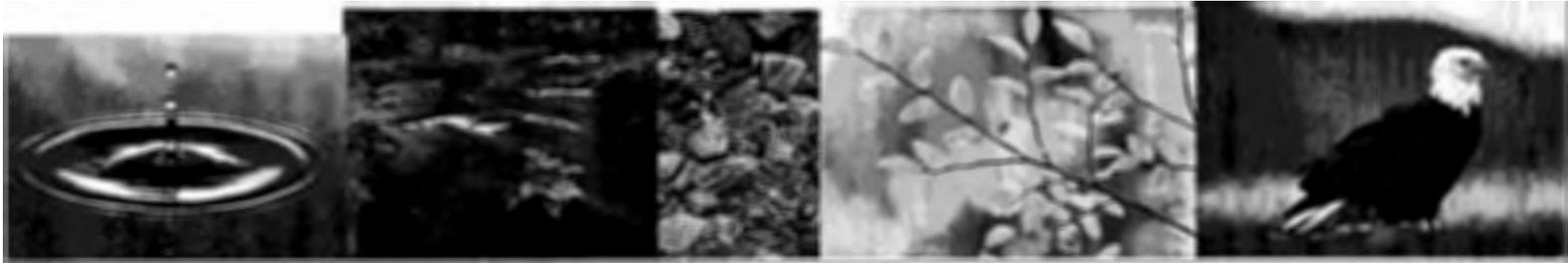


N00204.AR.005096  
NAS PENSACOLA  
5090.3a

RISK-BASED CLOSURE REQUEST AUGUST 2013 FOR UNDERGROUND STORAGE TANK  
SITE 1120 OUTLYING LANDING FIELD BRONSON NAS PENSACOLA FL  
08/1/2013

# Comprehensive Long-term Environmental Action Navy

CONTRACT NUMBER N62467-04-D-0055



Rev. 6  
August 2013

## Risk-Based Closure Request For Underground Storage Tank Site 1120

Outlying Landing Field Bronson  
Pensacola, Florida

Contract Task Order 0072

August 2013



NAS Jacksonville  
Jacksonville, Florida 32212-0030



**TABLE OF CONTENTS**

<u>SECTION</u>	<u>PAGE NO.</u>
<b>ACRONYMS AND ABBREVIATIONS .....</b>	<b>v</b>
<b>1.0 INTRODUCTION.....</b>	<b>1-1</b>
1.1 SITE HISTORY .....	1-1
1.2 PHYSICAL SETTING.....	1-5
1.2.1 Facility and Site Setting .....	1-5
1.2.2 Land Use.....	1-6
1.2.3 Groundwater and Surface Water Features.....	1-6
1.3 REPORT ORGANIZATION.....	1-6
<b>2.0 DATA EVALUATION AND CONSTITUENTS OF CONCERN SELECTION.....</b>	<b>2-1</b>
2.1 SOIL .....	2-1
2.1.1 Soil Screening Comparison with Direct Exposure SCTLs .....	2-1
2.1.2 Soil to Groundwater Leaching Evaluation.....	2-15
2.2 GROUNDWATER .....	2-15
<b>3.0 HUMAN HEALTH RISK ASSESSMENT.....</b>	<b>3-1</b>
3.1 HUMAN HEALTH RISK ASSESSMENT PROTOCOL .....	3-1
3.1.1 Data Evaluation.....	3-2
3.2 EXPOSURE ASSESSMENT .....	3-4
3.2.1 Potential Exposure Pathways .....	3-5
3.2.2 Calculation of Exposure Point Concentrations .....	3-11
3.2.3 Chemical Intake and Risk Estimation .....	3-11
3.3 TOXICITY ASSESSMENT PROTOCOL.....	3-13
3.3.1 Sources of Toxicity Criteria .....	3-13
3.3.2 Toxicity Criteria for Dermal Exposure .....	3-14
3.3.3 Toxicity Criteria for Carcinogenic Effects of PAHs.....	3-14
3.4 RISK EVALUATION .....	3-15
3.4.1 Florida Methodology for Evaluating Soil .....	3-15
3.4.2 Florida Methodology for Evaluating Groundwater .....	3-22
3.5 RISK CHARACTERIZATION RESULTS .....	3-24
3.5.1 Results of Subsurface Soil Evaluation.....	3-24
3.5.2 Results of Groundwater Evaluation .....	3-25
3.6 HUMAN HEALTH RISK UNCERTAINTY ANALYSIS.....	3-26
3.6.1 Usability and Completeness of Existing Databases .....	3-26
3.6.2 Uncertainty in the Exposure Assessment .....	3-26
3.6.3 Uncertainty in the Toxicological Evaluation .....	3-28
3.7 SUMMARY AND CONCLUSIONS.....	3-28
<b>4.0 CONCLUSIONS AND RECOMMENDATIONS.....</b>	<b>4-1</b>
4.1 SITE CLOSURE RECOMMENDATIONS .....	4-1
4.1.1 LIGHT NON-AQUEOUS PHASE LIQUID.....	4-1
4.1.2 Source Removal/Implemented Remedial Actions .....	4-1
4.1.3 Soil .....	4-1
4.1.4 Groundwater .....	4-2
4.2 PROPOSED INSTITUTIONAL CONTROLS .....	4-3
<b>REFERENCES.....</b>	<b>R-1</b>

**TABLE OF CONTENTS (CONTINUED)**

**APPENDIX**

- A HUMAN HEALTH RISK ASSESSMENT SUPPORT DOCUMENTATION
- B LABORATORY DATA REPORTS – ELECTRONIC ONLY
- C LAND USE CONTROL IMPLEMENTATION PLAN

**TABLES**

<b><u>NUMBER</u></b>	<b><u>PAGE NO.</u></b>
2-1	Summary of Detected Concentrations - Subsurface Soil ..... 2-2
2-2	Summary of Groundwater Monitoring Data ..... 2-4
2-3	Summary of Groundwater Data - December 2007 ..... 2-11
2-4	Summary of Groundwater Data for MW-14R and MW-38 – June 2010 ..... 2-13
3-1	Comparison with SCTLs for Leachability to Groundwater and C <sub>sat</sub> Limits - Subsurface Soil..... 3-6
3-2	Comparison of Concentrations in Groundwater to Groundwater CTLs and Natural Attenuation Criteria ..... 3-7
3-3	Comparison of Concentrations of Chemicals Detected in Groundwater to Construction Worker CTLs ..... 3-12
3-4	RMO Level 1 (Residential) Direct Contact Evaluation - Subsurface Soil ..... 3-17
3-5	RMO Level 2 (Industrial) Direct Contact Evaluation - Subsurface Soil..... 3-18
3-6	RMO Level 3 (Construction Worker) Direct contact Evaluation - Subsurface Soil ..... 3-19

**FIGURES**

<b><u>NUMBER</u></b>	<b><u>PAGE NO.</u></b>
1-1	Site Location Map ..... 1-2
1-2	Shallow Groundwater Flow – December 13, 2007 ..... 1-3
2-1	Land Use Control Boundary..... 2-14

## ACRONYMS AND ABBREVIATIONS

bgs	below ground surface
BMP	Base Master Plan
CLEAN	Comprehensive Long-term Environmental Action Navy
cm <sup>2</sup>	centimeter squared
COC	Contaminant of concern
C <sub>sat</sub>	soil saturation concentrations
CTL	Cleanup Target Level
CSF	cancer slope factor
CTO	Contract Task Order
DA <sub>event</sub>	absorbed dose per event
EPC	exposure point concentration
FAC	Florida Administrative Code
FDEP	Florida Department of Environmental Protection
FSW	Fresh Surface Water
GCTL	groundwater cleanup target levels
HEAST	Health Effects Assessment Summary Tables
HHRA	human health risk assessment
HQ	hazard Quotient
IRIS	Integrated Risk Information System
MCL	Maximum Contaminant Level
m <sup>3</sup>	cubic meter
mg	milligrams
mg/kg	milligram per kilogram
MNA	Monitored Natural Attenuation
MOP	Monitoring Only Plan
MSW	Marine Surface Water
NA	natural attenuation
NADC	Natural Attenuation Default Concentrations
NAS	Naval Air Station
NAVFAC SE	Naval Facilities Engineering Command, Southeast
NCEA	National Center for Environmental Assessment
OLF	Outlying Landing Field
ORC <sup>®</sup>	Oxygen-Release Compound
PAH	polynuclear aromatic hydrocarbon
PEF	Particulate Emissions Factor

## ACRONYMS AND ABBREVIATIONS (CONTINUED)

PPRTV	Provisional Peer Reviewed Toxicity Value
PRG	Preliminary Remediation Goal
RAGS	Risk Assessment Guidance for Superfund
RBC	Risk-Based Concentration
RBCA	Risk-Based Corrective Action
RBCAP	risk-based corrective action process
RfD	reference dose
RME	Reasonable Maximum Exposure
RMO	Risk Management Option
SAR	Site Assessment Report
SCTL	soil cleanup target levels
TEF	Toxicity Equivalence Factors
Tetra Tech	Tetra Tech NUS, Inc.
TPH	total petroleum hydrocarbons
TRPH	total recoverable petroleum hydrocarbons
UCL	Upper Confidence Limit
USEPA	United States Environmental Protection Agency
UST	underground storage tank
VF	Volatilization Factor
VOC	volatile organic compound

## 1.0 INTRODUCTION

This Risk-Based Closure Request has been prepared by Tetra Tech, Inc. (Tetra Tech) under the Comprehensive Long-term Environmental Action Navy (CLEAN) Contract Number N62467-04-R-0055 Contract Task Order (CTO) 0072. This Risk-Based Closure Request has been prepared to assess the potential human health exposure concerns for the residual contamination at Underground Storage Tank (UST) Site 1120, a petroleum site, at Outlying Landing Field (OLF) Bronson, which is part of Naval Air Station (NAS) Pensacola. This Risk-Based Closure Request has been prepared in accordance with the Florida Department of Environmental Protection (FDEP) Global Risk-Based Corrective Action (RBCA) rule [Chapter 62-780, Florida Administrative Code (FAC)]. As part of the Risk-Based Closure Request process, Tetra Tech evaluated the potential risk associated with current and potential future land use based exposure to the residual contamination in soil and groundwater.

### 1.1 SITE HISTORY

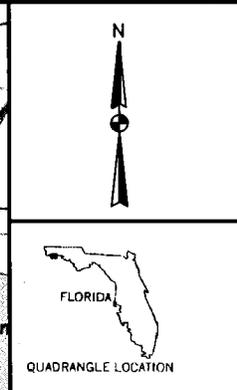
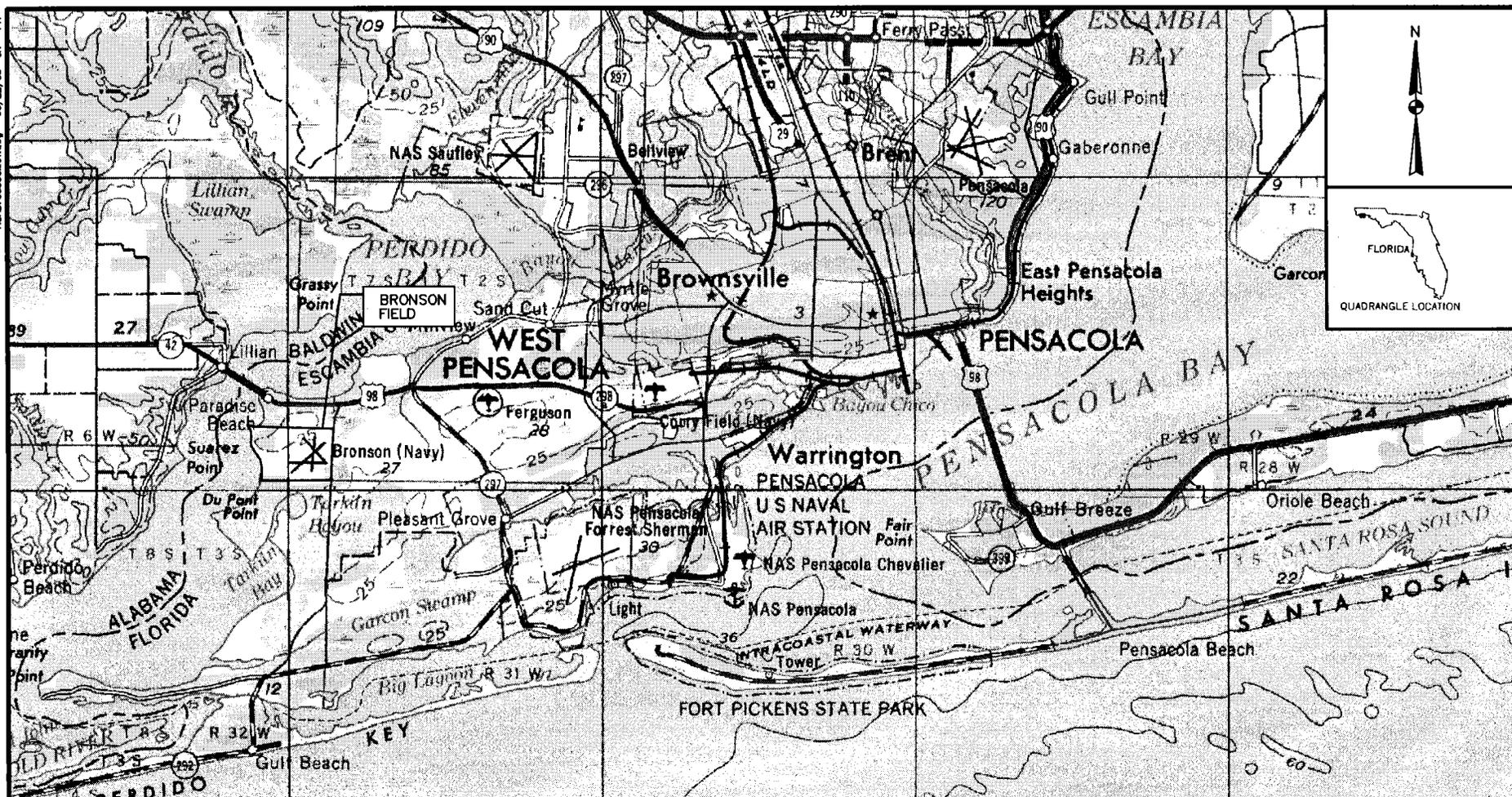
OLF Bronson is located in Escambia County, Florida (Figure 1-1). OLF Bronson was constructed in the early 1940's and used as a training base for Naval aviators during World War II and the Korean War. OLF Bronson was closed as an active airfield in 1950, but the runways were still used for helicopter training. Dismantling of OLF Bronson began in 1950 and by 1968 all buildings at OLF Bronson had been razed.

Site 1120 is the former location of a boiler room (Building 1120) at OLF Bronson (Figure 1-2). Three concrete USTs used to store fuel oil and one 250-gallon steel UST used to store butane were removed from Site 1120 in 1994. Approximately 200 cubic yards of soil were removed from the excavation during removal of the tanks and clean soil was used to backfill the excavation. Petroleum hydrocarbon vapors were noted in the soil during the removal of the USTs and analytical results of groundwater samples collected from a monitoring well indicated petroleum contamination of the groundwater (concentrations greater than allowable state target levels).

Investigations at the site have included the UST Closure Assessments completed in July 1994 and May 1995, and the initial Site Assessment field investigation completed in August 1997. In March 1998, the Site Assessment Report (SAR) based on the findings of these investigations was submitted (Navy Public Works Center, 1998).

Upon review of the SAR, the FDEP issued a technical review letter which requested additional site assessment in order to meet the requirements of Chapter 62-770, FAC (FDEP, 1998). The SAR addendum investigation was conducted in July 2000. Based on the additional site assessment data, the

ACAD:00550401.dwg 05/22/08 CK PT



SOURCE: USGS TOPOGRAPHIC QUADRANGLE  
PENSACOLA, FLORIDA-ALABAMA (1957 EDITION)

DRAWN BY	DATE
CK	5/22/08
CHECKED BY	DATE
REVISED BY	DATE
SCALE	
NOT TO SCALE	

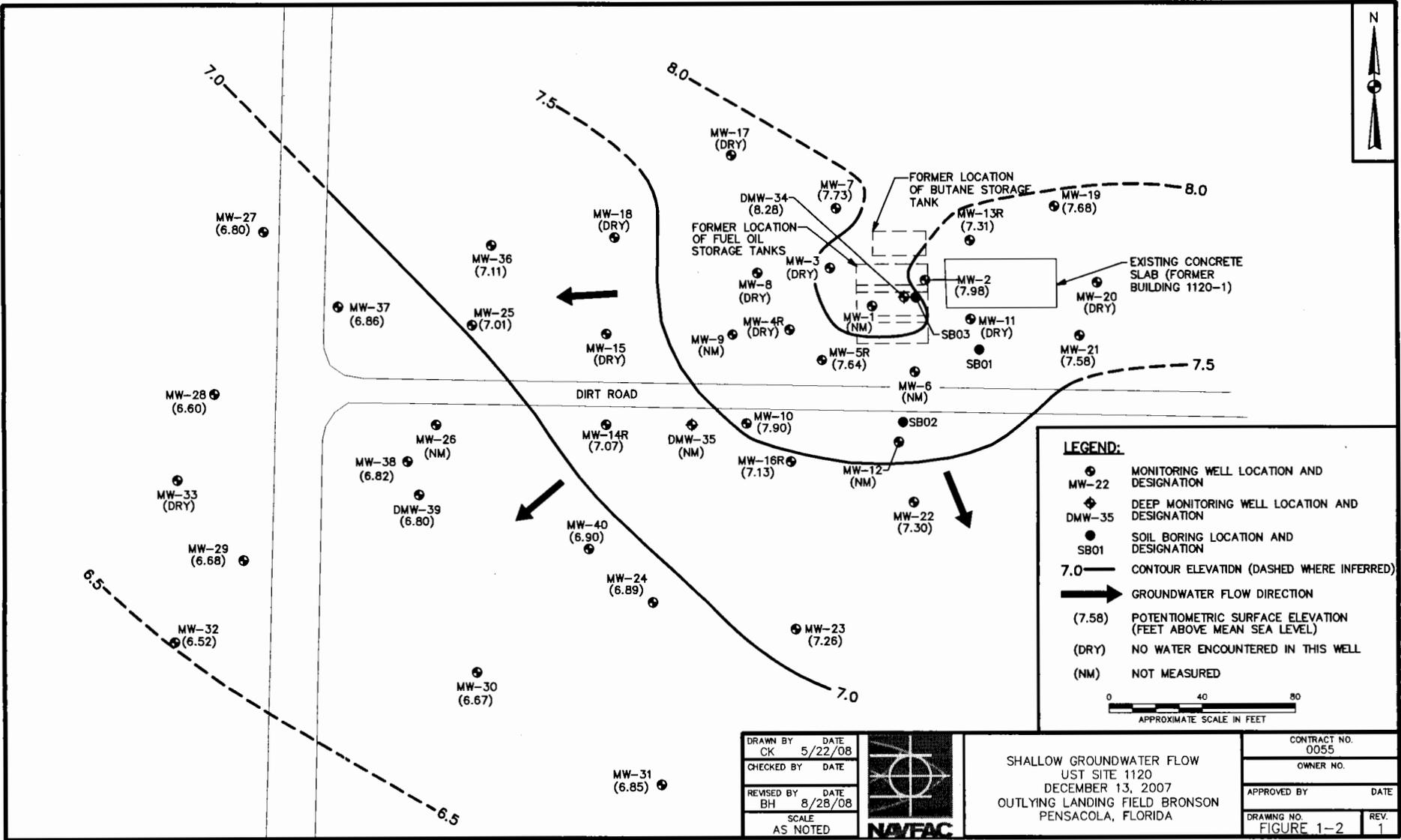


SITE LOCATION MAP  
UST SITE 1120  
OUTLYING LANDING FIELD BRONSON  
PENSACOLA, FLORIDA

CONTRACT NO. 0055	
OWNER NO. 0000	
APPROVED BY	DATE
DRAWING NO. FIGURE 1-1	REV. 0

FORM CADD NO. 531V-BH.DWG - REV 1 - 9/10/98

ACAD:0055c109.dwg 05/22/08 CK PIT



FORM CADD NO. SDIV-BLDVWG - REV 1 - 5/10/99

SAR addendum report recommended that monitored natural attenuation (MNA) was a suitable course of action for the site (Tetra Tech, 2001). On August 8, 2001, FDEP issued a technical review letter agreeing with the recommendation and requesting a Monitoring Only Plan (MOP) proposal for the site. On December 12, 2001, Tetra Tech submitted to FDEP the MOP proposal for Site 1120. On April 2, 2002, the FDEP MOP Approval Order, that outlined the requirements for natural attenuation (NA) monitoring at the site, was issued. Tetra Tech personnel conducted the first and second quarterly groundwater monitoring events in April 2002 and July 2002, respectively. Data collected during the second quarterly groundwater monitoring event indicated that concentrations of contaminants of concern (COCs) in the groundwater exceeded FDEP site-specific action levels. A confirmation sampling event was completed in September 2002, which confirmed the exceedance. Based on these results, Tetra Tech recommended that an Enhanced Natural Attenuation Treatability Study using Oxygen-Release Compound (ORC<sup>®</sup>) be completed at UST Site 1120.

The initial Treatability Study at the site was started in June 2003 and included a baseline sampling event (June 24 through 26, 2003), the ORC<sup>®</sup> injection event (July 13 to 19, 2003) and four quarters of post-injection groundwater sampling of 20 monitoring wells in September 2003, December 2003, March 2004, and June 2004. The site was scheduled for additional quarterly groundwater sampling in September 2004; however, the landfall of Hurricane Ivan on September 16, 2004 in the Pensacola area restricted site access and delayed all proposed work until March 2005. The quarterly sampling schedule then resumed with sampling events completed on March 2005, June 2005, and October 2005.

Tetra Tech completed the seventh quarterly groundwater monitoring event at Site 1120 on October 25 and 26, 2005 and submitted a letter report summarizing the results of the groundwater monitoring (Tetra Tech, 2006). The analytical results indicated that the concentration of 2-methylnaphthalene [210 micrograms per liter ( $\mu\text{g/L}$ )] in monitoring well MW-14R exceeded the Natural Attenuation Action Level of 200  $\mu\text{g/L}$ .

When an exceedance of action levels is determined, FDEP requires that the monitoring well be resampled for confirmation and if the concentration is confirmed FDEP requires that a proposal be submitted including one of three options. The options include:

- Perform a supplemental site assessment and submit a supplemental site assessment report
- Continue the implementation of the approved NA monitoring plan
- Prepare and submit a Remedial Action Plan.

However, based on the review of the historic analytical data and collected MNA parameters, Tetra Tech recommended in the Seventh Quarterly Groundwater Monitoring Letter Report (Tetra Tech, 2006) that an

additional injection event be completed to enhance bioremediation of the groundwater surrounding monitoring wells MW-14R and MW-25.

A Treatability Study Work Plan for the proposed work was submitted (Tetra Tech, 2007). During the preparation of the work plan, it was determined that enhanced biodegradation had limited effectiveness in the area of these wells [concentrations of polynuclear aromatic hydrocarbons (PAHs) in wells MW-14R and MW-25 exceeded the pre-injection concentrations]; therefore, a different technology (chemical oxidation) was recommended for the Treatability Study.

Tetra Tech installed additional groundwater monitoring wells in December 2007 to supplement the existing monitoring well network (both shallow and deep monitoring wells) and a round of baseline groundwater monitoring and sampling was conducted. In a letter report that documented the results of the December 2007 sampling (Tetra Tech, 2008), it was recommended that the Treatability Study Work Plan (Tetra Tech, 2007) be implemented with modifications to the proposed injection area and amount of chemical oxidant to be injected. In addition, Tetra Tech would complete quarterly sampling for a period of 1 year as per the Work Plan.

Subsequent to the March 12, 2008 letter, representatives of Tetra Tech and Naval Facilities Engineering Command, Southeast (NAVFAC SE) decided to pursue **No Further Action** at Site 1120 and submit a Risk-Based Closure Request.

However, after further discussion the Navy decided to collect one additional groundwater sample from monitoring wells MW-14R and MW-38 to be analyzed for naphthalene, 1-methylnaphthalene, 2-methylnaphthalene, and Total Recoverable Petroleum Hydrocarbons (TRPH). The analytical results of these groundwater samples were to provide data to confirm the concentrations that were detected in groundwater samples previously collected and to determine if current concentrations may be lower and at or below their Groundwater Cleanup Target Levels (GCTLs) or Natural Attenuation Default Concentrations (NADC).

## 1.2 PHYSICAL SETTING

Conditions at Site 1120 have been documented in historical site documents. This section of the report summarizes key information to the risk analysis.

### 1.2.1 Facility and Site Setting

NAS Pensacola is located south of the city of Pensacola (northwest Florida) on a peninsula on the western shore of Pensacola Bay. OLF Bronson is located northwest of NAS Pensacola about 1 mile from

the Alabama State Line and 5 miles west of the city of Pensacola (Figure 1-1). OLF Bronson consists of approximately 950 acres of grassy areas and forest on the eastern shore of Perdido Bay and is now known as the Blue Angels Recreation Park (currently used for recreational purposes). The areas south, east, and north of the facility are undeveloped with the exception of some residential properties along U.S. Highway 98 and Perdido Bay (0.5 miles north of the facility).

Site 1120 is located on OLF Bronson southwest of the remains of Building 1120 (former boiler room). Dense woods are located north, east, and west of Site 1120 and a dirt road running east to west is located south of the site. The site is an open, grassy area with the remains (concrete slab) of Building 1120 on the site.

### **1.2.2 Land Use**

OLF Bronson, or Blue Angels Recreational Area, is now used for recreational purposes. A disc golf course and a paint ball range are now located near Site 1120.

### **1.2.3 Groundwater and Surface Water Features**

Site 1120 is relatively flat, with a slight slope to the west. Soil at the site consists of a 2-inch layer of sandy loam at the surface and fine to medium sand interspersed with traces of silt and clay below the top layer. Medium sand with traces of coarse sand and silt can be found at lower depths [20 feet below ground surface (bgs)].

Groundwater elevations, as measured December 14, 2007, ranged from 6.52 feet to 7.98 feet. Groundwater contours developed from these elevations show that groundwater flows to the southwest (Figure 1-2).

The nearest surface water body is Perdido Bay, which eventually connects with the Gulf of Mexico.

## **1.3 REPORT ORGANIZATION**

**Section 1.0**, Introduction, provides a summary of the site history and physical setting, including site setting, land use, and groundwater and surface water features.

**Section 2.0**, Data Evaluation and Constituents of Potential Concern Selection, summarizes the soil and groundwater data collected at the site and the results of screening comparisons to soil cleanup target levels (SCTLs) and GCTLs.

**Section 3.0, Exposure Assessment,** provides the results of the risk assessment performed for Site 1120.

**Section 4.0, Conclusions and Recommendations,** provides the conclusion of the evaluation of the data and risk assessment and identifies the recommendations for how to proceed with the site.

Appendix A presents the Human Health Risk Assessment Support Documentation, Appendix B provides the Laboratory Data Reports (electronically only), and Appendix C provides the Land Use Control Implementation Plan.

## 2.0 DATA EVALUATION AND CONSTITUENTS OF CONCERN SELECTION

The data used to evaluate potential risks for Site 1120 have been presented in the SAR Addendum submitted in May 2001 (soil) (Tetra Tech, 2001), and the Baseline Sampling Letter Report submitted in March 2008 (groundwater) (Tetra Tech, 2008). The specific soil and groundwater data used in this evaluation is included in Tables 2-1 through 2-4.

### 2.1 SOIL

In response to comments received from FDEP on the SAR, three soil borings (OLFB20SB01, OLFB20SB02, and OLFB20SB03) were installed in June 2000 (Figure 2-1). The soil borings were advanced from the ground surface to 14 feet bgs and were sampled continuously at 2-foot intervals. The intervals submitted for chemical analysis were selected based on field screening results, field observations, and/or proximity to the seasonal high groundwater level. Two subsurface soil samples were collected from each soil boring (one duplicate sample was also collected) to provide data on site conditions following the removal of the USTs in 1994. Each sample was analyzed for volatile organic compounds (VOCs), PAHs, and total petroleum hydrocarbons (TPH).

Table 2-1 provides a summary of the detected concentrations found in the soils samples. The complete data set is provided in Appendix B. Table 2-1 also provides the SCTLs for direct exposure (residential and industrial) and for indirect exposure (leachability-based).

Only one VOC (toluene) was detected in the soil samples and it was detected in four of the six samples collected. Ten PAHs were detected in one sample (OLFB20SB03-1012) only. They were not detected in the field duplicate collected at this same location, indicating the heterogeneous nature of the soil at the site. TPH were detected in five of the six samples collected.

#### 2.1.1 Soil Screening Comparison with Direct Exposure SCTLs

The comparison of the positive detections in the soil samples with the direct exposure SCTLs (residential and industrial) indicates that only benzo(a)pyrene was detected at a concentration that exceeds a residential SCTL. None of the chemicals detected exceed an industrial SCTL.

Concentrations of other carcinogenic PAHs are converted to an equivalent concentration of benzo(a)pyrene to evaluate carcinogenic effects from exposure to PAHs. The benzo(a)pyrene equivalent concentration is shown in Table 2-1 and comparison of this concentration to the SCTLs indicate that the

TABLE 2-1

SUMMARY OF DETECTED CONCENTRATIONS - SUBSURFACE SOIL  
SITE 1120 - OLF BRONSON  
NAS PENSACOLA  
PENSACOLA, FLORIDA  
PAGE 1 OF 2

SAMPLE NUMBER LOCATION SAMPLE DATE DEPTH RANGE (Feet)	HUMAN HEALTH RISK SCREENING SOIL CLEANUP TARGET LEVEL <sup>(1)</sup>			OLFB20SB01-0406	OLFB20SB01-1214	OLFB20SB02-0406	OLFB20SB02-1214
	Residential	Industrial	Leachability	OLFB20SB01 20000601 4 - 6	OLFB20SB01 20000601 12 - 14	OLFB20SB02 20000601 4 - 6	OLFB20SB02 20000601 12 - 14
<b>Volatile Organics (mg/kg)</b>							
TOLUENE	7500	60000	0.5	0.0052 U	0.0014 J	0.0015 J	0.0058 U
<b>Semivolatile Organics (mg/kg)</b>							
BENZO(A)ANTHRACENE	(2)	(2)	0.8	0.068 U	0.068 U	0.07 U	0.07 U
BENZO(A)PYRENE	0.1	0.7	8	0.068 U	0.068 U	0.07 U	0.07 U
BENZO(B)FLUORANTHENE	(2)	(2)	2.4	0.068 U	0.068 U	0.07 U	0.07 U
BENZO(G,H,I)PERYLENE	2500	52000	32000	0.068 U	0.068 U	0.07 U	0.07 U
BENZO(K)FLUORANTHENE	(2)	(2)	24	0.068 U	0.068 U	0.07 U	0.07 U
CHRYSENE	(2)	(2)	77	0.34 U	0.34 U	0.35 U	0.35 U
FLUORANTHENE	3200	59000	1200	0.34 U	0.34 U	0.35 U	0.35 U
INDENO(1,2,3-CD)PYRENE	(2)	(2)	6.6	0.068 U	0.068 U	0.07 U	0.07 U
PHENANTHRENE	2200	36000	250	0.34 U	0.34 U	0.35 U	0.35 U
PYRENE	2400	45000	880	0.34 U	0.34 U	0.35 U	0.35 U
BENZO(A)PYPYRENE EQUIVALENT	0.1	0.7	8	ND	ND	ND	ND
<b>Petroleum Hydrocarbons (mg/kg)</b>							
TOTAL PETROLEUM HYDROCARBONS	460	2700	340	70.3	47.2	12.5	8.8 U

TABLE 2-1

SUMMARY OF DETECTED CONCENTRATIONS - SUBSURFACE SOIL  
SITE 1120 - OLF BRONSON  
NAS PENSACOLA  
PENSACOLA, FLORIDA  
PAGE 2 OF 2

LOCATION SAMPLE DATE DEPTH RANGE (Feet)	HUMAN HEALTH RISK SCREENING SOIL CLEANUP TARGET LEVEL <sup>(1)</sup>			OLFB20SB03-0810	OLFB20SB03-1012	OLFB20SB03-1012-AVG	OLFB20SB03-1012-D
	Residential	Industrial	Leachability	OLFB20SB03 20000601 8 - 10	OLFB20SB03 20000601 10 - 12	OLFB20SB03 20000601 10 - 12	OLFB20SB03 20000601 10 - 12
<b>Volatile Organics (mg/kg)</b>							
TOLUENE	7500	60000	0.5	0.0012 J	0.0057 U	0.0012 J	0.0012 J
<b>Semivolatile Organics (mg/kg)</b>							
BENZO(A)ANTHRACENE	(2)	(2)	0.8	0.069 U	0.123	0.07875	0.069 U
BENZO(A)PYRENE	0.1	0.7	8	0.069 U	0.108	0.07125	0.069 U
BENZO(B)FLUORANTHENE	(2)	(2)	2.4	0.069 U	0.136	0.08525	0.069 U
BENZO(G,H,I)PERYLENE	2500	52000	32000	0.069 U	0.091	0.06275	0.069 U
BENZO(K)FLUORANTHENE	(2)	(2)	24	0.069 U	0.0782	0.05635	0.069 U
CHRYSENE	(2)	(2)	77	0.35 U	0.136 J	0.136 J	0.35 U
FLUORANTHENE	3200	59000	1200	0.35 U	0.288 J	0.288 J	0.35 U
INDENO(1,2,3-CD)PYRENE	(2)	(2)	6.6	0.069 U	0.142	0.08825	0.069 U
PHENANTHRENE	2200	36000	250	0.35 U	0.12 J	0.12 J	0.35 U
PYRENE	2400	45000	880	0.35 U	0.186 J	0.186 J	0.35 U
BENZO(A)PYRENE EQUIVALENT	0.1	0.7	8	ND	0.18 <sup>(3)</sup>	0.13 <sup>(3)</sup>	ND
<b>Petroleum Hydrocarbons (mg/kg)</b>							
TOTAL PETROLEUM HYDROCARBONS	460	2700	340	16.6	22	21.3	20.6

Notes:

Shaded cells indicate that the specified criterion has been exceeded.

Footnotes:

- 1 Soil Cleanup Target levels (SCTLs) for Chapter 62-777, F.A. C. FDEP, April 2005.
- 2 Individual SCTLs are not available for these carcinogenic compounds. The concentrations for these compounds are converted to benzo(a)pyrene equivalents and totaled. The resulting benzo(a)pyrene equivalent concentration is compared to the SCTLs for benzo(a)pyrene.
- 3 The calculated benzo(a)pyrene equivalent for this sample includes 1/2 the detection limit for dibenzo(a,h)anthracene.

J = estimated concentration

U = non-detect value

mg/kg = milligrams per kilogram

ND = Not Detected

FAC = Florida Administrative Code

FDEP = Florida Department of Environmental Protection

TABLE 2-2  
SUMMARY OF GROUNDWATER MONITORING DATA  
UST SITE 1120 - OLF BRONSON  
NAS PENSACOLA  
PENSACOLA, FLORIDA  
PAGE 1 OF 7

WELL NAME FDEP WELL DESIGNATION SAMPLE ID SAMPLING EVENT COLLECTION DATE	GCTL <sup>(1)</sup> (µg/L)	Cont. Wells SSAL <sup>(2)</sup> (µg/L)	Peri. Wells SSAL <sup>(2)</sup> (µg/L)	MW-01									MW-02							MW-04							
				BRN-1120-MW01									Contaminated well BRN-1120-MW02							Contaminated well BRN-1120-MW04							
				Baseline	1Q	2Q	3Q	4Q	5Q	6Q	7Q	Baseline	1Q	2Q	3Q	4Q	5Q	6Q	7Q	Baseline	1Q	2Q	3Q	4Q	5Q	6Q	7Q
	06/24/03	09/25/03	12/10/03	NS	NS	03/02/05	NS	NS	08/24/03	09/25/03	12/10/03	03/11/04	06/08/04	03/02/05	08/07/05	10/25/05	06/24/03	09/25/03	12/10/03	03/11/04	06/08/04	03/02/05	06/07/05	NS			
<b>VOCs (µg/L)</b>																											
BENZENE	1	NC	NC	1 U	1 U	1 U	NS	NS	1 U	NS	NS	1 U	1 U	0.09 J	1 U	1 U	1 U	1 U	0.3 U	1 U	1 U	1 U	1 U	1 U	NS		
ETHYLBENZENE	30	300	30	1 U	1 U	1 U	NS	NS	1 U	NS	NS	0.5 J	1 U	1 U	1 U	1 U	1 U	1 U	0.2 U	14	1 U	6	1 U	3	1 U	1 U	NS
M+P-XYLENES	NC	NC	NC	1 U	2 U	2 U	NS	NS	NR	NS	NS	1 U	2 U	2 U	2 U	NR	NR	0.5 U	28	2 U	12	2 U	3	NR	NR	NS	
O-XYLENE	NC	NC	NC	1 U	1 U	1 U	NS	NS	NR	NS	NS	0.5 J	1 U	1 U	1 U	1 U	NR	NR	0.3 U	1 U	1 U	1 U	1 U	1 U	1 U	NS	
TOLUENE	40	NC	NC	1 U	1 U	1 U	NS	NS	1 U	NS	NS	1 U	1 U	0.3 J	1 U	1 U	1 U	1 U	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	NS	
TOTAL XYLENES	20	200	20	1 U	3 U	3 U	NS	NS	3 U	NS	NS	2	3 U	3 U	3 U	3 U	3 U	0.8 U	28	3 U	12	3 U	3	3 U	3 U	NS	
<b>PAHs (µg/L)</b>																											
1-METHYLNAPHTHALENE	28	200	20	0.2 U	0.2 U	0.2 U	NS	NS	0.2 U	NS	NS	5.9	0.2 U	1.4	0.18 J	5.2	3.1	0.2 U	15	380	0.2 U	36	0.2 U	18	0.2 U	0.2 U	NS
2-METHYLNAPHTHALENE	28	200	20	0.2 U	0.2 U	0.2 U	NS	NS	0.2 U	NS	NS	4.9	0.2 U	1.2	0.22	4.9	3.1	0.2 U	14	220	0.2 U	52	0.2 U	21	0.2 U	0.2 U	NS
ACENAPHTHENE	20	NC	NC	0.2 U	0.2 U	0.2 U	NS	NS	0.2 U	NS	NS	1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.1 J	110 U	0.2 U	7.7 U	0.2 U	0.3	0.2 U	0.2 U	NS
ACENAPHTHYLENE	210	NC	NC	0.2 U	0.2 U	0.2 U	NS	NS	0.2 U	NS	NS	1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.04 U	110 U	0.2 U	7.7 U	0.2 U	0.2 U	0.2 U	0.2 U	NS
BENZO(A)ANTHRACENE	0.05	NC	NC	0.2 U	0.2 U	0.2 U	NS	NS	0.2 U	NS	NS	1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.08 U	110 U	0.2 U	7.7 U	0.2 U	0.2 U	0.2 U	0.2 U	NS
BENZO(K)FLUORANTHENE	0.5	NC	NC	0.2 U	0.2 U	0.2 U	NS	NS	0.2 U	NS	NS	1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.1 U	110 U	0.2 U	7.7 U	0.2 U	0.2 U	0.2 U	0.2 U	NS
CHRYSENE	4.8	NC	NC	0.2 U	0.2 U	0.2 U	NS	NS	0.2 U	NS	NS	1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.05 U	110 U	0.2 U	7.7 U	0.2 U	0.2 U	0.2 U	0.2 U	NS
FLUORANTHENE	280	NC	NC	0.2 U	0.2 U	0.2 U	NS	NS	0.2 U	NS	NS	1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.07 U	110 U	0.2 U	7.7 U	0.2 U	0.2 U	0.2 U	0.2 U	NS
FLUORENE	280	NC	NC	0.2 U	0.2 U	0.2 U	NS	NS	0.2 U	NS	NS	1 U	0.2 U	0.2 U	0.2 U	0.092 J	0.2 U	0.2 U	0.2 J	110 U	0.2 U	7.7 U	0.2 U	0.52	0.2 U	0.2 U	NS
NAPHTHALENE	14	200	20	0.2 U	0.2 U	0.2 U	NS	NS	0.2 U	NS	NS	3	0.2 U	1.3	0.54	2.6	1.2	0.2 U	2	440	0.2 U	42	0.2 U	20	0.2 U	0.2 U	NS
PHENANTHRENE	210	NC	NC	0.2 U	0.2 U	0.2 U	NS	NS	0.2 U	NS	NS	1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.08 U	110 U	0.2 U	7.7 U	0.2 U	0.26	0.2 U	0.2 U	NS
PYRENE	210	NC	NC	0.2 U	0.2 U	0.2 U	NS	NS	0.2 U	NS	NS	1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.09 U	110 U	0.2 U	7.7 U	0.2 U	0.2 U	0.2 U	0.2 U	NS
<b>TRPH (µg/L)</b>																											
TOTAL PETROLEUM HYDROCARBONS	5000	50000	5000	500 U	290 J	530 U	NS	NS	320 J	NS	NS	1600	500 U	1700 U	500 U	670 J	680 J	420 J	560 U	3200	720	1800 U	290 J	650	1700 U	470 J	NS

TABLE 2-2  
SUMMARY OF GROUNDWATER MONITORING DATA  
UST SITE 1120 - OLF BRONSON  
NAS PENSACOLA  
PENSACOLA, FLORIDA  
PAGE 2 OF 7

WELL NAME FDEP WELL DESIGNATION SAMPLE ID SAMPLING EVENT COLLECTION DATE	GCTL <sup>(1)</sup> (µg/L)	Cont. Wells SSAL <sup>(2)</sup> (µg/L)	Perl. Wells SSAL <sup>(2)</sup> (µg/L)	MW-05R Contaminated well BRN-1120-MW05R								MW-07 BRN-1120-MW07								MW-08 BRN-1120-MW08								
				Baseline	1Q	2Q	3Q	4Q	5Q	6Q	7Q	Baseline	1Q	2Q	3Q	4Q	5Q	6Q	7Q	Baseline	1Q	2Q	3Q	4Q	5Q	6Q	7Q	
				06/24/03	09/25/03	12/10/03	03/11/04	06/08/04	03/02/05	06/07/05	10/26/05	06/25/03	09/26/03	12/11/03	03/11/04	06/08/04	03/03/05	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
<b>VOCs(3) (µg/L)</b>																												
BENZENE	1	NC	NC	1 U	1 U	1 U	1 U	1 U	1 U	1.0 U	0.3 U	1 U	1 U	1 U	1 U	1 U	1 U	NS	NS	NS	NS	1 U	NS	1 U	NS	NS	NS	NS
ETHYLBENZENE	30	300	30	0.3 J	1 U	10	1 U	12	0.96 J	1.0 U	6	1 U	1 U	1 U	1 U	1 U	1 U	NS	NS	NS	NS	1 U	NS	1 U	NS	NS	NS	NS
M+P-XYLENES	NC	NC	NC	1 U	2 U	30	2 U	28	NR	NR	16	1 U	2 U	2 U	2 U	2 U	NR	NS	NS	NS	NS	2 U	NS	2 U	NS	NS	NS	NS
O-XYLENE	NC	NC	NC	1 U	1 U	1 U	1 U	0.6 J	NR	NR	0.3 U	1 U	1 U	1 U	1 U	1 U	NR	NS	NS	NS	NS	1 U	NS	1 U	NS	NS	NS	NS
TOLUENE	40	NC	NC	1 U	1 U	1 U	1 U	1 U	1 U	1.0 U	0.2 U	1 U	1 U	1 U	1 U	1 U	0.43 J	NS	NS	NS	NS	1 U	NS	1 U	NS	NS	NS	NS
TOTAL XYLENES	20	200	20	1 U	3 U	30	3 U	28	2.8 J	3.0 U	16	1 U	3 U	3 U	3 U	3 U	NS	NS	NS	NS	3 U	NS	3 U	NS	NS	NS	NS	NS
<b>PAHs(4) (µg/L)</b>																												
1-METHYLNAPHTHALENE	28	200	20	2.2	0.2 U	34	0.2 U	37	0.31	0.2 U	16	0.2 U	0.2 U	0.37	0.094 J	0.64	0.2 U	NS	NS	NS	NS	0.2 U	NS	0.2 U	NS	NS	NS	NS
2-METHYLNAPHTHALENE	28	200	20	1.3	0.2 U	43	0.2 U	44	0.27	0.2 U	11	0.2 U	0.2 U	0.25	0.098 J	0.64	0.2 U	NS	NS	NS	NS	0.2 U	NS	0.2 U	NS	NS	NS	NS
ACENAPHTHENE	20	NC	NC	0.2 U	0.2 U	7.6 U	0.2 U	0.47	0.2 U	.15 J	0.1 J	0.2 U	0.2 U	0.2 U	0.2 U	0.1 J	0.2 U	NS	NS	NS	NS	0.2 U	NS	0.2 U	NS	NS	NS	NS
ACENAPHTHYLENE	210	NC	NC	0.2 U	0.2 U	7.6 U	0.2 U	0.2 U	0.2 U	0.2 U	0.04 U	0.2 U	0.2 U	0.051	0.2 U	0.21 U	0.2 U	NS	NS	NS	NS	0.2 U	NS	0.2 U	NS	NS	NS	NS
BENZO(A)ANTHRACENE	0.05	NC	NC	0.2 U	0.2 U	7.6 U	0.2 U	0.2 U	0.2 U	0.2 U	0.08 U	0.2 U	0.2 U	0.2 U	0.2 U	0.21 U	0.2 U	NS	NS	NS	NS	0.2 U	NS	0.2 U	NS	NS	NS	NS
BENZO(K)FLUORANTHENE	0.5	NC	NC	0.2 U	0.2 U	7.6 U	0.2 U	0.2 U	0.2 U	0.2 U	0.1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.21 U	0.2 U	NS	NS	NS	NS	0.2 U	NS	0.2 U	NS	NS	NS	NS
CHRYSENE	4.8	NC	NC	0.2 U	0.2 U	7.6 U	0.2 U	0.2 U	0.2 U	0.2 U	0.05 U	0.2 U	0.2 U	0.2 U	0.2 U	0.21 U	0.2 U	NS	NS	NS	NS	0.2 U	NS	0.2 U	NS	NS	NS	NS
FLUORANTHENE	280	NC	NC	0.2 U	0.2 U	7.6 U	0.2 U	0.2 U	0.2 U	0.2 U	0.07 U	0.2 U	0.2 U	0.2 U	0.2 U	0.21 U	0.2 U	NS	NS	NS	NS	0.2 U	NS	0.2 U	NS	NS	NS	NS
FLUORENE	280	NC	NC	0.2 U	0.2 U	7.6 U	0.2 U	0.85	0.2 U	0.2 U	0.1 J	0.2 U	0.2 U	0.11	0.2 U	0.3	0.2 U	NS	NS	NS	NS	0.2 U	NS	0.2 U	NS	NS	NS	NS
NAPHTHALENE	14	200	20	2.1	0.2 U	48	0.2 U	46	2.0	0.2 U	27	0.2 U	0.2 U	0.2 U	0.2 U	0.12 J	0.2 U	NS	NS	NS	NS	0.2 U	NS	0.2 U	NS	NS	NS	NS
PHENANTHRENE	210	NC	NC	0.2 U	0.2 U	7.6 U	0.2 U	0.38	0.2 U	0.2 U	0.08 U	0.2 U	0.2 U	0.2 U	0.2 U	0.18 J	0.2 U	NS	NS	NS	NS	0.2 U	NS	0.2 U	NS	NS	NS	NS
PYRENE	210	NC	NC	0.2 U	0.2 U	7.6 U	0.2 U	0.2 U	0.2 U	0.2 U	0.09 U	0.2 U	0.2 U	0.2 U	0.2 U	0.21 U	0.2 U	NS	NS	NS	NS	0.2 U	NS	0.2 U	NS	NS	NS	NS
<b>TRPH(5) (µg/L)</b>																												
TOTAL PETROLEUM HYDROCARBONS	5000	50000	5000	620	890	1800 U	350 J	1200	1100 J	1300 J	570	500 U	500 U	500 U	500 U	310 J	1700 U	NS	NS	NS	NS	500 U	NS	500 U	NS	NS	NS	NS



TABLE 2-2  
SUMMARY OF GROUNDWATER MONITORING DATA  
UST SITE 1120 - OLF BRONSON  
NAS PENSACOLA  
PENSACOLA, FLORIDA  
PAGE 4 OF 7

WELL NAME FDEP WELL DESIGNATION SAMPLE ID SAMPLING EVENT COLLECTION DATE	GCTL <sup>(1)</sup> (µg/L)	Cont. Wells SSAL <sup>(2)</sup> (µg/L)	Peri. Wells SSAL <sup>(2)</sup> (µg/L)	MW-17								MW-18								MW-24 Contaminated well BRN-1120-MW24								
				BRN-1120-MW17								BRN-1120-MW18																
				Baseline	1Q	2Q	3Q	4Q	5Q	6Q	7Q	Baseline	1Q	2Q	3Q	4Q	5Q	6Q	7Q	Baseline	1Q	2Q	3Q	4Q	5Q	6Q	7Q	
	06/26/03	09/26/03	12/11/03	03/11/04	NS	NS	NS	NS	06/26/03	09/26/03	12/11/03	03/10/04	06/08/04	03/03/05	NS	NS	06/25/03	09/24/03	12/10/03	03/10/04	06/07/04	03/03/05	06/07/05	10/26/05				
<b>VOCs(3) (µg/L)</b>																												
BENZENE	1	NC	NC	1 U	1 U	1 U	1 U	NS	NS	NS	NS	1 U	1 U	1 U	1 U	1 U	1 U	NS	NS	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1.0 U	0.3 U
ETHYLBENZENE	30	300	30	1 U	1 U	1 U	1 U	NS	NS	NS	NS	1 U	1 U	1 U	1 U	1 U	1 U	NS	NS	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1.0 U	0.2 U
M+P-XYLENES	NC	NC	NC	1 U	2 U	2 U	2 U	NS	NS	NS	NS	1 U	2 U	2 U	2 U	2 U	NR	NS	NS	1 U	2 U	2 U	2 U	2 U	NR	NR	0.5 U	
O-XYLENE	NC	NC	NC	1 U	1 U	1 U	1 U	NS	NS	NS	NS	1 U	1 U	1 U	1 U	1 U	NR	NS	NS	1 U	1 U	1 U	1 U	1 U	NR	NR	0.3 U	
TOLUENE	40	NC	NC	1 U	1 U	1 U	1 U	NS	NS	NS	NS	1 U	1 U	1 U	1 U	1 U	0.64 J	NS	NS	1 U	1 U	1 U	1 U	1 U	0.37 J	1.0 U	0.2 U	
TOTAL XYLENES	20	200	20	1 U	3 U	3 U	3 U	NS	NS	NS	NS	1 U	3 U	3 U	3 U	3 U	3 U	NS	NS	1 U	3 U	3 U	3 U	3 U	3 U	3.0 U	0.8 U	
<b>PAHs(4) (µg/L)</b>																												
1-METHYLNAPHTHALENE	28	200	20	0.11 J	0.2 U	0.096	0.2 U	NS	NS	NS	NS	0.22 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NS	NS	6.7	0.2 U	26	4.2	8.6	3.6	0.075 J	3	
2-METHYLNAPHTHALENE	28	200	20	0.092 J	0.2 U	0.2 U	0.2 U	NS	NS	NS	NS	0.22 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NS	NS	5.9	0.12 J	50	6	16	17	0.11 J	17	
ACENAPHTHENE	20	NC	NC	0.2 U	0.2 U	0.2 U	0.2 U	NS	NS	NS	NS	0.22 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NS	NS	1 U	0.17 J	7.5 U	0.3	0.36	0.4	0.2 U	0.8	
ACENAPHTHYLENE	210	NC	NC	0.2 U	0.2 U	0.2 U	0.2 U	NS	NS	NS	NS	0.22 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NS	NS	0.74 J	0.2 U	7.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.04 U	
BENZO(A)ANTHRACENE	0.05	NC	NC	0.2 U	0.2 U	0.2 U	0.2 U	NS	NS	NS	NS	0.22 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NS	NS	1 U	0.13 J	7.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.08 U	
BENZO(K)FLUORANTHENE	0.5	NC	NC	0.2 U	0.2 U	0.2 U	0.2 U	NS	NS	NS	NS	0.22 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NS	NS	1 U	0.16 J	7.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.1 U	
CHRYSENE	4.8	NC	NC	0.2 U	0.2 U	0.2 U	0.2 U	NS	NS	NS	NS	0.22 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NS	NS	1 U	0.2 U	7.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.05 U	
FLUORANTHENE	280	NC	NC	0.2 U	0.2 U	0.2 U	0.2 U	NS	NS	NS	NS	0.22 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NS	NS	1 U	0.2 U	7.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.07 U	
FLUORENE	280	NC	NC	0.2 U	0.2 U	0.2 U	0.2 U	NS	NS	NS	NS	0.22 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NS	NS	0.7 J	0.2 U	2.9 J	0.39	1.1	0.86	0.2 U	1	
NAPHTHALENE	14	200	20	0.2 U	0.2 U	0.2 U	0.2 U	NS	NS	NS	NS	0.22 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NS	NS	1 U	0.13 J	7.5 U	0.08 J	0.36	0.28	0.2 U	0.8	
PHENANTHRENE	210	NC	NC	0.2 U	0.2 U	0.2 U	0.2 U	NS	NS	NS	NS	0.22 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NS	NS	1 U	0.2 U	7.5 U	0.17 J	0.44	0.88	0.2 U	0.3	
PYRENE	210	NC	NC	0.2 U	0.2 U	0.2 U	0.2 U	NS	NS	NS	NS	0.22 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NS	NS	1 U	0.19 J	7.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.09 U	
<b>TRPH(5) (µg/L)</b>																												
TOTAL PETROLEUM HYDROCARBONS	5000	50000	5000	400 J	500 U	310 U	500 U	NS	NS	NS	NS	1300	500 U	570 U	500 U	500 U	1700 U	NS	NS	1200	500 U	2200 U	350 J	690	1200 J	1700 U	780	

TABLE 2-2  
SUMMARY OF GROUNDWATER MONITORING DATA  
UST SITE 1120 - OLF BRONSON  
NAS PENSACOLA  
PENSACOLA, FLORIDA  
PAGE 5 OF 7

WELL NAME FDEP WELL DESIGNATION SAMPLE ID SAMPLING EVENT COLLECTION DATE	GCTL <sup>(1)</sup> (µg/L)	Cont. Wells SSAL <sup>(2)</sup> (µg/L)	Peri. Wells SSAL <sup>(2)</sup> (µg/L)	MW-25 Contaminated well BRN-1120-MW25								MW-26 Contaminated well BRN-1120-MW26								MW-27 Contaminated well BRN-1120-MW27							
				Baseline	1Q	2Q	3Q	4Q	5Q	6Q	7Q	Baseline	1Q	2Q	3Q	4Q	5Q	6Q	7Q	Baseline	1Q	2Q	3Q	4Q	5Q	6Q	7Q
				06/25/03	09/25/03	12/11/03	03/10/04	NS	NS	06/08/05	10/26/05	06/26/03	09/24/03	12/11/03	03/10/04	06/07/04	NS	NS	06/08/05	NS	06/26/03	09/25/03	12/10/03	03/10/04	06/08/04	03/03/05	NS
<b>VOCs(3) (µg/L)</b>																											
BENZENE	1	NC	NC	1 U	1 U	1 U	1 U	NS	NS	1.0 U	0.3 U	1 U	1 U	1 U	1 U	1 U	NS	1.0 U	NS	1 U	1 U	1 U	1 U	1 U	1 U	NS	NS
ETHYLBENZENE	30	300	30	1	1 U	0.8 U	0.9 J	NS	NS	1.0 U	0.3 J	1 U	1 U	1 U	1 U	1 U	NS	1.0 U	NS	1 U	1 U	1 U	1 U	1 U	1 U	NS	NS
M+P-XYLENES	NC	NC	NC	1 U	2 U	0.4 J	2	NS	NS	NR	0.5 U	1 U	2 U	2 U	2 U	2 U	NS	NR	NS	1 U	2 U	2 U	2 U	2 U	NR	NS	NS
O-XYLENE	NC	NC	NC	1 U	1 U	1 U	1 U	NS	NS	NR	0.3 U	1 U	1 U	1 U	1 U	1 U	NS	NR	NS	1 U	1 U	1 U	1 U	1 U	NR	NS	NS
TOLUENE	40	NC	NC	1 U	1 U	1 U	1 U	NS	NS	1.0 U	0.2 U	1 U	1 U	1 U	1 U	1 U	NS	1.0 U	NS	1 U	1 U	1 U	1 U	1 U	1 U	NS	NS
TOTAL XYLENES	20	200	20	1 U	3 U	3 U	2 J	NS	NS	3.0 U	0.8 U	1 U	3 U	3 U	3 U	3 U	NS	3.0 U	NS	1 U	3 U	3 U	3 U	3 U	3 U	NS	NS
<b>PAHs(4) (µg/L)</b>																											
1-METHYLNAPHTHALENE	28	200	20	7.3	0.2 U	17	14	NS	NS	0.2 U	34	0.21 U	0.2 U	0.2 U	0.2 U	0.2 U	NS	0.2 U	NS	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NS	NS
2-METHYLNAPHTHALENE	28	200	20	20	0.11 J	56	18	NS	NS	0.2 U	56	0.21 U	0.2 U	0.2 U	0.2 U	0.2 U	NS	0.2 U	NS	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NS	NS
ACENAPHTHENE	20	NC	NC	1.9 U	0.2 U	7.7 U	0.24	NS	NS	0.2 U	0.09 U	0.21 U	0.2 U	0.2 U	0.2 U	0.2 U	NS	0.2 U	NS	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NS	NS
ACENAPHTHYLENE	210	NC	NC	1.9 U	0.2 U	7.7 U	0.2 U	NS	NS	0.2 U	0.04 U	0.21 U	0.2 U	0.2 U	0.2 U	0.2 U	NS	0.2 U	NS	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NS	NS
BENZO(A)ANTHRACENE	0.05	NC	NC	1.9 U	0.2 U	7.7 U	0.2 U	NS	NS	0.2 U	0.08 U	0.21 U	0.2 U	0.2 U	0.2 U	0.2 U	NS	0.2 U	NS	0.2 U	0.17 J	0.2 U	0.2 U	0.2 U	0.2 U	NS	NS
BENZO(K)FLUORANTHENE	0.5	NC	NC	1.9 U	0.2 U	7.7 U	0.2 U	NS	NS	0.2 U	0.1 U	0.21 U	0.2 U	0.2 U	0.2 U	0.2 U	NS	0.2 U	NS	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NS	NS
CHRYSENE	4.8	NC	NC	1.9 U	0.2 U	7.7 U	0.2 U	NS	NS	0.2 U	0.05 U	0.21 U	0.2 U	0.2 U	0.2 U	0.2 U	NS	0.2 U	NS	0.2 U	0.14 J	0.2 U	0.2 U	0.2 U	0.2 U	NS	NS
FLUORANTHENE	280	NC	NC	1.9 U	0.2 U	7.7 U	0.2 U	NS	NS	0.2 U	0.07 U	0.21 U	0.2 U	0.2 U	0.2 U	0.2 U	NS	0.2 U	NS	0.2 U	0.17 J	0.2 U	0.2 U	0.2 U	0.2 U	NS	NS
FLUORENE	280	NC	NC	1.9 U	0.2 U	7.7 U	0.36	NS	NS	0.2 U	2	0.21 U	0.2 U	0.2 U	0.2 U	0.17 J	NS	0.2 U	NS	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NS	NS
NAPHTHALENE	14	200	20	6	0.2 U	16	6.4	NS	NS	0.2 U	9	0.21 U	0.2 U	0.2 U	0.2 U	0.2 U	NS	0.2 U	NS	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NS	NS
PHENANTHRENE	210	NC	NC	1.9 U	0.2 U	7.7 U	0.11 J	NS	NS	0.2 U	0.8	0.21 U	0.2 U	0.2 U	0.2 U	0.2 U	NS	0.2 U	NS	0.2 U	0.077 J	0.2 U	0.2 U	0.2 U	0.2 U	NS	NS
PYRENE	210	NC	NC	1.9 U	0.2 U	7.7 U	0.2 U	NS	NS	0.2 U	0.09 U	0.21 U	0.2 U	0.2 U	0.2 U	0.2 U	NS	0.2 U	NS	0.2 U	0.22	0.2 U	0.2 U	0.2 U	0.2 U	NS	NS
<b>TRPH(5) (µg/L)</b>																											
TOTAL PETROLEUM HYDROCARBONS	5000	50000	5000	950	500 U	1300 U	450 J	NS	NS	1700 U	700	520 U	500 U	500 U	500 U	500 U	NS	1700 U	NS	500 U	500 U	330 U	500 U	500 U	1700 J	NS	NS

TABLE 2-2  
SUMMARY OF GROUNDWATER MONITORING DATA  
UST SITE 1120 - OLF BRONSON  
NAS PENSACOLA  
PENSACOLA, FLORIDA  
PAGE 6 OF 7

WELL NAME FDEP WELL DESIGNATION SAMPLE ID SAMPLING EVENT COLLECTION DATE	GCTL <sup>(1)</sup> (µg/L)	Cont. Wells SSAL <sup>(2)</sup> (µg/L)	Perf. Wells SSAL <sup>(2)</sup> (µg/L)	MW-28							MW-29							MW-30									
				Perimeter Well							Perimeter Well							Perimeter Well									
				BRN-1120-MW28							BRN-1120-MW29							OLFB1120MW30									
				Baseline	1Q	2Q	3Q	4Q	5Q	6Q	7Q	Baseline	1Q	2Q	3Q	4Q	5Q	6Q	7Q	Baseline	1Q	2Q	3Q	4Q	5Q	6Q	7Q
08/26/03	09/25/03	12/10/03	03/10/04	06/08/04	03/03/05	09/07/05	10/25/05	NS	09/25/03	12/10/03	03/10/04	06/08/04	NS	NS	10/25/05	NS	NS	NS	NS	08/07/04	NS	NS	10/26/05				
<b>VOCs(3) (µg/L)</b>																											
BENZENE	1	NC	NC	1 U	1 U	1 U	1 U	1 U	1 U	1.0 U	0.3 U	NS	1 U	1 U	1 U	1 U	NS	NS	0.3 U	NS	NS	NS	NS	1 U	NS	NS	0.3 U
ETHYLBENZENE	30	300	30	1 U	1 U	1 U	1 U	1 U	1 U	1.0 U	0.2 U	NS	1 U	1 U	0.3 J	0.4 J	NS	NS	0.2 U	NS	NS	NS	NS	1 U	NS	NS	0.2 U
M+P-XYLENES	NC	NC	NC	1 U	2 U	2 U	2 U	2 U	NR	NR	0.5 U	NS	2 U	2 U	2 U	2 U	NS	NS	0.5 U	NS	NS	NS	NS	2 U	NS	NS	0.5 U
O-XYLENE	NC	NC	NC	1 U	1 U	1 U	1 U	1 U	NR	NR	0.3 U	NS	1 U	1 U	1 U	1 U	NS	NS	0.3 U	NS	NS	NS	NS	1 U	NS	NS	0.3 U
TOLUENE	40	NC	NC	1 U	1 U	1 U	1 U	1 U	0.30 J	1.0 U	0.2 U	NS	1 U	1 U	0.2 J	1 U	NS	NS	0.2 U	NS	NS	NS	NS	1 U	NS	NS	0.2 U
TOTAL XYLENES	20	200	20	1 U	3 U	3 U	3 U	3 U	3 U	3.0 U	0.8 U	NS	3 U	3 U	3 U	3 U	NS	NS	0.8 U	NS	NS	NS	NS	3 U	NS	NS	0.8 U
<b>PAHs(4) (µg/L)</b>																											
1-METHYLNAPHTHALENE	28	200	20	0.21 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.09 U	NS	0.2 U	0.2 U	0.2 U	0.085 J	NS	NS	0.09 U	NS	NS	NS	NS	0.33	NS	NS	0.09 U
2-METHYLNAPHTHALENE	28	200	20	0.21 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.06 U	NS	0.2 U	1.2	0.97	2.7	NS	NS	0.06 U	NS	NS	NS	NS	3.6	NS	NS	1
ACENAPHTHENE	20	NC	NC	0.21 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.08 U	NS	0.2 U	0.2 U	0.12 J	0.21	NS	NS	0.08 U	NS	NS	NS	NS	0.34	NS	NS	0.08 U
ACENAPHTHYLENE	210	NC	NC	0.21 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.04 U	NS	0.2 U	0.2 U	0.2 U	0.2 U	NS	NS	0.04 U	NS	NS	NS	NS	0.2 U	NS	NS	0.04 U
BENZO(A)ANTHRACENE	0.05	NC	NC	0.21 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.08 U	NS	0.2 U	0.2 U	0.2 U	0.2 U	NS	NS	0.08 U	NS	NS	NS	NS	0.2 U	NS	NS	0.08 U
BENZO(K)FLUORANTHENE	0.5	NC	NC	0.21 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.09 U	NS	0.2 U	0.2 U	0.2 U	0.2 U	NS	NS	0.09 U	NS	NS	NS	NS	0.2 U	NS	NS	0.09 U
CHRYSENE	4.8	NC	NC	0.21 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.05 U	NS	0.2 U	0.2 U	0.2 U	0.2 U	NS	NS	0.05 U	NS	NS	NS	NS	0.2 U	NS	NS	0.05 U
FLUORANTHENE	280	NC	NC	0.21 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.07 U	NS	0.2 U	0.2 U	0.2 U	0.2 U	NS	NS	0.07 U	NS	NS	NS	NS	0.2 U	NS	NS	0.07 U
FLUORENE	280	NC	NC	0.21 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.06 U	NS	0.2 U	0.11 J	0.19 J	0.38	NS	NS	0.06 U	NS	NS	NS	NS	1	NS	NS	0.5
NAPHTHALENE	14	200	20	0.21 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.05 U	NS	0.2 U	0.12 J	0.52	1.6	NS	NS	0.05 U	NS	NS	NS	NS	0.29	NS	NS	0.2
PHENANTHRENE	210	NC	NC	0.21 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.08 U	NS	0.2 U	0.2 U	0.1 J	0.086 J	NS	NS	0.08 U	NS	NS	NS	NS	0.43	NS	NS	0.3
PYRENE	210	NC	NC	0.21 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.08 U	NS	0.2 U	0.2 U	0.2 U	0.2 U	NS	NS	0.08 U	NS	NS	NS	NS	0.2 U	NS	NS	0.08 U
<b>TRPH(5) (µg/L)</b>																											
TOTAL PETROLEUM HYDROCARBONS	5000	50000	5000	500 U	500 U	340 U	500 U	500 U	1700 J	1700 U	210 U	NS	500 U	500 U	500 U	300 J	NS	NS	220 U	NS	NS	NS	NS	490	NS	NS	540

TABLE 2-2

SUMMARY OF GROUNDWATER MONITORING DATA  
UST SITE 1120 - OLF BRONSON  
NAS PENSACOLA  
PENSACOLA, FLORIDA  
PAGE 7 OF 7

WELL NAME FDEP WELL DESIGNATION SAMPLE ID SAMPLING EVENT COLLECTION DATE	GCTL <sup>(1)</sup> (µg/L)	Cont. Wells SSAL <sup>(2)</sup> (µg/L)	Peri. Wells SSAL <sup>(2)</sup> (µg/L)	MW-32									MW-35						
				BRN-1120-MW32									BRN-1120-MW35						
				Baseline 08/28/03	1Q NS	2Q NS	3Q NS	4Q NS	5Q 03/03/05	6Q 06/07/05	7Q NS	Baseline 08/28/03	1Q 09/25/03	2Q 12/10/03	3Q 03/10/04	4Q 06/07/04	5Q 03/02/05	6Q NS	7Q NS
<b>VOCs(3) (µg/L)</b>																			
BENZENE	1	NC	NC	1 U	NS	NS	NS	NS	1 U	1.0 U	NS	1 U	1 U	1 U	1 U	1 U	1 U	NS	NS
ETHYLBENZENE	30	300	30	1 U	NS	NS	NS	NS	1 U	1.0 U	NS	1 U	1 U	1 U	1 U	1 U	1 U	NS	NS
M+P-XYLENES	NC	NC	NC	1 U	NS	NS	NS	NS	NR	NR	NS	1 U	2 U	2 U	2 U	2 U	NR	NS	NS
O-XYLENE	NC	NC	NC	1 U	NS	NS	NS	NS	NR	NR	NS	1 U	1 U	1 U	1 U	1 U	NR	NS	NS
TOLUENE	40	NC	NC	1 U	NS	NS	NS	NS	0.30 J	1.0 U	NS	1 U	1 U	1 U	1 U	1 U	0.27 J	NS	NS
TOTAL XYLENES	20	200	20	1 U	NS	NS	NS	NS	3 U	3.0 U	NS	1 U	3 U	3 U	3 U	3 U	3 U	NS	NS
<b>PAHs(4) (µg/L)</b>																			
1-METHYLNAPHTHALENE	28	200	20	0.2 U	NS	NS	NS	NS	0.2 U	0.2 U	NS	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NS	NS
2-METHYLNAPHTHALENE	28	200	20	0.2 U	NS	NS	NS	NS	0.2 U	0.2 U	NS	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NS	NS
ACENAPHTHENE	20	NC	NC	0.2 U	NS	NS	NS	NS	0.2 U	0.2 U	NS	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NS	NS
ACENAPHTHYLENE	210	NC	NC	0.2 U	NS	NS	NS	NS	0.2 U	0.2 U	NS	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NS	NS
BENZO(A)ANTHRACENE	0.05	NC	NC	0.2 U	NS	NS	NS	NS	0.2 U	0.2 U	NS	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NS	NS
BENZO(K)FLUORANTHENE	0.5	NC	NC	0.2 U	NS	NS	NS	NS	0.2 U	0.2 U	NS	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NS	NS
CHRYSENE	4.8	NC	NC	0.2 U	NS	NS	NS	NS	0.2 U	0.2 U	NS	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NS	NS
FLUORANTHENE	280	NC	NC	0.2 U	NS	NS	NS	NS	0.2 U	0.2 U	NS	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NS	NS
FLUORENE	280	NC	NC	0.2 U	NS	NS	NS	NS	0.2 U	0.2 U	NS	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NS	NS
NAPHTHALENE	14	200	20	0.2 U	NS	NS	NS	NS	0.2 U	0.2 U	NS	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NS	NS
PHENANTHRENE	210	NC	NC	0.2 U	NS	NS	NS	NS	0.2 U	0.2 U	NS	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NS	NS
PYRENE	210	NC	NC	0.2 U	NS	NS	NS	NS	0.2 U	0.2 U	NS	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NS	NS
<b>TRPH(5) (µg/L)</b>																			
TOTAL PETROLEUM HYDROCARBONS	5000	50000	5000	500 U	NS	NS	NS	NS	1700 J	1700 U	NS	500 U	500 U	350 U	500 U	500 U	1700J	NS	NS

Notes:

440	Exceeds GCTL
440	Exceeds GCTL and NADSC

<sup>1</sup> Groundwater Cleanup Target Level as provided in Chapter 62-777, FAC.

<sup>2</sup> Site-specific Natural Attenuation Action Levels FDEP April 2, 2002.

J = Estimated concentration

U = non-detect value

µg/L = micrograms per liter

NC = No Criteria

FAC = Florida Administrative Code

NS = Not sampled

NR = Not reported

SSAL = Site Specific Action Level

Cont. = Contaminated

Peri. = Perimeter

TABLE 2-3  
SUMMARY OF GROUNDWATER DATA - DECEMBER 2007  
SITE 1120 - OLF BRONSON  
NAS PENSACOLA  
PENSACOLA, FLORIDA  
PAGE 1 OF 2

WELL NAME	GCTL <sup>(1)</sup>	NADSC <sup>(2)</sup>	MW-5R BRN-1120-MW05R	MW-7 BRN-1120-MW07	MW-14R BRN-1120-MW14R	MW-14R DUP BRN-1120-DUP01-1207	MW-16R BRN-1120-MW16R	MW-24 BRN-1120-MW24	MW-25 BRN-1120-MW25	MW-27 BRN-1120-MW27
SAMPLE ID										
SAMPLING EVENT			Baseline	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline
COLLECTION DATE			12/13/07	12/13/07	12/14/07	12/14/07	12/13/07	12/13/07	12/13/07	12/13/07
<b>VOCs (µg/L)</b>										
CHLOROFORM	70	700	0.21U	0.58 J	0.21U	0.21U	0.39 J	1.6	0.26 J	3.3
ETHYLBENZENE	30	300	0.2 U	0.2 U	6	6.2	0.2 U	0.2 U	0.2 U	0.2 U
TOTAL XYLENES	20	200	0.56 U	0.56 U	9.3	10.2	0.56 U	0.56 U	0.56 U	0.56 U
<b>PAHs (µg/L)</b>										
1-METHYLNAPHTHALENE	28	280	0.25 U	0.24 U	140	133	0.34 J	0.25 J	0.25 U	0.25 U
2-METHYLNAPHTHALENE	28	280	0.25 U	0.24 U	178	172	0.43 J	0.65 J	0.25 U	0.25 U
ACENAPHTHENE	20	200	0.5 U	0.49 U	2 U	2 U	0.5 U	0.49 U	0.5 U	0.5 U
FLUORENE	280	2800	0.25 U	0.24 U	4.8	4.7	0.25 U	0.24 U	0.25 U	0.25 U
NAPHTHALENE	14	140	0.25 U	0.24 U	77.5	73.9	0.25 U	0.24 U	0.25 U	0.25 U
PHENANTHRENE	210	2100	0.5 U	0.49 U	2.6 J	2.5 J	0.5 U	0.49 U	0.5 U	0.5 U
<b>TRPH (mg/L)</b>										
TOTAL PETROLEUM HYDROCARBONS	5000	50,000	1,113	170 U	6,960	5,100	170 U	206 J	170 U	180 U

TABLE 2-3  
SUMMARY OF GROUNDWATER DATA - DECEMBER 2007  
SITE 1120 - OLF BRONSON  
NAS PENSACOLA  
PENSACOLA, FLORIDA  
PAGE 2 OF 2

WELL NAME SAMPLE ID SAMPLING EVENT COLLECTION DATE	GCTL <sup>(1)</sup>	NADSC <sup>(2)</sup>	MW-28 BRN-1120-MW28 Baseline 12/14/07	MW-29 BRN-1120-MW29 Baseline 12/14/07	MW-30 OLFB1120MW30 Baseline 12/14/07	MW-36 BRN-1120-MW32 Baseline 12/13/07	MW-37 BRN-1120-MW35 Baseline 12/13/07	MW-38 BRN-1120-MW35 Baseline 12/13/07	MW-39 BRN-1120-MW35 Baseline 12/13/07	MW-40 BRN-1120-MW35 Baseline 12/13/07
<b>VOCs (µg/L)</b>										
CHLOROFORM	70	700	4.1	11.1	5.6	3.5	25.5	0.21U	0.21U	0.47 J
ETHYLBENZENE	30	300	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
TOTAL XYLENES	20	200	0.56 U	0.56 U	0.56 U	0.56 U	0.56 U	0.56 U	0.56 U	0.56 U
<b>PAHs (µg/L)</b>										
1-METHYLNAPHTHALENE	28	280	0.25 U	0.25 U	1.2	0.25 U	0.24 U	0.24 U	0.24 U	12.8
2-METHYLNAPHTHALENE	28	280	0.25 U	0.25 U	2.4	0.25 U	0.24 U	0.69 J	0.24 U	17.2
ACENAPHTHENE	20	200	0.49 U	0.49 U	0.5 U	0.5 U	0.48 U	0.48 U	0.49 U	0.54 J
FLUORENE	280	2800	0.25 U	0.25 U	0.48 J	0.25 U	0.24 U	0.24 U	0.24 U	1.5
NAPHTHALENE	14	140	0.25 U	0.25 U	0.26 J	0.25 U	0.24 U	0.36 J	0.24 U	0.96 J
PHENANTHRENE	210	2100	0.49 U	0.49 U	0.5 U	0.5 U	0.48 U	0.48 U	0.49 U	1.1
<b>TRPH (mg/L)</b>										
TOTAL PETROLEUM HYDROCARBONS	5000	50,000	170 U	170 U	702	170 U	160 U	170 U	170 U	1,410

Shaded cells indicate that the specified criterion has been exceeded.

J = Estimated concentration

U = non-detect value

µg/L = micrograms per liter

mg/L = milligrams per liter

FAC = Florida Administrative Code

Footnotes:

1 Groundwater Cleanup Target Level as provided in Chapter 62-777, FAC.

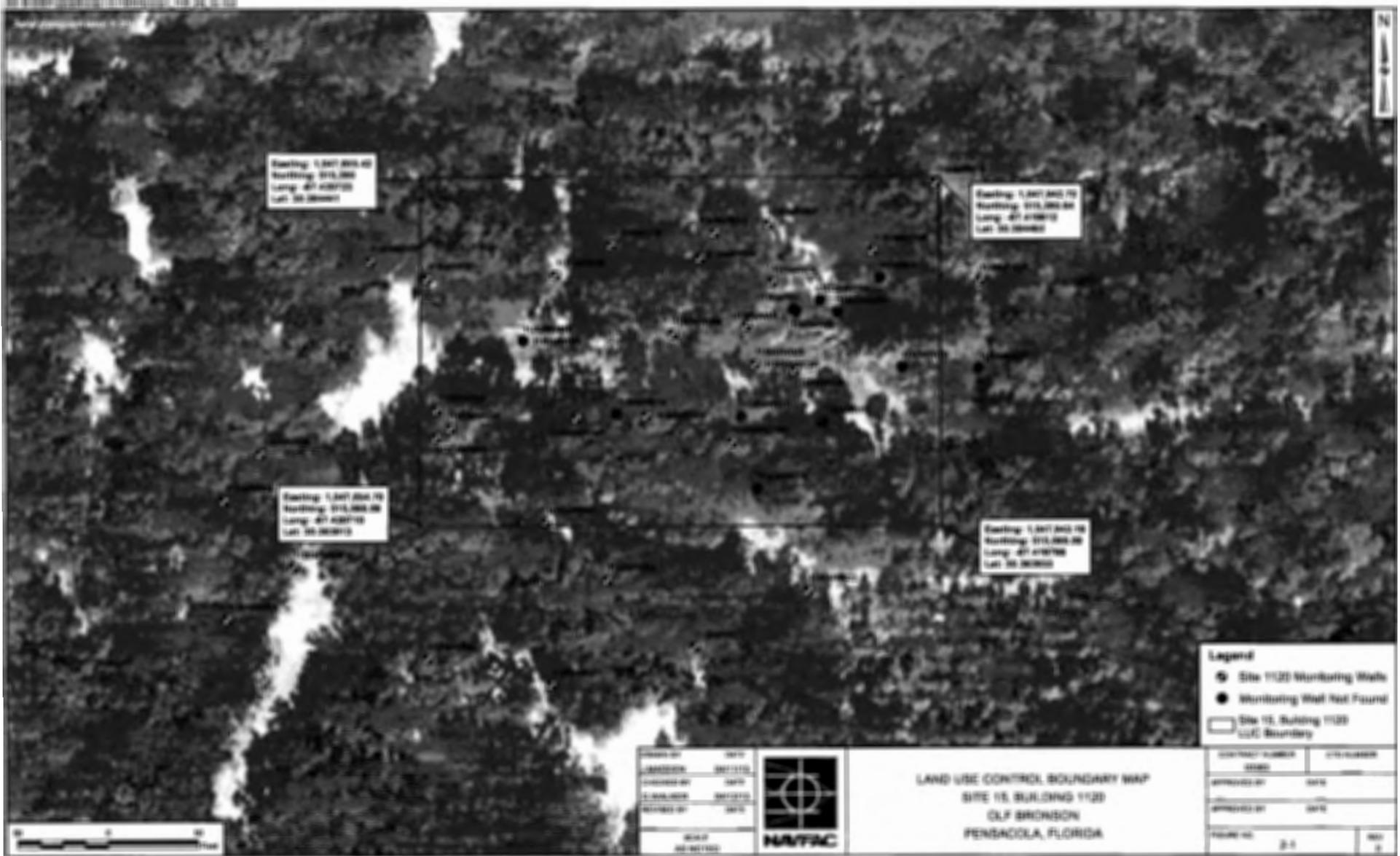
2 Natural Attenuation Default Source Concentrations as provided in Chapter 62-770, FAC.

TABLE 2-4

**SUMMARY OF GROUNDWATER DATA FOR MW-14R AND MW-38 - JUNE 2010**  
**SITE 1120 - OLF BRONSON**  
**NAS PENSACOLA**  
**PENSACOLA, FLORIDA**

Well ID	FDEP GCTLs (µg/L)	FDEP NADC CTLs (µg/L)	MW-14R										MW-38	
			Jun 2003	Sept 2003	Dec 2003	Mar 2004	Jun 2004	Mar 2005	Jun 2005	Oct 2005	Dec 2007	Jun 2010	Dec 2007	Jun 2010
1-Methylnaphthalene	28	280	<b>150</b>	<b>76</b>	<b>130</b>	<b>150</b>	<b>140</b>	<b>120</b>	0.75	<b>190</b>	<b>140</b>	<b>170</b>	0.24 U	0.3 U
2-Methylnaphthalene	28	280	<b>150</b>	<b>97</b>	<b>200</b>	<b>210</b>	<b>200</b>	<b>140</b>	1.1	<b>210</b>	<b>178</b>	<b>240</b>	0.69 J	0.043 J
Naphthalene	14	140	<b>52</b>	<b>41</b>	<b>98</b>	<b>160</b>	<b>100</b>	<b>62</b>	0.46	<b>82</b>	<b>77.5</b>	<b>72</b>	0.36 J	0.03 U
TRPH	5000	50000	3800	4600	4000	2500	2200	<b>5100</b>	1700	2600	<b>8960</b>	2200	170 U	850

Notes:  
**Bold** = Greater than FDEP Groundwater Cleanup Target Level (GCTL - Chapter 62-550, Florida Administrative Code (FAC) and Chapter 62-777, FAC)  
**Shaded Cell** = Greater than FDEP Natural Attenuation Default Concentration (NADC) (Chapter 62-777, FAC)  
 CTL = Cleanup target level  
 J = Estimated concentration  
 U = non-detect value



concentration of carcinogenic PAHs exceeds the residential SCTL in sample OLF20SB03-1012. This concentration does not exceed the industrial SCTL.

As noted above, PAHs were detected in sample OLF20SB03-1012 and not in the duplicate samples collected from the same location.

### **2.1.2 Soil to Groundwater Leaching Evaluation**

The comparison of the positive detections in the soil samples with the indirect exposure SCTLs (leachability) indicates that none of the chemicals detected exceed a leachability SCTL. Therefore, the soil is not an ongoing source of groundwater contamination.

## **2.2 GROUNDWATER**

Groundwater contamination was initially noted at Site 1120 during the removal of the USTs in 1994. MNA was recommended as a course of action for the site in 2001, but groundwater samples collected during several rounds of groundwater monitoring indicated that COC concentrations in the groundwater exceeded FDEP site-specific action levels. Therefore, it was recommended that a treatability study using ORC<sup>®</sup> be completed at UST Site 1120. Baseline groundwater samples were collected in June 2003 before the injection of the ORC<sup>®</sup> and seven rounds of quarterly monitoring were performed between September 2003 and October 2005. Based on the results of this quarterly monitoring, an additional injection event was recommended. Baseline groundwater samples were again collected in December 2007. Based on the results of the December 2007 sampling event and discussions with representatives from Tetra Tech and NAVFAC SE, it was determined that an additional round of groundwater samples would need to be collected from monitoring wells MW-14R and MW-38. Analysis for the two monitoring wells included: naphthalene, 1-methylnaphthalene, 2-methylnaphthalene, and TRPH. The analytical results obtained from this additional round of sampling provided data to confirm previously collected groundwater concentrations and determine if current concentrations are at or below their respective GCTLs or NADCs. The groundwater samples were collected in June 2010. Figure 1-2 shows the location of monitoring wells installed at Site 1120.

Table 2-2 provides a summary of the detected concentrations noted in the June 2003 baseline groundwater samples and in the seven rounds of quarterly monitoring samples collected between September 2003 and October 2005. The table also provides the GCTLs for the compounds detected. Fuel related VOCs (benzene, ethylbenzene, toluene, and xylenes) were detected in 13 of the monitoring wells sampled. However, the concentrations of these VOCs exceeded the GCTLs in only three of the monitoring wells sampled (MW-04, MW-05, and MW-14R). Generally the concentrations of VOCs have

decreased in each round for each monitoring well, and concentrations of VOCs have not exceeded the GCTLs since the fourth round of quarterly monitoring completed in June 2004.

PAHs were detected in 13 of the monitoring wells sampled and the concentrations of the PAHs exceeded the GCTLs in six of the wells sampled. The highest concentrations were detected in wells MW-14R and MW-04. Generally, the concentrations of PAHs have also decreased in each round for each monitoring well.

Table 2-3 provides a summary of the positive detections noted in the groundwater samples collected in December 2007. GCTLs and NADCs are also provided in this table. Ethylbenzene and total xylenes were the only fuel-related VOCs detected in this round of groundwater samples and they were detected in just one well (MW-14R). Chloroform was the only other VOC detected in this round of samples. None of the VOCs detected exceeded the GCTLs or NADCs.

Six PAHs were detected in the groundwater samples collected in December 2007. Only three of these PAHs (1-methylnaphthalene, 2-methylnaphthalene, and naphthalene) were detected at concentrations that exceeded the GCTLs, but none of the concentrations exceeded the NADCs. The exceedances of the GCTLs were detected in only one monitoring well (MW-14R). TRPH were also detected in this monitoring well at a concentration that exceeded its GCTL.

Table 2-4 provides a summary of laboratory results, GCTLs and NADCs for the sampling event that took place in June 2010. The table also provides the laboratory results from 2003 to 2007 for monitoring well MW-14R for comparison of concentrations detected from all sampling events. Analytical results indicated the presence of naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene in monitoring well MW-14R. The elevated concentrations of the contaminants listed above, all exceeded their respective GCTLs, but were less than their respective NADCs. Monitoring well MW-38 had a reported detection of 2-methylnaphthalene, but at a concentration well below its GCTL. TRPH was detected in both monitoring wells, but at concentrations below the GCTL and NADC.

### **3.0 HUMAN HEALTH RISK ASSESSMENT**

This section presents the human health risk assessment (HHRA) for soil and groundwater at Site 1120. The objective of the risk assessment is to determine whether detected concentrations of chemicals in soil and groundwater at the site pose significant threats to potential human receptors under current and/or future land use. The potential risks to receptors are estimated based on the assumption no further actions are taken to control contaminant releases or prevent receptor exposure.

#### **3.1 HUMAN HEALTH RISK ASSESSMENT PROTOCOL**

The risk assessment was conducted using FDEP guidance specified in the following documents:

- Technical Report: Development of Soil Cleanup Target Levels for Chapter 62-777, FAC (FDEP, 2005a).
- Contaminated Site Cleanup Criteria, Chapter 62-780 FAC, (FDEP, 2005b).

United States Environmental Protection Agency (USEPA) and Navy guidance documents were also used, if applicable. These included:

- Conducting Human Health Risk Assessments under the Environmental Restoration Program, (Department of the Navy, 2001).
- Risk Assessment Guidance for Superfund (RAGS): Volume I, Human Health Evaluation Manual (Part A), (USEPA, 1989).
- Soil Screening Guidance: Technical Background Document, (USEPA, 1996).
- Supplemental Guidance to RAGS: Region IV Bulletins, Human Health Risk Assessment, (USEPA, 2000).
- Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites, (USEPA, 2002).
- RAGS, Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance, Dermal Risk Assessment), (USEPA, 2004).

An HHRA consists of five components: data evaluation, exposure assessment, toxicity assessment, risk characterization, and uncertainty analysis. The following sections contain discussions of the five components as they apply to Site 1120.

### **3.1.1 Data Evaluation**

Data evaluation, the first component of a baseline HHRA, is a two-step, medium-specific task involving the compilation and evaluation of analytical data. The first step involves the compilation of the analytical database and an evaluation of data usability for purposes of HHRA. Under FDEP guidance, the second step of the data evaluation is the selection of a medium-specific list of potential COCs for the site. For Site 1120, potential COCs were identified by comparisons of concentrations of chemicals detected in soil and groundwater to FDEP SCTLs and GCTLs recommended in FDEP Chapter 62-780 FAC or to Cleanup Target Levels (CTLs) developed for alternate land use scenarios, as provided by Chapter 62-780. The soil data were also compared to Criteria based on Leachability to Groundwater provided in the Technical Report for Chapter 62-777 FAC. Chapter 62-780, FAC presents a phased risk-based corrective action process (RBCAP) that is iterative and tailors site rehabilitation tasks to site-specific conditions and risks.

#### **3.1.1.1 Data Usability**

The datasets used for the HHRA for Site 1120 consist of the following:

- Six subsurface soil samples (and one field duplicate) from three soil borings collected in June 2000. These samples were collected from depths of 4 to 14 feet bgs. The samples were collected after the tank closure and initial remedial action at the site. Contamination (primarily PAHs) was detected in sample OLFB20SB03-1012.
- Fifteen groundwater samples (and one field duplicate) collected in December 2007 and June 2010. These samples are the most recent groundwater samples collected at the site. Contamination (primarily PAHs) was detected in monitoring well MW-14R.

The samples were collected after the removal action which occurred in 1994 and are expected to represent current site conditions.

Only fixed-based analytical results from the field investigations were used in the quantitative risk evaluation. All detected concentrations with "J" qualifiers are considered positive detections and were used in the risk evaluation. Data with "U" and "UJ" qualifiers and data qualified because of blank contamination were retained and evaluated as nondetects. Field measurements and data regarded as

unreliable (i.e., qualified as "R" during the data validation process) were not used in the quantitative risk assessment.

Because the site is a UST site and releases were to the subsurface, surface soil, surface water, and sediment are not considered as media of concern for Site 1120.

### 3.1.1.2 Identification of Potential Chemicals of Concern

As stated previously, potential COCs were identified by comparisons of concentrations of chemicals in soil and groundwater to FDEP SCTLs and GCTLs provided in the Technical Report for Chapter 62-777 FAC or to CTLs developed for alternate land use scenarios. Details and results of the comparisons are provided in Sections 3.4 and 3.5. Because the samples were analyzed only for organic chemicals, background was not taken into account when identifying potential COCs. The following FDEP criteria were used to identify potential COCs for Site 1120:

#### Soil Criteria

- Residential SCTLs for Direct Exposure (FDEP, 2005a). The residential SCTLs are based on ingestion, dermal contact, and inhalation of vapors and/or particulates and assume that potential receptors are exposed 350 days per year for 30 years.
- Industrial SCTLs for Direct Exposure (FDEP, 2005a). The industrial SCTLs are based on ingestion, dermal contact, and inhalation of vapors and/or particulates and assume that future fulltime workers are exposed 250 days per year for 25 years.
- Alternate SCTLs for a Future Construction Worker scenario. The construction worker SCTLs were calculated using FDEP and USEPA guidance. These SCTLs are based on ingestion, dermal contact, and inhalation of vapors and/or particulates and assume that future construction workers are exposed 250 days per year for 1 year.
- SCTLs for Leachability based on Groundwater Criteria (FDEP, 2005a). These criteria evaluate the potential for chemicals in soil to impact groundwater and assume that groundwater at the site is used as a source of drinking water.
- Soil Saturation Concentrations ( $C_{sat}$ ) (FDEP, 2005a). These values are provided in Table 8 of Chapter 62-777 FAC and are used to determine the potential for the presence of free product in soil.

## Groundwater Criteria

Screening levels based on the following were used to select potential COCs for groundwater:

- GCTLs for Direct Exposure (FDEP, 2005a). The GCTLs assume a residential drinking water scenario and consist of primary standards [such as Federal Maximum Contaminant Levels (MCLs)], secondary standards (which are not based on adverse health effects), or risk-based values based on ingestion only. The risk-based criteria assume that potential receptors ingest 2 liters of contaminated groundwater 350 days per year for 30 years.
- Natural Attenuation Default Criteria (described in Chapter 62-785.690 FAC). NADCs are developed by multiplying the Groundwater Criteria by 10 for noncarcinogens and by 100 for carcinogens. For those contaminants that present both carcinogenic and non-carcinogenic risks, the Groundwater Criteria are multiplied by 10 as a noncarcinogen. For those contaminants that have both primary and secondary groundwater standards, the Groundwater Criteria and NADCs are based on the lower of the two standards. The NADCs are presented in Table V of Chapter 62-777 FAC (FDEP, 2005a).
- Alternate GCTLs for a Future Construction Worker scenario. The construction worker GCTLs were calculated using FDEP and USEPA guidance. These GCTLs are based on incidental ingestion and dermal contact with groundwater and assume that future construction workers are exposed 250 days per year for 1 year.

The SCTLs and GCTLs are based on a target cancer risk level of  $1 \times 10^{-6}$  (i.e., a one-in-one million probability of developing cancer) for chemicals classified as carcinogens or on a Hazard Quotient (HQ) of 1.0 (i.e., a no adverse non-carcinogenic effect level) for noncarcinogens.

Exposure to contaminants in subsurface soil is typically evaluated only for potential exposure during construction or excavation activities. Therefore, a construction/excavation worker is considered to be the receptor most likely exposed to subsurface soil. However, subsurface soil could potentially be brought to the surface during future excavation projects resulting in exposure of other receptors such as future residents or workers. For this reason, potential exposure of residents and typical industrial workers to subsurface soils are also evaluated in the risk assessment.

### **3.2 EXPOSURE ASSESSMENT**

The exposure assessment defines and evaluates, quantitatively or qualitatively, the type and magnitude of human exposure to the chemicals present at or migrating from the site. The exposure assessment is designed to depict the physical setting of the site, to identify potentially exposed populations and

applicable exposure pathways, to determine concentrations of potential COCs to which receptors might be exposed, and to estimate chemical intakes under the identified exposure scenarios. Actual or potential exposures at a site are determined based on the most likely pathways of contaminant release and transport, as well as human activity patterns.

### **3.2.1 Potential Exposure Pathways**

A complete exposure pathway has three components: (1) a source of chemicals that can be released to the environment, (2) a route of contaminant transport through an environmental medium, and (3) an exposure or contact point for a human receptor. For Site 1120, these three components are discussed in the following subsections.

#### **3.2.1.1 Sources of Environmental Contamination**

The contaminants at Site 1120 are petroleum hydrocarbons, mainly PAHs. The source of contamination at Site 1120 was the three USTs which contained fuel oils and have been removed. Therefore, the primary source of contamination at the site no longer exists. A secondary source of contamination at the site may be subsurface soil which was found to contain TPH and PAHs. TPH and PAHs were also detected in groundwater at the site. However, it should be noted that the PAHs detected in groundwater are not the same as those detected in subsurface soil (See Tables 3-1 and 3-2). Consequently, the analytical data at the site indicate that the current contamination in subsurface soil is not impacting local groundwater.

#### **3.2.1.2 Potential Contaminant Migration Routes**

Given that subsurface soil and groundwater contamination has occurred as a result of chemical releases from the USTs and that chemicals may migrate to deeper subsurface soils and groundwater, plausible contaminant release and migration mechanisms at Site 1120 are as follows:

Migration of soil contaminants downward through the soil column with infiltrating precipitation. Chemicals may continue to migrate in groundwater via dispersion and advection in the downgradient direction. Depth to groundwater at the Site is approximately 15 to 20 feet bgs. However, the COCs at the site (PAHs) are not environmentally mobile and do not tend to readily leach through the soil column. PAHs are much more likely to bind to soil and be transported via mass transport mechanisms rather than move in the dissolved phase. The presence of these chemicals in groundwater at the site may be more likely due to releases from the USTs rather than migration from subsurface soil.

Migration of fugitive dusts from subsurface soils into ambient air if construction/excavation activities were to occur in the future. As indicated in Table 3-1, PAHs were detected in only one sample at a depth of

TABLE 3-1

COMPARISON WITH SCTLs FOR LEACHABILITY TO GROUNDWATER AND C<sub>SAT</sub> LIMITS - SUBSURFACE SOIL  
SITE 1120 - OLF BRONSON  
NAS PENSACOLA  
PENSACOLA, FLORIDA

CAS No.	Parameter	Frequency of Detection	Maximum Concentration <sup>(1)</sup>	Sample of Maximum Detection	Background Value <sup>(1)</sup>	Florida Leachability to Groundwater <sup>(2)</sup>	Soil Saturation Limit, C <sub>sat</sub> <sup>(3)</sup>
<b>Volatile Organics (mg/kg)</b>							
108-88-3	TOLUENE	4/6	0.0015 J	OLFB20SB02-0406	NA(4)	0.5	650
<b>Semivolatile Organics (mg/kg)</b>							
191-24-2	BENZO(G,H,I)PERYLENE	1/6	0.091	OLFB20SB03-1012	NA	32000	---
206-44-0	FLUORANTHENE	1/6	0.288 J	OLFB20SB03-1012	NA	1200	---
85-01-8	PHENANTHRENE	1/6	0.12 J	OLFB20SB03-1012	NA	250	---
129-00-0	PYRENE	1/6	0.186 J	OLFB20SB03-1012	NA	880	---
56-55-3	BENZO(A)ANTHRACENE	1/6	0.123	OLFB20SB03-1012	NA	0.8	---
50-32-8	BENZO(A)PYRENE	1/6	0.108	OLFB20SB03-1012	NA	8	---
205-99-2	BENZO(B)FLUORANTHENE	1/6	0.136	OLFB20SB03-1012	NA	2.4	---
207-08-9	BENZO(K)FLUORANTHENE	1/6	0.0782	OLFB20SB03-1012	NA	24	---
218-01-9	CHRYSENE	1/6	0.136 J	OLFB20SB03-1012	NA	77	---
193-39-5	INDENO(1,2,3-CD)PYRENE	1/6	0.142	OLFB20SB03-1012	NA	6.6	---
<b>Petroleum Hydrocarbons (mg/kg)</b>							
TTNUS001	TOTAL PETROLEUM HYDROCARBONS	5/6	70.3	OLFB20SB01-0406	NA	340	---

Shaded cells indicate that the specified criterion or background level has been exceeded.

mg/kg = milligram per kilogram

PAHS = polynuclear aromatic hydrocarbons

COC = contaminant of concern

GW = Groundwater

Footnotes:

- 1 Sample and duplicate are counted as two separate samples when determining the maximum detected concentration.
- 2 Soil Cleanup Target Levels (SCTLs) for Leachability Based on Groundwater Criteria, Table 2, Chapter 62-777 Technical Report (FDEP, February 2005).
- 3 Soil Saturation Limits (C<sub>sat</sub>), Table 8, Chapter 62-777 Technical Report (FDEP, February 2005).
- 4 NA - Not Applicable. According to proposed Florida Rule 62-780 only naturally occurring (inorganic) constituents are considered in the background evaluation.

TABLE 3-2

COMPARISON OF CONCENTRATIONS IN GROUNDWATER TO GROUNDWATER CTLS AND NATURAL ATTENUATION CRITERIA  
SITE 1120 - OLF BRONSON  
NAS PENSACOLA  
PENSACOLA, FLORIDA  
PAGE 1 OF 3

WELL NAME SAMPLE ID SAMPLING EVENT COLLECTION DATE	GCTL <sup>(1)</sup>	NADSC <sup>(2)</sup>	MW-5R BRN-1120-MW05R Baseline 12/13/07	MW-7 BRN-1120-MW07 Baseline 12/13/07	MW-14R BRN-1120-MW14R Baseline 12/14/07	MW-14R DUP BRN-1120-DUP01-120 Baseline 12/14/07	MW-16R BRN-1120-MW16R Baseline 12/13/07	MW-24 BRN-1120-MW24 Baseline 12/13/07	MW-25 BRN-1120-MW25 Baseline 12/13/07
<b>Volatile Organics (µg/L)</b>									
CHLOROFORM	70	700	0.21U	0.58 J	0.21U	0.21U	0.39 J	1.6	0.26 J
ETHYLBENZENE	30	300	0.2 U	0.2 U	6	6.2	0.2 U	0.2 U	0.2 U
TOTAL XYLENES	20	200	0.56 U	0.56 U	9.3	10.2	0.56 U	0.56 U	0.56 U
<b>Semivolatile Organics (µg/L)</b>									
1-METHYLNAPHTHALENE (3)	28	280	0.25 U	0.24 U	140	133	0.34 J	0.25 J	0.25 U
2-METHYLNAPHTHALENE	28	280	0.25 U	0.24 U	178	172	0.43 J	0.65 J	0.25 U
ACENAPHTHENE	20	200	0.5 U	0.49 U	2 U	2 U	0.5 U	0.49 U	0.5 U
FLUORENE	280	2800	0.25 U	0.24 U	4.8	4.7	0.25 U	0.24 U	0.25 U
NAPHTHALENE	14	140	0.25 U	0.24 U	77.5	73.9	0.25 U	0.24 U	0.25 U
PHENANTHRENE	210	2100	0.5 U	0.49 U	2.6 J	2.5 J	0.5 U	0.49 U	0.5 U
<b>Petroleum Hydrocarbons (µg/L)</b>									
TOTAL PETROLEUM HYDROCARBONS	5,000	50,000	1,113	170 U	6960	6100	170 U	206 J	170 U

TABLE 3-2

COMPARISON OF CONCENTRATIONS IN GROUNDWATER TO GROUNDWATER CTLS AND NATURAL ATTENUATION CRITERIA  
SITE 1120 - OLF BRONSON  
NAS PENSACOLA  
PENSACOLA, FLORIDA  
PAGE 2 OF 3

WELL NAME SAMPLE ID SAMPLING EVENT COLLECTION DATE	GCTL <sup>(1)</sup>	NADSC <sup>(2)</sup>	MW-27 BRN-1120-MW27 Baseline 12/13/07	MW-28 BRN-1120-MW28 Baseline 12/14/07	MW-29 BRN-1120-MW29 Baseline 12/14/07	MW-30 OLFB1120MW30 Baseline 12/14/07	MW-36 BRN-1120-MW32 Baseline 12/13/07	MW-37 BRN-1120-MW35 Baseline 12/13/07	MW-38 BRN-1120-MW35 Baseline 12/13/07
<b>Volatile Organics (µg/L)</b>									
CHLOROFORM	70	700	3.3	4.1	11.1	5.6	3.5	25.5	0.21U
ETHYLBENZENE	30	300	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
TOTAL XYLENES	20	200	0.56 U	0.56 U	0.56 U	0.56 U	0.56 U	0.56 U	0.56 U
<b>Semivolatile Organics (µg/L)</b>									
1-METHYLNAPHTHALENE (3)	28	280	0.25 U	0.25 U	0.25 U	1.2	0.25 U	0.24 U	0.24 U
2-METHYLNAPHTHALENE	28	280	0.25 U	0.25 U	0.25 U	2.4	0.25 U	0.24 U	0.69 J
ACENAPHTHENE	20	200	0.5 U	0.49 U	0.49 U	0.5 U	0.5 U	0.48 U	0.48 U
FLUORENE	280	2800	0.25 U	0.25 U	0.25 U	0.48 J	0.25 U	0.24 U	0.24 U
NAPHTHALENE	14	140	0.25 U	0.25 U	0.25 U	0.26 J	0.25 U	0.24 U	0.36 J
PHENANTHRENE	210	2100	0.5 U	0.49 U	0.49 U	0.5 U	0.5 U	0.48 U	0.48 U
<b>Petroleum Hydrocarbons (µg/L)</b>									
TOTAL PETROLEUM HYDROCARB	5,000	50,000	180 U	170 U	170 U	702	170 U	160 U	170 U

**TABLE 3-2**  
**COMPARISON OF CONCENTRATIONS IN GROUNDWATER TO GROUNDWATER CTLS AND NATURAL ATTENUATION CRITERIA**  
**SITE 1120 - OLF BRONSON**  
**NAS PENSACOLA**  
**PENSACOLA, FLORIDA**  
**PAGE 3 OF 3**

WELL NAME SAMPLE ID SAMPLING EVENT COLLECTION DATE	GCTL <sup>(1)</sup>	NADSC <sup>(2)</sup>	MW-39 BRN-1120-MW35 Baseline 12/13/07	MW-40 BRN-1120-MW35 Baseline 12/13/07
<b>Volatile Organics (µg/L)</b>				
CHLOROFORM	70	700	0.21U	0.47 J
ETHYLBENZENE	30	300	0.2 U	0.2 U
TOTAL XYLENES	20	200	0.56 U	0.56 U
<b>Semivolatile Organics (µg/L)</b>				
1-METHYLNAPHTHALENE (3)	28	280	0.24 U	12.8
2-METHYLNAPHTHALENE	28	280	0.24 U	17.2
ACENAPHTHENE	20	200	0.49 U	0.54 J
FLUORENE	280	2800	0.24 U	1.5
NAPHTHALENE	14	140	0.24 U	0.96 J
PHENANTHRENE	210	2100	0.49 U	1.1
<b>Petroleum Hydrocarbons (µg/L)</b>				
<b>TOTAL PETROLEUM HYDROCARBONS</b>	<b>5,000</b>	<b>50,000</b>	<b>170 U</b>	<b>1,410</b>

**Footnotes:**

- 1 Groundwater Cleanup Target Level as provided in Chapter 62-777, FAC, April 2005.
- 2 Natural Attenuation Default Screening Criteria as provided in Chapter 62-777, F.A.C.
- 3 A chemical is selected as a potential COC if the maximum concentration is greater than the groundwater CTL of the Natural Attenuation Screening Level..

J = Estimated concentration  
 U = non-detect value  
 µg/L = microgram per liter  
 COC = contaminant of concern

10 to 12 feet bgs and toluene was detected at very low concentrations in four samples at depths of 4 to 14 feet bgs. Therefore, exposure to these contaminants could only occur if the soils were uncovered at some future time. Because the FDEP SCTLs are based on ingestion, inhalation, and dermal contact, potential risks from inhalation of dusts/vapors from subsurface soil are evaluated in the soil comparisons.

### 3.2.1.3 Potential Current and Future Receptors of Concern and Exposure Pathways

OLF Bronson is an active facility and will remain active for the foreseeable future. The area around Site 1120 is used for recreational purposes and access to the area is not restricted. However, because contamination at the site is limited to subsurface soil and groundwater, risks to recreational users are not evaluated in this HHRA, as a complete recreational exposure pathway does not exist. The most likely and reasonable exposure scenario for the site is a future construction/excavation scenario, and risks for construction workers were evaluated. For purposes of completeness and to be conservative, the risk assessment also considered receptor exposure for potential future residential and industrial land use scenarios. Based on current and potential future land use, the following potential receptors were assumed to be exposed to contaminated environmental media at Site 1120:

- **Current Land Use** – No receptors are expected to be exposed under current land use because contamination at Site 1120 is located in subsurface soil and groundwater at the site is not used as a source of drinking water.
- **Construction/Excavation Worker** – A plausible on-site receptor under future land use if construction activities were to occur at the site. This receptor could be exposed to subsurface soil by incidental ingestion, dermal contact, and inhalation (i.e., airborne particulates/vapors). The construction worker is assumed to be exposed to soil for 250 days per year (USEPA, 2002). This receptor could also be exposed to chemicals in shallow groundwater via ingestion and dermal contact if the groundwater were contacted during an excavation project.
- **Fulltime Occupational Worker** – An on-site receptor under future land use. This scenario was evaluated assuming that the site was developed for commercial/industrial uses, that subsurface soil was exposed, and that a worker spends the entire workday exposed to chemical contaminants in the excavated soil. The information obtained from this evaluation can be used to provide information for risk management decisions. This receptor could be exposed to the subsurface soil by incidental ingestion, dermal contact, and inhalation (i.e., airborne particulates/vapors). The occupational worker is expected to be exposed to soil 250 days per year for 25 years (USEPA, 1993 and 2002) but less intensely than the construction worker.

- **Hypothetical Future On-Site Child and Adult Resident** – The future residential scenario was quantitatively evaluated in the risk assessment for decision-making purposes although this scenario is unlikely for OLF Bronson. Future residents are assumed to have direct contact with site subsurface soil and exposure occurs by ingestion, dermal contact, and inhalation (i.e., airborne particulates/vapors). Future residents could also be exposed to groundwater only if drinking water wells were installed on the site in the future. The future residential drinking water scenario was evaluated for purposes of completeness. The GCTLs used in this evaluation assume that a receptor is exposed to groundwater by ingestion only. Residential receptors are assumed to be exposed to groundwater 350 days per year for a total of 30 years.
- **Recreational Users/Trespassers** – Not evaluated. Direct contact with subsurface soil is not anticipated for this receptor.

### **3.2.2 Calculation of Exposure Point Concentrations**

The exposure point concentration (EPC), calculated for potential COCs only, is a reasonable estimate of the chemical concentration likely to be contacted over time by a receptor and is used to calculate estimated exposure intakes. The determination of EPCs follows guidance described in Chapter 62-780 FAC (FDEP, 2005b) and the Florida upper confidence limit (UCL) Calculator tool.

The following decision rules were used to determine EPCs for Site 1120:

- If a soil dataset contains fewer than 10 samples, the EPC is defined as the maximum detected concentration. Because the dataset for subsurface soil at the site consisted of less than 10 samples, the maximum detected concentration in soil was used as the EPC. Note that soil contamination (mainly PAHs) was found in sample OLFB20SB03-1012 but no PAHs were detected in the field duplicate of this sample (OLFB20SB03-1012-D).
- FDEP guidance (Chapter 62-780 and 62-777) states that the goal for groundwater is to meet GCTLs at all locations. This is because “an individual will be exposed generally to the water where a potable well is placed” [Appendix E of the Technical Report for Chapter 62-777, (FDEP, 2005a)]. Consequently, the groundwater comparisons presented in Section 3.5 compare the concentrations in each individual monitoring well to the GCTLs (Tables 3-2 and 3-3).

### **3.2.3 Chemical Intake and Risk Estimation**

To evaluate risks for future construction workers, risk-based SCTLs and GCTLs were developed for the construction worker using FDEP and USEPA methodology. The exposure assumptions and intake

TABLE 3-3  
COMPARISON OF CONCENTRATIONS OF CHEMICALS DETECTED IN GROUNDWATER TO CONSTRUCTION WORKER CTLS  
SITE 1120 - OLF BRONSON  
NAS PENSACOLA  
PENSACOLA, FLORIDA  
PAGE 1 OF 1

WELL NAME SAMPLE ID SAMPLING EVENT COLLECTION DATE	Non-Apportioned Construction Worker GCTL(1)	Target Organ(2)	MW-5R BRN-1120-MW05R Baseline 12/13/07	MW-7 BRN-1120-MW07 Baseline 12/13/07	MW-7 Ratio	MW-14R BRN-1120-MW14R Baseline 12/14/07	MW-14R DUP BRN-1120-DUP01-1207 Baseline 12/14/07	MW-16R BRN-1120-MW16R Baseline 12/13/07	MW-24 BRN-1120-MW24 Baseline 12/13/07	MW-25 BRN-1120-MW25 Baseline 12/13/07
<b>Volatile Organics (µg/L)</b>										
CHLOROFORM	4,100	Liver	0.21U	0.58 J	1.4E-04	0.21U	0.21U	0.39 J	1.6	0.26 J
ETHYLBENZENE	7,900	Developmental, Kidney, Liver	0.2 U	0.2 U		6	6.2	0.2 U	0.2 U	0.2 U
TOTAL XYLENES	320,000	Neurological	0.56 U	0.56 U		9.3	10.2	0.56 U	0.56 U	0.56 U
<b>Semivolatile Organics (µg/L)</b>										
1-METHYLNAPHTHALENE (4)	8,200	Nasal	0.25 U	0.24 U		140	133	0.34 J	0.25 J	0.25 U
2-METHYLNAPHTHALENE	8,200	Nasal	0.25 U	0.24 U		178	172	0.43 J	0.65 J	0.25 U
ACENAPHTHENE	41,000	Liver	0.5 U	0.49 U		2 U	2 U	0.5 U	0.49 U	0.5 U
FLUORENE	120,000	Blood	0.25 U	0.24 U		4.8	4.7	0.25 U	0.24 U	0.25 U
NAPHTHALENE	82,000	Nasal	0.25 U	0.24 U		77.5	73.9	0.25 U	0.24 U	0.25 U
PHENANTHRENE	61,000	Kidney	0.5 U	0.49 U		2.6 J	2.5 J	0.5 U	0.49 U	0.5 U
<b>Petroleum Hydrocarbons (µg/L)</b>										
TOTAL PETROLEUM HYDROCARBONS	11,000	Mixed Endpoints	1,113	170 U		6,960	6,100	170 U	206 J	170 U

WELL NAME SAMPLE ID SAMPLING EVENT COLLECTION DATE	Non-Apportioned Construction Worker GCTL(1)	MW-27 BRN-1120-MW27 Baseline 12/13/07	MW-28 Ratio	MW-29 BRN-1120-MW29 Baseline 12/14/07	MW-29 Ratio	MW-30 OLFB1120MW30 Baseline 12/14/07	MW-36 Ratio	MW-38 BRN-1120-MW35 Baseline 12/13/07	MW-39 BRN-1120-MW35 Baseline 12/13/07
<b>Volatile Organics (µg/L)</b>									
CHLOROFORM	4,100	3.3	1.0E-03	11.1	2.7E-03	5.6	8.5E-04	0.21U	0.21U
ETHYLBENZENE	7,900	0.2 U		0.2 U		0.2 U		0.2 U	0.2 U
TOTAL XYLENES	320,000	0.56 U		0.56 U		0.56 U		0.56 U	0.56 U
<b>Semivolatile Organics (µg/L)</b>									
1-METHYLNAPHTHALENE (4)	8,200	0.25 U		0.25 U		1.2		0.24 U	0.24 U
2-METHYLNAPHTHALENE	8,200	0.25 U		0.25 U		2.4		0.69 J	0.24 U
ACENAPHTHENE	41,000	0.5 U		0.49 U		0.5 U		0.48 U	0.49 U
FLUORENE	120,000	0.25 U		0.25 U		0.48 J		0.24 U	0.24 U
NAPHTHALENE	82,000	0.25 U		0.25 U		0.26 J		0.36 J	0.24 U
PHENANTHRENE	61,000	0.5 U		0.49 U		0.5 U		0.48 U	0.49 U
<b>Petroleum Hydrocarbons (µg/L)</b>									
TOTAL PETROLEUM HYDROCARBONS	11,000	180 U		170 U		702		170 U	170 U

Shaded cells indicate that the specified criterion or background level has been selected as a potential COC.

Footnotes:

- 1 Groundwater CTLS for construction workers were developed using the methods presented in Chapter 62-777, F.A.C., April 2005 and current USEPA guidance (See Section 3.2.3 of text).
- 2 Target organs are obtained from Table II, Soil Cleanup Target Levels (SCTLs) for Chapter 62-777, F.A.C., April 2005.
- 3 The value of the simple apportioned SCTL is determined by dividing the non-apportioned SCTL by the number carcinogenic chemicals or by the number of chemicals impacting the same target organ for noncarcinogens. If the ratio of the maximum concentration to the non-apportioned SCTL is less than 0.1, that chemical is not included in the apportionment process (Chapter 62-777 F.A.C.).
- 4 A chemical is selected as a potential COC if the EPC/apportioned SCTL ratio is greater than 1 or if the maximum concentration/non-apportioned SCTL ratio is greater than 3.

J = Estimated concentration  
U = non-detect value  
µg/L = micrograms per liter

equations used to calculate the CTLs are presented in the following sections. The toxicity criteria [carcinogenic slope factors (CSFs) and non-carcinogenic reference doses (RfDs)] used in the CTLs calculations are discussed in Section 3.3. The risk-based concentrations (RBCs) are established by setting the cancer and non-cancer risk levels at  $1 \times 10^{-6}$  or hazard index of 1, respectively, and solving for the associated contaminant concentration as demonstrated in the USEPA Risk Assessment Guidance for Superfund, Part B (USEPA, 1991). The exposure assumptions selected for the construction worker were based on current USEPA risk assessment guidance (1989 and 2004) and State of Florida guidance (FDEP, 2005b), and are presented in Appendix A. Calculations of the CTLs are also presented in Appendix A.

### **3.3 TOXICITY ASSESSMENT PROTOCOL**

The objective of a toxicity assessment is to identify the potential for human health hazards and adverse effects in exposed populations. A significant portion of the toxicity assessment of the HHRA has been completed because CSFs and RfDs were used by FDEP in the development of the residential and industrial soil SCTLs and GCTLs. A CSF is an indicator of the potency of a chemical carcinogen (i.e., the greater the CSF, the more potent the carcinogen). An RfD is the dose at or below which adverse non-carcinogenic effects are not anticipated. These factors represent quantitative estimates of the relationship between the magnitude and types of exposures and the severity or probability of human health effects and were used to develop RBCs as described above. The most recent CSFs and RfDs published in Integrated Risk Information System (IRIS) were used in the development of the construction worker SCTLs and GCTLs. For some chemicals, such as benzo(g,h,i)perylene, phenanthrene, and TPH, RfDs are not currently available in IRIS. In these cases, the RfDs were obtained from the Technical Report for Chapter 62-777 FAC.

#### **3.3.1 Sources of Toxicity Criteria**

Oral and inhalation RfDs and CSFs used in this HHRA were obtained from the following primary recommended USEPA sources:

- Integrated Risk Information System (IRIS) (online), May 2008.
- USEPA Provisional Peer Reviewed Toxicity Values (PPRTVs) – The Office of Research and Development/National Center for Environmental Assessment (NCEA) Superfund Health Risk Technical Support Center develops PPRTVs on a chemical-specific basis when requested by USEPA's Superfund program. PPRTVs are provided in the Region 3 RBC Tables (USEPA Region 3, October 2007) and the Region 9 PRG Tables (USEPA, 2004).
- Tables 5a and 5b of the FDEP 62-777 Technical Report (FDEP, 2005a).
- Health Effects Assessment Summary Tables (HEAST) (USEPA, 1997).

Although RfDs and CSFs can be found in several toxicological sources, USEPA's IRIS online database, which is continuously updated, is the preferred source of toxicity values. The USEPA Region 9 Preliminary Remediation Goal (PRG) Tables (USEPA, 2004) and Region 3 RBC tables (USEPA, 2007) are also used as sources of toxicity criteria when criteria are not available from the aforementioned references.

### **3.3.2 Toxicity Criteria for Dermal Exposure**

RfDs and CSFs found in literature are frequently expressed as administered doses; therefore, these values are considered to be inappropriate for estimating the risks associated with dermal routes of exposure. Oral dose-response parameters based on administered doses must be adjusted to absorbed doses before comparisons to estimated dermal exposure intakes are made.

The adjustment from administered to absorbed dose was made using the following chemical-specific absorption efficiencies published in RAGS Part E:

$$RfD_{\text{dermal}} = (RfD_{\text{oral}})(ABS_{\text{GI}})$$

$$CSF_{\text{dermal}} = (CSF_{\text{oral}})/(ABS_{\text{GI}})$$

where:  $ABS_{\text{GI}}$  = absorption efficiency in the gastrointestinal tract

### **3.3.3 Toxicity Criteria for Carcinogenic Effects of PAHs**

Limited toxicity values are available to evaluate the carcinogenic effects from exposure to PAHs. The most extensively studied PAH is benzo(a)pyrene, which is classified by the USEPA as a probable human carcinogen. Although CSFs are available for benzo(a)pyrene, insufficient data are available to calculate CSFs for other carcinogenic PAHs. Toxic effects for these chemicals were evaluated using the concept of estimated orders of potential potency, as presented in USEPA Region 4 guidance (USEPA, 2000) and in the Rule 62-777 Technical Report. Toxicity Equivalence Factors (TEFs), which indicate the potency of each PAH compound relative to that of benzo(a)pyrene, are available for select carcinogenic PAHs. The equivalent oral and inhalation CSFs for PAHs other than benzo(a)pyrene are derived by multiplying the CSF for benzo(a)pyrene by the TEF for the PAH compounds. The TEFs for the carcinogenic PAHs are listed in the following table.

**Toxic Equivalency Factors for Carcinogenic PAHs**

Contaminant	TEF
Benzo(a)pyrene	1.0
Benzo(a)anthracene	0.1
Benzo(b)fluoranthene	0.1
Benzo(k)fluoranthene	0.01
Chrysene	0.001
Dibenz(a,h)anthracene	1.0
Indeno(1,2,3-cd)pyrene	0.1

These TEFs were used to convert the individual carcinogenic PAH concentrations to an equivalent concentration of benzo(a)pyrene. The carcinogenic PAHs detected at least once in a soil dataset were used in the calculation. Non-detect results were assigned a value of ½ the sample quantitation limit prior to the calculation.

### 3.4 RISK EVALUATION

This section describes the methodology used to evaluate risks for exposure to chemicals detected in soil and groundwater at Site 1120. The risk assessment methodology is based on guidance provided in Rule 62-780 FAC which makes use of a phased RBCAP that is iterative and tailors site rehabilitation to site-specific conditions and risks. Rule 62-780 is used in conjunction with Rule 62-777 FAC which provides the methodology used to establish the FDEP CTLs for the residential, commercial/industrial, or alternate land use scenarios. The methodologies described in the following paragraphs are presented in Appendix D and Appendix E of the Technical Report for Chapter 62-777 FAC (FDEP, 2005)

The FDEP risk characterization is performed, in part, through a series of tables in which concentrations of chemicals detected at a site are compared to various FDEP soil and groundwater criteria or to criteria developed according to guidelines presented in Chapter 62-777 FAC. The soil criteria include SCTLs for direct contact (i.e., ingestion, dermal contact, and inhalation), SCTLs for leachability to groundwater, and  $C_{sat}$  for an evaluation of free product. The groundwater criteria include GCTLs for direct contact with groundwater (based on ingestion), GCTLs for construction workers assumed to be exposure to groundwater during a future excavation project (based on ingestion and dermal contact), and water solubility values for evaluating the potential for the presence of free product (for organic chemicals).

#### 3.4.1 Florida Methodology for Evaluating Soil

Using the guidance provided in Rules 62-780 and 62-777, soil at Site 1120 was evaluated for the following land use scenarios:

- Residential land use [Risk Management Option (RMO)Level I]
- Commercial/industrial land use (RMO Level II)
- Future Construction (RMO Level III)

The evaluation of the hypothetical future residential and commercial/industrial land use of a site is described under RMO Levels I and II, respectively, of Rule 62.780.680. RMO Level III of the rule allows for the development and use of alternative SCTLs based on, for example, a site-specific risk assessment. In this risk assessment, alternative SCTLs were calculated for future construction workers using the equations and chemical-specific exposure and toxicological data provided in Chapter 62-777 FAC, the most recent toxicological information presented in IRIS, and the exposure factors presented in Appendix A.

Future construction workers were evaluated because they are considered to be the only receptors who could reasonably be exposed to contaminated soil at Site 1120. Because the USTs were the source of contamination, the soil data consists of subsurface soil samples collected from depths of 4 to 14 feet bgs and only the concentration of benzo(a)pyrene [0.108 milligram per kilogram (mg/kg)] in one sample (OLFB20SB03-1012) slightly exceeded the residential SCTL (0.1 mg/kg). It should be noted no PAHs were detected in the field duplicate of this sample (OLFB20SB03-1012-D). At this depth (10 to 12 ft bgs) only a future construction worker could be exposed to the benzo(a)pyrene contamination. As indicated previously, the construction worker is assumed to be exposed 250 days per year for 1 year. This is considered to be conservative and unrealistic because the impacted area is expected to be small and a worker is unlikely to spend 250 days in such a small area. Supporting documentation for the development of the construction worker SCTLs is presented in Appendix A.

As per FDEP guidance, subsurface soils at Site 1120 were first evaluated for residential land use (RMO Level I) by a comparison of chemical concentrations in soils to the relevant residential SCTLs. The process was then repeated for commercial/industrial land use (RMO Level II) and a potential construction/excavation scenario (RMO Level III). The comparisons conducted for each level are presented in Tables 3-4 through 3-6 with the chemicals exceeding the relevant screening levels (i.e., the potential COCs) highlighted. Supporting documentation is presented in Appendix A, as necessary. Using the guidance provided in Chapters 62-777 and 62-780, FAC the following evaluations were performed for Site 1120.

#### **3.4.1.1 Comparison with Direct Contact SCTLs**

According to the FDEP guidance documents, under RMO Level I and Level II, the maximum detected concentration of each contaminant detected in soil may be compared with the respective default SCTL

TABLE 3-4

RMO LEVEL 1 (RESIDENTIAL) DIRECT CONTACT EVALUATION - SUBSURFACE SOIL  
SITE 1120 - OLF BRONSON  
NAS PENSACOLA  
PENSACOLA, FLORIDA

CAS No.	Parameter	Frequency of Detection	Maximum Concentration (1)	Range of Nondetects	Sample of Maximum Detection	Background Value	Non-Apportioned Florida Residential SCTL- Direct Contact (2)	Ratio of Maximum Concentration/ Non-apportioned Residential SCTL	Is Chemical a Potential Level 1 COC ? (3)	Rationale for Contaminant Deletion or Selection
<b>Volatile Organics (mg/kg)</b>										
108-88-3	TOLUENE	4/6	0.0015 J	0.0052 - 0.0058	OLFB20SB02-0406	NA(4)	7500 N	2.0E-07	No	maximum < SCTL
<b>Semivolatile Organics (mg/kg)</b>										
191-24-2	BENZO(G,H,I)PERYLENE	1/6	0.091	0.068 - 0.07	OLFB20SB03-1012	NA	2500 N	3.6E-05	No	maximum < SCTL
206-44-0	FLUORANTHENE	1/6	0.288 J	0.34 - 0.35	OLFB20SB03-1012	NA	3200 N	9.0E-05	No	maximum < SCTL
85-01-8	PHENANTHRENE	1/6	0.12 J	0.34 - 0.35	OLFB20SB03-1012	NA	2200 N	5.5E-05	No	maximum < SCTL
129-00-0	PYRENE	1/6	0.186 J	0.34 - 0.35	OLFB20SB03-1012	NA	2400 N	7.8E-05	No	maximum < SCTL
	<b>CARCINOGENIC PAHS</b>	1/6	0.2	---	OLFB20SB03-1012	NA	0.1 C	2.0E+00	Yes	maximum > SCTL
<b>Petroleum Hydrocarbons (mg/kg)</b>										
TTNUS001	TOTAL PETROLEUM HYDROCARBONS	5/6	70.3	8.8 - 8.8	OLFB20SB01-0406	NA	460 N	1.5E-01	No	maximum < SCTL

Shaded cells indicate that the specified criterion or background level has been exceeded or that the chemical has been selected as a potential COC.

mg/kg = milligram per kilogram

PAHS = polynuclear aromatic hydrocarbons

COC = contaminant of concern

Footnotes:

- 1 Sample and duplicate are counted as two separate samples when determining the maximum detected concentration.
- 2 Soil Cleanup Target Levels (SCTLs) for Chapter 62-777, F.A.C., Florida Department of Environmental Protection (FDEP), April 2005.
- 3 A chemical is selected as a potential COC if the maximum concentration exceeds the non-apportioned SCTL.
- 4 NA - Not Applicable. According to Rule 62-780 only naturally occurring (inorganic) constituents are considered in the background evaluation.

TABLE 3-5  
RMO LEVEL II (INDUSTRIAL) DIRECT CONTACT EVALUATION - SUBSURFACE SOIL  
SITE 1120 - OLF BRONSON  
NAS PENSACOLA  
PENSACOLA, FLORIDA

CAS No.	Parameter	Frequency of Detection	Maximum Concentration (1)	Range of Nondetects	Sample of Maximum Detection	Concentration Used for Screening	Background Value	Non-Apportioned Florida Industrial SCTL- Direct Contact (2)	Ratio of Maximum Concentration/ Non-apportioned Industrial SCTL	Is Chemical a Potential Level 2 COC ? (3)	Rationale for Contaminant Deletion or Selection	
<b>Volatile Organics (mg/kg)</b>												
108-88-3	TOLUENE	4/6	0.0015 J	0.0052 - 0.0058	OLFB20SB02-0406	0.0015	NA(4)	60000	N	2.5E-08	No	maximum < SCTL
<b>Semivolatile Organics (mg/kg)</b>												
191-24-2	BENZO(G,H,I)PERYLENE	1/6	0.091	0.068 - 0.07	OLFB20SB03-1012	0.091	NA	52000	N	1.8E-06	No	maximum < SCTL
206-44-0	FLUORANTHENE	1/6	0.288 J	0.34 - 0.35	OLFB20SB03-1012	0.288	NA	59000	N	4.9E-06	No	maximum < SCTL
85-01-8	PHENANTHRENE	1/6	0.12 J	0.34 - 0.35	OLFB20SB03-1012	0.12	NA	36000	N	3.3E-06	No	maximum < SCTL
129-00-0	PYRENE	1/6	0.186 J	0.34 - 0.35	OLFB20SB03-1012	0.186	NA	45000	N	4.1E-06	No	maximum < SCTL
	CARCINOGENIC PAHS	1/6	0.2	0.068 - 0.07	OLFB20SB03-1012	0.2	NA	0.7	C	2.9E-01	No	maximum < SCTL
<b>Petroleum Hydrocarbons (mg/kg)</b>												
TTNUS001	TOTAL PETROLEUM HYDROCARBONS	5/6	70.3	8.8 - 8.8	OLFB20SB01-0406	70.3	NA	2700	N	2.6E-02	No	maximum < SCTL

Shaded cells indicate that the specified criterion or background level has been exceeded or that the chemical has been selected as a potential COC.

mg/kg = milligram per kilogram

PAHS = polynuclear aromatic hydrocarbons

COC = contaminant of concern

Footnotes:

- 1 Sample and duplicate are counted as two separate samples when determining the maximum detected concentration.
- 2 Soil Cleanup Target Levels (SCTLs) for Chapter 62-777, F.A.C., Florida Department of Environmental Protection (FDEP), April 2005.
- 3 A chemical is selected as a potential COC if the maximum concentration exceeds the non-apportioned SCTL.
- 4 NA - Not Applicable. According to Rule 62-780 only naturally occurring (inorganic) constituents are considered in the background evaluation.

TABLE 3-6  
RMO LEVEL III (CONSTRUCTION WORKER) DIRECT CONTACT EVALUATION - SUBSURFACE SOIL  
SITE 1120 - OLF BRONSON  
NAS PENSACOLA  
PENSACOLA, FLORIDA

CAS No.	Parameter	Frequency of Detection	Maximum Concentration (1, 2)	Range of Nondetects	Sample of Maximum Detection	Background Value	Non-Apportioned Florida Construction Worker SCTL- Direct Contact (3)	Target Organ (4)	Ratio of Maximum Concentration/ Non-apportioned Construction SCTL	Simple Apportioned Florida Residential SCTL- Direct Contact (5)	Is Chemical a Potential Level 3 COC ? (6)	Rationale for Contaminant Deletion or Selection(7)
<b>Volatile Organics (mg/kg)</b>												
108-88-3	TOLUENE	4/6	0.0015 J	0.0052 - 0.0058	OLFB20SB02-0406	NA(8)	14000 N	Kidney, Liver, Neurological	1.1E-07	14000	No	maximum < SCTL
<b>Semivolatile Organics (mg/kg)</b>												
191-24-2	BENZO(G,H,I)PERYLENE	1/6	0.091	0.068 - 0.07	OLFB20SB03-1012	NA	6400 N	Neurological	1.4E-05	6400	No	maximum < SCTL
206-44-0	FLUORANTHENE	1/6	0.288 J	0.34 - 0.35	OLFB20SB03-1012	NA	8400 N	Blood, Kidney, Liver	3.4E-05	8400	No	maximum < SCTL
85-01-8	PHENANTHRENE	1/6	0.12 J	0.34 - 0.35	OLFB20SB03-1012	NA	6100 N	Kidney	2.0E-05	6100	No	maximum < SCTL
129-00-0	PYRENE	1/6	0.186 J	0.34 - 0.35	OLFB20SB03-1012	NA	6300 N	Kidney	3.0E-05	6300	No	maximum < SCTL
	CARCINOGENIC PAHS	1/6	0.2	0.068 - 0.07	OLFB20SB03-1012	NA	2.1 C	Carcinogen	9.5E-02	2.1	No	maximum < SCTL
<b>Petroleum Hydrocarbons (mg/kg)</b>												
TTNUS001	TOTAL PETROLEUM HYDROCARBONS	5/6	70.3	8.8 - 8.8	OLFB20SB01-0406	NA	2000 N	Multiple Endpoints	3.5E-02	2000	No	maximum < SCTL

Shaded cells indicate that the specified criterion or background level has been exceeded or that the chemical has been selected as a potential COC.

mg/kg = milligram per kilogram

PAHS = polynuclear aromatic hydrocarbons

COC = contaminant of concern

Footnotes:

- 1 Sample and duplicate are counted as two separate samples when determining the maximum detected concentration.
- 2 Because the dataset consists of less than 10 samples, the maximum concentration is used as the exposure point concentration (EPC).
- 3 SCTLs for construction workers were developed using the methods presented in Chapter 62-777, F.A.C., April 2005 and current USEPA guidance (See Section 3.2.3 of text).
- 4 Target organs are obtained from Table II, Soil Cleanup Target Levels (SCTLs) for Chapter 62-777, F.A.C., April 2005.
- 5 The value of the simple apportioned SCTL is determined by dividing the non-apportioned SCTL by the number carcinogenic chemicals or by the number of chemicals impacting the same target organ for noncarcinogens.  
If the ratio of the maximum concentration to the non-apportioned SCTL is less than 0.1, that chemical is not included in the apportionment process (Chapter 62-777 F.A.C.).
- 6 According to the Chapter 62-780 F.A.C., a chemical is identified as a COC if the maximum concentration is greater than 3 times the non-apportioned SCTL.
- 7 A chemical is selected as a COC if the EPC/apportioned SCTL ratio is greater than 1 or if the maximum concentration/non-apportioned SCTL ratio is greater than 3.
- 8 NA - Not Applicable. According to Rule 62-780 only naturally occurring (inorganic) constituents are considered in the background evaluation.

listed in Chapter 62-777, FAC or, the 95% UCL of the mean of the site concentrations can be compared with apportioned chronic toxicity-based SCTLs. Under RMO Level III, UCLs must be compared with apportioned chronic toxicity-based SCTLs only. However, because the subsurface soil dataset consisted of less than 10 samples and most chemicals were positively detected listed in Chapter 62-777, FAC or, the 95% UCL of the mean of the site concentrations can be compared with apportioned chronic toxicity-based SCTLs. Under RMO Level III in only one sample, the maximum detected concentration was used in the RMO Levels I, II and III evaluations.

Therefore, if the maximum detected concentration for a chemical exceeds the direct contact SCTL for RMO Levels I and II, the constituent is identified as a potential COC and may be further evaluated using various apportionment approaches described in the following sections.

Because FDEP guidance stipulates that SCTLs must be apportioned when using RMO Level III, the following approach was used when evaluating risks for the construction worker, as described in Appendix D of the Technical Report (FDEP, 2005a).

**Simple Apportionment.** For simple apportionment the default SCTL for each chemical is divided by the number of chemicals that produce the same type of toxicity. For carcinogens, the value of the simple apportioned SCTL is calculated by dividing the non-apportioned SCTL by the number carcinogenic chemicals detected in a surface or subsurface soil dataset. For example, if five carcinogens were detected in a surface soil dataset for a site, the simple apportioned SCTLs for carcinogens are the non-apportioned SCTLs divided by 5 (FDEP, 2005). For Site 1120, only one constituent (carcinogenic PAHs) is classified a carcinogenic. Therefore, the construction worker SCTL for carcinogenic PAHs was not apportioned. For noncarcinogens, the simple apportioned SCTL is determined by dividing the non-apportioned SCTL by the number of chemicals impacting the same target organ. If the liver, for example, is identified as the target organ for 3 noncarcinogens in a dataset, the simple apportioned SCTLs for those chemicals are the non-apportioned values divided by 3.

Not all SCTLs should be apportioned. The Technical Report (FDEP, 2005a) lists the following exceptions to apportioning:

1. Do not apportion an SCTL based on natural background concentration or a practical quantitation limit. These are criteria that are not directly risk-based, and therefore are not subject to apportionment. This does not apply to Site 1120 because only organic chemicals were evaluated.
2. Do not apportion an SCTL based on acute toxicity. These SCTLs are always regarded as not-to-exceed values, and the default value should be compared with the maximum concentration on site. [Note that acute toxicity SCTLs are applicable only in situations where small children might be

present, such as a residence, playground, or school.] This does not apply to Site 1120 because none of the chemicals detected in soil at the site had SCTLs based on acute toxicity values.

3. Do not apportion lead SCTLs. Both residential and commercial/industrial lead SCTLs are based on a unique type of toxicological analysis that is not amenable to the standard apportionment process. This does not apply to Site 1120 because lead was not evaluated.
4. Do not apportion the SCTLs for chemicals present in low concentrations. Eliminate from consideration at a site chemicals whose maximum concentration is less than or equal to 1/10 the default SCTL. Chemicals present in low concentrations are unlikely to contribute substantially to risk and unnecessarily complicate the apportionment process. As shown in Table 3-4, the maximum concentrations of all detected chemicals were less than 1/10 of the default SCTLs for subsurface soil. Therefore, it was not necessary to apportion any of the SCTLs for the construction worker.
5. Do not apportion the SCTLs for chemicals detected infrequently. A chemical can be eliminated from consideration at a site if it is detected a) in only one out of 10 or more samples, or 5% or fewer out of 20 or more samples, and in only one environmental medium; b) in low concentrations (no more than the default SCTL); and c) there is no reason to believe that the chemical may be present due to historical site activities. These criteria are intended to eliminate chemical detections that are artifacts from sampling, analytical, or other problems. They are not intended to eliminate chemicals present due to site activities in localized areas of contamination. This does not apply to subsurface soil for Site 1120 because the dataset consisted of only six samples.

#### 3.4.1.2 Comparison with Leachability-based SCTLs

The potential for leaching was addressed through comparisons with SCTLs for Leachability Based on Groundwater Criteria (FDEP, 2005a). Unlike direct contact SCTLs, which are based primarily on long-term exposure covering a specified area, leachability-based default SCTLs are intended to protect water resources at all locations. Consequently, maximum rather than average (or 95% UCL) concentrations are compared with leaching criteria. If the maximum concentration of a chemical exceeds its respective leachability SCTL, that chemical is identified as a potential COC. The leachability comparisons are presented in Table 3-1.

#### 3.4.1.3 Evaluation of Free Product in Soil

The potential for the presence of free product (for organic chemicals) was evaluated by comparing maximum site concentrations to  $C_{sat}$  limits (Table 3-1). The  $C_{sat}$  values are provided in Table 8 of Chapter 62-777 FAC (FDEP, 2005a). The  $C_{sat}$  comparisons in Table 3-1 indicated that the concentrations of all organic chemicals detected in subsurface soil at Site 1120 were less than the  $C_{sat}$  levels. Therefore, it is unlikely these chemicals are present as free product at the site. Note that FDEP provides a  $C_{sat}$  value for

only one chemical (toluene) detected in subsurface soil at Site 1120. Therefore, this analysis is not applicable to most of the chemicals detected at Site 1120.

### **3.4.2 Florida Methodology for Evaluating Groundwater**

This section describes the methodology used to evaluate groundwater at Site 1120 using guidelines presented in Rules 62-780 and 62-777, FAC. A detailed discussion of the FDEP approach for evaluating groundwater is presented in Appendix E of the Rule 62-777 Technical Report (FDEP, 2005a).

Using the guidance provided in Rules 62-780 and 62-777, groundwater at Site 1120 was evaluated for residential land use (RMO Level I) and for a construction worker scenario (RMO Level III). As with soil, the FDEP risk characterization for groundwater is performed by comparing concentrations of chemicals detected in groundwater with FDEP groundwater criteria (or to criteria developed according to guidelines presented in Chapter 62-777).

In RMO Level I, the applicable GCTL is usually the default value for that contaminant in the groundwater as presented in Table 1 of the Technical Report. The GCTLs for potential residential exposure are based on primary and secondary standards (e.g., MCLs) or on human health risk-based criteria, assuming that the groundwater is used as a potable water source (and are based on the ingestion route of exposure only as shown in Figures 1 and 2 of the February 2005 Technical Report for Chapter 62-777, FAC). For noncarcinogens, the risk-based CTLs are calculated based on a hazard index of 1 and incorporate a default relative source contribution factor of 0.2. The relative source contribution factor means, in effect, that no more than 20 percent of the total allowable intake of the contaminant can come from contaminated water. For carcinogens, the default GCTL is based on an excess cancer risk of  $1 \times 10^{-6}$ .

The RMO Level I GCTLs for most of the constituents detected in groundwater at Site 1120 are risk-based values (e.g., naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene). The GCTLs for ethylbenzene, xylenes, and acenaphthene are secondary standards and are not based on human health effects. The guidance presented in 62-777 Technical Report states that CTLs based on primary or secondary standards should not be apportioned. As with soils, if alternative CTLs are developed, the default values should be apportioned. However, the alternate CTLs should not be lower than the primary or secondary standard.

Under RMO Level III, GCTLs were developed to account for possible exposure of construction workers to contaminants in shallow groundwater in a future construction/excavation project. The construction worker GCTLs were developed using guidance from USEPA RAGS-Part A and Part B and are based on ingestion and dermal contact. The GCTLs assume that construction workers are exposed 250 days per

year for 1 year. Details and calculations for the construction worker GCTLs for groundwater are presented in Appendix A.

FDEP guidance states that the goal for groundwater (unlike soil) is to meet GCTLs at all locations. This is because "an individual will be exposed generally to the water where a potable well is placed" [Appendix E of the Technical Report for Chapter 62-777 (FDEP, 2005a)]. Consequently, the RMO Level I and Level III comparisons for groundwater are presented for each individual monitoring well (Tables 3-2 and 3-3).

The following evaluations for Site 1120 were performed according to Rules 62-777 and 62-780:

- **Comparison of detected concentrations in each well to GCTLs (RMO Level I).** If the maximum detected concentration for a chemical exceeds the GCTL, the constituent is identified as a potential COC for residential land use at the site.
- **Comparison of concentrations in each well to simple apportioned GCTLs for future construction workers (RMO Level III).** If the maximum detected concentration for a chemical exceeds the GCTL, the constituent is identified as a potential COC for the construction worker scenario.
- **Comparison of detected concentrations in each well to Natural Attenuation Default Source Concentrations.** The use of the NADCs are stipulated in Chapter 62-785.690 FAC. This rule states that "Natural attenuation with monitoring is an allowable strategy for site rehabilitation depending on the current and projected use of groundwater in the vicinity of the site and the individual site characteristics, provided human health, public safety, and the environment are protected." NADCs are developed by multiplying the Groundwater Criteria by 10 for noncarcinogens and by 100 for carcinogens, except in the case of carcinogenic elements where the Groundwater Criteria are also multiplied by 10 as noncarcinogens. For those contaminants that have both primary and secondary groundwater standards, the Groundwater Criteria and NADCs are based on the lower of the two standards. The NADCs are presented in Table V of Chapter 62-777, FAC. The NA evaluation is presented in Table 3-2.
- **Evaluation of Free Product in Groundwater.** The potential for the presence of free product (for organic chemicals) was evaluated by comparing maximum site concentrations to water solubility values presented in Table 4, Chapter 62-777, FAC (FDEP, 2005). The water solubility comparisons indicated the concentrations of organic chemicals detected in groundwater at Site 1120 in 2007 were significantly less than their respective water solubilities. Therefore, it is unlikely these chemicals are present as free product in groundwater at the site.

### 3.5 RISK CHARACTERIZATION RESULTS

This section contains a summary of the results of the risk characterization for Site 1120 conducted using guidelines presented in Florida Rule 62-780, FAC and the Rule 62-777 Technical Report. The results are summarized in Tables 3-1 through 3-6 and are discussed below.

#### 3.5.1 Results of Subsurface Soil Evaluation

##### **RMO Level 1 Evaluation (Residential)**

Table 3-1 presents a comparison of the maximum detected chemical concentrations in subsurface soil to the FDEP residential SCTLs. The residential SCTLs are based on the assumption that hypothetical future residents (child and adult) are exposed 350 days per year for 30 years by ingestion, inhalation, and dermal contact. The following chemicals were identified as exceeding the RMO Level 1 SCTLs and were retained as potential COCs for residential exposures to subsurface soil at Site 1120:

- Carcinogenic PAHs (expressed as benzo(a)pyrene equivalents). Note that the maximum detected PAH concentration was less than three times the unapportioned residential SCTL, as required by Chapter 62-780, FAC and 62-777, FAC guidance.

There is considerable overestimation of risk in the residential subsurface soil evaluation because PAHs were detected in only one sample at a depth of 10 to 12 feet bgs. It is very unlikely that future residents would be exposed to soil at this depth. In addition, the site is currently located in an area used for recreational purposes and is anticipated that the site will not be developed for residential purposes in the foreseeable future.

##### **RMO Level II (Industrial, Future Fulltime Workers)**

The results of the Level I evaluation identified one potential COC for Site 1120. Therefore, an RMO Level II evaluation was conducted. A comparison of the maximum chemical concentrations in subsurface soil to the FDEP industrial SCTLs is presented in Table 3-2. The industrial SCTLs are based on the assumption that workers are exposed 250 days per year for 25 years by ingestion, inhalation, and dermal contact. The maximum concentrations of all detected compounds were less than the industrial SCTLs.

##### **RMO Level III (Construction Worker)**

As stated previously, a construction worker scenario was evaluated for Site 1120 because a future construction worker was the only potential receptor that could reasonably be expected to be exposed to subsurface soil contamination at the site. Alternative SCTLs for construction worker exposures were derived following the methodology presented in Appendix A. The construction worker SCTLs were based

on the assumption that workers are exposed 250 days per year for 1 year by ingestion, inhalation, and dermal contact. A comparison of the maximum detected chemical concentrations for subsurface soil to the apportioned and unapportioned alternative SCTLs is presented in Table 3-6. As shown in the table, the concentrations of all constituents were less than the apportioned and unapportioned alternate SCTLs. In addition, the ratios of the maximum concentrations to the unapportioned SCTLs were less than 0.1. Therefore, no constituents were retained as potential COCs for the construction worker exposure scenario.

### **Comparison of Chemicals in Subsurface Soil with Leachability SCTLs**

Table 3-1 presents comparisons of maximum detected concentrations in subsurface soil with Florida criteria based on leachability to groundwater. As shown in the table, maximum concentrations of all detected chemicals were less than the leachability criteria indicating that there is minimal potential for contaminants detected in subsurface soil to adversely impact groundwater. It should also be noted that none of the chemicals detected in subsurface soil at the site were detected in any groundwater samples at the site indicating that migration of chemicals from subsurface soil to groundwater has not occurred.

Table 3-1 also presents comparisons of maximum concentrations with  $C_{sat}$  to evaluate the potential for presence of free product. As shown in the table, the concentration of toluene in subsurface soil was significantly less than the  $C_{sat}$  (values were available only for toluene), indicating that free product is not present in subsurface soil.

### **3.5.2 Results of Groundwater Evaluation**

#### **RMO Level I Groundwater Evaluation (Residential)**

Groundwater was evaluated for future residential use (RMO Level I). Table 3-2 presents a comparison of the positively detected concentrations in December 2007 groundwater samples to the FDEP GCTLs. The following constituents were identified as exceeding the Level I GCTLs and were retained as potential COCs for residential exposures to groundwater at Site 1120:

- 1-Methylnaphthalene
- 2-Methylnaphthalene
- Naphthalene
- TPH

These exceedances occurred only at location MW-14R. The concentrations of 1-methylnaphthalene, 2-methylnaphthalene, and naphthalene in this sample were also greater than three times the GCTLs.

### **Comparison of Groundwater Concentrations with Natural Attenuation Default Concentrations**

Table 3-2 also presents comparisons of concentrations in groundwater samples with FDEP NADCs. As shown in the table, chemical concentrations in all samples were less than the NA criteria.

### **RMO Level III Groundwater Evaluation (Construction Worker)**

Table 3-3 presents a comparison of the positively detected concentrations in groundwater samples to GCTLs developed for potential construction worker exposures. The construction worker GCTLs were based on the assumption that workers are exposed 250 days per year for 1 year by ingestion and dermal contact (except PAHs). No chemicals exceeded the Level III GCTLs for exposure of future construction workers to groundwater at Site 1120.

## **3.6 HUMAN HEALTH RISK UNCERTAINTY ANALYSIS**

The baseline HHRA for Site 1120 was performed in accordance with current FDEP guidance. However, there are varying degrees of uncertainty associated with the HHRA. This section presents a summary of uncertainties inherent in the risk assessment for Site 1120 and includes a discussion of how they may affect the quantitative risk estimates and conclusions of the risk analysis.

### **3.6.1 Usability and Completeness of Existing Databases**

Data from soil samples collected in June 2000 and groundwater samples collected in December 2007 were used to assess risks to potential human receptors at Site 1120. The soil data were generally biased because samples were collected in areas of known or suspected contamination. For example, the samples were collected on the basis of headspace screening results, proximity to elevated groundwater concentrations, or areas of staining or odor. The groundwater evaluation was based on 15 samples collected in 2007, which are expected to represent current conditions at the site. All the data were validated according to USEPA guidance.

### **3.6.2 Uncertainty in the Exposure Assessment**

Uncertainty in the exposure assessment arose because of the determination of land use conditions, the methods used to calculate EPCs, the selection of receptors and scenarios, and the selection of exposure parameters. Each of these is discussed below.

#### **Land Use**

The current land use patterns at OLF Bronson are well established, thereby limiting the uncertainty associated with land use assumptions. Site 1120 is located in a recreational area and is expected to remain so as long as OLF Bronson remains open. To be conservative, risks to potential and future

construction workers, fulltime occupational workers, and on-site residents were estimated for the site. No exposures are expected to occur under current land use. Construction workers are considered to be the most likely receptors under future land use. Recreational users were not evaluated in the risk assessment because the contamination of concern at Site 1120 is located 10 to 12 feet bgs.

### **Exposure Point Concentrations**

Because the soil dataset consisted of less than 10 samples, the EPCs used to evaluate risks for soil were the maximum detected concentrations. Use of the maximum concentration as the EPC tends to overestimate potential risks because receptors are assumed to be exposed continuously to the maximum concentration for the entire exposure period. Uncertainty was also introduced when the nondetects results were assigned a value of one-half the nondetect quantitation limit in the calculation of the benzo(a)pyrene equivalent for soil. This may either overstate or understate the risks to potential receptors.

Groundwater was evaluated by comparing the concentrations in each monitoring well to GCTLs. There is uncertainty in assuming that current groundwater concentrations will not change in the future and this introduces additional uncertainty in the EPCs and risks for potential groundwater COCs. Concentrations in groundwater may diminish over time due to NA processes involving source depletion and dilution. This is an important consideration for Site 1120 because remediation has already occurred at the site and the source of contamination has been removed.

### **Exposure Routes and Receptor Identification**

The determination of various receptor groups and exposure routes of potential concern was based on current land use and potential future land use. Although residential use of groundwater was evaluated as an exposure scenario, groundwater is not currently used at the site nor is it expected to be used in the future. The evaluation of direct exposure to groundwater in the HHRA was included primarily to aid in risk management decision making. The only receptor likely to be exposed to the subsurface soil contamination at the site is the future construction worker. Future residents and future fulltime workers could only be exposed to contaminants in soil if residences or buildings were constructed on the site in the future and the subsurface soil were brought to the surface. This is not likely to occur at OLF Bronson and the residential and industrial scenarios were evaluated primarily for informational purposes.

### **Exposure Parameters**

The exposure factors used to calculate the risk-based SCTLs and GCTLs used in this report, in most cases, were obtained from USEPA or Florida guidance documents for the Reasonable Maximum Exposure (RME), which generally specify the use of the 95th percentile value for most parameters. Therefore, the selected values for the RME receptor represented an upper bound of the observed or

expected habits of the majority of the population. For example, construction workers were assumed to be exposed to soil and groundwater 250 days per year based on current USEPA guidance (USEPA, 2002). This is probably an overestimate considering the small areas of contamination present at the site.

For many parameters for which limited information exists (i.e., dermal absorption of chemicals from soil), greater uncertainty exists. For example, current USEPA dermal guidance (USEPA, 2004) does not provide dermal absorption factors for exposure to volatile organic chemicals in soil. Therefore, exposure from dermal contact with soil was not included in the construction worker SCTL calculations for volatiles in this risk assessment. Consequently, risks from exposure to soil may have been underestimated. However, the underestimation is considered minimal because only one volatile (toluene) was detected in the subsurface soil samples and the concentrations of toluene (0.0012 – 0.0015 mg/kg) were well below the residential, industrial, and construction worker SCTLs.

The FDEP GCTLs used to assess risks for groundwater are based on ingestion only and the calculated GCTLs for construction workers were based on ingestion and dermal contact. Inhalation effects are not considered in the GCTL calculations. For some chemicals (i.e., volatiles) the omission of the aqueous inhalation pathway could result in an underestimation of risk. Note that the GCTL for only one volatile chemical (chloroform) detected in groundwater at Site 1120 is a risk-based value.

### **3.6.3 Uncertainty in the Toxicological Evaluation**

The RBCs used to assess risk were developed using the toxicity criteria discussed in Section 3.3. Uncertainties associated with the toxicity assessment (determination of RfDs and CSFs and use of available criteria) are presented in this section. The CSFs and RfDs used to calculate the CTLs were obtained from the USEPA and FDEP sources listed in Section 3.3. Surrogate toxicity values were not used for any of the calculated CTLs. Therefore, the uncertainty associated with CSFs and RfDs is considered to be negligible.

## **3.7 SUMMARY AND CONCLUSIONS**

The HHRA conducted for OLF Bronson Site 1120 was based on chemicals detected in subsurface soil samples collected in 2000 and groundwater samples collected at the site in 2007. The evaluation was conducted using the State of Florida regulations and guidelines specified in Chapters 62-780 FAC and 62-777, FAC. The results of the risk assessment are summarized in the following sections.

The risk assessment evaluated risks for hypothetical future residents and fulltime industrial workers using the published SCTLs and GCTLs for the residential and industrial land use scenarios. Risks for future construction workers were evaluated using SCTLs and GCTLs developed for this risk assessment as

stipulated in the State of Florida regulations and guidelines. The following chemicals were identified as potential COCs for subsurface soils based on a comparison of maximum concentrations to the SCTLs:

**POTENTIAL COCS - SUBSURFACE SOIL EVALUTION**

<b>Residential</b>	<b>Industrial</b>	<b>Construction Worker</b>
Carcinogenic PAHs	---	---

As discussed previously, there is considerable overestimation of risk in the residential subsurface soil evaluation because PAHs were detected in only one sample at a depth of 10 to 12 feet bgs. It is unlikely that future residents would be exposed to soil at this depth. In addition, the site is currently located in an area used for recreational purposes and is anticipated that the site will not be developed for residential purposes in the foreseeable future.

The following chemicals were identified as potential COCs for groundwater based on a comparison of maximum concentrations to GCTLs:

**POTENTIAL COCS – GROUNDWATER EVALUATION**

<b>Residential</b>	<b>Natural Attenuation Criteria</b>	<b>Construction Worker</b>
1-Methylnaphthalene	---	---
2-Methylnaphthalene	---	---
Naphthalene	---	---
TRPH	---	---

Chemicals detected in soil were also evaluated for the potential to impact groundwater quality at the site by comparing maximum concentrations with FDEP SCTLs for migration from soil to groundwater. This evaluation indicated that that the concentrations of constituents detected in subsurface soil are not likely to adversely impact groundwater quality.

## 4.0 CONCLUSIONS AND RECOMMENDATIONS

Tetra Tech is proposing a risk-based closure for Site 1120. This Risk-Based Closure Request includes the site history, current site conditions, site risk assessment, and site closure recommendations to support the risk management decisions for Site 1120.

The data used in this closure request includes soil data collected in June 2000 and groundwater monitoring data collected from June 2003 through June 2010.

### 4.1 SITE CLOSURE RECOMMENDATIONS

Current site conditions are protective of human health, public safety, and the environment, and there are no current exposures to residually contaminated soil or groundwater. Based on the data and risk assessment included in this closure request, No Further Action Status, per FAC 62-780 RMO Level II, is recommended for the site. The rationale for this recommendation is provided below.

#### 4.1.1 LIGHT NON-AQUEOUS PHASE LIQUID

Light non-aqueous phase liquid is not present at the site and was never detected in any of the historical sampling at the site.

#### 4.1.2 Source Removal/Implemented Remedial Actions

The USTs and approximately 200 cubic yards of soil were removed from the site in 1994. Clean soil was used to backfill the site following the removal action.

An initial groundwater Treatability Study at the site was started in June 2003 and included injection of ORC<sup>®</sup> in 2003. Quarterly monitoring of the groundwater at the site following the ORC<sup>®</sup> injection was conducted from September 2003 to October 2005. Additional groundwater samples were collected in December 2007 and June 2010.

#### 4.1.3 Soil

Only one chemical, benzo(a)pyrene, is identified in the subsurface soil as a COC for risk assessment based on exceeding the direct-exposure residential SCTL. Subsurface soil does not exceed direct-exposure industrial SCTLs for any of the chemicals detected in the samples. Site soil does not present unacceptable risks for current or future exposures (other than future residential exposure). If construction work is to be conducted in this area, risk estimates suggest that no special precautions are needed. It is

unlikely that residential use of this property will occur in the future. However, if developed, future residents may be exposed to unacceptable levels of carcinogenic PAHs if subsurface soil is brought to the surface during development. Therefore, institutional controls to prevent residential development are justified.

Concentrations of the chemicals detected in the soil samples do not exceed leachability SCTLs. Therefore, the potential leaching of residual constituents from soil to groundwater is no longer a migration pathway of concern for this site.

Because the contamination is limited to subsurface soil and groundwater, no surface runoff of contamination and subsequent discharge to surface water is expected at the site. This results in an incomplete exposure pathway for residual contaminated subsurface soil to impact ecological receptors.

#### **4.1.4 Groundwater**

Evaluation of the quarterly monitoring data following the injection of ORC<sup>®</sup> and data from subsequent rounds of sampling indicate that the contaminant concentrations have generally decreased over time. In the most recent data, 1-methylnaphthalene, 2-methylnaphthalene, and naphthalene were the only constituents that exceeded GCTLs. However, the concentrations for all of these constituents were below NADCs (see Table 2-4). The contamination is limited to one monitoring well (MW-14R) and the contamination is not migrating. Overall contaminant concentrations at the site are decreasing, and the concentrations of 1-methylnaphthalene, 2-methylnaphthalene, and naphthalene in well MW-14R are likely to follow that trend.

Site groundwater does not present unacceptable risks for current or future exposures (other than residential). At the present time, there is no potable use of groundwater at OLF Bronson. If construction work is to be conducted in this area, risk estimates suggest that no special precautions are needed.

It is unlikely that residential use of the property will occur in the future. However, if developed, future residents may be exposed to unacceptable levels of carcinogenic PAHs if groundwater in the area was developed as a source of potable water. Therefore, institutional controls to prevent residential development are justified.

RMO Level II applies to the groundwater at this site under Option IID. Although groundwater concentrations exceed GCTLs in MW-14R, the following conditions are met:

- Historical data indicate that contamination has not been detected in the most downgradient wells. Since these wells are within the property boundaries, groundwater concentrations at the property boundaries are not expected to exceed GCTLs.
- The data indicate that groundwater in only one well (MW-14R) exceeds the GCTLs (concentrations in this well are decreasing). Therefore, contamination is limited to an area less than ¼ acre. The data also indicate that the contamination is not migrating.
- There are no fresh surface water (FSW) or marine surface water (MSW) bodies in the vicinity of the site. Since the downgradient wells show no impact, the site will not impact any FSW or MSW bodies at the property boundaries.

#### 4.2 PROPOSED INSTITUTIONAL CONTROLS

OLF Bronson is currently used as a recreational area (Blue Angels Recreation Park) and is not expected to be developed for any other uses. The site does not present unacceptable risks for current receptors or future construction or occupational workers. Although it is unlikely that residential use of the property will occur in the future, the site presents unacceptable risks for future residents if either contaminated subsurface soils are brought to the surface during site development or if groundwater is used as a source of potable water. Therefore, institutional controls to prevent residential development and potable water use are warranted. It is expected that with natural attenuation, site COC concentrations will decrease over time and those use limitations could be removed in the future.

The following institutional controls are recommended for the site to achieve No Further Action with Institutional Controls (RMO II):

- No residential use, and
- No potable use of groundwater

Consistent with Section C, Footnote 14, of FDEP's Institutional Controls Procedures Guidance (November 2010), the Navy proposes to implement the above identified institutional controls via reliance upon the NAS Pensacola Land Use Control Memorandum of Agreement (LUC MOA) previously executed between the Navy, FDEP and EPA Region 4 and site specific Land Use Control Implementation Plan (LUCIP) provided hereto as Attachment C. For Site 1120, the Navy proposes use of annual rather than quarterly site inspections under that MOA given the relatively low potential exposure risk associated with this OLF site.

## REFERENCES

Department of the Navy, 2001. Conducting Human Health Risk Assessments under the Environmental Restoration Program. February.

FDEP (Florida Department of Environmental Protection), 1998. Review Comments on Site Assessment Report for Underground Storage Tank Site 1120, Outlying Landing Field Bronson, Pensacola, Florida. Tallahassee, Florida. April.

FDEP, 2005a. Technical Report: Development of Soil Cleanup Target Levels (SCTLs) for Chapter 62-777, FAC, Division of Waste Management, Tallahassee, Florida. February.

FDEP, 2005b. Contaminated Site Cleanup Criteria, Chapter 62-780 FAC, Division of Waste Management, Tallahassee, Florida. April.

Navy Public Works Center, 1998. Site Assessment Report for Underground Storage Tank Site 1120, Outlying Landing Field Bronson, Pensacola, Florida. Naval Air Station Pensacola, Florida. March.

State of Florida, 2005. Contaminated Site Cleanup Criteria, Chapter 62-780 FAC. April

Tetra Tech NUS, Inc. (Tetra Tech), 2001. Site Assessment Report Addendum for Underground Storage Tank Site 1120, Outlying Landing Field Bronson, Pensacola, Florida. Tallahassee, Florida. May.

Tetra Tech, 2006. Enhanced Natural Attenuation Treatability Study Seventh Quarter Groundwater Monitoring Letter Report for Underground Storage Tank Site 1120, Outlying Landing Field Bronson, Pensacola, Florida. Tallahassee, Florida. February.

Tetra Tech, 2007. Treatability Study Work Plan for Underground Storage Tank Site 1120, Outlying Landing Field Bronson, Pensacola, Florida. Tallahassee, Florida. August.

Tetra Tech, 2008. Baseline Sampling Letter Report for Underground Storage Tank Site 1120, Outlying Landing Field Bronson, Pensacola, Florida. Tallahassee, Florida. March.

USEPA (United States Environmental Protection Agency), 1989. Risk Assessment Guidance for Superfund: Volume I, Human Health Evaluation Manual (Part A). EPA 540/1-89/002. Office of Emergency and Remedial Response, Washington, D.C. December.

USEPA, 1991. Risk Assessment Guidance for Superfund Volume 1: Human Health Evaluation Manual (Part B, Development of Risk-Based Preliminary Remediation Goals). Publication 9285.7-01B. Office of Emergency and Remedial Response, Washington, DC. NTIS PB92-963333. December.

USEPA, 1993. Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure. Office of Solid Waste and Emergency Response, Washington, DC. May.

USEPA, 1996. Soil Screening Guidance: Technical Background Document. EPA/540/R-95/128, Office of Solid Waste and Emergency Response, Washington, D.C. May.

USEPA, 1997. Health Effects Assessment Summary Tables FY 1997. Office of Solid Waste and Emergency Response, Washington, D.C. July.

USEPA, 2000. Supplemental Guidance to RAGS: Region IV Bulletins, Human Health Risk Assessment. Atlanta, Georgia. May.

USEPA, 2002. Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. Office of Solid Waste and Emergency Response 9355.4-24, Washington, D.C. December.

USEPA, 2004. Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual, (Part E, Supplemental Guidance for Dermal Risk Assessment), Final. EPA/540/R/99/005, Office of Emergency and Remedial Response, Washington, D.C. July.

USEPA, 2004. Region IX Preliminary Remediation Goals. October . Update December 28.

USEPA, 2007. Region III Risk-Based Concentration Table. Hazardous Waste Management Division, Philadelphia, Pennsylvania. October.

USEPA, 2008. Integrated Risk Information System (IRIS) Online at <http://www.epa.gov/iris/subst/index.html>. May.

**APPENDIX A**

**HUMAN HEALTH RISK ASSESSMENT**

**SUPPORT DOCUMENTATION**

**(CALCULATION OF SCTLs AND GCTLs FOR THE CONSTRUCTION WORKER)**

**APPENDIX A**

**HUMAN HEALTH RISK ASSESSMENT**

**SUPPORT DOCUMENTATION**

**(CALCULATION OF SCTLs AND GCTLs FOR THE CONSTRUCTION WORKER)**

### Chemical Intakes Used in Development of Construction Worker SCTLs and GCTLs.

The SCTLs for the construction worker were based on the combined effects of ingestion, inhalation, and dermal contact. The GCTLs for the construction worker were based on the combined effects of ingestion and dermal contact. The equations and exposure assumption for these calculations are presented in the following sections.

#### 3.2.3.1 Incidental Ingestion of Soil

Exposures associated with incidental ingestion were estimated in the following manner (USEPA, December 1989):

$$\text{Intake}_{si} = (C_{si})(IR_s)(FI)(EF)(ED)(CF)/(BW)(AT)$$

where:  $\text{Intake}_{si}$  = intake of contaminant "i" from soil (mg/kg/day)  
 $C_{si}$  = concentration of contaminant "i" in soil (mg/kg)  
 $IR_s$  = ingestion rate (mg/day)  
 $FI$  = fraction ingested from contaminated source (dimensionless)  
 $EF$  = exposure frequency (days/year)  
 $ED$  = exposure duration (year)  
 $CF$  = conversion factor ( $1 \times 10^{-6}$  kg/mg)  
 $BW$  = body weight (kg)  
 $AT$  = averaging time (days);  
for noncarcinogens,  $AT = ED \times 365$  days/year;  
for carcinogens,  $AT = 70$  years  $\times$  365 days/year

The construction worker was assumed to ingest 330 mg of soil per day (USEPA, December 2002), 250 days per year for 1 year and weigh 70 kg. A default value of 1.0 (USEPA, December 1989) is recommended for the fraction of soil ingested from the contaminated source.

#### 3.2.3.2 Dermal Contact with Soil

Dermal contact with soil is expected to coincide with incidental ingestion. Exposures associated with the dermal route were estimated in the following manner (USEPA, December 1989 and July 2004):

$$\text{Intake}_{si} = (C_{si})(SA)(AF)(ABS)(CF)EF(ED)/(BW)(AT)$$

where:  $\text{Intake}_{si}$  = amount of chemical "i" absorbed during contact with soil (mg/kg/day)

C <sub>s</sub>	=	concentration of chemical "i" in soil (mg/kg)
SA	=	skin surface area available for contact (cm <sup>2</sup> /day)
AF	=	skin adherence factor (mg/cm <sup>2</sup> )
ABS	=	absorption factor (dimensionless)
CF	=	conversion factor (1x10 <sup>-6</sup> kg/mg)
EF	=	exposure frequency (days/year)
ED	=	exposure duration (year)
BW	=	body weight (kg)
AT	=	averaging time (days); for noncarcinogens, AT = ED x 365 days/year; for carcinogens, AT = 70 years x 365 days/year

The head, hands, and forearms of the excavation/construction worker were assumed to be exposed to soils (assuming the receptors wear a short-sleeved shirt, long pants, and shoes). As recommended in the Risk Assessment Guidance for Superfund (RAGS) Part E (USEPA, July 2004), the skin surface area for a worker was assumed to be 3,300 cm<sup>2</sup>. This value represents the average of the 50<sup>th</sup>-percentile areas of males and females more than 18 years old. The soil adherence factor for the construction worker was assumed to be 0.3 mg/cm<sup>2</sup>. This value is the 95<sup>th</sup>-percentile value for construction workers, (Exhibit 3.3; USEPA, July 2004).

For the constituents identified as potential COCs for soil, the following dermal absorption factors were used (USEPA, Exhibit 3-4, July 2004):

- PAHs – 0.13
- Petroleum Hydrocarbons – 0.1
- VOCs – None

As indicated in RAGS Part E, absorption factors for VOCs in soil have not been developed due to insufficient data. Therefore, risks from dermal absorption of VOCs in soil were not included in the SCTL calculations. The same exposure frequencies and durations used in the estimation of ingestion intakes were used to estimate exposure via dermal contact.

### 3.2.3.3 Inhalation of Air and Fugitive Dust/Volatile Emissions

The amount of a chemical a receptor takes in as a result of breathing is determined using the concentration of the contaminant in air. Intakes of both particulates and vapors/gases are calculated using the same equation, as follows (USEPA, December 1991 and July 1996):

$$\text{Intake}_{ai} = \frac{(C_{ai})(IR_a)(ET)(EF)(ED)}{(BW)(AT)}$$

- where: Intake<sub>ai</sub> = intake of chemical "i" from air via inhalation (mg/kg/day)
- C<sub>ai</sub> = concentration of chemical "i" in air (mg/m<sup>3</sup>)
- IR<sub>a</sub> = inhalation rate (m<sup>3</sup>/hour)
- ET = exposure time (hours/day)
- EF = exposure frequency (days/year)
- ED = exposure duration (year)
- PEF = Particulate Emission Factor (m<sup>3</sup>/kg)
- VF = Volatilization Factor (chemical-specific) (m<sup>3</sup>/kg)
- BW = body weight (kg)
- AT = averaging time (days);
- = for noncarcinogens, AT = ED x 365 days/year;
- = for carcinogens, AT = 70 year x 365 days/year

The same exposure frequencies and durations used in the estimation of ingestion and dermal intakes of soil were used to estimate exposure via inhalation of air and fugitive dust/volatile emissions. The inhalation rate for construction/excavation workers was assumed to be 2.5 cubic meters (m<sup>3</sup>) per hour (USEPA, December 2002) for 8 an hour workday (i.e., 20 m<sup>3</sup> per day).

The concentrations of chemicals in air resulting from emissions from soil were developed following procedures presented in USEPA Soil Screening Guidance (July 1996 and December 2002b), as follows:

$$C_a = C_s \times \left[ \frac{1}{PEF} + \frac{1}{VF} \right]$$

- where: C<sub>a</sub> = chemical concentration in air, mg/m<sup>3</sup>
- C<sub>s</sub> = chemical concentration in soil, mg/kg
- PEF = Particulate Emission Factor, 2.43 x 10<sup>6</sup> m<sup>3</sup>/kg (USEPA, December 2002)
- VF = chemical-specific Volatilization Factor, m<sup>3</sup>/kg

For chemicals in soil that are not classified as volatile, the above equation reduces to:

$$C_a = C_s \times \left[ \frac{1}{PEF} \right]$$

The Particulate Emissions Factor (PEF) relates the concentration of the chemical in soil with the concentration of dust particles in air. The Volatilization Factor (VF) relates the concentration of the chemical in soil with the concentration in ambient air. The VFs used to calculate the alternate SCTLs used in this report were the VFs for workers presented in Table 4 of the 62-777 Technical Report (FDEP, February 2005). The PEF used for the construction worker was  $2.43 \times 10^6 \text{ m}^3/\text{kg}$  and was based on USEPA guidance (USEPA, December 2002). The calculation of the construction worker PEF is presented in this Appendix.

### 3.2.3.4 Incidental Ingestion of Groundwater – Construction Worker

This scenario assumes that construction workers accidentally ingest small amounts of water while working in an excavated area or trench which contains pools of shallow groundwater. The following intake equation and exposure parameters in the groundwater ingestion calculation:

$$\text{Intake}_{wi} = \frac{(C_{wi})(IR_w)(EF)(ED)}{(BW)(AT)}$$

where:  $\text{Intake}_{wi}$  = intake of chemical "i" from water (mg/kg/day)  
 $C_{wi}$  = concentration of chemical "i" in water (mg/L)  
 $IR_w$  = ingestion rate of groundwater (L/day)  
 $EF$  = exposure frequency (days/year)  
 $ED$  = exposure duration (year)  
 $BW$  = body weight (kg)  
 $AT$  = averaging time (days);  
for noncarcinogens,  $AT = ED \times 365 \text{ days/year}$ ;  
for carcinogens,  $AT = 70 \text{ years} \times 365 \text{ days/year}$

This scenario assumes that the construction worker accidentally ingests 0.05 mL of groundwater per day 250 days per year for 1 year.

### 3.2.3.5 Dermal Contact with Groundwater - Construction Worker

Dermal contact with groundwater for the construction worker is expected to coincide with incidental ingestion. The following equation was used to assess exposures resulting from dermal contact with water (USEPA, July 2004):

$$\text{DAD}_{wi} = \frac{(DA_{\text{event}})(EV)(ED)(EF)(A)}{(BW)(AT)}$$

where:

DAD <sub>wi</sub>	=	dermally absorbed dose of chemical "i" from water (mg/kg/day)
DA <sub>event</sub>	=	absorbed dose per event (mg/cm <sup>2</sup> -event)
EV	=	event frequency (events/day)
ED	=	exposure duration (years)
EF	=	exposure frequency (days/year)
A	=	skin surface area available for contact (cm <sup>2</sup> )
BW	=	body weight (kg)
AT	=	averaging time (days)
		for noncarcinogens, AT = ED x 365 days/year
		for carcinogens, AT = 70 years x 365 days/year

The exposed surface area of the body available for contact was assumed to be similar to the assumptions outlined for dermal contact with soil, 3,300 cm<sup>2</sup>. The workers were also assumed to be exposed 8 hours per day, 250 days per year for 1 year.

The absorbed dose per event (DA<sub>event</sub>) was estimated using a non-steady-state approach for organic compounds and a traditional steady-state approach for inorganics. For organics, the following equations apply:

$$\text{If } t_{\text{event}} < t', \text{ then: } DA_{\text{event}} = (2)(K_p)(FA)(C_w)(CF) \left( \sqrt{\frac{6 \tau t_{\text{event}}}{\pi}} \right)$$

$$\text{If } t_{\text{event}} > t', \text{ then: } DA_{\text{event}} = (K_p)(FA)(C_w)(CF) \left( \frac{t_{\text{event}}}{1+B} + 2 \tau \left( \frac{1+3B+3B^2}{(1+B)^2} \right) \right)$$

where:

t <sub>event</sub>	=	duration of event (hours/event)
t'	=	time it takes to reach steady-state conditions (hours)
K <sub>p</sub>	=	permeability coefficient from water through skin (cm/hour)
FA	=	chemical-specific fraction absorbed (dimensionless)
C <sub>wi</sub>	=	concentration of chemical "i" in water (mg/L)
τ	=	lag time (hour)
π	=	Pi (dimensionless; equal to 3.1416)
CF	=	conversion factor (0.001 L/cm <sup>3</sup> )

B = dimensionless ratio of the permeability of the stratum corneum relative to the permeability across the viable epidermis

Values for the chemical-specific parameters ( $t'$ ,  $K_p$ ,  $\tau$ , FA, and B) were obtained from RAGS Part E, the current dermal guidance (USEPA, July 2004), and are presented in Appendix A. If no published values were available for a particular compound, values were calculated using equations provided in this guidance. Note that for PAHs in groundwater, exposure by dermal contact was not included in the GCTL calculations because USEPA dermal guidance (USEPA, July 2004) indicates that there is a great deal of uncertainty and overestimation of exposure in the model used to estimate the permeability of aqueous PAHs through the skin. In addition, Tetra Tech Inc. has been advised by USEPA Region 4 not to calculate risks from PAHs in water because tests have shown that PAHs in water do not penetrate the skin. Details and calculations of the construction worker GCTLs are presented in Appendix A.

<b>CLIENT:</b> SITE 1120		<b>JOB NUMBER:</b> 00705
<b>SUBJECT:</b> CALCULATION OF ALTERNATE SOIL CLEANUP TARGET LEVELS (SCTLs) FOR CARCINOGENS CONSTRUCTION WORKERS		
<b>BASED ON:</b> TECHNICAL REPORT: DEVELOPMENT OF SOIL CLEANUP TARGET LEVELS FOR CHAPTER 62-777, F.A.C., FDEP, FEBRUARY 2005		
<b>BY:</b> T. JACKMAN	<b>CHECKED BY:</b>	<b>DATE:</b> 7/28/2005

**PURPOSE:** To calculate an alternative soil cleanup level for construction workers exposed to soil.

**RELEVANT EQUATIONS:**

$$SCTL = \frac{TR \times BW \times AT}{EF \times ED \times FC \times [Intake_{Ing} + Intake_{Der} + Intake_{Inh}]}$$

$$Intake_{Ing} = CSFo \times IRo \times 10^{-6} \text{ kg/mg}$$

$$Intake_{Der} = CSFd \times SA \times AF \times DA \times 10^{-6} \text{ kg/mg}$$

$$Intake_{Inh} = CSFi \times IRI \times (1/VF + 1/PEF)$$

Where:

Chemical	=	<b>Benzo(a)pyrene (cPAHs)</b>
SCTL	=	Soil Cleanup Target Level (mg/kg)
TR	=	1.0E-06 Target Cancer Risk (unitless)
BW	=	70 Body weight (kg)
AT	=	25550 Averaging time (days)
EF	=	250 Exposure frequency (days/year)
ED	=	1 Exposure duration (years)
FC	=	1 Fraction from contaminated source (unitless)
IRo	=	330 Ingestion rate, oral (mg/day)
SA	=	3300 Surface area of skin exposed (cm <sup>2</sup> /day)
AF	=	0.3 Adherence factor (mg/cm <sup>2</sup> )
DA	=	0.13 Dermal absorption (unitless)
IRi	=	20 Inhalation rate (m <sup>3</sup> /day)
VF	=	2.72E+07 Volatilization factor (m <sup>3</sup> /kg)
PEF	=	2.43E+06 Particulate emission factor (m <sup>3</sup> /kg)
CSFo	=	7.30E+00 Oral cancer slope factor (mg/kg/day) <sup>-1</sup>
CSFd	=	7.30E+00 Dermal cancer slope factor (mg/kg/day) <sup>-1</sup>
CSFi	=	3.10E+00 Inhalation cancer slope factor (mg/kg/day) <sup>-1</sup>

<b>CLIENT:</b> SITE 1120		<b>JOB NUMBER:</b> 00705
<b>SUBJECT:</b> CALCULATION OF ALTERNATE SOIL CLEANUP TARGET LEVELS (SCTLs) FOR CARCINOGENS CONSTRUCTION WORKERS		
<b>BASED ON:</b> TECHNICAL REPORT: DEVELOPMENT OF SOIL CLEANUP TARGET LEVELS FOR CHAPTER 62-777, F.A.C., FDEP, FEBRUARY 2005		
<b>BY:</b> T. JACKMAN	<b>CHECKED BY:</b>	<b>DATE:</b> 7/28/2005

**EXAMPLE CALCULATION - BENZO(A)PYRENE**

$$Intake_{Ing} = 7.30E+00 \text{ (mg/kg-day)}^{-1} \times 330 \text{ mg/day} \times 1E-06 \text{ kg/mg}$$

$$Intake_{Ing} = 2.41E-03 \text{ kg-kg/mg}$$

$$Intake_{Der} = 7.30E+00 \text{ (mg/kg-day)}^{-1} \times 3300 \text{ cm}^2/\text{day} \times 0.3 \text{ mg/cm}^2 \times 0.13 \times 1E-06 \text{ kg/mg}$$

$$Intake_{Der} = 9.40E-04 \text{ kg-kg/mg}$$

$$Intake_{Inh} = 3.10E+00 \text{ (mg/kg-day)}^{-1} \times 20 \text{ m}^3/\text{day} \times (1/2.72E+07 \text{ m}^3/\text{kg} + 1/2.43E+06 \text{ m}^3/\text{kg})$$

$$Intake_{Inh} = 2.78E-05 \text{ kg-kg/mg}$$

$$SCTL = \frac{1.E-06 \times 70 \text{ kg} \times 25550 \text{ days}}{250 \text{ days/yr} \times 1 \text{ yrs} \times 1 \times [2.41E-03 \text{ kg-kg/mg} + 9.40E-04 \text{ kg-kg/mg} + 2.78E-05 \text{ kg-kg/mg}]}$$

$$SCTL = 2.12E+00 \text{ mg/kg}$$

**CALCULATION WORKSHEET**

<b>CLIENT:</b> SITE 1120		<b>JOB NUMBER:</b> 00705
<b>SUBJECT:</b> CALCULATION OF ALTERNATE SOIL CLEANUP TARGET LEVELS (SCTLs) FOR NONCARCINOGENS - CONSTRUCTION WORKERS		
<b>BASED ON:</b> TECHNICAL REPORT: DEVELOPMENT OF SOIL CLEANUP TARGET LEVELS FOR CHAPTER 62-777, F.A.C., FDEP, FEBRUARY 2005		
<b>BY:</b> T. JACKMAN	<b>CHECKED BY:</b>	<b>DATE:</b> 5/20/2008

**PURPOSE:** To calculate an alternative soil cleanup level for construction workers exposed to soil.

**RELEVANT EQUATIONS:**

$$SCTL = \frac{THI \times BW \times AT}{EF \times ED \times FC \times [Intake_{ing} + Intake_{Der} + Intake_{inh}]}$$

$$Intake_{ing} = 1/RfDo \times IRo \times 10^{-6} \text{ kg/mg}$$

$$Intake_{Der} = 1/RfDd \times SA \times AF \times DA \times 10^{-6} \text{ kg/mg}$$

$$Intake_{inh} = 1/RfDi \times IRi \times (1/VF + 1/PEF)$$

Where:

Chemical	=	TRPH
SCTL	=	Soil Cleanup Target Level (mg/kg)
THI	=	1 Target Hazard Index (unitless)
BW	=	70 Body weight (kg)
AT	=	365 Averaging time (days)
EF	=	250 Exposure frequency (days/year)
ED	=	1 Exposure duration (years)
FC	=	1 Fraction from contaminated source (unitless)
IRo	=	330 Ingestion rate, oral (mg/day)
SA	=	3300 Surface area of skin exposed (cm <sup>2</sup> /day)
AF	=	0.3 Adherence factor (mg/cm <sup>2</sup> )
DA	=	0.1 Dermal absorption (unitless)
IRi	=	20 Inhalation rate (m <sup>3</sup> /day)
VF	=	8.73E+03 Volatilization factor (m <sup>3</sup> /kg)
PEF	=	2.43E+06 Particulate emission factor (m <sup>3</sup> /kg)
RfDo	=	4.0E-02 Oral reference dose (mg/kg/day)
RfDd	=	4.0E-02 Dermal reference dose (mg/kg/day)
RfDi	=	5.7E-02 Inhalation reference dose (mg/kg/day)

<b>CLIENT:</b> SITE 1120		<b>JOB NUMBER:</b> 00705
<b>SUBJECT:</b> CALCULATION OF ALTERNATE SOIL CLEANUP TARGET LEVELS (SCTLs) FOR NONCARCINOGENS - CONSTRUCTION WORKERS		
<b>BASED ON:</b> TECHNICAL REPORT: DEVELOPMENT OF SOIL CLEANUP TARGET LEVELS FOR CHAPTER 62-777, F.A.C., FDEP, FEBRUARY 2005		
<b>BY:</b> T. JACKMAN	<b>CHECKED BY:</b>	<b>DATE:</b> 5/20/2008

**EXAMPLE CALCULATION - TRPH**

$$\text{Intake}_{\text{Ing}} = 1/4.0\text{E-}02 \text{ mg/kg-day} \times 330 \text{ mg/day} \times 1\text{E-}06 \text{ kg/mg}$$

$$\text{Intake}_{\text{Ing}} = 8.25\text{E-}03 \text{ kg-kg/mg}$$

$$\text{Intake}_{\text{Der}} = 1/4.0\text{E-}02 \text{ mg/kg-day} \times 3300 \text{ cm}^2/\text{day} \times 0.3 \text{ mg/cm}^2 \times 0.1 \times 1\text{E-}06 \text{ kg/mg}$$

$$\text{Intake}_{\text{Der}} = 2.48\text{E-}03 \text{ kg-kg/mg}$$

$$\text{Intake}_{\text{Inh}} = 1/5.7\text{E-}02 \text{ mg/kg-day} \times 20 \text{ m}^3/\text{day} \times (1/8.73\text{E+}03 \text{ m}^3/\text{kg} + 1/2.43\text{E+}06 \text{ m}^3/\text{kg})$$

$$\text{Intake}_{\text{Inh}} = 4.02\text{E-}02 \text{ kg-kg/mg}$$

$$\text{SCTL} = \frac{1 \times 70 \text{ kg} \times 365 \text{ days}}{250 \text{ days/yr} \times 1 \text{ yrs} \times 1 \times [8.25\text{E-}03 \text{ kg-kg/mg} + 2.48\text{E-}03 \text{ kg-kg/mg} + 4.02\text{E-}02 \text{ kg-kg/mg}]}$$

$$\text{SCTL} = 2.01\text{E+}03 \text{ mg/kg}$$

<b>CLIENT:</b> SITE 1120		<b>JOB NUMBER:</b> 00705
<b>SUBJECT:</b> CALCULATION OF PARTICULATE EMISSION FACTOR FOR CONSTRUCTION WORKERS		
<b>BASED ON:</b> Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (USEPA, December 2002)		
<b>BY:</b> T.JACKMAN	<b>CHECKED BY:</b>	<b>DATE:</b> 05/22/08

Equation 5-5 Derivation of the Particulate Emission Factor Construction Scenario - Construction Worker	
$PEF_{sc} = Q/C_{sr} \times \frac{1}{F_D} \times \left[ \frac{T \times A_R}{556 \times \left(\frac{W}{3}\right)^{0.4} \times \frac{(365 \text{ day} - p)}{365 \text{ day}} \times VKT} \right]$	
Parameter/Definition (units)	Default
PEF <sub>sc</sub> /subchronic road particulate emission factor (m <sup>3</sup> /kg)	site-specific
Q/C <sub>sr</sub> /inverse of 1-h average air concentration along a straight road segment bisecting a 0.5-acre square site (g/m <sup>2</sup> -s per kg/m <sup>3</sup> )	23.02
F <sub>D</sub> /dispersion correction factor (unitless)	0.185 (Appendix E)
T/total time over which construction occurs (s)	site-specific
A <sub>R</sub> /surface area of contaminated road segment (m <sup>2</sup> )	274.213
L <sub>R</sub> /length of road segment (ft)	(A <sub>R</sub> = L <sub>R</sub> × W <sub>R</sub> × 0.092903m <sup>2</sup> /ft <sup>2</sup> )
W <sub>R</sub> /width of road segment (ft)	
W/mean vehicle weight (tons)	site-specific
p/number of days with at least 0.01 inches of precipitation (days/year) (see Figure 5-2)	site-specific
VKT/sum of fleet vehicle kilometers traveled during the exposure duration (km)	site-specific

**Calculation of PEF for Construction Workers**

Q/C	23.02 (g/m <sup>2</sup> -s per kg/m <sup>3</sup> )
F <sub>D</sub>	0.185 dispersion correction factor (unitless)
T	7.20E+06 sec      3600 sec/hr x 8hr/day x 250days/yr
Area (A)	274.213 m <sup>2</sup>
W	8 tons
p	110 day/year
VKT	175.5 km
<b>PEF =</b>	<b>2.43E+06 m<sup>3</sup>/kg</b>

**EXPOSURE ASSUMPTIONS FOR EXPOSURE OF  
CONSTRUCTION WORKERS TO GROUNDWATER**

Exposure Route	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CW	Chemical Concentration in Water	Max or 95% UCL	ug/L	USEPA, December 2002	Chronic Daily Intake (CDI) (mg/kg/day) =  $\frac{CW \times CF \times IR \cdot GW \times EF \times ED}{BW \times AT}$
	CR	Contact Rate	0.05	L/day	Professional Judgement	
	CF	Conversion factor	0.001	ug/mg	--	
	ET	Exposure Time	NA	hours/event	--	
	EF	Exposure Frequency	250	events/year	USEPA, December 2002	
	ED	Exposure Duration	1	years	Professional Judgement	
	BW	Body Weight	70	kg	U.S. EPA, 1993	
	AT-N	Averaging Time (Non-Cancer)	365	days	U.S. EPA, 1989	
Dermal	DAevent	Absorbed dose per event	Calculated	mg/cm <sup>2</sup> -event	US.EPA, July 2004	Dermally Absorbed Dose (mg/kg/day) =  $\frac{DAevent \times EV \times EF \times ED \times SA}{BW \times AT}$  See text for calculation of DAevent.
	SA	Skin Surface Available for Contact	3,300	cm <sup>2</sup>	US.EPA, July 2004	
	EV	Event Frequency	1	events/day	Professional Judgement	
	ET	Exposure Time	8	hours/event	8 Hour Workday	
	EF	Exposure Frequency	250	days/year	Professional Judgement	
	ED	Exposure Duration	1	years	Professional Judgement	
	BW	Body Weight	70	kg	U.S. EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	365	days	U.S. EPA, 1989	

Noncancer Ingestion Intake = 4.89E-07

Dermal Intake = 3.23E+01

**TOXICOLOGICAL DATA FOR CALCULATION OF GROUNDWATER CTLS FOR CONSTRUCTION WORKERS**

Chemical	RfDo mg/kg/d	CSFo 1/mg/kg/d	Oral to Dermal Adjustment	RfDd mg/kg/d	CSFd 1/mg/kg/d
Chloroform	1.00E-02		1	1.00E-02	
Ethylbenzene	1.00E-01		1	1.00E-01	
Xylenes	2.00E-01		1	2.00E-01	
1-Methylnaphthalene	4.00E-03		1	4.00E-03	
2-Methylnaphthalene	4.00E-03		1	4.00E-03	
Naphthalene	2.00E-02		1	2.00E-02	
Acenphthene	6.00E-02		1	6.00E-02	
Fluorene	4.00E-02		1	4.00E-02	
Phenanthrene	3.00E-02		1	3.00E-02	
TRPH	4.00E-02		1	4.00E-02	

**CALCULATION OF D<sub>event</sub> FOR EXPOSURES TO GROUNDWATER - CONSTRUCTION WORKER**  
**SOURCE: RISK ASSESSMENT GUIDANCE FOR SUPERFUND, PART E, SUPPLEMENTAL GUIDANCE FOR DERMAL RISK ASSESSMENT INTERIM GUIDANCE**

RELEVANT EQUATIONS:

For Inorganics DA<sub>event</sub> = K<sub>p</sub> x C<sub>w</sub> x CF x t<sub>event</sub>

For Organics If t<sub>event</sub> ≤ t\*, then: DA<sub>event</sub> = 2 x FA x K<sub>p</sub> x C<sub>w</sub> x CF x  $\sqrt{\frac{6 \times \text{tau} \times \text{tevent}}{\pi}}$

If t<sub>event</sub> > t\*, then: DA<sub>event</sub> = FA x K<sub>p</sub> x C<sub>w</sub> x CF x  $\left[ \frac{\text{tevent}}{1+B} + 2 \times \text{tau} \times \left( \frac{1+3B+3B^2}{(1+B)^2} \right) \right]$

- DA<sub>event</sub> = : Chemical specific absorbed dose per event (mg/cm<sup>2</sup>-event)
- C<sub>w</sub> = : Concentration of chemical in water (ug/L)
- t<sub>event</sub> = : 8 duration of event (hr/event)
- tau = : Chemical specific lag time (hr)
- t\* = : Chemical specific time it takes to reach steady state (hr)
- B = : Chemical specific dimensionless constant
- K<sub>p</sub> = : Chemical specific permeability constant (cm/hr)
- CF = : 1.0E-06 (L/cm<sup>3</sup>)(mg/ug)
- FA = : Fraction absorbed (dimensionless)

CHEMICAL	C <sub>w</sub> (ug/L)	Organic or Inorganic	Estimated K <sub>p</sub> (cm/hr)	FA	tau-event (hr)	B	t* (hr)	DA <sub>event</sub> (mg/cm <sup>2</sup> - event)
Chloroform	1	O	6.83E-03	1	4.98E-01	2.87E-02	1.19E+00	6.01E-08
Ethylbenzene	1	O	4.93E-02	1	4.20E-01	1.95E-01	1.01E+00	3.79E-07
Xylenes	1	O	5.00E-04	1	1.34E-01	2.45E-04	3.22E-01	4.13E-09
1-Methylnaphthalene	1	O	9.08E-02	1	6.58E-01	4.16E-01	1.58E+00	6.78E-07
2-Methylnaphthalene	1	O	8.94E-02	1	6.58E-01	4.10E-01	1.58E+00	6.69E-07
Naphthalene	1	O	4.66E-02	1	5.58E-01	2.03E-01	1.34E+00	3.72E-07
Acenphthene	1	O	8.39E-02	1	7.68E-01	4.01E-01	1.84E+00	6.55E-07
Fluorene	1	O	1.07E-01	1	8.97E-01	5.29E-01	2.15E+00	8.38E-07
Phenanthrene	1	O	1.44E-01	1	1.06E+00	7.40E-01	4.11E+00	1.16E-06
TRPH	1	O	1.16E-02	1	5.81E-01	5.13E-02	1.39E+00	1.03E-07

**CALCULATION OF GROUNDWATER CTLS FOR CONSTRUCTION WORKERS**

Chemical	Hazard Index (Adult)		
	Incidental Ingestion	Dermal Contact	Combined
Chloroform	2.0E+04	5.2E+03	4.1E+03
Ethylbenzene	2.0E+05	8.2E+03	7.9E+03
Xylenes	4.1E+05	1.5E+06	3.2E+05
1-Methylnaphthalene	8.2E+03	NA	8.2E+03
2-Methylnaphthalene	8.2E+03	NA	8.2E+03
Naphthalene	4.1E+04	NA	4.1E+04
Acenphthene	1.2E+05	NA	1.2E+05
Fluorene	8.2E+04	NA	8.2E+04
Phenanthrene	6.1E+04	8.0E+02	6.1E+04
TRPH	8.2E+04	1.2E+04	1.1E+04

**APPENDIX B**

**LABORATORY DATA REPORTS**



Volatiles

Sample OLFS4-MW05S-002 required a 10X dilution due to concentrations of cis-1,2-dichloroethene and naphthalene greater than the linear calibration range of the instrument.

Semivolatiles

Sample BRN-1120-MW14R-0610 required a 10X dilution for naphthalene and 1-methylnaphthalene and a 20X dilution for 2-methylnaphthalene due to concentrations greater than the linear calibration range of the instrument.

Florida-PRO

No data qualification issues were noted.

Additional Comments:

Positive results less than the reporting limit (RL) were qualified as estimated "J", due to uncertainty near the detection limit.

EXECUTIVE SUMMARY

**Laboratory Performance Issues:** None.

**Other Factors Affecting Data Quality:** None.

The data for these analyses were reviewed with reference to the EPA Functional Guidelines for Organic Data Validation (October 1999), and the Department of Defense (DoD) document entitled "Quality Systems Manual (QSM) for Environmental Laboratories" (January 2006). The text of this report has been formulated to address only those problem areas affecting data quality.



Tetra Tech NUS

Edward Sedlmyer  
Chemist/Data Validator



Tetra Tech NUS

Joseph A. Samchuck  
Data Validation Quality Assurance Officer

**Attachments:**

- Appendix A – Qualified Analytical Results
- Appendix B – Results as Reported by the Laboratory
- Appendix C – Support Documentation

**APPENDIX A**

**QUALIFIED ANALYTICAL RESULTS**

**Data Validation Qualifier Codes:**

- A = Lab Blank Contamination
- B = Field Blank Contamination
- C = Calibration Noncompliance (e.g. % RSDs, %Ds, ICVs, CCVs, RRFs, etc.)
- C01 = GC/MS Tuning Noncompliance
- D = MS/MSD Recovery Noncompliance
- E = LCS/LCSD Recovery Noncompliance
- F = Lab Duplicate Imprecision
- G = Field Duplicate Imprecision
- H = Holding Time Exceedance
- I = ICP Serial Dilution Noncompliance
- J = GFAA PDS - GFAA MSA's  $r < 0.995$  / ICP PDS Recovery Noncompliance
- K = ICP Interference - includes ICS % R Noncompliance
- L = Instrument Calibration Range Exceedance
- M = Sample Preservation Noncompliance
- N = Internal Standard Noncompliance
- N01 = Internal Standard Recovery Noncompliance Dioxins
- N02 = Recovery Standard Noncompliance Dioxins
- N03 = Clean-up Standard Noncompliance Dioxins
- O = Poor Instrument Performance (e.g. base-line drifting)
- P = Uncertainty near detection limit ( $< 2 \times$  IDL for inorganics and  $<$ CRQL for organics)
- Q = Other problems (can encompass a number of issues; e.g. chromatography,interferences, etc.)
- R = Surrogates Recovery Noncompliance
- S = Pesticide/PCB Resolution
- T = % Breakdown Noncompliance for DDT and Endrin
- U = % Difference between columns/detectors  $>25\%$  for positive results determined via GC/HPLC
- V = Non-linear calibrations; correlation coefficient  $r < 0.995$
- W = EMPC result
- X = Signal to noise response drop
- Y = Percent solids  $<30\%$
- Z = Uncertainty at 2 sigma deviation is greater than sample activity

<b>PROJ_NO: 00389</b> <b>SDG: B002767</b> <b>FRACTION: OV</b> <b>MEDIA: WATER</b>	NSAMPLE	OLFS4-MW05S-002			OLFS4-MW05S-002RE			OLFS4-MW30S-002			OLFS4-MW31S-002		
	LAB_ID	B002650-04			B002650-04RE1			B002650-01			B002650-03		
	SAMP_DATE	6/8/2010			6/8/2010			6/8/2010			6/8/2010		
	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/L			UG/L			UG/L			UG/L		
	PCT_SOLIDS	0.0			0.0			0.0			0.0		
	DUP_OF												
PARAMETER	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	
BENZENE	82						0.35	U		0.35	U		
CIS-1,2-DICHLOROETHENE				910			0.41	U		0.41	U		
ETHYLBENZENE	54						0.43	U		0.43	U		
ISOPROPYLBENZENE	21						0.5	U		0.5	U		
NAPHTHALENE				250			0.23	U		0.23	U		
TOTAL XYLENES	160						0.85	U		0.85	U		

<b>PROJ_NO: 00389</b> <b>SDG: B002767</b> <b>FRACTION: OV</b> <b>MEDIA: WATER</b>	NSAMPLE	OLFS4-MW32S-002		OLFS4-TB-0610		
	LAB_ID	B002650-02		B002650-11RE1		
	SAMP_DATE	6/8/2010		6/9/2010		
	QC_TYPE	NM		NM		
	UNITS	UG/L		UG/L		
	PCT_SOLIDS	0.0		0.0		
	DUP_OF					
PARAMETER	RESULT	VQL	QLCD	RESULT	VQL	QLCD
BENZENE	0.35	U		0.35	U	
CIS-1,2-DICHLOROETHENE	0.68	J	P	0.41	U	
ETHYLBENZENE	1.6			0.43	U	
ISOPROPYLBENZENE	1.1			0.5	U	
NAPHTHALENE	2.7			0.23	U	
TOTAL XYLENES	8.3			0.85	U	

<b>PROJ_NO: 00389</b> <b>SDG: B002767</b> <b>FRACTION: PAH</b> <b>MEDIA: WATER</b>	NSAMPLE	BRN-1120-MW14R-0610DL			BRN-1120-MW14R-0610RE			BRN-1120-MW38-0610		
	LAB_ID	B002767-01RE2			B002767-01RE1			B002767-02		
	SAMP_DATE	6/10/2010			6/10/2010			6/10/2010		
	QC_TYPE	NM			NM			NM		
	UNITS	UG/L			UG/L			UG/L		
	PCT_SOLIDS	0.0			0.0			0.0		
	DUP_OF									
PARAMETER	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	
1-METHYLNAPHTHALENE				170			0.03	U		
2-METHYLNAPHTHALENE	240						0.043	J	P	
NAPHTHALENE				72			0.03	U		

<b>PROJ_NO: 00389</b> <b>SDG: B002767</b> <b>FRACTION: PET</b> <b>MEDIA: WATER</b>	NSAMPLE	BRN-1120-MW14R-0610			BRN-1120-MW38-0610		
	LAB_ID	B002767-01			B002767-02		
	SAMP_DATE	6/10/2010			6/10/2010		
	QC_TYPE	NM			NM		
	UNITS	MG/L			MG/L		
	PCT_SOLIDS	0.0			0.0		
	DUP_OF						
PARAMETER	RESULT	VQL	QLCD	RESULT	VQL	QLCD	
TPH (C08-C40)	2.2			0.085	U		

**APPENDIX B**

**RESULTS AS REPORTED BY THE LABORATORY**

# ORGANIC ANALYSIS DATA SHEET

EPA 8260B

OLFS4-MW05S-002

Laboratory:	<u>ENCO Orlando</u>	SDG:	<u>BR004-004</u>
Client:	<u>Tetra Tech NUS (BR004)</u>	Project:	<u>Saufley Field Pensacola - CTO 29</u>
Matrix:	<u>Ground Water</u>	Laboratory ID:	<u>A003212-03</u>
		File ID:	<u>3FL033.D</u>
Sampled:	<u>06/08/10 12:10</u>	Prepared:	<u>06/17/10 15:29</u>
		Analyzed:	<u>06/18/10 05:50</u>
Solids:		Preparation:	<u>EPA 5030B MS</u>
		Initial/Final:	<u>5 mL / 5 mL</u>
Batch:	<u>0F17031</u>	Sequence:	<u>AA11576</u>
		Calibration:	<u>1005038</u>
		Instrument:	<u>QVGCMS3</u>

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q	MDL	MRL
156-59-2	cis-1,2-Dichloroethene	1	650	E	0.41	1.0
71-43-2	Benzene	1	82		0.35	1.0
100-41-4	Ethylbenzene	1	54		0.43	1.0
98-82-8	Isopropylbenzene	1	21		0.50	1.0
91-20-3	Naphthalene	1	310	E	0.23	1.0
1330-20-7	Xylenes (Total)	1	160		0.85	1.0

SYSTEM MONITORING COMPOUND	ADDED (ug/L)	CONC (ug/L)	% REC	QC LIMITS	Q
Dibromofluoromethane	50.0	49	97	53 - 146	
1,2-Dichloroethane-d4	50.0	48	97	45 - 174	
Toluene-d8	50.0	54	109	41 - 146	
4-Bromofluorobenzene	50.0	52	104	41 - 142	

INTERNAL STANDARD	AREA	RT	REF AREA	REF RT	Q
Pentafluorobenzene	1781392	10.95	1928393	10.93	
1,4-Difluorobenzene	2777186	11.53	3160832	11.51	
Chlorobenzene-d5	2326457	14.24	2666975	14.22	
1,4-Dichlorobenzene-d4	1028553	16.52	1158205	16.5	

\* Values outside of QC limits









# ORGANIC ANALYSIS DATA SHEET

**EPA 8260B**

**OLFS4-TB-0610**

Laboratory: <u>ENCO Orlando</u>	SDG: <u>BR004-004</u>	
Client: <u>Tetra Tech NUS (BR004)</u>	Project: <u>Saufley Field Pensacola - CTO 29</u>	
Matrix: <u>Ground Water</u>	Laboratory ID: <u>A003212-04RE1</u>	File ID: <u>3FL037.D</u>
Sampled: <u>06/09/10 11:00</u>	Prepared: <u>06/17/10 15:29</u>	Analyzed: <u>06/18/10 12:33</u>
Solids:	Preparation: <u>EPA 5030B MS</u>	Initial/Final: <u>5 mL / 5 mL</u>
Batch: <u>0F17031</u>	Sequence: <u>AA11576</u>	Calibration: <u>1005038</u>
		Instrument: <u>OVGCM3</u>

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q	MDL	MRL
156-59-2	cis-1,2-Dichloroethene	1	0.41	U	0.41	1.0
71-43-2	Benzene	1	0.35	U	0.35	1.0
100-41-4	Ethylbenzene	1	0.43	U	0.43	1.0
98-82-8	Isopropylbenzene	1	0.50	U	0.50	1.0
91-20-3	Naphthalene	1	0.23	U	0.23	1.0
1330-20-7	Xylenes (Total)	1	0.85	U	0.85	1.0

SYSTEM MONITORING COMPOUND	ADDED (ug/L)	CONC (ug/L)	% REC	QC LIMITS	Q
Dibromofluoromethane	50.0	41	83	53 - 146	
1,2-Dichloroethane-d4	50.0	40	80	45 - 174	
Toluene-d8	50.0	45	89	41 - 146	
4-Bromofluorobenzene	50.0	40	80	41 - 142	

INTERNAL STANDARD	AREA	RT	REF AREA	REF RT	Q
Pentafluorobenzene	1758907	10.94	1928393	10.93	
1,4-Difluorobenzene	2819818	11.52	3160832	11.51	
Chlorobenzene-d5	2206970	14.22	2666975	14.22	
1,4-Dichlorobenzene-d4	955611	16.51	1158205	16.5	

\* Values outside of QC limits















**APPENDIX C**

**SUPPORT DOCUMENTATION**

# HOLD TIME

SDG B002767

SORT	UNITS	NSAMPLE	LAB_ID	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	SMP_EXTR	EXTR_ANL	SMP_ANL
M	UG/L	OLFS4-MW07S-002	B002650-05	NM	06/08/2010	06/11/2010	06/14/2010	3	3	6
M	UG/L	OLFS4-MW16S-002	B002650-07	NM	06/08/2010	06/11/2010	06/14/2010	3	3	6
M	UG/L	OLFS4-MW17S-002	B002650-09	NM	06/09/2010	06/11/2010	06/14/2010	2	3	5
M	UG/L	OLFS4-MW18S-002	B002650-10	NM	06/09/2010	06/11/2010	06/14/2010	2	3	5
M	UG/L	OLFS4-MW19S-002	B002650-08	NM	06/08/2010	06/11/2010	06/14/2010	3	3	6
M	UG/L	OLFS4-MW06S-002	B002650-06	NM	06/08/2010	06/11/2010	06/14/2010	3	3	6
OV	UG/L	OLFS4-MW32S-002	B002650-02	NM	06/08/2010	06/17/2010	06/18/2010	9	1	10
OV	UG/L	OLFS4-MW05S-002	B002650-04	NM	06/08/2010	06/17/2010	06/18/2010	9	1	10
OV	UG/L	OLFS4-MW05S-002	B002650-04RE1	NM	06/08/2010	06/17/2010	06/18/2010	9	1	10
OV	UG/L	OLFS4-MW31S-002	B002650-03	NM	06/08/2010	06/17/2010	06/18/2010	9	1	10
OV	UG/L	OLFS4-TB-0610	B002650-11RE1	NM	06/09/2010	06/17/2010	06/18/2010	8	1	9
OV	UG/L	OLFS4-MW30S-002	B002650-01	NM	06/08/2010	06/17/2010	06/18/2010	9	1	10
SIM	UG/L	BRN-1120-MW14R-0610	B002767-01	NM	06/10/2010	06/16/2010	06/17/2010	6	1	7
SIM	UG/L	BRN-1120-MW14R-0610	B002767-01RE1	NM	06/10/2010	06/16/2010	06/17/2010	6	1	7
SIM	UG/L	BRN-1120-MW14R-0610	B002767-01RE2	NM	06/10/2010	06/16/2010	06/17/2010	6	1	7

SORT	UNITS	NSAMPLE	LAB ID	QC TYPE	SAMP DATE	EXTR DATE	ANAL DATE	SMP EXTR	EXTR_ANL	SMP_ANL
SIM	UG/L	BRN-1120-MW38-0610	B002767-02	NM	06/10/2010	06/16/2010	06/17/2010	6	1	7
SIM	UG/L	BRN-1120-MW38-0610	B002767-02RIE1	NM	06/10/2010	06/16/2010	06/17/2010	6	1	7
TPH	MG/L	BRN-1120-MW38-0610	B002767-02	NM	06/10/2010	06/14/2010	06/14/2010	4	0	4
TPH	MG/L	BRN-1120-MW14R-0610	B002767-01	NM	06/10/2010	06/14/2010	06/14/2010	4	0	4





TETRA TECHNUS, INC.

CHAIN OF CUSTODY

NUMBER

2730

B00 2767

PAGE 1 OF 1

PROJECT NO: 112600389	FACILITY: OLF Benson	PROJECT MANAGER Gerry Walker	PHONE NUMBER (352)385-9899	LABORATORY NAME AND CONTACT: EWC/Lindsay Crawford
SAMPLERS (SIGNATURE) <i>MUD 2002</i>		FIELD OPERATIONS LEADER Bill Olson	PHONE NUMBER (352)385-9899	
		CARRIER/WAYBILL NUMBER 868450945118		CITY, STATE Jacksonville, FL 32216

STANDARD TAT   
RUSH TAT   
 24 hr.  48 hr.  72 hr.  7 day  14 day

DATE YEAR	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	NO. OF CONTAINERS	CONTAINER TYPE PLASTIC (P) or GLASS (G)				PRESERVATIVE USED	COMMENTS
									1	2	3	4		
6/10	8:20	BRN-1120-MW14R-0610	MW14R	-	-	GW	G	3	G	G	G	G	RC 4°C	
6/10	9:25	BRN-1120-MW38-0610	MW38	-	-	GW	G	3	G	G	G	G	RC 4°C	

1. RELINQUISHED BY <i>MUD 2002</i>	DATE 6-10-10	TIME 15:30	1 RECEIVED BY <i>Kristi Lilly</i>	DATE 6-11-10	TIME 10:00
2. RELINQUISHED BY	DATE	TIME	2 RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3 RECEIVED BY	DATE	TIME

COMMENTS  
Cooler @ 4.5°C

**Environmental Conservation Laboratories, Inc.**

4810 Executive Park Court, Suite 211

Jacksonville FL, 32216-6069

Phone: 904.296.3007 FAX: 904.296.6210



www.encolabs.com

Thursday, July 1, 2010

Tetra Tech NUS (BR004)

Attn: Gerald Walker

1558 Village Square Blvd.

Tallahassee, FL 32309

**RE: Laboratory Results for**

**Project Number: [none], Project Name/Desc: Saufley Field Pensacola - CTO 29**

**ENCO Workorder: B002650**

Dear Gerald Walker,

Enclosed is a copy of your laboratory report for test samples received by our laboratory on Thursday, June 10, 2010.

Unless otherwise noted in an attached project narrative, all samples were received in acceptable condition and processed in accordance with the referenced methods/procedures. Results for these procedures apply only to the samples as submitted.

The analytical results contained in this report are in compliance with NELAC standards, except as noted in the project narrative. This report shall not be reproduced except in full, without the written approval of the Laboratory.

This report contains only those analyses performed by Environmental Conservation Laboratories. Unless otherwise noted, all analyses were performed at ENCO Jacksonville. Data from outside organizations will be reported under separate cover.

If you have any questions or require further information, please do not hesitate to contact me.

Sincerely,

A handwritten signature in black ink that reads 'Christina M. Tompkins'. The signature is written in a cursive style with a large initial 'C'.

Chris Tompkins

Project Manager

Enclosure(s)

**FLAGS/NOTES AND DEFINITIONS**

MRL	MRL: Minimum Reporting Limit.
B	Results are based upon membrane filter colony counts that are outside the method indicated ideal range.
I	The reported value is between the laboratory method detection limit (MDL) and the practical quantitation limit (PQL).
J	Estimated value. The associated sample note or project narrative indicate the causative reason.
K	Off-scale low; Actual value is known to be less than the value given.
L	Off-scale high; Actual value is known to be greater than value given.
M	Presence of analyte is verified but not quantified; the actual value is less than the MRL but greater than the MDL.
N	Presumptive evidence of presence of material.
O	Sampled, but analysis lost or not performed.
Q	Sample exceeded the accepted holding time.
T	Value reported is less than the laboratory method detection limit. The value is reported for informational purposes only and shall not be used in statistical analysis.
U	Indicates that the compound was analyzed for but not detected.
V	Indicates that the analyte was detected in both the sample and the associated method blank.
Y	The laboratory analysis was from an improperly preserved sample. The data may not be accurate.
Z	Too many colonies were present (TNTC); the numeric value represents the filtration volume.
?	Data are rejected and should not be used. Some or all of the quality control data for the analyte were outside criteria, and the presence or absence of the analyte cannot be determined from the data.
*	Not reported due to interference.
E	The concentration indicated for this analyte is an estimated value above the calibration range of the instrument. This value is considered an estimate (CLP E-flag).

Client: Tetra Tech NUS (BR004)  
 Project: Saufley Field Pensacola- CTO 29  
 SDG Number: BR004-004  
 Project Manager: **Gerald Walker**  
 ENCO Project ID: B002650 and B002767

Overview

The laboratory received two coolers for this project. The coolers were received properly sealed with the custody seals intact. The coolers were received on wet ice and within temperature compliance. Samples for this project were received on June 10, 2010 and June 11, 2010. All samples submitted were analyzed by Environmental Conservation Laboratories, Inc. in accordance with the methods referenced in the laboratory report. Samples submitted for EPA 8260B were subcontracted to Environmental Conservation Laboratories in Orlando, FL and there A2LA Certification number is 3000.01. Environmental Conservation Laboratories in Jacksonville, FL A2LA Certification number is 3000.02. There were no analyses performed outside method specified holding times. All analyses were reported using State of Florida requirements under Rule 62-160 Florida Administrative Code. A list of the data qualifier flags is summarized on page 3 of the report. Any particular difficulties encountered during sample handling and processing will be discussed in the Remarks section below.

Laboratory Sample Identification	Client Sample Identification	Analyses
B002650-01	OLFS4-MW30S-002	EPA 8260B and EPA 6010C
B002650-02	OLFS4-MW32S-002	EPA 8260B and EPA 6010C
B002650-03	OLFS4-MW31S-002	EPA 8260B and EPA 6010C
B002650-04	OLFS4-MW05S-002	EPA 8260B and EPA 6010C
B002650-05	OLFS4-MW07S-002	EPA 8260B and EPA 6010C
B002650-06	OLFS4-MW06S-002	EPA 8260B and EPA 6010C
B002650-07	OLFS4-MW16S-002	EPA 8260B and EPA 6010C
B002650-08	OLFS4-MW19S-002	EPA 8260B and EPA 6010C
B002650-09	OLFS4-MW17S-002	EPA 8260B and EPA 6010C
B002650-10	OLFS4-MW18S-002	EPA 8260B and EPA 6010C
B0026501-11	OLFS4-TB-0610	EPA 8260B and EPA 6010C
B002767-01	BRN-1120-MW14R-0610	EPA 8270D and FLPRO
B002767-02	BRN-1120-MW38-0610	EPA 8270D and FLPRO

Remarks

Analysis: EPA 8260B

Affected Sample(s): OLFS4-MW05S-002 [A003212-03] [B002650-04]

Comment: An analytical dilution for cis-1, 2-Dichloroethene, Naphthalene, and Total Xylenes was required because the initial result was above the calibration range for the instrument.

Affected Sample(s): AA11187-CAL1, AA11187-CAL5,

Nonconformance: Manual integrations

The following manual integration was performed in the sample(s) AA11187-CAL1 due to poor integration (peak tailing/baseline selection): DBCP.

The following manual integration was performed in the sample(s) AA11187-CAL5 due to poor integration (peak tailing/baseline selection): Isopropylbenzene.

Affected Sample(s): AA11576-CCV1

Nonconformance: Manual integrations

The following manual integrations were performed in the sample(s) AA11576-CCV1 due to poor integration (peak tailing, baseline selection): DBCP

Analysis: EPA 8270D

Affected Samples: 0F16008-BLK1, 0F16008-BS1, 0F16008-BSD1, BRN-1120-MW14R-0610[B002767-01], BRN-1120-MW38-0610[B002767-02], BA07352-IBL1

Nonconformance: The Internal Standard was biased low in instrument blank 1 however no analytes associated with this internal were reported.

Affected Samples: BRN-1120-MW38-0610[B002767-02], BRN-1120-MW38-0610[B002767-02RE1]

Nonconformance: BRN-1120-MW38-0610[B002767-02] was re-analyzed as RE1 to confirm initial results because the first run followed a sample requiring a 20x dilution.

Affected Samples: BRN-1120-MW14R-0610[B002767-01], BRN-1120-MW14R-0610[B002767-01RE1]

Nonconformance: An analytical dilution was required for the above sample because the initial results were above the calibration range for the instrument.

Analysis: EPA 8270D

Affected Samples: BLK1, 0F16008-BS1, 0F16008-BSD1, BRN-1120-MW14R-0610[B002767-01], BRN-1120-MW38-0610[B002767-02]

Nonconformance: There was insufficient sample submitted for the laboratory to perform a client specific matrix spike and matrix spike duplicate. The laboratory performed precision and accuracy quality control using fortified blanks.

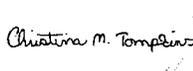
Analysis: FLPRO

Affected Samples: 0F14010-MSD1, BRN-1120-MW14R-0610[B002767-01], BRN-1120-MW38-0610[B002767-02]

Nonconformance: The electronic data package submitted for above samples contains both original and manual integrations performed during sample analysis. Manual integrations were required for chromatographic integration due to poor integration (peak tailing, baseline selection).

Affected Samples: -BLK1, 0F16008-BS1, 0F16008-BSD1, BRN-1120-MW14R-0610[B002767-01], BRN-1120-MW38-0610[B002767-02]

Nonconformance: There was insufficient sample submitted for the laboratory to perform a client specific matrix spike and matrix spike duplicate. The laboratory performed precision and accuracy quality control using an alternative sample that was not related to this project.

  
Digitally signed by Christina Tompkins  
DN: cn=Christina Tompkins, o=Environmental  
Conservation Laboratories, ou=Project Manager,  
email=ctompkins@encolabs.com, c=US  
Reason: I am approving this document!  
Date: 2010.07.01 16:04:31 -0400

Chris Tompkins  
Project Manager

ENCO Orlando

SDG: BR004-004

CLASS: 01\_VOA\_MS

METHOD: EPA 8260B

# ANALYSES DATA PACKAGE COVER PAGE

EPA 8260B

Laboratory: ENCO Orlando

SDG: BR004-004

Client: Tetra Tech NUS (BR004)

Project: Saufley Field Pensacola - CTO 29

**Client Sample Id:**

OLFS4-MW30S-002

OLFS4-MW31S-002

OLFS4-MW05S-002

OLFS4-MW05S-002

OLFS4-TB-0610

OLFS4-TB-0610

OLFS4-MW32S-002

**Lab Sample Id:**

A003212-01

A003212-02

A003212-03

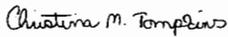
A003212-03RE1

A003212-04

A003212-04RE1

A003212-05

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in computer-readable data submitted on diskette has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signatures.

Signature:  Digitally signed by Christina M. Tompkins  
DN: ou=Christina Tompkins, ou=Environmental Concentration Laboratories,  
ou=Project Manager, email=tompkins@tetra.com, c=US  
Reason: I am approving this document  
Date: 2010.07.01 14:05:00 -0400

Name: Christina M. Tompkins

Date: July 1, 2010

Title: Project Manager

# HOLDING TIME SUMMARY

EPA 8260B

Laboratory: ENCO Orlando

SDG: BR004-004

Client: Tetra Tech NUS (BR004)

Project: Saufley Field Pensacola - CTO 29

Sample Name	Date Collected	Date Received	Date Prepared	Days to Prep	Max Days to Prep	Date Analyzed	Days to Analysis	Max Days to Analysis	Q
OLFS4-MW30S-002	06/08/10 08:35	06/15/10 16:45	06/17/10 15:29	9.25	NA	06/18/10 04:50	10.00	14.00	
OLFS4-MW31S-002	06/08/10 10:50	06/15/10 16:45	06/17/10 15:29	9.15	NA	06/18/10 05:20	10.00	14.00	
OLFS4-MW05S-002	06/08/10 12:10	06/15/10 16:45	06/17/10 15:29	9.10	NA	06/18/10 05:50	10.00	14.00	
OLFS4-MW05S-002	06/08/10 12:10	06/15/10 16:45	06/17/10 15:29	9.10	NA	06/18/10 12:03	10.00	14.00	
OLFS4-TB-0610	06/09/10 11:00	06/15/10 16:45	06/17/10 15:29	8.15	NA	06/18/10 12:33	9.00	14.00	
OLFS4-MW32S-002	06/08/10 09:50	06/15/10 16:45	06/17/10 15:29	9.19	NA	06/18/10 06:50	10.00	14.00	



# SURROGATE STANDARD RECOVERY AND RT SUMMARY

EPA 8260B

Laboratory: <u>ENCO Orlando</u>	SDG: <u>BR004-004</u>
Client: <u>Tetra Tech NUS (BR004)</u>	Project: <u>Saufley Field Pensacola - CTO 29</u>
Sequence: <u>AA11576</u>	Instrument: <u>OVGCMS3</u>
Matrix: <u>Water</u>	Calibration: <u>1005038</u>

Surrogate Compound	Spike Level ug/L	% Recovery	Recovery Limits	RT	Calibration RT	RT Diff	RT Diff Limit	Q
<b>Calibration Check (AA11576-CCV1 )</b> Lab File ID: 3FL026.D      Analyzed: 06/18/10 02:21								
Dibromofluoromethane	50.0	98	80 - 120	10.52	10.502	0.0180	+/-1.0	
1,2-Dichloroethane-d4	50.0	93	80 - 120	11.1	11.082	0.0180	+/-1.0	
Toluene-d8	50.0	106	80 - 120	12.82	12.81	0.0100	+/-1.0	
4-Bromofluorobenzene	50.0	95	80 - 120	15.33	15.32	0.0100	+/-1.0	
<b>LCS (0F17031-BS1 )</b> Lab File ID: 3FL027.D      Analyzed: 06/18/10 02:51								
Dibromofluoromethane	50.0	99	53 - 146	10.51	10.502	0.0080	+/-1.0	
1,2-Dichloroethane-d4	50.0	97	45 - 174	11.09	11.082	0.0080	+/-1.0	
Toluene-d8	50.0	107	41 - 146	12.82	12.81	0.0100	+/-1.0	
4-Bromofluorobenzene	50.0	97	41 - 142	15.33	15.32	0.0100	+/-1.0	
<b>Blank (0F17031-BLK1 )</b> Lab File ID: 3FL028.D      Analyzed: 06/18/10 03:21								
Dibromofluoromethane	50.0	85	53 - 146	10.51	10.502	0.0080	+/-1.0	
1,2-Dichloroethane-d4	50.0	84	45 - 174	11.09	11.082	0.0080	+/-1.0	
Toluene-d8	50.0	89	41 - 146	12.82	12.81	0.0100	+/-1.0	
4-Bromofluorobenzene	50.0	79	41 - 142	15.33	15.32	0.0100	+/-1.0	
<b>Matrix Spike (0F17031-MS1 )</b> Lab File ID: 3FL029.D      Analyzed: 06/18/10 03:51								
Dibromofluoromethane	50.0	101	53 - 146	10.51	10.502	0.0080	+/-1.0	
1,2-Dichloroethane-d4	50.0	97	45 - 174	11.09	11.082	0.0080	+/-1.0	
Toluene-d8	50.0	106	41 - 146	12.82	12.81	0.0100	+/-1.0	
4-Bromofluorobenzene	50.0	97	41 - 142	15.33	15.32	0.0100	+/-1.0	
<b>Matrix Spike Dup (0F17031-MSD1 )</b> Lab File ID: 3FL030.D      Analyzed: 06/18/10 04:20								
Dibromofluoromethane	50.0	99	53 - 146	10.51	10.502	0.0080	+/-1.0	
1,2-Dichloroethane-d4	50.0	96	45 - 174	11.1	11.082	0.0180	+/-1.0	
Toluene-d8	50.0	106	41 - 146	12.82	12.81	0.0100	+/-1.0	
4-Bromofluorobenzene	50.0	95	41 - 142	15.33	15.32	0.0100	+/-1.0	
<b>OLFS4-MW30S-002 (A003212-01 )</b> Lab File ID: 3FL031.D      Analyzed: 06/18/10 04:50								
Dibromofluoromethane	50.0	102	53 - 146	10.51	10.502	0.0080	+/-1.0	
1,2-Dichloroethane-d4	50.0	97	45 - 174	11.09	11.082	0.0080	+/-1.0	
Toluene-d8	50.0	107	41 - 146	12.82	12.81	0.0100	+/-1.0	
4-Bromofluorobenzene	50.0	99	41 - 142	15.33	15.32	0.0100	+/-1.0	
<b>OLFS4-MW31S-002 (A003212-02 )</b> Lab File ID: 3FL032.D      Analyzed: 06/18/10 05:20								
Dibromofluoromethane	50.0	102	53 - 146	10.52	10.502	0.0180	+/-1.0	
1,2-Dichloroethane-d4	50.0	98	45 - 174	11.1	11.082	0.0180	+/-1.0	
Toluene-d8	50.0	108	41 - 146	12.83	12.81	0.0200	+/-1.0	
4-Bromofluorobenzene	50.0	96	41 - 142	15.33	15.32	0.0100	+/-1.0	

# SURROGATE STANDARD RECOVERY AND RT SUMMARY

EPA 8260B

Laboratory:	<u>ENCO Orlando</u>	SDG:	<u>BR004-004</u>
Client:	<u>Tetra Tech NUS (BR004)</u>	Project:	<u>Saufley Field Pensacola - CTO 29</u>
Sequence:	<u>AA11576</u>	Instrument:	<u>OVCMS3</u>
Matrix:	<u>Water</u>	Calibration:	<u>1005038</u>

Surrogate Compound	Spike Level ug/L	% Recovery	Recovery Limits	RT	Calibration RT	RT Diff	RT Diff Limit	Q
<b>OLFS4-MW05S-002 (A003212-03)</b>								
Lab File ID: 3FL033.D				Analyzed: 06/18/10 05:50				
Dibromofluoromethane	50.0	97	53 - 146	10.53	10.502	0.0280	+/-1.0	
1,2-Dichloroethane-d4	50.0	97	45 - 174	11.11	11.082	0.0280	+/-1.0	
Toluene-d8	50.0	109	41 - 146	12.84	12.81	0.0300	+/-1.0	
4-Bromofluorobenzene	50.0	104	41 - 142	15.34	15.32	0.0200	+/-1.0	
<b>OLFS4-MW32S-002 (A003212-05)</b>								
Lab File ID: 3FL035.D				Analyzed: 06/18/10 06:50				
Dibromofluoromethane	50.0	98	53 - 146	10.51	10.502	0.0080	+/-1.0	
1,2-Dichloroethane-d4	50.0	100	45 - 174	11.09	11.082	0.0080	+/-1.0	
Toluene-d8	50.0	109	41 - 146	12.82	12.81	0.0100	+/-1.0	
4-Bromofluorobenzene	50.0	99	41 - 142	15.32	15.32	0.0000	+/-1.0	
<b>OLFS4-MW05S-002 (A003212-03RE1)</b>								
Lab File ID: 3FL036.D				Analyzed: 06/18/10 12:03				
Dibromofluoromethane	50.0	82	53 - 146	10.52	10.502	0.0180	+/-1.0	
1,2-Dichloroethane-d4	50.0	81	45 - 174	11.1	11.082	0.0180	+/-1.0	
Toluene-d8	50.0	88	41 - 146	12.83	12.81	0.0200	+/-1.0	
4-Bromofluorobenzene	50.0	76	41 - 142	15.32	15.32	0.0000	+/-1.0	
<b>OLFS4-TB-0610 (A003212-04RE1)</b>								
Lab File ID: 3FL037.D				Analyzed: 06/18/10 12:33				
Dibromofluoromethane	50.0	83	53 - 146	10.52	10.502	0.0180	+/-1.0	
1,2-Dichloroethane-d4	50.0	80	45 - 174	11.1	11.082	0.0180	+/-1.0	
Toluene-d8	50.0	89	41 - 146	12.82	12.81	0.0100	+/-1.0	
4-Bromofluorobenzene	50.0	80	41 - 142	15.32	15.32	0.0000	+/-1.0	

# PREPARATION BATCH SUMMARY

## EPA 8260B

Laboratory: ENCO Orlando

SDG: BR004-004

Client: Tetra Tech NUS (BR004)

Project: Saufley Field Pensacola - CTO 29

Batch: 0F17031 Batch Matrix: Water

Preparation: EPA 5030B MS

SAMPLE NAME	LAB SAMPLE ID	LAB FILE ID	DATE PREPARED	OBSERVATIONS
Blank	0F17031-BLK1	3FL028.D	06/17/10 15:29	
LCS	0F17031-BS1	3FL027.D	06/17/10 15:29	
OLFS4-MW30S-002	0F17031-MS1	3FL029.D	06/17/10 15:29	
OLFS4-MW30S-002	0F17031-MSD1	3FL030.D	06/17/10 15:29	
OLFS4-MW30S-002	A003212-01	3FL031.D	06/17/10 15:29	DOD project. LSB 06/16/10
OLFS4-MW31S-002	A003212-02	3FL032.D	06/17/10 15:29	DOD project. LSB 06/16/10
OLFS4-MW05S-002	A003212-03	3FL033.D	06/17/10 15:29	DOD project. LSB 06/16/10
OLFS4-MW05S-002	A003212-03RE1	3FL036.D	06/17/10 15:29	DOD project. LSB 06/16/10
OLFS4-TB-0610	A003212-04RE1	3FL037.D	06/17/10 15:29	DOD project. LSB 06/16/10
OLFS4-MW32S-002	A003212-05	3FL035.D	06/17/10 15:29	DOD project. LSB 06/16/10



## LCS / LCS DUPLICATE RECOVERY

### EPA 8260B

Laboratory: ENCO Orlando

SDG: BR004-004

Client: Tetra Tech NUS (BR004)

Project: Saufley Field Pensacola - CTO 29

Matrix: Water

Batch: 0F17031

Laboratory ID: 0F17031-BS1

Preparation: EPA 5030B MS

Initial/Final: 5 mL / 5 mL

COMPOUND	SPIKE ADDED (ug/L)	LCS CONCENTRATION (ug/L)	LCS % REC. #	QC LIMITS REC.
cis-1,2-Dichloroethene	20.0	19	95	65 - 123
Benzene	20.0	24	118	73 - 138
Ethylbenzene	20.0	21	107	68 - 121
m,p-Xylenes	40.0	43	107	72 - 122
o-Xylene	20.0	19	96	70 - 120
Isopropylbenzene	20.0	24	120	76 - 132
Naphthalene	20.0	15	77	49 - 150

# Column to be used to flag recovery and RPD values with an asterisk

\* Values outside of QC limits



# MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

**EPA 8260B**

<b>OLFS4-MW30S-002</b>
------------------------

Laboratory: ENCO Orlando

SDG: BR004-004

Client: Tetra Tech NUS (BR004)

Project: Saufley Field Pensacola - CTO 29

Matrix: Water

Batch: 0F17031

Laboratory ID: 0F17031-MSD1

Preparation: EPA 5030B MS

Initial/Final: 5 mL / 5 mL

Source Sample Name: B002650-01 (OLFS4-MW30S-002)

COMPOUND	SPIKE ADDED (ug/L)	MSD CONCENTRATION (ug/L)	MSD % REC. #	% RPD #	QC LIMITS	
					RPD	REC.
cis-1,2-Dichloroethene	20.0	18	88	6	17	65 - 123
Benzene	20.0	23	113	1	14	73 - 138
Ethylbenzene	20.0	21	104	0.7	18	68 - 121
m,p-Xylenes	40.0	41	103	0.4	18	72 - 122
o-Xylene	20.0	20	100	5	16	70 - 120
Isopropylbenzene	20.0	25	122	4	23	76 - 132
Naphthalene	20.0	17	86	4	35	49 - 150

# Column to be used to flag recovery and RPD values with an asterisk

\* Values outside of QC limits





**INTERNAL STANDARD AREA AND RT SUMMARY  
EPA 8260B**

Laboratory: ENCO Orlando

SDG: BR004-004

Client: Tetra Tech NUS (BR004)

Project: Saufley Field Pensacola - CTO 29

Sequence: AA11576

Instrument: OVGCM3

Matrix: Water

Calibration: 1005038

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
<b>Calibration Check (AA11576-CCV1)</b>									
			Lab File ID: 3FL026.D			Analyzed: 06/18/10 02:21			
Pentafluorobenzene	1742236	10.94	1928393	10.93	90	50 - 200	0.0100	+/-0.50	
1,4-Difluorobenzene	2796987	11.52	3160832	11.51	88	50 - 200	0.0100	+/-0.50	
Chlorobenzene-d5	2363961	14.23	2666975	14.22	89	50 - 200	0.0100	+/-0.50	
1,4-Dichlorobenzene-d4	1067441	16.51	1158205	16.5	92	50 - 200	0.0100	+/-0.50	
<b>LCS (0F17031-BS1)</b>									
			Lab File ID: 3FL027.D			Analyzed: 06/18/10 02:51			
Pentafluorobenzene	1789559	10.94	1928393	10.93	93	50 - 200	0.0100	+/-0.50	
1,4-Difluorobenzene	2819056	11.52	3160832	11.51	89	50 - 200	0.0100	+/-0.50	
Chlorobenzene-d5	2345974	14.22	2666975	14.22	88	50 - 200	0.0000	+/-0.50	
1,4-Dichlorobenzene-d4	1029932	16.52	1158205	16.5	89	50 - 200	0.0200	+/-0.50	
<b>Blank (0F17031-BLK1)</b>									
			Lab File ID: 3FL028.D			Analyzed: 06/18/10 03:21			
Pentafluorobenzene	1693475	10.95	1928393	10.93	88	50 - 200	0.0200	+/-0.50	
1,4-Difluorobenzene	2715062	11.52	3160832	11.51	86	50 - 200	0.0100	+/-0.50	
Chlorobenzene-d5	2178412	14.23	2666975	14.22	82	50 - 200	0.0100	+/-0.50	
1,4-Dichlorobenzene-d4	922412	16.52	1158205	16.5	80	50 - 200	0.0200	+/-0.50	
<b>Matrix Spike (0F17031-MS1)</b>									
			Lab File ID: 3FL029.D			Analyzed: 06/18/10 03:51			
Pentafluorobenzene	1722878	10.95	1928393	10.93	89	50 - 200	0.0200	+/-0.50	
1,4-Difluorobenzene	2793966	11.52	3160832	11.51	88	50 - 200	0.0100	+/-0.50	
Chlorobenzene-d5	2341025	14.23	2666975	14.22	88	50 - 200	0.0100	+/-0.50	
1,4-Dichlorobenzene-d4	1036001	16.52	1158205	16.5	89	50 - 200	0.0200	+/-0.50	
<b>Matrix Spike Dup (0F17031-MSD1)</b>									
			Lab File ID: 3FL030.D			Analyzed: 06/18/10 04:20			
Pentafluorobenzene	1780671	10.94	1928393	10.93	92	50 - 200	0.0100	+/-0.50	
1,4-Difluorobenzene	2832107	11.52	3160832	11.51	90	50 - 200	0.0100	+/-0.50	
Chlorobenzene-d5	2388162	14.22	2666975	14.22	90	50 - 200	0.0000	+/-0.50	
1,4-Dichlorobenzene-d4	1039506	16.51	1158205	16.5	90	50 - 200	0.0100	+/-0.50	
<b>OLFS4-MW30S-002 (A003212-01)</b>									
			Lab File ID: 3FL031.D			Analyzed: 06/18/10 04:50			
Pentafluorobenzene	1672412	10.94	1928393	10.93	87	50 - 200	0.0100	+/-0.50	
1,4-Difluorobenzene	2736332	11.52	3160832	11.51	87	50 - 200	0.0100	+/-0.50	
Chlorobenzene-d5	2182813	14.23	2666975	14.22	82	50 - 200	0.0100	+/-0.50	
1,4-Dichlorobenzene-d4	963086	16.51	1158205	16.5	83	50 - 200	0.0100	+/-0.50	
<b>OLFS4-MW31S-002 (A003212-02)</b>									
			Lab File ID: 3FL032.D			Analyzed: 06/18/10 05:20			
Pentafluorobenzene	1669087	10.95	1928393	10.93	87	50 - 200	0.0200	+/-0.50	
1,4-Difluorobenzene	2748101	11.52	3160832	11.51	87	50 - 200	0.0100	+/-0.50	
Chlorobenzene-d5	2207094	14.23	2666975	14.22	83	50 - 200	0.0100	+/-0.50	
1,4-Dichlorobenzene-d4	922813	16.51	1158205	16.5	80	50 - 200	0.0100	+/-0.50	



# ANALYSIS BATCH (SEQUENCE) SUMMARY

## EPA 8260B

Laboratory: ENCO Orlando

SDG: BR004-004

Client: Tetra Tech NUS (BR004)

Project: Saufley Field Pensacola - CTO 29

Sequence: AA11187

Instrument: OVGCMS3

Calibration: 1005038

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
MS Tune	AA11187-TUN1	3E1100.D	05/14/10 12:16
Initial Cal Blank	AA11187-ICB1	3E1101.D	05/14/10 12:46
Cal Standard	AA11187-CAL1	3E1102.D	05/14/10 13:16
Cal Standard	AA11187-CAL2	3E1005.D	05/14/10 14:16
Cal Standard	AA11187-CAL3	3E1007.D	05/14/10 15:16
Cal Standard	AA11187-CAL4	3E1008.D	05/14/10 15:46
Cal Standard	AA11187-CAL5	3E1009.D	05/14/10 16:16
Cal Standard	AA11187-CAL6	3E1010.D	05/14/10 16:45
Cal Standard	AA11187-CAL7	3E1011.D	05/14/10 17:15
Secondary Cal Check	AA11187-SCV1	3E1015.D	05/14/10 19:15
Secondary Cal Check	AA11187-SCV2	3E1016.D	05/14/10 19:46
Secondary Cal Check	AA11187-SCV3	3E1017.D	05/14/10 20:16

## ANALYSIS BATCH (SEQUENCE) SUMMARY

**EPA 8260B**

Laboratory:	<u>ENCO Orlando</u>	SDG:	<u>BR004-004</u>
Client:	<u>Tetra Tech NUS (BR004)</u>	Project:	<u>Saufley Field Pensacola - CTO 29</u>
Sequence:	<u>AA11576</u>	Instrument:	<u>OVCMS3</u>
		Calibration:	<u>1005038</u>

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
MS Tune	AA11576-TUN1	3FL025.D	06/18/10 01:51
Calibration Check	AA11576-CCV1	3FL026.D	06/18/10 02:21
LCS	0F17031-BS1	3FL027.D	06/18/10 02:51
Blank	0F17031-BLK1	3FL028.D	06/18/10 03:21
B002650-01 (OLFS4-MW30S- 000)	0F17031-MS1	3FL029.D	06/18/10 03:51
B002650-01 (OLFS4-MW30S- 000)	0F17031-MSD1	3FL030.D	06/18/10 04:20
B002650-01 (OLFS4-MW30S- 000)	A003212-01	3FL031.D	06/18/10 04:50
B002650-03 (OLFS4-MW31S- 000)	A003212-02	3FL032.D	06/18/10 05:20
B002650-04 (OLFS4-MW05S- 000)	A003212-03	3FL033.D	06/18/10 05:50
B002650-02 (OLFS4-MW32S- 000)	A003212-05	3FL035.D	06/18/10 06:50
B002650-04 (OLFS4-MW05S- 000)	A003212-03RE1	3FL036.D	06/18/10 12:03
B002650-11 (OLFS4-TB-0610)	A003212-04RE1	3FL037.D	06/18/10 12:33

# MASS SPECTROMETER INSTRUMENT PERFORMANCE CHECK

## EPA 8260B

Laboratory: ENCO Orlando

SDG: BR004-004

Client: Tetra Tech NUS (BR004)

Project: Saufley Field Pensacola - CTO 29

Lab File ID: 3E1100.D

Injection Date: 05/14/10

Instrument ID: OVGCMS3

Injection Time: 12:16

Sequence: AA11187

Lab Sample ID: AA11187-TUN1

m/z	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE	
50	15 - 40% of 95	25.6	PASS
75	30 - 60% of 95	48.5	PASS
95	Base peak, 100% relative abundance	100	PASS
96	5 - 9% of 95	6.71	PASS
173	Less than 2% of 174	0	PASS
174	50 - 200% of 95	67.5	PASS
175	5 - 9% of 174	8.07	PASS
176	95 - 101% of 174	96.5	PASS
177	5 - 9% of 176	6.15	PASS



# INITIAL CALIBRATION DATA

EPA 8260B

Laboratory: ENCO Orlando

SDG: BR004-004

Client: Tetra Tech NUS (BR004)

Project: Saufley Field Pensacola - CTO 29

Calibration: 1005038

Instrument: OVGCMS3

Matrix: Water

Calibration Date: 05/11/10 13:02

Compound	Level 01		Level 02		Level 03		Level 04		Level 05		Level 06	
	ug/L	RF										
cis-1,2-Dichloroethenc	1	0.7414872	5	0.6673735	20	0.7121559	50	0.6926642	100	0.7130165	200	0.6908837
Benzenc	1	1.426155	5	1.405102	20	1.501044	50	1.488298	100	1.483296	200	1.314977
Ethylbenzenc	1	0.4413146	5	0.5175715	20	0.5536096	50	0.5533624	100	0.5459245	200	0.5441668
m,p-Xylencs	2	0.6449669	10	0.6254804	40	0.686157	100	0.6607318	200	0.6421484	400	0.6149587
o-Xylenc	1	0.6434218	5	0.6244508	20	0.6510937	50	0.6518988	100	0.646677	200	0.6656201
Isopropylbenzenc	1	1.477728	5	1.382348	20	1.518039	50	1.492496	100	1.457013	200	1.385022
Naphthalenc	1	1.834676	5	1.794568	20	1.756721	50	1.716249	100	1.796695	200	1.781775
Dibromofluoromethanc	1	1.129913	5	0.8641751	20	0.766917	50	0.6373204	100	0.7645905	200	0.7287731
1,2-Dichloroethanc-d4	1	0.7920216	5	0.5815115	20	0.5137037	50	0.4400742	100	0.5471333	200	0.5567481
Tolucnc-d8	1	1.744207	5	1.371979	20	1.209706	50	1.087127	100	1.235225	200	1.143437
4-Bromofluorobenzenc	1	1.111761	5	0.6963239	20	0.6133518	50	0.53477	100	0.6172954	200	0.6345557

# INITIAL CALIBRATION DATA (Continued)

EPA 8260B

Laboratory: ENCO Orlando

SDG: BR004-004

Client: Tetra Tech NUS (BR004)

Project: Saufley Field Pensacola - CTO 29

Calibration: 1005038

Instrument: OVGCMS3

Matrix: Water

Calibration Date: 05/11/10 13:02

Compound	Level 07		Level 08		Level 09		Level 10		Level 11		Level 12	
	ug/L	RF										
cis-1,2-Dichloroethene												
Benzene												
Ethylbenzene												
m,p-Xylenes												
o-Xylene												
Isopropylbenzene												
Naphthalene												
Dibromofluoromethane												
1,2-Dichloroethane-d4												
Toluene-d8												
4-Bromofluorobenzene												

## INITIAL CALIBRATION DATA (Continued)

### EPA 8260B

Laboratory: ENCO Orlando

SDG: BR004-004

Client: Tetra Tech NUS (BR004)

Project: Saufley Field Pensacola - CTO 29

Calibration: 1005038

Instrument: OVGCMS3

Matrix: Water

Calibration Date: 05/11/10 13:02

Compound	Mean RF	RF RSD	Mean RT	RT RSD	Linear r	Quad COD	LIMIT	Q
cis-1,2-Dichloroethene	0.7029302	3.59237	10.02	0.0198293			15	
Benzene	1.436479	4.912606	10.95	7.179156E-03			15	
Ethylbenzene	0.5259916	8.278569	14.205	4.099103E-02			CCC (30)	
m,p-Xylenes	0.6457405	3.935876	14.32167	2.918941E-02			15	
o-Xylene	0.6471937	2.082957	14.73	8.744038E-03			15	
Isopropylbenzene	1.452108	3.898717	15	0			15	
Naphthalene	1.780114	2.259589	19.955	2.434729E-02			15	
Dibromofluoromethane	0.7523552	10.85007	10.502	0.0428724			15	
1,2-Dichloroethane-d4	0.5278342	10.373	11.082	3.813257E-02			15	
Toluene-d8	1.209495	8.904882	12.81	1.822783E-02			15	
4-Bromofluorobenzene	0.6192594	9.329119	15.32	1.013514E-02			15	

# SECOND-SOURCE CALIBRATION VERIFICATION

## EPA 8260B

Laboratory: ENCO Orlando

SDG: BR004-004

Client: Tetra Tech NUS (BR004)

Project: Saufley Field Pensacola - CTO 29

Calibration: 1005038

Laboratory ID: AA11187-SCV1

Sequence: AA11187

Standard ID: A0E0271

ANALYTE	EXPECTED (ug/L)	FOUND (ug/L)	% DRIFT	QC LIMIT
Isopropylbenzene	50.0	59	17.5	25.00
o-Xylene	50.0	52	3.8	25.00
Naphthalene	50.0	50	-0.1	25.00
Benzene	50.0	55	10.3	25.00
cis-1,2-Dichloroethene	50.0	51	3.0	25.00
m,p-Xylenes	100	110	7.9	25.00
Ethylbenzene	50.0	54	8.9	25.00

\* Values outside of QC limits

# SECOND-SOURCE CALIBRATION VERIFICATION

## EPA 8260B

Laboratory: ENCO Orlando

SDG: BR004-004

Client: Tetra Tech NUS (BR004)

Project: Saufley Field Pensacola - CTO 29

Calibration: 1005038

Laboratory ID: AA11187-SCV2

Sequence: AA11187

Standard ID: A0E0189

ANALYTE	EXPECTED (ug/L)	FOUND (ug/L)	% DRIFT	QC LIMIT
Isopropylbenzene	50.0	56	11.4	25.00

\* Values outside of QC limits

# SECOND-SOURCE CALIBRATION VERIFICATION

EPA 8260B

Laboratory: ENCO Orlando

SDG: BR004-004

Client: Tetra Tech NUS (BR004)

Project: Saufley Field Pensacola - CTO 29

Calibration: 1005038

Laboratory ID: AA11187-SCV3

Sequence: AA11187

Standard ID: A0E0272

ANALYTE	EXPECTED (ug/L)	FOUND (ug/L)	% DRIFT	QC LIMIT
Isopropylbenzene	100	120	15.8	25.00
o-Xylene	100	100	1.7	25.00
Naphthalene	100	100	1.2	25.00
Benzene	100	110	5.3	25.00
cis-1,2-Dichloroethene	100	100	0.1	25.00
m,p-Xylenes	200	200	2.1	25.00
Ethylbenzene	100	110	5.3	25.00

\* Values outside of QC limits



# CONTINUING CALIBRATION CHECK

## EPA 8260B

Laboratory: <u>ENCO Orlando</u>	SDG: <u>BR004-004</u>
Client: <u>Tetra Tech NUS (BR004)</u>	Project: <u>Saufley Field Pensacola - CTO 29</u>
Instrument ID: <u>OVGCMS3</u>	Calibration: <u>1005038</u>
Lab File ID: <u>3FL026.D</u>	Calibration Date: <u>05/11/10 13:02</u>
Sequence: <u>AA11576</u>	Injection Date: <u>06/18/10</u>
Lab Sample ID: <u>AA11576-CCV1</u>	Injection Time: <u>02:21</u>

COMPOUND	TYPE	CONC. (ug/L)		RESPONSE FACTOR			% DIFF / DRIFT	
		STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
cis-1,2-Dichloroethene	A	50.0	50	0.7029302	0.6971553		-0.8	20
Benzene	A	50.0	56	1.436479	1.614609		12.4	20
Ethylbenzene	A	50.0	53	0.5259916	0.5582601		6.1	20
m,p-Xylenes	A	100	110	0.6457405	0.6790296		5.2	20
o-Xylene	A	50.0	51	0.6471937	0.6541039		1.1	20
Isopropylbenzene	A	50.0	51	1.452108	1.484341		2.2	20
Naphthalene	A	50.0	45	1.780114	1.590498		-10.7	20

# Column to be used to flag Response Factor and %Diff/Drift values with an asterisk

\* Values outside of QC limits

Sample ID OLFS4-MW05S-002

**SAMPLE CALC**

**IS AREA**

1933209

**DILUTION**

10

**COMPOUND OF INTEREST AREA**

2472706

**IS AMOUNT (NG)**

250

**PURGE VOLUME (ML)**

5

**AVE RRF**

0.7029

**CONCENTRATION PPB**

909.8116

cis-1,2-Dichloroethene = 910 ug/L

Quantitation Report (QT Reviewed)

Data File : C:\HPCHEM\1\DATA\061710\3FL036.D Vial: 36  
 Acq On : 18 Jun 2010 12:03 Operator: kdw  
 Sample : a003212-01rel Inst : OVGCMS3  
 Misc : 10x r Multiplr: 1.00  
 MS Integration Params: rteint.p  
 Quant Time: Jun 18 12:48 2010 Quant Results File: W1005038.RES

Quant Method : C:\HPCHEM\1\METHODS\W1005038.M (RTE Integrator)  
 Title : ENCO SOPVGCMS/05;element cal 1005038  
 Last Update : Wed May 19 15:15:51 2010  
 Response via : Initial Calibration  
 DataAcq Meth : 8260S

*OLFS4-MW055-002*

*Under 80*

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Pentafluorobenzene(IS)	10.94	168	1933209	50.00	ug/L	0.01
38) 1,4-Difluorobenzene(IS)	11.52	144	3045057	50.00	ug/L	0.00
58) Chlorobenzene-d5(IS)	14.22	117	2517830	50.00	ug/L	0.00
81) 1,4-Dichlorobenzene-d4(IS)	16.51	152	1164078	50.00	ug/L	0.00

System Monitoring Compounds	R.T.	QIon	Response	Conc	Units	Dev(Min)
30) Dibromofluoromethane	10.52	113	1191768	40.97	ug/L	0.01
Spiked Amount	50.000	Range 53 - 146	Recovery =	81.94%		
44) 1,2-Dichloroethane-d4	11.10	65	1295731	40.31	ug/L	0.01
Spiked Amount	50.000	Range 45 - 174	Recovery =	80.62%		
56) D8-Toluene	12.83	98	3248258	44.10	ug/L	0.01
Spiked Amount	50.000	Range 41 - 146	Recovery =	88.20%		
77) Bromofluorobenzene	15.32	95	1185934	38.03	ug/L	0.00
Spiked Amount	50.000	Range 41 - 142	Recovery =	76.06%		

Target Compounds	R.T.	QIon	Response	Conc	Units	Qvalue
2) Dichlorodifluoromethane	0.00	85		N.D.		
3) Chloromethane	0.00	50		N.D.		
4) Vinyl Chloride	0.00	62		N.D.		
5) Bromomethane	0.00	94		N.D. d		
6) Chloroethane	0.00	64		N.D.		
7) Trichlorofluoromethane	0.00	101		N.D.		
8) Trichlorotrifluoroethane	0.00	101		N.D.		
9) acrolein	0.00	56		N.D. d		
10) Acetone	0.00	43		N.D. d		
11) 1,1-Dichloroethene	7.49	96	7037	0.46	ug/L	98
12) 3-Chloropropene	0.00	76		N.D.		
13) Acetonitrile	0.00	41		N.D. d		
14) Iodomethane	0.00	142		N.D.		
15) Carbon disulfide	7.55	76	26174	0.42	ug/L	64
16) Methylene Chloride	8.36	84	84749	2.11	ug/L	93
17) Methyl tert-butyl ether	0.00	73		N.D.		
18) Acrylonitrile	0.00	53		N.D.		
19) T-1,2-Dichloroethene	0.00	96		N.D.		
20) Isopropyl Ether	0.00	45		N.D.		
21) C-1,2-Dichloroethene	10.04	96	2472706	90.98	ug/L	98
22) 1,1-Dichloroethane	9.41	63	298991	5.46	ug/L	94
23) Vinyl Acetate	0.00	43		N.D.		
24) Chloroprene	0.00	53		N.D.		
25) 2-Butanone	0.00	72		N.D. d		
26) Propionitrile	0.00	54		N.D.		
27) 2,2-Dichloropropane	0.00	77		N.D.		
28) Methacrylonitrile	0.00	67		N.D. d		
29) Chloroform	0.00	83		N.D.		
31) Dibromofluoromethane	10.52	113	1191768	40.97	ug/L	100
32) Bromochloromethane	0.00	128		N.D.		
33) 1,1,1-Trichloroethane	0.00	97		N.D.		
34) 1,1-Dichloropropene	0.00	75		N.D.		
35) Diethyl ether	0.00	59		N.D. d		
36) Methyl Acetate	0.00	74		N.D.		
37) Cyclohexane	0.00	56		N.D. d		

(#) = qualifier out of range (m) = manual integration  
 3FL036.D W1005038.M Fri Jun 18 16:40:02 2010

# ANALYSES DATA PACKAGE COVER PAGE

EPA 8270D

Laboratory: ENCO Jacksonville

SDG: BR004-004

Client: Tetra Tech NUS (BR004)

Project: Saufley Field Pensacola - CTO 29

**Client Sample Id:**

BRN-1120-MW14R-0610

BRN-1120-MW14R-0610

BRN-1120-MW14R-0610

BRN-1120-MW38-0610

BRN-1120-MW38-0610

**Lab Sample Id:**

B002767-01

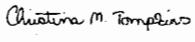
B002767-01RE1

B002767-01RE2

B002767-02

B002767-02RE1

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in computer-readable data submitted on diskette has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signatures.

Signature: 

Digitally signed by Christina Tompkins  
DN: cn=Christina Tompkins, o=Environmental  
Compliance Laboratories, ou=Quality Manager,  
email=ctompkins@encolab.com, c=US  
Reason: I am approving this document  
Date: 2010.07.01 10:50:22 -0400

Name: Christina Tompkins

Date: July 1, 2010

Title: Project Manager

# HOLDING TIME SUMMARY

## EPA 8270D

Laboratory: ENCO Jacksonville

SDG: BR004-004

Client: Tetra Tech NUS (BR004)

Project: Saufley Field Pensacola - CTO 29

Sample Name	Date Collected	Date Received	Date Prepared	Days to Prep	Max Days to Prep	Date Analyzed	Days to Analysis	Max Days to Analysis	0
BRN-1120-MW14R-0610	06/10/10 08:20	06/11/10 10:00	06/16/10 10:13	6.00	7.00	06/17/10 15:10	1.00	40.00	
BRN-1120-MW14R-0610	06/10/10 08:20	06/11/10 10:00	06/16/10 10:13	6.00	7.00	06/17/10 16:40	1.00	40.00	
BRN-1120-MW14R-0610	06/10/10 08:20	06/11/10 10:00	06/16/10 10:13	6.00	7.00	06/17/10 17:06	1.00	40.00	
BRN-1120-MW38-0610	06/10/10 09:35	06/11/10 10:00	06/16/10 10:13	6.00	7.00	06/17/10 15:32	1.00	40.00	
BRN-1120-MW38-0610	06/10/10 09:35	06/11/10 10:00	06/16/10 10:13	6.00	7.00	06/17/10 16:17	1.00	40.00	

# SURROGATE STANDARD RECOVERY AND RT SUMMARY

## EPA 8270D

Laboratory:	<u>ENCO Jacksonville</u>	SDG:	<u>BR004-004</u>
Client:	<u>Tetra Tech NUS (BR004)</u>	Project:	<u>Saufley Field Pensacola - CTO 29</u>
Sequence:	<u>BA07144</u>	Instrument:	<u>JSVGCMS3</u>
Matrix:	<u>Water</u>	Calibration:	<u>1005012</u>

Surrogate Compound	Spike Level ug/mL	% Recovery	Recovery Limits	RT	Calibration RT	RT Diff	RT Diff Limit	Q
<b>Secondary Cal Check (BA07144-SCV1)</b>		Lab File ID: 6EK014.D			Analyzed: 05/16/10 17:26			
p-Terphenyl	5.00	102	75 - 125	10.882	10.88233	-0.0003	+/-1.0	

**SURROGATE STANDARD RECOVERY AND RT SUMMARY**  
**EPA 8270D**

Laboratory: ENCO Jacksonville  
 Client: Tetra Tech NUS (BR004)  
 Sequence: BA07352  
 Matrix: Water

SDG: BR004-004  
 Project: Saufley Field Pensacola - CTO 29  
 Instrument: JSVGCMS3  
 Calibration: 1005012

Surrogate Compound	Spike Level ug/mL	% Recovery	Recovery Limits	RT	Calibration RT	RT Diff	RT Diff Limit	Q
<b>Calibration Check (BA07352-CCV1)</b>			Lab File ID: 6FL003.D		Analyzed: 06/17/10 12:54			
p-Terphenyl	10.0	104	80 - 120	10.848	10.88233	-0.0343	+/-1.0	
<b>Instrument Blank (BA07352-IBL1)</b>			Lab File ID: 6FL004.D		Analyzed: 06/17/10 13:40			
p-Terphenyl			39 - 148	0	10.88233	-10.8823	+/-1.0	
<b>Blank (0F16008-BLK1)</b>			Lab File ID: 6FL005.D		Analyzed: 06/17/10 14:02			
p-Terphenyl	5.00	95	39 - 148	10.849	10.88233	-0.0333	+/-1.0	
<b>LCS (0F16008-BS1)</b>			Lab File ID: 6FL006.D		Analyzed: 06/17/10 14:25			
p-Terphenyl	5.00	95	39 - 148	10.849	10.88233	-0.0333	+/-1.0	
<b>LCS Dup (0F16008-BSD1)</b>			Lab File ID: 6FL007.D		Analyzed: 06/17/10 14:47			
p-Terphenyl	5.00	93	39 - 148	10.848	10.88233	-0.0343	+/-1.0	
<b>BRN-1120-MW14R-0610 (B002767-01)</b>			Lab File ID: 6FL008.D		Analyzed: 06/17/10 15:10			
p-Terphenyl	5.00	82	39 - 148	10.852	10.88233	-0.0303	+/-1.0	
<b>BRN-1120-MW38-0610 (B002767-02)</b>			Lab File ID: 6FL009.D		Analyzed: 06/17/10 15:32			
p-Terphenyl	5.00	92	39 - 148	10.849	10.88233	-0.0333	+/-1.0	
<b>Instrument Blank (BA07352-IBL2)</b>			Lab File ID: 6FL010.D		Analyzed: 06/17/10 15:55			
p-Terphenyl			39 - 148	0	10.88233	-10.8823	+/-1.0	
<b>BRN-1120-MW38-0610 (B002767-02RE1)</b>			Lab File ID: 6FL011.D		Analyzed: 06/17/10 16:17			
p-Terphenyl	5.00	90	39 - 148	10.852	10.88233	-0.0303	+/-1.0	
<b>BRN-1120-MW14R-0610 (B002767-01RE1)</b>			Lab File ID: 6FL012.D		Analyzed: 06/17/10 16:40			
p-Terphenyl	5.00	95	39 - 148	10.852	10.88233	-0.0303	+/-1.0	
<b>BRN-1120-MW14R-0610 (B002767-01RE2)</b>			Lab File ID: 6FL013.D		Analyzed: 06/17/10 17:06			
p-Terphenyl	5.00	92	39 - 148	10.856	10.88233	-0.0263	+/-1.0	





## LCS / LCS DUPLICATE RECOVERY

EPA 8270D

Laboratory: <u>ENCO Jacksonville</u>	SDG: <u>BR004-004</u>
Client: <u>Tetra Tech NUS (BR004)</u>	Project: <u>Saufley Field Pensacola - CTO 29</u>
Matrix: <u>Water</u>	
Batch: <u>OF16008</u>	Laboratory ID: <u>OF16008-BS1</u>
Preparation: <u>EPA 3510C MS</u>	Initial/Final: <u>500 mL / 0.5 mL</u>

COMPOUND	SPIKE ADDED (ug/L)	LCS CONCENTRATION (ug/L)	LCS % REC. #	QC LIMITS REC.
2-Methylnaphthalene	2.00	1.5	77	45 - 105
Naphthalene	2.00	1.6	82	35 - 105
1-Methylnaphthalene	2.00	1.7	83	41 - 120

COMPOUND	SPIKE ADDED (ug/L)	LCS D CONCENTRATION (ug/L)	LCS D % REC. #	% RPD #	QC LIMITS	
					RPD	REC.
2-Methylnaphthalene	2.00	1.4	71	9	30	45 - 105
Naphthalene	2.00	1.5	75	10	30	35 - 105
1-Methylnaphthalene	2.00	1.5	74	11		41 - 120

# Column to be used to flag recovery and RPD values with an asterisk

\* Values outside of QC limits

**INTERNAL STANDARD AREA AND RT SUMMARY  
EPA 8270D**

Laboratory: ENCO Jacksonville  
 Client: Tetra Tech NUS (BR004)  
 Sequence: BA07352  
 Matrix: Water

SDG: BR004-004  
 Project: Saufley Field Pensacola - CTO 29  
 Instrument: JSVGCMS3  
 Calibration: 1005012

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
<b>Blank (0F16008-BLK1 )</b>									
Lab File ID: 6FL005.D					Analyzed: 06/17/10 14:02				
Naphthalene-d8	470220	4.85	494653	4.88	95	50 - 200	-0.0300	+/-0.50	
Acenaphthene-d10	189990	7	198154	7.03	96	50 - 200	-0.0300	+/-0.50	
Phenanthrene-d10	328140	8.85	341188	8.88	96	50 - 200	-0.0300	+/-0.50	
Chrysene-d12	285083	12.14	313299	12.17	91	50 - 200	-0.0300	+/-0.50	
Perylene-d12	204380	13.8	244963	13.83	83	50 - 200	-0.0300	+/-0.50	
<b>BRN-1120-MW14R-0610 (B002767-01 )</b>									
Lab File ID: 6FL008.D					Analyzed: 06/17/10 15:10				
Naphthalene-d8	498315	4.86	494653	4.88	101	50 - 200	-0.0200	+/-0.50	
Acenaphthene-d10	214998	7	198154	7.03	109	50 - 200	-0.0300	+/-0.50	
Phenanthrene-d10	375670	8.85	341188	8.88	110	50 - 200	-0.0300	+/-0.50	
Chrysene-d12	327601	12.14	313299	12.17	105	50 - 200	-0.0300	+/-0.50	
Perylene-d12	248039	13.8	244963	13.83	101	50 - 200	-0.0300	+/-0.50	
<b>BRN-1120-MW38-0610 (B002767-02 )</b>									
Lab File ID: 6FL009.D					Analyzed: 06/17/10 15:32				
Naphthalene-d8	469469	4.85	494653	4.88	95	50 - 200	-0.0300	+/-0.50	
Acenaphthene-d10	192080	7	198154	7.03	97	50 - 200	-0.0300	+/-0.50	
Phenanthrene-d10	342578	8.85	341188	8.88	100	50 - 200	-0.0300	+/-0.50	
Chrysene-d12	304854	12.14	313299	12.17	97	50 - 200	-0.0300	+/-0.50	
Perylene-d12	226713	13.8	244963	13.83	93	50 - 200	-0.0300	+/-0.50	
<b>BRN-1120-MW38-0610 (B002767-02RE1 )</b>									
Lab File ID: 6FL011.D					Analyzed: 06/17/10 16:17				
Naphthalene-d8	474401	4.85	494653	4.88	96	50 - 200	-0.0300	+/-0.50	
Acenaphthene-d10	195611	7	198154	7.03	99	50 - 200	-0.0300	+/-0.50	
Phenanthrene-d10	349353	8.85	341188	8.88	102	50 - 200	-0.0300	+/-0.50	
Chrysene-d12	303677	12.14	313299	12.17	97	50 - 200	-0.0300	+/-0.50	
Perylene-d12	223152	13.8	244963	13.83	91	50 - 200	-0.0300	+/-0.50	
<b>BRN-1120-MW14R-0610 (B002767-01RE1 )</b>									
Lab File ID: 6FL012.D					Analyzed: 06/17/10 16:40				
Naphthalene-d8	419381	4.86	494653	4.88	85	50 - 200	-0.0200	+/-0.50	
Acenaphthene-d10	172793	7	198154	7.03	87	50 - 200	-0.0300	+/-0.50	
Phenanthrene-d10	296384	8.85	341188	8.88	87	50 - 200	-0.0300	+/-0.50	
Chrysene-d12	260797	12.14	313299	12.17	83	50 - 200	-0.0300	+/-0.50	
Perylene-d12	190823	13.8	244963	13.83	78	50 - 200	-0.0300	+/-0.50	
<b>BRN-1120-MW14R-0610 (B002767-01RE2 )</b>									
Lab File ID: 6FL013.D					Analyzed: 06/17/10 17:06				
Naphthalene-d8	443598	4.857	494653	4.88	90	50 - 200	-0.0230	+/-0.50	
Acenaphthene-d10	181396	6.999	198154	7.03	92	50 - 200	-0.0310	+/-0.50	
Phenanthrene-d10	318040	8.849	341188	8.88	93	50 - 200	-0.0310	+/-0.50	
Chrysene-d12	279091	12.141	313299	12.17	89	50 - 200	-0.0290	+/-0.50	
Perylene-d12	199708	13.801	244963	13.83	82	50 - 200	-0.0290	+/-0.50	

**ANALYSIS BATCH (SEQUENCE) SUMMARY**  
**EPA 8270D**

Laboratory: ENCO Jacksonville  
 Client: Tetra Tech NUS (BR004)  
 Sequence: BA07144

SDG: BR004-004  
 Project: Saufley Field Pensacola - CTO 29  
 Instrument: JSVGCMS3  
 Calibration: 1005012

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
MS Tune	BA07144-TUN1	6EK002.D	05/16/10 12:53
Cal Standard	BA07144-CAL1	6EK006.D	05/16/10 14:25
Cal Standard	BA07144-CAL2	6EK007.D	05/16/10 14:48
Cal Standard	BA07144-CAL4	6EK009.D	05/16/10 15:33
Cal Standard	BA07144-CAL5	6EK010.D	05/16/10 15:56
Cal Standard	BA07144-CAL6	6EK011.D	05/16/10 16:18
Cal Standard	BA07144-CAL3	6EK012.D	05/16/10 16:41
Secondary Cal Check	BA07144-SCV1	6EK014.D	05/16/10 17:26

# MASS SPECTROMETER INSTRUMENT PERFORMANCE CHECK

EPA 8270D

Laboratory: <u>ENCO Jacksonville</u>	SDG: <u>BR004-004</u>
Client: <u>Tetra Tech NUS (BR004)</u>	Project: <u>Saufley Field Pensacola - CTO 29</u>
Lab File ID: <u>6EK002.D</u>	Injection Date: <u>05/16/10</u>
Instrument ID: <u>JSVGCMS3</u>	Injection Time: <u>12:53</u>
Sequence: <u>BA07144</u>	Lab Sample ID: <u>BA07144-TUN1</u>

m/z	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE	
51	10 - 80% of 198	28.6	PASS
68	Less than 2% of 69	0.0962	PASS
70	Less than 2% of 69	0.0836	PASS
127	10 - 80% of 198	42.3	PASS
197	Less than 2% of 198	0	PASS
198	Base peak, 100% relative abundance	100	PASS
199	5 - 9% of 198	6.65	PASS
275	10 - 60% of 198	22.1	PASS
365	1 - 200% of 198	2.4	PASS
441	0.1 - 24% of 442	0.109	PASS
442	50 - 200% of 198	68.5	PASS
443	15 - 24% of 442	19.3	PASS
69	Base peak, 100% relative abundance	100	PASS

# INITIAL CALIBRATION STANDARDS

## EPA 8270D

Laboratory: ENCO Jacksonville

SDG: BR004-004

Client: Tetra Tech NUS (BR004)

Project: Saufley Field Pensacola - CTO 29

Sequence: BA07144

Instrument: JSVGCMS3

Calibration: 1005012

Standard ID	Description	Lab Sample ID	Lab File ID	Analysis Date/Time
B0E0037	Tune - 8270 Tune Working Std	BA07144-TUN1	6EK002.D	05/16/10 12:53
B0E0179	8270/pah/sim Curve - 0.1ppm curve std	BA07144-CAL1	6EK006.D	05/16/10 14:25
B0E0178	8270/pah/sim Curve - 0.5ppm curve std	BA07144-CAL2	6EK007.D	05/16/10 14:48
B0E0176	8270/pah/sim Curve - 5.0ppm curve std	BA07144-CAL4	6EK009.D	05/16/10 15:33
B0E0175	8270/pah/sim Curve - 10.0ppm curve std	BA07144-CAL5	6EK010.D	05/16/10 15:56
B0E0174	8270/pah/sim Curve - 20.0ppm curve std	BA07144-CAL6	6EK011.D	05/16/10 16:18
B0E0177	8270/pah/sim Curve - 2.0ppm curve std	BA07144-CAL3	6EK012.D	05/16/10 16:41
B0E0155	8270/pah/sim - SCV (5ug/mL)	BA07144-SCV1	6EK014.D	05/16/10 17:26

**INITIAL CALIBRATION DATA**  
**EPA 8270D**

Laboratory: ENCO Jacksonville

SDG: BR004-004

Client: Tetra Tech NUS (BR004)

Project: Saufley Field Pensacola - CTO 29

Calibration: 1005012

Instrument: JSVGMS3

Matrix: Water

Calibration Date: 05/16/10 22:57

Compound	Level 01		Level 02		Level 03		Level 04		Level 05		Level 06	
	ug/mL	RF										
2-Methylnaphthalene	0.1	0.6401546	0.5	0.6091375	2	0.7551282	5	0.6860783	10	0.7144463	20	0.6926725
Naphthalene	0.1	1.038493	0.5	0.9970304	2	1.193265	5	1.050916	10	1.095786	20	1.056575
1-Methylnaphthalene	0.1	0.6034058	0.5	0.5894526	2	0.7322131	5	0.6551642	10	0.6935549	20	0.6683612
p-Terphenyl	0.1	0.8354982	0.5	0.8149117	2	1.016625	5	0.9131018	10	0.9353963	20	0.8850916

## INITIAL CALIBRATION DATA (Continued)

EPA 8270D

Laboratory: <u>ENCO Jacksonville</u>	SDG: <u>BR004-004</u>
Client: <u>Tetra Tech NUS (BR004)</u>	Project: <u>Saufley Field Pensacola - CTO 29</u>
Calibration: <u>1005012</u>	Instrument: <u>JSVGCMS3</u>
Matrix: <u>Water</u>	Calibration Date: <u>05/16/10 22:57</u>

Compound	Mean RF	RF RSD	Mean RT	RT RSD	Linear r	Quad COD	LIMIT	Q
2-Methylnaphthalene	0.6829362	7.63267	5.7445	3.415557E-02			SPCC (0.4)	
Naphthalene	1.072011	6.284885	4.908	2.685419E-02			SPCC (0.7)	
1-Methylnaphthalene	0.6570253	8.213413	5.866333	2.972384E-02			20	
p-Terphenyl	0.9001041	8.110737	10.88233	2.471132E-02			20	

# SECOND-SOURCE CALIBRATION VERIFICATION

EPA 8270D

Laboratory: ENCO Jacksonville

SDG: BR004-004

Client: Tetra Tech NUS (BR004)

Project: Saufley Field Pensacola - CTO 29

Calibration: 1005012

Laboratory ID: BA07144-SCV1

Sequence: BA07144

Standard ID: B0E0155

ANALYTE	EXPECTED (ug/mL)	FOUND (ug/mL)	% DRIFT	QC LIMIT
p-Terphenyl	5.00	5.1	2.2	20.00
2-Methylnaphthalene	5.00	5.3	5.4	20.00
Naphthalene	5.00	5.3	6.6	20.00
1-Methylnaphthalene	5.00	5.3	6.1	20.00

\* Values outside of QC limits

# ANALYSIS BATCH (SEQUENCE) SUMMARY

EPA 8270D

Laboratory: ENCO Jacksonville

SDG: BR004-004

Client: Tetra Tech NUS (BR004)

Project: Saufley Field Pensacola - CTO 29

Sequence: BA07352

Instrument: JSVGCMS3

Calibration: 1005012

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
MS Tune	BA07352-TUN1	6FL002.D	06/17/10 12:28
Calibration Check	BA07352-CCV1	6FL003.D	06/17/10 12:54
Instrument Blank	BA07352-IBL1	6FL004.D	06/17/10 13:40
Blank	0F16008-BLK1	6FL005.D	06/17/10 14:02
LCS	0F16008-BS1	6FL006.D	06/17/10 14:25
LCS Dup	0F16008-BSD1	6FL007.D	06/17/10 14:47
BRN-1120-MW14R-0610	B002767-01	6FL008.D	06/17/10 15:10
BRN-1120-MW38-0610	B002767-02	6FL009.D	06/17/10 15:32
Instrument Blank	BA07352-IBL2	6FL010.D	06/17/10 15:55
BRN-1120-MW38-0610	B002767-02RE1	6FL011.D	06/17/10 16:17
BRN-1120-MW14R-0610	B002767-01RE1	6FL012.D	06/17/10 16:40
BRN-1120-MW14R-0610	B002767-01RE2	6FL013.D	06/17/10 17:06



# CONTINUING CALIBRATION CHECK

## EPA 8270D

Laboratory: <u>ENCO Jacksonville</u>	SDG: <u>BR004-004</u>
Client: <u>Tetra Tech NUS (BR004)</u>	Project: <u>Saufley Field Pensacola - CTO 29</u>
Instrument ID: <u>JSVGCMS3</u>	Calibration: <u>1005012</u>
Lab File ID: <u>6FL003.D</u>	Calibration Date: <u>05/16/10 22:57</u>
Sequence: <u>BA07352</u>	Injection Date: <u>06/17/10</u>
Lab Sample ID: <u>BA07352-CCV1</u>	Injection Time: <u>12:54</u>

COMPOUND	TYPE	CONC. (ug/mL)		RESPONSE FACTOR			% DIFF / DRIFT	
		STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
2-Methylnaphthalene	A	10.0	11	0.6829362	0.7272623	0.4	6.5	20
Naphthalene	A	10.0	11	1.072011	1.139055	0.7	6.3	20
1-Methylnaphthalene	A	10.0	11	0.6570253	0.7028079		7.0	20

# Column to be used to flag Response Factor and %Diff/Drift values with an asterisk

\* Values outside of QC limits

PREPARATION BENCH SHEET

Printed: 6/16/2010 10:15:11AM

**Analysis**  
8270D PAH SIM DOD

OF16008  
ENCO Jacksonville

**Surrogate Solution**  
B0E0346 8270/pah/sim water surrogate

Prepared using: EPA 3510C\_MS

**Spiking Solution**  
B0E0119 8270/pah/sim water spike

Matrix: Water

B0E0114 IS.

Lab Number	Code	Sample ID, Source and Sample Location	Due Date	Analysis	pH adj	Res Cl <sup>(1)</sup>	Initial (mL)	Final (mL)	Spike ID	ul Spike	ul Surr1	ul Surr2	Extraction Comments
OF16008-BLK1		Blank		QC	NA	A	500	0.5	JNS	6/16/10	500	7	
OF16008-BS1		LCS		QC	NA	A	500	0.5	B0E0119	500	500	JNS	
OF16008-BSD1		LCS Dup		QC	NA	A	500	0.5	B0E0119	500	500	JNS	
B002767-01	D	BRN-1120-MW14R-0610 A[E12]	18-Jun-10	8270D PAH SIM DOD	NA	A	500	0.5			500		report naphthalene 1-Methylna
B002767-02	D	BRN-1120-MW38-0610 A[E12]	18-Jun-10	8270D PAH SIM DOD	NA	A	500	0.5			500		report naphthalene 1-Methylna

(1) Before solvent extraction proceeds, verify that there is no residual chlorine above 0.5 mg/L. Any sample above this must be treated to remove excess chlorine before extraction and this documented as a comment.

Start Date/Time 6/16/10 2:00

Stop Date/Time 6/16/10 5:00

Standard ID#	Description	Manufacture Lot#
B0D0291	MECL2 / Dichloromethane HPLC grade Tanl	DB406
B0E0220	SODIUM SULFATE, Anhydrous GR ACS	50090015

Equipment Used

Sonicator	<u>NA</u>	Tuned per manufacturer instructions? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA
Turbovap	<u>TSVTK3</u>	Temperature: <u>45.2</u> N2 pressure (initial): <u>20</u> (final): <u>20</u>
Turbovap	<u>NA</u>	Temperature: <u>NA</u> N2 pressure (initial): <u>NA</u> (final): <u>NA</u>
Turbovap	<u>NA</u>	Temperature: <u>NA</u> N2 pressure (initial): <u>NA</u> (final): <u>NA</u>
Balance	<u>NA</u>	Daily calibration complete? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA
Other		

MJ 6-16-10  
Samples Prepared By Date

JNS 6/16/10  
Samples Prepared By Date

\_\_\_\_\_  
Samples Prepared By Date

**SAMPLE ID** BRN-1120-MW14R-0610

**SAMPLE CALC**

<b>IS AREA</b>	<b>DILUTION</b>	<b>COMPOUND OF INTEREST</b>	<b>IS AMOUNT (ug/m</b>	<b>Final Extract Volume (ML)</b>	<b>AVE RRF</b>	<b>CONCENTRATION PPB</b>
443598	20	362756	10	0.5	0.6829	239.48
			Amt. inj (ul)	<b>Sample Volume (ML)</b>		
				1		
				500		

2-methylnaphthalene = 240 ug/L

Quantitation Report (QT Reviewed)

Data Path : C:\Documents and Settings\labuser\Desktop\6FL\  
 InstName : JSVGCMS3  
 Data File : 6FL013.D  
 Acq On : 17 Jun 2010 17:06  
 Operator : JWJ  
 Sample : B002767-01RE2@20x  
 Misc : 20@8270 pah sim DoD water  
 ALS Vial : 13 Sample Multiplier: 1

BRN-1120-MW14R-0610

Quant Time: Jun 22 11:05:05 2010  
 Quant Method : C:\Documents and Settings\labuser\Desktop\Methods\2010 Methods\SIM-6EK.M  
 Quant Title : SOP SVGCMS/3.0 (SIM-6EK,1005012 , 5/16/10)  
 QLast Update : Tue Jun 08 14:35:18 2010  
 Response via : Initial Calibration

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev (Min)
1) NAPHTHALENE-D8	4.857	136	443598	10.000	ug/mL	0.00
5) ACENAPHTHENE-D10	6.999	164	181396	10.000	ug/mL	0.00
9) PHENANTHRENE-D10	8.849	188	318040	10.000	ug/mL	0.00
15) CHRYSENE-D12	12.141	240	279091	10.000	ug/mL	0.00
18) PERYLENE-D12	13.801	264	199708	10.000	ug/mL	0.00

Target Compounds	R.T.	QIon	Response	Conc	Units	Qvalue
2) Naphthalene	4.881	128	171152	3.599	ug/mL	99
3) 2-Methylnaphthalene	5.717	142	362756	11.974	ug/mL	99
4) 1-Methylnaphthalene	5.836	142	253247	8.689	ug/mL	98
6) Acenaphthylene	6.827	152	1600	0.036	ug/mL#	1
7) Acenaphthene	7.041	154	3235	0.122	ug/mL	80
8) Fluorene	7.687	166	7456	0.230	ug/mL	94
10) Phenanthrene	8.879	178	5346	0.124	ug/mL	98
11) Anthracene	8.955	178	146	N.D.		
12) Fluoranthene	10.382	202	60	N.D.		
13) Pyrene	10.666	202	67	N.D.		
14) p-Terphenyl	10.856	230	6615	0.231	ug/mL	99
16) Benzo(a)anthracene	0.000	228	0	N.D.	d	
17) Chrysene	0.000	228	0	N.D.	d	
19) Benzo(b)fluoranthene	0.000	252	0	N.D.		
20) Benzo(k)fluoranthene	0.000	252	0	N.D.		
21) Benzo(a)pyrene	0.000	252	0	N.D.		
22) Indeno(1,2,3-cd)pyrene	15.134	276	4	N.D.		
23) Dibenzo(a,h)anthracene	15.190	278	20	N.D.		
24) Benzo(g,h,i)perylene	15.466	276	1	N.D.		

(#) = qualifier out of range (m) = manual integration (+) = signals summed

**ANALYSES DATA PACKAGE COVER PAGE**  
**FLPRO**

Laboratory: ENCO Jacksonville

SDG: BR004-004

Client: Tetra Tech NUS (BR004)

Project: Saufley Field Pensacola - CTO 29

---

**Client Sample Id:**

BRN-1120-MW14R-0610

BRN-1120-MW38-0610

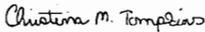
**Lab Sample Id:**

B002767-01

B002767-02

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in computer-readable data submitted on diskette has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signatures.

Signature:



Name:

Christina Tompkins

Date:

July 1, 2010

Title:

Project Manager

Digitally signed by Christina Tompkins  
DN: cn=Christina Tompkins, o=Environmental  
Consultants, email=christina.tompkins@enco.com, c=US  
Reason: I am approving this document  
Date: 2010.07.01 16:05:55 -0400

## HOLDING TIME SUMMARY FLPRO

Laboratory: ENCO Jacksonville

SDG: BR004-004

Client: Tetra Tech NUS (BR004)

Project: Saufley Field Pensacola - CTO 29

Sample Name	Date Collected	Date Received	Date Prepared	Days to Prep	Max Days to Prep	Date Analyzed	Days to Analysis	Max Days to Analysis	
BRN-1120-MW14R-0610	06/10/10 08:20	06/11/10 10:00	06/14/10 12:41	4.00	7.00	06/14/10 17:07	0.00	40.00	0
BRN-1120-MW38-0610	06/10/10 09:35	06/11/10 10:00	06/14/10 12:41	4.00	7.00	06/14/10 17:30	0.00	40.00	

**SURROGATE STANDARD RECOVERY AND RT SUMMARY  
FLPRO**

Laboratory: ENCO Jacksonville  
 Client: Tetra Tech NUS (BR004)  
 Sequence: BA04591  
 Matrix: Water

SDG: BR004-004  
 Project: Saufley Field Pensacola - CTO 29  
 Instrument: JSVGCFID3  
 Calibration: 0903009

Surrogate Compound	Spike Level ug/mL	% Recovery	Recovery Limits	RT	Calibration RT	RT Diff	RT Diff Limit	Q
<b>Secondary Cal Check (BA04591-SCV1)</b>			Lab File ID: 3CAA008.D		Analyzed: 03/06/09 12:13			
n-Nonatriacontane	100	103	0 - 200	13.517	13.35633	0.1607	+/-1.0	
o-Terphenyl	50.0	98	0 - 200	6.98	6.9795	0.0005	+/-1.0	



# PREPARATION BATCH SUMMARY

## FLPRO

Laboratory: ENCO Jacksonville SDG: BR004-004  
Client: Tetra Tech NUS (BR004) Project: Saufley Field Pensacola - CTO 29  
Batch: 0F14010 Batch Matrix: Water Preparation: EPA 3510C

SAMPLE NAME	LAB SAMPLE ID	LAB FILE ID	DATE PREPARED	OBSERVATIONS
Blank	0F14010-BLK1	3F1013.D	06/14/10 12:41	
LCS	0F14010-BS1	3F1014.D	06/14/10 12:41	
MW-1	0F14010-MS1	3F1015.D	06/14/10 12:41	
MW-1	0F14010-MSD1	3F1016.D	06/14/10 12:41	
BRN-1120-MW14R-0610	B002767-01	3F1018.D	06/14/10 12:41	
BRN-1120-MW38-0610	B002767-02	3F1019.D	06/14/10 12:41	







**MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY**  
**FLPRO**

<u>MW-1</u>
-------------

Laboratory: ENCO Jacksonville

SDG: BR004-004

Client: Tetra Tech NUS (BR004)

Project: Saufley Field Pensacola - CTO 29

Matrix: Water

Batch: 0F14010

Laboratory ID: 0F14010-MSD1

Preparation: EPA 3510C

Initial/Final: 1000 mL / 1 mL

Source Sample Name: MW-1

COMPOUND	SPIKE ADDED (mg/L)	MSD CONCENTRATION (mg/L)	MSD % REC. #	% RPD #	QC LIMITS	
					RPD	REC.
TPH (C8-C40)	1.70	1.9	73	0.04	15	65 - 126

# Column to be used to flag recovery and RPD values with an asterisk

\* Values outside of QC limits

**ANALYSIS BATCH (SEQUENCE) SUMMARY**  
**FLPRO**

Laboratory: ENCO Jacksonville

SDG: BR004-004

Client: Tetra Tech NUS (BR004)

Project: Saufley Field Pensacola - CTO 29

Sequence: BA04591

Instrument: JSVGCFID3

Calibration: 0903009

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
Cal Standard	BA04591-CAL1	3CAA002.D	03/06/09 09:52
Cal Standard	BA04591-CAL2	3CAA003.D	03/06/09 10:15
Cal Standard	BA04591-CAL3	3CAA004.D	03/06/09 10:39
Cal Standard	BA04591-CAL4	3CAA005.D	03/06/09 11:02
Cal Standard	BA04591-CAL5	3CAA006.D	03/06/09 11:26
Cal Standard	BA04591-CAL6	3CAA007.D	03/06/09 11:49
Secondary Cal Check	BA04591-SCV1	3CAA008.D	03/06/09 12:13



**INITIAL CALIBRATION DATA**  
**FLPRO**

Laboratory: ENCO Jacksonville

SDG: BR004-004

Client: Tetra Tech NUS (BR004)

Project: Saufley Field Pensacola - CTO 29

Calibration: 0903009

Instrument: JSVGCFID3

Matrix: Water

Calibration Date: 03/06/09 13:47

Compound	Level 01		Level 02		Level 03		Level 04		Level 05		Level 06	
	ug/mL	RF										
TPH (C8-C40)	170	182810.8	425	166497.3	850	161249	1700	170510.2	4250	165030.1	8500	167214.7
n-Nonatriacontane	10	217966.6	25	198305.4	50	208600.6	100	190251	250	196480.2	500	190120.7
o-Terphenyl	5	174259	12.5	163409.9	25	169944.7	50	182608	125	174105.7	250	165871.4

## INITIAL CALIBRATION DATA (Continued)

### FLPRO

Laboratory:	<u>ENCO Jacksonville</u>	SDG:	<u>BR004-004</u>
Client:	<u>Tetra Tech NUS (BR004)</u>	Project:	<u>Saufley Field Pensacola - CTO 29</u>
Calibration:	<u>0903009</u>	Instrument:	<u>JSVGCFID3</u>
Matrix:	<u>Water</u>	Calibration Date:	<u>03/06/09 13:47</u>

Compound	Mean RF	RF RSD	Mean RT	RT RSD	Linear r	Quad COD	LIMIT	Q
TPH (C8-C40)	168885.4	4.416965	1.52	1.867383E-02			20	
n-Nonatriacontane	200287.4	5.488375	13.35633	0.139642			20	
o-Terphenyl	171699.8	4.01062	6.9795	2.078147E-02			20	

# SECOND-SOURCE CALIBRATION VERIFICATION

## FLPRO

**Laboratory:** ENCO Jacksonville

**SDG:** BR004-004

**Client:** Tetra Tech NUS (BR004)

**Project:** Saufley Field Pensacola - CTO 29

**Calibration:** 0903009

**Laboratory ID:** BA04591-SCV1

**Sequence:** BA04591

**Standard ID:** B8L0396

ANALYTE	EXPECTED (ug/mL)	FOUND (ug/mL)	% DRIFT	QC LIMIT
TPH (C8-C40)	1700	1700	0.3	20.00
o-Terphenyl	50.0	49	-1.6	
n-Nonatriacontane	100	100	3.5	

\* Values outside of QC limits

**ANALYSIS BATCH (SEQUENCE) SUMMARY**  
**FLPRO**

Laboratory: ENCO Jacksonville

SDG: BR004-004

Client: Tetra Tech NUS (BR004)

Project: Saufley Field Pensacola - CTO 29

Sequence: BA07331

Instrument: JSVGCFID3

Calibration: 0903009

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
Calibration Check	BA07331-CCV1	3FI012.D	06/14/10 14:45
Blank	0F14010-BLK1	3FI013.D	06/14/10 15:09
LCS	0F14010-BS1	3FI014.D	06/14/10 15:32
MW-1	0F14010-MS1	3FI015.D	06/14/10 15:56
MW-1	0F14010-MSD1	3FI016.D	06/14/10 16:19
BRN-1120-MW14R-0610	B002767-01	3FI018.D	06/14/10 17:07
BRN-1120-MW38-0610	B002767-02	3FI019.D	06/14/10 17:30
Calibration Check	BA07331-CCV2	3FI020.D	06/14/10 17:54

**CONTINUING CALIBRATION CHECK  
FLPRO**

Laboratory: <u>ENCO Jacksonville</u>	SDG: <u>BR004-004</u>
Client: <u>Tetra Tech NUS (BR004)</u>	Project: <u>Saufley Field Pensacola - CTO 29</u>
Instrument ID: <u>JSVGCFID3</u>	Calibration: <u>0903009</u>
Lab File ID: <u>3FI012.D</u>	Calibration Date: <u>03/06/09 13:47</u>
Sequence: <u>BA07331</u>	Injection Date: <u>06/14/10</u>
Lab Sample ID: <u>BA07331-CCV1</u>	Injection Time: <u>14:45</u>

COMPOUND	TYPE	CONC. (ug/mL)		RESPONSE FACTOR			% DIFF / DRIFT	
		STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
TPH (C8-C40)	A	1700	1900	168885.4	189673.2		12.3	25

# Column to be used to flag Response Factor and %Diff/Drift values with an asterisk

\* Values outside of QC limits

## CONTINUING CALIBRATION CHECK FLPRO

Laboratory: <u>ENCO Jacksonville</u>	SDG: <u>BR004-004</u>
Client: <u>Tetra Tech NUS (BR004)</u>	Project: <u>Saufley Field Pensacola - CTO 29</u>
Instrument ID: <u>JSVGCFID3</u>	Calibration: <u>0903009</u>
Lab File ID: <u>3FI020.D</u>	Calibration Date: <u>03/06/09 13:47</u>
Sequence: <u>BA07331</u>	Injection Date: <u>06/14/10</u>
Lab Sample ID: <u>BA07331-CCV2</u>	Injection Time: <u>17:54</u>

COMPOUND	TYPE	CONC. (ug/mL)		RESPONSE FACTOR			% DIFF / DRIFT	
		STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
TPH (C8-C40)	A	1700	2000	168885.4	196130.8		16.1	25

# Column to be used to flag Response Factor and %Diff/Drift values with an asterisk

\* Values outside of QC limits

PREPARATION BENCH SHEET

Printed: 6/14/2010 12:42:52PM

Analysis  
FLPRO  
FLPRO DOD

OF14010  
ENCO Jacksonville

Surrogate Solution  
B0E0118 FLPRO- FLPRO Surrogate

Prepared using: EPA 3510C

Spiking Solution  
B0F0015 Flpro - Flpro Spike

Matrix: Water

Lab Number	Code	Sample ID, Source and Sample Location	Due Date	Analysis	pH adj	Res Cl <sup>(1)</sup>	Initial (mL)	Final (mL)	Spike ID	ul Spike	ul Surr1	ul Surr2	Extraction Comments
OF14010-BLK1		Blank		QC	NA	A	1000	1.0	<del>B0F0015</del>	61410	1000		
OF14010-BS1		LCS		QC	NA	A	1000	1.0	B0F0015	1000	1000		
OF14010-MS1		Matrix Spike [B002692-02]		QC	NA	A	1000	1.0	B0F0015	1000	1000		
OF14010-MSD1		Matrix Spike Dup [B002692-02]		QC	NA	A	1000	1.0	B0F0015	1000	1000		
B002692-02		MW-1		FLPRO DOD	NA	A	1000	1.0			1000		Added for BatchQC in OF14010
B002692-02		MW-1	22-Jun-10	FLPRO	NA	A	1000	1.0			1000		
B002767-01	D	BRN-1120-MW14R-0610 B[E12]	18-Jun-10	FLPRO DOD	NA	A	930	1.0			1000		
B002767-02	D	BRN-1120-MW38-0610 B[E12]	18-Jun-10	FLPRO DOD	NA	A	940	1.0			1000		

(1) Before solvent extraction proceeds, verify that there is no residual chlorine above 0.5 mg/L. Any sample above this must be treated to remove excess chlorine before extraction, and this documented as a comment.

Start Date/Time 6-14-10 10:30  
Stop Date/Time 6-14-10 13:47

Standard ID#	Description	Manufacture Lot#
B0D0291	MECL2 / Dichloromethane HPLC grade Tanl	DB406
B0E0220	SODIUM SULFATE, Anhydrous GR ACS	50090015
B9I0325	SILICA GEL	TA1588034 919

Equipment Used

Sonicator NA Tuned per manufacturer instructions?  Yes  No  NA

Turbovap JSVTV1 Temperature: 46.0 N2 pressure (initial): 15 (final): 20

Turbovap JSVTV3 Temperature: 45.3 N2 pressure (initial): 15 (final): 20

Turbovap NA Temperature: NA N2 pressure (initial): NA (final): NA

Balance NA Daily calibration complete?  Yes  No  NA

Other NA

**SAMPLE CALC  
RESPONSE**

325787031

**SAMPLE ID**

**BRN-1120-MW14R-0610  
ICAL AVG RESPONSE**

168885.4

**DILUTION FACTOR**

1.00

**Initial Amt. ( ml)**

930

**final Amt. (ml)**

1

**CONCENTRATION**

2.07

TPH (C8-C40) = 2.2 mg/L

Quantitation Report (QT Reviewed)

Data Path : V:\1\DATA\JSVGCFID3\3FI\  
 Data File : 3FI018.D  
 Signal(s) : FID1A.CH  
 Acq On : 14 Jun 2010 5:07 pm  
 Operator : JWJ  
 Sample : B002767-01  
 Misc :  
 ALS Vial : 17 Sample Multiplier: 1

*BRN-1120-MW14R-0610*

Integration File: events.e  
 Quant Time: Jun 14 17:56:48 2010  
 Quant Method : V:\1\METHODS\FIpro3CA.m  
 Quant Title : FLPRO::JSVGCFID3  
 QLast Update : Mon May 24 14:39:40 2010  
 Response via : Initial Calibration  
 Integrator: ChemStation 6890 Scale Mode: Large solvent peaks clipped

Volume Inj. :  
 Signal Phase :  
 Signal Info :

Compound	R.T.	Response	Conc Units
-----			
System Monitoring Compounds			
2) S o-Terphenyl	6.933f	8593426	50.049 ug/mLm
3) S Nonatriacontane	13.110	20649283	103.098 ug/mL
Target Compounds			
1) H HYDROCARBONS (C8-C40)	1.520	325787031	1929.042 ug/mL
-----			

(f)=RT Delta > 1/2 Window

(m)=manual int.

**APPENDIX C**

**LAND USE CONTROL IMPLEMENTATION PLAN**

**LAND USE CONTROL IMPLEMENTATION PLAN  
UST SITE 15, BUILDING 1120, OUTLYING LANDING FIELD BRONSON**

**Naval Air Station (NAS) Pensacola  
Pensacola, Florida**

This Land Use Control Implementation Plan (LUCIP) is a component of the remedy proposed for Underground Storage Tank (UST) Site 15, Building 1120 at Outlying Landing Field (OLF) Bronson being managed under the Florida Petroleum Cleanup Program. A Risk-Based Closure Request was prepared by Tetra Tech, Inc. (Tetra Tech). The report documented that current site conditions are protective of human health, public safety, and the environment and there are no current human or ecological exposures to petroleum-related constituents in soil or groundwater. Based on the site's environmental data and risk assessment included in the closure request; a No Further Action Status, per RMO Level II in Chapter 62-780.680(2), Florida Administrative Code (F.A.C.), was recommended for the site.

1. SITE LOCATION

OLF Bronson is located northwest of NAS Pensacola about 1 mile from the Alabama State Line and 5 miles west of the city of Pensacola. The areas south, east, and north of the facility are undeveloped with the exception of some residential properties along U.S. Highway 98 and Perdido Bay (0.5 miles north of the facility). UST Site 15, Building 1120 itself is located southwest of the remains of Building 1120. Dense woods are located north, east, and west of Site 1120 and a dirt road running east to west is located south of the site. The site is an open, brushy area with the remains (concrete slab) of Building 1120 on the site.

OLF Bronson consists of approximately 950 acres of grassy areas and forest on the eastern shore of Perdido Bay and comprises the Blue Angels Recreation Park. Currently OLF Bronson is used solely for recreational purposes, a disc golf course and paint ball range are located near Site 1120 which is relatively flat with a slight slope to the west.

2. SITE DESCRIPTION

UST Site 15, Building 1120 is a former underground storage tank site located aboard OLF Bronson, near the remains of Building 1120, a former boiler room. Soils at the site consist of a 2-inch layer of sandy loam at the surface and fine to medium sand interspersed with traces of silt and clay below the top layer. Medium sand with traces of coarse sand and silt can be found at lower depths [20 feet below ground surface (bgs)].

Benzo(a)pyrene has been identified as a chemical of concern (COC) in onsite subsurface soils based on exceeding the residential direct exposure (but not industrial direct exposure) Florida Soil Cleanup Target Levels (SCTLs) per Chapter 62-777, F.A.C. None of the analytes were detected at concentrations that exceeded their respective Florida leachability to groundwater SCTLs per Chapter 62-777, F.A.C.

1-methylnaphthalene, 2-methylnaphthalene, and naphthalene have been identified as COC's for groundwater because they exceed their Florida Groundwater Cleanup Target Levels (GCTLs) per Chapter 62-777, F.A.C. However, the concentrations for these constituents were below their Florida Natural Attenuation Default Screening Criteria per Chapter 62-777, F.A.C. The COCs are limited to one monitoring well location and are not migrating. Overall the concentrations of COCs in groundwater at the site are decreasing. Site groundwater does not

present unacceptable risks for current exposure because although the nearest potable water source is located on base (operated by Emerald Coast Utilities Authority) it is located approximately 1,400 feet upgradient from the UST Site 15, Building 1120 site boundary.

Because site contamination is limited to subsurface soil and groundwater, surface water runoff or potential migration of the petroleum-related constituent contamination to surface water is not expected to occur at the site. Also, because site contamination is limited to subsurface soil and groundwater there is no exposure pathway for ecological receptors.

### 3. LAND USE CONTROL (LUC) OBJECTIVES

The objectives of implementing LUCs at UST Site 15, Building 1120 are to prohibit the residential exposure to subsurface soils and prohibit the use of groundwater, thereby reducing the risk to human health. The LUCs at UST Site 15, Building 1120 will protect human health by limiting exposure to the COCs in subsurface soil and groundwater that exceed their respective Florida Cleanup Target Levels.

### 4. ESTABLISHMENT AND IMPLEMENTATION OF LUCS

NAS Pensacola will implement, maintain, and enforce LUCs; which will protect human health and the environment.

LUCs will be established and implemented as follows:

- NAS Pensacola will implement, monitor, maintain, and enforce the remedies at UST Site 15, Building 1120 that protect human health and the environment in accordance with Chapter 62-770.68(2), F.A.C. The current recommendation for UST Site 15, Building 1120 is No Further Action (NFA) with Controls (including prohibit residential use of the site and prohibit use of groundwater). The following LUCs will be implemented:
  1. Establish an Institutional Control (IC) to prohibit future use or reuse of the Site for residential or residential-like land uses unless prior written approval is obtained from the FDEP. Residential and residential-like land use restrictions prohibit uses including, but not limited to, any form of housing, any kind of school (including pre-schools, elementary schools, and secondary schools), child care facilities, playgrounds, and adult convalescent or nursing care facilities.
  2. Establish an IC to prohibit all uses of groundwater from the surficial aquifer underlying the Site including, but not limited to, human consumption, dewatering, irrigation, heating/cooling purposes, and industrial processes unless prior written approval is obtained from the FDEP.
- The LUC objectives for UST Site 15, Building 1120 are to protect human health by limiting exposure to subsurface soils that exceed the residential direct exposure SCTL for benzo(a)pyrene and limiting exposure to groundwater that exceeds the GCTLs for 1-methylnaphthalene, 2-methylnaphthalene, and naphthalene.
- NAS Pensacola with oversight for OLF Bronson has administrative controls in the form of "dig permits" that require approval for projects involving construction or subsurface disturbance. The LUC will be documented in the NAS Pensacola Base Mater Plan (BMP). After receiving notice from FDEP of Site Rehabilitation Closeout Order (SRCO)

finalization, the Navy will update the NAS Pensacola BMP to reflect the LUCs selected in the SRCO for UST Site 15, Building 1120. LUC information incorporated into the BMP will include a depiction of the UST Site 15, Building 1120 boundaries shown on Attachment 1.

- NAS Pensacola will conduct annual inspections and provide annual certification to FDEP to verify compliance with the LUC requirement, objectives and controls in this LUCIP. The following LUC oversight and maintenance procedures will apply to UST Site 15, Building 1120 in lieu of those otherwise specified in Section V of the NAS Pensacola LUC MOA (1999):
  1. Annual Site Inspections: Beginning upon notice by FDEP of SRCO finalization, NAS Pensacola personnel will conduct annual physical inspections of UST Site 15, Building 1120 and provide annual certification to FDEP to verify compliance with the LUC requirements, objectives and controls in this LUCIP. Inspections will document any violations of these controls and confirm that all necessary LUCs have been implemented and are properly maintained.
  2. Compliance Reporting: Beginning upon notice by FDEP of SRCO finalization, the NAS Pensacola Installation Restoration Manager will provide to FDEP an annual LUC Compliance Certificate for UST Site 15, Building 1120 consistent with Attachment 2.
- NAS Pensacola will provide prompt notice to FDEP (verbal report within 24 hours, written report within 5 days) if it discovers any activity on UST Site 15, Building 1120 that is inconsistent with the LUCIP requirements, objectives, or controls; or any action that may interfere with the effectiveness of the ICs.
- NAS Pensacola will provide notice to FDEP at least six months prior to any transfer or sale of UST Site 15, Building 1120 including transfers to private, state, or local entities so that FDEP can be involved in discussions to ensure that appropriate provisions are included in the transfer terms or conveyance documents to maintain effective ICs. If it is not possible for the facility to notify FDEP within six months prior to transfer or sale, then the facility will notify FDEP as soon as possible, but no later than 60 days prior to the transfer or sale of any property subject to ICs. In addition to the land transfer notice and discussion provisions above, The Navy further agrees to provide similar notice, within the same time frames, as to federal to federal transfer of property accountability and administrative control of UST Site 15, Building 1120. Review and comment opportunities afforded to FDEP as to federal to federal transfers will be in accordance with all applicable federal laws.

5. DECISION DOCUMENT

Tetra Tech NUS, Inc. (Tetra Tech), 2012. Risk-Based Closure Request for Underground Storage Tank Site 15, Building 1120, Outlying Landing Field Bronson, Pensacola, Florida. Tallahassee, Florida.

FDEP (Florida Department of Environmental Protection), Issued \_\_\_\_\_. Site Rehabilitation Closeout Order (SRCO) for Underground Storage Tank Site 15, Building 1120, Outlying Landing Field Bronson, Pensacola, Florida.

6. OTHER PERTINENT INFORMATION

Except as specified in Section 5 above, all existing terms and conditions contained in the NAS Pensacola LUC MOA (1999) between Navy, FDEP and U.S. EPA shall apply to this site.

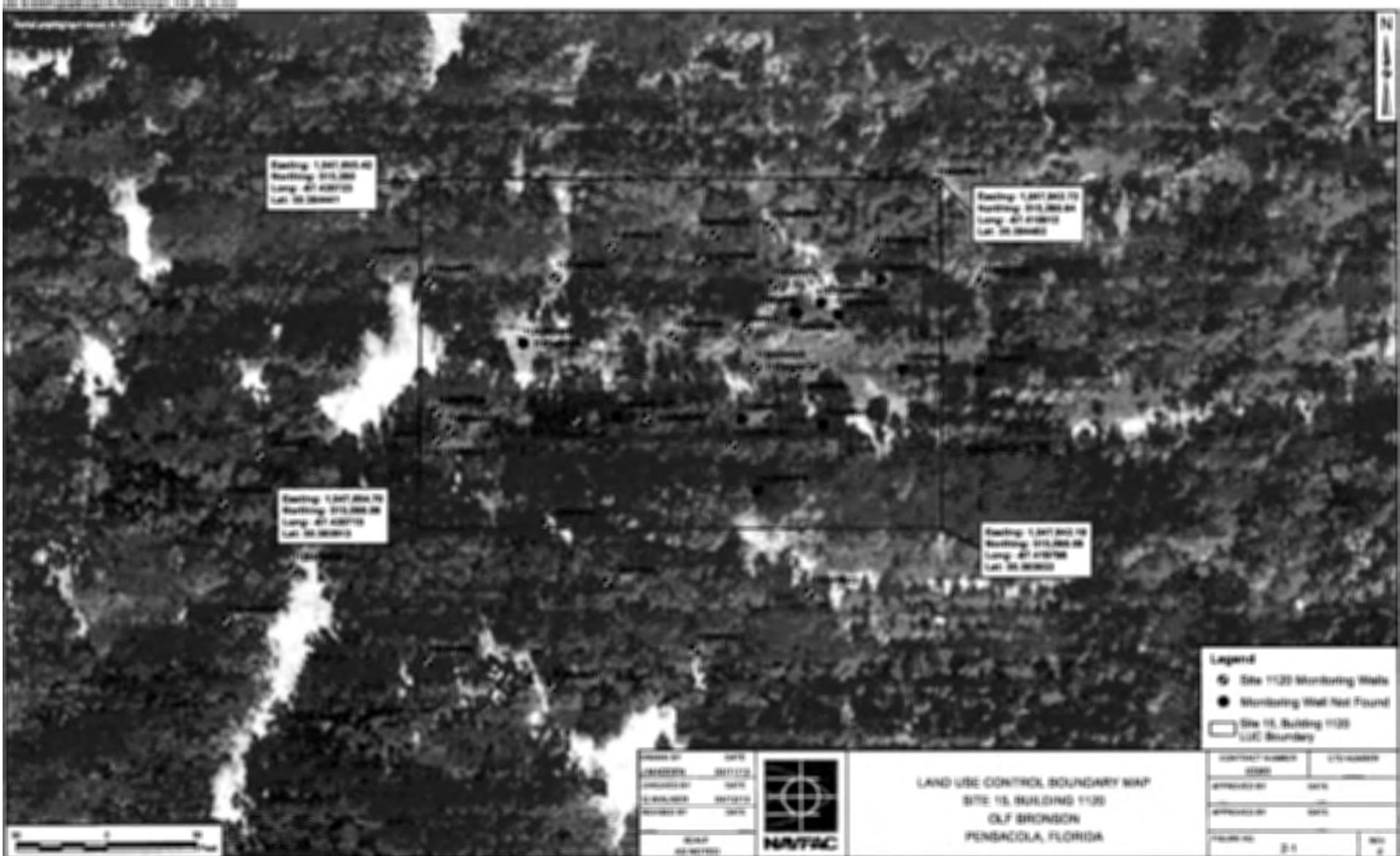
7. GEOGRAPHIC LOCATION WHERE LAND USE CONTROLS APPLY

The area in which LUC will be applied is shown on Attachment 1 of this LUCIP. The area is outlined by the coordinates that define the corners of the LUC area. Specifically the coordinates include:

**UST Site 15, Building 1120, Boundary Coordinates**

	<u>Northing</u>	<u>Easting</u>
Northwest Corner	515,280	1,047,655.42
Northeast Corner	515,280.64	1,047,942.72
Southwest Corner	515,088.09	1,047,654.70
Southeast Corner	515,088.09	1,047,942.19

## **Attachment 1**



Easting: 1,207,000.00  
 Northing: 215,000.00  
 Long: 47.420710  
 Lat: 26.900000

Easting: 1,207,000.70  
 Northing: 215,000.00  
 Long: 47.420810  
 Lat: 26.900000

Easting: 1,207,000.70  
 Northing: 215,000.00  
 Long: 47.420710  
 Lat: 26.900000

Easting: 1,207,000.70  
 Northing: 215,000.00  
 Long: 47.420810  
 Lat: 26.900000

**Legend**

- Site 1523 Monitoring Wells
- Monitoring Well Not Found
- Site 15, Building 132 LUC Boundary

DATE:	08/11/10
PROJECT:	081110
CLIENT:	DAF
SCALE:	1:1000
BY:	DAF



LAND USE CONTROL BOUNDARY MAP  
 SITE 15, BUILDING 132  
 OLF BRONSON  
 PENSACOLA, FLORIDA

DATE:	08/11/10
PROJECT:	081110
CLIENT:	DAF
SCALE:	1:1000
BY:	DAF



## **Attachment 2**

**UST Site 15 Building 1120 Annual LUC Compliance Certificate**

Outlying Landing Field (OLF) Bronson  
Naval Air Station Pensacola  
FL9170024567

Property Owner: NAVAL AIR STATION PENSACOLA

Property Address: OLF BRONSON – BLUE ANGELS RECREATIONAL AREA, FLORIDA

Is evaluation for all or a portion of the Site 15 – Building 1120 property? \_\_\_\_\_  
If evaluating only a portion of the site, attach a figure identifying the portion being evaluated.

This evaluation covers the period from **1 January** \_\_\_\_\_ **through 31 December** \_\_\_\_\_.  
Form shall be submitted by **1 March** of the year following the reporting period.

**Certification Checklist**

	<b>In Compliance</b>	<b>Non-Compliance</b>	<b>See Comment</b>
1) No residential use within the Site boundary	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2) No potable use of groundwater within the Site boundary	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

I, the undersigned, hereby certify that I am an authorized representative of the above named property owner and that the above described Land Use Controls have been complied with for the period noted. Alternately, any known deficiencies and owner's completed or planned actions to address such deficiencies are described in the attached Explanation of Deficiency(ies).

\_\_\_\_\_  
Signature – Greg Campbell (Navy)

\_\_\_\_\_  
Date

\_\_\_\_\_  
Signature – Patty Whittemore (Navy)

\_\_\_\_\_  
Date

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

**Mail completed form(s) to:**  
Florida Dept of Environmental Protection  
Division of Waste Management  
Bureau of Waste Cleanup  
Federal Programs Section  
Attn: NAS Pensacola RPM; Mr. David Gabka  
2600 Blair Stone Road  
Tallahassee, FL 32399-2400

Commanding Officer  
Naval Facilities Engineering Command, Southeast  
Attn: Environmental Restoration Division RPM; Ms. Patty Marajh-Whittmore  
Building 903  
Jacksonville, FL 32212-0030

Commanding Officer  
Naval Air Station Pensacola  
Attn: Environmental Department Coordinator; Mr. Greg Campbell  
310 John Tower Road  
Pensacola, FL 32508-5000