MCL. However, lead was detected in samples from both upgradient and downgradient wells, indicating that their origin is not Site A.

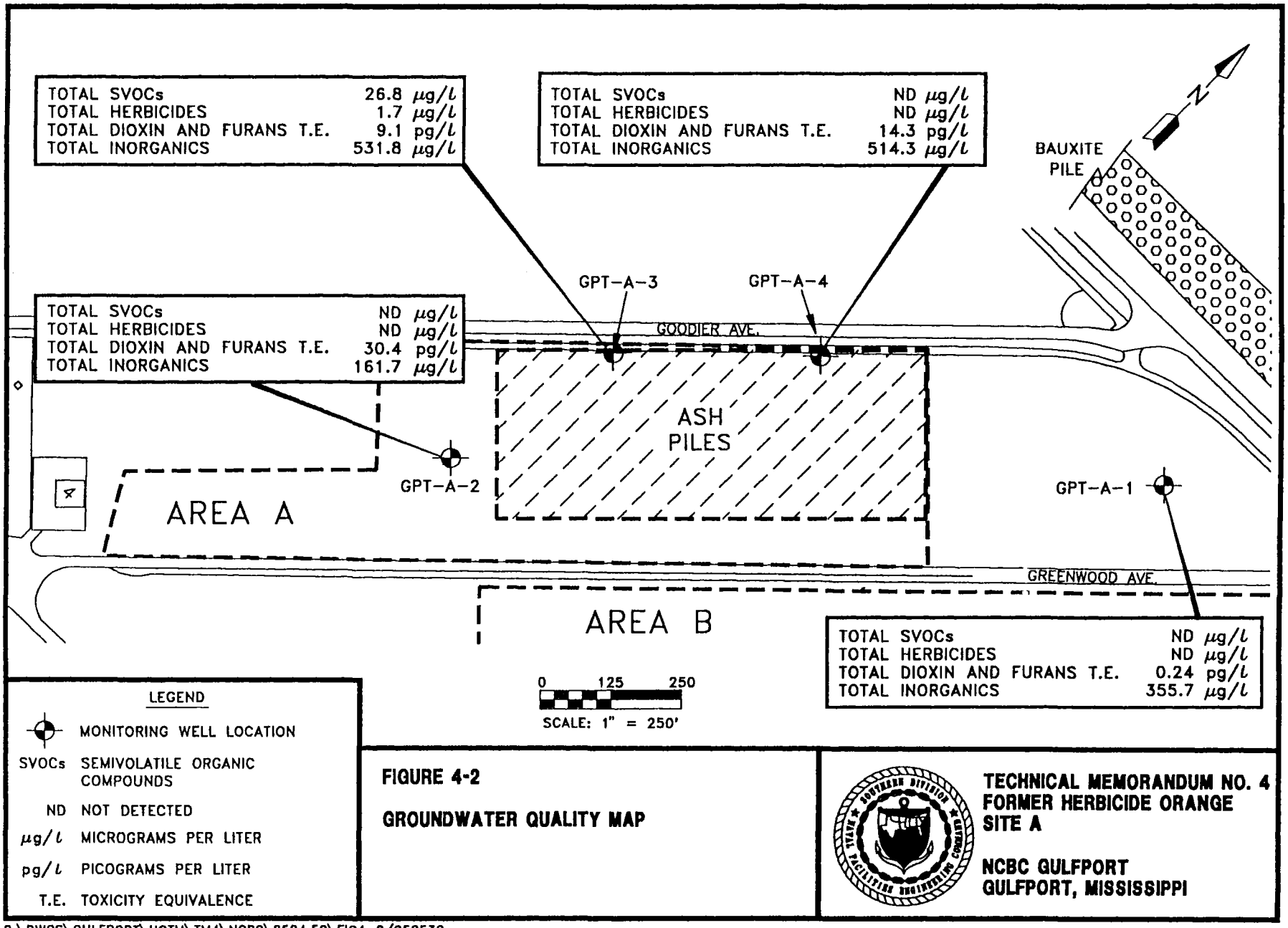


FIGURE 4-2

GROUNDWATER QUALITY MAP

TECHNICAL MEMORANDUM NO. 4
FORMER HERBICIDE ORANGE SITE A

NCBC GULFPORT
GULFPORT, MISSISSIPPI

C:\DWGS\GULFPORT\HOTM\TM4\NCBC\8504.50\FIG4-2/950530

Gifpt [MS_SITEA.TM4]
mlv.08.95

Table 4-5
Maximum Chemical Concentrations Detected in Groundwater Samples

Technical Memorandum No. 4
Site A, Former Herbicide Orange Storage Area
Groundwater Sampling Event No. 4
Naval Construction Battalion Center
Gulfport, Mississippi

Analyte	Maximum Detection Concentration	MCL
Dioxins and Furans (pg/ℓ)		
2,3,7,8-Tetrachlorodibenzo-p-dioxin	27	
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	63	
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	280	
Octachlorodibenzo-p-dioxin	5,200	
TEQ	30.4	30
Volatile Organic Compounds (μg/ℓ)		
Toluene	4 J	1,000
Xylenes (total)	7	10,000
Semivolatile Organic Compounds (μg/ℓ)		
Phenol	0.9 J	NA
2-Chlorophenol	0.9 J	NA
2-Methylphenol	1 J	NA
2,4-Dichlorophenol	1 J	NA
Naphthalene	23	NA
Herbicides (μg/ℓ)		
(2,4,5-Trichlorophenoxy)propionic acid	1.7	50
Inorganics (μg/ℓ)		
Antimony	3.3 J	6
Arsenic	45.5	50
Barium	167 J	2,000
Chromium	82.4	100
Cobalt	19.4 J	NA
Copper	21.9 J	1,300
Lead	34.6	15
Mercury	0.56	2
Nickel	30.6 J	100
Selenium	16.5	50
Vanadium	129	NA
Zinc	54.8	[1]5,000
Sulfide	27,000 J	NA

[1] Secondary maximum contaminant level.

Notes: MCL = maximum contaminant level.
pg/ℓ = picograms per liter.
TEQ = toxicity equivalent.
μg/ℓ = micrograms per liter.
J = estimated value.
NA = not applicable.

5.0 SUMMARY

This chapter summarizes results from the fourth groundwater sampling event at Site A. The sampling event is part of an ongoing delisting process of the ash at this site.

Groundwater samples were collected in February 1995 and were analyzed for full Appendix IX (USEPA, 1986) and sulfide analyses, PAH (USEPA Method 8310) analyses, and dioxin and furan (USEPA Method 8290) analyses. The samples were analyzed and validated according to NEESA Level D data quality objectives (DQOs) (NEESA, 1988). Data quality and useability were good and, with the excpetion of cyanide, met the 85 percent completeness goal.

Groundwater samples from the upgradient and downgradient wells exhibited positive OCDD results. Samples from the three downgradient wells had positive detections of 1,2,3,4,6,7,8-HpCDD. Samples from wells GPT-A-2 and GPT-A-3 had positive detections of 2,3,7,8-TCDD. Sample GPTHO4-2D from well GPT-A-2 had a TEQ of 30.4 pg/ℓ, which is above the MCL for 2,3,7,8-TCDD of 30 pg/ℓ. TEQs from the other samples are below this MCL. The soil is believed to be the source of dioxin and furan contamination in the groundwater.

None of the organic compounds that were analyzed exceeded their associated MCL. The only inorganic compound exceeding its associated MCL is lead; however, it was detected in both the upgradient and downgradient well samples.

This round of groundwater sample analyses, like the results of the three previous rounds of groundwater sampling, indicates the presence of concentrations of organic compounds and inorganic chemicals in the groundwater.

REFERENCES

ABB Environmental Services, Inc. (ABB-ES), 1993, Addendum to Versar Sampling and Analysis Plan, Former Herbicide Orange Site A: prepared for Southern Division, Naval Facilities Engineering Command (SOUTHNAVFACENGCOM), Charleston, South Carolina, Contract No. N62467-89-D-0317/092, November.

ABB-ES, 1994, Technical Memorandum No. 1, Site A, Former Herbicide Orange Storage Area, Groundwater Sampling Event No. 1, Naval Construction Battalion Center, Gulfport, Mississippi: prepared for SOUTHNAVFACENGCOM, Charleston, South Carolina, Contract No. N62467-89-D-0317/092.

ABB-ES, 1995a, Technical Memorandum No. 2, Site A, Former Herbicide Orange Storage Area, Groundwater Sampling Event No. 2, Naval Construction Battalion Center, Gulfport, Mississippi: prepared for Southern Division, Naval Facilities Engineering Command (SOUTHNAVFACENGCOM), Charleston, South Carolina, Contract No. N62467-89-D-0317/092, January.

ABB-ES, 1995b, Technical Memorandum No. 3, Site A, Former Herbicide Orange Storage Area, Groundwater Sampling Event No. 2, Naval Construction Battalion Center, Gulfport, Mississippi: prepared for SOUTHNAVFACENGCOM, Charleston, South Carolina, Contract No. N62467-89-D-0317/092, April.

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

U.S. Environmental Protection Agency (USEPA), 1986, Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW-846): 3rd Edition.

USEPA, 1988, Laboratory Data Validation: Functional Guidelines For Evaluating Inorganics Analyses: July.

USEPA, 1990, Contract Laboratory Program, Statement of Work for Organics Analysis: USEPA Document No. OLM01.8, last revised August 1991.

USEPA, 1991, National Functional Guidelines for Organic Data Review: Office of Emergency and Remedial Response, June.

Versar, 1990, Ground-Water Monitoring Program Plan, Naval Construction Battalion Center, Gulfport, Mississippi: November 20.

APPENDIX A

ANALYTICAL DATA VALIDATION TABLES

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:	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					
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	POL					
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
Diallate	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	21.9 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-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-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	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	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	POL		
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
Dialfate	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	0.86 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		1.6 U	1.4 U
1,2,3,4,7,8-HxCDD		0.96 U	0.84 U
1,2,3,6,7,8-HxCDD		0.76 U	0.84 U
1,2,3,7,8,9-HxCDD		1.1 U	0.86 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

APPENDIX B

PRECISION, ACCURACY, REPRESENTATIVENESS, COMPARABILITY, AND COMPLETENESS REPORT

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

April 1995

TABLE OF CONTENTS
Precision, Accuracy, Representativeness,
Comparability, and Completeness
NCBC Gulfport HO

Section	Title	Page No.
1.0	INTRODUCTION	1-1
2.0	PRECISION	2-1
2.1	Water Matrix	2-14
3.0	ACCURACY	3-1
3.1	Water Matrix	3-8
4.0	REPRESENTATIVENESS	4-1
4.1	Trip Blanks	4-28
4.2	Field Blanks	4-28
4.3	Equipment Rinseate Blanks	4-28
4.4	Method Blanks	4-29
4.5	Holding Times	4-29
5.0	COMPARABILITY	5-1
6.0	COMPLETENESS	6-1
7.0	PARCC SUMMARY	7-1
7.1	Water Matrix	7-1
7.2	QC Matrix	7-1

REFERENCES

APPENDICES

Appendix A: Calibration Summary
Appendix B: Serial Dilution Summary
Appendix C: Summary of Rejected Data

LIST OF TABLES
Precision, Accuracy, Representativeness,
Comparability, and Completeness
NCBC Gulfport HO

Tables	Title	Page No.
2-1	Organic Compounds, Water Sample and Duplicate Precision	2-2
2-2	Inorganic Compounds, Water Sample and Duplicate Precision	2-4
2-3	GC/MS Volatile Organic Compounds, Water Matrix Spike and Matrix Spike Duplicates	2-6
2-3A	Dioxin/Furan Compounds, Water Matrix Spike and Matrix Spike Duplicates	2-6A
2-4	Semivolatile Organic Compounds, Water Matrix Spike and Matrix Spike Duplicates	2-7
2-5	Polynuclear Aromatic Hydrocarbons, Water Matrix Spike and Matrix Spike Duplicates	2-8
2-6	Pesticide/PCBs, Water Matrix Spike and Matrix Spike Duplicates	2-9
2-7	Organophosphorus Pesticides, Water Matrix Spike and Matrix Spike Duplicates	2-10
2-8	Herbicides, Water Matrix Spike and Matrix Spike Duplicates	2-11
2-9	Metals and Cyanide, Water Matrix and Matrix Duplicates	2-12
2-10	Sulfide, Water Matrix Spike and Matrix Duplicates	2-13
3-1	GC/MS Volatile Surrogate Recoveries in Water Matrix	3-2
3-1	GC/MS Volatile Surrogate Recoveries in Water Matrix	3-2
3-1A	Dioxin/Furan Internal Standard Recoveries in Water Matrix	3-2A
3-2	Semivolatile Surrogate Recoveries in Water Matrix	3-3
3-3	Polynuclear Aromatic Hydrocarbons Surrogate Recoveries in Water Matrix	3-4
3-4	Pesticides/PCBs Surrogate Recoveries in Water Matrix	3-5
3-5	Organophosphorus Pesticides Surrogate Recoveries in Water Matrix	3-6
3-6	Herbicides Surrogate Recoveries in Water Matrix	3-7
4-1	GC/MS Volatiles Detected in Trip Blanks	4-2
4-2	GC/MS Volatiles Detected in Field Blanks	4-3
4-2A	Dioxin/Furans Detected in Field Blanks	4-3A
4-3	GC/MS Semivolatiles Detected in Field Blanks	4-4
4-4	Polynuclear Aromatic Hydrocarbons Detected in Field Blanks	4-5
4-5	Pesticide/PCBs Detected in Field Blanks	4-6
4-6	Organophosphorus Pesticides Detected in Field Blanks	4-7
4-7	Herbicides Detected in Field Blanks	4-8
4-8	Metals Detected in Field Blanks	4-9
4-9	Cyanide Detected in Field Blanks	4-10
4-10	Sulfide Detected in Field Blanks	4-11
4-11	GC/MS Volatiles Detected in Rinseate Blanks	4-12
4-11A	Dioxin/Furans Detected in Rinseate Blanks	4-12A
4-12	GC/MS Semivolatiles Detected in Rinseate Blanks	4-13
4-13	Polynuclear Aromatic Hydrocarbons Detected in Rinseate Blanks	4-14
4-14	Pesticide/PCBs Detected in Rinseate Blanks	4-15
4-15	Organophosphorus Pesticides Detected in Rinseate Blanks	4-16
4-16	Herbicides Detected in Rinseate Blanks	4-17
4-17	Metals/Cyanide Detected in Rinseate Blanks	4-18
4-18	Metals/Cyanide Detected in Rinseate Blanks	4-19
4-19	Sulfide Detected in Rinseate Blanks	4-20

LIST OF TABLES
Precision, Accuracy, Representativeness,
Comparability, and Completeness
NCBC Gulfport HO

Tables	Title	Page No.
4-20	GC/MS Volatiles Detected in Method Blanks	4-21
4-20A	Dioxin/Furans Detected in Method Blanks	4-21A
4-21	GC/MS Semivolatiles Detected in Method Blanks	4-22
4-22	Polynuclear Aromatic Hydrocarbons Detected in Method Blanks	4-23
4-23	Pesticide/PCBs Detected in Method Blanks	4-24
4-24	Organophosphorus Pesticides Detected in Method Blanks	4-25
4-25	Herbicides Detected in Method Blanks	4-26
4-26	Metals/Cyanide Detected in Method Blanks	4-27
5-1	USEPA Procedure (CLP and SW-846 Methodologies)	5-1
6-1	Completion Goal (>85 Percent)	6-1
7-1	PARCCs Criteria Summary, Water Samples	7-2
7-2	PARCCs Criteria Summary, Quality Control Samples	7-4

Appendix A
Calibration Criteria Summary

NCBC Gulfport HO

Tables	Title	Page No.
A-1	GC/MS Volatile Organic Compounds, Initial and Continuing Calibration Outlier Summary	Appendix A
A-2	GC/MS Semivolatile Organic Compounds, Initial and Continuing Calibration Outlier Summary	Appendix A
A-3	Pesticides/PCBs Compound, Initial and Continuing Calibration Outlier Summary	Appendix A

Appendix B
Serial Dilution Summary

NCBC Gulfport HO

Tables	Title	Page No.
B-1	Metals, Water Sample Serial Dilution Summary	Appendix B

Appendix C
Rejected Data Summary

NCBC Gulfport HO

Tables	Title	Page No.
C-1	GC/MS Volatile Organic Compounds, Rejected Data Summary	Appendix C
C-1A	Dioxin/Furan Compounds, Rejected Data Summary	Appendix C
C-2	GC/MS Semivolatile Organic Compounds, Rejected Data Summary	Appendix C
C-3	Polynuclear Aromatic Hydrocarbons, Rejected Data Summary	Appendix C
C-4	Pesticide/PCBs, Rejected Data Summary	Appendix C
C-5	Organophosphorus Pesticides, Rejected Data Summary	Appendix C
C-6	Herbicides, Rejected Data Summary	Appendix C
C-7	Total Metals, Rejected Data Summary	Appendix C
C-8	Cyanide, Rejected Data Summary	Appendix C
C-9	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:

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

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 MD

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.

2 - 6A

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

2 - 6

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*		SDG GPTH04-1		
MSD = MATRIX SPIKE DUPLICATE		MS	MSD	
RPD = RELATIVE PERCENT DIFFERENCE		%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 GPTH04-1*		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

2-11

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)

2-12

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 GPTHO4-1 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%

3-2

TABLE 3 - 1A
WATER SAMPLE INTERNAL STANDARDS % RECOVERIES
DIOXIN/FURAN
NCBC GULFPORT HO

	BS-01-DI4	BS-01-RI4	GPTH04-1	GPTH04-2	GPTH04-2D	GPTH04-3	GPTH04-4	GPTH04-1MS	GPTH04-1MSD
I.S. COMPOUND									
13C-2378-TCDF	64	61	71	96	59	70	56	66	59
13C-2378-TCDD	67	69	77	85	65	79	58	71	66
13C-12378-PeCDF	63	63	63	84	50	56	44	66	52
13C-12378-PeCDD	65	63	69	84	59	66	46	67	51
13C-123478-HxCDF	59	60	55	100	48	60	45	69	54
13C-123678-HxCDD	79	79	67	98	66	71	58	70	68
13C-1234678-HpCDF	58	60	50	*140	43	57	41	56	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%

3 - 3

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%

3 - 4

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%

3 - 5

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%

3-6

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%

3-7

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			

4 - 2

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	

4 - 3

TABLE 4 - 2A
DIOXIN FURAN COMPOUNDS DETECTED IN FIELD BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	FB CONC.	UNITS	VALIDATION QUALIFIER
080412	BS-01-D14	GPTH04-1, GPTH04-1MS, GPTH04-1MSD, GPTH04-2, GPTH04-2D, GPTH04-3, GPTH04-4	NO CONTAMINATION FOUND			

4 - 3A

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			

4 - 5

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			

4 - 6

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			

4 - 7

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			

4 - 8

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			

4 - 10

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				

4 - 12

TABLE 4 - 11A
DIOXIN FURAN COMPOUNDS DETECTED IN RINSEATE BLANKS
NCBC GULFPORT HO

SDG NUMBER	BLANK ID	RELATED ENVIRONMENTAL SAMPLES	CONTAMINANT	RB CONC.	UNITS	VALIDATION QUALIFIER
080412	BS-01-R14	GPTH04-1, GPTH04-1MS, GPTH04-1MSD, GPTH04-2, GPTH04-2D, GPTH04-3, GPTH04-4	NO CONTAMINATION FOUND			

4 - 12A

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			

4 - 19

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			

4 - 20

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-DI4	METHYLENE CHLORIDE	5	ug/L	CRQL
		BS-01-RI4, 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			

4 - 21

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 QUALIFER
080412	METHOD BLANK	BS-01-D14, BS-01-R14, GPTH04-1, GPTH04-2, GPTH04-2D, GPTH04-3, GPTH04-4, GPTH04-1MS, GPTH04-1MSD	NO CONTAMINATION FOUND			

4 - 21A

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	

4 - 22

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-DI4, BS-01-RI4, GPTH04-1, GPTH04-2, GPTH04-2D, GPTH04-3, GPTH04-4, GPTH04-1MS, GPTH04-1MSD	NO CONTAMINATION FOUND			

4 - 23

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-D14, BS-01-R14, GPTH04-1, GPTH04-2, GPTH04-2D, GPTH04-3, GPTH04-4, GPTH04-1MS, GPTH04-1MSD	NO CONTAMINATION FOUND			

4 - 24

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-DI4, BS-01-RI4, GPTH04-1, GPTH04-2, GPTH04-2D, GPTH04-3, GPTH04-4, GPTH04-1MS, GPTH04-1MSD	NO CONTAMINATION FOUND			

4 - 25

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-DI4, BS-01-RI4, GPTH04-1, GPTH04-2, GPTH04-2D, GPTH04-3, GPTH04-4, GPTH04-1MS, GPTH04-1MSD	NO CONTAMINATION FOUND			

4 - 26

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, 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	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.

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, 1988a., Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses, 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.

USEPA, 1990c., Statement of Work for Inorganic Analysis, Multi-Media, Multi-Concentration, United States Environmental Protection Agency Contracts Laboratory Program, Document No. ILM02.1, July 1988.

USEPA, 1990c., Statement of Work for Organics Analysis, Multi-Media, Multi-Concentration, United States Environmental Protection Agency Contracts Laboratory Program, Document No. OLM01.8, June 1992.

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

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 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			

4 - 4

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

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

*** 9 TARGET COMPOUNDS PER SAMPLE**

TABLE C-6
CHLORINATED HERBICIDES - 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

*** 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**

ABB
ASEA BROWN BOVERI

June 26, 1995

Commanding Officer
SOUTHNAVFACENGCOM
2155 Eagle Drive
North Charleston, SC 29418

ATTN: Dan Owens

SUBJECT: Preliminary Draft Technical Memorandum #4

Dear Dan:

Enclosed is the draft of the fourth Herbicide Orange groundwater sampling technical memorandum. One copy each has been sent to you, Gordon Crane and John Gordon. This preliminary draft is for your review. Once comments have been received, the draft final will be produced for review by the State.

If you have any questions about the enclosed, please give me a call at (615) 531-1922.

Sincerely,
ABB Environmental Services, Inc

Karen Boles for Penny Baxter

Penny M. Baxter
Senior Project Manager

pc: J. Gordon/AFCEE
G. Crane/NCBC
file

[8504.018]

ABB Environmental Services, Inc.

1400 Centerpoint Blvd.
Suite 158
Knoxville, Tennessee 37932-1968

Telephone
(615) 531-1922

Fax
(615) 531-8226

WORD PROCESSING REQUEST FORM

Work Request ☐ **Scheduling Request** ☐

Project Name: NCBC Gulfport, MS	
Product Title: Tech Memo No 1, Site A, Former HO Storage Area, GW Sampling Event No 4	
Project Manager: Penny Baxter	**Submitted by:** Milly Vandergriff
Date/Time Submitted: 6/20/95	**Date/Time Due:** 6/22/95
CHARGE NUMBER: 8504.51	**Document Due Date:** 6/22/95
Hours Budgeted: **Expenses Budgeted:**	**File Name/Footer:** **File Location:**

Special Instructions:

☐ Standard NAVY Format
☐ Other Format (describe)
☐ See Submitter prior to beginning work.

Document Specifications

Document is a:
☐ DRAFT ☐ FINAL DRAFT ☐ FINAL

Print Spacing:
☐ Single ☐ Double

Covers Needed: ☐ Yes ☐ No
Quantity: _____
Color: _____

Spines Needed: ☐ Yes ☐ No
Quantity: _____
Size: _____
(provide sample binder if possible)

Dividers Needed: ☑ Yes ☐ No
Quantity: 8 sets
Text: Chapters 1 thru 5
References
Appendix A
Appendix B

For Production Department Use Only

Assigned to:	Date/Time Assigned:	File Name & Location
Work By:	Date/Time Completed:	
Reviewed By:	Date/Time Completed:	
Returned to Requestor:		
Notes:		

Editing Service Request Form

Installation: Gulfport	
Document Title: Tech. memo No. 4, Site A, Former HD Storage Area	
Project Manager: Penny Baxter	Submitted by: Karen Boles + Kate Kelly
Date and Time Assigned: 6-21-95	Date Due:
Charge Number: 08504.51	Special Instructions:
Hours Budgeted:	

Description of Services:

☐ See submitter before beginning work.

Document Status

☐ Preliminary Draft
☑ Draft
☐ Final Draft
☐ Final

Revisions to be made in:

☐ Tallahassee WP
☑ Offsite WP
☐ Graphics
☐ Other

Format

☑ Standard Navy Format
☐ Response to Comments
☐ Letter Report Format
☐ Statement of Work Format
☐ POA Format
☐ Other

Other Instructions

Instructions

☐ Proof against manuscript
☑ Copy Edit
☑ Technical Edit (first pass)
☐ Technical Edit (follow-up)
☐ Other

Elements to Review

☑ Figures
☑ Text
☑ Tables

Attachments

☐ Partial appendices
☑ Complete appendices
☐ Other

Copy Edit Instructions	Initials	Date
Captions are identical on figures, in the TOC, and on slip sheets.	SAC	6/21
Captions are identical on tables and in TOC.	SAC	6/21
TOC entries are identical to chapter, section, subsection, and paragraph headings.	SAC	6/21
All acronyms within the report (in tables, text, and figures) are in the glossary and used consistently.	SAC	6/21
All references within the report (in tables, text, and figures) are listed in the references.	SAC	6/21
Tables are in the correct format. ☐ All abbreviations and acronyms are spelled out in body or listed in notes. ☐ Footnotes are numbered correctly (as they appear, left to right, top to bottom). ☐ Notes are in correct order (as they appear, left to right, top to bottom). ☐ Footnotes appear before sources, sources appear before notes. ☐ Notes, sources, and footnotes end with periods. ☐ Stub column is flush left. ☐ Numeric columns are decimally aligned.	SAC	6/21
Figures are complete. ☐ All maps have identical north arrow, in upper right corner if space allows. ☐ All maps have identical scale bars, in lower right corner if space allows. ☐ Title block is the same on all figures. ☐ All map elements are labeled on figure or shown in legend.	SAC	6/21

Assignment Information

Function	Name	Date Assigned	Date Due	Initials	Date
Proofreading (initial):	NA				
Copy Editing:	Steve Chapman	6-21-95		SAC	6/21
Technical Editing:	~~Ann Petty~~ Rita Weinstein	6-22-95		RW	6/23
Proofreading (follow-up):					
Returned to Requestor:					

Notes: