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NAS CECIL FIELD
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TECHNICAL MEMORANDUM DETAILING REMEDIAL OPTIONS AT BUILDING 815 WASH
RACK PETROLEUM SITE NAS CECIL FIELD FL
10/2/2014
RESOLUTION CONSULTANTS

2 October 2014

Mr. David Grabka
Remedial Project Manager
Technical Review/Federal Facilities
Florida Department of Environmental Protection
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

**Re: Building 815 Wash Rack — Technical Memorandum
Former Naval Air Station Cecil Field
Jacksonville, Florida
Contract No: N62470-11-D-8013
CTO: JM76**

Dear Mr. Grabka:

On behalf of the Navy, Resolution Consultants is pleased to submit for your review the enclosed technical memorandum detailing remedial options at the Building 815 Wash Rack petroleum site at the Former Naval Air Station Cecil Field. If you should have any questions, please feel free to contact me at 904-301-4503 or via email at kwimble@ensafe.com.

Sincerely,

Resolution Consultants



By: Kara F. Wimble
Task Order Manager

Attachments: Attachment A — Figures
Attachment B — Summary Table of Analytical Results

cc: Art Sanford — Navy (1 CD, 1 electronic copy)
Dave Barney — Navy (1 CD, 1 electronic copy)
Stacin Martin — Navy (1 electronic copy)
Frank McInturff — Resolution Consultants (1 electronic copy)
Laurelee Judson — Resolution Consultants (1 electronic copy)
Megan Boerio — Tetra Tech (1 electronic copy)



Introduction

According to a comment letter from the Florida Department of Environmental Protection (FDEP) dated 4 April 2013, if groundwater cleanup target levels (GCTLs) could not be attained during the January 2014 (Year 6) sampling event, then a proposal for possible remedial options must be submitted pursuant to Subsection 62-770.690(8) Florida Administrative Code (FAC). Resolution Consultants was tasked with investigating possible remedial options for the Former Naval Air Station (NAS) Cecil Field 815 Wash Rack petroleum site (Site), where the contaminant of concern (COC), naphthalene, is located in the shallow groundwater zone [5 to 15 feet below ground surface (bgs)]. This technical memorandum describes a brief history of the site, the physical setting, and the most reasonably ascertainable remedial options per guidelines outlined in Chapter 62-780 FAC.

History

An aircraft wash rack was located north of Building 815 within the Former NAS Cecil Field (Figure 1 in Attachment A). The wash rack was paved with concrete and sloped to drain rinse water to a catch basin. A gate valve in the wash rack piping system may have been used to divert runoff from the storm water drainage system to the sanitary sewer system when the wash rack was in use (Harding Law Associates, January 1999). The nature and extent of naphthalene was initially delineated under FDEP's Petroleum Program as part of the site assessment conducted in 1999. Based on the 2000 Natural Attenuation Monitoring Plan Approval Order (NAMPAO) issued by FDEP, semi-annual monitoring was conducted at the Site from 2000 to 2003. Following the results from the July 2003 groundwater sampling event, it was concluded that naphthalene concentrations in well CEF-815-1S were continuously exceeding the annual milestone cleanup objectives defined in the NAMPAO. It was recommended that the monitoring program be discontinued and a Remedial Action Plan (RAP) be developed for the site (TtNUS, June 2003). FDEP concurred with discontinuing the monitoring program, but recommended conducting a soil assessment prior to preparation of a RAP (FDEP, February 2004).

In January 2005, soil samples were collected at the Site to determine if a continuing source of soil contamination was present in the vicinity of monitoring well CEF-815-1S. Eight samples were collected above the water table and capillary fringe from 2 to 4 feet, and were analyzed for volatile organic compounds, polynuclear aromatic hydrocarbons (PAHs), and total recoverable petroleum hydrocarbons (TRPH). Site COCs including benzene, toluene, ethyl benzene, total xylenes, methyl tert-butyl ether, and PAHs were not detected, and all reporting limits were less than FDEP Soil Cleanup Target Levels (SCTLs) per FAC Chapter 62-777. The results from the soil assessment indicated that the TRPH did not

exceed its FDEP SCTLs when detected in the soil. The soil in the vicinity of CEF-815-1S was not determined to be a continuing source of groundwater contamination (TtNUS, August 2005).

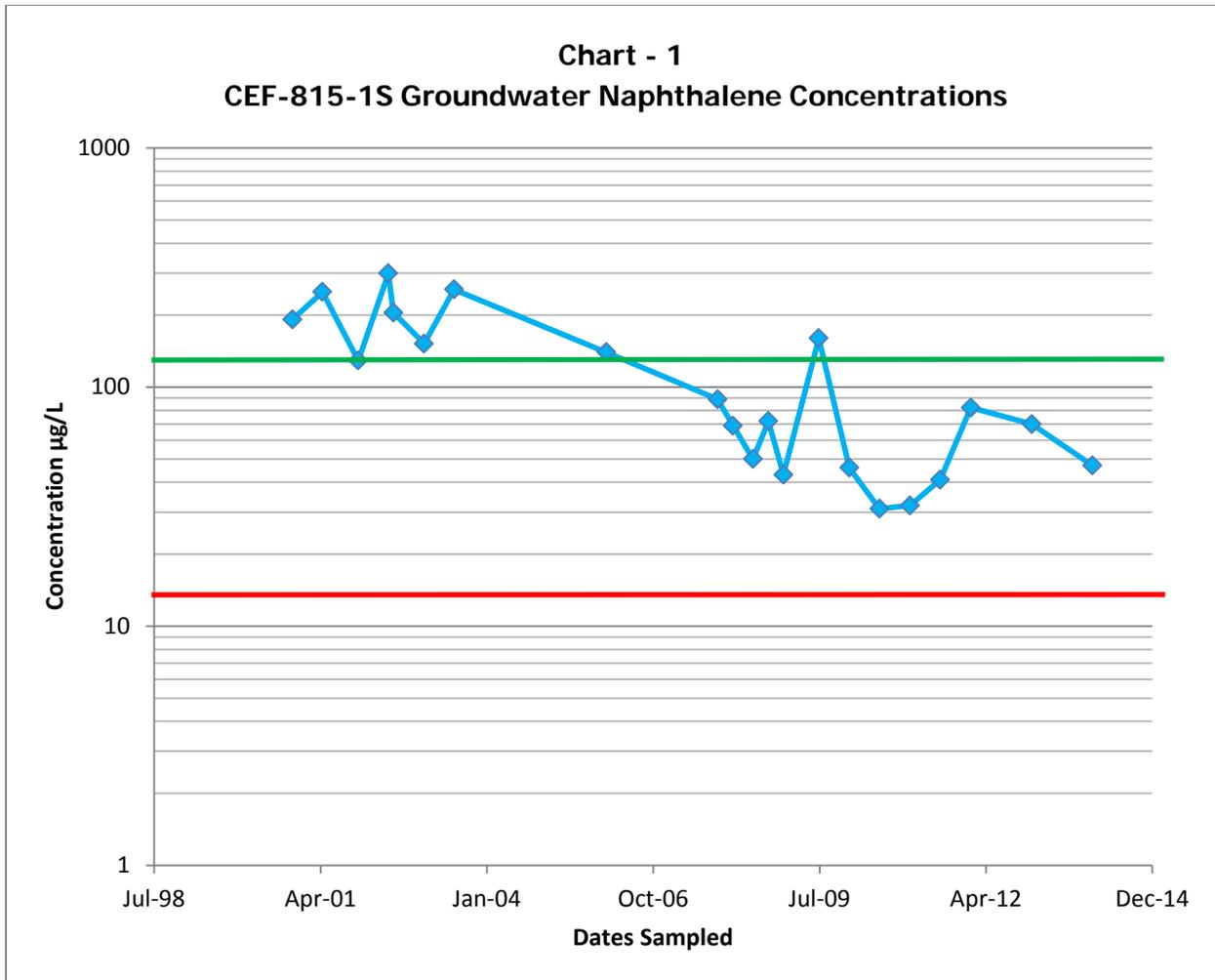
From 2005 through 2008, semi-annual groundwater monitoring continued, but analytical results indicated a decrease in naphthalene concentrations. During the September 2007 BCT Meeting, it was decided that the groundwater would be addressed under the petroleum program and a Site Assessment Report addendum was recommended.

During the second Site Assessment Report Addendum field event in February 2008, one shallow monitoring well (CEF-815-5S) was installed downgradient approximately 30 feet southeast of CEF-815-1S and was screened from approximately 5 to 15 feet bgs. Long-term monitoring (LTM) of four wells CEF-815-1S, NG-12S, CEF-815-5S, and CEF-059-028-015 for naphthalene was recommended to be conducted over a 5-year period (TtNUS, May 2008). The proposed sampling frequency was quarterly for the first year, semi-annually for years two and three, and annually for years four and five. FDEP issued an updated NAMP AO in November 2008 that incorporated these recommendations (FDEP, November 2008).

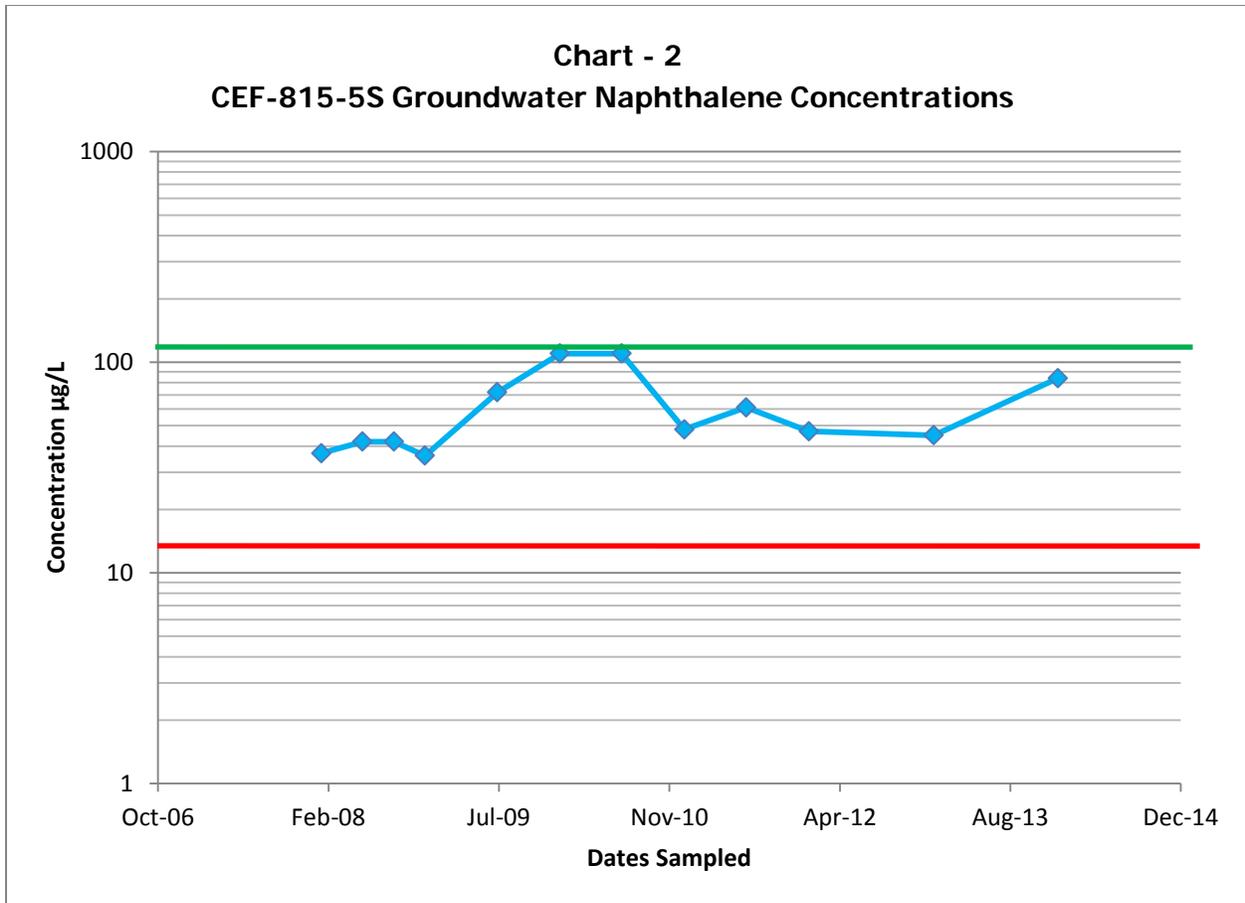
Recent Sampling Events Summary

According to the 2013 Uniform Federal Policy-Sampling and Analysis Plan, four monitoring wells [two source area monitoring wells (CEF-815-1S and CEF-815-5S), one side gradient monitoring well (NG-12S), and one downgradient monitoring well (CEF-059-028-015)] are sampled and analyzed annually for naphthalene (Figure 2). Monitoring well CEF-815-1S (source well) (Chart 1) has been below the Natural Attenuation Default Concentrations (NADC) of 140 micrograms per liter ($\mu\text{g/L}$) for naphthalene since January 2010 but has been above the FDEP GCTL of 14 $\mu\text{g/L}$ since sampling began in November 2000. CEF-815-5S (Chart 2) has been below the NADC but above the GCTL since sampling began in February 2008. NG-12S (side gradient well) has been below the GCTL since sampling began in November 2000 (excluding the July 2003 sampling event). CEF-059-028-015 (downgradient well) has been below the GCTL since sampling began in September 2008. See Table 1 in Attachment B for a summary of the analytical results from these four monitoring results.

In conjunction with analytical monitoring, depth to water measurements are also collected at the four Site wells to generate a potentiometric surface map. Historically, groundwater flow directions have been consistently to the southeast. Since January 2012, the Site's four monitoring wells have been sampled annually for naphthalene. Based on recent LTM analytical data and potentiometric surface maps (Attachment A), naphthalene concentrations appear to be relatively stable. Although natural attenuation is the selected remedy for the Site, possible remedial options are being evaluated per 62-780.690(8)(f) FAC.



Red Line = Groundwater Cleanup Target Level
Green Line = Natural Attenuation Default Concentration
Blue Line = Analytical Results



Red Line = Groundwater Cleanup Target Level
Green Line = Natural Attenuation Default Concentration
Blue Line = Analytical Results

Site Considerations

The following site considerations should be considered in the remedial selection process:

- The Site lies within the land use control boundary for Former NAS Cecil Field installation restoration site — Site 59. The Record of Decision prohibits the use of groundwater at Cecil Field.
- The Site is also located near an existing (and operational) remediation system within Site 59 that could potentially influence remedial options, goals, and timing at the Site.
- The site is capped with 12 to 15 inches of concrete restricting infiltration.

Recommended Actions

Resolution Consultants was tasked with investigating possible remedial options to determine the best course of action for the Site. The options described below appear to be the most cost-effective to the Navy and are in compliance with FDEP per guidelines outlined in FAC Chapter 62-780¹. Additional site investigation was not considered since soils have been determined to not be a continuing source to the groundwater contamination, and the groundwater plume is properly delineated.

Three potential remedial options have been identified and are summarized below.

Option #1

Option #1 consists of the deployment of an ORC[®] filter sock in monitoring well CEF-815-1S (source well)². The benefits of using ORC[®] filter socks is that it takes advantage of the existing well network and eliminates the need for installing injection points through 12 to 15 inches of concrete which could potentially disrupt piping and effects of the existing remediation system at Site 59. Additional wells in the immediate area (Figure 3) that are installed within the same water bearing zone (5 to 15 feet below ground surface) would be sampled for naphthalene since the well with the ORC[®] filter sock would potentially provide inaccurate results. In addition, it is recommended that, at a minimum, wells CEF-815-3S and NG-26S be sampled

¹ Per the FDEP letter dated 3 June 2014, the Site is not able to qualify for conditional closure via Risk Management Option Level II or III because it lies in the shallow water bearing zone above Site 59.

² ORC[®] is a proprietary mixture of phosphate-intercalated magnesium peroxide that can be placed into the water bearing zone and produce controlled releases of oxygen for periods of up to 12 months. ORC[®] introduces molecular oxygen into the surrounding groundwater to accelerate the rate of naturally occurring aerobic contaminate biodegradation.

to monitor results of the ORC[®] filter sock if deployed. If this option is chosen, it may be warranted to install a well slightly downgradient and west of CEF-815-1S to better define the western boundary of the naphthalene plume and to monitor the effects of the ORC[®] filter sock.

The ORC[®] filter sock will rely on the groundwater flow for dispersion. Since it is thought groundwater movement (velocity) is relatively slow in this area (calculated to be approximately 10 to 15 feet per year), it could take 2 to 4 years for the ORC[®] to migrate to CEF-815-5S. In addition, the estimated area of influence will be in the immediate area around the well in which it is installed and slightly downgradient only.

With the ORC[®] filter sock deployment in place, groundwater monitoring frequency will need to be decreased to every 2 years (based on groundwater velocity) after ORC[®] deployment. At the completion of the 2-year monitoring event, a report will be generated and analytical results compared to previous data. In addition, a baseline groundwater monitoring event will also need to be conducted prior to the deployment of ORC[®] filter socks.

The downside of Option #1 is the sampling of additional wells, dependency of the groundwater flow direction for dispersion of ORC[®], and the potential for the installment of another monitoring well to delineate the western boundary of the naphthalene plume.

Option #2

Option #2 consists of chemical injections of ORC[®]. A pilot study of the geochemical properties of the soil and groundwater would be conducted to help determine the locations and amount of ORC[®] to inject. In addition, a baseline groundwater monitoring event will also need to be conducted prior to chemical injections. This groundwater sampling event will also include monitoring for additional geochemistry to better understand the type and amount of injection to install. The benefit of chemical injections is that it can increase the horizontal extent of the areas that would be treated because the ORC[®] is injected under pressure.

With the ORC[®] injections completed, groundwater monitoring frequency will likely be increased (based on groundwater velocities and locations of injections installed), and will begin approximately 2 months after the initial injections. At the completion of 1 or 2 years of monitoring, a summary report will be generated and analytical results compared to previous data.

One downside to Option #2 is the potential for impacting the Site 59 remediation system and associated piping during injections. Another downside includes further monitoring and time necessary to investigate the type and amount of injectant to use.

Option #3

Option #3 consists of continuing long-term groundwater monitoring for naphthalene only at the four Site wells, but to decrease the frequency of sampling to every 2 years. The naphthalene concentrations and the location of the plume have remained stable and/or are decreasing; the plume is located below 12 to 15 inches of concrete, eliminating infiltration; groundwater velocities are slow; and in natural environments such as groundwater, naphthalene has a tendency to volatilize and biodegrade, therefore, there is little tendency for it to build up in the environment over time. Additionally, the concentrations of naphthalene are well under the NADC, so active remediation, as detailed in Options #1 and #2, are not warranted at this time.

Recommendation

Based on the evaluation of historical data and the three options detailed above, Resolution Consultants recommends Option #3. If this option is approved, the next sampling event would be in February 2015.

References

Harding Lawson Associates. *Sampling and Analysis Report, Hangar 815*. Base Realignment and Closure, Zone D, Industrial Flight Line Area. Naval Air Station Cecil Field, Jacksonville, Florida. January 1999.

Florida Department of Environmental Protection. *Site Assessment Report and Monitoring Only Proposal for Building 815 Wash Rack*. Naval Air Station Cecil Field, Jacksonville, Florida. Prepared for Department of the Navy, Southern Division, Naval Facilities Engineering Command. February 2004.

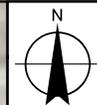
— *Natural Attenuation Monitoring Plan, Building 815 Wash Rack Area*. Naval Air Station Cecil Field, Jacksonville, Florida. Prepared for Department of the Navy, Southern Division, Naval Facilities Engineering Command. November 2008.

Tetra Tech NUS, Inc. *Groundwater Monitoring Report 1st Semi-Annual, 3rd Year (January 2003)*. Prepared for the Florida Department of Environmental Protection. June 2003.

— *Supplemental Site Assessment Letter Report for Building 815*. Naval Air Station Cecil Field, Jacksonville, Florida. Prepared for Department of the Navy, Southern Division, Naval Facilities Engineering Command. August 2005.

— *Site Assessment Report Addendum, Building 815 Wash Rack Area*. Naval Air Station Cecil Field, Jacksonville, Florida. Prepared for Department of the Navy, Southern Division, Naval Facilities Engineering Command. May 2008.

Attachment A
Figures



Hangar 1845
(FRCSE)



Bldg 815 Wash Rack



CEF-815-1S

NG-12S

CEF-815-5S

CEF-059-023-015

Building 815
(Flightstar)

Legend

-  Monitoring Well
-  Stormwater Sewer
-  Catch Basin
-  Remediation Shed
-  Wash Rack

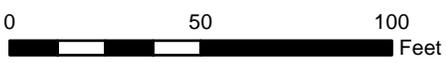


FIGURE 1
SITE MAP
BUILDING 815 WASH RACK
FORMER NAS CECIL FIELD
JACKSONVILLE, FLORIDA



REQUESTED BY: N. Dross
DRAWN BY: kburnum

DATE: 8/20/2014
TASK ORDER NUMBER: JM76

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CEF-815-1S [4-14]
ug/L
NAPHTHALENE (GCTL/NADC - 14/140)

07/2009	01/2010	07/2010	01/2011	07/2011	01/2012	01/2013	01/2014
160	46/39	31	32	41	82	67	47

CEF-815-5S [5-15]
ug/L
NAPHTHALENE (GCTL/NADC - 14/140)

07/2009	01/2010	07/2010	01/2011	07/2011	01/2012	01/2013	01/2014
72	110	110	48	61	47	45	84

NG-12S [4-14]
ug/L
NAPHTHALENE (GCTL/NADC - 14/140)

07/2009	01/2010	07/2010	01/2011	07/2011	01/2012	01/2013	01/2014
0.11 J	4	<0.0185	0.0235 I/0.0282 I	<0.0463	<0.0472/<0.0472	<0.0463/<0.0463	<0.05/<0.0478

CEF-059-028-015 [5-15]
ug/L
NAPHTHALENE (GCTL/NADC - 14/140)

07/2009	01/2010	07/2010	01/2011	03/2011	07/2011	01/2012	01/2013	01/2014
<0.10	<0.72	<0.0185	<0.0185	<0.0185	<0.0463/<0.0463	<0.0472	<0.0463	<0.05

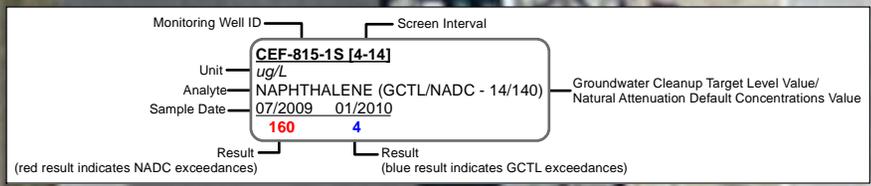


FIGURE 2
GROUNDWATER ANALYTICAL RESULTS
BUILDING 815 WASH RACK
FORMER NAS CECIL FIELD
JACKSONVILLE, FLORIDA

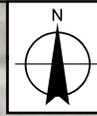
Legend

- Monitoring Well
- Plume Boundary (dashed where inferred)
- Groundwater Flow



REQUESTED BY: N. Dross DATE: 8/13/2014
DRAWN BY: kbumum TASK ORDER NUMBER: JM76

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Legend

- ◆ Monitoring Well
- ◆ Monitoring Well - Not Part of the LTM
- Catch Basin
- Stormwater Sewer
- Remediation Shed
- Wash Rack

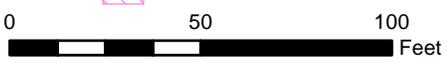


FIGURE 3
HISTORICAL SITE FEATURES LOCATION MAP
BUILDING 815 WASH RACK
FORMER NAS CECIL FIELD
JACKSONVILLE, FLORIDA

REQUESTED BY: N. Dross	DATE: 8/20/2014
DRAWN BY: kburnum	TASK ORDER NUMBER: JM76

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Attachment B
Summary Table of Analytical Results

**TABLE 1
HISTORICAL GROUNDWATER ANALYTICAL DATA
BUILDING 815 WASH RACK AREA
FORMER NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA**



Location ID	VOCs			
	Naphthalene (ug/L)			
	FDEP GTCL	14		
	FDEP NADC	140		
CEF-815-1S	November 2000	192		
	May 2001	250		
	December 2001	129		
	June 2002	299		
	July 2002	205		
	January 2003	152		
	July 2003	256		
	January 2006	140		
	November 2007	89		
	February 2008	Sample	69	
		Duplicate	68	
	June 2008	Sample	50	
		Duplicate	58	
	September 2008	Sample	72	J
		Duplicate	43	J
	December 2008	Sample	43	
		Duplicate	41	
	July 2009	160		
	January 2010	Sample	46	
		Duplicate	39	
	July 2010	31		
	January 2011	32		
	July 2011	41		
January 2012	82			
January 2013	70			
January 2014	47			
CEF-815-5S	February 2008	37		
	June 2008	42		
	September 2008	42		
	December 2008	36		
	July 2009	72		
	January 2010	110		
	July 2010	110		
	January 2011	48		
	July 2011	61		
	January 2012	47		
	January 2013	45		
	January 2014	84		
	NG-12S	November 2000	9.2	
May 2001		8.2		
December 2001		7.1		
June 2002		3.4		
January 2003		13.2		
July 2003		39.9		
January 2006		13.6		
November 2007		4.7		
February 2008		3.3		
June 2008		2.2		
September 2008		0.51		
December 2008		0.53	J	
January 2009		13.6		
July 2009		0.11	J	
January 2010		4.3		
July 2010		0.0185	U	
January 2011		Sample	0.0235	I
		Duplicate	0.0282	I
July 2011		0.0463	U	
January 2012		Sample	0.0472	U
		Duplicate	0.0472	U
January 2013		Sample	0.0463	U
		Duplicate	0.0463	U
January 2014	Sample	0.05	U	
	Duplicate	0.0478	U	
CEF-059-028-015	February 2008	0.1	J	
	June 2008	0.058		
	September 2008	0.12		
	December 2008	0.24	U	
	July 2009	0.1	U	
	January 2010	0.72	U	
	July 2010	0.0185	U	
	January 2011	0.0185	U	
	March 2011	0.0185	U	
	July 2011	Sample	0.0463	U
		Duplicate	0.0463	U
	January 2012	0.0472	U	
	January 2013	0.0463	U	
January 2014	0.05	U		

Notes:

- FDEP = Florida Department of Environmental Protection
- GTCL = Groundwater Cleanup Target Level exceedences, per FDEP 62-777 FAC, Table 1**
- NADC = Natural Attenuation Default Concentration exceedence, per FDEP 62-777 FAC, Table 1**
- µg/L = Microgram per liter
- mg/L = Milligram per liter
- U = Non-detect
- I = Reported value is between laboratory method detection limit and laboratory quantitation limit
- J = Estimated Value
- NA = Not Analyzed