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NAS CECIL FIELD
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TECHNICAL MEMORANDUM SOLAR POWERED AIR SPARGING TREATMENT SYSTEM
OPERABLE UNIT 8 (OU 8) SITE 3 FORMER NAS CECIL FIELD FL
03/01/2015
RESOLUTION CONSULTANTS

**TECHNICAL MEMORANDUM
SOLAR-POWERED AIR-SPARGING TREATMENT SYSTEM**

**OPERABLE UNIT 8, SITE 3
FORMER NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA**

Revision: 0

Prepared for:



**Base Realignment and Closure Program Management Office East
203 S. Davis Drive, Building 247
Joint Base Charleston, South Carolina 29404**



**Naval Facilities Engineering Command Southeast
Building 135 North
P.O. Box 30
Jacksonville, Florida 32212-0030**

Prepared by:



**Resolution Consultants
A Joint Venture of AECOM & EnSafe
1500 Wells Fargo Building
440 Monticello Avenue
Norfolk, Virginia 23510**

**Contract Number: N62470-11-D-8013
CTO JM76**

March 2015

FLORIDA PROFESSIONAL ENGINEER SEAL

I am registered to practice engineering by the State of Florida Board of Professional Engineers. I certify, under penalty of law, that this technical memorandum associated with Operable Unit 8, Site 3 of the Former Naval Air Station Cecil Field, Jacksonville, Florida, was prepared in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. To the best of my knowledge and belief, the information submitted is true, accurate, and complete, and the contents of this document are consistent with currently accepted engineering practices.

Name: David A. Myers

License Number: 66483

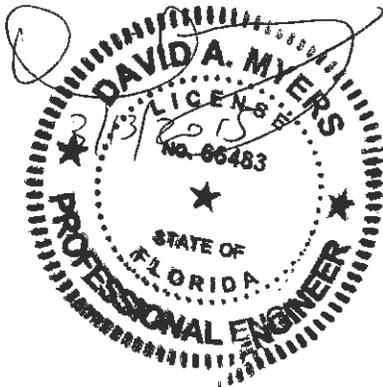
State: Florida

Signature:



Date:

3/13/2015



Concurrence by:



Kara F. Wimble
CTO Manager

3/13/15

Date

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1.0 INTRODUCTION

This technical memorandum is related to the solar-powered air-sparging treatment curtain (SPAS system) at Operable Unit (OU) 8, Site 3 located at the former Naval Air Station (NAS) Cecil Field. This technical memorandum summarizes the field activities and analytical results associated with the SPAS system, which was installed and operated adjacent to Rowell Creek, from June 2012 to the present.

This technical memorandum was prepared by Resolution Consultants under United States Navy, Naval Facilities Engineering Command contract number N62470-11-D-8013, Contract Task Order JM76, for consideration by Naval Facilities Engineering Command, and the Florida Department of Environmental Protection (FDEP), and the United States Environmental Protection Agency.

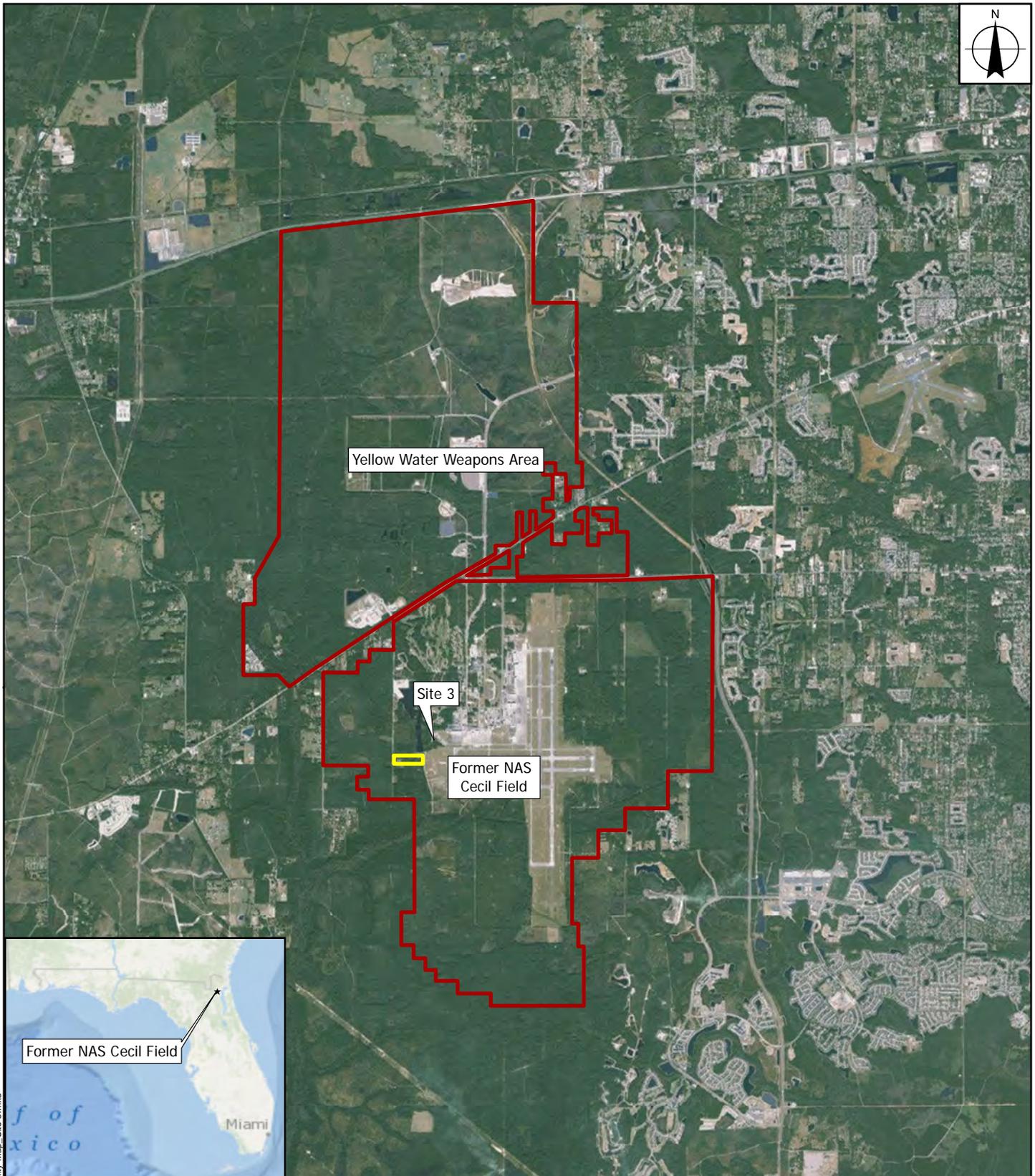
2.0 SITE DESCRIPTION

The SPAS system is located at Operable Unit 8, Site 3 within the Former NAS Cecil Field in Jacksonville, Duval County, Florida, with latitude 30 degrees, 13 minutes, and 1.5 seconds (north) and longitude 81 degrees, 53 minutes and 54.4 seconds (west). Please refer to the General Vicinity Map (Figure 2-1) for the site location.

The majority of Site 3 is vegetated woodlands with an unpaved access road, which intersects the northwest portion of the site. Additionally, Rowell Creek runs through the eastern portion of Site 3. Rowell Creek flows from north to south through Site 3, and is fed via storm water outfall structures from the south end of Lake Fretwell, which is located approximately 200 feet north of Site 3 across an elevated portion of the unpaved access road. Structures associated with Site 3 include the existing air-sparging system located in the northwest corner of the site and the SPAS system located adjacent to the western bank of Rowell Creek. Please refer to the Site Map (Figure 2-2) for existing site features.

2.1 System Decisions and Actions

Based on the *Third Five-Year Review Report, Naval Air Station Cecil Field, Jacksonville, Florida*, long-term protectiveness for the Site 3 remedy was deferred until an evaluation of actions necessary to address the groundwater plume exceedances near Rowell Creek could be conducted (Tetra Tech NUS 2011). As a result, the SPAS system was installed near the edge of Rowell Creek. A summary of decisions and actions associated with the SPAS system is detailed in Table 2-1.



Yellow Water Weapons Area

Site 3

Former NAS Cecil Field

Former NAS Cecil Field

Miami

Legend

-  LUC Boundary
-  Installation Boundary

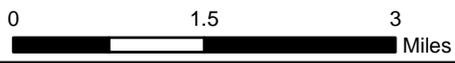


FIGURE 2-1
 GENERAL VICINITY MAP
 SITE 3
 FORMER NAS CECIL FIELD
 JACKSONVILLE, FLORIDA



REQUESTED BY: K. Wimble
 DRAWN BY: kburnum

DATE: 1/12/2015
 TASK ORDER NUMBER: JM76

Service Layer Credits: Sources: Esri, GEBCO, NOAA, National Geographic, DeLorme, NAVTEQ, Geonames.org, and other contributors. Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

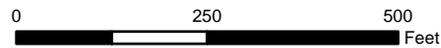
X:\Navv\NAS_CecilField\Site 3\Figure 2-1 Vicinity Map_Site 3.mxd



FIGURE 2-2
 SITE MAP
 OU8, SITE 3
 FORMER NAS CECIL FIELD
 JACKSONVILLE, FLORIDA

Legend

- ◆ Monitoring Well
- ▶▶▶ Creek
- ▭ LUC Boundary
- ◆ Monitoring Well (not located in field)
- Former Disposal Pit Area



NAFAC
 Naval Facilities Engineering Command

RESOLUTION CONSULTANTS

REQUESTED BY: D. Myers	DATE: 1/9/2015
DRAWN BY: kburnum	TASK ORDER NUMBER: JM76

X:\NavFac\NAS_CecilField\Site 3\Figure 2-2 Site Map_Site 3.mxd

Service Layer Credits: City of Jacksonville



The SPAS system includes three solar panels, which generate power to operate air-sparge compressors at each panel location. Each solar-powered air-sparge compressor is connected to three air-sparge wells located in the vicinity of the panels for a total of nine air-sparging wells. The nine air-sparging wells were installed in a general north to south alignment along the western bank of Rowell Creek to provide a “curtain” of air-sparging groundwater treatment adjacent to Rowell Creek. In the event groundwater monitoring results in the vicinity of the system are favorable, then BCT may consider moving the system upgradient toward the source area.

Table 2-1 System Decisions and Actions	
Event Date	Decisions/Actions
February 2011	BCT decides to perform air-sparging pilot test to address groundwater contamination near Rowell Creek.
October 2011	Pilot Test Work Plan submitted to BCT, U.S. EPA approved.
November 2011	FDEP approved Pilot Test Work Plan.
June 2012	Construction of system began including monitoring wells, concrete system pads, and support poles.
June 2012	Flooding and sediment deposits at site due to Tropical Storm Debbie on 25 June 2012; 12.56 inches of rain fell in two days.
July 2012	System components installed during the weeks of 9 July and 16 July 2012.
October 2012	Air-sparge wells re-installed 17-19 October 2012, due to tight soil formations below 40' bgs. Well screen depths: AS-A1 30-32 feet bgs AS-A2 26-28 feet bgs AS-A3 28.5-30.5 feet bgs AS-B1 36.5-38.5 feet bgs AS-B2 through AS-C3 all 38-40feet bgs
November 2012	Full system start-up occurred on 7 November 2012.
January 2014	Due to unfavorable results, BCT agrees to adjust system to direct air-sparging to one air-sparge well at each of the three solar panel locations.
July 2014	Tetra Tech recommends directing all air-sparging from all three solar panels to one air-sparge well at Unit B.
September 2014	Annual sampling is conducted by Solution-IES; results are consistent with previous results.
February 2015	Tetra Tech operates reconfigured system since October 2014. January 2015 sampling event results show decrease in vinyl chloride levels in all three well points adjacent to Rowell Creek.

Notes:

- BCT = Base Cleanup Team
- bgs = Below ground surface
- COC = Contaminants of concern
- FDEP = Florida Department of Environmental Protection
- U.S. EPA = United States Environmental Protection Agency



2.2 Conceptual Site Model

A graphic depiction of the overall conceptual site model based on existing site conditions is shown in Figure 2-3. The SPAS system adjacent to Rowell Creek is shown in Figure 2-4. A cross section in the vicinity of SPAS system and Rowell Creek is shown in Figure 2-5. Table 2-2 provides a general description of geologic features in the vicinity of the Site 3 SPAS system.

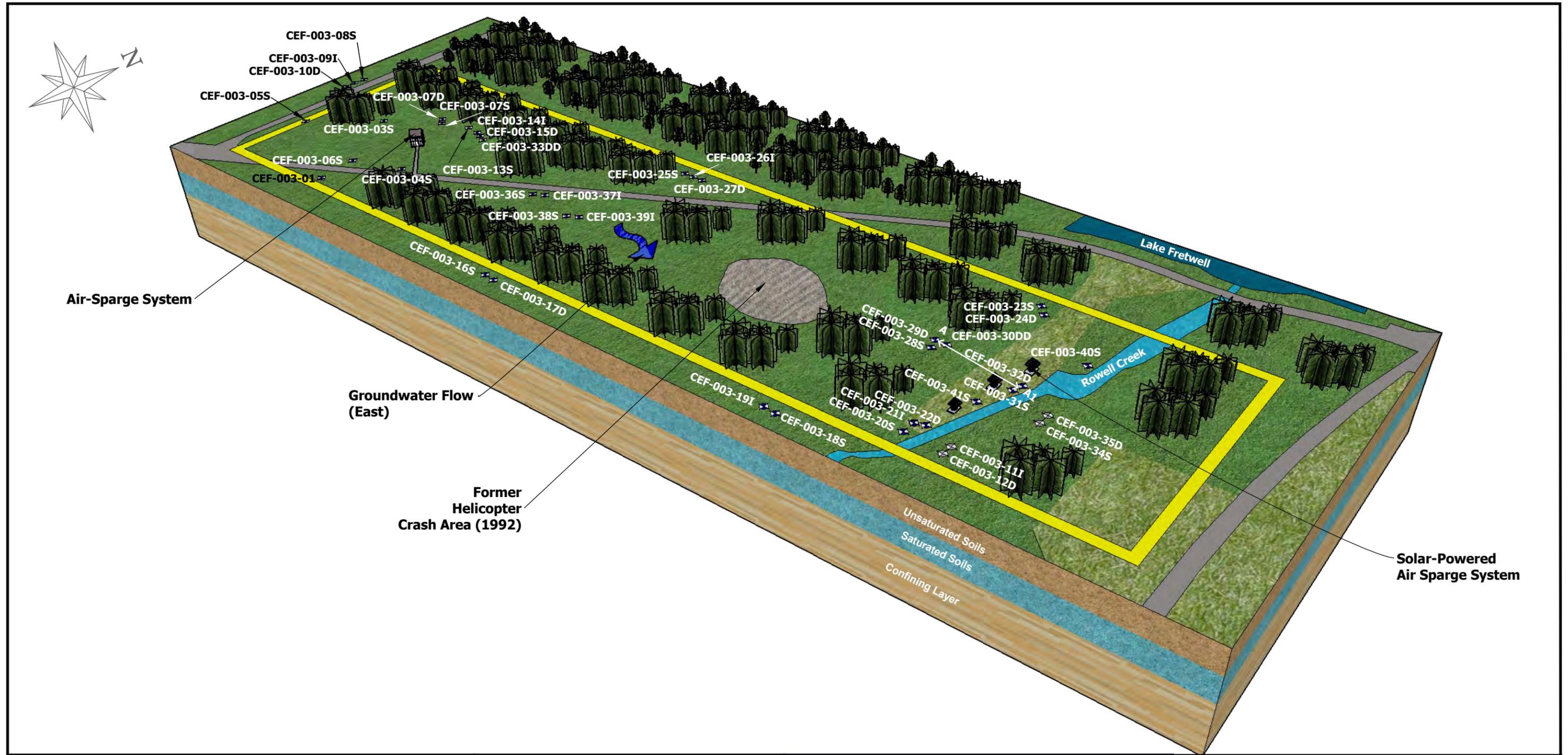
Table 2-2 Geologic Depth Intervals		
Depth (ft bgs)	Upper Boundary Geologic Feature	Lower Boundary Geologic Feature
0 to 55	Top of water table (0 to 10 ft bgs) Sand from 0 to 55 feet bgs	Sandy Clay starts at approximately 55 ft bgs
55 to 75	Sandy Clay at 55 ft bgs	Clayey Sand starts at approximately 75 ft bgs
75 to 90	Clayey Sand at 75 ft bgs	Blue-Marl confining unit starts at approximately 90 ft bgs
90 to 95	Blue-Marl confining unit at 90 ft bgs	Dolomite (upper rock unit) starts at approximately 95 ft bgs
95 to 105	Dolomite (upper rock unit) at 95 ft bgs	Gray-Marl confining unit starts at approximately 105 ft bgs
105 to 120	Gray-Marl confining unit 105 ft bgs	Gray-Marl confining unit continues past 102 ft bgs

Notes:

ft bgs = Feet below ground surface

Sources: *Ground-Water Flow in The Surficial Aquifer System and Potential Movement of Contaminants from Selected Waste Disposal Sites at Cecil Field Naval Air Station, Jacksonville, Florida* (U.S. Geological Survey 1998) and the *Final Remedial Investigation at Operable Unit 8 (OU 8) Site 3 NAS Cecil Field FL* (ABB Environmental Services 1996).

J:\jacksonville\Clients\A - L\C_SMs\Navy - CLEAN\Former NAS Cecil Field\CSMs\Site 3\Draft Final\Main CSM_Site 3\Figure 2-3 Site 3 v2



Contaminant Source:
Oil and Sludge Disposal Pit/Helicopter Crash Site

Land Use Controls:
 *Land within Site 3 may not be used for residential, recreational, or agricultural use.
 *Rowell creek sediments within Site 3 may not be altered or disturbed.
 *Surface and subsurface soils within Site 3 may not be disturbed.
 *Surficial aquifer groundwater use within Site 3 is prohibited.
 *Tampering or damaging any Navy wells or remediation systems is prohibited.

Legend

- Groundwater Monitoring Well
- Groundwater Monitoring Well (could not be located during September 2014 Basewide Monitoring Well Survey)
- Groundwater Flow Directions
- Land Use Control Parcel

NOTES:

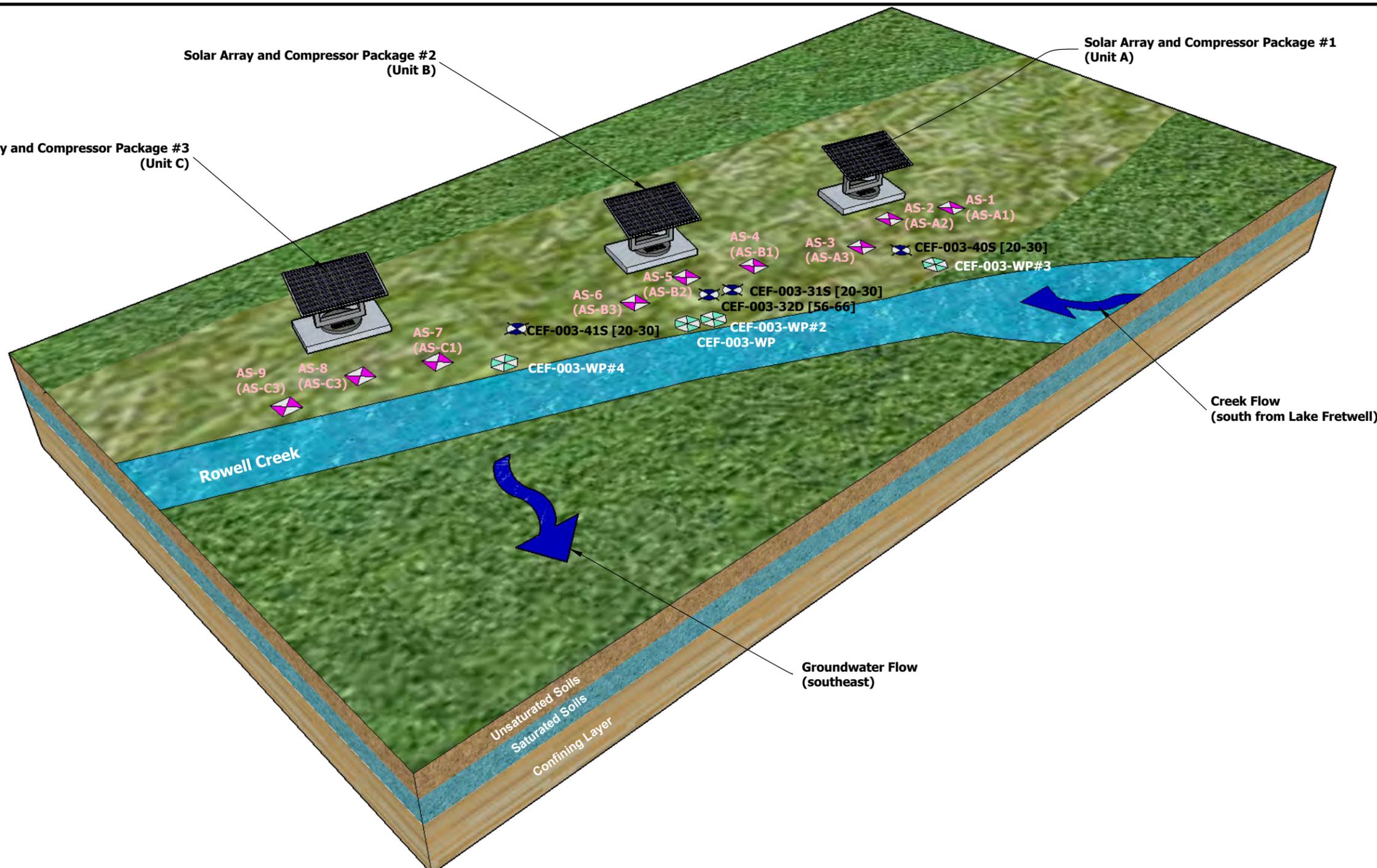
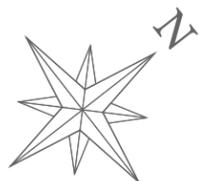
- Conceptual Site Model not to scale. Horizontal dimensions based on recent aerial imaging, site visits, and historical knowledge. Vertical dimensions exaggerated for purpose of conveying pertinent site information.
- Groundwater monitoring well locations approximated based on existing site figures and geographic information system data.
- Site Constituents of Concern: Select Volatile Organic Compounds

**FIGURE 2-3
CONCEPTUAL SITE MODEL
OU8, SITE 3
FORMER NAS CECIL FIELD
JACKSONVILLE, FLORIDA**




REQUESTED BY: D. Myers	Date: February 4, 2015
DRAWN BY: Kburnum	CTO NO.: JM76

J:\Jacksonville\Clients\A - L\CSMs\Navy - CLEAN\Former NAS Cecil Field\CSMs\Site 3\Draft Final\Inset CSM_Site 3\Figure 2-4 Inset for Site 3



Contaminant Source: Oil and Sludge Disposal Pit/Helicopter Crash Site

Land Use Controls:

- *Land within Site 3 may not be used for residential, recreational, or agricultural use.
- *Rowell creek sediments within Site 3 may not be altered or disturbed.
- *Surface and subsurface soils within Site 3 may not be disturbed.
- *Surficial aquifer groundwater use within Site 3 is prohibited.
- *Tampering or damaging any Navy wells or remediation systems is prohibited.

Legend	
	Groundwater Monitoring Well
	Well Point
	Air Sparge Well
	Flow Directions

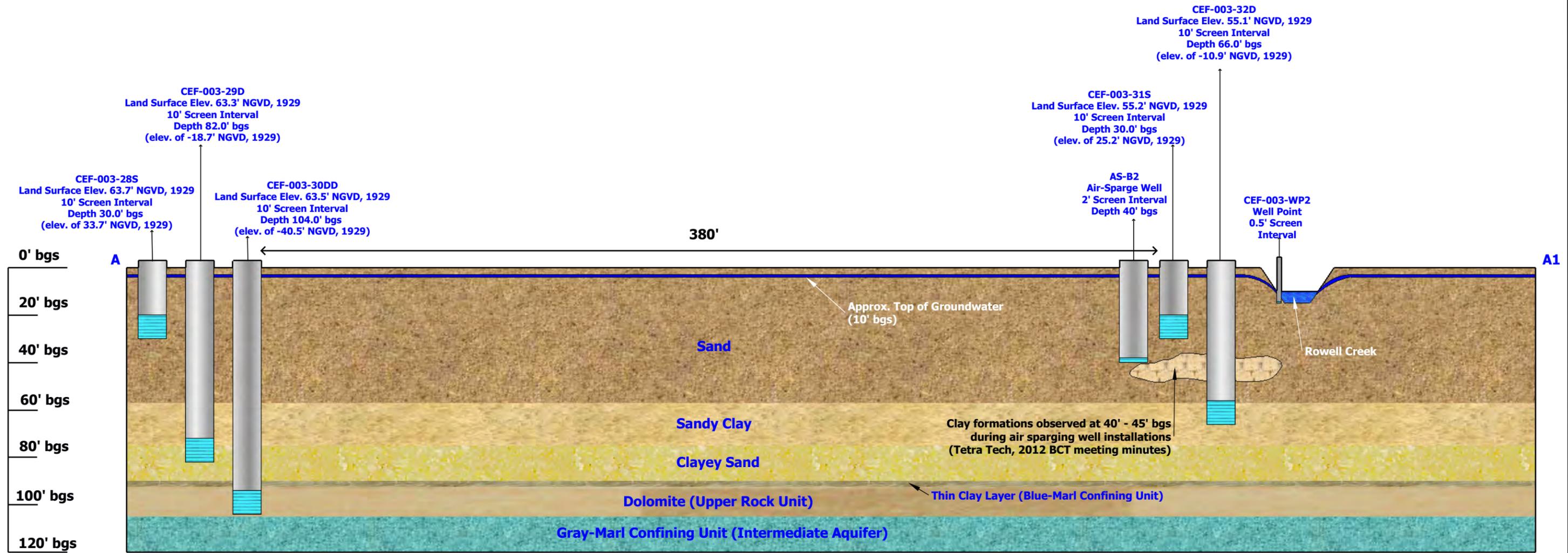
NOTES:

- Conceptual Site Model not to scale. Horizontal dimensions based on recent aerial imaging, site visits, and historic knowledge. Vertical dimensions exaggerated for purpose of conveying pertinent site information.
- Groundwater monitoring well locations approximated based on existing site figures and geographic information system data.
- Site COC: Select VOCs

**FIGURE 2-4
CONCEPTUAL SITE MODEL - INSET
SITE 3
FORMER NAS CECIL FIELD
JACKSONVILLE, FLORIDA**

 Naval Facilities Engineering Command	
REQUESTED BY: D. Myers	Date: October 22, 2014
DRAWN BY: K. Burnum	CTO NO.: JM76

J:\Jacksonville\Clients\VA - L_CSMs\Navy - CLEAN\Former NAS Cecil Field\CMS\Site 3\Draft_Final\Cross-Section_Site 3\Figure 2-5 Cross Section Site 3



References:

- "Ground-water flow in the Surficial Aquifer System and Potential Movement of Contaminants from Selected Waste Disposal Sites at Cecil Field Naval Air Station, Jacksonville, Florida", USGS (1998)
- "Final Remedial Investigation at Operable Unit 8 (OU 8) Site 3 NAS Cecil Field FL", ABB Environmental Services, Inc. (2/1/1996)
- "Draft Year 15, Annual Groundwater Monitoring Report 2013", Solutions-IES (1/21/2014)

Contaminant Source: Oil and Sludge Disposal Pit/Helicopter Crash Site

Land Use Controls:

- *Land within Site 3 may not be used for residential, recreational, or agricultural use.
- *Rowell creek sediments within Site 3 may not be altered or disturbed.
- *Surface and subsurface soils within Site 3 may not be disturbed.
- *Surficial aquifer groundwater use within Site 3 is prohibited.
- *Tampering or damaging any Navy wells or remediation systems is prohibited.

NOTES:

- Conceptual Site Model not to scale. Horizontal dimensions based on recent aerial imaging, site visits, and historical knowledge. Vertical dimensions exaggerated for purpose of conveying pertinent site information.
- Groundwater monitoring well locations approximated based on existing site figures and geographic information system data.
- Site COC: Select VOCs

**FIGURE 2-5
 CONCEPTUAL SITE MODEL-CROSS SECTION
 SITE 3
 FORMER NAS CECIL FIELD
 JACKSONVILLE, FLORIDA**



REQUESTED BY: D Myers

Date: February 4, 2015

DRAWN BY: K. Burnum

CTO NO.: JM76



3.0 DATA EVALUATION

From July 2012 through September 2014, groundwater samples were collected for select volatile organic compounds from monitoring wells (CEF-003-31S, CEF-003-40S, and CEF-003-41S) and associated well points (CEF-003-WP2, CEF-003-WP3, CEF-003-WP4). In January 2015, samples were collected from the above listed well points. The sample results are shown in Table 3-1 and in Figure 3-1. The following section discusses the general findings from these sampling events.

- Vinyl chloride results in CEF-003-31S have generally ranged from non-detect to 1.6 microgram per liter ($\mu\text{g/L}$) following installation of the SPAS system, exceeding its GCTL of 1 $\mu\text{g/L}$ and 1,1-DCE concentrations have decreased from 32.8 $\mu\text{g/L}$ in December 2012 to 14.1 $\mu\text{g/L}$ in September 2014, exceeding its GCTL of 7 $\mu\text{g/L}$.
- Vinyl chloride concentrations in CEF-003-40S have exhibited a continuing upward trend since the first quarter 2013 and had a result of 41.9 $\mu\text{g/L}$ in September 2014; 1,1-DCE concentrations have decreased from 14.3 $\mu\text{g/L}$ in December 2012 to 5.9 $\mu\text{g/L}$ in September 2012.
- Well point COC concentrations have continued to decrease from July 2012 to September 2014. However, the January 2015 sampling results show increase in 1,1-dichloroethane (except at CEF-003-WP3), 1,1-dichloroethene, and cis-1,2-dichloroethene. Vinyl chloride concentrations have decreased since July 2012, approximately 80 percent in CEF-003-WP2 and CEF-003-WP3, and about 40 percent in CEF-003-WP4, but still exceed the FDEP Surface Water Cleanup Target Levels (SWCTLs) of 2.4 $\mu\text{g/L}$. 1,1-DCE concentrations exceeded the SWCTL of 3.2 $\mu\text{g/L}$ in CEF-003-WP3 (10.5 $\mu\text{g/L}$) and in CEF-003-WP4 (14.3 $\mu\text{g/L}$) during the January 2015 sampling event.

Surface water samples were inadvertently collected from Rowell Creek instead of well points during quarterly sampling events from December 2012 through December 2013. These results are summarized in the Site 3 presentation that Tetra Tech prepared for the January 2014 BCT meeting (Tetra Tech NUS 2014). These samples indicated that surface water was non-detect for OU 8, Site 3 COCs.

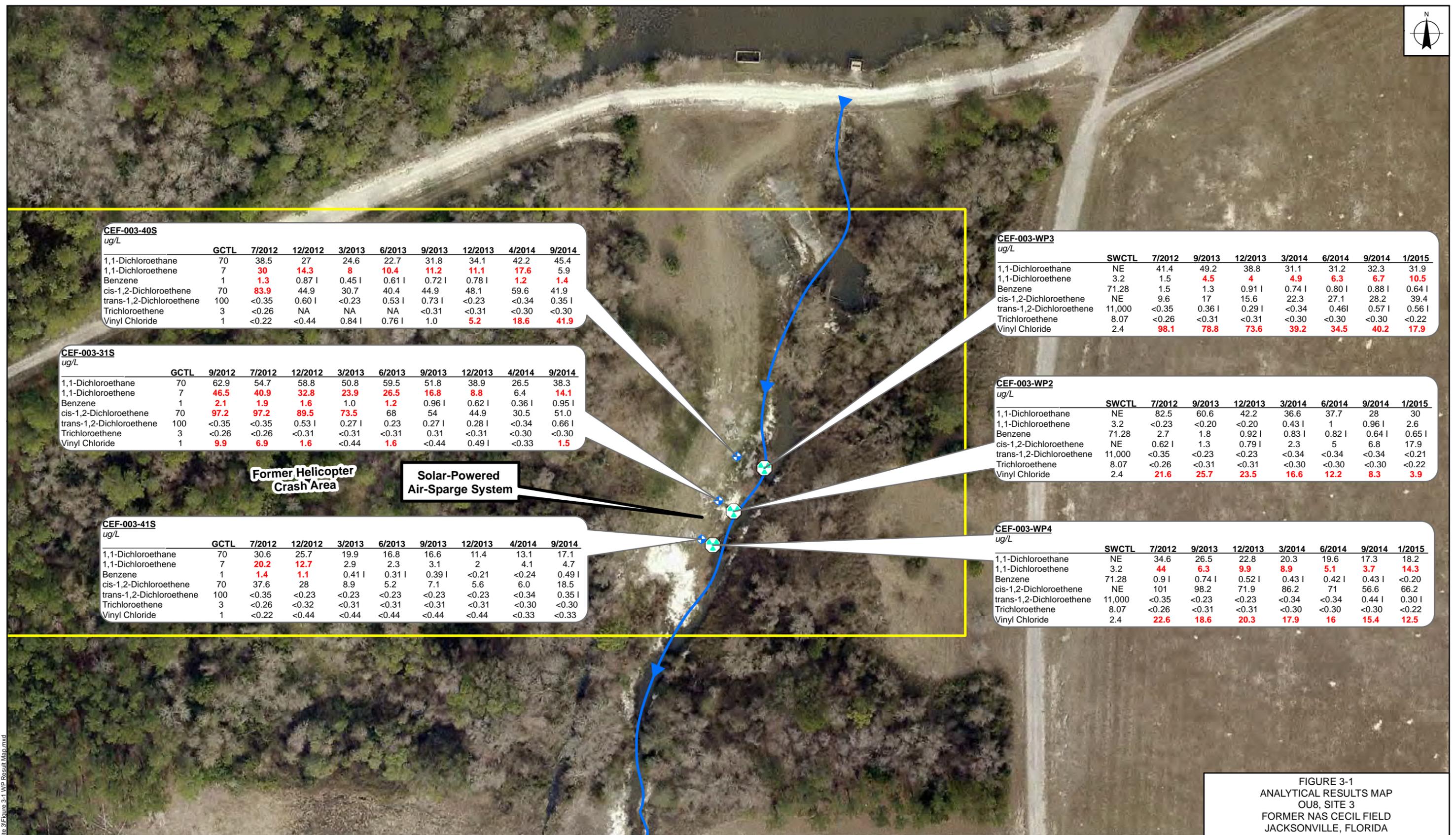


Table 3-1 Analytical Results								
Well ID	Sample Date	Volatile Organic Compounds (µg/L)						
		1,1-Dichloroethane	1,1-Dichloroethene	Benzene	c/s-1,2-Dichloroethene	trans-1,2-Dichloroethene	Trichloroethene	Vinyl Chloride
GCTL (µg/L)		70	7	1	70	100	3	1
MCL (µg/L)		NE	7	5	70	100	5	2
CEF-003-31S	September 2012	62.9	46.5	2.1	97.2	0.35 U	0.26 U	9.9
	July 2012	54.7	40.9	1.9	97.2	0.35 U	0.26 U	6.9
	December 2012	58.8	32.8	1.6	89.5	0.53 I	0.31 U	1.6
	March 2013	50.8	23.9	1.0	73.5	0.27 I	0.31 U	0.44 U
	June 2013	59.5	26.5	1.2	68	0.23	0.31 U	1.6
	September 2013	51.8	16.8	0.96 I	54	0.27 I	0.31	0.44 U
	December 2013	38.9	8.8	0.62 I	44.9	0.28 I	0.31 U	0.49 I
	April 2014	26.5	6.4	0.36 I	30.5	0.34 U	0.30 U	0.33 U
September 2014	38.3	14.1	0.95 I	51.0	0.66 I	0.30 U	1.5	
CEF-003-40S	July 2012	38.5	30	1.3	83.9	0.35 U	0.26 U	0.22 U
	December 2012	27	14.3	0.87 I	44.9	0.60 I	NA	0.44 U
	March 2013	24.6	8	0.45 I	30.7	0.23 U	NA	0.84 I
	June 2013	22.7	10.4	0.61 I	40.4	0.53 I	NA	0.76 I
	September 2013	31.8	11.2	0.72 I	44.9	0.73 I	0.31 U	1.0
	December 2013	34.1	11.1	0.78 I	48.1	0.23 U	0.31 U	5.2
	April 2014	42.2	17.6	1.2	59.6	0.34 U	0.30 U	18.6
September 2014	45.4	5.9	1.4	41.9	0.35 I	0.30 U	41.9	
CEF-003-41S	July 2012	30.6	20.2	1.4	37.6	0.35 U	0.26 U	0.22 U
	December 2012	25.7	12.7	1.1	28	0.23 U	0.32 U	0.44 U
	March 2013	19.9	2.9	0.41 I	8.9	0.23 U	0.31 U	0.44 U
	June 2013	16.8	2.3	0.31 I	5.2	0.23 U	0.31 U	0.44 U
	September 2013	16.6	3.1	0.39 I	7.1	0.23 U	0.31 U	0.44 U
	December 2013	11.4	2	<0.21	5.6	0.23 U	0.31 U	0.44 U
	April 2014	13.1	4.1	<0.24	6.0	0.34 U	0.30 U	0.33 U
September 2014	17.1	4.7	0.49 I	18.5	0.35 I	0.30 U	0.33 U	



Well ID	Sample Date	Volatile Organic Compounds (µg/L)						
		1,1-Dichloroethane	1,1-Dichloroethene	Benzene	c/s-1,2-Dichloroethene	trans-1,2-Dichloroethene	Trichloroethene	Vinyl Chloride
SWCTL (µg/L)		NE	3.2	71.28	NE	11,000	8.07	2.4
CEF-003-WP2	July 2012	82.5	0.23 U	2.7	0.62 I	0.35 U	0.26 U	21.6
	September 2013	60.6	0.20 U	1.8	1.3	0.23 U	0.31 U	25.7
	December 2013	42.2	0.20 U	0.92 I	0.79 I	0.23 U	0.31 U	23.5
	March 2014	36.6	0.43 I	0.83 I	2.3	0.34 U	0.30 U	16.6
	June 2014	37.7	1	0.82 I	5	0.34 U	0.30 U	12.2
	September 2014	28	0.96 I	0.64 I	6.8	0.34 U	0.30 U	8.3
	January 2015	30	2.6	0.65 I	17.9	0.21 U	0.22 U	3.9
CEF-003-WP3	July 2012	41.4	1.5	1.5	9.6	0.35 U	0.26 U	98.1
	September 2013	49.2	4.5	1.3	17	0.36 I	0.31 U	78.8
	December 2013	38.8	4	0.91 I	15.6	0.29 I	0.31 U	73.6
	March 2014	31.1	4.9	0.74 I	22.3	0.34 U	0.30 U	39.2
	June 2014	31.2	6.3	0.80 I	27.1	0.46 I	0.30 U	34.5
	September 2014	32.3	6.7	0.88 I	28.2	0.57 I	0.30 U	40.2
	January 2015	31.9	10.5	0.64 I	39.4	0.56 I	0.22 U	17.9
CEF-003-WP4	July 2012	34.6	44	0.9 I	101	0.35 U	0.26 U	22.6
	September 2013	26.5	6.3	0.74 I	98.2	0.23 U	0.31 U	18.6
	December 2013	22.8	9.9	0.52 I	71.9	0.23 U	0.31 U	20.3
	March 2014	20.3	8.9	0.43 I	86.2	0.34 U	0.30 U	17.9
	June 2014	19.6	5.1	0.42 I	71	0.34 U	0.30 U	16
	September 2014	17.3	3.7	0.43 I	56.6	0.44 I	0.30 U	15.4
	January 2015	18.2	14.3	0.20 U	66.2	0.30 I	0.22 U	12.5

- Notes:**
- µg/L = Micrograms per liter
 - GCTL = Florida Department of Environmental Protection Groundwater Cleanup Target Level, Chapter 62-777, F.A.C.
 - MCL = Environmental Protection Agency Maximum Contaminant Level
 - SWCTL = Florida Department of Environmental Protection Surface Water Cleanup Target Level, FDEP Criteria for Surface Water Classifications for Class III water, Chapter 62-302.530, F.A.C. and Table 1, Groundwater and Surface Water Cleanup Target Levels, Chapter 62-777, F.A.C.
 - NE = Not established
 - Highlighting indicates values greater than the GCTL (monitor wells) or SWCTL (well points)
 - Bold** = Bold indicates values above the method detection limit
 - I** = Indicates values that are greater than the method detection limit but less than the lab reporting limit
 - U** = Chemical not detected
 - SWCTL = Florida Department of Environmental Protection Surface Water Cleanup Target Level
 - Rounding Rule = "Rounding Analytical Data for Site Rehabilitation Completion Nov 17, 2011", referencing Chapter 62-780, FAC, states exceedances are determined using the same number of significant figures as the respective regulatory limit — effective Nov 2011.



CEF-003-40S
ug/L

	GCTL	7/2012	12/2012	3/2013	6/2013	9/2013	12/2013	4/2014	9/2014
1,1-Dichloroethane	70	38.5	27	24.6	22.7	31.8	34.1	42.2	45.4
1,1-Dichloroethene	7	30	14.3	8	10.4	11.2	11.1	17.6	5.9
Benzene	1	1.3	0.87	0.45	0.61	0.72	0.78	1.2	1.4
cis-1,2-Dichloroethene	70	83.9	44.9	30.7	40.4	44.9	48.1	59.6	41.9
trans-1,2-Dichloroethene	100	<0.35	0.60	<0.23	0.53	0.73	<0.23	<0.34	0.35
Trichloroethene	3	<0.26	NA	NA	NA	<0.31	<0.31	<0.30	<0.30
Vinyl Chloride	1	<0.22	<0.44	0.84	0.76	1.0	5.2	18.6	41.9

CEF-003-WP3
ug/L

	SWCTL	7/2012	9/2013	12/2013	3/2014	6/2014	9/2014	1/2015
1,1-Dichloroethane	NE	41.4	49.2	38.8	31.1	31.2	32.3	31.9
1,1-Dichloroethene	3.2	1.5	4.5	4	4.9	6.3	6.7	10.5
Benzene	71.28	1.5	1.3	0.91	0.74	0.80	0.88	0.64
cis-1,2-Dichloroethene	NE	9.6	17	15.6	22.3	27.1	28.2	39.4
trans-1,2-Dichloroethene	11,000	<0.35	0.36	0.29	<0.34	0.46	0.57	0.56
Trichloroethene	8.07	<0.26	<0.31	<0.31	<0.30	<0.30	<0.30	<0.22
Vinyl Chloride	2.4	98.1	78.8	73.6	39.2	34.5	40.2	17.9

CEF-003-31S
ug/L

	GCTL	9/2012	7/2012	12/2012	3/2013	6/2013	9/2013	12/2013	4/2014	9/2014
1,1-Dichloroethane	70	62.9	54.7	58.8	50.8	59.5	51.8	38.9	26.5	38.3
1,1-Dichloroethene	7	46.5	40.9	32.8	23.9	26.5	16.8	8.8	6.4	14.1
Benzene	1	2.1	1.9	1.6	1.0	1.2	0.96	0.62	0.36	0.95
cis-1,2-Dichloroethene	70	97.2	97.2	89.5	73.5	68	54	44.9	30.5	51.0
trans-1,2-Dichloroethene	100	<0.35	<0.35	0.53	0.27	0.23	0.27	0.28	<0.34	0.66
Trichloroethene	3	<0.26	<0.26	<0.31	<0.31	<0.31	0.31	<0.31	<0.30	<0.30
Vinyl Chloride	1	9.9	6.9	1.6	<0.44	1.6	<0.44	0.49	<0.33	1.5

CEF-003-WP2
ug/L

	SWCTL	7/2012	9/2013	12/2013	3/2014	6/2014	9/2014	1/2015
1,1-Dichloroethane	NE	82.5	60.6	42.2	36.6	37.7	28	30
1,1-Dichloroethene	3.2	<0.23	<0.20	<0.20	0.43	1	0.96	2.6
Benzene	71.28	2.7	1.8	0.92	0.83	0.82	0.64	0.65
cis-1,2-Dichloroethene	NE	0.62	1.3	0.79	2.3	5	6.8	17.9
trans-1,2-Dichloroethene	11,000	<0.35	<0.23	<0.23	<0.34	<0.34	<0.34	<0.21
Trichloroethene	8.07	<0.26	<0.31	<0.31	<0.30	<0.30	<0.30	<0.22
Vinyl Chloride	2.4	21.6	25.7	23.5	16.6	12.2	8.3	3.9

CEF-003-41S
ug/L

	GCTL	7/2012	12/2012	3/2013	6/2013	9/2013	12/2013	4/2014	9/2014
1,1-Dichloroethane	70	30.6	25.7	19.9	16.8	16.6	11.4	13.1	17.1
1,1-Dichloroethene	7	20.2	12.7	2.9	2.3	3.1	2	4.1	4.7
Benzene	1	1.4	1.1	0.41	0.31	0.39	<0.21	<0.24	0.49
cis-1,2-Dichloroethene	70	37.6	28	8.9	5.2	7.1	5.6	6.0	18.5
trans-1,2-Dichloroethene	100	<0.35	<0.23	<0.23	<0.23	<0.23	<0.23	<0.34	0.35
Trichloroethene	3	<0.26	<0.32	<0.31	<0.31	<0.31	<0.31	<0.30	<0.30
Vinyl Chloride	1	<0.22	<0.44	<0.44	<0.44	<0.44	<0.44	<0.33	<0.33

CEF-003-WP4
ug/L

	SWCTL	7/2012	9/2013	12/2013	3/2014	6/2014	9/2014	1/2015
1,1-Dichloroethane	NE	34.6	26.5	22.8	20.3	19.6	17.3	18.2
1,1-Dichloroethene	3.2	44	6.3	9.9	8.9	5.1	3.7	14.3
Benzene	71.28	0.9	0.74	0.52	0.43	0.42	0.43	<0.20
cis-1,2-Dichloroethene	NE	101	98.2	71.9	86.2	71	56.6	66.2
trans-1,2-Dichloroethene	11,000	<0.35	<0.23	<0.23	<0.34	<0.34	0.44	0.30
Trichloroethene	8.07	<0.26	<0.31	<0.31	<0.30	<0.30	<0.30	<0.22
Vinyl Chloride	2.4	22.6	18.6	20.3	17.9	16	15.4	12.5

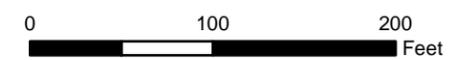
Former Helicopter Crash Area

Solar-Powered Air-Sparge System

FIGURE 3-1
ANALYTICAL RESULTS MAP
OU8, SITE 3
FORMER NAS CECIL FIELD
JACKSONVILLE, FLORIDA

Legend

- Monitoring Well
- Well Point Monitoring Location
- Creek
- LUC Boundary



REQUESTED BY: D. Myers DATE: 3/10/2015
 DRAWN BY: kburnum TASK ORDER NUMBER: JM76

Service Layer Credits: City of Jacksonville

X:\Navv\NAS_CecilField\Site 3\Figure 3-1_WP_Result_Map.mxd

4.0 CONCLUSIONS

This Technical Memorandum for the Site 3 SPAS system includes a summary of the decisions and actions associated with the system, a Conceptual Site Model and associated cross-section, and sample results for the periodic groundwater monitoring efforts completed between July 2012 and September 2014 and corresponding well point monitoring completed through January 2015. Based on this information, the following conclusions can be made:

- Monitoring wells associated with the SPAS system, including CEF-003-31S and CEF-003-41S, has generally shown declines in COC concentrations since July 2012; however, 1,1-dichloroethene and vinyl chloride remain above FDEP GCTLs per Chapter 62-777, F.A.C. in CEF-003-31S.
- Monitoring well CEF-003-40S located just north of the SPAS system has shown increases in vinyl chloride and benzene. Additional optimization of the SPAS system in the vicinity of CEF-003-40S may be warranted in the event COCs at CEF-003-40S continue to increase. Vinyl Chloride was detected at the highest recorded concentration in CEF-003-40S in the most recent sampling event in September 2014.
- Well points associated with the SPAS system, including CEF-003-WP2, CEF-003-WP3, and CEF-003-WP4, have shown declines in COC concentrations since July 2012 through September 2014; however, the January 2015 results show increase in 1,1-dichloroethane (except at CEF-003-WP3), 1,1-dichloroethene, and cis-1,2-dichloroethene. In addition, 1,1-dichloroethene and vinyl chloride continue to remain above FDEP SWCTLs.



5.0 REFERENCES

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