N60200.AR.008747
NAS CECIL FIELD
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FINAL PILOT STUDY WORK PLAN FOR SOLAR POWERED LOW VOLUME AIR SPARGING TREATMENT CURTAIN AT OPERABLE UNIT 8 (OU 8) NAS CECIL FIELD FL

4/1/2012

TETRA TECH

TETRA TECH

PITT-04-12-035

April 11, 2012

Project Number 112G00378

NAVFAC SE
Attn: Mr. Art Sanford
4130 Faber Place Drive
North Charleston, South Carolina 29405

Reference: CLEAN Contract No. N62467-04-D-0055
Contract Task Order 0025

Subject: Final Pilot Study Work Plan for Solar Powered Low Volume Air Sparging Treatment Curtain at Operable Unit 8, Site 3
Naval Air Station Cecil Field
Jacksonville, Florida

Dear Mr. Sanford:

Enclosed please find one copy of the subject deliverable. Copies have been sent to the members of the NAS Cecil Field Partnering Team as noted below. The draft version was approved by EPA and FDEP as submitted. The document was also reviewed and approved by the Jacksonville Airport Authority (JAA) and the Federal Airport Authority (FAA). A final approval letter is requested to verify receipt of this final document.

If you have any questions, please call me at 412-921-8163 or Megan Boerio at 412-921-7271.

Sincerely,

Robert F. Simcik, P.E.
Task Order Manager

RFS/clm

Enclosure

cc: D. Vaughn-Wright, U.S. EPA (electronic copy)
D. Grabka, FDEP (1 copy)
M. Davidson, NAVFAC SE (electronic copy)
S. Martin, NAVFAC Atlantic (electronic copy)
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Comprehensive **L**ong-term **E**nvironmental **A**ction **N**avy

CONTRACT NUMBER N62467-04-D-0055

Pilot Study Work Plan
for
Solar Powered Low Volume Air Sparging Treatment Curtain
at
Operable Unit 8
Site 3

Naval Air Station Cecil Field
Jacksonville, Florida

Contract Task Order 0025

April 2012

NAVFAC
Naval Facilities Engineering Command
Southeast
2155 Eagle Drive
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TETRA TECH

101102/P

PILOT STUDY WORK PLAN
FOR
SOLAR POWERED LOW VOLUME AIR SPARGING TREATMENT CURTAIN
AT
OPERABLE UNIT 8
SITE 3

NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

COMPREHENSIVE LONG-TERM ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT

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OCTOBER 2011

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This document that describes the Pilot Study Work Plan for Solar Powered Low Volume Air Sparging Treatment Curtain for Operable Unit 8, Site 3, at Naval Air Station Cecil Field, Jacksonville, Florida, has been prepared under the direction of a Florida-registered professional engineer. The work and professional opinions rendered in this report were conducted or developed in accordance with commonly accepted procedures consistent with applicable standards of practice.

Robert F. Simcik, P.E.
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Date: 10/25/11

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3 SITE 3 WELL POINT INVESTIGATION RESULTS, PRESENTATION, AND FIELD PAPERWORK BACKUIP
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ACRONYMS

AIMD	Aircraft Intermediate Maintenance Department
AS	Air sparging
bgs	Below ground surface
BOD	Biochemical oxygen demand
BRAC	Base Realignment and Closure
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CLEAN	Comprehensive Long-Term Environmental Action Navy
COD	Chemical oxygen demand
CTO	Contract Task Order
DCE	Dichloroethene
DO	Dissolved oxygen
F.A.C.	Florida Adminstrative Code
FDEP	Florida Department of Environmental Protection
FOL	Field Operations Leader
FS	Feasibility Study
GCTL	Groundwater Cleanup Target Level
gpm	Gallon per minute
ID	Inside diameter
IDW	Investigation-derived waste
IR	Installation Restoration
ITRC	Interstate Technology & Regulatory Council
MNA	Monitored Natural Attenuation
msl	Mean sea level
NA-DV	Natural Attenuation Default Value
NAPL	Nonaqueous-phase liquid
NAS	Naval Air Station
NAVFAC SE	Naval Facilities Engineering Command Southeast
NGVD	National Geodetic Vertical Datum
ORP	Oxidation-reduction potential
OU	Operable Unit
PCE	Tetrachloroethene
ppm	Part per million
PVC	Polyvinyl chloride
QA/QC	Quality assurance/quality control
RI	Remedial Investigation
ROD	Record of Decision

ROI	Radius of Influence
SOP	Standard Operating Procedure
SVE	Soil vapor extraction
SVOC	Semivolatile organic compound
TCE	Trichloroethene
TOC	Total organic carbon
TtNUS	Tetra Tech NUS, Inc.
U.S. EPA	United States Environmental Protection Agency
VC	Vinyl chloride
VOC	Volatile organic compound

1.0 INTRODUCTION

This Pilot Study Work Plan for Naval Air Station (NAS) Cecil Field, Jacksonville, Florida, has been prepared by Tetra Tech, Inc., (Tetra Tech) for Naval Facilities Engineering Command Southeast (NAVFAC SE) under the Comprehensive Long-Term Environmental Action Navy (CLEAN) Program, Contract Number N62467-04-D-0055, Contract Task Order (CTO) 0025. This Work Plan describes a pilot study that will be conducted to determine the effectiveness of solar powered low volume air sparging in reducing groundwater concentrations of chlorinated volatile organic compounds (VOCs) to concentrations that are less than regulatory criteria at Operable Unit 8, Site 3.

1.1 SCOPE AND OBJECTIVE

The objective of the Pilot Study which is detailed in this Work Plan is to determine the effectiveness of using solar powered low volume air sparging technology to reduce the groundwater concentrations of cis-1,2-dichloroethene (cis-1,2-DCE); 1,1-dichloroethene (1,1-DCE); and vinyl chloride (VC) in the Site 3 proposed treatment area. These compounds have been detected at concentrations greater than their Florida Department of Environmental Protection (FDEP) Groundwater Cleanup Target Levels (GCTLs) in this area. Groundwater from the proposed treatment area flows into Rowell Creek, where VC has been observed at concentrations greater than the FDEP GCTL and FDEP Surface Water Cleanup Target Level (SWCTL). The pilot study will be conducted approximately 25 feet inland from the creek along the perpendicular width of the identified chlorinated VOC plume area.

During the Solar Powered Low Volume Air Sparge Pilot Study, ambient air will be injected into the subsurface at Site 3 via air injection wells on an intermittent basis to strip the chlorinated VOCs from the groundwater, and create an aerobic condition which promotes additional degradation prior to the groundwater being discharged into the adjacent creek. The Pilot Study results will be evaluated and the information will be used to determine the effectiveness of this technology, and to assess whether this technology could be an appropriate long-term resolution to the observed surface water exceedances at this site and in other similarly contaminated groundwater plumes.

1.2 SITE BACKGROUND

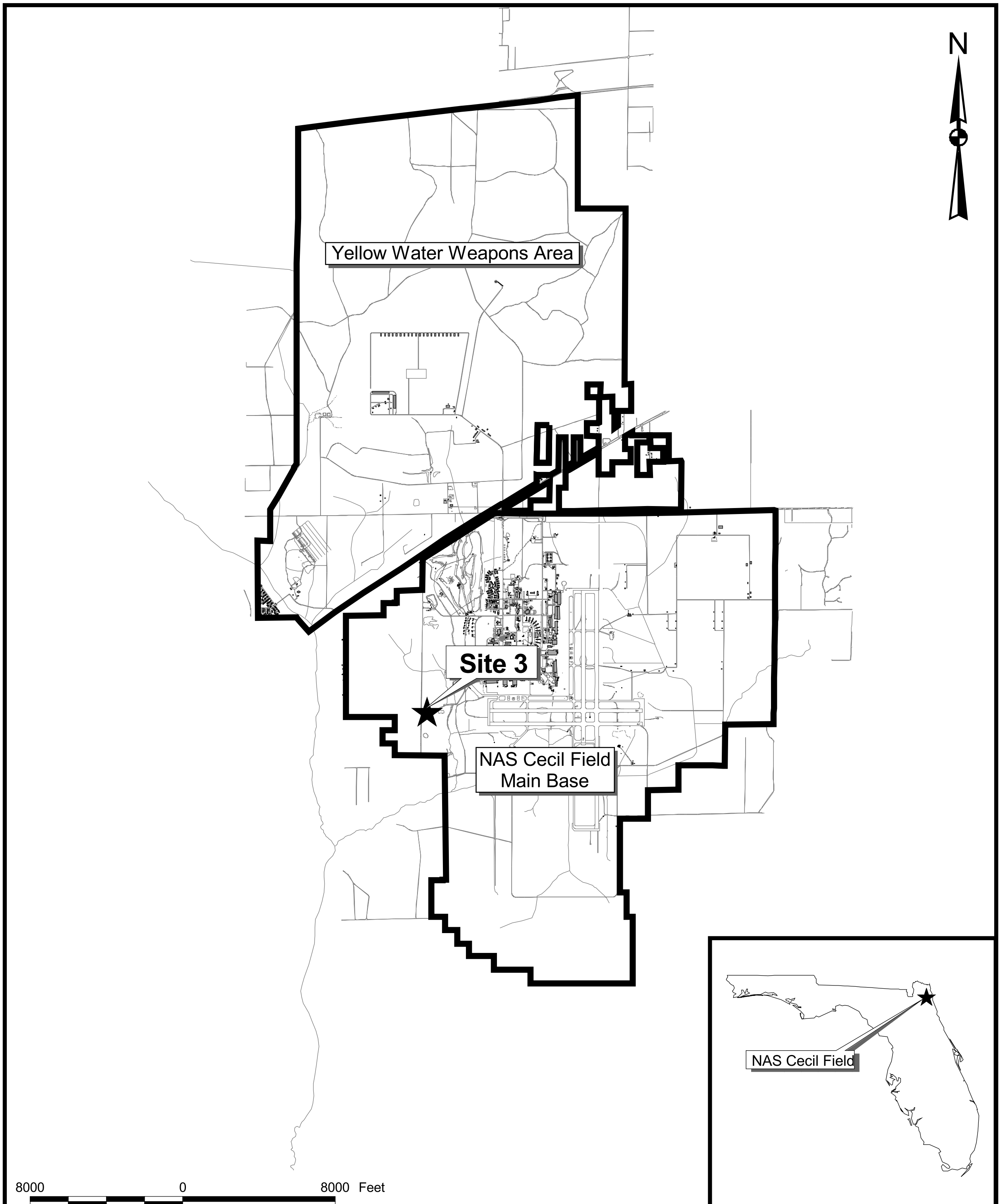
Site 3, Oil/Sludge Disposal Pit is located in the southwestern portion of the Main Base area of NAS Cecil Field about 3,500 feet west of the east-west runways, as shown on Figure 1-1. Site 3 occupies about 0.5 acres. There are no potable wells in the vicinity of the site that tap the surficial aquifer. A pit on the western side of Site 3 was used to dispose of liquid wastes and sludge from as early as the mid-1950s until 1975. Liquid wastes were taken to the site in bowsers or 55-gallon drums, drained into the pit, and allowed to seep into the soil or evaporate. When the liquid level in the pit neared the ground surface level, the Station's fire department burned the wastes. About 200 to 300 gallons of waste oil, fuel, and tank sludge from the fuel farm were disposed weekly at the site, and a total of approximately 210,000 to 310,000 gallons were disposed throughout the 20-year lifetime of the site. Wastes were generated by the squadrons, Aircraft Intermediate Maintenance Department (AIMD), and the public works department and were composed of fuels, oils, solvents, paint, and paint strippers. Following closure of the site in 1975, the pit was filled and covered with soil. In 1992, a Navy helicopter crashed into a wooded area east of the site. The helicopter had a fuel capacity of between 1,800 and 2,000 gallons and ignited on impact [ABB Environmental Services, Inc. (ABB-ES), 1996].

Site 3 is located near the western perimeter of NAS Cecil Field, in the flight path of landing aircraft. It is a vacant, relatively featureless area with no residential, commercial, or industrial functions. Human activity is generally limited to security patrols or joggers on the Lake Fretwell access road and Perimeter Road. Vegetative cover consists of thick brush and briars. The disposal pit (source area), estimated to be approximately 100 feet in diameter and 3 to 5 feet deep, is located immediately northeast of the intersection of Perimeter Road and the Lake Fretwell access road, both of which are unpaved.

There is a relatively uniform gentle slope toward Rowell Creek and Lake Fretwell over the length of the site. A 6.7-acre wetland is located approximately 800 feet east of the disposal pit, adjacent to Rowell Creek. Rowell Creek is classified by the State of Florida as Class III freshwater. The Pilot Study will be conducted adjacent to Rowell Creek, but will not impact any wetlands.

1.3 DOCUMENT ORGANIZATION

This Work Plan includes site-specific information to be used for the pilot study at Site 3 at NAS Cecil Field. Section 1.0 is the introduction to this Pilot Study Work Plan and describes the scope and objectives, summarizes Site 3 background information, and describes the document organization. Section 2.0 provides baseline conditions in the Pilot Study area including information on the delineation of the groundwater contamination, and geochemical and hydrogeological baseline conditions prior to conducting the pilot study. Section 3.0 provides a summary of the proposed air sparging technology to be evaluated. Section 4.0 describes the Pilot Study design and its various components. Section 5.0 identifies the activities to be conducted for the Pilot Study system installation, start-up, and initial evaluation. Section 6.0 provides information regarding the operation and maintenance of the Pilot Study system. This section also discusses system evaluation and sampling procedures which will be conducted to evaluate and report on the effectiveness of this technology after system startup.



DRAWN BY	DATE		GENERAL LOCATION MAP	CONTRACT NUMBER
MJJ	23Sept11	NAVFAC	OPERABLE UNIT 8, SITE 3	2267
CHECKED BY	DATE		NAVAL AIR STATION CECIL FIELD	APPROVED BY DATE
COST/SCHEDULE-AREA			JACKSONVILLE, FLORIDA	APPROVED BY DATE
SCALE AS NOTED				DRAWING NO. FIGURE 1-1 REV 0

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2.0 PILOT STUDY BASELINE CONDITIONS

This section provides information regarding the current groundwater contamination at Site 3 that has warranted the need for an action. It also provides information regarding current conditions to aid in the design and evaluation of the proposed Pilot Study system.

2.1 GROUNDWATER SAMPLING AND RESULTS

Site 3 is currently undergoing long-term groundwater monitoring (LTM) which implemented in accordance with the approved Uniform Federal Policy (UFP) Sampling and Analysis Plan (SAP) prepared by Tetra Tech (Tetra Tech, 2011). Air sparging was identified in the ROD (Tetra Tech, 1998a) as the active remedial alternative to address source area groundwater contamination, particularly trichloroethene (TCE) and its daughter products. The system successfully achieved the active remedial goals established for this site after approximately 1 year of full operation and 1 year of intermittent operation. The system has not operated since September 2002. The most recent LTM groundwater sampling was the Year 12 annual groundwater monitoring effort conducted in September 2010 by Solutions-IES. The results of this effort were presented in the annual report (Solutions-IES, 2011). The Year 12 LTM report was reviewed by the United States Environmental Protection Agency (EPA) and a Memorandum dated August 11, 2011 was submitted detailing the results of the EPA review (U.S. EPA, 2011). The Memorandum provides a summary of the groundwater conditions at Site 3 and is provided in Attachment 1.

The locations of the monitoring wells currently in the LTM groundwater monitoring program are shown on Figure 2-1. The analytical results which exceeded regulatory criteria during the monitoring effort are presented in the tag map identified as Figure 2-2. The Year 12 Annual Groundwater Monitoring Report documented that VC concentrations in the samples obtained from the Well Point (WP) exceeded the regulatory criteria for two consecutive events. During the September 2009 and September 2010 groundwater sampling events, the detected VC concentrations of 12.9 µg/L and 5.0 µg/L, respectively, exceeded both the FDEP GCTL of 1.0 µg/L and the FDEP SWCTL of 2.4 µg/L. The UFP SAP states that if any chemical of concern (COC) concentration in the surface water/groundwater interface WP is greater than the SWCTL, then the WP will be resampled to verify the exceedance. If the exceedance is verified, then the Base Realignment and Closure (BRAC) Cleanup Team (BCT) shall take appropriate actions to mitigate adverse impacts on Rowell Creek and downgradient receptors.

The results of the Year 12 Annual groundwater monitoring effort were presented to the Cecil Field BCT on November 3, 2010. Based on discussions at this meeting, Tetra Tech was directed to review options to address the observed VC exceedances, and present its findings at the next BCT meeting. Tetra Tech proposed actions to address the observed FDEP SWCTL exceedances at the February 9, 2011 BCT meeting (BCT, 2011a, Meeting Minute No. 2669). Various alternatives were reviewed including: air sparging, substrate injections, and a recirculation system with aeration or stripping treatment prior to reinjection. Tetra Tech was directed at this meeting (Decision No. 807) to evaluate air sparging as an alternative to address the observed VC exceedances. During the evaluation that followed, Tetra Tech identified that additional data were needed to determine the extent of potential VC discharge into the surface water. Tetra Tech submitted an email on March 25, 2011 detailing additional Well Point sampling to be conducted upstream and downstream of the original well point location with the VC exceedances. Based on the preliminary results of this additional sampling, a subsequent email was sent on April 13, 2011 detailing additional actions to be taken to conduct a vertical evaluation of the contaminant removal capacity of the creek bed sediments. The two emails with their attachments are provided in Attachment 2. The results of the field activities conducted in accordance with these e-mails were presented at the May 11, 2011 BCT meeting. These results confirmed the LTM VC detections in the original Well Point; identified VC exceedances in samples collected 50 feet upstream and 50 downstream of the original WP location; and indicated that the creek sediments were not completely removing all of the VC contamination prior to the groundwater being discharged into the surface water (BCT, 2011b, Meeting Minute No. 2678). The presentation and supporting field paperwork are provided in Attachment 3. Based on this presentation, the BCT directed Tetra Tech to conduct a direct push technology (DPT) investigation (with onsite laboratory analysis) in the area of CEF-003-031S along Rowell Creek to delineate the vertical and horizontal extent of VOC contamination (Decision No. 810).

Tetra Tech conducted the DPT investigation field effort during the week of July 12, 2011. Attachment 4 contains the Work Plan for the sampling effort, a summary of the field effort, analytical results tag maps, the results summary table, and field paperwork backup information. The results were presented at the August 16, 2011 BCT meeting. These results demonstrated that the VC contamination is limited to a relatively small area (25 feet in length: 12.5 feet upstream and 12.5 feet downstream) centered on the original well CEF-003-031S; however, cis-1,2-DCE and 1,1-DCE concentrations were elevated across a more significant area (approximately 180 feet in length centered on the original well location). It appears that these groundwater contaminants are degrading to VC as they approach the discharge points at the creek (WP sample locations) as identified on Figures 2-4 and 2-5.

2.2 GEOCHEMICAL PARAMETERS

The geochemical data which were collected during the LTM program sampling include: dissolved oxygen (DO), pH, oxidation-reduction potential (ORP), and conductivity. These data provide useful information about current conditions which will aid in determining if the proposed air sparging technology is appropriate, and provide a baseline for geochemical conditions prior to system operation. The area of interest for this Pilot Study is located near monitoring well CEF-003-031S and the temporary well point

(WP#2); results from previous LTM events at these locations are summarized in Tables 2-1 and 2-2. The data indicate that there is an anaerobic aquifer in the proposed treatment area that becomes aerobic at the Well Point location immediately adjacent to the creek. This conclusion is based primarily on the averages of the DO and ORP medians obtained during the events conducted since July 2007: a DO of 0.7 mg/L and ORP of -117.2 mV in the monitoring well, and a DO of 3.4 mg/l and ORP of -56.8 mV in the Well Point. Generally DO concentrations of less than 1.0 mg/L indicate anaerobic conditions; and ORP ranges from 200 mV in aerobic oxidizing conditions to -400 mV in strongly anaerobic reducing conditions.

Additional geochemical parameter data which were collected during the July 2011 DPT investigation from the proposed treatment area provide similar results to those obtained during the LTM effort. The information collected during the DPT effort is summarized in the results table provided in Attachment 4. The average median values for DO and ORP in the twelve sampling locations along the proposed treatment area from the same sample interval as the monitoring well (20 to 30 feet below land surface) are 0.4 mg/L and 14 mV, respectively.

Air stripping of the contaminants of concern (cis-1,2-DCE and 1,1-DCE) will be the primary treatment process in the area of the proposed treatment system. Both of these contaminants appear to be reducing to VC in passing from the proposed treatment area to the creek discharge point. This is made evident by the DC exceedances shown on Figure 2-5 in the DPT results corresponding with few VC exceedances, and then the VC exceedance detected in the creek during the well point sapling conducted in April 2011 with none of the parent products (in particular, TCE) were observed. The proposed air sparge treatment system will create an aerobic condition in the treatment area; however, upgradient of the treatment area, conditions will remain anaerobic to promote the continued degradation of residual TCE and some of its daughter products. Although stripping of the contaminants will be the primary mechanism for removal of contamination, the increased residual time in an aerobic condition will enable further degradation, if needed, of these contaminants (1,1-DCE, cis-1,2-DCE, and VC) prior to groundwater discharge to the surface water.

2.3 HYDROGEOLOGY

Groundwater elevation data from LTM reports indicate that groundwater flow at Site 3 is to the east in the direction of Rowell Creek, as shown on Figure 2-3. The average hydraulic gradient at Site 3 varies from the source area to the discharge point into Rowell Creek. The average horizontal gradient in the surficial aquifer measured along the flow path from the waste disposal pit area (CEF-003-03S) to Rowell Creek (CEF-003-20S) during the Remedial Investigation (RI) in March through September 1994 was approximately 0.016 feet/feet (ft/ft). The gradients increase as the groundwater approaches Rowell Creek. The source area gradient is relatively flat with a gradient of 0.005 ft/ft and the gradient in the last 300 feet before Rowell creek is approximately 0.035 ft/ft. Testing during the RI identified a hydraulic conductivity of 7.5 ft/day and an effective porosity of 0.20, providing a seepage velocity of 88 feet per year; the rate increases toward Rowell Creek where the seepage velocity is approximately 190 feet per year. Detailed information is provided in the Remedial Investigation for Operable Unit 8, Site 3 (ABB-ES, 1996).

Overburden geology of Site 3 consists of fine to very fine sand with varying amounts of silt. A continuous clay layer is located at a depth approximately 46 feet to 50 feet below land surface. Boring logs from the proposed treatment area are presented in the Work Plan contained in Attachment 4. Isolated, discontinuous, relatively thin clay layers may be present, but are not expected to significantly impact the proposed air sparging treatment technology.

TABLE 2-1

SUMMARY OF GEOCHEMICAL DATA
MONITORING WELL CEF-003-31S
SITE 3, NAS CECIL FIELD, JACKSONVILLE, FLORIDA

Sample ID	Sample Date	Contractor	D.O. (mg/L)	pH (standard units)	ORP (mV)	COND. (uS/cm)	Vinyl Chloride (ug/L)	
CEF-003-31S	Sep-10	Solutions-IES	0.2	6.74	-358.8	237	10.9	
CEF-003-31S	Sep-09	Solutions-IES	1	6.37	-18.9	255	13.3	
CEF-003-31S	Oct-08	Solutions-IES	1	6.3	26.1	*	5	
CEF-003-31S	Jan-07	Ellis	<1	6.46	-38	390	6	
CEF-003-31S	Jul-06	Ellis	1.5	6.59	430	1411	2.6	
CEF-003-31S	Jan-06	Ellis	<1	6.71	-159.5	330	2.1	
CEF-003-31S	Jul-05	Ellis	0.37	6.45	93	326	5.7	
CEF-003-31S	Jan-05	Ellis	0.33	6.64	285	314	3.2	
CEF-003-31S	Jul-04	Ellis	2	6.41	-87	330	5.8	
CEF-003-31S	Jan-04	Ellis	1	7.02	-33	285	7.9	
CEF-003-31S	Jul-03	Ellis	0.46	6.79	-83.9	315	5.2	
CEF-003-31S	Feb-03	Ellis	0.2	6.86	-131.9	311	1.8	
CEF-003-31S	Jul-02	Ellis	0.3	6.86	-164	334	4.3	J
CEF-003-31S	Jan-02	Ellis	1	7.1	-77	325	0.55	J
CEF-003-31S	Jul-01	Ellis	1	6.74	-35	320	2	
CEF-003-31S	Jan-01	Ellis	0.4	6.83	-134	282	2.1	
CEF-003-31S	Oct-00	Ellis	0.6	7.02	-110	358	1.4	
CEF-003-31S	Jul-00	Ellis	0.2	6.86	-140	340	1	U
CEF-003-31S	Apr-00	Ellis	0.2	6.99	-143	332	2	U
CEF-003-31S	Feb-00	Ellis	1	6.94	0	*	1	U
CEF-003-31S	Nov-99	Ellis	0.6	6.92	-75	335	1	U
CEF-003-31S	Aug-99	Ellis	0.3	6.9	<-55	226	3.8	
CEF-003-31S	May-99	Ellis	0.97	7.15	-123.9	323	1.1	
CEF-003-31S	Feb-99	Ellis	0.6	7	-129.1	321	1	U
CEF-003-31S	Dec-98	Ellis	0.71	6.72	-120.4	310	0.9	J

AVERAGES		**0.7**	**6.5**	**-117.2**	**246.0**	**7.8**
STD DEV		**0.5**	**0.2**	**210.4**	**12.7**	**5.2**
MEDIAN		**1.0**	**6.4**	**-18.9**	**246.0**	**8.0**
MAX		**1.0**	**6.7**	**26.1**	**255.0**	**13.3**
MIN		**0.2**	**6.3**	**-358.8**	**237.0**	**2.0**

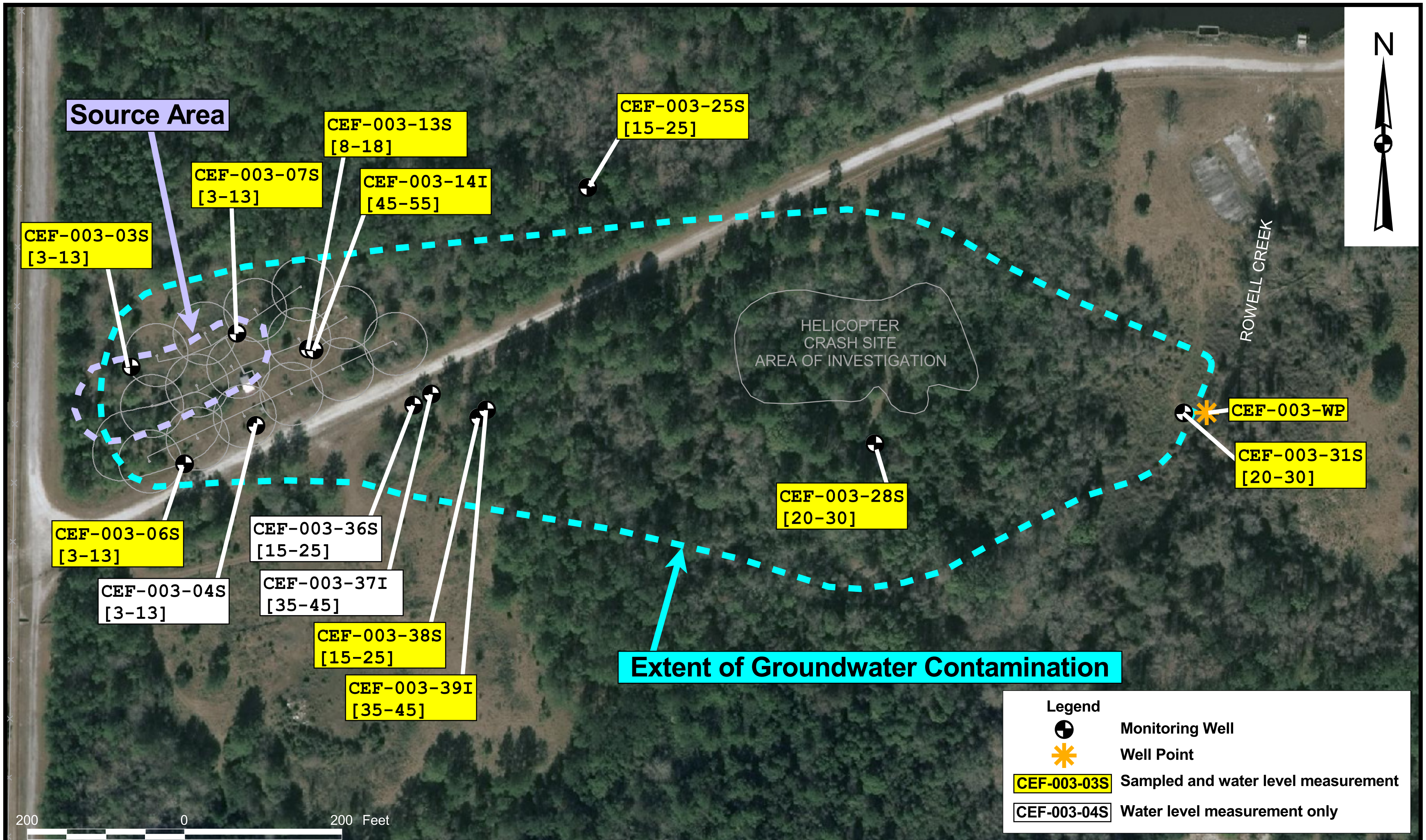
* Anomalous readings were removed to enable realistic statistical calculations.
NR - Not Recorded

TABLE 2-2

SUMMARY OF GEOCHEMICAL DATA
WELL POINT
SITE 3, NAS CECIL FIELD, JACKSONVILLE, FLORIDA

Sample ID	Contractor	Sample Date	D.O. (mg/L)	pH (standard units)	ORP (mV)	COND. (uS/cm)	Vinyl Chloride (ug/L)	
CEF-003-WP	Solutions-IES	Sep-10	0.4	6.57	-305.1	217	5	
CEF-003-WP	Solutions-IES	Sep-09	2	6.16	21.7	350	12.9	
CEF-003-WP	Solutions-IES	Oct-08	7	6.18	28.3	110	<0.3	
CEF-003-WP	Solutions-IES	Jul-07	4	6.3	28	150	<0.34	
CEF-003-WP	Ellis	Jan-07	4	6.77	9	230	0.5	U
CEF-003-WP	Ellis	Jul-06	<1	6.45	-30.8	312	5.9	
CEF-003-WP	Ellis	Jan-06	8	6.45	27	93	0.5	U
CEF-003-WP	Ellis	Jul-05	3.37	6.19	153	67	0.5	U
CEF-003-WP	Ellis	Jan-05	8.29	6.71	283	130	0.54	J
CEF-003-WP	Ellis	Jul-04	5	6.58	-21	150	1	U
CEF-003-WP	Ellis	Jan-04	6	7.09	109	130	1	U
CEF-003-WP	Ellis	Jul-03	2.23	6.28	-4.3	107	1	U
CEF-003-WP	Ellis	Feb-03	6	6.42	117	122	1	U
CEF-003-WP	Ellis	Jul-02	1	6.18	-154	271	2	
CEF-003-WP	Ellis	Jan-02	8	6.92	86	64	1	U
CEF-003-WP	Ellis	Jul-01	5	6.27	107	83	1	U
CEF-003-WP	Ellis	Jan-01	8	6.66	62	140	1	U
CEF-003-WP	Ellis	Oct-00	0.8	6.25	-114	323	38.5	
CEF-003-WP	Ellis	Jul-00	1	4.97	-164	95	6.7	
CEF-003-WP	Ellis	Apr-00	7	6.89	96	*	1	U
CEF-003-WP	Ellis	Feb-00	1	6.32	-124	*	2.9	
CEF-003-WP	Ellis	Nov-99	3	6.51	2	139	1	U
CEF-003-WP	Ellis	Aug-99	1.5	6.38	-10	112	1	U
CEF-003-WP	Ellis	May-99	5.44	6.84	18	272	1	U
CEF-003-WP	Ellis	Feb-99	0.455	6.67	-166.8	303	7.7	
CEF-003-WP	Ellis	Dec-98	0	6.43	-104.9	326	1.9	
AVERAGE			**3.4**	**6.3**	**-56.8**	**206.8**	**4.6**	
STD DEV			**2.8**	**0.2**	**165.6**	**105.2**	**5.9**	
MEDIAN			**3.0**	**6.2**	**24.9**	**183.5**	**2.7**	
MAX			**7.0**	**6.6**	**28.3**	**350.0**	**12.9**	
MIN			**0.4**	**6.2**	**-305.1**	**110.0**	**0.3**	

* Anomalous readings were removed to enable realistic statistical calculations.
NR - Not Recorded



DRAWN BY MJJ	DATE 23Sept11	NAVFAC	SITE LAYOUT AND WELL LOCATION MAP OPERABLE UNIT 8, SITE 3 NAS CECIL FIELD JACKSONVILLE, FLORIDA	CONTRACT NUMBER 2267
CHECKED BY	DATE			APPROVED BY / DATE
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SCALE AS NOTED				DRAWING NO. FIGURE 2-1 / REV 0

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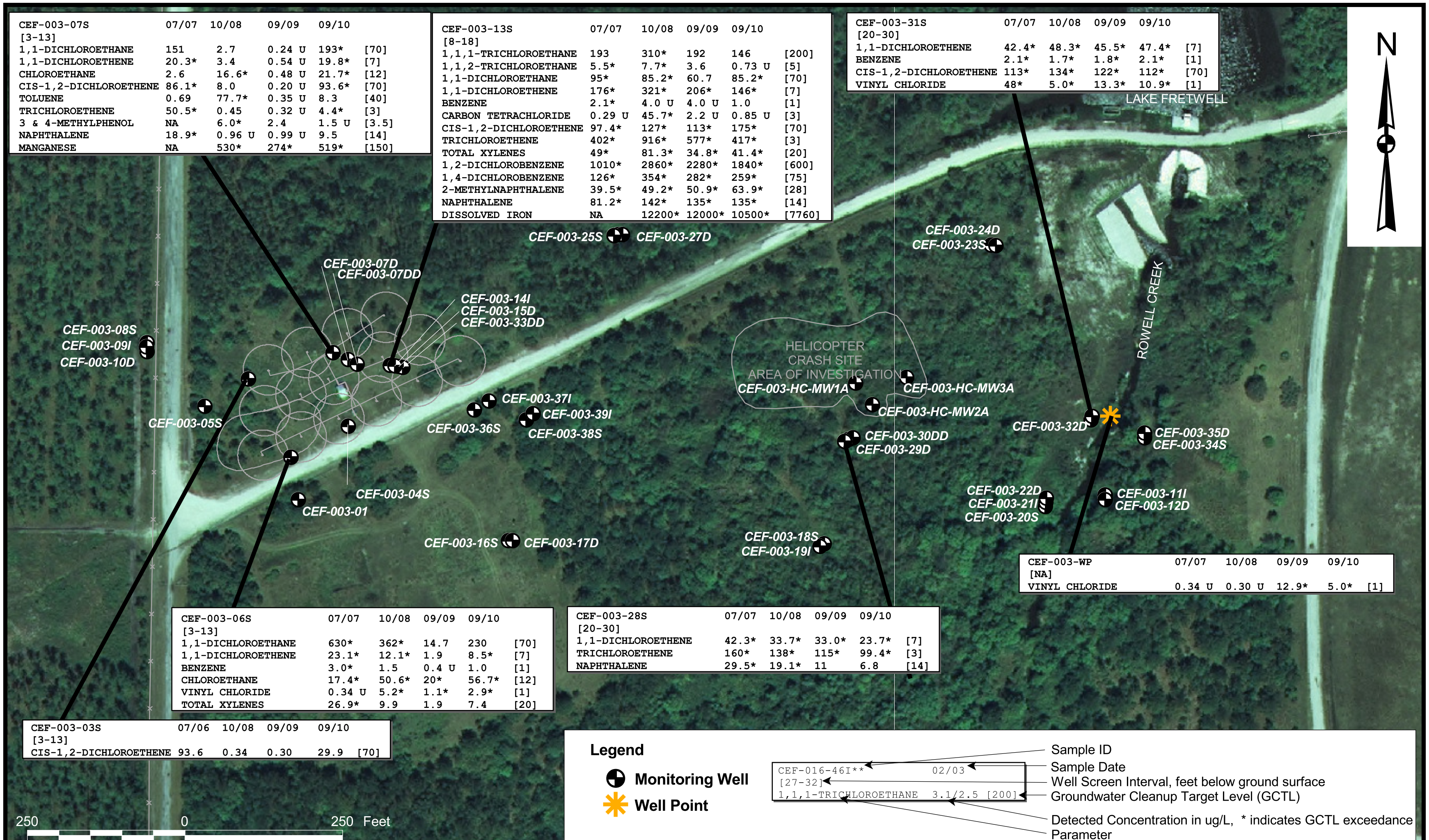

CEF-003-07S [3-13]	07/07	10/08	09/09	09/10	
1,1-DICHLOROETHANE	151	2.7	0.24 U	193*	[70]
1,1-DICHLOROETHENE	20.3*	3.4	0.54 U	19.8*	[7]
CHLOROETHANE	2.6	16.6*	0.48 U	21.7*	[12]
CIS-1,2-DICHLOROETHENE	86.1*	8.0	0.20 U	93.6*	[70]
TOLUENE	0.69	77.7*	0.35 U	8.3	[40]
TRICHLOROETHENE	50.5*	0.45	0.32 U	4.4*	[3]
3 & 4-METHYLPHENOL	NA	6.0*	2.4	1.5 U	[3.5]
NAPHTHALENE	18.9*	0.96 U	0.99 U	9.5	[14]
MANGANESE	NA	530*	274*	519*	[150]

CEF-003-13S [8-18]	07/07	10/08	09/09	09/10	
1,1,1-TRICHLOROETHANE	193	310*	192	146	[200]
1,1,2-TRICHLOROETHANE	5.5*	7.7*	3.6	0.73 U	[5]
1,1-DICHLOROETHANE	95*	85.2*	60.7	85.2*	[70]
1,1-DICHLOROETHENE	176*	321*	206*	146*	[7]
BENZENE	2.1*	4.0 U	4.0 U	1.0	[1]
CARBON TETRACHLORIDE	0.29 U	45.7*	2.2 U	0.85 U	[3]
CIS-1,2-DICHLOROETHENE	97.4*	127*	113*	175*	[70]
TRICHLOROETHENE	402*	916*	577*	417*	[3]
TOTAL XYLENES	49*	81.3*	34.8*	41.4*	[20]
1,2-DICHLOROBENZENE	1010*	2860*	2280*	1840*	[600]
1,4-DICHLOROBENZENE	126*	354*	282*	259*	[75]
2-METHYLNAPHTHALENE	39.5*	49.2*	50.9*	63.9*	[28]
NAPHTHALENE	81.2*	142*	135*	135*	[14]
DISSOLVED IRON	NA	12200*	12000*	10500*	[7760]

CEF-003-31S [20-30]	07/07	10/08	09/09	09/10	
1,1-DICHLOROETHENE	42.4*	48.3*	45.5*	47.4*	[7]
BENZENE	2.1*	1.7*	1.8*	2.1*	[1]
CIS-1,2-DICHLOROETHENE	113*	134*	122*	112*	[70]
VINYL CHLORIDE	48*	5.0*	13.3*	10.9*	[1]

CEF-003-WP [NA]	07/07	10/08	09/09	09/10	
VINYL CHLORIDE	0.34 U	0.30 U	12.9*	5.0*	[1]

CEF-003-06S [3-13]	07/07	10/08	09/09	09/10	
1,1-DICHLOROETHANE	630*	362*	14.7	230	[70]
1,1-DICHLOROETHENE	23.1*	12.1*	1.9	8.5*	[7]
BENZENE	3.0*	1.5	0.4 U	1.0	[1]
CHLOROETHANE	17.4*	50.6*	20*	56.7*	[12]
VINYL CHLORIDE	0.34 U	5.2*	1.1*	2.9*	[1]
TOTAL XYLENES	26.9*	9.9	1.9	7.4	[20]

CEF-003-28S [20-30]	07/07	10/08	09/09	09/10	
1,1-DICHLOROETHENE	42.3*	33.7*	33.0*	23.7*	[7]
TRICHLOROETHENE	160*	138*	115*	99.4*	[3]
NAPHTHALENE	29.5*	19.1*	11	6.8	[14]

CEF-003-03S [3-13]	07/06	10/08	09/09	09/10	
CIS-1,2-DICHLOROETHENE	93.6	0.34	0.30	29.9	[70]

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SCALE	AS NOTED

NAVFAC

CONTAMINANT CONCENTRATION MAP

OPERABLE UNIT 8, SITE 3

NAS CECIL FIELD

JACKSONVILLE, FLORIDA

CONTRACT NUMBER 2267	
APPROVED BY	DATE
APPROVED BY	DATE
DRAWING NO. FIGURE 2-2	REV 0

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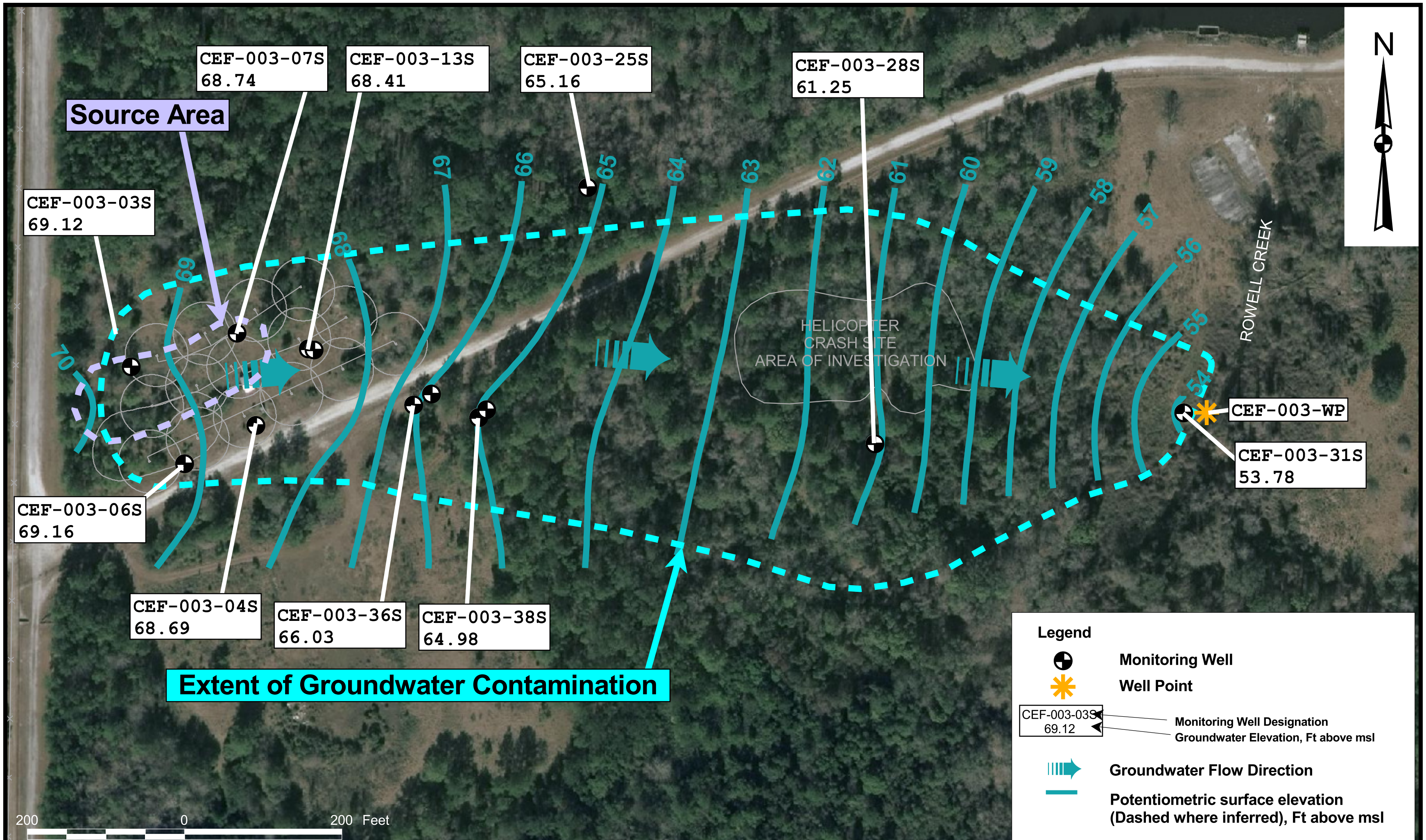

DRAWN BY	DATE		POTENTIOMETRIC SURFACE ELEVATION MAP SEPTEMBER 2010 OPERABLE UNIT 8, SITE 3 NAS CECIL FIELD JACKSONVILLE, FLORIDA	CONTRACT NUMBER 2267	
MJJ	23Sept11	NAVFAC		APPROVED BY	DATE
CHECKED BY	DATE			APPROVED BY	DATE
COST/SCHEDULE-AREA				DRAWING NO. FIGURE 2-3	REV 0
SCALE AS NOTED					

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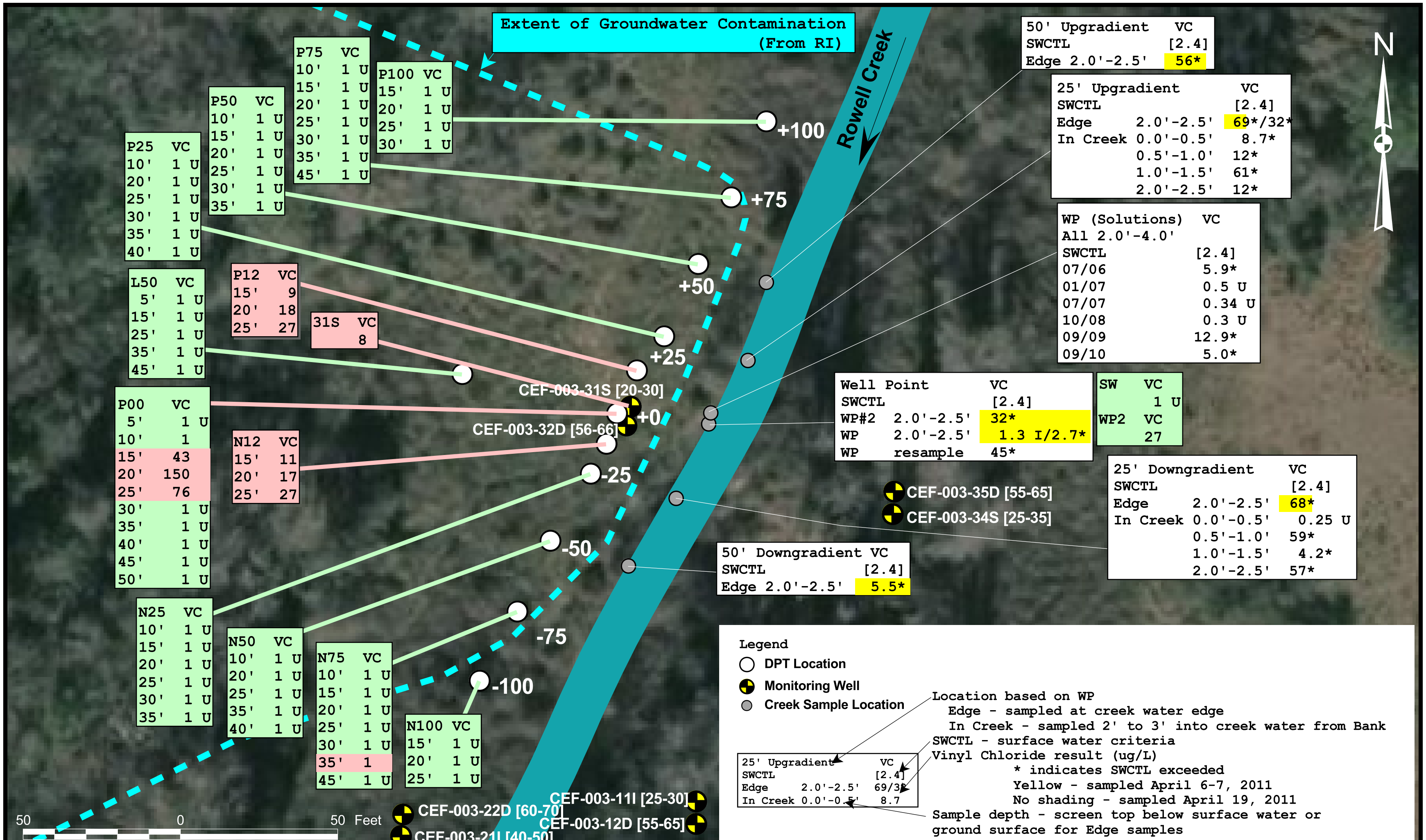

DRAWN BY: MJJ; DATE: 23Sept11	NAVFAC	VINYL CHLORIDE RESULTS - JULY 2011 DPT INVESTIGATION	CONTRACT NUMBER: 2267
CHECKED BY; DATE		OPERABLE UNIT 8, SITE 3	APPROVED BY; DATE
COST/SCHEDULE-AREA		NAS CECIL FIELD	APPROVED BY; DATE
SCALE: AS NOTED		JACKSONVILLE, FLORIDA	DRAWING NO.: FIGURE 2-4; REV: 0

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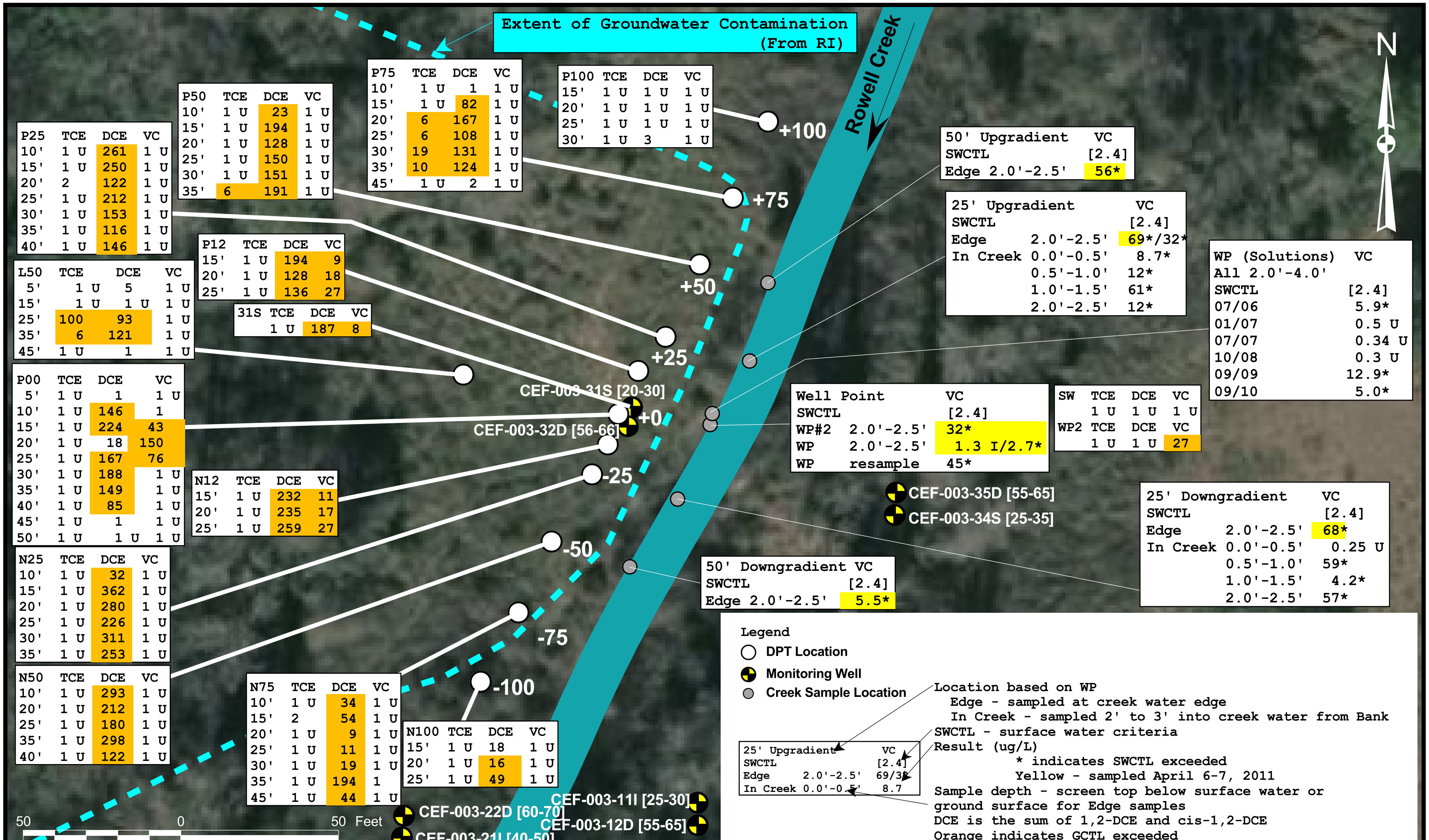

DRAWN BY MJJ — DATE 23Sept11	NAVFAC	VOC RESULTS - JULY 2011 DPT INVESTIGATION OPERABLE UNIT 8, SITE 3 NAS CECIL FIELD JACKSONVILLE, FLORIDA	CONTRACT NUMBER 2267
CHECKED BY — DATE			APPROVED BY — DATE
COST/SCHEDULE-AREA			APPROVED BY — DATE
SCALE AS NOTED			DRAWING NO. FIGURE 2-5 — REV 0

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3.0 AIR SPARGING

This section provides a brief summary of the air sparging technology proposed for the pilot study.

3.1 APPLICATION

Air sparging is an in situ remedial technology that reduces concentrations of volatile constituents via volatilization and anaerobic biological processes. This technology, which is also known as "in situ air stripping" and "in situ volatilization," involves the injection of contaminant-free air into the subsurface saturated zone, enabling a phase transfer of volatile compounds from a dissolved state to a vapor phase. The air is then vented through the unsaturated zone.

When used appropriately, air sparging has been found to be effective in reducing concentrations of VOCs. An air sparging system can use either vertical or horizontal sparge wells. Well orientation should be based on site-specific needs and conditions.

Air sparging should not be used if the following site conditions exist:

- Free product is present. Air sparging can create groundwater mounding which could potentially cause free product to migrate and contamination to spread.

- Nearby basements, sewers, or other subsurface confined spaces are present at the site. Potentially dangerous constituent concentrations could accumulate in basements unless a vapor extraction system is used to control vapor migration.

- Contaminated groundwater is located in a confined aquifer system. Air sparging cannot be used to treat groundwater in a confined aquifer because the injected air would be trapped by the saturated confining layer and could not escape to the unsaturated zone.

- Significant volatilization of COCs would result in air permit exceedances (or would require the use of a vapor extraction system added to the air sparge system).

The conditions that exist in the downgradient plume area of Site 3, discussed in Section 2, are appropriate for the use of air sparging as a remedial technology.

3.2 OPERATION PRINCIPLES

The effectiveness of air sparging depends primarily on two factors:

1. Vapor/dissolved phase partitioning of the constituents determines the equilibrium distribution of a constituent between the dissolved phase and the vapor phase. Vapor/dissolved phase partitioning is, therefore, a significant factor in determining the rate at which dissolved constituents can be transferred to the vapor phase.

2. Permeability of the soil determines the rate and pressure at which air can be injected into the saturated zone. It is the other significant factor in determining the mass transfer rate of the constituents from the dissolved phase to the vapor phase.

In general, air sparging is more effective for constituents with greater Henry's constant volatility and lower solubility, and for soils with higher permeability. The rate at which the constituent mass will be removed decreases as air sparging operations proceed and concentrations of dissolved constituents are reduced.

Stratified or highly variable heterogeneous soils typically create the greatest obstacles to air sparging. Both the injected air and the stripped vapors will travel along the paths of least resistance (coarse-grained zones), and could travel a great lateral distance from the injection point. This phenomenon could result in the contaminant-laden sparge vapors migrating outside the vapor extraction control area.

The contamination and subsurface soil conditions in the area of the proposed pilot study are appropriate for this application.

3.3 SYSTEM DESIGN DISCUSSION

The essential goals in designing an air sparging system are to configure the wells and monitoring points in such a way to:

1. Optimize the influence on the plume, thereby maximizing the removal efficiency of the system.
2. Provide optimum monitoring and vapor extraction points to ensure minimal migration of the vapor plume, and no undetected migration of either the dissolved phase or vapor phase plumes. In shallow applications, in large plume areas, or in locations under buildings or pavements, horizontal vapor extraction wells are very cost effective and efficient for controlling vapor migration.

Field pilot studies are often necessary to adequately design and evaluate air sparging systems.

None of the site conditions detailed in Section 3.1 which would prevent the use of air sparging technology exist at Site 3. Soil vapor extraction will not be required at Site 3 due to the relatively low concentrations of the COCs that will be volatilized. The emphasis of the proposed Pilot Study is unique because it will be conducted over the entire length of the treatment area. The performance of the air sparging system will be evaluated to determine its effectiveness, and to assess whether it could be used as a long-term or permanent solution at this Site.

The placement and number of air sparge points required to address the dissolved phase plume is determined primarily by the permeability and structure of the soil, as these affect the sparging pressure and distribution of air in the saturated zone. Coarse-grained soils (*e.g.*, sand, gravel) have greater intrinsic permeability than fine-grained soils (*e.g.*, clay, silt), and are more amenable to air movement (and water) through more permeable soil. Greater lateral dispersion of the air is likely in fine-grained soils and can result in lateral displacement of the groundwater and contaminants if groundwater control is not maintained.

The radius of influence (ROI) for air sparging wells is defined as the greatest distance from a sparging well at which sufficient sparge pressure and airflow can be induced to enhance the mass transfer of contaminants from the dissolved phase to the vapor phase. The ROI is an important parameter to be considered in the design of the air sparging system. The ROI will help determine the number and spacing of the sparging wells. Air sparging wells should be placed so that the overlap of their ROIs completely covers the area of contamination.

The sparging air flow rate required to provide sufficient air flow to enhance mass transfer is site-specific. The proposed Solar Powered Air Sparge System will be operated on an intermittent alternating basis; therefore, each area (as determined by the observed ROI of each individual well) will have active air sparging conducted for only a portion of each day of operation at what can be considered a low air flow rate of 3 cubic feet per minute (cfm).

4.0 PILOT STUDY DESIGN

This section describes the general design of the Pilot Study. In this pilot study, an air sparging curtain will be installed. The pilot test data will be used to determine if this technology can feasibly intercept and treat the dissolved VOC plume in order to prevent contamination from discharging into Rowell Creek. The proposed air sparging curtain will be solar powered and the air flow will be pulsed (alternating air flow) on a non-continuous basis. This is a somewhat unique application, and thus warrants conducting this pilot study.

4.1 AIR SPARGING SYSTEM LAYOUT

Figure 4-1 shows the pilot study area and the proposed air sparging curtain which will be located approximately 25 feet from and parallel to Rowell Creek. The air sparging curtain will be approximately 200 feet long, and will span the entire perpendicular width of the dissolved VOC plume. The air sparging curtain will consist of nine sparge wells spaced approximately 25 feet apart.

4.1.1 Sparging Curtain Length, Well Spacing, and Air Flow Rates

The latest DPT investigation identified the width of the VOC plume immediately upgradient of Rowell Creek to be approximately 150 to 180 feet; therefore, the length of the air sparge curtain will be approximately 200 feet to completely intercept and treat the perpendicular width VOC plume.

One of the main design considerations is the spacing between the air injection wells within the sparge curtain. Previous work at this facility has demonstrated that the air sparging ROI can be significant. For example, a 50-foot radius of influence was reported at 3 standard cubic feet per minute (SCFM) of injection air flow during the pilot test at Site 5 (ABB-ES, 1997b). Furthermore, the source area treatment at Site 3 used an air sparge well spacing of 70 feet to successfully achieve the established remedial action objectives for the source area within the anticipated time frame.

An effective air sparge curtain is usually designed with a relatively close spacing between the injection wells to provide a reliable one-pass treatment of groundwater. The dimensions of the ROI cone depend on the angle of distribution of air and the depth of injection. The angle of distribution depends on the formation air permeability and injection air flow. The typical range of angle distribution usually varies between 15 degrees for coarse gravels to 60 degrees for fine silty sands (Nyer, 1998).

The pilot area geology is represented mostly by sands and fine sands; therefore, a relatively large angle of distribution can be expected. Assuming (conservatively) 40 degrees as a minimum angle of distribution, the design ROI (for a 40 degree distribution angle and 45 foot injection depth) would be approximately 16 feet. It is recommended to space the injection wells at approximately 25 feet apart to achieve a good overlap between the injection wells ROI zones. A total of nine injection wells will be required with the selected spacing. The design ROI (15 feet) and the selected well spacing (25 feet) would allow for approximately 7 feet of ROI overlap. Refer to Figure 4-1 for the air sparging curtain layout.

The injection air flow rate was selected based on various papers on this topic including Suthersan's (1999), and also on the flow rate that was used successfully for the Site 3 source area treatment system which was an average of approximately 3 SCFM. Therefore, a minimum of 3 SCFM of air flow will be used per sparging well in the sparging curtain at Site 3. Based on 45 feet of injection depth and a very shallow water table, the required injection pressure is expected to be approximately 20 pounds per square inch, gauge (psig).

4.1.2 Solar Power and Pulsed Operation

The pilot test area at Site 3 is located in a remote location far from existing power sources. It would be costly to install a long power line to the pilot test location. Consideration was given to green and sustainable technologies in the selection of a power service. After review of the various options, the Cecil Field BCT decided to utilize solar power for the air sparging system operation (BCT, 2011c, Meeting Minute No. 2691; Decision No. 817). The use of solar power has created some unique design challenges and placed certain restrictions on equipment and operation for the sparging system.

In general, energy consumption to produce compressed air is fairly high because compressed air temperature rises as a result of compression. If all nine air sparging wells were required to operate at the same time on a 24-hour basis (3 SCFM at 20 psig per injection well), the resulting solar array required would be approximately 1,000 square feet at a total cost of $250,000 to $500,000; however, continuous operation is not being proposed for this pilot test.

It is believed that continuous air sparging is not necessary for effective VOC removal, and that a pulsed operation can be utilized when the air flow is rotated between groups of sparge wells. In fact, both laboratory studies and operational experience suggest that a pulsed operation can deliver higher removal rates of dissolved VOCs compared to a continuous operation. This is based on the evidence that the VOC volatilization rates dramatically decrease after the air sparging system reaches steady-state conditions (Yang, 2005). A pulsed air sparging operation is documented to be more effective (as compared to a continuous operation) in the NAVFAC Air Sparging Guidance Document (Batelle, 2001). In fact, the NAVFAC guidance document specifically mentions that a pulsed operation may be necessary for air sparging curtain applications: "*Pulsed operation may be necessary in sparge barrier applications to* *prevent groundwater bypassing due to water permeability reductions in the formation caused by air injection.*"

Therefore, a pulsed operation will be implemented for the NAS Cecil Site 3 air sparging curtain in order to both increase the sparging curtain effectiveness, and at the same time significantly reduce the size and cost of solar arrays. This pulsed operation will be implemented as follows:

- Air sparging wells will be combined in three groups of three wells per group (Figure 4-1).
- Air flow will be rotated between three wells within each group such that each well is operated approximately one third of the time.
- Rotation time between the wells will be determined by the time it takes for the injected air channels to develop (steady-state conditions manifested by constant air flow and pressure), while also taking into consideration the total time the system can operate each day.
- It is expected that the rotation time between the wells will range from ½ hour to 2 hours. However, the actual rotation time will be determined and optimized in the field.

4.2 PROCESS EQUIPMENT

The air sparging system will have three identical equipment modules. Each equipment module will have the following components:

1. Air sparging wells (three wells per equipment module, nine wells total).
2. Air compressor to deliver at least 3 SCFM of air at 20 psig.
3. Solar array with all necessary power components (battery pack, DC-AC inverter, etc.) capable of powering the air compressor during daylight hours (6 to 9 hours per day depending on the season).
4. Controls and instrumentation for system operation (solenoid valves, timing relays, flow meters, valves, gauges, etc.).
5. Compressed air lines from air compressor to air sparging wells.

The air sparging system components, instrumentation, and safety interlocks are shown on the piping and instrumentation diagram (P&ID) (Figure 4-2). The equipment manufacturer's information is presented in

Attachment 5. The information about the selected equipment items is summarized in Table 4-1. The descriptions of the key equipment items are included in the following sections.

4.2.1 Sparging Wells

A total of nine air sparging wells will be installed as shown on Figure 4-1. The air sparging wells will be installed to a depth of approximately 45 feet below grade surface. The wells will be constructed using ¾ -inch polyvinyl chloride (PVC) Schedule 40 solid casing with the 2-foot screened section installed at the bottom (#10-inch slot screen). The wells will be installed using a pre-packed filter sand around the screened section and a bentonite seal around the solid casing portion (1½" pre-packed filter sand and seal column). If available, a 40 micron SCHUMASOIL screen will be used. A 2-foot fine sand seal will be placed above the well screen, and grout slurry will be installed around the solid casing portion to seal the bore hole. A 12-inch diameter by 12-inch protective well head vault will be installed along with a 3-foot by 3-foot concrete pad to complete the system well installation. The cross section of a proposed air sparge well is shown on Figure 4-4.

4.2.2 Air Compressor

The air compressor for this application had to be selected very carefully in order to minimize the power consumption while delivering the required air flow at the specified discharge pressure (at least 3 SCFM at 20 psig). The optimum air compressor currently available for this application is an oil-free rocking-piston type air compressor. The selected air compressor (Thomas Gardner Model 2660CE37, 1/3 hp, 115VAC or similar) delivers 3.28 SCFM air flow at 20 psig with 40 psig maximum pressure. Based on the manufacturer's test data (Attachment 6) this air compressor requires 390 watts of power to produce 3.28 SCFM of air flow at 20 psig.

The air compressor with electrical controls and instrumentation will be housed in a small pre-fabricated rain-tight ventilated equipment cabinet as shown on Figure 4-3. The equipment cabinet dimensions will be approximately 2 feet wide by 2 feet deep by 4 feet high. The construction details for the equipment cabinet (DDB Model OD-50DXC) are presented in Attachment 5.

4.2.3 Solar Arrays

Detailed electrical power consumption calculations were performed and various power losses (such as DC to AC conversion efficiency, battery bank efficiency, etc.) were considered. Based on these calculations (Attachment 7), powering the selected air compressor would require a solar array with at least six solar panels. Each solar panel (Suntech model STP190S-24/Ad+ or similar, Attachment 5) will have approximate dimensions of 32 inches by 62 inches. Therefore, the entire 6-panel array will be approximately 10 feet by 8 feet for each equipment module.

Each solar array will be mounted on top of a 6-inch diameter Schedule 40 steel pipe as shown on Figure 4-4. The 6-inch steel pipe will be 11 feet long: 5 feet of the pipe will be in the ground anchored by concrete within a 30-inch borehole, and 6 feet will be above ground (Figure 4-4). The mounting brackets and hardware for the solar arrays will be capable of withstanding up to 90 miles per hour (mph) wind speed.

The solar array power components will include the following elements: battery bank charge controller, battery bank (four 105 AH deep cycle batteries), DC to AC current inverter, timer, low current switch, and all appropriate wiring and electrical panels. All of these components will be mounted directly on the 6-inch steel pipe below the solar array. The main purpose of the battery bank is to smooth the solar power input fluctuation during the day. However, the size of the solar arrays and the battery banks will allow the system to run only during the daytime solar radiation period (estimated 6 to 9 hours per day).

4.2.4 Controls, Instrumentation and Piping

The air sparging system piping, controls, instrumentation, and safety interlocks are shown on the piping and instrumentation diagram (Figure 4-2). Physical equipment layout inside each cabinet is shown on Figure 4-3. The equipment parts list is presented in Table 4-1.

During system operation, the compressed air flow will be constantly rotated between three air sparging wells using solenoid valves controlled by an adjustable timing relay. Run-time counters with pressure switches on each line will be used to determine the actual time when air is injected into a particular sparging well. The total air compressor run-time will be determined by a separate run-time counter/pressure switch combination. A high pressure switch will be used to shut down the system in case of over-pressure. Run-time counters will be no-voltage type with a 10-year internal battery life. Therefore, pressure switches will be connected to run-time counters directly, and no voltage will be required in the circuits.

The lines from the equipment cabinet to the air sparging wells will be installed aboveground as shown on Figure 4-3. However, high strength ½-inch outside diameter (OD) stainless tubing (1,337 psig pressure rating) will be used to prevent accidental line ruptures and damage. The wellhead plumbing and a shut-off valve will be housed in a raised well protection vault box (12-inch diameter by 12-inch high) for protection.

4.3 MONITORING WELLS AND WELL POINTS

In order to monitor the effectiveness of this pilot test, two additional monitoring wells and two additional well points will be installed. The wells will be installed 50 feet upstream and 50 feet downstream of the original monitoring well (CEF-003-31S) and Well Point (WP#2) locations, as shown on Figure 4-5.

The monitoring wells shall be installed using DPT. Experiences from previous installation efforts at this site have shown DPT is appropriate for these locations and depths. The monitoring wells installed by DPT will consist of a 1-inch diameter micro-well. The wells will be constructed of Schedule 40, threaded, flush-joint, National Sanitation Foundation (NSF)-approved PVC well screen and riser pipe. Each monitoring well will be screened from 20 feet below ground surface (bgs) to 30 feet bgs (same screen interval as CEF-003-31S), and have a 0.01-inch slot with a 2.5-inch 20/30 factory packed mesh sand. A two-foot bentonite or fine sand seal will be placed above the sand pack and completed to the surface with grout slurry as shown on Figure 4-6. The riser will extend approximately 3 feet above the ground surface with a locking cap at the top, and will be completed with a protective surface casing.

The Well Points will be installed immediately adjacent to the edge of the typical creek water level edge (same approximate location from creek edge as observed in existing Well Point WP#2). The well points will be direct driven to a depth 2 feet below the typical creek water level, which is a total depth of approximately 3 feet bgs; the total depth is dependent on the creek edge slope which is relatively steep. The well points will be constructed of Schedule 40, threaded, flush-joint, NSF-approved PVC well screen and riser pipe. The screen will be 0.01-inch slot measuring 12 inches long; therefore, the screen interval will be located from 2 feet to 3 feet below the typical creek surface level. Typically the creek is about 2 to 3 feet deep along its center line. Additional information regarding previous Well Point installations is contained within Attachment 3.

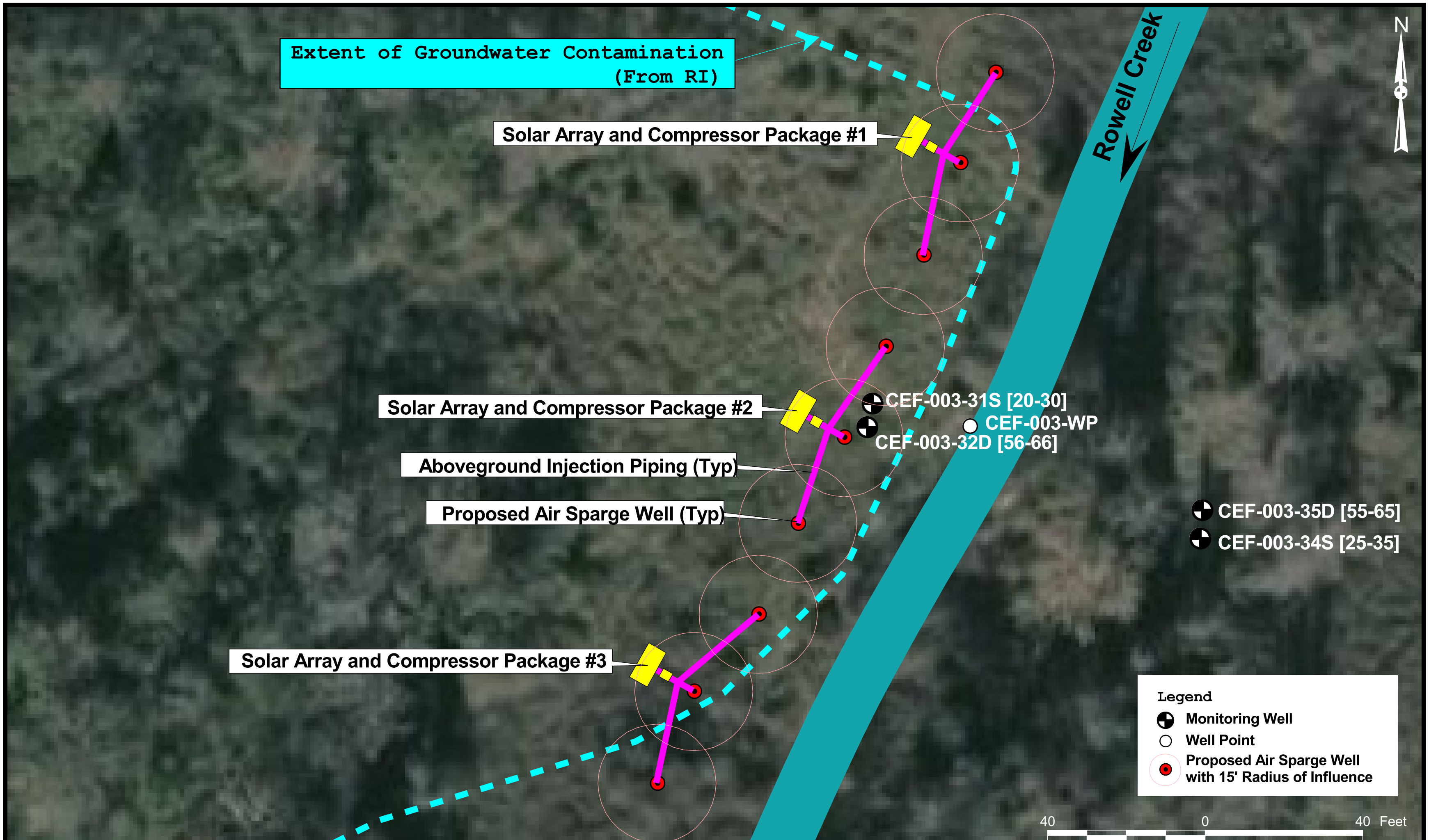
4.4 AIR SPARGING SYSTEM SITING

Because the pilot study test is being conducted on Jacksonville Aviation Authority (JAA) property within the flight path of landing aircraft, and there will be elevated solar panel structures on the site, Federal Aviation Administration (FAA) publications were reviewed to ensure compliance for the system siting. Based upon a conservative analysis of *Technical Guidance for Evaluating Selected Solar Technologies on Airports*, November 2010, and *FAA Advisory Circular 150/5300-13*, 1989, most recently amended in 2011, it was determined that the location of the pilot study is outside the Runway Protection Zone (RPZ) configuration/location. Additionally, the solar power array structures do not exceed any obstruction standards contained in 14 Code of Federal Regulations (CFR), Part 77. With respect to aircraft safety, the selected solar panels have low reflective characteristics that utilize patented surface pyramids to enhance sunlight absorption by redirecting reflected light to other areas on the cell surface to be reabsorbed. Photographs of similar applications are provided on Figure 4-7.

TABLE 4-1

EQUIPMENT LIST
SITE 3, NAS CECIL FIELD
JACKSONVILLE, FLORIDA

No	Item	PID symbol	Model/ Part No.	Vendor	Qty
1	Solar panels	NA	STP190S-24/Ad+	Genpro	18
2	50″H x 25″W x 25″D outdoor cabinet, aluminum construction with sun-reflective paint, double access doors, venting louvers	NA	OD-50DX©	DDB Unlimited	3
3	Rocking Piston Compressor, Model: , 3.2 SCFM & 20 psig, 40 psig maximum pressure, 1/3 hp, 115 VAC	AC-A, AC-B, AC-C	2660CE37	Thomas Gardner	3
4	Mini Programmable Logic Controller (timer), 8 Signal Input/4 Relay Output, 100/240 VAC, Eaton Corp model Easy512-AC-RC	PT-A, PT-b, PT-C	7244K8	McMaster	3
5	Programming software, Easy-Soft-Basic	NA	Included	Wesco	1
6	Brass Solenoid Valve, ASCO Red Hat part number 8210G094, normally closed, 1/2 FNPT, 115VAaC, 11.6 watts, 120 psi diff pressure, 5/8" orifice	SV-A1 to SV-C3	3UL13	Grainger	9
7	Dial-Indicating Flowmeter for Air Aluminum, 1/4" FNPT, 0-10 SCFM, 2-1/2" Dial	NA	9909K11	McMaster	1
8	Adjustable pressure switch, Dwyer, 5 to 25 PSIG, 1/8" MNPT, normally open	PS-A to PS-C3	A2-2801	Dwyer	9
9	Adjustable pressure switch, Dwyer, 20 to 60 PSIG, 1/8" MNPT, normally open	HPS-A, HPS-B, HPS-C	A2-3811	Dwyer	3
10	Hour meter, no voltage type (dry contact), Trumeter model 7511	TR-A to TR-C3	17015T12	McMaster	12
11	Pressure gauge, 0-30 psig	PG-A	32255K71	McMaster	3
12	1/2" FNPT bronze ball valve with union end	V-A to V-C3	45135K63	McMaster	12
13	1/2-inch 304SS tubing, 100' coil	NA	8989K67	McMaster	3
14	1/8-inch 304SS tubing, 6' length	NA	8989K11	McMaster	3
15	1/2" tube x 1/2" NPT Male Pipe Adapter, brass	NA	50915K328	McMaster	9
16	1/8" tube x 1/8" NPT Male Pipe Adapter, brass	NA	50915K311	McMaster	18
17	Various 1/2" fittings (tees, nipples, etc.)	NA	NA	McMaster	1



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COST/SCHEDULE-AREA	
SCALE AS NOTED	

SYSTEM SITE MAP
OPERABLE UNIT 8, SITE 3
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

CONTRACT NUMBER 2267	
APPROVED BY	DATE
APPROVED BY	DATE
DRAWING NO. FIGURE 4-1	REV 0

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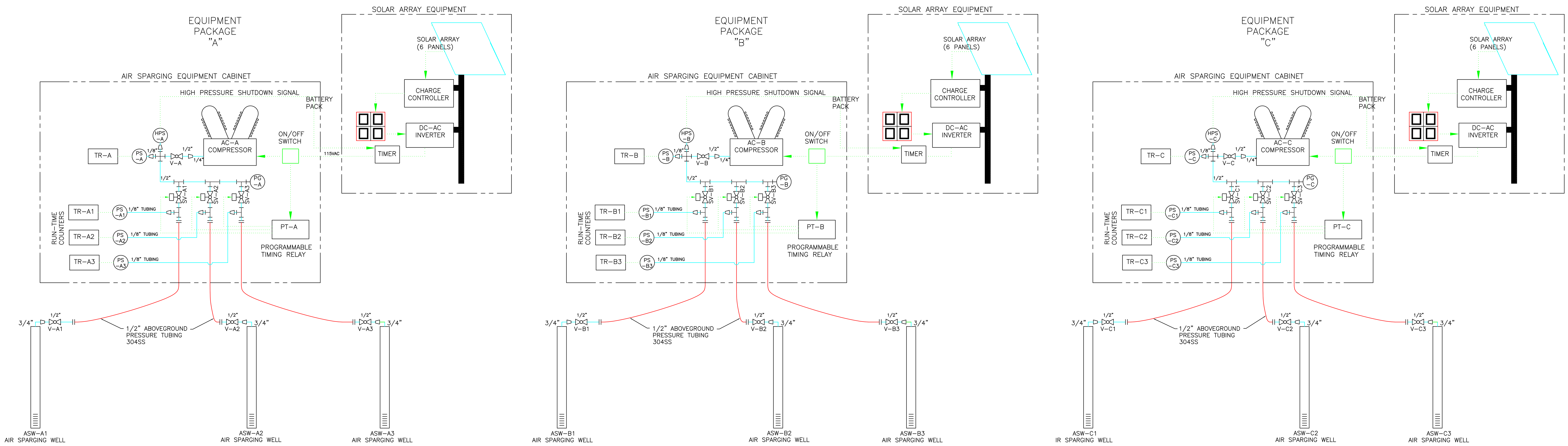
KEY EQUIPMENT ITEMS

OILLESS ROCKING PISTON AIR COMPRESSOR (AC–A TO AC–C), THOMAS MODEL 2660CE37 1/3 HP, 115VAC, 3.2 SCFM @ 20 PSIG	SOLAR ARRAY: SIX (6) SOLAR PANELS @ 180 Watts, 36 Volts, 32"Wx62"L EACH PANEL; 124"Wx96"L ENTIRE ARRAY POLE–MOUNTED AT ASW–1 TO ASW–3	EQUIPMENT CABINET: OUTDOOR RACK ENCLOSURE DBB UNLIMITED MODEL OD–50DXC ALUMINUM CONSTRUCTION, SUN–REFLECTIVE PAINT (WHITE), LOUVERS FOR VENTING, TWO SIDE ACCESS DOORS	BATTERY PACK: 24 Volts FOUR (4) 12–Volt CELLS @ 105 AH	PROGRAMMING TIMING RELAY (PT–A TO PT–C), EATON MODEL EASY512–AC–RC, 4 RELAY OUTPUTS	SOLENOID VALVES (SV–1A TO SV–3C), ASCO RED HAT MODEL 8210G094, 1/2" FNPT, NORMALLY CLOSED, 11.6 WT COIL, 115 VAC	PRESSURE SWITCHES (PS–A TO PS–C3, DWYER MODEL A2–2801, 5 TO 25 PSIG, 1/8" MNPT	HIGH PRESSURE SWITCHES (HPS–A TO HPS–C, DWYER MODEL A2–3811, 20 TO 60 PSIG, 1/8" MNPT	RUN–TIME METER (TR–A TO TR–C3) TRUMETER MODEL 7511, NO–VOLTAGE DRY CONTACT, 10 YEARS BATTERY LIFE



NOTES

1. THREE IDENTICAL EQUIPMENT PACKAGES (DESIGNATED AS "A" THROUGH "C") ARE TO BE INSTALLED: TOTAL OF NINE (9) AIR SPARGING WELLS, THREE (3) SOLAR ARRAYS, AND THREE (3) AIR COMPRESSORS.

2. AIR FLOW WILL BE ALTERNATED BETWEEN AIR SPARGING WELLS BY PROGRAMMABLE TIMING RELAY.

3. INJECTION AIR FLOW IS 3 TO 3.5 CFM. EXPECTED INJECTION PRESSURE AT WELLHEAD IS 15 TO 25 PSIG.

5. AIR COMPRESSOR IS 1/3 HP WITH 40 PSIG MAXIMUM DISCHARGE PRESSURE.

6. SOLAR ARRAY DIMENSION IS APPROXIMATELY 10 FEET BY 8 FEET AT 1080 WATTS TOTAL RATED POWER OUTPUT.

LEGEND

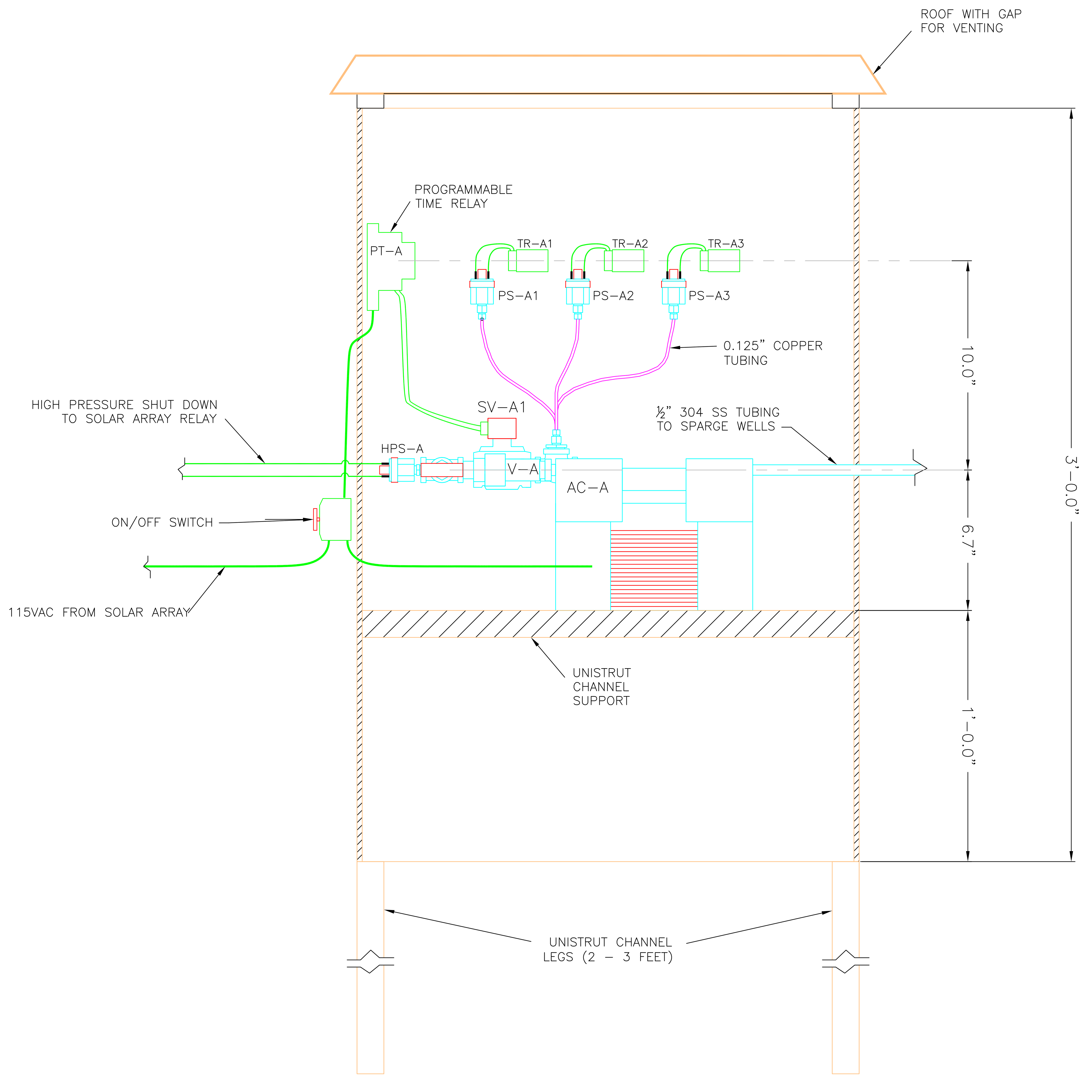
PS–	PRESSURE SWITCH
PG–	PRESSURE GAUGE
SV–	SOLENOID VALVE
V–	BALL VALVE
AC–	AIR COMPRESSOR
PT–	PROGRAMMABLE TIME RELAY
TR–	RUN–TIME COUNTER

DRAWN BY: BD	DATE: 10–05–11
CHECKED BY: RS	DATE: 10–05–11
COST/SCHEDULE–AREA	
SCALE: NTS	

AIR SPARGING SYSTEM P&ID

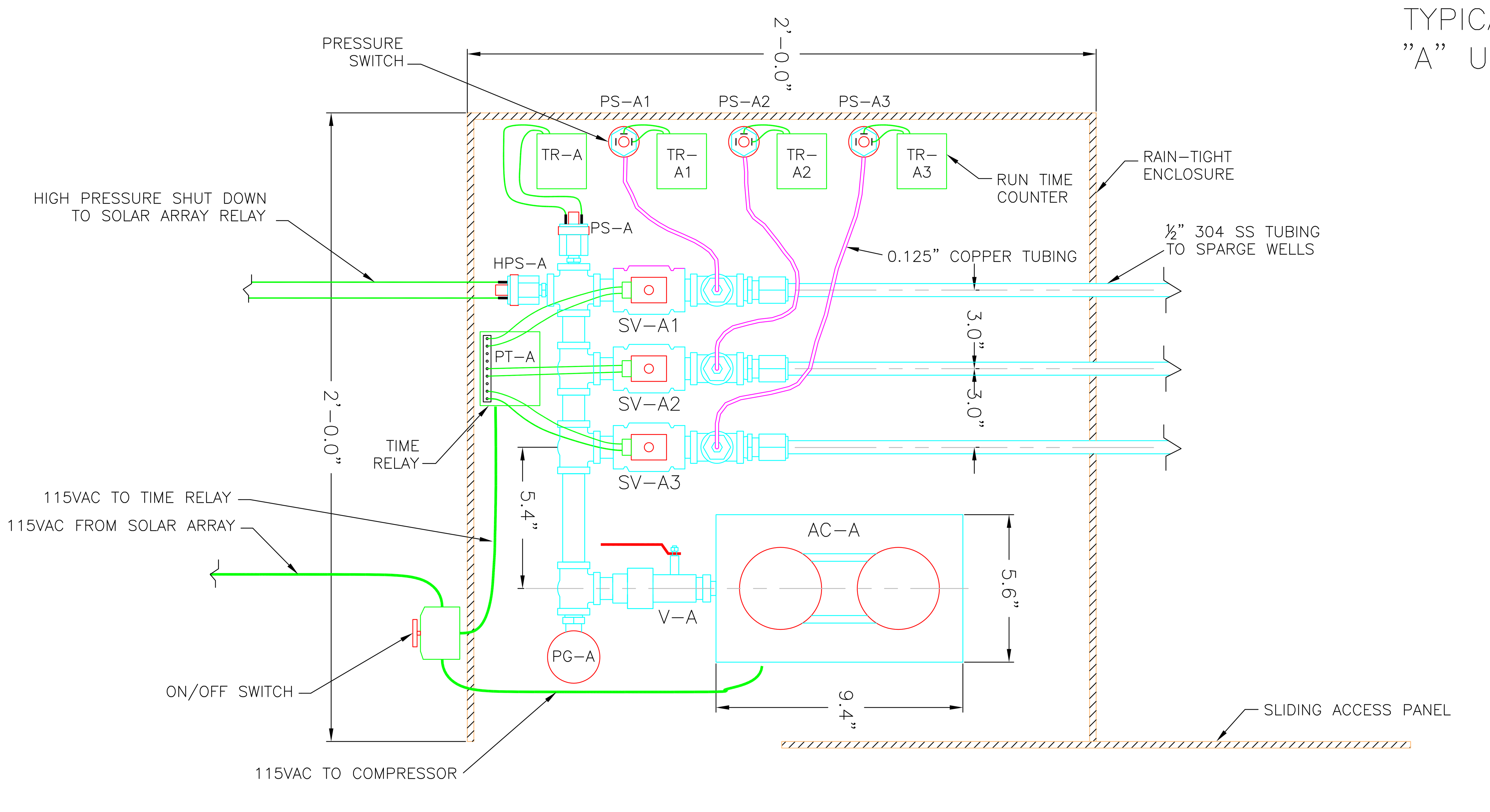
OPERABLE UNIT 8, SITE 3
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

CONTRACT NUMBER: JM09	
DRAWN BY	DATE
DRAWN BY	DATE
DRAWING NO.: FIGURE 4–2	REV: 0



EQUIPMENT CABINET FRONT VIEW

NOTE:
TYPICAL OF 3 UNITS
"A" UNIT SHOWN



EQUIPMENT CABINET PLAN VIEW

SCALE
0 8" 16"

DRAWN BY	DATE
BD	10-05-11
CHECKED BY	DATE
RS	10-05-11
COST/SCHEDULE-AREA	
SCALE 1" = 8" (11"x17")	

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AIR SPARGING EQUIPMENT CONFIGURATION

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

CONTRACT NUMBER JM09	
DRAWN BY	DATE
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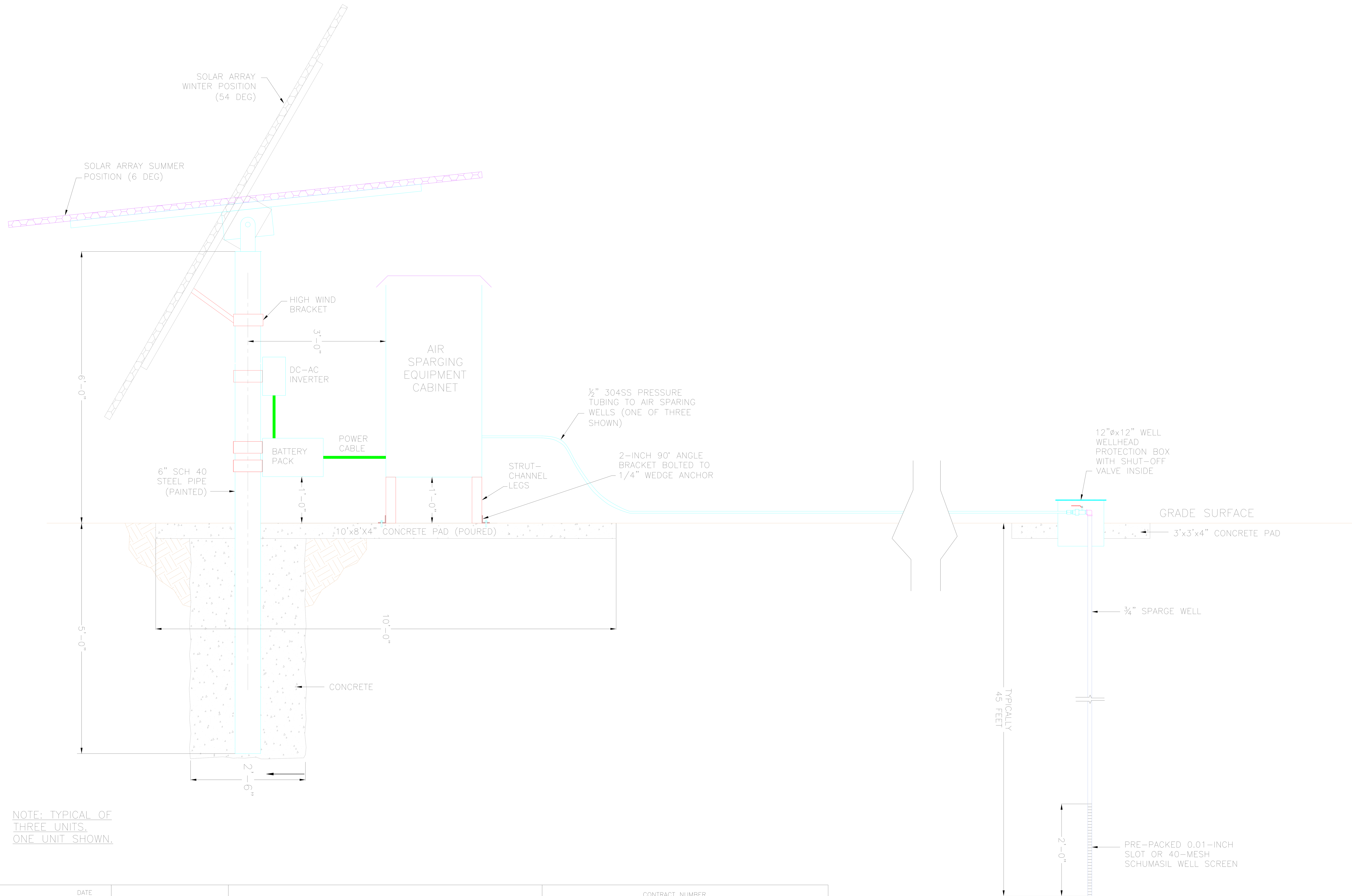

NOTE: TYPICAL OF THREE UNITS. ONE UNIT SHOWN.

DRAWN BY: BD	DATE: 10-05-11	SOLAR ARRAY AND SPARGING EQUIPMENT SET-UP	CONTRACT NUMBER: JM09
CHECKED BY: RS	DATE: 10-05-11	OPERABLE UNIT 8, SITE 3 NAVAL AIR STATION CECIL FIELD JACKSONVILLE, FLORIDA	DRAWN BY / DATE
COST/SCHEDULE-AREA			DRAWN BY / DATE
SCALE: NTS			DRAWING NO.: FIGURE 4-4 — REV: 0

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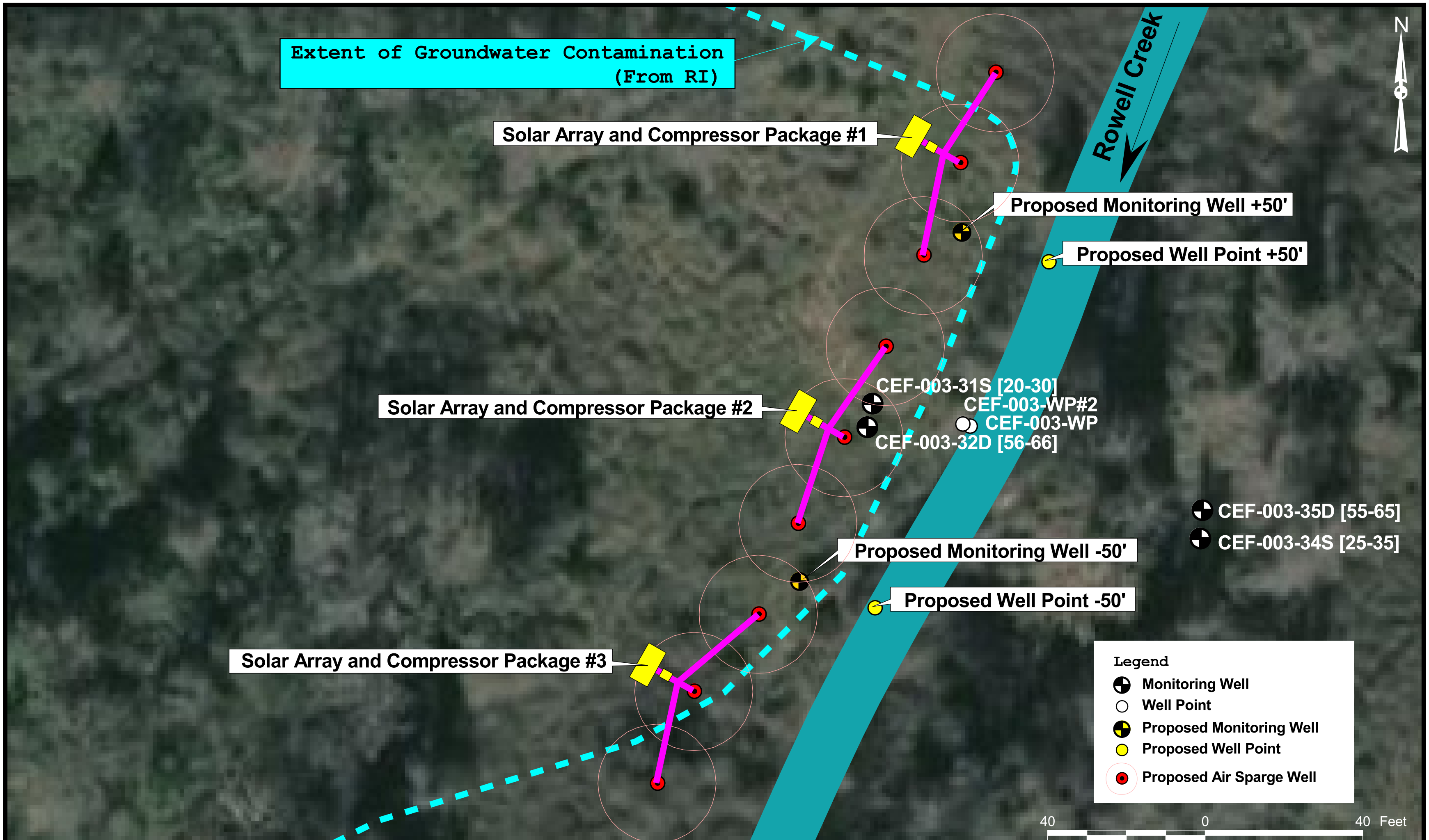

DRAWN BY MJJ	DATE 23Sept11	PROPOSED MONITORING WELL AND WELL POINT LOCATIONS OPERABLE UNIT 8, SITE 3 NAVAL AIR STATION CECIL FIELD JACKSONVILLE, FLORIDA	CONTRACT NUMBER 2267
CHECKED BY	DATE		APPROVED BY / DATE
COST/SCHEDULE-AREA			APPROVED BY / DATE
SCALE AS NOTED			DRAWING NO. FIGURE 4-5 / REV 0

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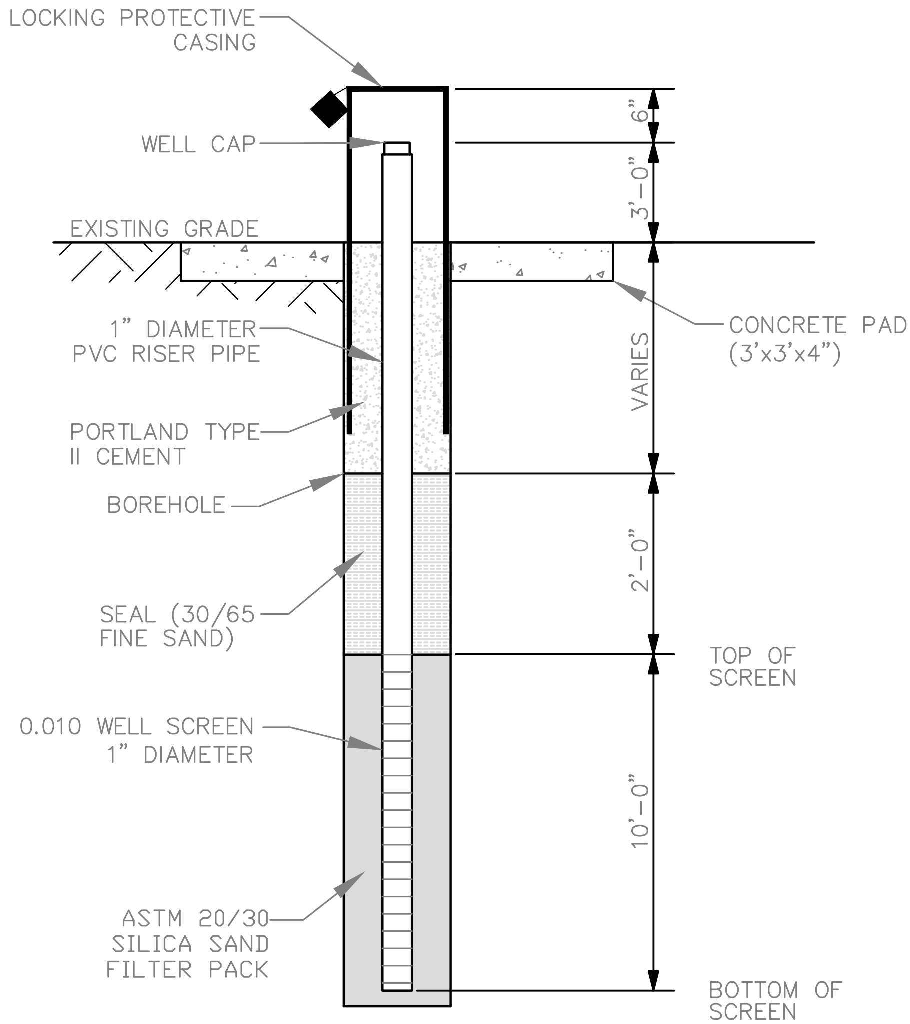

TYPICAL WELL

NOT TO SCALE

DRAWN BY MF — DATE 9/26/11	MONITORING WELL CONSTRUCTION OPERABLE UNIT 8, SITE 3 NAVAL AIR STATION CECIL FIELD JACKSONVILLE, FLORIDA	CONTRACT NO. 0378
CHECKED BY — DATE		OWNER NO.
REVISED BY — DATE		APPROVED BY — DATE
SCALE AS NOTED		DRAWING NO. FIGURE 4-6 — REV. 0

FORM CADD NO. SDIV-AV.DWG - REV 1 - 9/10/98

Figure 4-7

5.0 SYSTEM INSTALLATION AND STARTUP

This section describes specific field operations, methods, and procedures to be used for this pilot study field effort during installation, startup, and initial evaluation.

5.1 MOBILIZATION/DEMOBILIZATION

Implementation of the pilot test will be conducted in several phases once the final Work Plan is approved. These phases will include: procurement of equipment, supplies, and professional services; assembling the various components offsite prior to installation; monitoring well, well point, and system well installation; system pad and mounting pole installation; field installation of system; system startup; system operation and maintenance, and evaluation.

During the onsite field activities, the Field Operations Leader (FOL)/site geologist will be assigned the role of Site Safety Officer. A drilling subcontractor will mobilize the necessary personnel, equipment and supplies for air sparging and monitoring well installation. Well points will be installed by Tetra Tech personnel. A separate subcontractor may be utilized to install the steel poles for the solar array supports and concrete works. The air sparging process equipment assembly and installation will be performed by Tetra Tech personnel. The current Health and Safety Plan (HASP) for activities being conducted at the Cecil Field Installation Restoration (IR) sites will be updated to include the proposed activities for this Site 3 Pilot Test effort.

5.2 MONITORING AND SYSTEM WELL INSTALLATION

Two additional monitoring wells and two additional well points will be installed to assist in the evaluation of the effectiveness of the air sparge system. The system wells will be installed by a certified drilling subcontractor in accordance with the information provided in Section 4.2.1, and the monitoring wells will be installed by a certified drilling subcontractor in accordance with the information provided in Section 4.3. The well points will be installed by Tetra Tech personnel in accordance with the information provided Section 4.3.

The drilling subcontractor might also be utilized to install the support posts for the Solar Arrays, or another specialty subcontractor may be procured for this effort. Upon completion of the system installation, a certified surveying subcontractor will be procured to perform the tasks described in Section 5.4.

5.3 SYSTEM CONSTRUCTION

The main components of the air sparging curtain are the air sparging wells (nine total), pole-mounted solar power arrays (three total), air sparging equipment modules (three total), and above-ground compressed air injection lines. The construction details for these components are summarized in the following sections.

5.3.2 Solar Power Arrays

A total of three solar power arrays with associated equipment will be installed in locations shown on Figure 4-1. Each solar array with all associated electrical components (charge controller, battery pack, etc.) will be mounted on top of a 6-inch diameter Schedule 40 steel pipe as shown on Figure 4-4. The total length of the 6-inch steel pipe will be 11 feet long; 5 feet of the pipe will be in the ground anchored with concrete within a 30-inch borehole. A post hole digging machine or an accessory capable of using 30-inch diameter augers could be used for the purpose of installing these pipes. The steel pipe will be centered within the borehole and anchored with concrete. Depending on the existing ground surface conditions, a small concrete pad (10 feet by 8 feet by 4 inches) will be installed around the 6-inch steel pipe as shown on Figure 4-4 to serve as a base for the air sparging equipment module.

Equipment related to the solar power arrays will be supplied by a vendor as a complete package ready for installation. The hardware brackets for holding the solar panels will be mounted on the top of the 6-inch steel pipe. The solar panels will be attached to the mounting brackets. All power components such as battery pack and charge controller will be attached directly to the 6-inch pipe below the solar array as shown on Figure 4-4. All housings, junction boxes, and electrical wiring will be rain-tight.

5.3.3 System Process Equipment

The system has been designed to minimize the number of components while providing the information necessary to verify and quantify the operation of the system. The design enables simple component replacement, as needed; however, components were selected with longevity and reliability as a primary consideration.

The air compressor with all its associated controls and instrumentation will be housed in a small pre-fabricated rain-tight ventilated equipment cabinet as shown on Figure 4-3. The equipment cabinet dimensions will be approximately 2 feet wide by 2 feet deep by 4 feet high. The electrical rating for the equipment cabinets is NEMA 3R (protection in outdoor applications against rain, sleet and snow; or indoors against dripping water). The legs of the equipment cabinets will be bolted to the concrete slab using common concrete anchors as shown on Figure 4-4. The construction details for the equipment cabinet (DDB Model OD-50DXC) are presented in Attachment 5.

The equipment, piping, instrumentation, and controls inside the cabinets will be assembled off-site to minimize the personnel time in the field, and to improve the installation quality. The equipment cabinets will be mobilized to the site as turn-key ready-to-use equipment modules. The modules will be tested and evaluated prior to shipment. Only minor work (such as connecting tubing to the air sparging wells) will be needed in the field.

Each of the air sparging equipment modules will have three aboveground compressed air lines: one to each of its associated air sparging wells. The aboveground lines will be ½-inch OD stainless steel tubing with a pressure rating of 1,337 psig. This high-strength tubing was selected to minimize damage caused by accidental breakage, sun exposure, temperature, and other risk factors. The tubing can be placed slightly below the ground surface to prevent significant heating of the tubing caused by direct exposure to the sunlight. The tubing connections to each sparge well and the wellhead shut-off valve will be housed in a raised wellhead protection box (12-inch diameter steel box with 12-inch galvanized steel sheet metal skirt). A typical sparge well wellhead connection is shown on Figure 4-4.

5.4 DECONTAMINATION, INVESTIGATION-DERIVED WASTE HANDLING, AND SURVEYING

Decontamination activities will be conducted during the installation of the sparge wells, monitoring wells and well points in accordance with the Tetra Tech Decontamination of Field Equipment and Waste Handling Standard Operating Procedure (SOP).

Investigation-derived waste (IDW) generated during the pilot study is to be handled and disposed in accordance with the Tetra Tech Decontamination of Field Equipment and Waste Handling SOP and NAS Cecil Field practices. Purge water waste from well sampling will be stored in drums. The drums will be transported to the IDW storage building until they can be properly disposed.

The locations of new air sparging wells, monitoring wells, well points, air sparging equipment modules, and compressed air lines will be surveyed upon completion of the installation.

5.5 START-UP OPERATION

Startup of the sparge curtain system will be performed after all construction activities are completed. Start-up activities for each equipment module will be identical. The primary tasks during the start-up of each equipment module are as follows:

- Perform functional equipment tests and shakedown
- Evaluate system daily run-time duration (solar arrays)
- Determine sparge wells pulsing intervals
- Evaluate ROI

A period of sunny weather is preferable for the system start-up. Following the system construction, the electrical wiring and mechanical set-up will be checked according to the equipment manufacturer's recommendations. The battery pack charge controller at each solar array will then be turned on to charge the batteries. The approximate time the battery packs take to acquire a full charge will be recorded.

5.5.1 Daily Run Time

Initially, the individual sparging wells will be tested in a manual mode. After the batteries are fully charged, the air compressors in each equipment module will be turned on at a pre-determined time of the day (1 to 2 hours after sunrise). At this time during the initial start up evaluation, the control valves will be configured such that only one sparge well (out of three) associated with each equipment module will be connected to the air compressor discharge. For example, initially wells ASW-A1, ASW-B1, and ASW-C1 will be operated (solenoid valves SV-A1, SV-B1, and SV-C1 will be open; wellhead valves V-A1, V-B1, and V-C1 will be open; and the rest of the valves will be closed) (See Figure 4-2).

When the injection flow and pressure stabilize (see Section 5.5.2 below), the control valves will be manually switched to allow wells ASW-A2, ASW-B2, and ASW-C2 to operate (solenoid valves SV-A2, SV-B2, and SV-C2 will be open; wellhead valves V-A2, V-B2, and V-C2 will be open; the rest of the valves will be closed) (See Figure 4-2). Finally, after pressure and flow stabilize, the control valves will be manually switched to allow wells ASW-A3, ASW-B3, and ASW-C3 to operate (solenoid valves SV-A3, SV-B3, and SV-C3 will be open; wellhead valves V-A3, V-B3, and V-C3 will be open; the rest of the valves will be closed) (See Figure 4-2).

During this initial phase of the start-up, the air compressors will be allowed to run until the low voltage sensor detects that the battery pack has been depleted to the designated level and turns the system off. It is anticipated that the level of depletion will be set at 25 percent (75 percent capacity remaining). Note that the system is designed so that operation of the air compressor uses less voltage than what is produced by the solar panels in typical sunlight. The period of time from initial start-up to when the low voltage sensor shuts the system off will be considered the longest run time duration attainable at that time of the year, provided that the start-up is performed on a sunny day. The solar array timers will then be adjusted for a daily system run time that is less than this maximum attainable run time in order to prevent an excessive battery pack discharge. It is preferred that the timers shut off the system rather than relying on the low voltage sensor. Battery performance and life expectancy are optimized when draining of the battery pack is minimized. This daily run-time duration will be adjusted during the year to account for a changing daylight time duration as discussed in Section 6.2. It is expected that the daily runtime duration will vary from 6 to 9 hours.

The hours of daylight and solar noon information for any given day or time period can be found at: http://www.timeanddate.com/worldclock/astronomy.html?n=411. This information will be used to assist in the setting of the timers, as will site-specific observations such as the locations of trees and other nearby obstructions.

5.5.2 Pulse Frequency

During the testing of individual sparging wells in a manual mode (as described in Section 5.5.1), a detailed record of pressure and air flow changes versus time will also be created. Air flow meters will be used during the start-up to confirm the pressure versus flow performance curve for the air compressors. After the start-up, air flow meters will be taken off line to reduce pressure losses and to prevent mechanical damage. The air flow meters used during the start-up will be direct reading variable area type with 0 to 10 SCFM scale. Periodic checks to confirm performance curves will be conducted with the monthly evaluations. If necessary, data logging pressure transducers will be used to record the changes in the injection pressure. A record of pressure and air flow changes versus time will be developed for each of the air sparging wells in the curtain.

It is expected that immediately after the compressor start-up, the pressure will build up to a maximum level and then gradually decrease until it reaches a near constant level when all injected air pathways within the saturated formation are established. The injection air flow will likely gradually increase and then reach a near constant level as pathways for the compressed air become fully developed. Sparging well pulse frequency will be the time needed for the injection flow and pressure to stabilize. It is expected that the pulse frequency initially will be 1 hour. Because the sparge wells are located in areas of similar geology and are constructed in the same way, the pulse duration is expected to be similar for all of the sparge wells in the curtain. The programmable timers within the sparging equipment cabinets will be programmed to automatically maintain the selected pulse frequency, and rotate the air flow between the sparge wells.

5.5.3 Radius of Influence

The existing and new monitoring wells and well points in Rowell Creek will be used to determine the ROI of the sparging wells in the curtain. Prior to the system start-up, baseline measurements of depth to water and several field parameters (dissolved oxygen, ORP, pH, temperature, conductivity) will be taken. The following monitoring wells and well points will be used for this purpose:

- CEF-003-20S (existing monitoring well) – in area, but screened at 4 feet to 14 feet bgs.
- CEF-003-28S (existing monitoring well) – significant distance (400 feet) from test area.
- CEF-003-31S (existing monitoring well) – within treatment area.
- CEF-003-40S (new proposed monitoring well) – within treatment area.
- CEF-003-41S (new proposed monitoring well) – within treatment area.
- CEF-003-WP2 (existing well point) – within treatment area.
- CEF-003-WP3 (new proposed creek well point) – within treatment area.
- CEF-003-WP4 (new proposed creek well point) – within treatment area.

During the system start-up, regular measurements will be collected of depth to water in the monitoring wells and well points, and the other field parameters. The Evaluation Worksheet (page 4 of 6 ROI Measurement Data in Attachment 8) will be used to record this information. Because the depth to water at the site is very shallow and the monitoring wells are in close proximity to the sparge curtain, it is possible that after the air sparging system start-up the groundwater will flow out of the monitoring wells. To prevent this, monitoring well casings may be extended aboveground or the wells may be sealed.

Baseline groundwater sampling which will be conducted prior to system startup is discussed in Section 6.0.

6.0 OPERATION, MAINTENANCE, AND EVALUATION

This section describes the requirements and procedures for the pilot study system operation and maintenance, and the evaluation of the system's operation and effectiveness.

6.1 GROUNDWATER MONITORING

The effectiveness of the system will be evaluated primarily based on its ability to reduce contaminant concentrations in the well point and treatment area monitoring well groundwater samples. A baseline sampling event will be conducted after well installation and before AS system startup activities. The wells that will be used to evaluate the effectiveness of the system are: three monitoring wells (CEF-003-31S, CEF-003-40S, and CEF-003-41S) and three well points (WP#2, WP#3, and WP#4). These wells and well points will be sampled and analyzed for VOCs in accordance with the procedures and methods identified in the UFP-SAP approved for Site 3 groundwater monitoring efforts (Tetra Tech, 2011).

Site 3 is currently being monitored on an annual basis every September under the long-term monitoring program; however, the following additional sampling of the six wells to establish a baseline is proposed:

- Baseline (after well installation and before system startup).
- One month after system startup.
- Quarterly (3 months after system startup and for the next three quarters after that to provide monitoring of system for a 1-year period).
- Annually (the newly installed wells will be added to the LTM monitoring program to verify compliance at the well point locations).

Table 6-1 provides a summary of the analyses, methodologies, bottle requirements, preservation requirements, and holding times for the samples to be submitted for fixed-base laboratory analysis.

6.2 SYSTEM EVALUATIONS

System evaluations will be conducted in conjunction with the operation and maintenance activities. It is assumed that after system startup, bi-monthly site visits will be performed to check the system status and to collect measurements of the operational parameters. Evaluations will be conducted monthly after the system has established an acceptable performance record.

During each evaluation, a routine equipment status check will be performed according to the equipment manufacturer's recommendations. The form to be completed for this status check is provided in Attachment 8. The system process piping will be checked for leaks. The monitoring wells and well points in the vicinity of the air sparging curtain will also be checked for water and air seeps. Rowell Creek will be visually checked for air bubbles. The following operational parameters will also be recorded during each site visit:

- Injection pressure at each compressor (pressure gauges PG-A, PG-B, and PG-C; Figure 4-2).

- Injection air flow, which will be determined based on the injection pressure measurements (start-up data and manufacturer's compressor test data in Attachment 7).

- Total run time of each air compressor (run-time counters TR-A, TR-B, and TR-C; Figure 4-2).

- Total run time of each sparge well (run-time counters TR-A1, TR-A2, TR-A3, TR-B1, TR-B2, TR-B3, TR-C1, TR-C2, and TR-C3; Figure 4-2).

- Solar array system performance data (charge controller log for previous 128 days).

The information collected will be used to determine the system operational history for the period between the personnel site visits.

The solar arrays will also be adjusted periodically to maintain optimum efficiency and run time. The following solar array adjustments will be performed every 2 months depending on the actual operational requirements:

- Solar array angle: will vary from 6 degrees at summer solstice to 54 degrees at winter solstice. Adjustments will be made in equal increments (8degree increments if adjustments are performed every 2 months).

- Solar array timer daily run time duration: will vary from maximum duration at summer solstice to minimum duration at winter solstice. Adjustments will be made in equal increments (if duration in June is 9 hours and in December is 6 hours, the increments would be ½ hour every 2 months).

6.3 OPERATION AND MAINTENANCE

The air compressors are the only system equipment items with moving parts. Therefore, the operation and maintenance of the air sparging curtain is not expected to be labor intensive. It is assumed that initially bi-monthly site visits will be performed to check the system status and to collect measurements of the operational parameters. The duration between site visits will likely be increased once the system is fully operational and a performance record has been established.

It should be noted that the sparging curtain is located in an area where hurricanes may occur. The solar arrays are designed to withstand up to 90 miles per hour (mph) wind. However, it is recommended that the solar panels and equipment cabinets be removed and stored off site if a hurricane is forecasted.

6.4 TROUBLESHOOTING

If a high pressure alarm switch triggers an equipment module shut-down, then the alarm condition will be cleared and the equipment module will be re-started.

It is also possible that the low voltage sensor cut-off limit will need to be adjusted periodically.

Injection air flow will be determined based on the injection pressure rate ROI.

6.4.1 <u>Automatic Shutdown</u>

A high pressure switch in each of the equipment modules (PS-A, PS-B, PS-C; Figure 4-2) will shut down the air compressor if the injection pressure exceeds a preset-point. The most likely cause of this would be a malfunction of a solenoid valve. The air compressor will remain shut off until the system is manually reset and restarted.

6.4.2 <u>System Shutdown and Re-Start</u>

System shutdown will be conducted in the manual mode. To shut down the system, the “On/Off” switch on the equipment cabinet will be turned to the “Off” position (Figure 4-3).

Following an automatic shutdown, the system will be restarted after determining and correcting the cause of the automatic shutdown. Prior to resetting and restarting the system, all wellhead valves will be opened (VA-1 through VC-3). The “On/Off” switch on the equipment cabinet will be reset (Figure 4-3). The same procedure will be followed to restart the system after manual shutdown.

TABLE 6-1

**SUMMARY OF FIXED-BASE LABORATORY ANALYSES, METHODOLOGIES, BOTTLE REQUIREMENTS, PRESERVATION REQUIREMENTS, AND HOLDING TIMES
OPERABLE UNIT 8 SITE 3
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA**

Analysis	Analytical Method or SOP	Quantity of Samples[(1)]	Quantity of Containers per Sample	Container Type	Preservation Requirements	Holding Times[(2)]
Aqueous Samples						
Chlorinated VOC	SW-846 8260B	6	3	40-mL vials with Teflon septa (Borosilicate glass)	Cool to 4°C HCl to pH $\leq$ 2	14 days to analysis

SOP Standard operating procedure.
VOC Volatile organic compounds.

1 Samples per event. Number does not include QA/QC samples to be analyzed.
2 All holding times are determined from date of collection.

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ATTACHMENT 1

EPA MEMORANDUM REGARDING SITE 3 YEAR 12 GROUNDWATER MONITORING REPORT

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4

61 Forsyth Street
Atlanta, Georgia 30303-3104

August 11, 2011

4SD-TSS

MEMORANDUM

SUBJECT: NAS Cecil Field, Jacksonville, Florida

FROM: William N. O'Steen, Environmental Scientist
Technical Services Section, Superfund Division

THROUGH: Glenn Adams, Chief
Technical Services Section

TO: Deborah A. Vaughn-Wright, Remedial Project Manager
DOD Section

This memorandum responds to your request for a review of **the Final Year 12 Annual Groundwater Monitoring Report, September 2010, Site 3, Former NAS Cecil Field, Jacksonville, Florida**. This document is referred to herein as 'the Report." I am not providing you with comments per se on the contents or structure of this document. Rather, this memorandum presents an independent data analysis for your consideration. If this presentation does not meet your needs, please inform me and I can prepare a supplemental memorandum that is strictly a review of the Report. For your convenience, discussion in this memorandum is referenced to specific sections or pages of the Report, as applicable, and a summary of the review is included at the end of the memorandum text. If you need additional technical assistance on this project, please contact me.

Background Discussion

Site 3 remedial action began in 1999 with air sparging of groundwater in the general contaminant source area. The air sparging remedial action continued on an intermittent basis from May 2000 until the summer of 2002. According to text at the end of Section 1.2 of the Report, the air sparging groundwater remedial action at Site 3 has been offline since sometime between a late July 2002 sampling event and a September 2002 sampling event. Therefore, since that time, natural attenuation of groundwater contamination has been the sole groundwater remedial action occurring at Site 3. Thus, one might ask how effectively the natural attenuation of groundwater contamination is proceeding since the initial sampling event following shutdown of the air sparging system (September 2002 and more recent groundwater samples).

Figure 4 of the Report shows monitoring wells at which there are current exceedances of one or more of Florida's Groundwater Cleanup Target Levels (GCTLs) and/or an exceedance of concentrations of naturally occurring inorganics established as background values (inorganic background data set (IBDS)). Based on Figure 4, there are three areas of interest for a review of the monitoring data collected beginning in September 2002: the general source area (currently of interest are data from CEF-003-06S, CEF-003-07S, and CEF-003-13S); a location midway between the general source area and the groundwater discharge area to the east, represented by data from CEF-003-28S; and data from monitoring locations near the groundwater discharge area, (CEF-003-31S and CEF-003-WP). This review memorandum evaluates conditions in each of these three areas with respect to the progress of groundwater cleanup in the passive remedial environment (remediation through only natural attenuation).

Review of Data from the General Source Area

Figure 4 of the Report identifies wells CEF-003-06S, CEF-003-07S, and CEF-003-13S (hereafter identified in this memorandum as wells 6S, 7S, and 143S) as the three source area wells with current groundwater contamination of concern. A review of Table 3 in the Report indicates the following contaminants of interest in each of these three wells (see Table 1 of this memorandum below). For purposes of this review, contaminants of interest are those that currently or have typically and recently exceed a Florida GCTL or background concentration (as flagged in the Report) and/or a contaminant that is a potential degradation product of one or more contaminants that exceed a GCTL.

Table 1. Contaminants of Interest in the General Source Area

Monitoring Well	Contaminants of Interest	Comments
06S	1,1-dichloroethane, 1,1-dichloroethene, benzene, chloroethane, vinyl chloride	1,1-dichloroethane and chloroethane are biodegradation products of 1,1,1-trichloroethane; 1,1-dichloroethene is a potential abiotic 1,1,1-trichloroethane degradation product; vinyl chloride is a degradation product of biodegradation of trichloroethene
07S	1,1-dichloroethane, 1,1-dichloroethene, chloroethane, cis 1,2-dichloroethene, trichloroethene, dissolved manganese	cis 1,2-dichloroethene is a degradation product of biodegradation of trichloroethene; dissolved manganese data in the Report only cover samples obtained since January 2007
13S	1,1,1-trichloroethane, 1,1,2-trichloroethane, 1,1-dichloroethane, 1,1-dichloroethene, cis 1,2-dichloroethene, trichloroethene, total xylenes, 1,2-dichlorobenzene, 1,4-dichlorobenzene, 2-methyl naphthalene; naphthalene, dissolved iron	1,2-dichlorobenzene, 1,4-dichlorobenzene, 2-methyl naphthalene and naphthalene are identified in the Report as semivolatile organic compounds; dissolved iron data in the Report only cover samples obtained since January 2007

Based on Figure 4 of the Report, 13S is clearly the well in the general source area with the highest overall degree of groundwater contamination. Figure 1 of this memorandum plots 13S groundwater concentration data for the period since the active groundwater remediation ended (September 2002 and later), showing the contaminants with the most significant levels of contamination relative to their performance standards (and their degradation products, if present). Data are shown at a log scale because of the wide concentration ranges of the different contaminants. There are numerous important conditions that can be observed or inferred from

Figure 1:

- Initial concentrations from September 2002 are all very low relative to most of the later results. The first sample reflects concentrations influenced by the air sparging groundwater remedial action.
- Initially, both 1,1,1-trichloroethane and 1,1-dichloroethane concentrations increased after the September 2002 sample, reflecting the adjustment to a condition where the air sparging remedial action no longer was influencing the groundwater quality. For samples collected after 2006, the 1,1,1-trichloroethane concentrations appear to have decreased, while the 1,1-dichloroethane concentrations remained steady or continued to increase somewhat. This condition probably reflects ongoing biodegradation of the 1,1,1-trichlorethane to produce 1,1-dichloroethane. A decrease in 1,1,1-trichloroethane concentrations over time cannot be confirmed through statistical analysis. An increase in 1,1-dichloroethane concentrations over time is indicated by nonparametric statistical trend analysis.
- 1,1-dichloroethene concentrations increased after cessation of the active remedial action, then apparently began to decrease at about the same time that the 1,1,1-trichlorethane concentrations were decreasing. This pattern indicates that degradation of 1,1,1-trichlorethane is probably or mostly a biotic process, because significant abiotic degradation of 1,1,1-trichloroethane to produce 1,1-dichloroethene should have caused an increase or stabilized the 1,1-dichloroethene concentration.
- Trichloroethene concentrations peak after the initial sample (an increase from 5.2 ug/L in September 2002 to 1490 ug/L in February 2003). Then, after the high concentration observed in February 2003, trichloroethene concentrations fluctuated throughout the remainder of the monitoring period. There may be a trend of declining concentrations for the later monitoring events. This supposition is supported by the apparent concentration trends for cis 1,2-dichloroethene, but cannot be supported by nonparametric statistical trend analysis of the trichloroethene data. Further monitoring data from this well may result in statistical confirmation of a probable downward trend in trichloroethene concentrations. If so, it should be possible to predict when trichloroethene concentrations at this location will decrease to a level below the 3 ug/L Florida primary drinking-water standard. A preliminary evaluation of the progress of reduction of trichloroethene concentrations through natural attenuation processes suggests that with a 1490 ug/L concentration in February 2003 and a 417 ug/L concentration in September 2010, the most optimistic time period for concentrations of trichloroethene to decrease to below 3 ug/L exceeds 30 years. This estimation considered that as 417 ug/L is approximately 28% of 1490 ug/L and such a decrease occurred over a 7.5-year period, continued progression would result in 28% of a 417 ug/L concentration remaining after 15 years, 28% of that concentration would remain after 22.5 years, and so forth.
- cis 1,2-dichloroethene concentrations have generally increased since the initial sample. The first sample collected after September 2002 showed a strong increase in the cis 1,2-dichlorethene concentration, similar to that observed for trichloroethene. After this sharp increase in the concentration of cis 1,2-dichloroethene, the concentration dropped substantially in the next sample. However, following the decrease, the cis 1,2-dichloroethene concentration started to rise and has continued to increase over the course of the monitoring period. A trend of increasing concentrations of cis 1,2-dichloroethene is supported by nonparametric statistical trend analysis. The rising concentration of cis

1,2-dichloroethene indicates that at least some of the trichloroethene concentration decrease is occurring through reductive dechlorination.

- trichloroethene is present in higher concentrations than cis 1,2-dichloroethene across the entire monitoring period.
- The most recent concentration of trichloroethene was 417 ug/L. This concentration exceeds Florida's primary drinking-water standard of 3 ug/L by a factor of 139*x*. The "natural attenuation default criterion" for trichloroethene is 100*x* the drinking-water standard, or 300 ug/L. Thus, using the state of Florida's approach for consideration of monitored natural attenuation as a groundwater remedial strategy, the trichloroethene concentration at 13S exceeds the value that the state considers as the maximum level at which monitored natural attenuation may be an appropriate remedial strategy.
- It is unclear from the monitoring data shown on Figure 1 if the concentrations of 1,2-dichlorobenzene and 1,4-dichlorobenzene are changing over time. Nonparametric statistical trend analysis indicates there has been no change in the concentrations of these contaminants. These contaminants are less environmentally mobile and probably less degradable than chlorinated ethenes and ethanes in anaerobic geochemical environments. Thus, it is not surprising that the dichlorobenzenes are relatively stable in concentration and there is no substantive evidence they are decreasing in concentration at 13S.
- 2-methylnaphthalene and naphthalene are similar non-chlorinated semivolatile organic compounds. There is no obvious trend in the concentration of these compounds. They would not be expected to rapidly biodegrade in an anaerobic subsurface environment.

Figure 2 shows trichloroethene and 1,2-DCE concentration data for general source area wells 13S and 7S. These compounds were not present in substantive concentrations in any of the 6S samples collected since September 2002. Figure 2 data are plotted at a log scale to show the wide range in concentrations. Figure 2 shows differing patterns at 7S and 13S. The trichloroethene and cis 1,2-dichloroethene data for 13S are discussed above. Unlike at 13S, there was no rapid increase in 7S trichloroethene and cis 1,2-dichloroethene concentrations after the active remedial action stopped. This differentiation suggests that either the air sparging had a limited effect on the 7S concentrations or that a more prominent degree of residual contaminant mass is present around the 13S location. 7S also shows a widely varying range in concentrations, with no clear trend in concentrations present. The 7S cis 1,2-dichloroethene concentration is generally higher than the trichloroethene over the period shown, and is indicative of some trichloroethene biodegradation around the well. However, the ratio of cis 1,2-dichloroethene to trichloroethene fluctuates over the period of monitoring and thus there is no obvious indication from 7S data of a progressive increase in trichloroethene biodegradation following the cessation of air sparging. The ratio of cis 1,2-dichloroethene to trichloroethene is generally higher to much higher in the samples collected after September 2002 compared to the September 2002 ratio. This difference probably reflects a more favorable geochemical environment for reductive dechlorination after the air sparging remedial action ended.

Figures 3a-3c plot the concentrations of 1,1-dichloroethane, 1,1-dichloroethene, and chloroethane in samples from wells 6S, 7S, and 13S. Chloroethane was not found in substantive concentrations in the 13S samples.

For 1,1-dichloroethane, data from 13S show a progression of increasing concentrations following cessation of active remedial actions. 1,1,1-trichloroethane is the parent compound of this degradation product and is present in higher concentrations than 1,1-dichloroethane after the September 2002 monitoring event. However, later sample results indicate a higher proportion of 1,1-dichloroethane relative to 1,1,1-trichloroethane present in the 13S samples, suggesting probable greater biodegradation of 1,1,1-trichloroethane occurring at later monitoring periods. For 7S, the later samples tend to have somewhat higher concentrations of 1,1-dichloroethane relative to the earlier samples. As there is no appreciable 1,1,1-trichloroethane contamination in any of the 7S samples from 2002 or later, there is an uncertain cause of the fluctuating concentrations of 1,1-dichloroethane. 6S 1,1-dichloroethane concentrations are higher than the 1,1-dichoroethane concentrations in 13S and 7S. 6S concentrations show considerable fluctuation, from less than 10 ug/L to more than 600 ug/L. There is some apparent correlation between the higher 6S concentrations of 1,1-dichloroethene and higher 7S concentrations of 1,1-dichloroethane. This apparent correlation suggests that shifting groundwater flow directions or water-level fluctuations are responsible for the large concentration swings observed at these two wells.

The 1,1-dichloroethene concentration at 13S is considerably higher than the concentrations observed in the 6S and 7S samples. Figure 3b suggests that 13S concentrations of 1,1-dichloroethene are decreasing over time after the dramatic rise in concentration following shutdown of the active remedial action. However, such a downward trend cannot be confirmed using nonparametric statistical analysis. For 6S and 7S data, there appears to be an increasing concentration of 1,1-dichloroethene for the data from 2003 and later. However, such a trend is not confirmed through nonparametric statistical analysis. To summarize, there is no indication of any trend in the 1,1-dichloroethene concentration following shutdown of the air sparging remedial action. 13S 1,1-dichloroethene concentrations showed a dramatic rise after active remediation stopped. There was no clear response of 6S and 7S 1,1-dichloroethene concentrations to shutdown of the air sparging.

The chloroethane concentrations for 6S and 7S appear to show increasing concentrations over time. However, because of the considerable variability, nonparametric statistical analysis cannot confirm an overall increasing concentration trend for either well. Higher chloroethane concentrations following shutoff of the air sparging system would be consistent with enhanced reductive dechlorination in a more anaerobic environment.

Review of Data from Well 28S

Monitoring well 28S is located approximately 700 feet east of the general source area. Using the same criteria for identifying contaminants of interest in the general source area (see the first paragraph of the previous section of this review memorandum), 28S contaminants of interest are 1,1-dichloroethene, cis 1,2-dichloroethene, trichloroethene, and naphthalene. The question arises as to whether or not these contaminants are decreasing over time in the period following the cessation of the active remedial action and, if so, how rapidly are they decreasing at 28S.

Figure 4 is a plot of the concentration trends of the four contaminants of interest at 28S. The data clearly indicate decreasing concentrations of each of the contaminants. The question then arises as to the anticipated time when the concentrations of contaminants at this monitoring well will eventually decrease to their respective drinking-water standards (MCLs) or for naphthalene, decrease to below the Florida groundwater cleanup target level (GCTL). There is no one answer to this question, because of some uncertainty as to the true slope of the trend line.

Uncertainty on the trend line slope was evaluated for each of the contaminants to predict when contaminant concentrations might attain their respective MCL or GCTL. Figure 5 is a plot of the results of this analysis for 1,1-dichloroethene. This figure shows that the best fit linear trend line predicts the time to attain the 7 ug/L MCL could be within one year. The 95% lower confidence level on the slope of the trend line indicates that MCL could be reached in about 4.5 years; probably in early 2016.

Using the 95% lower confidence limit on the trend line slope as an indicator of when the concentrations of contaminants at 28S might be expected to decrease to their respective MCLs or GCTLs, the following results are obtained:

1,1-dichloroethene: will probably attain its performance standard within about 4.5 years (early 2016)
Trichloroethene: will probably attain its performance standard within about 2.75 years (mid 2014)

Based on the available data, cis 1,2-dichloroethene has probably already decreased in concentration to below its performance standard, and naphthalene has probably decreased to below its Florida GCTL.

Review of Data from Wells 31S and CEF-003-WP

31S is located in close proximity to the stream that is the discharge point for shallow groundwater. CEF-003-WP is a hand-driven well point installed at the discharge point of groundwater migrating from Site 3. This well point is installed, sampled, and then removed at each sampling event (reference Report Section 2.0). It is located a short distance east of 31S.

At 31S, contaminants of interest are 1,1-dichloroethene, benzene, cis 1,2-dichloroethene, and vinyl chloride. At CEF-003-WP, the primary contaminant of interest is vinyl chloride. 1,1-dichloroethene has not been detected at CEF-003-WP since July 2004 (1.4 ug/L); cis 1,2-dichloroethene is periodically detected, but at concentrations less than 1 ug/L. Benzene is also periodically detected in CEF-003-WP samples. Most recently, benzene was detected at a concentration of 1.4 ug/L in July 2006 and again in the September 2010 sample, with four intervening samples showing no trace of benzene.

February 2003-September 2010 31S data for the four contaminants of interest are plotted on Figure 6. Figure 6 indicates that the concentration of cis 1,2-dichloroethene is probably decreasing at this well. The 1,1-dichloroethene concentration may be decreasing. The vinyl chloride concentration may be increasing, possibly as a result of ongoing reductive dechlorination of cis 1,2-dichloroethene in the subsurface geochemical environment near the stream. This reductive dechlorination process is apparently relatively robust in this area, as CEF-003-WP samples have shown very little contamination by cis 1,2-dichloroethene, despite its being present in substantive concentrations in the 31S samples. The benzene concentration appears to show no trend of declining concentrations.

Nonparametric statistical analysis was used to evaluate potential trends in all four 31S contaminants of interest. Table 2 summarizes the results of this evaluation.

Contaminant	Summary of Statistical Evaluation of Trend *
1,1-dichloroethene	no apparent trend
cis 1,2-dichloroethene	concentrations probably decreasing ($\alpha < 0.001$)
benzene	concentrations probably increasing ($\alpha = 0.025$)
vinyl chloride	no apparent trend ($\alpha = 0.064$) but concentrations may be increasing

* trend analysis done using the Mann-Kendall test; α probability level set to 0.05

The decreasing concentrations of cis 1,2-dichloroethene support a conclusion that vinyl chloride concentrations might be increasing over time, as biodegradation of cis 1,2-dichloroethene under very anaerobic conditions is associated with dechlorination of cis 1,2-dichloroethene and production of vinyl chloride.

CEF-003-WP data show that only vinyl chloride and benzene are present in any appreciable concentration over the period of interest. Both are periodically detected in samples from this monitoring point. Several other organic contaminants may also be detected, although at concentrations less than their MCLs or GCTLs.

The two most recent samples from CEF-003-WP contained above-MCL concentrations of vinyl chloride, and the last sample contained 1.4 ug/L of benzene. It is probably not coincidental that three of the four most recent samples from 31S contained the highest concentrations of vinyl chloride reported from that well and the lowest concentrations of cis 1,2-dichloroethene since a sample from 1999. Increasing conversion of cis 1,2-dichloroethene to vinyl chloride around 31S may explain the rise in vinyl chloride concentrations in CEF-003-WP samples. It is not known if an increasing degree of reductive dechlorination around 31S is related to cessation of the air sparging remedial action hundreds of feet upgradient.

The state of Florida has a 2.4 ug/L surface water cleanup target level for vinyl chloride. The Florida Department of Environmental Protection has considered shallow groundwater concentrations near a surface water discharge area to be a reasonable estimation of the concentrations that might be present in the surface water. Conceptually, because of the high volatility of vinyl chloride and the irregular detection of vinyl chloride in CEF-003-WP samples, it is not expected that low-level vinyl chloride contamination in the groundwater at CEF-003-WP would translate into measurable amounts of vinyl chloride in the surface water. However, there may be some rationale for evaluating this possible concern in more detail. One option for such further evaluation is through a combination of (a) shallow groundwater sampling of CEF-003-WP on a more frequent basis (to determine if the recent concentrations of 12.9 ug/L and 5 ug/L in September 2009 and September 2010) are representative of overall groundwater quality conditions or are maximum values observed at the particular season when those samples were collected and (b) actual surface water sampling at an appropriate location and depth to evaluate if the shallow groundwater concentrations actually translate to unacceptable surface water concentrations. Note that the state surface water criterion for vinyl chloride is based on an assumed human exposure to the contaminant through fish ingestion. Based on my understanding of Site conditions, this exposure scenario is probably not an issue.

Summary of this Review Memorandum

This memorandum focuses on the effectiveness of natural attenuation as a process for remediating groundwater at OU8, Site 3, NAS Cecil Field. Since late 2002, there has been no active groundwater remedial action at Site 3. Before that time, source area groundwater remedial action consisted of air sparging, on a continuous basis from May 1999 until May 2000 and on an intermittent basis from May 2000 until the summer of 2002. Air sparging would produce a more oxic environment, and would have caused air stripping of many of the principal contaminants (chlorinated ethenes and ethanes) at Site 3 but would be an unfavorable environment for reductive dechlorination of those contaminants. After cessation of the air sparging, subsurface conditions would have returned to a more anaerobic environment more conducive to reductive dechlorination.

Three areas of interest are evaluated in this memorandum. These three parts of Site 3 include the general source area, a monitoring well between the general source area and the surface water discharge area for shallow groundwater, and the groundwater in close proximity to the surface water discharge location.

In the general source area, contaminants of interest were defined for three monitoring wells where the most significant contamination is and has been present. Contaminant concentration trends were evaluated from the period from September 2002 through September 2010. This interval covers the time the air sparging remedial action has been inoperative.

Well 13S is the general source area well with the most significant levels of groundwater contamination. Contaminants of interest at 13S that were monitored in September 2002 were detected at relatively low to very low concentrations, reflecting the residual effects of the air sparging. In the following sample from February 2003, the concentrations of most contaminants of interest showed large concentration increases. Following that February 2003 spike in concentrations, concentrations of more chlorinated compounds such as 1,1,1-trichloroethane and trichloroethene showed some possible concentration decreases, although these decreases were not confirmed by statistical trend analysis. However, increasing concentrations of daughter products 1,1-dichloroethane and cis 1,2-dichloroethene are confirmed by nonparametric statistical trend analysis, implying increased reductive dechlorination of the parent compounds.

The efficacy of natural attenuation processes on reducing concentrations of 1,1,1-trichloroethane and trichloroethene at 13S cannot be reliably confirmed using the available data, because a trend of their decreasing concentrations is not confirmed by nonparametric statistical trend analysis. However, assuming a decreasing trend of these contaminants, and considering that trichloroethene currently exceeds its drinking-water standard by the greatest amount, a preliminary, optimistic estimation of the time needed for 13S trichloroethene concentrations to decrease to below the 3 ug/L Florida drinking-water standard exceeds 30 years. Using the Florida “natural attenuation default criteria” process, the current level of trichloroethene contamination exceeds a concentration that Florida would consider as potentially appropriate for a natural attenuation groundwater remedial action.

In addition to contamination by chlorinated ethene and ethane compounds at 13S, there is contamination by 1,2-dichlorobenzene, 1-4 dichlorobenzene, 2-methyl naphthalene, and naphthalene. There is no indication from the monitoring data that concentrations of these contaminants are decreasing over time as a result of natural attenuation processes. These contaminants are probably less degradable than chlorinated ethenes and ethanes in an anaerobic subsurface geochemical environment and are less environmentally mobile than the chlorinated ethenes and ethanes. Thus, it is expected that natural attenuation will be less effective at remediation of these compounds.

At well 7S, the contaminants of interest include 1,1-dichloroethane, 1,1-dichloroethene, chloroethane, cis 1,2-dichloroethene, and trichloroethene. The pattern of 7S cis 1,2-dichloroethene and trichloroethene concentrations following cessation of air sparging differs from the conditions observed at 13S. There is considerable variation in 7S concentrations of these compounds. There is also no clear trend of declining concentrations of these compounds. Although the most recent sample from 7S contained cis 1,2-dichloroethene and trichloroethene at concentrations only marginally exceeding their drinking-water standards, it is unclear how effectively natural attenuation is acting to reduce their concentrations. There is also uncertainty about the effectiveness of natural attenuation for reduction of concentrations of the remaining contaminants of interest at 7S. The most recent 7S sample contained the highest 1,1-dichloroethane and chloroethane concentrations observed since air sparging ended, and a concentration of 1,1,-dichloroethene that almost equaled the highest concentration seen since air sparging ended. There is no appreciable 1,1,1-trichloroethane in recent 7S samples, so increases of 11,1-trichloroethane degradation products cannot be attributed to more effective dechlorination of 1,1,1-trichloroethane in the post-sparging environment.

At well 6S, contaminants of interest include 1,1-dichloroethane, 1,1-dichloroethene, chloroethane, benzene, and vinyl chloride. At 6S, the concentrations of 1,1-dichloroethane are higher than those observed at either 13S or 7S. There are dramatic concentration fluctuations in the 6S concentrations of 1,1-dichloroethane. The concentration fluctuations appear to follow a similar pattern at 6S and at 7S, implying a hydrologic influence on the concentrations, such as shifting groundwater flow patterns. There is no apparent trend in 6S concentrations of 1,1-dichloroethane. There is also no apparent trend in either 1,1-dichloroethene or chloroethane concentrations in 6S samples since air sparging ended. The same comment applies to vinyl chloride, although the most recent 6S samples have higher vinyl chloride concentrations than data collected before 2008.

To summarize the evaluation of monitoring data from wells in the general source area, there are indications of enhanced reductive dechlorination of 1,1,1-trichloroethane and trichloroethene in the post-sparging environment at well 13S. Data suggest that natural attenuation processes will require more than 30 years to reduce 13S trichloroethene concentrations to below the 3 ug/L Florida drinking-water standard. The current 13S trichloroethene concentration exceeds the Florida natural attenuation default criterion, a maximum concentration for Florida considering natural attenuation to be potentially feasible as a groundwater remedial option. Several contaminants at 13S show no clear trend of declining concentrations in response to natural attenuation. Post-sparging data from wells 6S and 7S do not clearly establish that natural attenuation is effectively remediating groundwater contamination at those locations.

Well 28S is downgradient from the general source area. Contaminants of interest at this well include 1,1-dichloroethene, cis 1,2-dichloroethene, trichloroethene, and naphthalene. Each of these contaminants show declining concentration trends over time. For the two contaminants that exceed their respective drinking-water standards in the most recent 28S sample, statistical data analysis indicates that 1,1-dichloroethene should reach the drinking-water standard in about 4.5 years or less, and trichloroethene should reach its drinking-water standard in about 2.75 years.

Wells 31S and CEF-003-WP are located near the discharge area for shallow contaminated groundwater. Reductive dechlorination appears to be relatively robust in the general area of these wells, as there are substantive concentrations of cis 1,2-dichloroethene at 31S and inconsequential (typically non-detect) concentrations of cis 1,2-dichlorethene at CEF-003-WP, a short distance downgradient. Statistical trend analysis of data from 31S indicates probable decreasing concentrations of cis 1,2-dichloroethene, probable increasing concentrations of benzene, no apparent trend for 1,1-dichloroethene, and a possible trend of increasing concentrations of vinyl chloride. There may be a very slow decrease in 1,1-dichlorethene concentrations, as the most recent concentrations of this compound are slightly lower than concentrations observed prior to July 2007. The benzene contamination, although probably slowly increasing, is approximately 2 ug/L (between the Florida drinking-water standard of 1 ug/L and the Federal drinking-water standard of 5 ug/L). Benzene at the observed concentration is probably not a concern with respect to potential contaminant levels in the nearby stream.

CEF-003-WP data show that only vinyl chloride and benzene are present in any appreciable concentration over the period of interest. Both are periodically detected in samples from this monitoring point. Several other organic contaminants may also be detected, although at concentrations less than their MCLs or GCTLs.

The state of Florida has a 2.4 ug/L surface water cleanup target level for vinyl chloride and has considered shallow groundwater concentrations near a surface water discharge area to be a reasonable estimation of the concentrations that might be present in the surface water. It is not expected that low-level CEF-003-WP vinyl chloride contamination would translate into measurable amounts of vinyl chloride in the surface water. However, there may be some rationale for evaluating this possible concern in more detail. A recommended strategy for evaluating this concern is to combine more frequent CEF-003-WP sampling with in-stream sampling to evaluate actual surface water concentrations of vinyl chloride.

Please note that I have not included any suggestions or recommendations regarding possible changes to the remedial action and/or groundwater monitoring at Site 3. After you have reviewed this memorandum and perhaps received feedback from your management or outside parties regarding the concerns noted in this review, I will be glad to provide you with further technical support on Site 3 which could include suggestions or recommendations regarding the issues discussed in this memorandum.

cc: Glenn Adams, Chief, TSS (electronic copy)

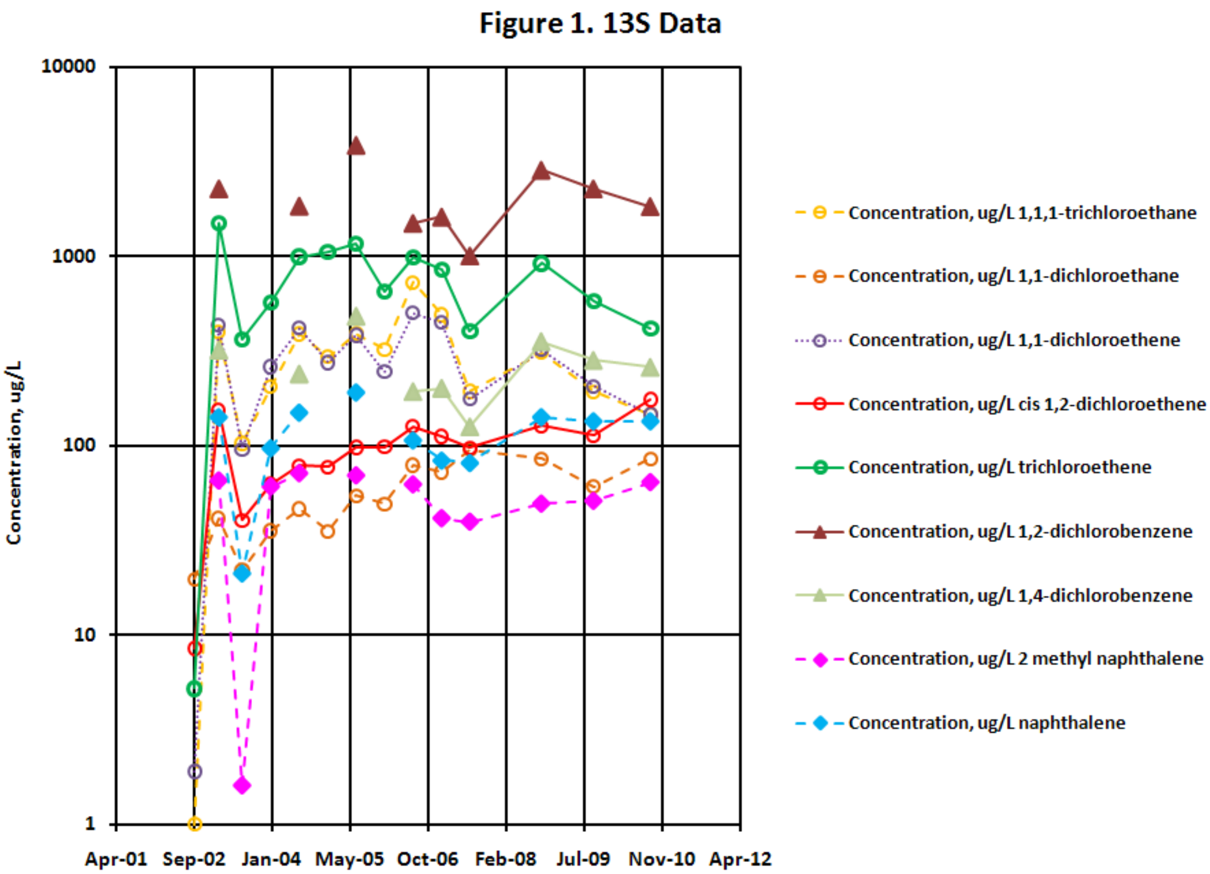
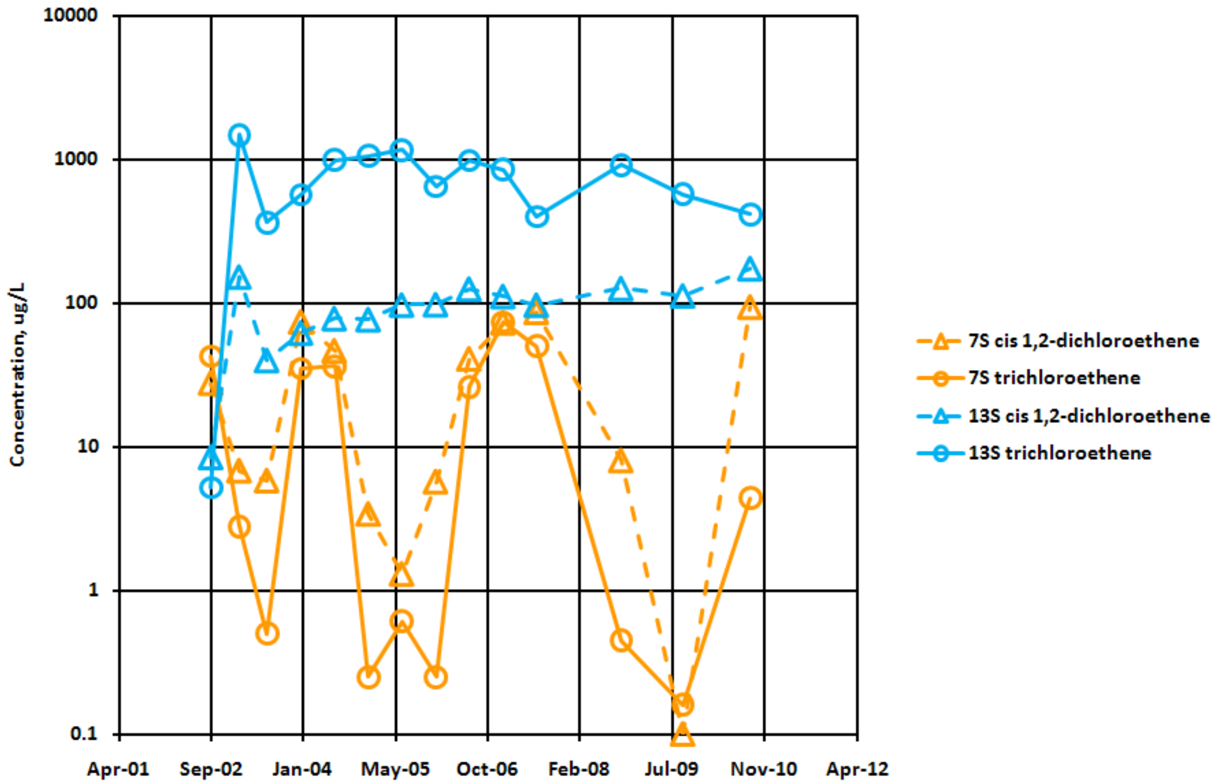


Figure 1. 13S Data
10000
1000
100
10
1
Concentration, ug/L
Apr-01
Sep-02
Jan-04
May-05
Oct-06
Feb-08
Jul-09
Nov-10
Apr-12
Concentration, ug/L 1,1,1-trichloroethane
Concentration, ug/L 1,1-dichloroethane
Concentration, ug/L 1,1-dichloroethene
Concentration, ug/L cis 1,2-dichloroethene
Concentration, ug/L trichloroethene
Concentration, ug/L 1,2-dichlorobenzene
Concentration, ug/L 1,4-dichlorobenzene
Concentration, ug/L 2 methyl naphthalene
Concentration, ug/L naphthalene

Figure 2. Trichloroethene and cis 1,2-Dichloroethene, Generalized Source Area Wells 7S and 13S



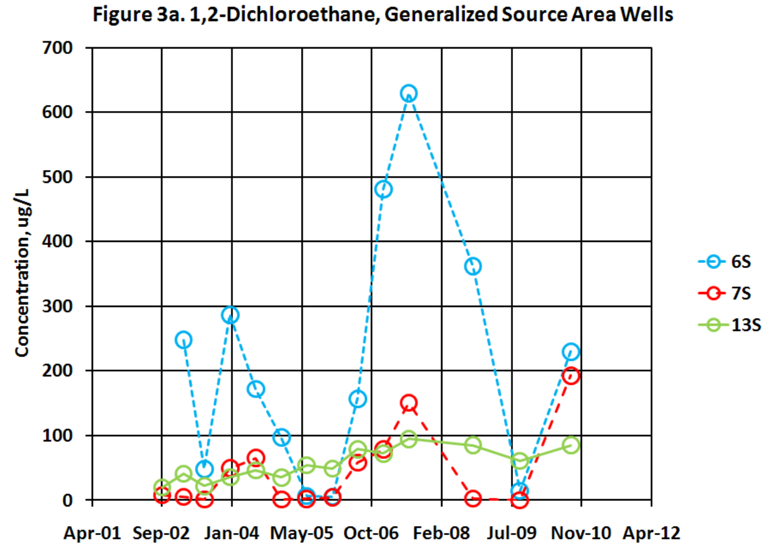


Figure 3a. 1,2-Dichloroethane, Generalized Source Area Wells
Concentration, ug/L
700
600
500
400
300
200
100
0
Apr-01
Sep-02
Jan-04
May-05
Oct-06
Feb-08
Jul-09
Nov-10
Apr-12
6S
7S
13S

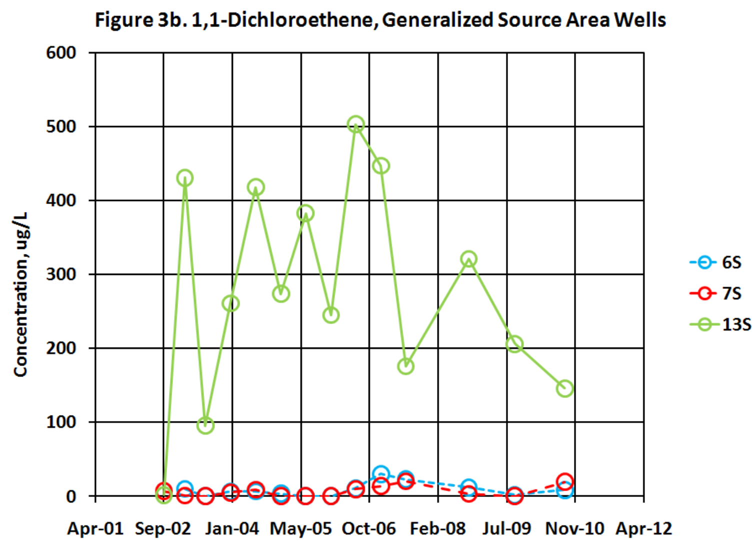


Figure 3b. 1,1-Dichloroethene, Generalized Source Area Wells
Concentration, ug/L
600
500
400
300
200
100
0
Apr-01
Sep-02
Jan-04
May-05
Oct-06
Feb-08
Jul-09
Nov-10
Apr-12
6S
7S
13S

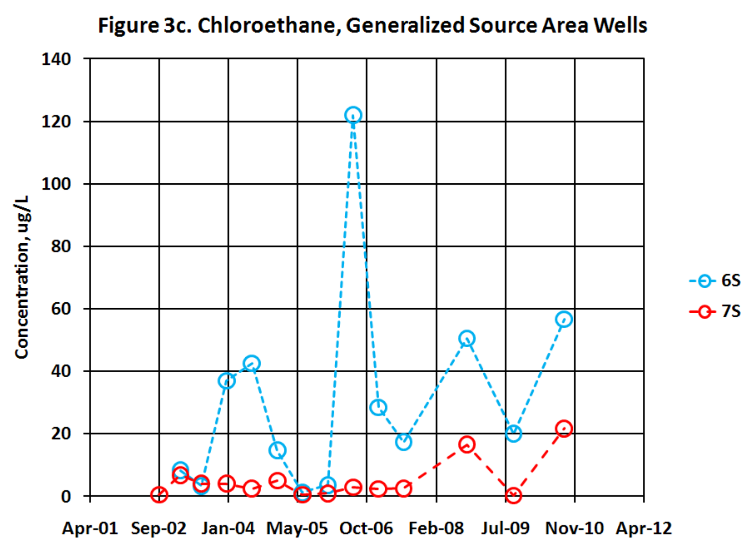


Figure 3c. Chloroethane, Generalized Source Area Wells
Concentration, ug/L
140
120
100
80
60
40
20
0
Apr-01
Sep-02
Jan-04
May-05
Oct-06
Feb-08
Jul-09
Nov-10
Apr-12
6S
7S

Figure 4. 28S Data

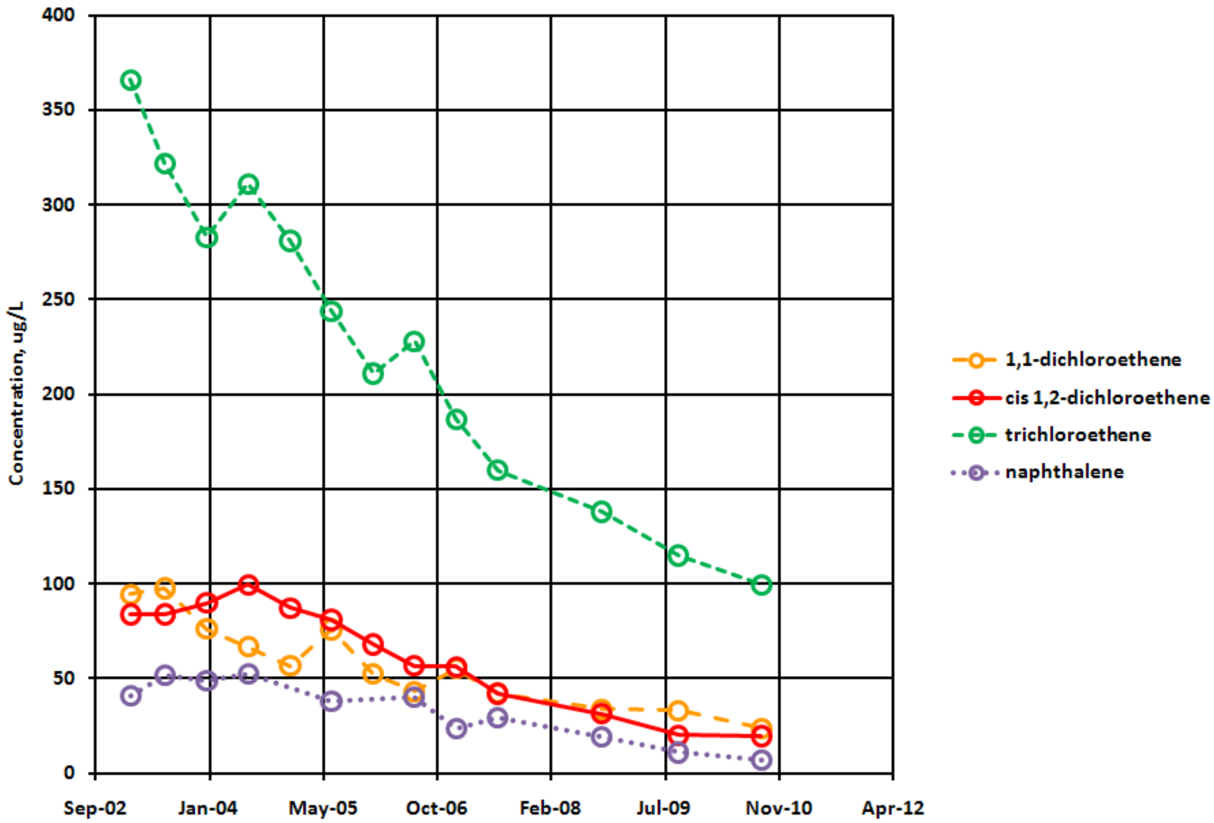


Figure 5. 1,1-Dichloroethene

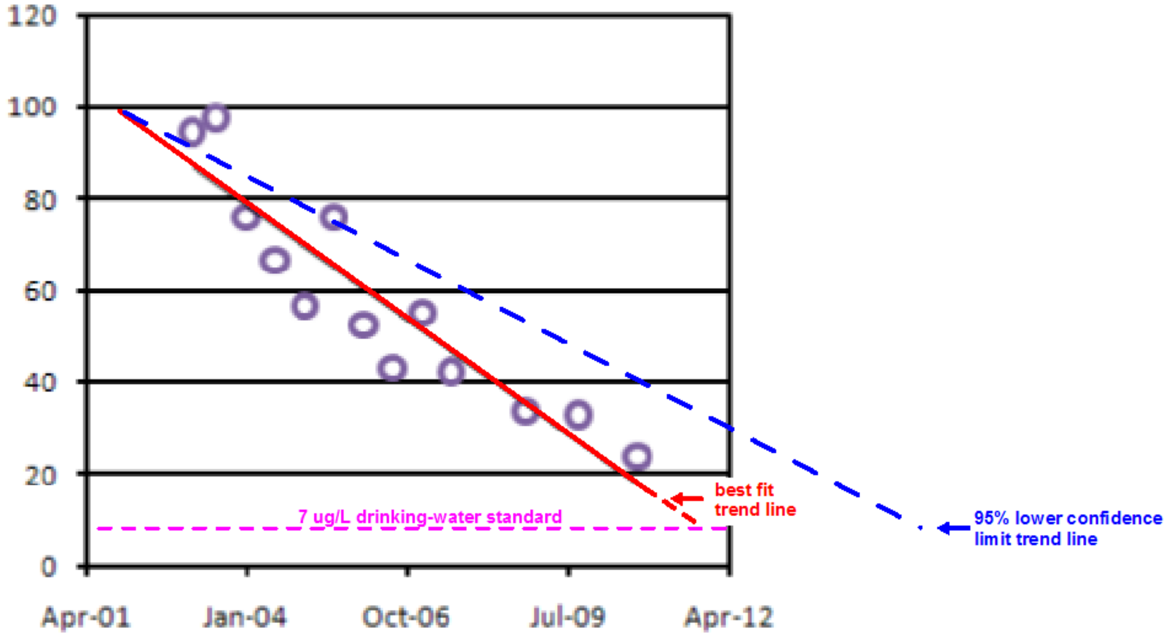
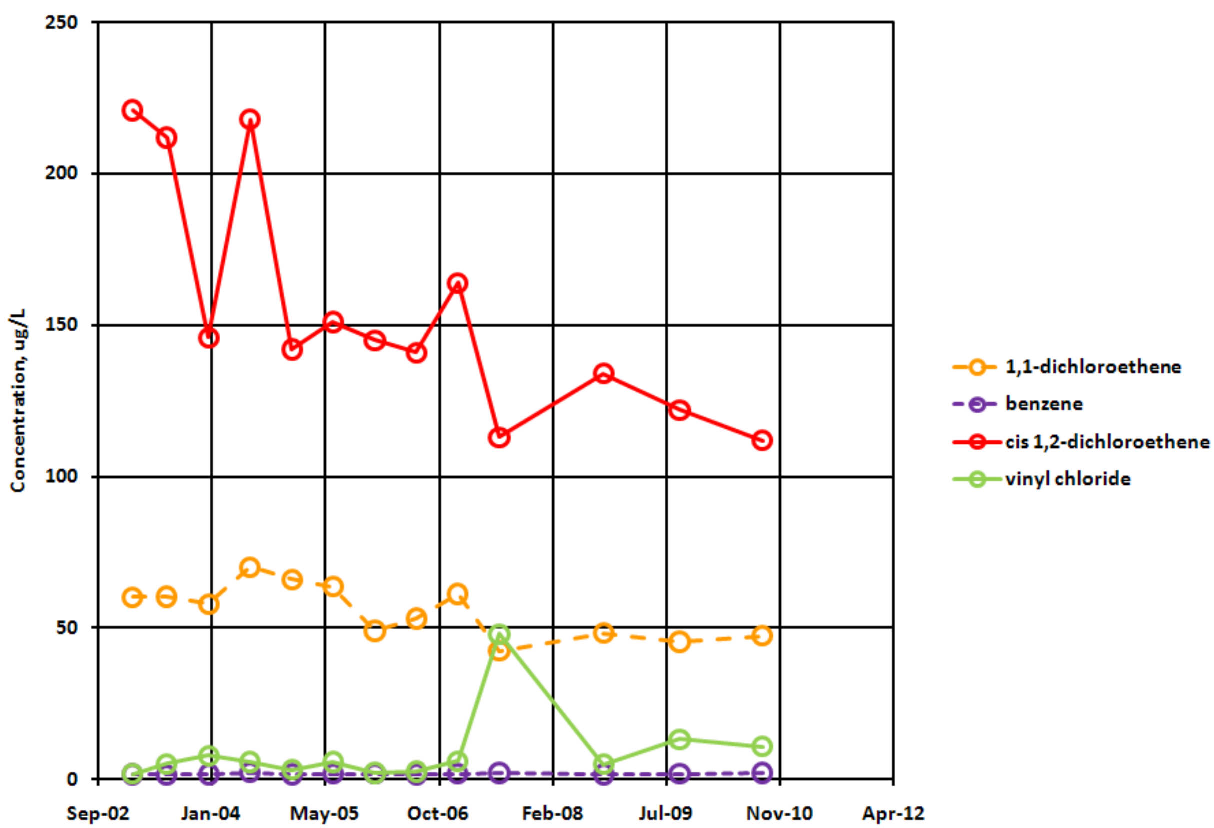


Figure 6. 31S Data



ATTACHMENT 2

SITE 3 WELL POINT INVESTIGATION E-MAILS REGARDING PROPOSED EFFORT

Simcik, Robert

From:	Simcik, Robert
Sent:	Friday, March 25, 2011 11:06 AM
To:	David.Grabka@dep.state.fl.us; 'Vaughn-Wright.Debbie@epamail.epa.gov'; 'Sanford, Art F CTR OASN (EI&E), BRAC PMO SE'; mark.e.davidson@navy.mil; stacin.martin@navy.mil; 'Jessica Keener'; Jonnet, Mark; Michael.Halil@CH2M.com
Subject:	Site 3 Pilot Test _ additional Well Point sampling.
Attachments:	Site-03_Well Point Additional Sampling.pptx

Team, in order to get some additional information for the proposed Site 3 Air Sparge Pilot Test design, we are going to collect some additional Well Point samples along Rowell Creek. The objective of the sampling is to verify the limits of contamination discharging into the creek to determine the required length of the air sparge curtain. Attached is a figure which identifies the approximate location of the samples to be collected. Our goal is to collect these samples within the next week or so in order to have the results for the May 11, 2011 BCT meeting. If you have any questions or comments please let us know.

Thanks, Rob

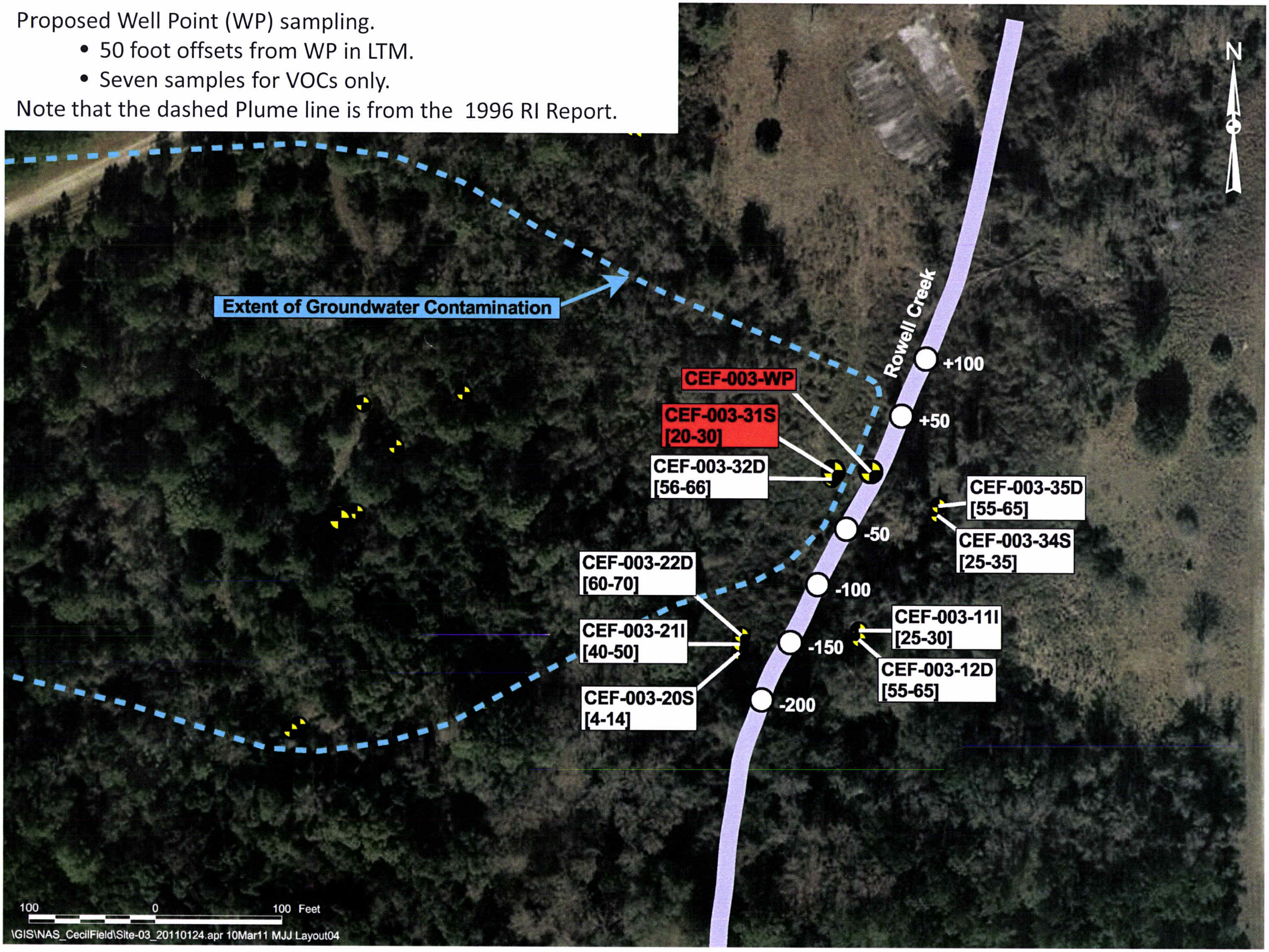
Robert Simcik P.E. | Project Manager
Direct: 412.921.8163 | Main: 412.921.7090 | Fax: 412.921.4040
robert.simcik@tetratech.com

Tetra Tech | Civil Engineering Group
661 Andersen Drive Foster Plaza 7 | Pittsburgh, PA 15220 | www.tetratech.com

Proposed Well Point (WP) sampling.

- 50 foot offsets from WP in LTM.
- Seven samples for VOCs only.

Note that the dashed Plume line is from the 1996 RI Report.



Simcik, Robert

From: Simcik, Robert
Sent: Wednesday, April 13, 2011 3:42 PM
To: 'Sanford, Art F CTR OASN (EI&E), BRAC PMO SE'; 'Davidson, Mark E CIV OASN (EI&E), BRAC PMO SE'
Subject: Additional Sampling at Site 3.
Attachments: WP location at site 3 figure.jpg; VC resulst in Well Points..xlsx

To confirm:

We will conduct a vertical delineation in the creek at Site 3 to determine impact of creek bed sediments on select VOC detected at Site 3. We will collect four WP samples at two locations. The samples will be collected at the locations of the two highest VC detections during the WP evaluation (Locations CEF-003-WP-UP025 and CEF-003-WP-DOWN025) and the samples will be collected from the following screen intervals: 0.0' to 0.5' (top of well screen immediately below the bottom of the creek); 0.5' to 1.0'; 1.0' to 1.5'; and 2.0' to 2.5' (depth of original WP samples). The samples will be collected between 2 to 3 feet from edge of the creek.

Efforts will be conducted to try not to disturb the creek bed sediments (muck) prior and during sampling (which will not be easy). Will attempt to install all four interval depths at same time as not to create conduit for surface/creek water below the creek bed. A combination of PVC risers with 6 inch screens and steel rods with stainless steel 6 inch drive point well screens will be used depending on depth of sample (and if WP needs to be driven). The samples will be submitted for rush analysis to have results in time for the BCT meeting.

No additional up and down creek delineation sampling will be conducted during this effort.

Let me know if I captured this correctly and/or any suggestions or other samples. Currently planning to conduct the sampling effort on Tuesday 19th and results will be available NLT 25th.

Rob.

Robert Simcik P.E. | Project Manager
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robert.simcik@tetratech.com

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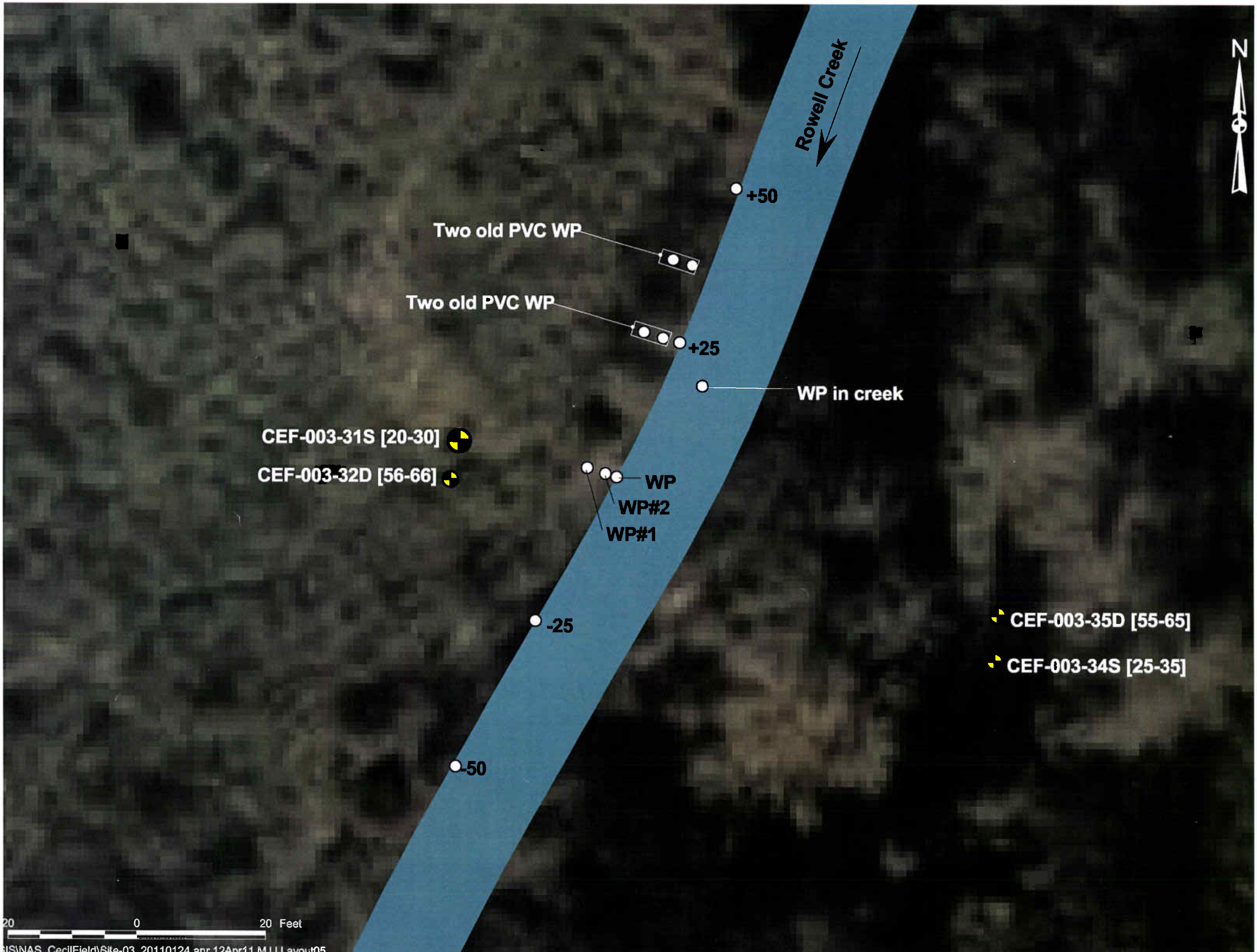
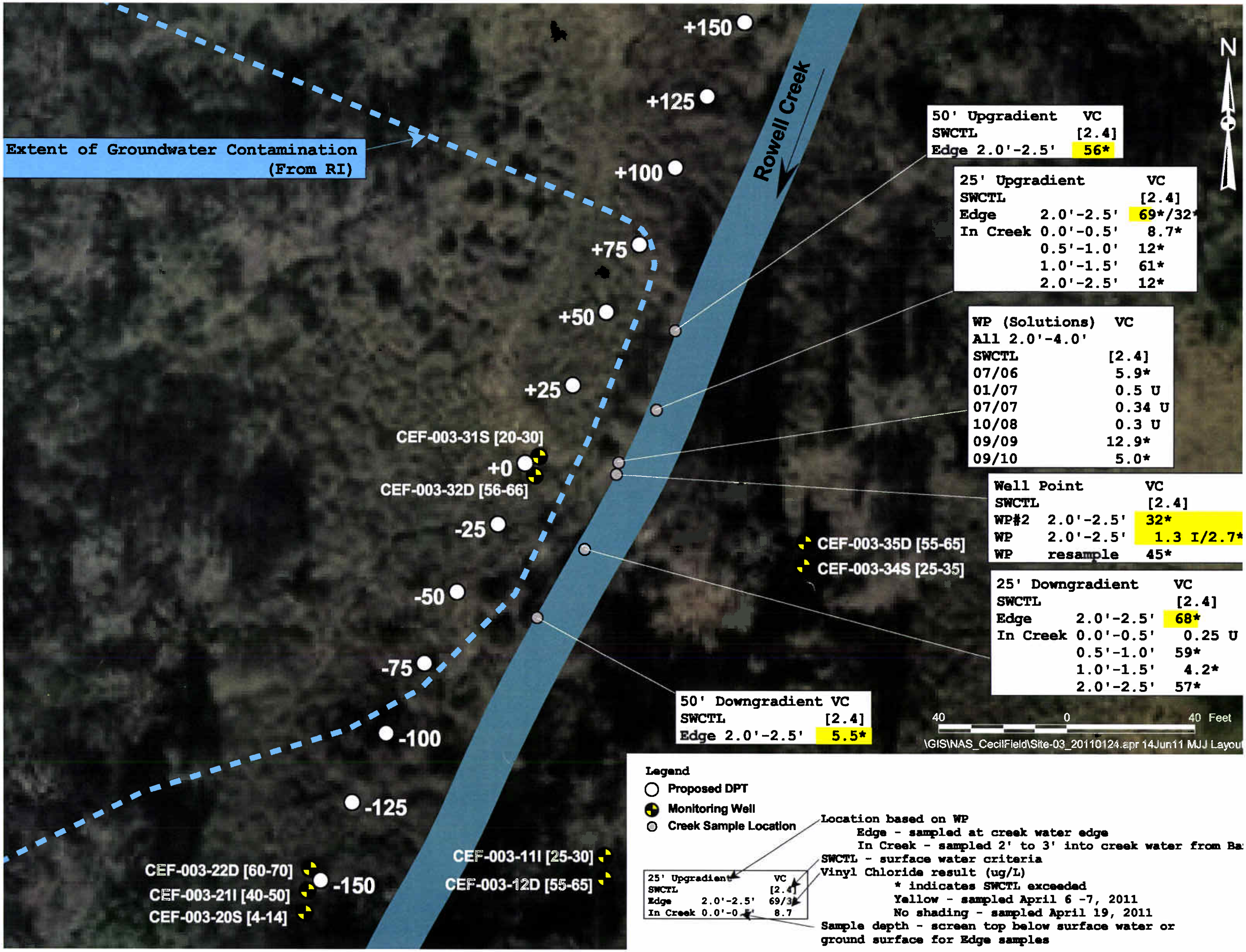


Rowell Creek
N
+50
Two old PVC WP
Two old PVC WP
+25
WP in creek
CEF-003-31S [20-30]
CEF-003-32D [56-66]
WP
WP#2
WP#1
-25
CEF-003-35D [55-65]
CEF-003-34S [25-35]
-50
20
0
20 Feet
IS\NAS_CecilField\Site-03_20110124.apr 12Apr11 MJJ Layout05

Location	Sampling Date	Parameter	GCTL	SWCTL_FW	Result	Qualifier
CEF-003-WP-UP050	4/7/2011	Vinyl Chloride	1	2.4	56	
CEF-003-WP-UP025	4/7/2011	Vinyl Chloride	1	2.4	69	
CEF-003-WP-ORIGINAL	4/6/2011	Vinyl Chloride	1	2.4	1.3	I
CEF-003-DUP01	4/6/2011	Vinyl Chloride	1	2.4	2.7	
CEF-003-WP2-OLD	4/6/2011	Vinyl Chloride	1	2.4	32	
CEF-003-WP-DOWN025	4/7/2011	Vinyl Chloride	1	2.4	68	
CEF-003-WP-DOWN050	4/7/2011	Vinyl Chloride	1	2.4	5.5	



Extent of Groundwater Contamination (From RI)
Rowell Creek
N
+150
+125
+100
+75
+50
+25
+0
-25
-50
-75
-100
-125
-150
CEF-003-31S [20-30]
CEF-003-32D [56-66]
CEF-003-35D [55-65]
CEF-003-34S [25-35]
CEF-003-22D [60-70]
CEF-003-21I [40-50]
CEF-003-20S [4-14]
CEF-003-11I [25-30]
CEF-003-12D [55-65]
50' Upgradient VC
SWCTL [2.4]
Edge 2.0'-2.5' 56*
25' Upgradient VC
SWCTL [2.4]
Edge 2.0'-2.5' 69*/32*
In Creek 0.0'-0.5' 8.7*
0.5'-1.0' 12*
1.0'-1.5' 61*
2.0'-2.5' 12*
WP (Solutions) VC
All 2.0'-4.0'
SWCTL [2.4]
07/06 5.9*
01/07 0.5 U
07/07 0.34 U
10/08 0.3 U
09/09 12.9*
09/10 5.0*
Well Point VC
SWCTL [2.4]
WP#2 2.0'-2.5' 32*
WP 2.0'-2.5' 1.3 I/2.7*
WP resample 45*
25' Downgradient VC
SWCTL [2.4]
Edge 2.0'-2.5' 68*
In Creek 0.0'-0.5' 0.25 U
0.5'-1.0' 59*
1.0'-1.5' 4.2*
2.0'-2.5' 57*
50' Downgradient VC
SWCTL [2.4]
Edge 2.0'-2.5' 5.5*
40 0 40 Feet
\GIS\NAS_CecilField\Site-03_20110124.apr 14Jun11 MJJ Layout
Legend
Proposed DPT
Monitoring Well
Creek Sample Location
Location based on WP
Edge - sampled at creek water edge
In Creek - sampled 2' to 3' into creek water from Ba
SWCTL - surface water criteria
Vinyl Chloride result (ug/L)
* indicates SWCTL exceeded
Yellow - sampled April 6 -7, 2011
No shading - sampled April 19, 2011
Sample depth - screen top below surface water or ground surface for Edge samples
25' Upgradient VC
SWCTL [2.4]
Edge 2.0'-2.5' 69/3
In Creek 0.0'-0 8.7

ATTACHMENT 3

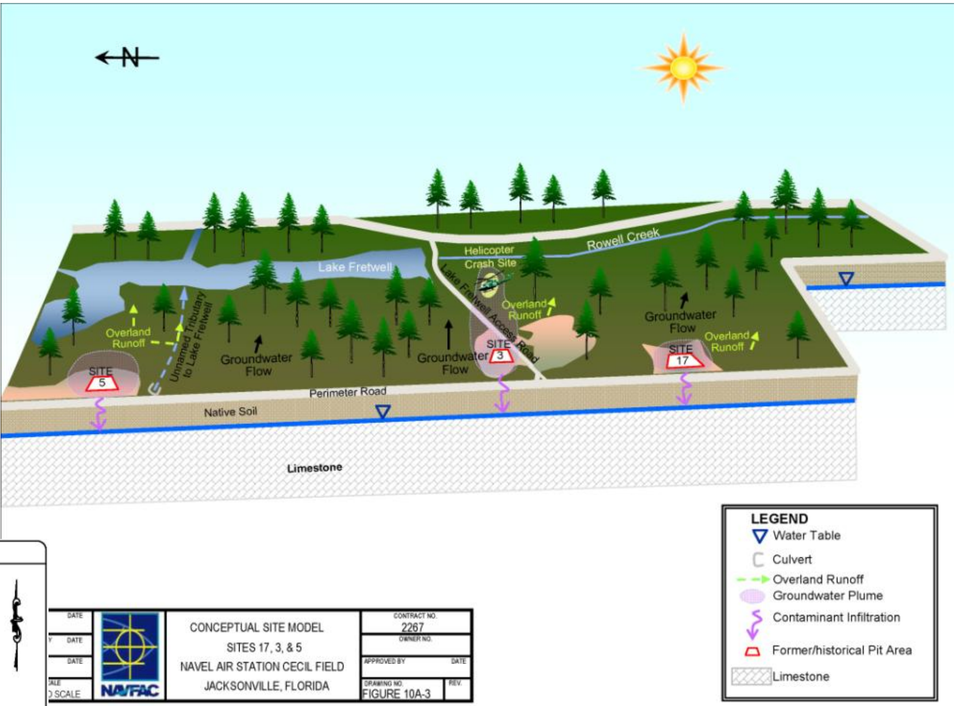
SITE 3 WELL POINT INVESTIGATION RESULTS, PRESENTATION, AND FIELD PAPERWORK BACKUP

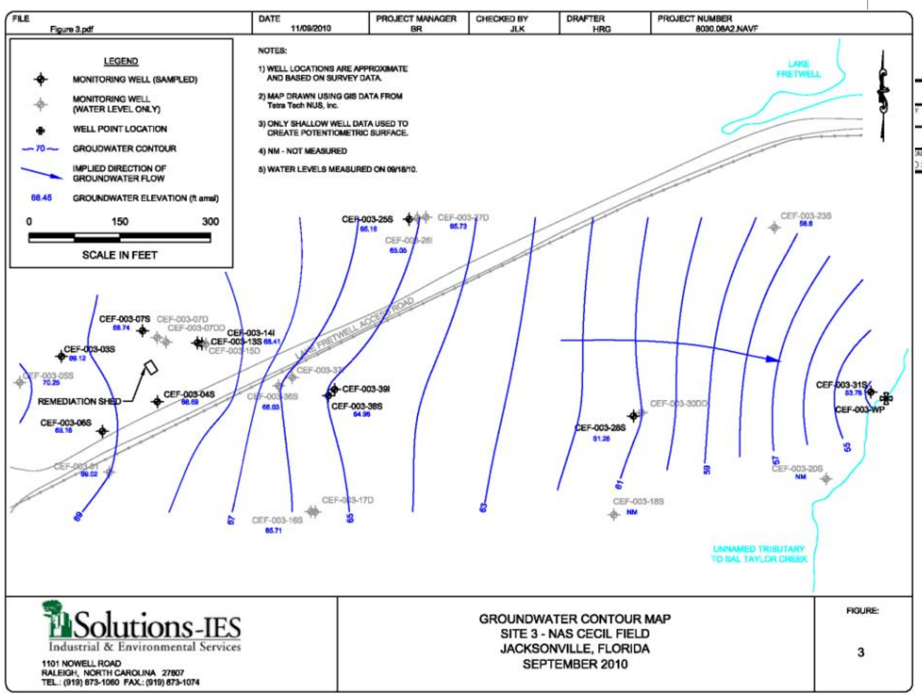
Site 3 Well Point Investigation

Introduction

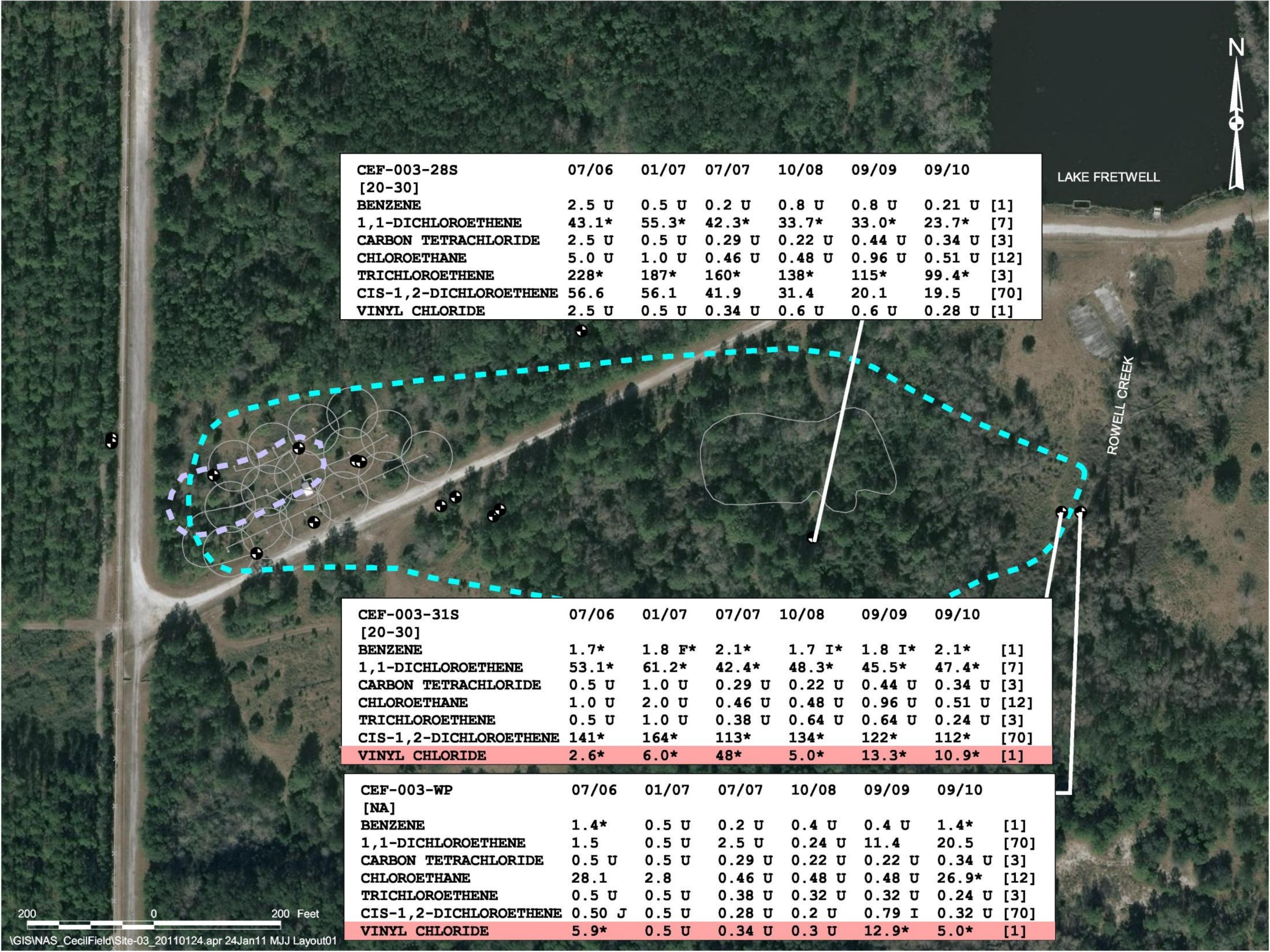
Issue: VC was confirmed in the Site 3 LTM Well Point. September 2009 and 2010 events.

Action: Feb-11 BCT decision to evaluate AS pilot test as option to address discharge to Rowell Creek.





<u>Surface Water:</u> If any COC concentration in the surface water/groundwater interface well point is greater than the SWCTLs, then resample to verify the exceedance. If the exceedance is verified, then the BCT takes appropriate actions to mitigate adverse impact on Rowell Creek and downgradient receptors (expanding the OU boundary and monitoring network, or taking a response action).



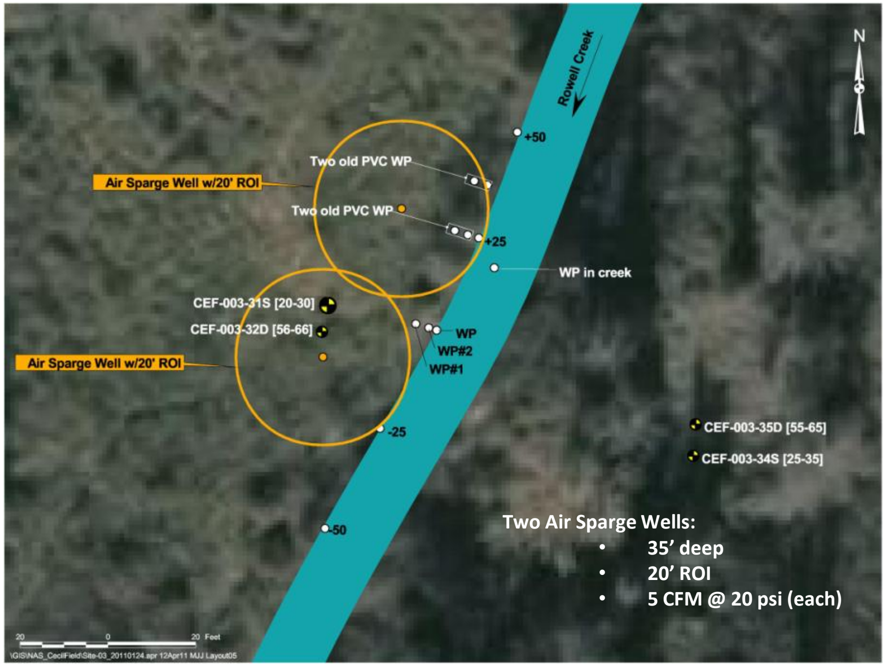
CEF-003-28S [20-30]	07/06	01/07	07/07	10/08	09/09	09/10	
BENZENE	2.5 U	0.5 U	0.2 U	0.8 U	0.8 U	0.21 U	[1]
1,1-DICHLOROETHENE	43.1*	55.3*	42.3*	33.7*	33.0*	23.7*	[7]
CARBON TETRACHLORIDE	2.5 U	0.5 U	0.29 U	0.22 U	0.44 U	0.34 U	[3]
CHLOROETHANE	5.0 U	1.0 U	0.46 U	0.48 U	0.96 U	0.51 U	[12]
TRICHLOROETHENE	228*	187*	160*	138*	115*	99.4*	[3]
CIS-1,2-DICHLOROETHENE	56.6	56.1	41.9	31.4	20.1	19.5	[70]
VINYL CHLORIDE	2.5 U	0.5 U	0.34 U	0.6 U	0.6 U	0.28 U	[1]

CEF-003-31S [20-30]	07/06	01/07	07/07	10/08	09/09	09/10	
BENZENE	1.7*	1.8 F*	2.1*	1.7 I*	1.8 I*	2.1*	[1]
1,1-DICHLOROETHENE	53.1*	61.2*	42.4*	48.3*	45.5*	47.4*	[7]
CARBON TETRACHLORIDE	0.5 U	1.0 U	0.29 U	0.22 U	0.44 U	0.34 U	[3]
CHLOROETHANE	1.0 U	2.0 U	0.46 U	0.48 U	0.96 U	0.51 U	[12]
TRICHLOROETHENE	0.5 U	1.0 U	0.38 U	0.64 U	0.64 U	0.24 U	[3]
CIS-1,2-DICHLOROETHENE	141*	164*	113*	134*	122*	112*	[70]
VINYL CHLORIDE	2.6*	6.0*	48*	5.0*	13.3*	10.9*	[1]

CEF-003-WP [NA]	07/06	01/07	07/07	10/08	09/09	09/10	
BENZENE	1.4*	0.5 U	0.2 U	0.4 U	0.4 U	1.4*	[1]
1,1-DICHLOROETHENE	1.5	0.5 U	2.5 U	0.24 U	11.4	20.5	[70]
CARBON TETRACHLORIDE	0.5 U	0.5 U	0.29 U	0.22 U	0.22 U	0.34 U	[3]
CHLOROETHANE	28.1	2.8	0.46 U	0.48 U	0.48 U	26.9*	[12]
TRICHLOROETHENE	0.5 U	0.5 U	0.38 U	0.32 U	0.32 U	0.24 U	[3]
CIS-1,2-DICHLOROETHENE	0.50 J	0.5 U	0.28 U	0.2 U	0.79 I	0.32 U	[70]
VINYL CHLORIDE	5.9*	0.5 U	0.34 U	0.3 U	12.9*	5.0*	[1]

Options associated with AS system included:

- Repairing Site 3 existing system and running air transfer line to treatment area.
- Running electric to treatment area and installation of smaller system.
- Solar powered system.



Evaluation required confirmation of discharge limits to determine length of air sparge curtain. Solar powered option only feasible/cost effective with limited number of AS wells.

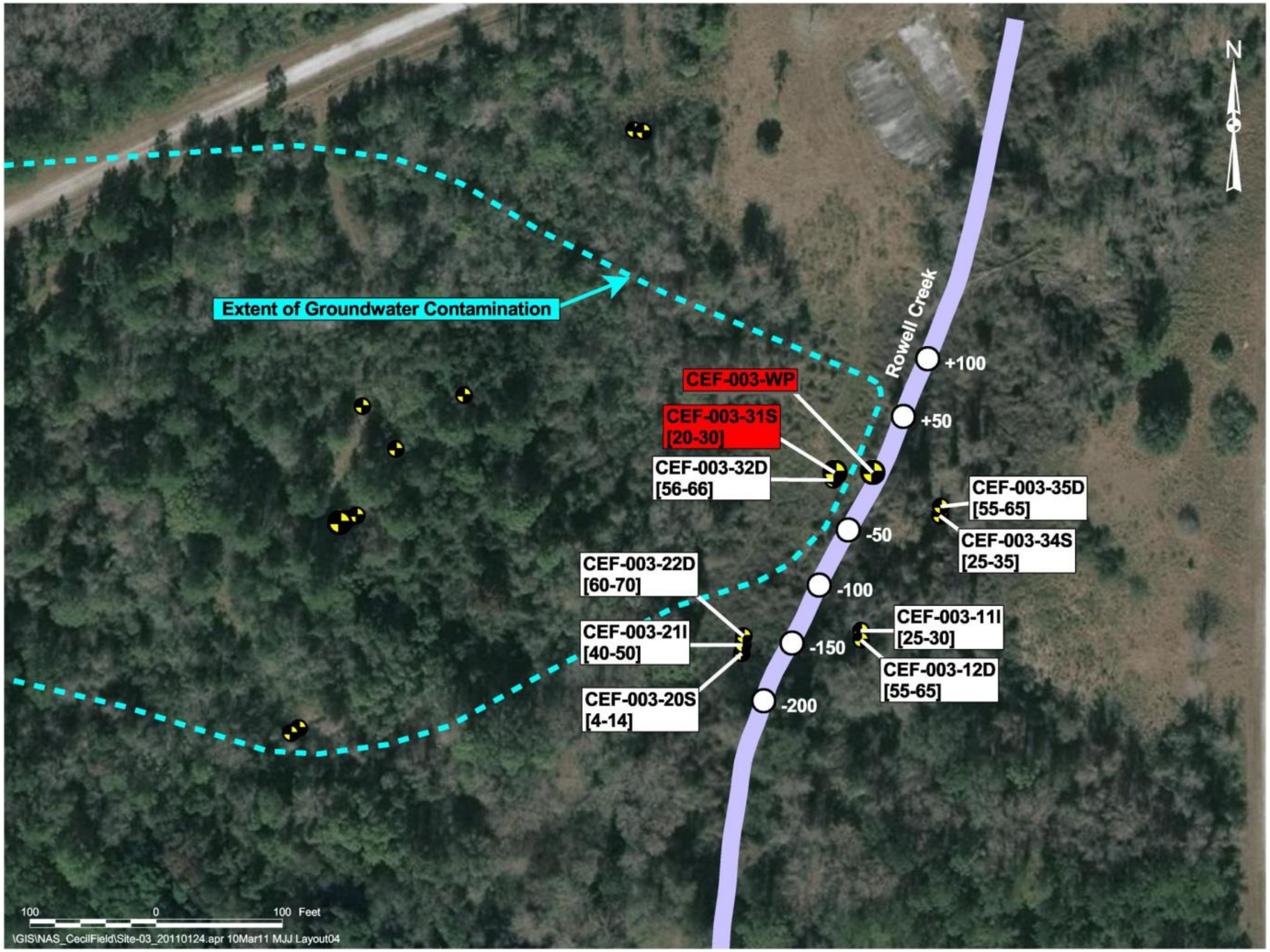
Proposed additional WP sampling to verify limits of discharge to creek.

The proposed Well Point (WP) sampling plan sent to Team identified:

- 50 foot offsets from WP in LTM.
- Seven samples for VOCs only.

The proposed sampling plan was modified slightly based on field observations (old PVC stickup WPs) and level of effort to install and sample the WPs.

- The original WP location was resampled to confirm exceedence.
- Sampled the PVC well point (WP#2) install by Chapelle in 1997 at the "original location".
- Additional samples were also collected at 25' up and down stream.
- Four samples (+100, -100, -150, and -200) were not collected during first round pending quick turn results.



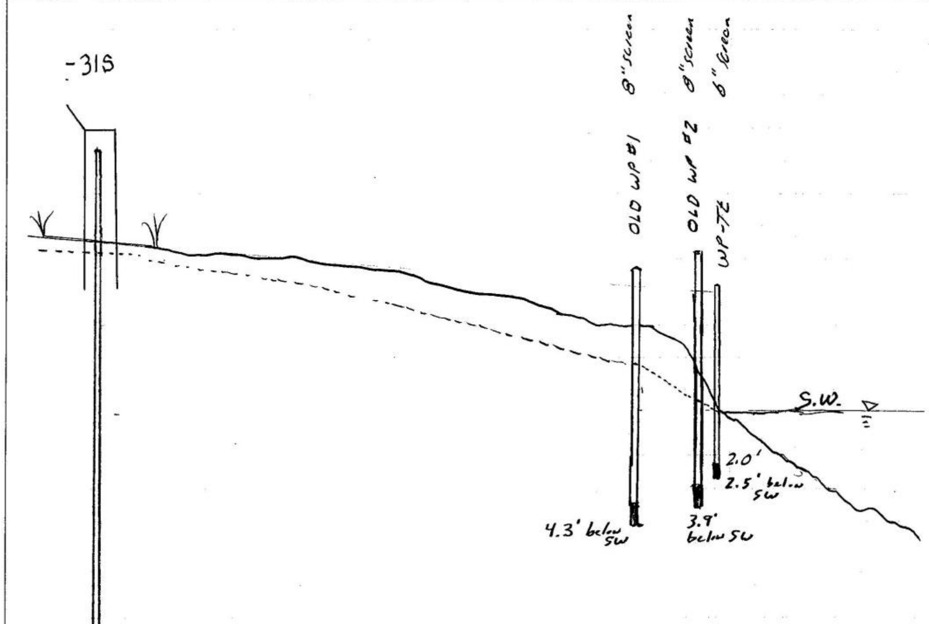
Revised Sampling

- Six samples collected
- +50, +25, WP, -25, -50, and old PVC pipe #2

TETRA TECH NUS, INC. **CALCULATION WORKSHEET** PAGE ______ OF ______

CLIENT	JOB NUMBER
SUBJECT Cecil Field Site 3 Well Point Investigation	
BASED ON Scale: 1" = 5' ; H&V	DRAWING NUMBER

BY	CHECKED BY	APPROVED BY	DATE
RS			4/12/11



Sampling Setup

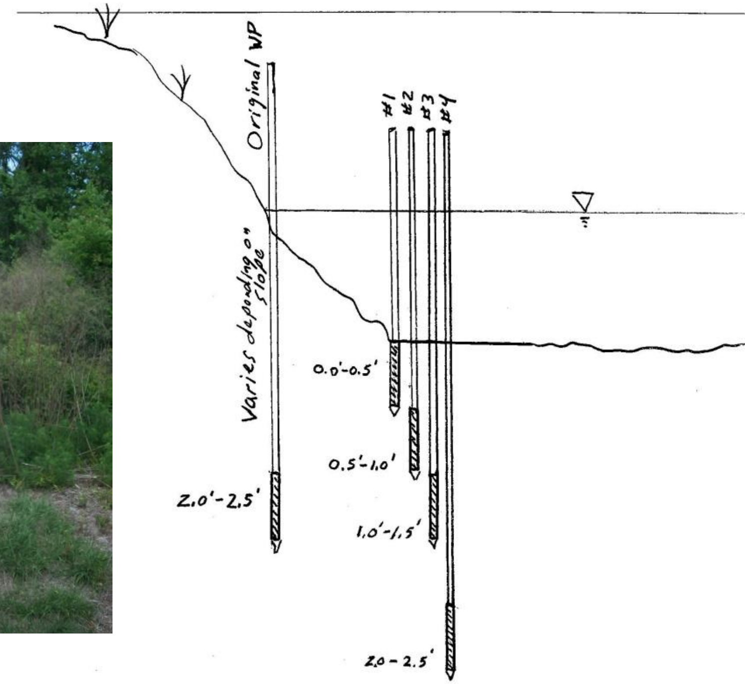
Results identified VC exceedances in all WP samples, others parameters detected less than GCTL/SWCTL or ND

First Round Vinyl Chloride Results

LOCATION	SAMPLE DATE	VINYL CHLORIDE (ug/L)		
		GCTL	SWCTL_FW	RESULT
WP-UP050	4/7/2011	1	2.4	**56**
WP-UP025	4/7/2011	1	2.4	**69**
WP-ORIGINAL	4/6/2011	1	2.4	1.3 I
DUP01	4/6/2011	1	2.4	**2.7**
WP2-OLD	4/6/2011	1	2.4	**32**
WP-DOWN025	4/7/2011	1	2.4	**68**
WP-DOWN050	4/7/2011	1	2.4	**5.5**

Upon reviewing results with Navy, decision made to conduct 2nd round of sampling, objective was to:

- Verify and/or determine if VC is decreasing before discharge into Creek (Vertical Delineation Test).
- Verify low detection at original WP location (LTM sample location).
- Verify maximum VC detected during 1st round testing (WP-UP025) for Vertical Delineation Test.
- Quick turn to have results for May BCT meeting.



Vertical Delineation Test.

- Test conducted at the two highest VC results (+25 and -25 feet from Original WP location).
- Four well points with 6-inch screens installed to depths of 0.0'-0.5'; 0.5'-1.0'; 1.0'-1.5'; and 2.0'-2.5'
- Wells developed and then sampled for select VOCs.

Also collected samples from:

- 25UP (confirm vertical test location result)
- Original WP (check low detection)

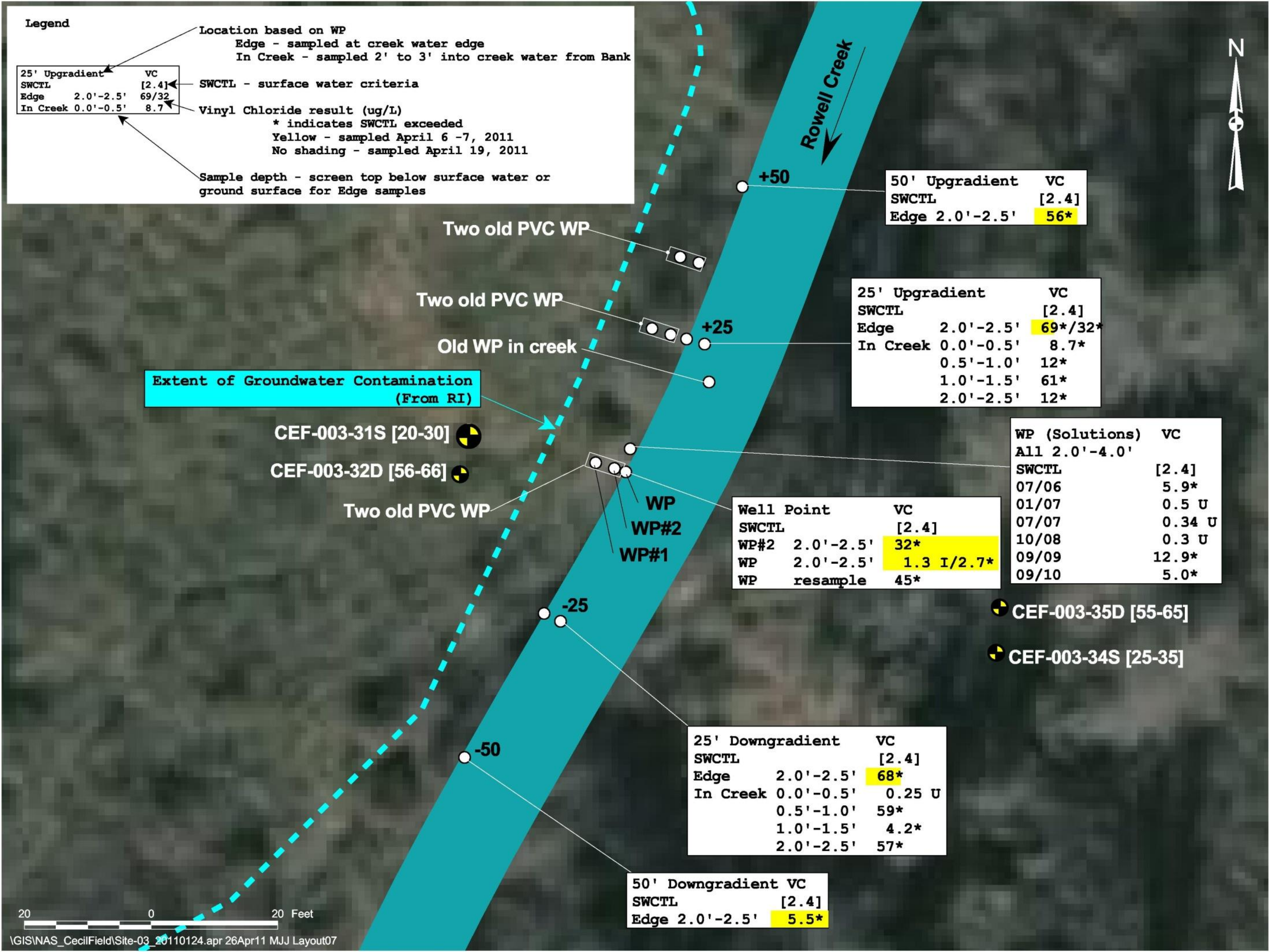
Vinyl Chloride Rowell Creek Results

LOCATION	SAMPLE DATE	VINYL CHLORIDE (ug/L)			
		GCTL	SWCTL_FW	RESULT	
WP-UP050	4/7/2011	1	2.4	56	
WP-UP025	4/7/2011	1	2.4	69	
WP-UP25-RS	4/19/2011	1	2.4	32	
WP-UP25-0005	4/19/2011	1	2.4	8.7	
WP-UP25-0510	4/19/2011	1	2.4	12	
WP-UP25-1015	4/19/2011	1	2.4	61	
WP-UP25-2025	4/19/2011	1	2.4	12	
WP-DUP01	4/19/2011	1	2.4	12	
WP-ORIGINAL	4/6/2011	1	2.4	1.3	I
DUP01	4/6/2011	1	2.4	2.7	
WP-ORG-RS	4/19/2011	1	2.4	45	
WP2-OLD	4/6/2011	1	2.4	32	
WP-DOWN025	4/7/2011	1	2.4	68	
WP-DN25-0005	4/19/2011	1	2.4	0.25	U
WP-DN25-0510	4/19/2011	1	2.4	59	
WP-DN25-1015	4/19/2011	1	2.4	4.2	
WP-DN25-2025	4/19/2011	1	2.4	57	
WP-DOWN050	4/7/2011	1	2.4	5.5	

1st round results have yellow background

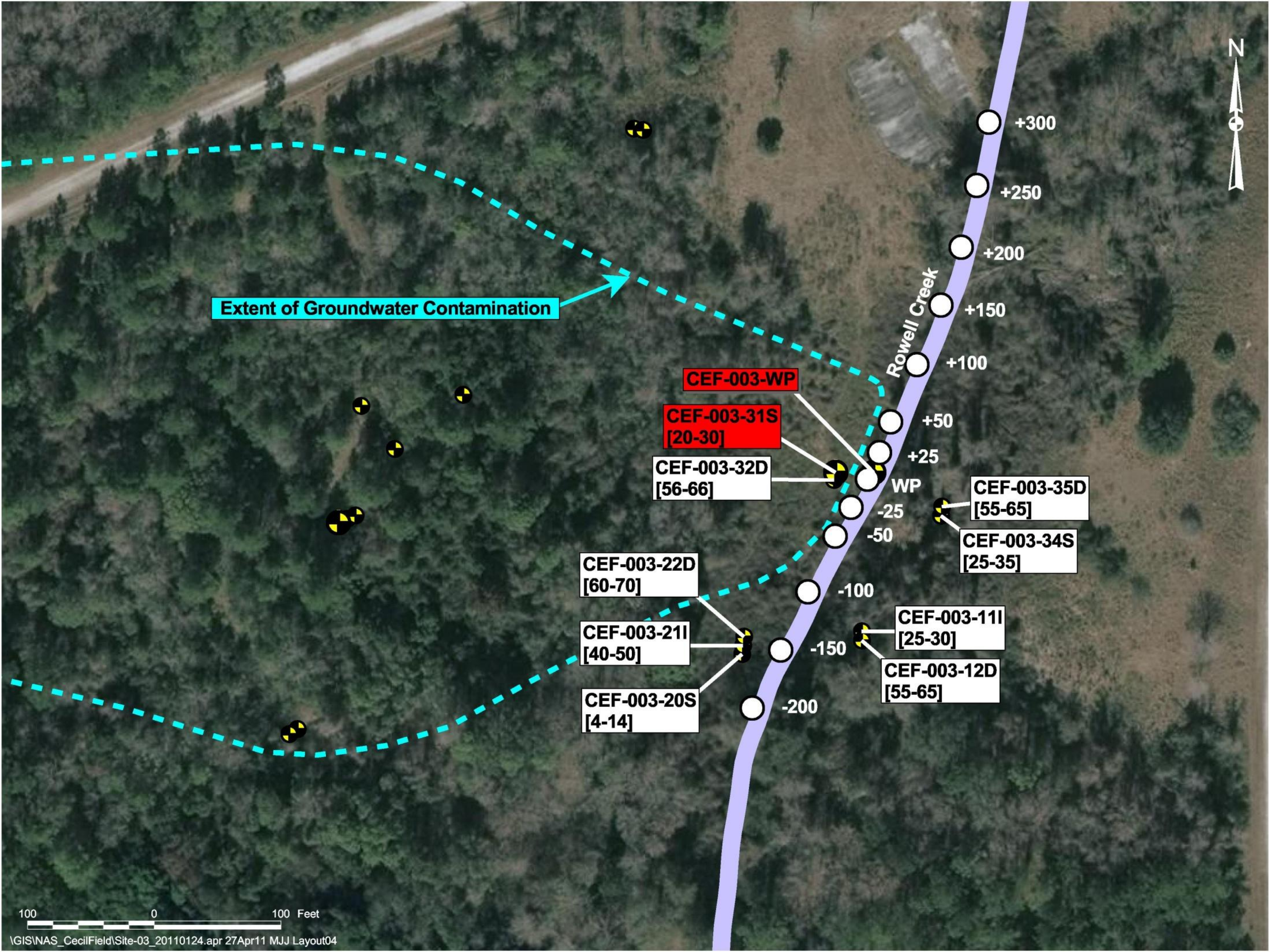
2nd round results:

- WP-ORG did not verify initial low level result, 2nd round result similar to other locations sampled on the bank of Rowel Creek
- UP025:
  - 1st round maximum VC, 2nd round about ½ 1st round VC but still exceeding SWCTL.
  - Possible reduction of VC toward discharge into creek, but 0.0’-0.5’ still above SWCTL.
- DOWN25:
  - VC non-detect at 0.0’-0.5’ interval, but 0.5’-1.0’ interval higher than interval immediately below it (results seem to fluctuate in the various zones).


Legend
25' Upgradient VC
SWCTL [2.4]
Edge 2.0'-2.5' 69/32
In Creek 0.0'-0.5' 8.7
Location based on WP
Edge - sampled at creek water edge
In Creek - sampled 2' to 3' into creek water from Bank
SWCTL - surface water criteria
Vinyl Chloride result (ug/L)
* indicates SWCTL exceeded
Yellow - sampled April 6 -7, 2011
No shading - sampled April 19, 2011
Sample depth - screen top below surface water or ground surface for Edge samples
Rowell Creek
N
+50
50' Upgradient VC
SWCTL [2.4]
Edge 2.0'-2.5' 56*
Two old PVC WP
Two old PVC WP
+25
25' Upgradient VC
SWCTL [2.4]
Edge 2.0'-2.5' 69*/32*
In Creek 0.0'-0.5' 8.7*
0.5'-1.0' 12*
1.0'-1.5' 61*
2.0'-2.5' 12*
Old WP in creek
Extent of Groundwater Contamination (From RI)
CEF-003-31S [20-30]
CEF-003-32D [56-66]
Two old PVC WP
WP
WP#2
WP#1
WP (Solutions) VC
All 2.0'-4.0'
SWCTL [2.4]
07/06 5.9*
01/07 0.5 U
07/07 0.34 U
10/08 0.3 U
09/09 12.9*
09/10 5.0*
Well Point VC
SWCTL [2.4]
WP#2 2.0'-2.5' 32*
WP 2.0'-2.5' 1.3 I/2.7*
WP resample 45*
CEF-003-35D [55-65]
CEF-003-34S [25-35]
-25
-50
25' Downgradient VC
SWCTL [2.4]
Edge 2.0'-2.5' 68*
In Creek 0.0'-0.5' 0.25 U
0.5'-1.0' 59*
1.0'-1.5' 4.2*
2.0'-2.5' 57*
50' Downgradient VC
SWCTL [2.4]
Edge 2.0'-2.5' 5.5*
20 0 20 Feet
\GIS\NAS_CecilField\Site-03_20110124.apr 26Apr11 MJJ Layout07

Path Forward Options

- Verify Vertical Delineation Test using passive sampling with diffusion sampler.
  - Collect sample directly above creek bottom (+0.5' to 0.0' interval in addition to the previous intervals directly below creek bottom).
  - If sample from directly above creek bottom is below SWCTLs then no "issue" exists.
- Delineate extent of VC contamination along creek using WPs.
  - Use same WP sampling strategy (2.0' – 2.5' interval installed at edge of creek).
  - Sample every 50' up and down gradient from last sample locations.
    - Collect three samples up and down gradient (100', 150', and 200') during first round.
    - Samples will be analyzed incrementally on quick turn bases until result below SWCTL.
    - One sample location below the SWCTL (as long as there are no other samples further up or down stream of that location) is adequate to determine limits of the VC potential discharge plume.
    - If the furthest up or down or both sample location during the first round still exceeds the SWCTL, then additional WP sampling will be conducted until the limits are established.
    - The samples will be analyzed for VC only.
  - Continue to evaluate AS option to address observed exceedances of VC in WP samples.



N
Extent of Groundwater Contamination
Rowell Creek
+300
+250
+200
+150
+100
+50
+25
WP
-25
-50
-100
-150
-200
CEF-003-WP
CEF-003-31S [20-30]
CEF-003-32D [56-66]
CEF-003-35D [55-65]
CEF-003-34S [25-35]
CEF-003-22D [60-70]
CEF-003-21I [40-50]
CEF-003-20S [4-14]
CEF-003-11I [25-30]
CEF-003-12D [55-65]
100 0 100 Feet
\GIS\NAS_CecilField\Site-03_20110124.apr 27Apr11 MJJ Layout04

Site 3 4-6-11

1050 Personnel Dave S.?ker
Rob Sincik
PPE Level "D"
Weather Clear 72°F
Obj Collect gw of select VOCs
from creek & well

1050 Had meetings at Flightstar & w/ Rusty of JAA earlier today.
Dave on site to get ready for days field activities. - Calibrating
YSI & turbidity meter. Both instruments rented from Field Env. Inst.
See ~~above~~ calibration sheet for both instruments. Both calibrated.

1125 For well points we are using a stainless steel well point that
is hand driven into the ground. This screen will be cleaning
per FDEP SOPs - H_2O, H_2O + Liquinox & post grade Alcohol.
between points and before sampling begins. All H_2O will
be containerized & placed into Drum 3-46. This is a new drum

1137 Well point cleaned & ready for use

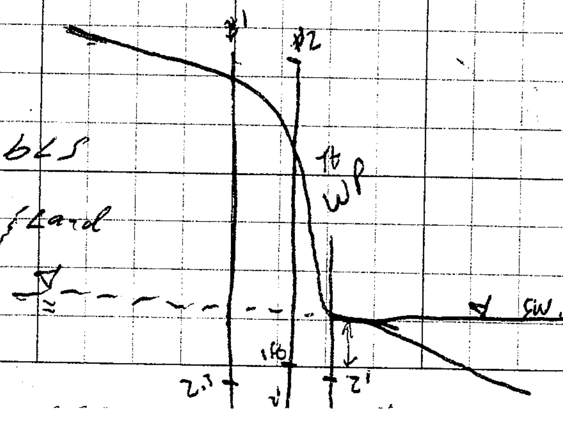
1421 Have placed metal rods at sample location
1422 Check white PVC well? new pair of wells along creek
bank. called 1st PVC well (I) & the other ~~(#2)~~ (II)

PVC Well (I) 9.94 TD
5.60 DTW ← ~5.~~6~~ riser above surface H_2O
~~(II)~~ ← 2.2 above ground

PVC Well (II) 3.70 ft above ground Riser
~5.80 ft above surface H_2O
5.80 DTW
~~9.88~~ TD

(I) 4.3 ft below ground w/ H_2O
(II) 3.88 ft Below ground w/ H_2O

Well Point driven at SW meets
the shore line.
WP driven to depth total of 2.5 bls
and 6" screen from Top of well
screen at 2' below surface water standard



13

Site 3 4-6-11

1530 Placement of well (WP) based on UFP SAP & Placement of previous well Point.

Existing WP #1 and #2 (#2 closer to Creek) information on previous page

Installed WP at original Sample location; Photo taken

Set up to Sample WP and existing WP #2

Sample ID's will Be:

The Well Point: CEF-003-WP-Original

Existing PVC Pipe #2: CEF-003-WP2-Old

Based on walk of Creek and further discussions on AS system proposed will also collect a sample 25' downgradient of original location.

So: Changes from E-mail Work Plans

1) Will collect a GW sample from Monitoring Well CEF-003-31S

2) Will collect an additional sample 25' downgradient of original location (e-mail work Plan identified every 50' up & downgradient).

3) Will Collect a sample from existing well point installed by Solutions-IES.

Observation: There is an old pvc 1" pipe stained brown in the middle of the creek about 15' upgradient of "original" WP location.

Purging the WPs. Very black organic at beginning/start of purge, but cleared up pretty quickly. The WP was very slow to recover (purged dry easily). Solutions-IES PVC well does not purge dry - Good clear up. Will sample this one first.

RL

Site 3 4-6-11

WELLS SAMPLED TODAY

	ID	Begin	Sample Time
1)	CEF-003-WP2-OLD	1500	1640
2)	CEF-003-WP-original	1530	1620
3)	CEF-003-DUP01 = Dup of CEF-003-WP-ORIGINAL		1645

1704 Packed up & leaving. All samples are on ICE & have been since collection.

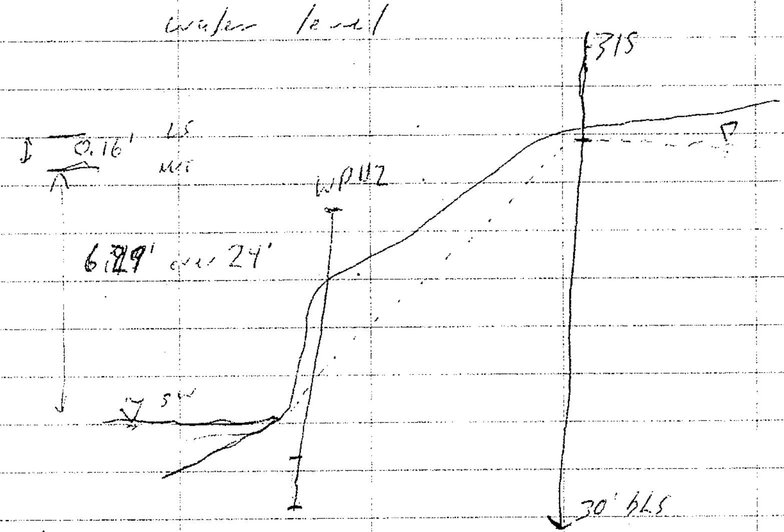
1715 Locked gates, site secure - off to Fed Ex

1830 AT Fed Ex shipping cooler - Samples Are RUSH Analysis
LAB Katahdin

April 7, 2011 Sunny, High 85°F

0700 Dave Picked up ice and additional Spikes DS - Dave Siefken
RS - Rob Simick

0800 Arrived at Site 3 and setup over CEF-003-31S.
The screen interval is 20' - 30'
Total Depth (TD): 33.4' TOC — Casing 3.55' BLS to TOC
Water Level: 3.71' Static water Depth from TOC
Note this well is only 24' from edge of creek and TOC is about 10' above the creek water level



* NOTE: PE tubing (existing) was 24' Total lenght. Used existing tubing.

0845 Began Purging CEF-003-31S
- Clear and developed well. Form filled out.

0910 Sample collected ID: CEF-003-31S

Will hold analysis pending evaluation of the results at the original well point location.

0920 Began preparation for sampling next well point.
Added Down gradient / down stream point @ 25' from Original Location
CEF-003-WP-Down025 .....

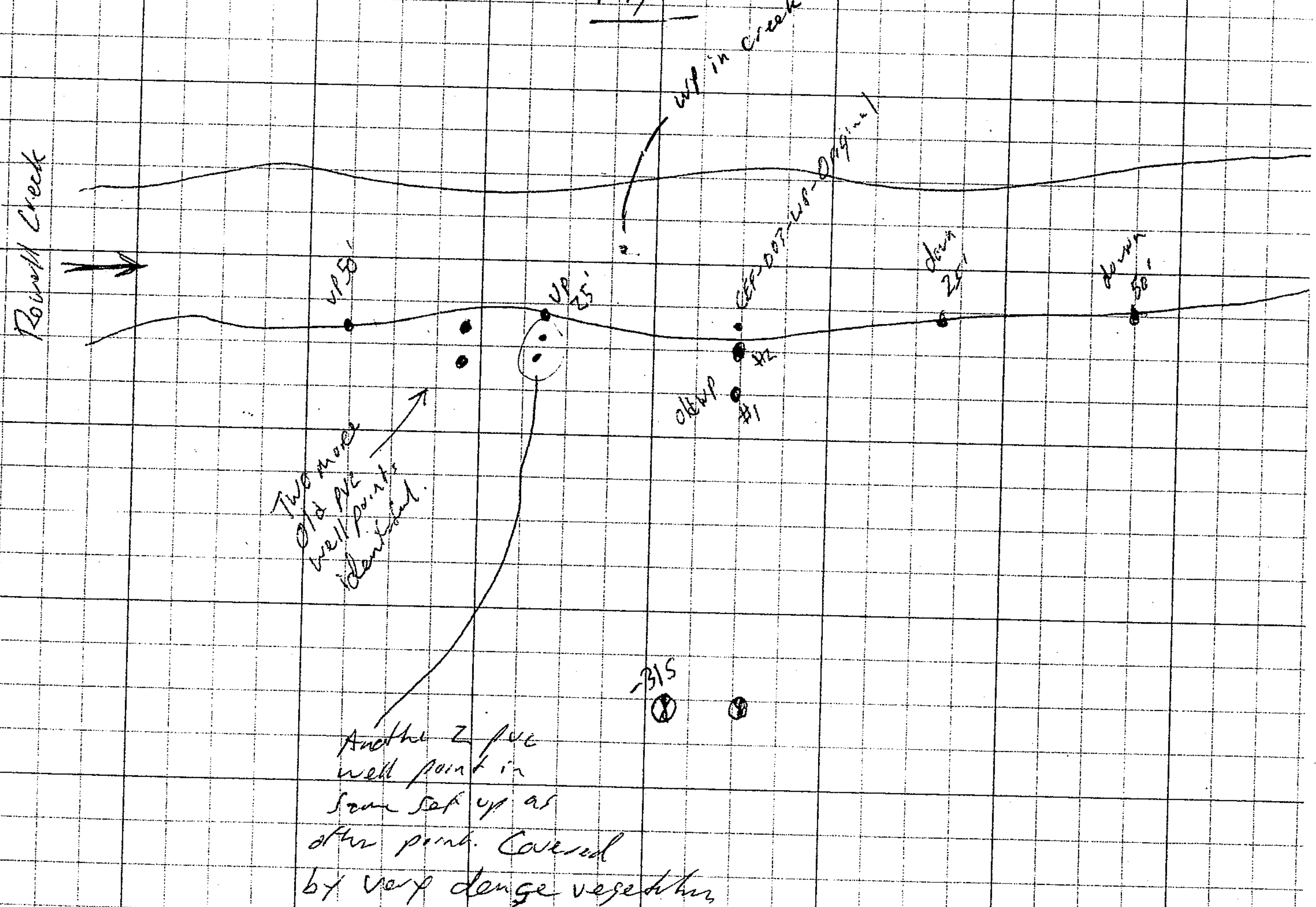
1000 Began purging Down 25' location. Initially the water was black and organic at beginning
— Not submit both 25' and 50' to stick w/ original plan.

Site 3 — 4-7-11

Wells Sampled Today

Well ID	Began Purge	Sample time	Comments
CEF-003-31S	0845	0910	Clear, drawdown 1 foot, good w
CEF-003-WP-~~Down025~~ Down025	1000	1045	Black muck to start purge. Clearing up healthy wells. Good
CEF-003-WP-Down050	1120	1140 *	Well purges dry. Difficult get good flow. *Purged longer 12:10 completed last VOA
CEF-003-WP-Up050	1230	1300	Same as other wells
CEF-003-WP-Up025	1335	1410	Same black in beginning, good flow.

Figure



1050 Set up at 50' down stream of original location.

1105 Drive WP at 50' location

1120 Began purging. WP goes dry. Much more like original WP location. Very little volume in the well point setup. Purged dry approximately 8 times.

1140 Took turbidity, not enough volume to collect flow thru water quality parameters. Collected sample.

1220 Began prep. for WP 50' upgradient of original location

1230 Installed WP. Went in very easily. No really hard zone identified but still about 1.5' below SW so pushed in about 1 foot. Purge just like the other WP locations with Dirck initially, purge dry, and after about 2 min able to pump and clears up. Purged dry again.

1300 Collect well point sample @ 50' upgrad

1335 Set up well point at 25' upgradient of original location and began purging. Very good flow. Well never went dry. Good turbidity on this well @ 15 NTUs Hard/soft/Hard. The WP went in same as the other wells, not sure why so good. Water quality reading indicate it is definitely GW with no SW infiltration.

1410 Collected 25' upgradient/upstream sample
CEF-003-WP-Up025

1425 Collecting water quality measurement of creek surface water for potential future use!

Temp: 20.76 °C steady
Cond: 0.169 mS/cm 0.156 mS/cm Steady
D.O: 108.6 % verified 9.65 mg/L Steady
PH: 6.93 pH
~~ORP~~: -1.7 pHmV
ORP -151.9 orp

Site 3 4-7-11

1507 Packed up from todays activities Rob left ~ 1445. All Samples are collected & I may need to return next week depending on lab analysis results.

1518 Through both gates, Locked & Site secure heading for Bldg 536 to put IDW in bldg for storage.

1533 At Bldg 536 sealed 2 buckets bucket 1 & Bucket 2 - put Drum labels on each bucket with ID of 3-46 1 of 2 & 2 of 2 will leave on haz spill pallet until we know Lab results. - Bldg 536 looks very clean Jeff doing a good job - HRC still in bldg. Off to return Contractor pass

1548 Returned contractor pass for Rob & I off to Fed-Ex

1730 At Fed Ex - Send cooler to Katahdin for Rush analysis of select VOC see Chain-of-Custody for constituents.

END of DAY

DS

TETRA TECH NUS, INC. — CHAIN OF CUSTODY — NUMBER 0879 — PAGE 1 OF 1

PROJECT NO:	112G02267
FACILITY:	Cecil Field / Site 3
PROJECT MANAGER	Rob Simcik
PHONE NUMBER	412-973-5809
LABORATORY NAME AND CONTACT:	Katahdin Lab
SAMPLERS (SIGNATURE)	[signature]
FIELD OPERATIONS LEADER	David Siefken
PHONE NUMBER	412-334-7260
ADDRESS	600 Technology Way
CARRIER/WAYBILL NUMBER	8427.1835.0447
CITY, STATE	Scarborough, ME 04074

NOTE: Might not have all samples analyzed. Verify with PM prior to analysis. Only hold -315 do all well point (WP) samples immediately.

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

CONTAINER TYPE PLASTIC (P) or GLASS (G): G
PRESERVATIVE USED: HCl
TYPE OF ANALYSIS: * Select VOCs 8260B

Day	DATE YEAR 2011	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT) Below Sediment	BOTTOM DEPTH (FT) Below Sediment	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	* Select VOCs 8260B							COMMENTS
4/7	1	0910	CEF-003-31S	CEF-31S	2.0'	2.5'	GW	G	3	✓		Hold pending PM approval					Reg # 331452
4/7	2	1045	CEF-003-WP-Down025	-025'	2.0'	2.5'	GW	G	3	✓		Rush Analysis Now					
4/7	3	1140	CEF-003-WP-Down050	-50'	2.0'	2.5'	GW	G	3	✓		Rush Analysis Now					
4/7	4	1300	CEF-003-WP-Up050	+50'	2.0'	2.5'	GW	G	3	✓		Rush Analysis Now					
4/7	5	1410	CEF-003-WP-Up025	+25'	2.0'	2.5'	GW	G	3	✓		Rush Analysis Now					*Select VOCs
																	-1,1-DCE
																	1,2-DCB
																	1,4-DCB
																	Napth
																	TCE
																	Cis-1,2-DCE
																	VC

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY [signature]	4-7-11	1733	1. RECEIVED BY		
2. RELINQUISHED BY			2. RECEIVED BY		
3. RELINQUISHED BY			3. RECEIVED BY		

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R
FORM NO. TtNUS-001

SITE NAME: Site 3		SITE LOCATION: Cell 1	
WELL NO: MW 31s	SAMPLE ID: CEF-003-31s		DATE: 4-7-11

PURGING DATA

WELL DIAMETER (inches): 2"	TUBING DIAMETER (inches): 1/4	WELL SCREEN INTERVAL DEPTH: 20 ft to 30 ft	STATIC DEPTH TO WATER (feet): 3.71	PURGE PUMP TYPE OR BAILER: PP

WELL VOLUME PURGE: **1 WELL VOLUME** = (TOTAL WELL DEPTH – STATIC DEPTH TO WATER) X WELL CAPACITY
(only fill out if applicable)
= (feet – feet) X gallons/foot = ~~6.4~~ 2 ~~gallons~~

EQUIPMENT VOLUME PURGE: **1 EQUIPMENT VOL.** = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME
(only fill out if applicable)
= gallons + (gallons/foot X feet) + gallons = <2 L gallons

INITIAL PUMP OR TUBING DEPTH IN WELL (feet): 25	FINAL PUMP OR TUBING DEPTH IN WELL (feet): 25	PURGING INITIATED AT: 0845	PURGING ENDED AT: 0905	TOTAL VOLUME PURGED (~~gallons~~): <6

TIME	VOLUME PURGED (~~gallons~~ L)	CUMUL. VOLUME PURGED (~~gallons~~ mL)	PURGE RATE (gpm)	DEPTH TO WATER (feet)	pH (standard units)	TEMP. (°C)	COND. (circle units) µmhos/cm or µS/cm	DISSOLVED OXYGEN (circle units) ~~mg/L or~~ % saturation	TURBIDITY (NTUs)	COLOR (describe)	ODOR (describe)
0845	0	0	300	3.71							
0855	3000	3000	300	4.92	6.55	18.51	0.245	7.5	0.71	Clear	None
0900	~~300~~ 1500	4500	300	4.93	6.55	18.64	0.242	8.7	0.70	clear	None
0905	1500	6000	300	4.94	6.56	18.69	0.274	14.6	0.68	clear	None
0910											

WELL CAPACITY (Gallons Per Foot): **0.75"** = 0.02; **1"** = 0.04; **1.25"** = 0.06; **2"** = 0.16; **3"** = 0.37; **4"** = 0.65; **5"** = 1.02; **6"** = 1.47; **12"** = 5.88
TUBING INSIDE DIA. CAPACITY (Gal./Ft.): **1/8"** = 0.0006; **3/16"** = 0.0014; **1/4"** = 0.0026; **5/16"** = 0.004; **3/8"** = 0.006; **1/2"** = 0.010; **5/8"** = 0.016
PURGING EQUIPMENT CODES: **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **PP** = Peristaltic Pump; **O** = Other (Specify)

SAMPLING DATA

SAMPLED BY (PRINT) / AFFILIATION: RDKL Tt	SAMPLER(S) SIGNATURE(S): David Siefken	SAMPLING INITIATED AT: 0910	SAMPLING ENDED AT: 0930
PUMP OR TUBING DEPTH IN WELL (feet): 25	TUBING MATERIAL CODE: PE	FIELD-FILTERED: Y (N) Filtration Equipment Type:	FILTER SIZE: ____ µm
FIELD DECONTAMINATION: PUMP Y (N)	TUBING Y (N) (replaced)	DUPLICATE: Y (N)	

SAMPLE CONTAINER SPECIFICATION				SAMPLE PRESERVATION			INTENDED ANALYSIS AND/OR METHOD	SAMPLING EQUIPMENT CODE	SAMPLE PUMP FLOW RATE (mL per minute)
SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOL ADDED IN FIELD (mL)	FINAL pH			
1	3	CG	(3)40 mL	HCL	(3) 40 mL	<2	Select 8260 B	RFPP	200

REMARKS: good well. High H_2O table, Near surface of land.

MATERIAL CODES: **AG** = Amber Glass; **CG** = Clear Glass; **PE** = Polyethylene; **PP** = Polypropylene; **S** = Silicone; **T** = Teflon; **O** = Other (Specify)

SAMPLING EQUIPMENT CODES: **APP** = After Peristaltic Pump; **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **RFPP** = Reverse Flow Peristaltic Pump; **SM** = Straw Method (Tubing Gravity Drain); **O** = Other (Specify)

NOTES: 1. The above do not constitute all of the information required by Chapter 62-160, F.A.C.
2. STABILIZATION CRITERIA FOR RANGE OF VARIATION OF LAST THREE CONSECUTIVE READINGS (SEE FS 2212, SECTION 3)
pH: ± 0.2 units **Temperature:** ± 0.2 °C **Specific Conductance:** ± 5% **Dissolved Oxygen:** all readings ≤ 20% saturation (see Table FS 2200-2); optionally, ± 0.2 mg/L or ± 10% (whichever is greater) **Turbidity:** all readings ≤ 20 NTU; optionally ± 5 NTU or ± 10% (whichever is greater)

Revision Date: February 12, 2009

(*) 3.55 riser above ground.

SITE NAME: Site 3	SITE LOCATION: Cecil
WELL NO: CEF-003-WP-Down 025 SAMPLE ID: CEF-003-WP-Down 025	DATE: 4-7-11

PURGING DATA

WELL DIAMETER (inches): 3/4	TUBING DIAMETER (inches): 1/4	WELL SCREEN INTERVAL DEPTH: 2.5 to 2.9 ft	STATIC DEPTH TO WATER (feet): NA	PURGE PUMP TYPE OR BAILER: PP

WELL VOLUME PURGE: 1 WELL VOLUME = (TOTAL WELL DEPTH – STATIC DEPTH TO WATER) X WELL CAPACITY
(only fill out if applicable)
= (feet – feet) X gallons/foot = gallons

EQUIPMENT VOLUME PURGE: 1 EQUIPMENT VOL. = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME
(only fill out if applicable)
= gallons + (gallons/foot X feet) + gallons = ~~gallons~~ <1

INITIAL PUMP OR TUBING DEPTH IN WELL (feet): 2.5	FINAL PUMP OR TUBING DEPTH IN WELL (feet): 2.5	PURGING INITIATED AT: 1000	PURGING ENDED AT: 1035	TOTAL VOLUME PURGED (~~gallons~~ L): 7.0

TIME	VOLUME PURGED (~~gallons~~ ml)	CUMUL. VOLUME PURGED (~~gallons~~ ml)	PURGE RATE (~~gpm~~ ml)	DEPTH TO WATER (feet)	pH (standard units)	TEMP. (°C)	COND. (circle units) µmhos/cm or µS/cm	DISSOLVED OXYGEN (circle units) ~~mg/L or~~ (% saturation)	TURBIDITY (NTUs)	COLOR (describe)	ODOR (describe)
1000	0	0	200								
1015	3000	300	200	NA	7.01	20.23	0.336	9.5	114	Lt. Brown	—
1020	1000	4000	200	NA	6.99	20.35	0.337	12.7	38	Clear	—
1025	1000	5000	200	NA	7.01	20.31	0.337	12.1	35	Clear	—
1030	1000	6000	200	NA	6.98	20.35	0.336	10.1	23	Clear	—
1035	1000	7000	200	NA	6.99	20.38	0.335	8.6	14.69	Clear	—
	(1045)										

WELL CAPACITY (Gallons Per Foot): **0.75"** = 0.02; **1"** = 0.04; **1.25"** = 0.06; **2"** = 0.16; **3"** = 0.37; **4"** = 0.65; **5"** = 1.02; **6"** = 1.47; **12"** = 5.88
TUBING INSIDE DIA. CAPACITY (Gal./Ft.): **1/8"** = 0.0006; **3/16"** = 0.0014; **1/4"** = 0.0026; **5/16"** = 0.004; **3/8"** = 0.006; **1/2"** = 0.010; **5/8"** = 0.016

PURGING EQUIPMENT CODES: **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **PP** = Peristaltic Pump; **O** = Other (Specify)

SAMPLING DATA

SAMPLED BY (PRINT) / AFFILIATION: Dave Siefken / Tt	SAMPLER(S) SIGNATURE(S): [signature]	SAMPLING INITIATED AT: 1045	SAMPLING ENDED AT: 1050
PUMP OR TUBING DEPTH IN WELL (feet):	TUBING MATERIAL CODE: PE	FIELD-FILTERED: Y (N) Filtration Equipment Type:	FILTER SIZE: ____ µm
FIELD DECONTAMINATION: PUMP Y (N)	TUBING (Y) N (replaced)	DUPLICATE: Y (N)	

SAMPLE CONTAINER SPECIFICATION				SAMPLE PRESERVATION			INTENDED ANALYSIS AND/OR METHOD	SAMPLING EQUIPMENT CODE	SAMPLE PUMP FLOW RATE (mL per minute)
SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOL ADDED IN FIELD (mL)	FINAL pH			
1	3	CG	(3)40 mL	HCL	(3) 40 mL	<2	Select 8260 B	RFPP	200

REMARKS:
Drive point TW does not allow for DTW.

MATERIAL CODES: **AG** = Amber Glass; **CG** = Clear Glass; **PE** = Polyethylene; **PP** = Polypropylene; **S** = Silicone; **T** = Teflon; **O** = Other (Specify)

SAMPLING EQUIPMENT CODES: **APP** = After Peristaltic Pump; **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **RFPP** = Reverse Flow Peristaltic Pump; **SM** = Straw Method (Tubing Gravity Drain); **O** = Other (Specify)

NOTES: 1. The above do not constitute all of the information required by Chapter 62-160, F.A.C.
2. STABILIZATION CRITERIA FOR RANGE OF VARIATION OF LAST THREE CONSECUTIVE READINGS (SEE FS 2212, SECTION 3)
pH: ± 0.2 units **Temperature:** ± 0.2 °C **Specific Conductance:** ± 5% **Dissolved Oxygen:** all readings ≤ 20% saturation (see Table FS 2200-2); optionally, ± 0.2 mg/L or ± 10% (whichever is greater) **Turbidity:** all readings ≤ 20 NTU; optionally ± 5 NTU or ± 10% (whichever is greater)

Revision Date: February 12, 2009

SITE NAME: Site 3	SITE LOCATION: Cecil	
WELL NO: CEF-003-WP-Dawn 050	SAMPLE ID: CEF-003-WP-Dawn-050	DATE: 4-7-11

PURGING DATA

WELL DIAMETER (inches): 3/4"	TUBING DIAMETER (inches): 1/4	WELL SCREEN INTERVAL DEPTH: 2.5 ft to 2.0 ft	STATIC DEPTH TO WATER (feet): NA	PURGE PUMP TYPE OR BAILER: PP

WELL VOLUME PURGE: 1 WELL VOLUME = (TOTAL WELL DEPTH – STATIC DEPTH TO WATER) X WELL CAPACITY
(only fill out if applicable)
= (feet – feet) X gallons/foot = <1 gallons

EQUIPMENT VOLUME PURGE: 1 EQUIPMENT VOL. = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME
(only fill out if applicable)
= gallons + (gallons/foot X feet) + gallons = gallons

INITIAL PUMP OR TUBING DEPTH IN WELL (feet): 2.5	FINAL PUMP OR TUBING DEPTH IN WELL (feet): 2.5	PURGING INITIATED AT: 1120	PURGING ENDED AT: 1140	TOTAL VOLUME PURGED (gallons): <1 L

TIME	VOLUME PURGED (~~gallons~~)	CUMUL. VOLUME PURGED (gallons)	PURGE RATE (gpm)	DEPTH TO WATER (feet)	pH (standard units)	TEMP. (°C)	COND. (circle units) μmhos/cm or μS/cm	DISSOLVED OXYGEN (circle units) mg/L or % saturation	TURBIDITY (NTUs)	COLOR (describe)	ODOR (describe)
1120	0	0	100	NA							
1121	~~~50ml~~	~~~50~~ ~50	100	NA	~ Purged	dry	within	1 min -	~	50 ml	purged
1129	purged	Dry	5 times.	Not enough	for	flow	cell	reading			
1130									126		
1140									85		
									90		
(1140)											

WELL CAPACITY (Gallons Per Foot): **0.75"** = 0.02; **1"** = 0.04; **1.25"** = 0.06; **2"** = 0.16; **3"** = 0.37; **4"** = 0.65; **5"** = 1.02; **6"** = 1.47; **12"** = 5.88
TUBING INSIDE DIA. CAPACITY (Gal./Ft.): **1/8"** = 0.0006; **3/16"** = 0.0014; **1/4"** = 0.0026; **5/16"** = 0.004; **3/8"** = 0.006; **1/2"** = 0.010; **5/8"** = 0.016

PURGING EQUIPMENT CODES: **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **PP** = Peristaltic Pump; **O** = Other (Specify)

SAMPLING DATA

SAMPLED BY (PRINT) / AFFILIATION: David Siefken / TT	SAMPLER(S) SIGNATURE(S): [signature]	SAMPLING INITIATED AT: 1140	SAMPLING ENDED AT: 1145
PUMP OR TUBING DEPTH IN WELL (feet): 2.5	TUBING MATERIAL CODE: PE	FIELD-FILTERED: Y (N) Filtration Equipment Type:	FILTER SIZE: ____ μm
FIELD DECONTAMINATION: PUMP Y (N)	TUBING (Y) N (replaced)	DUPLICATE: Y (N)	

SAMPLE CONTAINER SPECIFICATION				SAMPLE PRESERVATION			INTENDED ANALYSIS AND/OR METHOD	SAMPLING EQUIPMENT CODE	SAMPLE PUMP FLOW RATE (mL per minute)
SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOL ADDED IN FIELD (mL)	FINAL pH			
1	3	CG	(3)40 mL	HCL	(3) 40 mL	<2	Select 8260 B	RFPP	100

REMARKS: Purged dry. Numerous times very very poor producing well.

MATERIAL CODES: **AG** = Amber Glass; **CG** = Clear Glass; **PE** = Polyethylene; **PP** = Polypropylene; **S** = Silicone; **T** = Teflon; **O** = Other (Specify)

SAMPLING EQUIPMENT CODES: **APP** = After Peristaltic Pump; **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **RFPP** = Reverse Flow Peristaltic Pump; **SM** = Straw Method (Tubing Gravity Drain); **O** = Other (Specify)

NOTES: 1. The above do not constitute all of the information required by Chapter 62-160, F.A.C.
2. STABILIZATION CRITERIA FOR RANGE OF VARIATION OF LAST THREE CONSECUTIVE READINGS (SEE FS 2212, SECTION 3)
pH: ± 0.2 units **Temperature:** ± 0.2 °C **Specific Conductance:** ± 5% **Dissolved Oxygen:** all readings ≤ 20% saturation (see Table FS 2200-2); optionally, ± 0.2 mg/L or ± 10% (whichever is greater) **Turbidity:** all readings ≤ 20 NTU; optionally ± 5 NTU or ± 10% (whichever is greater)

Revision Date: February 12, 2009

SITE NAME: Site 3		SITE LOCATION: Cecil	
WELL NO: CEF-003-WP-UP-050	SAMPLE ID: CEF-003-WP-UP-050		DATE: 4-7-11

PURGING DATA

WELL DIAMETER (inches): 3/4	TUBING DIAMETER (inches): 1/4	WELL SCREEN INTERVAL DEPTH: 2.5 ft to 2.0 ft	STATIC DEPTH TO WATER (feet): No	PURGE PUMP TYPE OR BAILER: PP

WELL VOLUME PURGE: 1 WELL VOLUME = (TOTAL WELL DEPTH – STATIC DEPTH TO WATER) X WELL CAPACITY
(only fill out if applicable) = (feet – feet) X gallons/foot = <1 gallons

EQUIPMENT VOLUME PURGE: 1 EQUIPMENT VOL. = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME
(only fill out if applicable) = gallons + (gallons/foot X feet) + gallons = <1 gallons

INITIAL PUMP OR TUBING DEPTH IN WELL (feet): 2.5	FINAL PUMP OR TUBING DEPTH IN WELL (feet): 2.5	PURGING INITIATED AT: 1230	PURGING ENDED AT: 1300	TOTAL VOLUME PURGED (~~gallons~~ L): ~1 L

TIME	VOLUME PURGED (~~gallons~~ ml)	CUMUL. VOLUME PURGED (~~gallons~~ ml)	PURGE RATE (gpm)	DEPTH TO WATER (feet)	pH (standard units)	TEMP. (°C)	COND. (circle units) µmhos/cm or µS/cm	DISSOLVED OXYGEN (circle units) mg/L or % saturation	TURBIDITY (NTUs)	COLOR (describe)	ODOR (describe)
1230	0	0	100								
1240	1000	1000	100	NA	6.38	24.80	0.262	151	44.	Lt. Brown	—
1300									41		
1300 (circled)											

WELL CAPACITY (Gallons Per Foot): **0.75"** = 0.02; **1"** = 0.04; **1.25"** = 0.06; **2"** = 0.16; **3"** = 0.37; **4"** = 0.65; **5"** = 1.02; **6"** = 1.47; **12"** = 5.88
TUBING INSIDE DIA. CAPACITY (Gal./Ft.): **1/8"** = 0.0006; **3/16"** = 0.0014; **1/4"** = 0.0026; **5/16"** = 0.004; **3/8"** = 0.006; **1/2"** = 0.010; **5/8"** = 0.016
PURGING EQUIPMENT CODES: **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **PP** = Peristaltic Pump; **O** = Other (Specify)

SAMPLING DATA

SAMPLED BY (PRINT) / AFFILIATION: David Siefken / TT	SAMPLER(S) SIGNATURE(S): [signature]	SAMPLING INITIATED AT: 1300	SAMPLING ENDED AT: 1305
PUMP OR TUBING DEPTH IN WELL (feet): 2.5	TUBING MATERIAL CODE: PE	FIELD-FILTERED: Y (N) Filtration Equipment Type:	FILTER SIZE: ____ µm
FIELD DECONTAMINATION: PUMP Y (N)	TUBING (Y) N (replaced)	DUPLICATE: Y (N)	

SAMPLE CONTAINER SPECIFICATION				SAMPLE PRESERVATION			INTENDED ANALYSIS AND/OR METHOD	SAMPLING EQUIPMENT CODE	SAMPLE PUMP FLOW RATE (mL per minute)
SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOL ADDED IN FIELD (mL)	FINAL pH			
1	3	CG	(3)40 mL	HCL	(3) 40 mL	<2	Select 8260 B	RFPP	100.

REMARKS:

MATERIAL CODES: **AG** = Amber Glass; **CG** = Clear Glass; **PE** = Polyethylene; **PP** = Polypropylene; **S** = Silicone; **T** = Teflon; **O** = Other (Specify)
SAMPLING EQUIPMENT CODES: **APP** = After Peristaltic Pump; **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **RFPP** = Reverse Flow Peristaltic Pump; **SM** = Straw Method (Tubing Gravity Drain); **O** = Other (Specify)

NOTES: 1. The above do not constitute all of the information required by Chapter 62-160, F.A.C.
2. STABILIZATION CRITERIA FOR RANGE OF VARIATION OF LAST THREE CONSECUTIVE READINGS (SEE FS 2212, SECTION 3)
pH: ± 0.2 units **Temperature:** ± 0.2 °C **Specific Conductance:** ± 5% **Dissolved Oxygen:** all readings ≤ 20% saturation (see Table FS 2200-2); optionally, ± 0.2 mg/L or ± 10% (whichever is greater) **Turbidity:** all readings ≤ 20 NTU; optionally ± 5 NTU or ± 10% (whichever is greater)

Revision Date: February 12, 2009

(A) TW Purged dry 2 time before I got enough H_2O for 1st flow cell reading

Revision Date: February 1, 2004

Form FD 9000-24

GROUNDWATER SAMPLING LOG

SITE NAME: CEF-003-WP-UP-025 / Site 3		SITE LOCATION: Cecil
WELL NO: UP-025	SAMPLE ID: CEF-003-WP-UP-025	DATE 4-7-11

PURGING DATA

WELL DIAMETER (inches): ~~2~~ 3/4	TUBING DIAMETER (inches): ~~3/16~~ 1/4	WELL SCREEN INTERVAL DEPTH: 2.5 feet to 20 feet	STATIC DEPTH TO WATER (feet): NA	PURGE PUMP TYPE OR BAILER: Peristaltic Pump

WELL VOLUME PURGE: 1 WELL VOLUME = (TOTAL WELL DEPTH – STATIC DEPTH TO WATER) X WELL CAPACITY
(only fill out if applicable)
= (feet – feet) X liters/foot = <1 liters

EQUIPMENT VOLUME PURGE: 1 EQUIPMENT VOL. = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME
(only fill out if applicable)
= liters + (liters/foot X feet) + liters = liters

INITIAL PUMP OR TUBING DEPTH IN WELL (feet): 2.5	FINAL PUMP OR TUBING DEPTH IN WELL (feet): 2.5	PURGING INITIATED AT: 1335	PURGING ENDED AT: 1405	TOTAL VOLUME PURGED (liters): 4.0

TIME	VOLUME PURGED (~~gallons~~ mL)	CUMUL. VOLUME PURGED (~~gallons~~ mL)	PURGE RATE (~~g~~ mLpm)	DEPTH TO WATER (feet)	pH (standard units)	TEMP. (°C)	COND. (circle units) μmhos/cm or μS/cm	DISSOLVED OXYGEN (circle units) mg/L or (% saturation)	TURBIDITY (NTUs)	COLOR (describe)	ODOR (describe)
1335	0	0	100	NA							
1345	1000	1000	100	NA	6.38	21.86	0.268	5.9	36	Clear	–
1355	1000	2000	100	NA	6.44	21.89	0.269	8.1	15	Clear	–
1400	1000	3000	100	NA	6.39	21.85	0.270	15.2		Clear	–
1405	1000	4000	100	NA	6.48	21.89	0.271	13.8		Clear	–
1410											

WELL CAPACITY (Liters Per Foot): **0.75"** = 0.0757; **1"** = 0.151; **1.25"** = 0.227; **2"** = 0.605; **3"** = 0.37; **4"** = 1.40; **5"** = 3.861; **6"** = 5.564; **12"** = 22.25
TUBING INSIDE DIA. CAPACITY (Ltr./Ft.): **1/8"** = 0.00227; **3/16"** = 0.00529; **1/4"** = 0.00984; **5/16"** = 0.0151; **3/8"** = 0.0227; **1/2"** = 0.0378; **5/8"** = 0.0605
PURGING EQUIPMENT CODES: **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **PP** = Peristaltic Pump; **O** = Other (Specify)

SAMPLING DATA

SAMPLED BY (PRINT) / AFFILIATION: Dave Stefher /TtNUS	SAMPLER(S) SIGNATURE(S): [signature]	SAMPLING INITIATED AT: 1410	SAMPLING ENDED AT: 1415
PUMP OR TUBING DEPTH IN WELL (feet): 2.5	TUBING MATERIAL CODE: Teflon (Poly) (circle one)	FIELD-FILTERED: Y (N) Filtration Equipment Type:	FILTER SIZE: ____ μm
FIELD DECONTAMINATION: PUMP Y (N)	TUBING (Y) N (replaced)	DUPLICATE: Y (N)	

SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME (mL)	PRESERVATIVE USED	TOTAL VOL ADDED IN FIELD (mL)	FINAL pH	INTENDED ANALYSIS AND/OR METHOD	SAMPLING EQUIPMENT CODE	SAMPLE PUMP FLOW RATE (mL per minute)
1	3	CG	40	HCL	40	<2	8260	RPP	100

REMARKS:

MATERIAL CODES: **AG** = Amber Glass; **CG** = Clear Glass; **PE** = Polyethylene; **PP** = Polypropylene; **S** = Silicone; **T** = Teflon; **O** = Other (Specify)

SAMPLING EQUIPMENT CODES: **APP** = After Peristaltic Pump; **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **RFPP** = Reverse Flow Peristaltic Pump; **SM** = Straw Method (Tubing Gravity Drain); **O** = Other (Specify)

NOTES: 1. **The above do not constitute all of the information required by Chapter 62-160, F.A.C.**
2. STABILIZATION CRITERIA FOR RANGE OF VARIATION OF LAST THREE CONSECUTIVE READINGS (SEE FS 2212, SECTION 3)

pH: ± 0.2 units **Temperature:** ± 0.2 °C **Specific Conductance:** ± 5% **Dissolved Oxygen:** all readings ≤ 20% saturation (see Table FS 2200-2); optionally, ± 0.2 mg/L or ± 10% (whichever is greater). **Turbidity:** all readings ≤ 20 NTU; optionally ± 5 NTU or ± 10% (whichever is greater)

Siefken, David

From: Simcik, Robert
Sent: Tuesday, March 29, 2011 11:50 AM
To: Siefken, David
Subject: FW: Site 3 Pilot Test _ additional Well Point sampling.

Dave, here is the list of "Select VOCs" for the COC.

Select Volatile Organic Compounds (VOC)	SW-846 5030B/8260B

From: Grabka, David [mailto:David.Grabka@dep.state.fl.us]
Sent: Tuesday, March 29, 2011 11:43 AM
To: Simcik, Robert; Vaughn-Wright.Debbie@epamail.epa.gov; Sanford, Art F CTR OASN (EI&E), BRAC PMO SE; mark.e.davidson@navy.mil; stacin.martin@navy.mil; Jessica Keener; Jonnet, Mark; Michael.Halil@CH2M.com
Cc: Boerio, Megan
Subject: RE: Site 3 Pilot Test _ additional Well Point sampling.

Thanks. The list looks fine.

From: Simcik, Robert [mailto:Robert.Simcik@tetratech.com]
Sent: Monday, March 28, 2011 3:18 PM
To: Grabka, David; Vaughn-Wright.Debbie@epamail.epa.gov; Sanford, Art F CTR OASN (EI&E), BRAC PMO SE; mark.e.davidson@navy.mil; stacin.martin@navy.mil; Jessica Keener; Jonnet, Mark; Michael.Halil@CH2M.com
Cc: Boerio, Megan
Subject: RE: Site 3 Pilot Test _ additional Well Point sampling.

Dave, we reviewed the GCTL exceedences for the wells that have the potential to migrate to the creek and developed the following list of Select VOCs for the Well Point sampling analysis. Note that this "additional sampling to support the pilot test design" does not match the list of select VOC (19) and select SVOCs (6) in the UFP SAP because we are only looking at the parameters which have the potential to impact the surface water. Also analyzing 1,2-Dichlorobenzene and Naphthalene as a VOC, not SVOC, as cost savings measure. Cis doesn't have a SW limit, but I want to see what, if anything is going on with it.

SW-846 METHOD 8260-B
ANALYTICAL DETECTION LIMITS
Volatile Organic Compounds
NAS Cecil Field

Parameter	62-777 Minimum surface water criteria
VOCs (UG/L)	
1,1-DICHLOROETHENE	3.2
1,2-DICHLOROBENZENE	99
1,4-DICHLOROBENZENE	3
NAPHTHALENE	26
TRICHLOROETHENE	80.7
CIS-1,2-DICHLOROETHENE	NA
VINYL CHLORIDE	2.4

Tetra Tech NUS, Inc.

EQUIPMENT CALIBRATION LOG

PROJECT NAME : Cecil

SITE NAME: Site 3

PROJECT No.: 112g02267

INSTRUMENT NAME/MODEL:

MANUFACTURER:

SERIAL NUMBER:

	Date of Calibration	Instrument I.D. Number	Person Performing Calibration	Instrument Settings		Instrument Readings		Calibration Standard (Lot No.)	Remarks and Comments
				Pre-calibration	Post-calibration	Pre-calibration	Post-calibration		
YSI	4-6-11	06C2320AF	D.S	DO	100 %	91.9		—	Cal solution provided by F.I.
				pH	10.0	pH 10.08		—	
				pH	7.0	7.06		—	
				Cond	1.409	1.337		—	
Turbidity	4-6-11	200812225	DS	1000	1000	1003		10-31-11	CO 37677
				100	100	102		10-31-11	CO 37441
				0	0	0		10-31-11	CO 38873
YSI	4-7-11	06C2320AF	DS	DO	100	107			
				pH	~~1.409~~ 4.0	~~1.282~~ 3.83			
				pH	7.0	7.10			
				Cond	1.409	1.282			
Turb		200912225		1000					
				100					
				0					
	4-7-11	06C2320AF		DO	~~77.8~~	77.8			
					4	4.20			
					7	7.10			
					1.409	1.903			

TETRA TECH NUS, INC. | **CHAIN OF CUSTODY** | **NUMBER** 0878 | **PAGE** 1 **OF** 1

PROJECT NO: 112g02267	FACILITY: Cecil / Site 3	PROJECT MANAGER: Rob Simcik	PHONE NUMBER: 412 921 8163	LABORATORY NAME AND CONTACT: Katahdin Lab
SAMPLERS (SIGNATURE): [signature]		FIELD OPERATIONS LEADER: David Siefken	PHONE NUMBER: 904 334-7260	ADDRESS: 600 Technology Way
		CARRIER/WAYBILL NUMBER:		CITY, STATE: Scarborough, ME 04074

STANDARD TAT ☐
RUSH TAT ☒ ← RUSH
☒ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): G
PRESERVATIVE USED: HCl
TYPE OF ANALYSIS: ⊛ Select VOC 8260B

[redacted]	[redacted]	[redacted]	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	⊛ Select VOC 8260B							COMMENTS
1	[redacted]	[redacted]	CEF	7.68'	9.68'	GW	G	3	✓							requisition 331452
2	1640	CEF-003-WP-Original	CEF	2.0'	2.5'	GW	G	3	✓							
3	1645	CEF-003-DUP01	CEF	—	—	GW	G	3	✓							⊛ Select VOC
																1,1-DCE
																1,2-DCB
																1,4-DCB
																Naphthalene
																Trichloroethene
																1,2 DCE (cis)
																VC

1. RELINQUISHED BY [signature]	DATE 4-6-11	TIME 1822	1. RECEIVED BY	DATE	TIME
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R
FORM NO. TtNUS-001

SITE NAME: Cecil Field	SITE LOCATION: Site 3 Rowell Creek location
WELL NO: WP Original	SAMPLE ID: CEF-003-WP-Original	DATE: 4/6/11

PURGING DATA

WELL DIAMETER (inches): 3/4"	TUBING DIAMETER (inches): 1/4"	WELL SCREEN INTERVAL, DEPTH: 2.5' ft to 2.0' ft	STATIC DEPTH TO WATER (feet): NA	PURGE PUMP TYPE OR BAILER: P. Pump

WELL VOLUME PURGE: 1 WELL VOLUME = (TOTAL WELL DEPTH – STATIC DEPTH TO WATER) X WELL CAPACITY
(only fill out if applicable)
= (feet – feet) X * gallons/foot = <2L needed ~~gallons~~

EQUIPMENT VOLUME PURGE: 1 EQUIPMENT VOL. = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME
(only fill out if applicable)
= gallons + (gallons/foot X feet) + gallons = gallons

INITIAL PUMP OR TUBING DEPTH IN WELL (feet): 2.25	FINAL PUMP OR TUBING DEPTH IN WELL (feet): 2.25	PURGING INITIATED AT:	PURGING ENDED AT:	TOTAL VOLUME PURGED (gallons):

TIME	VOLUME PURGED (~~gallons~~ L)	CUMUL. VOLUME PURGED (~~gallons~~ L)	PURGE RATE (gpm)	DEPTH TO WATER (feet)	pH (standard units)	TEMP. (°C)	COND. (circle units) μmhos/cm or μS/cm	DISSOLVED OXYGEN (circle units) mg/L or % saturation	TURBIDITY (NTUs)	COLOR (describe)	ODOR (describe)
1500	0	0	100	NA -	(Not	able	due to	drive point	TW)		
1640	L.5	L.5	100	"					35	Clear	None
Purge	dry	within ~	15	seconds	initially	- eventually		could	purge ~	30 sec	
	of water	through	tubing.		could	fill 1-2	vials	at a time.			

WELL CAPACITY (Gallons Per Foot): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88
TUBING INSIDE DIA. CAPACITY (Gal./Ft.): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016
PURGING EQUIPMENT CODES: B = Bailer; BP = Bladder Pump; ESP = Electric Submersible Pump; PP = Peristaltic Pump; O = Other (Specify)

SAMPLING DATA

SAMPLED BY (PRINT) / AFFILIATION: David Siefken	SAMPLER(S) SIGNATURE(S): [signature]	SAMPLING INITIATED AT: 1640	SAMPLING ENDED AT:
PUMP OR TUBING DEPTH IN WELL (feet): 2.25	TUBING MATERIAL CODE: PE	FIELD-FILTERED: Y (N) Filtration Equipment Type:	FILTER SIZE: ____ μm
FIELD DECONTAMINATION: PUMP Y (N)	TUBING (Y) N (replaced)	DUPLICATE: (Y) N (Dup 01)	

SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOL ADDED IN FIELD (mL)	FINAL pH	INTENDED ANALYSIS AND/OR METHOD	SAMPLING EQUIPMENT CODE	SAMPLE PUMP FLOW RATE (mL per minute)
1	3	CG	(3)40 mL	HCL	(3) 40 mL	<2	Select 8260 B	RFPP	

(Columns 1–4: SAMPLE CONTAINER SPECIFICATION; columns 5–7: SAMPLE PRESERVATION)

REMARKS:
(*) DUP - CEF-003-DUP01

MATERIAL CODES: AG = Amber Glass; CG = Clear Glass; PE = Polyethylene; PP = Polypropylene; S = Silicone; T = Teflon; O = Other (Specify)

SAMPLING EQUIPMENT CODES: APP = After Peristaltic Pump; B = Bailer; BP = Bladder Pump; ESP = Electric Submersible Pump; RFPP = Reverse Flow Peristaltic Pump; SM = Straw Method (Tubing Gravity Drain); O = Other (Specify)

NOTES: 1. The above do not constitute all of the information required by Chapter 62-160, F.A.C.
2. STABILIZATION CRITERIA FOR RANGE OF VARIATION OF LAST THREE CONSECUTIVE READINGS (SEE FS 2212, SECTION 3)

pH: ± 0.2 units **Temperature:** ± 0.2 °C **Specific Conductance:** ± 5% **Dissolved Oxygen:** all readings ≤ 20% saturation (see Table FS 2200-2); optionally, ± 0.2 mg/L or ± 10% (whichever is greater) **Turbidity:** all readings ≤ 20 NTU; optionally ± 5 NTU or ± 10% (whichever is greater)

Revision Date: February 12, 2009

*NOTE: Very slow recovery, rapid purge to dry.

6

SITE NAME: Site 3		SITE LOCATION: Cecil	
WELL NO: WP2 - OLD	SAMPLE ID: CEF-003 - WP2 - OLD		DATE: 4-6-11

PURGING DATA

WELL DIAMETER (inches): 1 1/4	TUBING DIAMETER (inches): 1/4	WELL SCREEN INTERVAL DEPTH: 9.68 ft to 7.68 ft	STATIC DEPTH TO WATER (feet): 5.8	PURGE PUMP TYPE OR BAILER: PP

WELL VOLUME PURGE: **1 WELL VOLUME** = (TOTAL WELL DEPTH – STATIC DEPTH TO WATER) X WELL CAPACITY
(only fill out if applicable)
= (feet – feet) X gallons/foot = 2 L ~~gallons~~

EQUIPMENT VOLUME PURGE: **1 EQUIPMENT VOL.** = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME
(only fill out if applicable)
= gallons + (gallons/foot X feet) + gallons = gallons

INITIAL PUMP OR TUBING DEPTH IN WELL (feet): 9.50	FINAL PUMP OR TUBING DEPTH IN WELL (feet): 9.5	PURGING INITIATED AT: 1530	PURGING ENDED AT:	TOTAL VOLUME PURGED (gallons):

TIME	VOLUME PURGED (~~gallons~~ ml)	CUMUL. VOLUME PURGED (~~gallons~~ mL)	PURGE RATE (~~gpm~~ mL/m)	DEPTH TO WATER (feet)	pH (standard units)	TEMP. (°C)	COND. (circle units) µmhos/cm or µS/cm	DISSOLVED OXYGEN (circle units) ~~mg/L or~~ % saturation	TURBIDITY (NTUs)	COLOR (describe)	ODOR (describe)
1530	0	0	100	5.80							
1600	3000	3000	100	8.07	6.42	21.00	0.229	21.6 %	2.01	Clear	None
1610	1000	4000	100	8.08	6.39	20.96	0.227	11 %	2.00	Clear	None
1615	500	4500	100	8.08	6.34	20.93	0.227	9.4	1.98	Clear	None
1620	500	5000	100	8.08	6.35	20.76	0.226	9.3	1.99	Clear	None
1620											

WELL CAPACITY (Gallons Per Foot): **0.75"** = 0.02; **1"** = 0.04; **1.25"** = 0.06; **2"** = 0.16; **3"** = 0.37; **4"** = 0.65; **5"** = 1.02; **6"** = 1.47; **12"** = 5.88
TUBING INSIDE DIA. CAPACITY (Gal./Ft.): **1/8"** = 0.0006; **3/16"** = 0.0014; **1/4"** = 0.0026; **5/16"** = 0.004; **3/8"** = 0.006; **1/2"** = 0.010; **5/8"** = 0.016

PURGING EQUIPMENT CODES: **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **PP** = Peristaltic Pump; **O** = Other (Specify)

SAMPLING DATA

SAMPLED BY (PRINT) / AFFILIATION: David Siefken / TT	SAMPLER(S) SIGNATURE(S): [signature]	SAMPLING INITIATED AT: 1620	SAMPLING ENDED AT: 1630
PUMP OR TUBING DEPTH IN WELL (feet): 9.5	TUBING MATERIAL CODE: PE	FIELD-FILTERED: Y (N) Filtration Equipment Type: DS	FILTER SIZE: ____ µm
FIELD DECONTAMINATION: PUMP Y (N)	TUBING (Y) N (replaced)	DUPLICATE: ~~Y~~ (N) Not Dup.	

SAMPLE CONTAINER SPECIFICATION				SAMPLE PRESERVATION			INTENDED ANALYSIS AND/OR METHOD	SAMPLING EQUIPMENT CODE	SAMPLE PUMP FLOW RATE (mL per minute)
SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOL ADDED IN FIELD (mL)	FINAL pH			
1	3	CG	(3)40 mL	HCL	(3) 40 mL	<2	Select 8260 B	RFPP	100

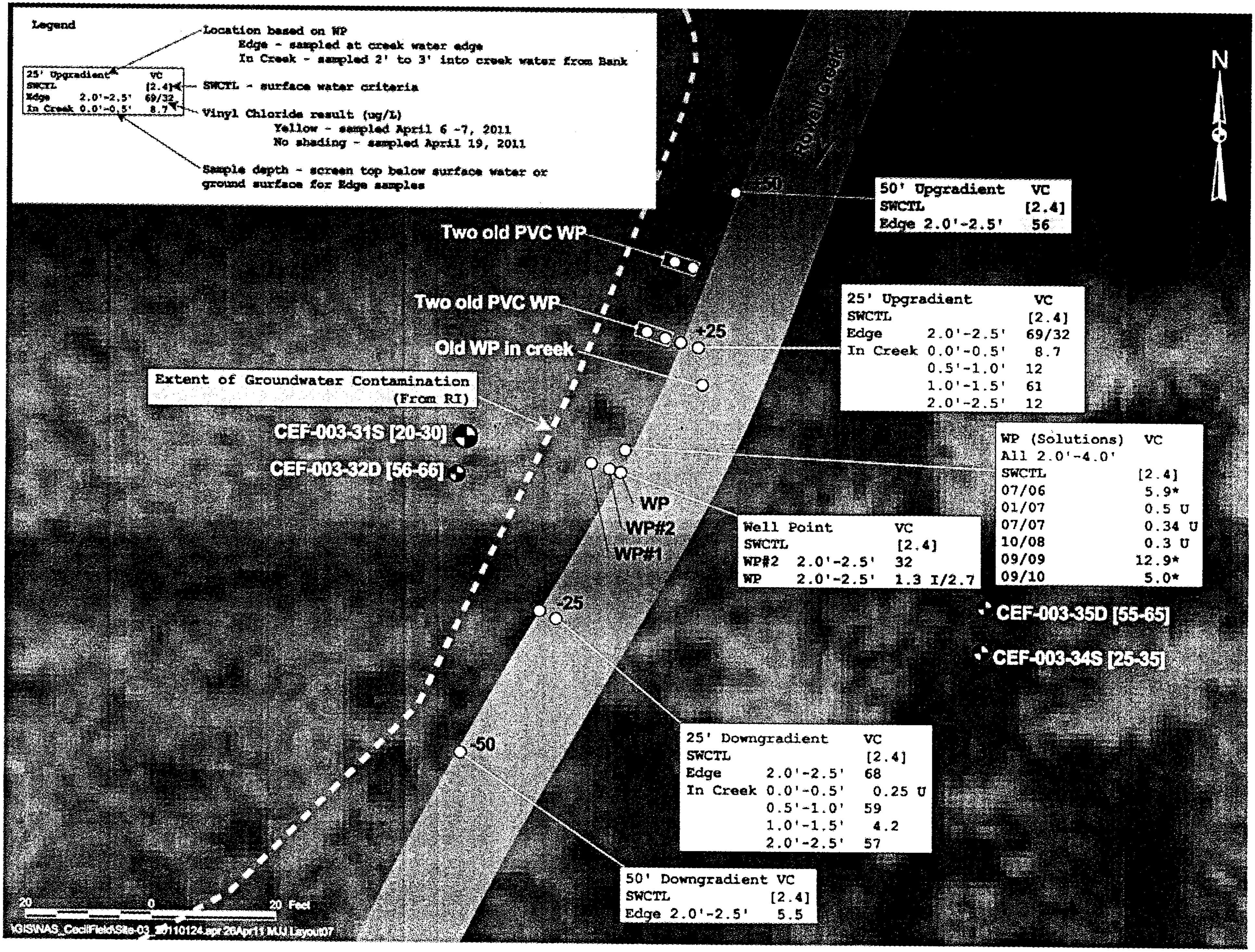
REMARKS:
~~Dup = CEF-003 - DUP01~~

MATERIAL CODES: **AG** = Amber Glass; **CG** = Clear Glass; **PE** = Polyethylene; **PP** = Polypropylene; **S** = Silicone; **T** = Teflon; **O** = Other (Specify)

SAMPLING EQUIPMENT CODES: **APP** = After Peristaltic Pump; **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **RFPP** = Reverse Flow Peristaltic Pump; **SM** = Straw Method (Tubing Gravity Drain); **O** = Other (Specify)

NOTES: 1. The above do not constitute all of the information required by Chapter 62-160, F.A.C.
2. STABILIZATION CRITERIA FOR RANGE OF VARIATION OF LAST THREE CONSECUTIVE READINGS (SEE FS 2212, SECTION 3)
pH: ± 0.2 units **Temperature:** ± 0.2 °C **Specific Conductance:** ± 5% **Dissolved Oxygen:** all readings ≤ 20% saturation (see Table FS 2200-2); optionally, ± 0.2 mg/L or ± 10% (whichever is greater) **Turbidity:** all readings ≤ 20 NTU; optionally ± 5 NTU or ± 10% (whichever is greater)

Revision Date: February 12, 2009



Legend
Location based on WP
Edge - sampled at creek water edge
In Creek - sampled 2' to 3' into creek water from Bank
25' Upgradient VC
SWCTL [2.4]
Edge 2.0'-2.5' 69/32
In Creek 0.0'-0.5' 8.7
SWCTL - surface water criteria
Vinyl Chloride result (ug/L)
Yellow - sampled April 6 -7, 2011
No shading - sampled April 19, 2011
Sample depth - screen top below surface water or ground surface for Edge samples
N
+50
50' Upgradient VC
SWCTL [2.4]
Edge 2.0'-2.5' 56
Two old PVC WP
Two old PVC WP
+25
25' Upgradient VC
SWCTL [2.4]
Edge 2.0'-2.5' 69/32
In Creek 0.0'-0.5' 8.7
0.5'-1.0' 12
1.0'-1.5' 61
2.0'-2.5' 12
Old WP in creek
Extent of Groundwater Contamination (From RI)
CEF-003-31S [20-30]
CEF-003-32D [56-66]
WP (Solutions) VC
All 2.0'-4.0'
SWCTL [2.4]
07/06 5.9*
01/07 0.5 U
07/07 0.34 U
10/08 0.3 U
09/09 12.9*
09/10 5.0*
WP
WP#2
WP#1
Well Point VC
SWCTL [2.4]
WP#2 2.0'-2.5' 32
WP 2.0'-2.5' 1.3 I/2.7
-25
CEF-003-35D [55-65]
CEF-003-34S [25-35]
25' Downgradient VC
SWCTL [2.4]
Edge 2.0'-2.5' 68
In Creek 0.0'-0.5' 0.25 U
0.5'-1.0' 59
1.0'-1.5' 4.2
2.0'-2.5' 57
-50
50' Downgradient VC
SWCTL [2.4]
Edge 2.0'-2.5' 5.5
20 0 20 Feet
\GIS\NAS_CecilField\Site-03_20110124.apr 26Apr11 MJJ Layout07

TETRA TECH NUS, INC. **CHAIN OF CUSTODY** | NUMBER 0866 | PAGE 1 OF 1

PROJECT NO: 112G02267	FACILITY: Cecil / Site 3	PROJECT MANAGER: Rob Simcik	PHONE NUMBER: ~~60~~ 412 921 8163
SAMPLERS (SIGNATURE): [signature]		FIELD OPERATIONS LEADER: Dave Siefken	PHONE NUMBER: 904-334-7260
		CARRIER/WAYBILL NUMBER: FEDEX: 8427-1834-4783	

LABORATORY NAME AND CONTACT: Katahdin
ADDRESS: 600 Technology Way
CITY, STATE: Scarborough, ME 04074

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

CONTAINER TYPE PLASTIC (P) or GLASS (G): G
PRESERVATIVE USED:
TYPE OF ANALYSIS: 8260B *select*

[redacted]	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	8260B *select*							COMMENTS
4/19	1145	CEF-003-WP-UP25-2025	2'-2.5'	2.0'	2.5'	GW	G	3	✓							* Select VOC *
4/19	1205	CEF-003-WP-UP25-1015	1'-1.5'	1.0'	1.5'	GW	G	3	✓							1,1 DCE
[redacted]/19	1215	CEF-003-WP-UP25-0510	.5'-1'	0.5	1.0	GW	G	3	✓							1,2 DCB
4/19	1220	CEF-003-WP-DUP01	—	—	—	GW	G	3	✓							1,4 DCB
4/19	1230	CEF-003-WP-UP25-0005	0'-0.5'	0.0'	0.5'	GW	G	3	✓							Napthalene
4/19	1415	CEF-003-WP-UP25-RS	2'-2.5'	2.0'	2.5'	GW	G	3	✓							Trichloroethene
4/19	1520	CEF-003-WP-DN25-0510	.5'-1'	0.5'	1.0	GW	G	3	✓							Cis-1,2 Dichloroethene
4/19	1445	CEF-003-WP-DN25-2025	2'-2.5'	2.0	2.5	GW	G	3	✓							VC
4/19	1455	CEF-003-WP-DN25-1015	1'-1.5'	1.0'	1.5'	GW	G	3	✓							
4/19	1535	CEF-003-WP-DN25-0005	0-0.5	0.0	0.5	GW	G	3	✓							
4/19	1630	CEF-003-WP-ORG-RS	2-2.5	2.0	2.5	GW	G	3	✓							

1. RELINQUISHED BY [signature]	DATE 4/19/11	TIME 1800	1. RECEIVED BY	DATE	TIME
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R
FORM NO. TtNUS-001

Revision Date: February 12, 2009 Form FD 9000-24

GROUNDWATER SAMPLING LOG

SITE NAME: Cecil / Site 3	SITE LOCATION: Site 3	
WELL NO: WP-~~UP~~25-2025	SAMPLE ID: CEF-003-WP- UP25-~~0005~~ 2025	DATE 4/19 4/ 19 /2011

PURGING DATA

WELL DIAMETER (inches): 1	TUBING DIAMETER (inches): 3/16	WELL SCREEN INTERVAL DEPTH: 2.0 feet to 2.5 feet	STATIC DEPTH TO WATER (feet): ~~72.5~~ NA	PURGE PUMP TYPE OR BAILER: Peristaltic Pump

WELL VOLUME PURGE: 1 WELL VOLUME = (TOTAL WELL DEPTH – STATIC DEPTH TO WATER) X WELL CAPACITY
(only fill out if applicable)
= (feet – feet) X liters/foot = liters

EQUIPMENT VOLUME PURGE: 1 EQUIPMENT VOL. = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME
(only fill out if applicable)
= liters + (liters/foot X feet) + liters = ~1L liters

INITIAL PUMP OR TUBING DEPTH IN WELL (feet): 2.25	FINAL PUMP OR TUBING DEPTH IN WELL (feet): 2.25	PURGING INITIATED AT: 1100	PURGING ENDED AT: 1135	TOTAL VOLUME PURGED (liters): 15

TIME	VOLUME PURGED (~~gallons~~) L	CUMUL. VOLUME PURGED (~~gallons~~) L	PURGE RATE (mL/m) (~~gpm~~)	DEPTH TO WATER (feet)	pH (standard units)	TEMP. (°C)	COND. (circle units) μmhos/cm or μS/cm	DISSOLVED OXYGEN (circle units) mg/L ~~or~~ (% saturation)	TURBIDITY (NTUs)	COLOR (describe)	ORP ODOR (describe)
1100	0	0	300	NA							
1120	600	6.0	300	NA	6.46	23.23	0.228	10.7	22.97	Clear	—
1125	3	9	300	NA	6.47	23.21	0.232	10.3	20.12	Clear	—
1130	3	12	300	NA	6.47	23.01	0.233	11.6	11.45	Clear	(-)147
1132	1.5	13.5	300	NA	6.47	23.16	0.235	11.8	11.62	Clear	(-)149
1135	1.5	15	300	NA							
1145 SAMPLE											

WELL CAPACITY (Liters Per Foot): **0.75"** = 0.0757; **1"** = 0.151; **1.25"** = 0.227; **2"** = 0.605; **3"** = 0.37; **4"** = 1.40; **5"** = 3.861; **6"** = 5.564; **12"** = 22.25
TUBING INSIDE DIA. CAPACITY (Ltr./Ft.): **1/8"** = 0.00227; **3/16"** = 0.00529; **1/4"** = 0.00984; **5/16"** = 0.0151; **3/8"** = 0.0227; **1/2"** = 0.0378; **5/8"** = 0.0605

PURGING EQUIPMENT CODES: **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **PP** = Peristaltic Pump; **O** = Other (Specify)

SAMPLING DATA

SAMPLED BY (PRINT) / AFFILIATION: ~~Jeff Krone~~/TtNUS Dave Siefken/Tt	SAMPLER(S) SIGNATURE(S): [signature]	SAMPLING INITIATED AT: 1145	SAMPLING ENDED AT: 1150
PUMP OR TUBING DEPTH IN WELL (feet): 2.25	TUBING MATERIAL CODE: Teflon Poly (PE) (circle one)	FIELD-FILTERED: Y (N) Filtration Equipment Type:	FILTER SIZE: ____ μm
FIELD DECONTAMINATION: PUMP Y (N)	TUBING (Y) N (replaced)	DUPLICATE: Y (N)	

SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOL ADDED IN FIELD (mL)	FINAL pH	INTENDED ANALYSIS AND/OR METHOD	SAMPLING EQUIPMENT CODE	SAMPLE PUMP FLOW RATE (mL per minute)
PP	3	CG	40 ML	HCL	NONE	<2	VOCs (~~BTEX+ MTBE~~) 8260B	RFPP	200
							Select ↑		

REMARKS:
Screen 2.0 - 2.5 Ft below Creek Sediment

MATERIAL CODES: **AG** = Amber Glass; **CG** = Clear Glass; **PE** = Polyethylene; **PP** = Polypropylene; **S** = Silicone; **T** = Teflon; **O** = Other (Specify)

SAMPLING EQUIPMENT CODES: **APP** = After Peristaltic Pump; **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **RFPP** = Reverse Flow Peristaltic Pump; **SM** = Straw Method (Tubing Gravity Drain); **O** = Other (Specify)

NOTES: 1. The above do not constitute all of the information required by Chapter 62-160, F.A.C.
2. STABILIZATION CRITERIA FOR RANGE OF VARIATION OF LAST THREE CONSECUTIVE READINGS (SEE FS 2212, SECTION 3)

pH: ± 0.2 units **Temperature:** ± 0.2 °C **Specific Conductance:** ± 5% **Dissolved Oxygen:** all readings ≤ 20% saturation (see Table FS 2200-2); optionally, ± 0.2 mg/L or ± 10% (whichever is greater) **Turbidity:** all readings ≤ 20 NTU; optionally ± 5 NTU or ± 10% (whichever is greater)

Revision Date: February 12, 2009 Form FD 9000-24

GROUNDWATER SAMPLING LOG

SITE NAME: Cecil / Site 3	SITE LOCATION: Site 3
WELL NO: WP-UP25-1015	SAMPLE ID: CEF-003-WP-UP25-1015	DATE: 4/19/2011

PURGING DATA

WELL DIAMETER (inches): 1	TUBING DIAMETER (inches): 3/16	WELL SCREEN INTERVAL DEPTH: 1.0 feet to 1.5 feet	STATIC DEPTH TO WATER (feet): NA	PURGE PUMP TYPE OR BAILER: Peristaltic Pump

WELL VOLUME PURGE: 1 WELL VOLUME = (TOTAL WELL DEPTH – STATIC DEPTH TO WATER) X WELL CAPACITY
(only fill out if applicable)
= (feet – feet) X liters/foot = liters

EQUIPMENT VOLUME PURGE: 1 EQUIPMENT VOL. = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME
(only fill out if applicable)
= liters + (liters/foot X feet) + ~1 Liter liters = liters

INITIAL PUMP OR TUBING DEPTH IN WELL (feet): 1.25	FINAL PUMP OR TUBING DEPTH IN WELL (feet): 1.25	PURGING INITIATED AT: 1115	PURGING ENDED AT: 1155	TOTAL VOLUME PURGED (liters): 15

TIME	VOLUME PURGED (~~gallons~~ L)	CUMUL. VOLUME PURGED (~~gallons~~ L)	PURGE RATE (gpm)	DEPTH TO WATER (feet)	pH (standard units)	TEMP. (°C)	COND. (circle units) μmhos/cm or μS/cm	DISSOLVED OXYGEN (circle units) ~~mg/L or~~ % saturation	TURBIDITY (NTUs)	COLOR (describe)	ORP ~~ODOR~~ (describe)
1115	0	0	300	NA							
1145	9	9	300	NA	6.85	22.76	0.349	9.7	8.73	—	(-)176
1150	3	12	300	NA	6.84	22.76	0.349	8.4	8.61	—	(-)188
1155	3	15	300	NA	6.83	22.78	0.349	3.8	7.58	—	(-)193
1205	SAMPLE										

WELL CAPACITY (Liters Per Foot): **0.75"** = 0.0757; **1"** = 0.151; **1.25"** = 0.227; **2"** = 0.605; **3"** = 0.37; **4"** = 1.40; **5"** = 3.861; **6"** = 5.564; **12"** = 22.25
TUBING INSIDE DIA. CAPACITY (Ltr./Ft.): **1/8"** = 0.00227; **3/16"** = 0.00529; **1/4"** = 0.00984; **5/16"** = 0.0151; **3/8"** = 0.0227; **1/2"** = 0.0378; **5/8"** = 0.0605
PURGING EQUIPMENT CODES: B = Bailer; BP = Bladder Pump; ESP = Electric Submersible Pump; PP = Peristaltic Pump; O = Other (Specify)

SAMPLING DATA

SAMPLED BY (PRINT) / AFFILIATION: ~~Jeff Krone~~/TtNUS Dave Siefken / Tt	SAMPLER(S) SIGNATURE(S): [signature]	SAMPLING INITIATED AT: 1205	SAMPLING ENDED AT: 1210
PUMP OR TUBING DEPTH IN WELL (feet): 1.25	TUBING MATERIAL CODE: Teflon Poly (circle one) PE	FIELD-FILTERED: Y (N) Filtration Equipment Type:	FILTER SIZE: ___ μm
FIELD DECONTAMINATION: PUMP (Y) N	TUBING (Y) N (replaced)	DUPLICATE: Y (N)	

SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOL ADDED IN FIELD (mL)	FINAL pH	INTENDED ANALYSIS AND/OR METHOD	SAMPLING EQUIPMENT CODE	SAMPLE PUMP FLOW RATE (mL per minute)
PP	3	CG	40 ML	HCL	NONE	<2	~~VOCs (BTEX + MTBE) 8260B~~	RFPP	200
							Select VOC		

REMARKS:
GW sample collected 1.0 - 1.5 ft below Sediment

MATERIAL CODES: AG = Amber Glass; CG = Clear Glass; PE = Polyethylene; PP = Polypropylene; S = Silicone; T = Teflon; O = Other (Specify)

SAMPLING EQUIPMENT CODES: APP = After Peristaltic Pump; B = Bailer; BP = Bladder Pump; ESP = Electric Submersible Pump; RFPP = Reverse Flow Peristaltic Pump; SM = Straw Method (Tubing Gravity Drain); O = Other (Specify)

NOTES: 1. The above do not constitute all of the information required by Chapter 62-160, F.A.C.
2. STABILIZATION CRITERIA FOR RANGE OF VARIATION OF LAST THREE CONSECUTIVE READINGS (SEE FS 2212, SECTION 3)
pH: ± 0.2 units **Temperature:** ± 0.2 °C **Specific Conductance:** ± 5% **Dissolved Oxygen:** all readings ≤ 20% saturation (see Table FS 2200-2); optionally, ± 0.2 mg/L or ± 10% (whichever is greater) **Turbidity:** all readings ≤ 20 NTU; optionally ± 5 NTU or ± 10% (whichever is greater)

Revision Date: February 12, 2009 Form FD 9000-24

GROUNDWATER SAMPLING LOG

SITE NAME: Cecil / Site 3	SITE LOCATION: Site 3	
WELL NO: WP UP 25 05 10	SAMPLE ID: CEF-003-WP-UP250510	DATE: 4/19/2011

PURGING DATA

WELL DIAMETER (inches): 1	TUBING DIAMETER (inches): 3/16	WELL SCREEN INTERVAL DEPTH: 0.5 feet to 1.0 feet	STATIC DEPTH TO WATER (feet): NA	PURGE PUMP TYPE OR BAILER: Peristaltic Pump

WELL VOLUME PURGE: **1 WELL VOLUME** = (TOTAL WELL DEPTH – STATIC DEPTH TO WATER) X WELL CAPACITY
(only fill out if applicable)
= (feet – feet) X liters/foot = liters

EQUIPMENT VOLUME PURGE: **1 EQUIPMENT VOL.** = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME
(only fill out if applicable)
= liters + (liters/foot X feet) + liters = <1 liters

INITIAL PUMP OR TUBING DEPTH IN WELL (feet): 0.7	FINAL PUMP OR TUBING DEPTH IN WELL (feet): 0.7	PURGING INITIATED AT: 1130	PURGING ENDED AT: 1210	TOTAL VOLUME PURGED (liters): 15

TIME	VOLUME PURGED (gallons)	CUMUL. VOLUME PURGED (gallons)	PURGE RATE (gpm)	DEPTH TO WATER (feet)	pH (standard units)	TEMP. (°C)	COND. (circle units) µmhos/cm or mS/cm	DISSOLVED OXYGEN (circle units) ~~mg/L or~~ (% saturation)	TURBIDITY (NTUs)	COLOR (describe)	ORP ~~ODOR~~ (describe)
1130	0	0	300	NA							
1200	9	9	300	NA	6.82	24.13	0.275	15.4	6.87	Clear	(-)170
1205	3	12	300	NA	6.84	24.10	0.274	12.3	6.55	Clear	(-)170
1210	3	15	300	NA	6.81	23.82	0.272	11.3	6.41	Clear	(-)178
1215	SAMPLE										

WELL CAPACITY (Liters Per Foot): **0.75"** = 0.0757; **1"** = 0.151; **1.25"** = 0.227; **2"** = 0.605; **3"** = 0.37; **4"** = 1.40; **5"** = 3.861; **6"** = 5.564; **12"** = 22.25
TUBING INSIDE DIA. CAPACITY (Ltr./Ft.): **1/8"** = 0.00227; **3/16"** = 0.00529; **1/4"** = 0.00984; **5/16"** = 0.0151; **3/8"** = 0.0227; **1/2"** = 0.0378; **5/8"** = 0.0605
PURGING EQUIPMENT CODES: **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **PP** = Peristaltic Pump; **O** = Other (Specify)

SAMPLING DATA

SAMPLED BY (PRINT) / AFFILIATION: ~~Jeff Krone~~/TtNUS David Siefken	SAMPLER(S) SIGNATURE(S): [signature]	SAMPLING INITIATED AT: 1215	SAMPLING ENDED AT: 1220
PUMP OR TUBING DEPTH IN WELL (feet): 0.7 ft	TUBING MATERIAL CODE: Teflon Poly (circle one) PE	FIELD-FILTERED: Y (N) Filtration Equipment Type:	FILTER SIZE: ____ µm
FIELD DECONTAMINATION: PUMP Y (N)	TUBING (Y) N (replaced)	DUPLICATE: (Y) N Dup 01	

SAMPLE CONTAINER SPECIFICATION				SAMPLE PRESERVATION			INTENDED ANALYSIS AND/OR METHOD	SAMPLING EQUIPMENT CODE	SAMPLE PUMP FLOW RATE (mL per minute)
SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOL ADDED IN FIELD (mL)	FINAL pH			
PP	3	CG	40 ML	HCL	NONE	<2	VOCs (~~BTEX + MTBE) 8260B~~ Select	RFPP	200

REMARKS:
GW from 0.5 - 1.0 Ft below Sediment (*) DUPLICATE

MATERIAL CODES: **AG** = Amber Glass; **CG** = Clear Glass; **PE** = Polyethylene; **PP** = Polypropylene; **S** = Silicone; **T** = Teflon; **O** = Other (Specify)

SAMPLING EQUIPMENT CODES: **APP** = After Peristaltic Pump; **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **RFPP** = Reverse Flow Peristaltic Pump; **SM** = Straw Method (Tubing Gravity Drain); **O** = Other (Specify)

NOTES: 1. The above do not constitute all of the information required by Chapter 62-160, F.A.C.
2. STABILIZATION CRITERIA FOR RANGE OF VARIATION OF LAST THREE CONSECUTIVE READINGS (SEE FS 2212, SECTION 3)
pH: ± 0.2 units **Temperature:** ± 0.2 °C **Specific Conductance:** ± 5% **Dissolved Oxygen:** all readings ≤ 20% saturation (see Table FS 2200-2); optionally, ± 0.2 mg/L or ± 10% (whichever is greater) **Turbidity:** all readings ≤ 20 NTU; optionally ± 5 NTU or ± 10% (whichever is greater)

Dup = CEF-003-WP-DUP01

Revision Date: February 12, 2009 Form FD 9000-24

GROUNDWATER SAMPLING LOG

SITE NAME: Cecil / Site 3	SITE LOCATION: Site 3	
WELL NO: WP-UP25-0005	SAMPLE ID: CEF-003-WP-UP 25 0005	DATE: 4/19/2011

PURGING DATA

WELL DIAMETER (inches): 1	TUBING DIAMETER (inches): 3/16	WELL SCREEN INTERVAL DEPTH: 0.0 feet to 0.5 feet	STATIC DEPTH TO WATER (feet): NA	PURGE PUMP TYPE OR BAILER: Peristaltic Pump

WELL VOLUME PURGE: 1 WELL VOLUME = (TOTAL WELL DEPTH – STATIC DEPTH TO WATER) X WELL CAPACITY
(only fill out if applicable)
= (feet – feet) X liters/foot = liters

EQUIPMENT VOLUME PURGE: 1 EQUIPMENT VOL. = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME
(only fill out if applicable)
= liters + (liters/foot X feet) + liters = <1 liters

INITIAL PUMP OR TUBING DEPTH IN WELL (feet): 0.25	FINAL PUMP OR TUBING DEPTH IN WELL (feet): 0.25	PURGING INITIATED AT: 1140	PURGING ENDED AT: 1225	TOTAL VOLUME PURGED (liters): 13.5

TIME	VOLUME PURGED (gallons)	CUMUL. VOLUME PURGED (gallons)	PURGE RATE (gpm)	DEPTH TO WATER (feet)	pH (standard units)	TEMP. (°C)	COND. (circle units) μmhos/cm or μS/cm	DISSOLVED OXYGEN (circle units) ~~mg/L or~~ % saturation (circled)	TURBIDITY (NTUs)	COLOR (describe)	ORP ~~ODOR~~ (describe)
1140	0	0	300	NA							
1215	10.5	10.5	300	NA	6.52	23.78	0.158	48.5	23.44	–	(-) 88
1220	1.5	12	300	NA	6.54	23.68	0.155	41.2	16.30	–	(-) 84
1225	1.5	13.5	300	NA	6.53	23.84	0.155	50.5	18.59	–	(-) 84
1230	SAMPLE										

WELL CAPACITY (Liters Per Foot): **0.75"** = 0.0757; **1"** = 0.151; **1.25"** = 0.227; **2"** = 0.605; **3"** = 0.37; **4"** = 1.40; **5"** = 3.861; **6"** = 5.564; **12"** = 22.25
TUBING INSIDE DIA. CAPACITY (Ltr./Ft.): **1/8"** = 0.00227; **3/16"** = 0.00529; **1/4"** = 0.00984; **5/16"** = 0.0151; **3/8"** = 0.0227; **1/2"** = 0.0378; **5/8"** = 0.0605

PURGING EQUIPMENT CODES: B = Bailer; BP = Bladder Pump; ESP = Electric Submersible Pump; PP = Peristaltic Pump; O = Other (Specify)

SAMPLING DATA

SAMPLED BY (PRINT) / AFFILIATION: ~~Jeff Krone~~/TtNUS DAVE SIEFKEN	SAMPLER(S) SIGNATURE(S): [signature]	SAMPLING INITIATED AT: 1230	SAMPLING ENDED AT: 1235
PUMP OR TUBING DEPTH IN WELL (feet): 0.25	TUBING MATERIAL CODE: Teflon / Poly / PE (circle one)	FIELD-FILTERED: Y (N) Filtration Equipment Type:	FILTER SIZE: ____ μm
FIELD DECONTAMINATION: PUMP Y (N)	TUBING (Y) N (replaced)	DUPLICATE: Y (N)	

SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOL ADDED IN FIELD (mL)	FINAL pH	INTENDED ANALYSIS AND/OR METHOD	SAMPLING EQUIPMENT CODE	SAMPLE PUMP FLOW RATE (mL per minute)
PP	3	CG	40 ML	HCL	NONE	<2	VOCs (~~BTEX + MTBE~~) 8260B	RFPP	
							Select ↑		

REMARKS:
GW Sample Collected 0.0 – 0.5 ft below Sediment

MATERIAL CODES: AG = Amber Glass; CG = Clear Glass; PE = Polyethylene; PP = Polypropylene; S = Silicone; T = Teflon; O = Other (Specify)

SAMPLING EQUIPMENT CODES: APP = After Peristaltic Pump; B = Bailer; BP = Bladder Pump; ESP = Electric Submersible Pump; RFPP = Reverse Flow Peristaltic Pump; SM = Straw Method (Tubing Gravity Drain); O = Other (Specify)

NOTES: 1. The above do not constitute all of the information required by Chapter 62-160, F.A.C.
2. STABILIZATION CRITERIA FOR RANGE OF VARIATION OF LAST THREE CONSECUTIVE READINGS (SEE FS 2212, SECTION 3)

pH: ± 0.2 units **Temperature:** ± 0.2 °C **Specific Conductance:** ± 5% **Dissolved Oxygen:** all readings ≤ 20% saturation (see Table FS 2200-2); optionally, ± 0.2 mg/L or ± 10% (whichever is greater) **Turbidity:** all readings ≤ 20 NTU; optionally ± 5 NTU or ± 10% (whichever is greater)

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GROUNDWATER SAMPLING LOG

SITE NAME: Cecil / Site 3	SITE LOCATION: **Site 3**
WELL NO: UP-25-RS	SAMPLE ID: CEF-003-WP-UP 25 - RS
DATE: 4/ 19 /2011	

PURGING DATA

WELL DIAMETER (inches): 3/4	TUBING DIAMETER (inches): 3/16	WELL SCREEN INTERVAL DEPTH: 2.0 feet to 2.5 feet	STATIC DEPTH TO WATER (feet): NA	PURGE PUMP TYPE OR BAILER: Peristaltic Pump

WELL VOLUME PURGE: **1 WELL VOLUME** = (TOTAL WELL DEPTH – STATIC DEPTH TO WATER) X WELL CAPACITY
(only fill out if applicable)
= (feet – feet) X liters/foot = liters

EQUIPMENT VOLUME PURGE: **1 EQUIPMENT VOL.** = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME
(only fill out if applicable)
= liters + (liters/foot X feet) + liters = <1 liters

INITIAL PUMP OR TUBING DEPTH IN WELL (feet): 2.25	FINAL PUMP OR TUBING DEPTH IN WELL (feet): 2.25	PURGING INITIATED AT: 1300	PURGING ENDED AT: 1410	TOTAL VOLUME PURGED (liters): NA

TIME	VOLUME PURGED (gallons)	CUMUL. VOLUME PURGED (gallons)	PURGE RATE (gpm)	DEPTH TO WATER (feet)	pH (standard units)	TEMP. (°C)	COND. (circle units) µmhos/cm or µS/cm	DISSOLVED OXYGEN (circle units) mg/L or % saturation	TURBIDITY (NTUs)	COLOR (describe)	ODOR (describe)
1300	0	0	100	NA							
1400	Purged Dry Several times (4)								63		
1405	Not enough H2O for flow cell readings								32		
1410									13.64		
1415	SAMPLE										

WELL CAPACITY (Liters Per Foot): **0.75"** = 0.0757; **1"** = 0.151; **1.25"** = 0.227; **2"** = 0.605; **3"** = 0.37; **4"** = 1.40; **5"** = 3.861; **6"** = 5.564; **12"** = 22.25
TUBING INSIDE DIA. CAPACITY (Ltr./Ft.): **1/8"** = 0.00227; **3/16"** = 0.00529; **1/4"** = 0.00984; **5/16"** = 0.0151; **3/8"** = 0.0227; **1/2"** = 0.0378; **5/8"** = 0.0605

PURGING EQUIPMENT CODES: **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **PP** = Peristaltic Pump; **O** = Other (Specify)

SAMPLING DATA

SAMPLED BY (PRINT) / AFFILIATION: ~~Jeff Krone~~/TtNUS Dave Seffner	SAMPLER(S) SIGNATURE(S): [signature]	SAMPLING INITIATED AT: 1415	SAMPLING ENDED AT: 1420
PUMP OR TUBING DEPTH IN WELL (feet): 2.25	TUBING MATERIAL CODE: Teflon ~~Poly~~ PE (circle one)	FIELD-FILTERED: Y (N) Filtration Equipment Type:	FILTER SIZE: _____ µm
FIELD DECONTAMINATION: PUMP Y (N)	TUBING (Y) N (replaced)	DUPLICATE: Y (N)	

SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOL ADDED IN FIELD (mL)	FINAL pH	INTENDED ANALYSIS AND/OR METHOD	SAMPLING EQUIPMENT CODE	SAMPLE PUMP FLOW RATE (mL per minute)
PP	3	CG	40 ML	HCL	NONE	<2	VOCs (~~BTEX + MTBE~~) 8260B	RFPP	
							Select ↑		

(Columns 1–4: SAMPLE CONTAINER SPECIFICATION; columns 5–7: SAMPLE PRESERVATION)

REMARKS:
Drove SS TW to a depth of 2.5 ft below top of Sediment, Steep bank no bank shoulder

MATERIAL CODES: **AG** = Amber Glass; **CG** = Clear Glass; **PE** = Polyethylene; **PP** = Polypropylene; **S** = Silicone; **T** = Teflon; **O** = Other (Specify)

SAMPLING EQUIPMENT CODES: **APP** = After Peristaltic Pump; **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **RFPP** = Reverse Flow Peristaltic Pump; **SM** = Straw Method (Tubing Gravity Drain); **O** = Other (Specify)

NOTES: 1. The above do not constitute all of the information required by Chapter 62-160, F.A.C.
2. STABILIZATION CRITERIA FOR RANGE OF VARIATION OF LAST THREE CONSECUTIVE READINGS (SEE FS 2212, SECTION 3)

pH: ± 0.2 units **Temperature:** ± 0.2 °C **Specific Conductance:** ± 5% **Dissolved Oxygen:** all readings ≤ 20% saturation (see Table FS 2200-2); optionally, ± 0.2 mg/L or ± 10% (whichever is greater) **Turbidity:** all readings ≤ 20 NTU; optionally ± 5 NTU or ± 10% (whichever is greater)

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GROUNDWATER SAMPLING LOG

SITE NAME: Cecil / Site 3	SITE LOCATION: Site 3	
WELL NO: WP-~~BN~~ 25- ~~20~~25	SAMPLE ID: CEF-003-WP- DN 25-2025	DATE: 4/ 19 /2011

PURGING DATA

WELL DIAMETER (inches): 1	TUBING DIAMETER (inches): 3/16	WELL SCREEN INTERVAL DEPTH: 2.0 feet to 2.5 feet	STATIC DEPTH TO WATER (feet): NA	PURGE PUMP TYPE OR BAILER: Peristaltic Pump

WELL VOLUME PURGE: **1 WELL VOLUME** = (TOTAL WELL DEPTH – STATIC DEPTH TO WATER) X WELL CAPACITY
(only fill out if applicable)
= (feet – feet) X liters/foot = liters

EQUIPMENT VOLUME PURGE: **1 EQUIPMENT VOL.** = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME
(only fill out if applicable)
= liters + (liters/foot X feet) + liters = ~1 liters

INITIAL PUMP OR TUBING DEPTH IN WELL (feet): 2.25	FINAL PUMP OR TUBING DEPTH IN WELL (feet): 2.25	PURGING INITIATED AT: 1400	PURGING ENDED AT: 1440	TOTAL VOLUME PURGED (liters): 15

TIME	VOLUME PURGED (~~gallons~~) L	CUMUL. VOLUME PURGED (~~gallons~~) L	PURGE RATE (~~gpm~~) ml	DEPTH TO WATER (feet)	pH (standard units)	TEMP. (°C)	COND. (circle units) µmhos/cm or µS/cm	DISSOLVED OXYGEN (circle units) ~~mg/L or~~ (% saturation)	TURBIDITY (NTUs)	COLOR (describe)	ORP ~~ODOR~~ (describe)
1400	0	0	300	NA							
1430	9	9	300	NA	6.96	22.85	0.307	4.3	11.91	CL	(-) 138
1435	3	12	300	NA	6.91	22.73	0.304	2.6	9.88	CL	(-) 155
1440	3	15	300	NA	6.92	22.71	0.303	2.4	8.79	CL	(-) 160
1440	SAMPLE										

WELL CAPACITY (Liters Per Foot): **0.75"** = 0.0757; **1"** = 0.151; **1.25"** = 0.227; **2"** = 0.605; **3"** = 0.37; **4"** = 1.40; **5"** = 3.861; **6"** = 5.564; **12"** = 22.25
TUBING INSIDE DIA. CAPACITY (Ltr./Ft.): **1/8"** = 0.00227; **3/16"** = 0.00529; **1/4"** = 0.00984; **5/16"** = 0.0151; **3/8"** = 0.0227; **1/2"** = 0.0378; **5/8"** = 0.0605

PURGING EQUIPMENT CODES: **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **PP** = Peristaltic Pump; **O** = Other (Specify)

SAMPLING DATA

SAMPLED BY (PRINT) / AFFILIATION: ~~Jeff Krone~~/TtNUS DAVE SIEFKEN	SAMPLER(S) SIGNATURE(S): [signature]	SAMPLING INITIATED AT: 1440	SAMPLING ENDED AT: 1445
PUMP OR TUBING DEPTH IN WELL (feet): 2.25	TUBING MATERIAL CODE: Teflon Poly (PE) (circle one)	FIELD-FILTERED: Y (N) Filtration Equipment Type:	FILTER SIZE: ____ µm
FIELD DECONTAMINATION: PUMP Y (N)	TUBING (Y) N (replaced)	DUPLICATE: Y (N)	

SAMPLE CONTAINER SPECIFICATION				SAMPLE PRESERVATION			INTENDED ANALYSIS AND/OR METHOD	SAMPLING EQUIPMENT CODE	SAMPLE PUMP FLOW RATE (mL per minute)
SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOL ADDED IN FIELD (mL)	FINAL pH			
PP	3	CG	40 ML	HCL	NONE	<2	VOCs (~~BTEX + MTBE~~) 8260B Select	RFPP	200

REMARKS:
GW Down Stream 25' 2.0-2.5 ft below Sediment

MATERIAL CODES: **AG** = Amber Glass; **CG** = Clear Glass; **PE** = Polyethylene; **PP** = Polypropylene; **S** = Silicone; **T** = Teflon; **O** = Other (Specify)

SAMPLING EQUIPMENT CODES: **APP** = After Peristaltic Pump; **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **RFPP** = Reverse Flow Peristaltic Pump; **SM** = Straw Method (Tubing Gravity Drain); **O** = Other (Specify)

NOTES: 1. The above do not constitute all of the information required by Chapter 62-160, F.A.C.
2. STABILIZATION CRITERIA FOR RANGE OF VARIATION OF LAST THREE CONSECUTIVE READINGS (SEE FS 2212, SECTION 3)

pH: ± 0.2 units **Temperature:** ± 0.2 °C **Specific Conductance:** ± 5% **Dissolved Oxygen:** all readings ≤ 20% saturation (see Table FS 2200-2) optionally, ± 0.2 mg/L or ± 10% (whichever is greater) **Turbidity:** all readings ≤ 20 NTU; optionally ± 5 NTU or ± 10% (whichever is g

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GROUNDWATER SAMPLING LOG

SITE NAME: Cecil / Site 3	SITE LOCATION: Site 3	
WELL NO: WP. DN25. 1015	SAMPLE ID: CEF-003-WP- DN25 1015	DATE: 4/19/2011

PURGING DATA

WELL DIAMETER (inches): 1	TUBING DIAMETER (inches): 3/16	WELL SCREEN INTERVAL DEPTH: 1.0 feet to 1.5 feet	STATIC DEPTH TO WATER (feet): NA	PURGE PUMP TYPE OR BAILER: Peristaltic Pump

WELL VOLUME PURGE: 1 WELL VOLUME = (TOTAL WELL DEPTH – STATIC DEPTH TO WATER) X WELL CAPACITY
(only fill out if applicable)
= (feet – feet) X liters/foot = liters

EQUIPMENT VOLUME PURGE: 1 EQUIPMENT VOL. = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME
(only fill out if applicable)
= liters + (liters/foot X feet) + liters = <1 liters

INITIAL PUMP OR TUBING DEPTH IN WELL (feet): 1.25	FINAL PUMP OR TUBING DEPTH IN WELL (feet): 1.2	PURGING INITIATED AT: 1440	PURGING ENDED AT: 1450	TOTAL VOLUME PURGED (liters): 18L

TIME	VOLUME PURGED (~~gallons~~ L)	CUMUL. VOLUME PURGED (~~gallons~~ L)	PURGE RATE (mL pm)	DEPTH TO WATER (feet)	pH (standard units)	TEMP. (°C)	COND. (circle units) μmhos/cm or μS/cm	DISSOLVED OXYGEN (circle units) ~~mg/L or~~ % saturation	TURBIDITY (NTUs)	COLOR (describe)	ORP ~~ODOR~~ (describe)
1400	0	0	300	NA							
1440	12	12	300	NA	6.94	23.49	0.303	2.4	8.84	cl	(-)170
1445	~~15~~ 3	15	300	NA	6.94	23.58	0.303	2.3	7.96	cl	(-)173
1450	3	18	300	NA	6.95	23.64	0.304	3.1	7.18	cl	(-)177
1450 SAMPLE											

WELL CAPACITY (Liters Per Foot): **0.75"** = 0.0757; **1"** = 0.151; **1.25"** = 0.227; **2"** = 0.605; **3"** = 0.37; **4"** = 1.40; **5"** = 3.861; **6"** = 5.564; **12"** = 22.25
TUBING INSIDE DIA. CAPACITY (Ltr./Ft.): **1/8"** = 0.00227; **3/16"** = 0.00529; **1/4"** = 0.00984; **5/16"** = 0.0151; **3/8"** = 0.0227; **1/2"** = 0.0378; **5/8"** = 0.0605

PURGING EQUIPMENT CODES: **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **PP** = Peristaltic Pump; **O** = Other (Specify)

SAMPLING DATA

SAMPLED BY (PRINT) / AFFILIATION: ~~Jeff Krone~~/TtNUS Dave Siefken	SAMPLER(S) SIGNATURE(S): [signature]	SAMPLING INITIATED AT: 1450	SAMPLING ENDED AT: 1455
PUMP OR TUBING DEPTH IN WELL (feet): 1.25	TUBING MATERIAL CODE: Teflon Poly (circle one) PE	FIELD-FILTERED: Y (N) Filtration Equipment Type:	FILTER SIZE: ____ μm
FIELD DECONTAMINATION: PUMP Y (N)	TUBING (Y) N (replaced)	DUPLICATE: Y (N)	

SAMPLE CONTAINER SPECIFICATION				SAMPLE PRESERVATION			INTENDED ANALYSIS AND/OR METHOD	SAMPLING EQUIPMENT CODE	SAMPLE PUMP FLOW RATE (mL per minute)
SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOL ADDED IN FIELD (mL)	FINAL pH			
PP	3	CG	40 ML	HCL	NONE	<2	VOCs (BTEX + MTBE) 8260B	RFPP	

REMARKS:
GW Down Stream 25' @ 1.0 – 1.5 ft below Sediment

MATERIAL CODES: **AG** = Amber Glass; **CG** = Clear Glass; **PE** = Polyethylene; **PP** = Polypropylene; **S** = Silicone; **T** = Teflon; **O** = Other (Specify)

SAMPLING EQUIPMENT CODES: **APP** = After Peristaltic Pump; **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **RFPP** = Reverse Flow Peristaltic Pump; **SM** = Straw Method (Tubing Gravity Drain); **O** = Other (Specify)

NOTES: 1. **The above do not constitute all of the information required by Chapter 62-160, F.A.C.**
2. STABILIZATION CRITERIA FOR RANGE OF VARIATION OF LAST THREE CONSECUTIVE READINGS (SEE FS 2212, SECTION 3)
pH: ± 0.2 units **Temperature:** ± 0.2 °C **Specific Conductance:** ± 5% **Dissolved Oxygen:** all readings ≤ 20% saturation (see Table FS 2200-2); optionally, ± 0.2 mg/L or ± 10% (whichever is greater) **Turbidity:** all readings ≤ 20 NTU; optionally ± 5 NTU or ± 10% (whichever is greater)

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GROUNDWATER SAMPLING LOG

SITE NAME: Cecil / Site 3	SITE LOCATION: **Site 3**	
WELL NO: WP DN 25 0510	SAMPLE ID: CEF-003-WP-DN 25 0510	DATE : 4/ 19 /2011

PURGING DATA

WELL DIAMETER (inches): 1	TUBING DIAMETER (inches): 3/16	WELL SCREEN INTERVAL DEPTH: .5 feet to 1.0 feet	STATIC DEPTH TO WATER (feet): NA	PURGE PUMP TYPE OR BAILER: Peristaltic Pump

WELL VOLUME PURGE: 1 WELL VOLUME = (TOTAL WELL DEPTH – STATIC DEPTH TO WATER) X WELL CAPACITY
(only fill out if applicable)
= (feet – feet) X liters/foot = liters

EQUIPMENT VOLUME PURGE: 1 EQUIPMENT VOL. = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME
(only fill out if applicable)
= liters + (liters/foot X feet) + liters = liters

INITIAL PUMP OR TUBING DEPTH IN WELL (feet): 0.75	FINAL PUMP OR TUBING DEPTH IN WELL (feet): 0.75	PURGING INITIATED AT: 1445	PURGING ENDED AT: 1515	TOTAL VOLUME PURGED (liters): 2 L

TIME	VOLUME PURGED (gallons)	CUMUL. VOLUME PURGED (gallons)	PURGE RATE (gpm)	DEPTH TO WATER (feet)	pH (standard units)	TEMP. (°C)	COND. (circle units) µmhos/cm or µS/cm	DISSOLVED OXYGEN (circle units) mg/L or % saturation	TURBIDITY (NTUs)	COLOR (describe)	ODOR (describe)
1445	0	0	100								
	Purge Dry			(5) times.	Not enough for				Flow cell reading		
1515	SAMPLE								10.86		

WELL CAPACITY (Liters Per Foot): **0.75"** = 0.0757; **1"** = 0.151; **1.25"** = 0.227; **2"** = 0.605; **3"** = 0.37; **4"** = 1.40; **5"** = 3.861; **6"** = 5.564; **12"** = 22.25
TUBING INSIDE DIA. CAPACITY (Ltr./Ft.): **1/8"** = 0.00227; **3/16"** = 0.00529; **1/4"** = 0.00984; **5/16"** = 0.0151; **3/8"** = 0.0227; **1/2"** = 0.0378; **5/8"** = 0.0605

PURGING EQUIPMENT CODES: **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **PP** = Peristaltic Pump; **O** = Other (Specify)

SAMPLING DATA

SAMPLED BY (PRINT) / AFFILIATION: ~~Jeff Krone~~/TtNUS Dave Siefken	SAMPLER(S) SIGNATURE(S): [signature]	SAMPLING INITIATED AT: 1515	SAMPLING ENDED AT: 1520
PUMP OR TUBING DEPTH IN WELL (feet): 0.75	TUBING MATERIAL CODE: Teflon Poly (circle one) — PE circled	FIELD-FILTERED: Y (N) Filtration Equipment Type:	FILTER SIZE: ______ µm
FIELD DECONTAMINATION: PUMP Y (N)	TUBING (Y) N (replaced)	DUPLICATE: Y (N)	

SAMPLE CONTAINER SPECIFICATION				SAMPLE PRESERVATION			INTENDED ANALYSIS AND/OR METHOD	SAMPLING EQUIPMENT CODE	SAMPLE PUMP FLOW RATE (mL per minute)
SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOL ADDED IN FIELD (mL)	FINAL pH			
PP	3	CG	40 ML	HCL	NONE	<2	VOCs (~~BTEX + MTBE~~) 8260B	RFPP	100
							Select 4		

REMARKS:
GW Down Stream 25' collected at 0.5 - 1.0 ft below sediment

MATERIAL CODES: **AG** = Amber Glass; **CG** = Clear Glass; **PE** = Polyethylene; **PP** = Polypropylene; **S** = Silicone; **T** = Teflon; **O** = Other (Specify)

SAMPLING EQUIPMENT CODES: **APP** = After Peristaltic Pump; **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **RFPP** = Reverse Flow Peristaltic Pump; **SM** = Straw Method (Tubing Gravity Drain); **O** = Other (Specify)

NOTES: 1. **The above do not constitute all of the information required by Chapter 62-160, F.A.C.**
2. STABILIZATION CRITERIA FOR RANGE OF VARIATION OF LAST THREE CONSECUTIVE READINGS (SEE FS 2212, SECTION 3)

pH: ± 0.2 units **Temperature:** ± 0.2 °C **Specific Conductance:** ± 5% **Dissolved Oxygen:** all readings ≤ 20% saturation (see Table FS 2200-2); optionally, ± 0.2 mg/L or ± 10% (whichever is greater) **Turbidity:** all readings ≤ 20 NTU; optionally ± 5 NTU or ± 10% (whichever is greater)

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GROUNDWATER SAMPLING LOG

SITE NAME: Cecil / Site 3	SITE LOCATION: Site 3	
WELL NO: WP-DN 25 ~~00-00~~ 00-0.5	SAMPLE ID: CEF-003-WP-DN25 0005	DATE: 4/19/2011

PURGING DATA

WELL DIAMETER (inches): 1	TUBING DIAMETER (inches): 3/16	WELL SCREEN INTERVAL DEPTH: 0.0 feet to 0.5 feet	STATIC DEPTH TO WATER (feet):	PURGE PUMP TYPE OR BAILER: Peristaltic Pump

WELL VOLUME PURGE: 1 WELL VOLUME = (TOTAL WELL DEPTH – STATIC DEPTH TO WATER) X WELL CAPACITY
(only fill out if applicable)
= (feet – feet) X liters/foot = liters

EQUIPMENT VOLUME PURGE: 1 EQUIPMENT VOL. = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME
(only fill out if applicable)
= liters + (liters/foot X feet) + liters ≤1 liters

INITIAL PUMP OR TUBING DEPTH IN WELL (feet): 0.25	FINAL PUMP OR TUBING DEPTH IN WELL (feet): 0.25	PURGING INITIATED AT: 1500	PURGING ENDED AT: 1530	TOTAL VOLUME PURGED (liters): 12

TIME	VOLUME PURGED (gallons)	CUMUL. VOLUME PURGED (gallons)	PURGE RATE (gpm)	DEPTH TO WATER (feet)	pH (standard units)	TEMP. (°C)	COND. (circle units) μmhos/cm or μS/cm	DISSOLVED OXYGEN (circle units) mg/L or % saturation	TURBIDITY (NTUs)	COLOR (describe)	ORP ODOR (describe)
1500	0	0	300	NA							
1520	6	6	300	NA	7.57	26.65	0.164	68.8	30.26	CL	(-) 96.5
1525	3	9	300	NA	7.65	26.76	0.162	66.8	12.78	cl	(-) 90.7
1530	3	12	300	NA	7.64	26.71	0.162	66.6	11.62	cl	(-) 91.9
1530 SAMPLE											

WELL CAPACITY (Liters Per Foot): **0.75"** = 0.0757; **1"** = 0.151; **1.25"** = 0.227; **2"** = 0.605; **3"** = 0.37; **4"** = 1.40; **5"** = 3.861; **6"** = 5.564; **12"** = 22.25
TUBING INSIDE DIA. CAPACITY (Ltr./Ft.): **1/8"** = 0.00227; **3/16"** = 0.00529; **1/4"** = 0.00984; **5/16"** = 0.0151; **3/8"** = 0.0227; **1/2"** = 0.0378; **5/8"** = 0.0605
PURGING EQUIPMENT CODES: **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **PP** = Peristaltic Pump; **O** = Other (Specify)

SAMPLING DATA

SAMPLED BY (PRINT) / AFFILIATION: ~~Jeff Krone~~/TtNUS Dave Siefken	SAMPLER(S) SIGNATURE(S): [signature]	SAMPLING INITIATED AT: 1530	SAMPLING ENDED AT: 1535
PUMP OR TUBING DEPTH IN WELL (feet): 0.25	TUBING MATERIAL CODE: Teflon Poly (circle one) PE	FIELD-FILTERED: Y (N) Filtration Equipment Type:	FILTER SIZE: ____ μm
FIELD DECONTAMINATION: PUMP Y (N)	TUBING (Y) N (replaced)	DUPLICATE: Y (N)	

SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOL ADDED IN FIELD (mL)	FINAL pH	INTENDED ANALYSIS AND/OR METHOD	SAMPLING EQUIPMENT CODE	SAMPLE PUMP FLOW RATE (mL per minute)
PP	3	CG	40 ML	HCL	NONE	<2	VOCs (~~BTEX + MTBE~~) 8260B	RFPP	100
							Select ↑		

REMARKS:
GW Down Stream 25' Collected at 0.0 - 0.5 ft below Sediment

MATERIAL CODES: AG = Amber Glass; CG = Clear Glass; PE = Polyethylene; PP = Polypropylene; S = Silicone; T = Teflon; O = Other (Specify)

SAMPLING EQUIPMENT CODES: APP = After Peristaltic Pump; B = Bailer; BP = Bladder Pump; ESP = Electric Submersible Pump; RFPP = Reverse Flow Peristaltic Pump; SM = Straw Method (Tubing Gravity Drain); O = Other (Specify)

NOTES: 1. The above do not constitute all of the information required by Chapter 62-160, F.A.C.
2. STABILIZATION CRITERIA FOR RANGE OF VARIATION OF LAST THREE CONSECUTIVE READINGS (SEE FS 2212, SECTION 3)
pH: ± 0.2 units **Temperature:** ± 0.2 °C **Specific Conductance:** ± 5% **Dissolved Oxygen:** all readings ≤ 20% saturation (see Table FS 2200-2); optionally, ± 0.2 mg/L or ± 10% (whichever is greater) **Turbidity:** all readings ≤ 20 NTU; optionally ± 5 NTU or ± 10% (whichever is greater)

Revision Date: February 12, 2009 Form FD 9000-24

GROUNDWATER SAMPLING LOG

SITE NAME: Cecil / Site 3	SITE LOCATION: Site 3	
WELL NO: WP-ORG-RS	SAMPLE ID: CEF-003-WP-ORG-RS	DATE : 4/ 19 /2011

PURGING DATA

WELL DIAMETER (inches): 1	TUBING DIAMETER (inches): 3/16	WELL SCREEN INTERVAL DEPTH: 2 feet to 2.5 feet	STATIC DEPTH TO WATER (feet): NA	PURGE PUMP TYPE OR BAILER: Peristaltic Pump

WELL VOLUME PURGE: 1 WELL VOLUME = (TOTAL WELL DEPTH – STATIC DEPTH TO WATER) X WELL CAPACITY
(only fill out if applicable)
= (feet – feet) X liters/foot = liters

EQUIPMENT VOLUME PURGE: 1 EQUIPMENT VOL. = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME
(only fill out if applicable)
= liters + (liters/foot X feet) + liters = <1 liters

INITIAL PUMP OR TUBING DEPTH IN WELL (feet): 2.25	FINAL PUMP OR TUBING DEPTH IN WELL (feet): 2.25	PURGING INITIATED AT: 1600	PURGING ENDED AT: 1630	TOTAL VOLUME PURGED (liters): <1 L

TIME	VOLUME PURGED (~~gallons~~ L)	CUMUL. VOLUME PURGED (~~gallons~~ L)	PURGE RATE (gpm)	DEPTH TO WATER (feet)	pH (standard units)	TEMP. (°C)	COND. (circle units) µmhos/cm or µS/cm	DISSOLVED OXYGEN (circle units) mg/L or % saturation	TURBIDITY (NTUs)	COLOR (describe)	ODOR (describe)
1600	0	0	100	NA							
	Purged Dry (4) times. Not enough for Flow cell.										
1630	SAMPLE										

WELL CAPACITY (Liters Per Foot): **0.75"** = 0.0757; **1"** = 0.151; **1.25"** = 0.227; **2"** = 0.605; **3"** = 0.37; **4"** = 1.40; **5"** = 3.861; **6"** = 5.564; **12"** = 22.25
TUBING INSIDE DIA. CAPACITY (Ltr./Ft.): **1/8"** = 0.00227; **3/16"** = 0.00529; **1/4"** = 0.00984; **5/16"** = 0.0151; **3/8"** = 0.0227; **1/2"** = 0.0378; **5/8"** = 0.0605

PURGING EQUIPMENT CODES: B = Bailer; BP = Bladder Pump; ESP = Electric Submersible Pump; PP = Peristaltic Pump; O = Other (Specify)

SAMPLING DATA

SAMPLED BY (PRINT) / AFFILIATION: ~~Jeff Krone~~/TtNUS Dave Siefken	SAMPLER(S) SIGNATURE(S): [signature]	SAMPLING INITIATED AT: 1630	SAMPLING ENDED AT: 1635
PUMP OR TUBING DEPTH IN WELL (feet): 2.25	TUBING MATERIAL CODE: Teflon Poly (circle one) PE	FIELD-FILTERED: Y (N) Filtration Equipment Type:	FILTER SIZE: ____ µm
FIELD DECONTAMINATION: PUMP Y (N)	TUBING (Y) N (replaced)	DUPLICATE: Y (N)	

SAMPLE CONTAINER SPECIFICATION				SAMPLE PRESERVATION			INTENDED ANALYSIS AND/OR METHOD	SAMPLING EQUIPMENT CODE	SAMPLE PUMP FLOW RATE (mL per minute)
SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOL ADDED IN FIELD (mL)	FINAL pH			
PP	3	CG	40 ML	HCL	NONE	<2	VOCs (~~BTEX~~ + ~~MTBE~~) 8260B	RFPP	100
							Select ↑		

REMARKS:
Drove SS TW Point to 2.5 ft below sediment / Land surface at edge of creek

MATERIAL CODES: AG = Amber Glass; CG = Clear Glass; PE = Polyethylene; PP = Polypropylene; S = Silicone; T = Teflon; O = Other (Specify)

SAMPLING EQUIPMENT CODES: APP = After Peristaltic Pump; B = Bailer; BP = Bladder Pump; ESP = Electric Submersible Pump; RFPP = Reverse Flow Peristaltic Pump; SM = Straw Method (Tubing Gravity Drain); O = Other (Specify)

NOTES: 1. The above do not constitute all of the information required by Chapter 62-160, F.A.C.
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pH: ± 0.2 units **Temperature:** ± 0.2 °C **Specific Conductance:** ± 5% **Dissolved Oxygen:** all readings ≤ 20% saturation (see Table FS 2200-2); optionally, ± 0.2 mg/L or ± 10% (whichever is greater) **Turbidity:** all readings ≤ 20 NTU; optionally ± 5 NTU or ± 10% (whichever is greater)

Tetra Tech NUS, Inc.

DOCUMENTATION OF FIELD CALIBRATION

PROJECT NAME : [redacted] Site 3

INSTRUMENT NAME/MODEL: HF Scientific + YSI 556

SITE NAME: Cecil

MANUFACTURER:

PROJECT No.: 112G02267

SERIAL NUMBER:

Date of Calibration	Instrument Name and Model	Instrument I.D. Number	Person Performing Calibration	Instrument Settings		Instrument Readings		Calibration Standard (Lot No.)	Remarks and Comments
				Pre-calibration	Post-calibration	Pre-calibration	Post-calibration		
	YSI 556				pH 4	3.96	4		
					pH7	6.98	7		
					Cond1.~~409~~	1.037	1.0		
					DO %	78	100		
					ORP	321	337		
	~~La Motte 2020~~ HF Scientific				.2	.9	.2		
					10	9.7	10		
					1000	111	100		

Site 3 Creek Sampling 4-19-11

Personnel : Dave Steffen & Rob Simcich
PPE : Level "D"
Weather : Pt sunny 89°F
Obj : Collect GW samples below creek bed for lab analysis
LAB : Katahdin
Analysis Select VOC

* Water Level @ CEF-003-31S DTW = 4.24' TOC
Total depth 33.1' TOC
Casing: 2.5' Above Ground Level

0815 Checked in with Tower for JAA site access. Discussion w/ Rusty Chandler

0845 Set-up for ~~Sed.~~ creek vertical evaluation.

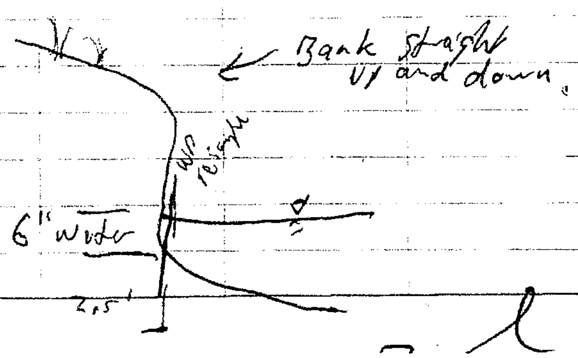
0950 YSI Calibrated.
HF Scientific Calibrated
Rob is constructing Schedule 40 PVC 10 slot temporary well points w/ 6" screen.

Checking Creek H_2O parameters

Temp	20.94 °C
pH	6.04
Cond	0.143 mS/cm
DO	74.5 % or 6.64 mg/L
ORP	(+) 168

* Duplicate Sample CEF-003-WP-DUP01 @ CEF-003-WP-UP25-0510

Re sample @ 25' UP Stream location
CEF-003-WP-UP25-RS



* Well drys up during purging.

* Clear sample after 4 gal
clear after 2

[signature]

7D

Site 3 Creek Sampling 4.19.18

GW samples to be collected today will be obtained through a temporary well. ~~The~~ TWs Each TW is constructed with 1" Schedule 40 pvc with 6" of screen. No glue was used in the fabrication of these well. Two sample locations will each have (4) wells ~~[illegible]~~ installed such that the TWs are 2.5 ft from creek bank & 1.0 ft apart. This orientation creates a line of wells parallel to the creek bank. The two sample areas are 1) UP 25' & 2) Down (DN) 25'. The depth of the individual TW shall be based on depth below distance the sediment. The (4) depth selected include the following:

1) 0.0 – 0.5 ft
2) 0.5 – 1.0 ft
3) 1.0 – 1.5 ft
4) 2.0 – 2.5 ft

The depth of each sample shall be noted on sample ID by removing the decimal points ie 0.0 – 0.5 = 0005. TWs shall be hand driven into sediment & purged like a typical monitoring well.

Decon

Decon of stainless steel (SS) TW is the same as a SS handauger. Liquinox – DI – Alcohol – DI. TW screens were allowed to air dry before used.

WELLS SAMPLED

Time	ID	Depth (ft)	Comments
1145	CEF-003-WPUP 25-2025	2.0-2.5	Purged good.
1205	CEF-003-WPUP 25-1015	1.0-1.5	Purged good.
(*) 1215	CEF 003-WPUP 25-0510	0.5-1.0	Purged good (*) Duplicate 01
1230	CEF 003 WPUP 25 - 0005	0.0-0.5	Purged good
1415	CEF 003 WP UP 25-RS	2.0-2.5	Poor recharge. TW in H_2O at edge of bank
1440	CEF-003 WP DN 25 2025	2.0-2.5	good purge.
1450	CEF 003 WP DN 25 1015	1.0-1.5	prurged good
1515	CEF 003 WP DN 25 0510	0.5-1.0	~~Purged good.~~ poor recharge
1530	CEF 003 WP DN 25 0005	0.0-0.5	purged good
1630	CEF 003 WP ORG - RS	2.0-2.5	~~Purged good.~~ poor recharge
0000	CEF 003-WP DUP01	= CEF 003 WP UP 25 0510	

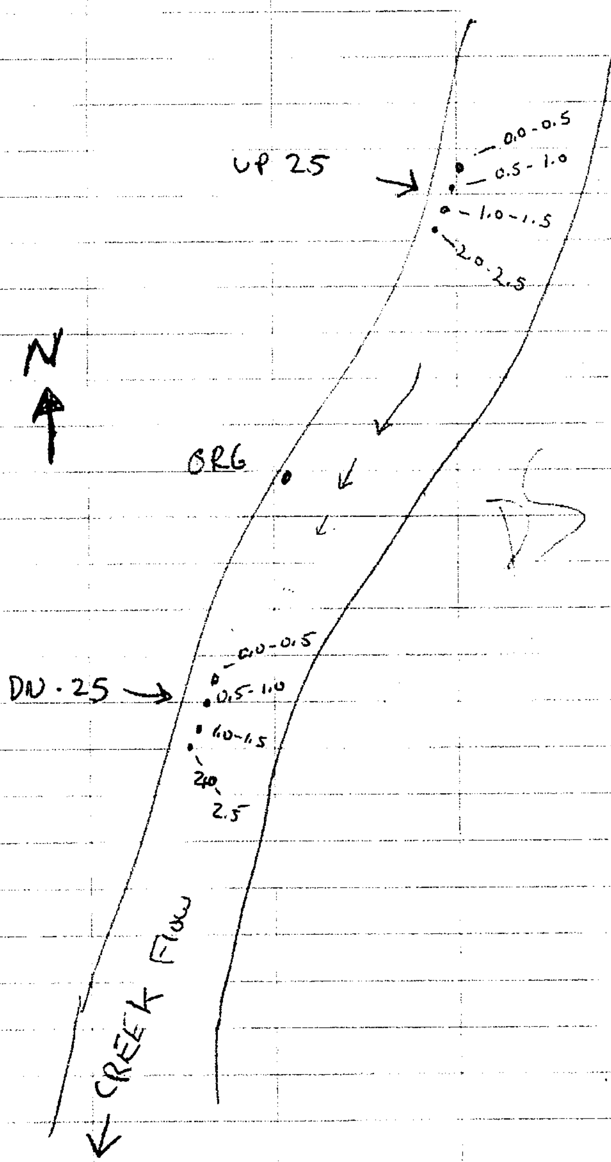
1700 Once samples collected they are placed into cooler w/ ice.
Fed Ex # 8427-1834-4783

1710 Off to Fed Ex Site secure... picked up trash.
Left green fence posts in place with sample locations written on orange protective cap.
For both locations the most shallow depth below sediments collected was installed up stream. & then we worked to deeper samples.

1810 AT Fed Ex -

1815 off to office

1830 At office off load truck end of Day



RLK

TETRA TECH NUS, INC. **CHAIN OF CUSTODY** NUMBER 0866 PAGE 1 OF 1

PROJECT NO: 112G02267	FACILITY: Cecil / Site 3	PROJECT MANAGER: Rob Simcik	PHONE NUMBER: 412 921 8163	LABORATORY NAME AND CONTACT: Katahdin
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER: Dave Siefken	PHONE NUMBER: 904-334-7260	ADDRESS: 600 Technology Way
		CARRIER/WAYBILL NUMBER: FEDEX: 8427-1834-4783		CITY, STATE: Scarborough, ME 04074

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

SE2059

CONTAINER TYPE PLASTIC (P) or GLASS (G): G
PRESERVATIVE USED:
TYPE OF ANALYSIS: 8260B (*) Select (*)

DATE YEAR 2011	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	8260B Select	COMMENTS
4/19	1145	CEF-003-WP-UP25-2025	2'-2.5'	2.0'	2.5'	GW	G	3	✓	(*) Select VOC (*)
4/19	1205	CEF-003-WP-UP25-1015	1'-1.5'	1.0'	1.5'	GW	G	3	✓	1,1 DCE
4/19	1215	CEF-003-WP-UP25-0510	.5'-1'	0.5	1.0	GW	G	3	✓	1,2 DCB
4/19	1220	CEF-003-WP-DUP01	—	—	—	GW	G	3	✓	1,4 DCB
4/19	1230	CEF003-WP-UP25-0005	0'-0.5'	0.0'	0.5'	GW	G	3	✓	Napthalene
4/19	1415	CEF-003-WP-UP25-RS	2'-2.5'	2.0'	2.5'	GW	G	3	✓	Trichloroethene
4/19	1510	CEF003-WP-DN25-0510	.5'-1'	0.5'	1.0	GW	G	3	✓	Cis-1,2 Dichloroethene
4/19	1445	CEF-003-WP-DN25-2025	2'-2.5'	2.0	2.5'	GW	G	3	✓	VC
4/19	1455	CEF-003-WP-DN25-1015	1'-1.5'	1.0'	1.5'	GW	G	3	✓	
4/19	1535	CEF-003-WP-DN25-0005	0-0.5'	0.0	0.5	GW	G	3	✓	
4/19	1630	CEF-003-WP-ORG-RS	2-2.5'	2.0'	2.5	GW	G	3	✓	

1. RELINQUISHED BY	DATE 4/19/11	TIME 1800	1. RECEIVED BY	DATE 4-20-11	TIME 15:00
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R
FORM NO. TtNUS-001

ATTACHMENT 4

SITE 3 DPT WITH MOBILE LABORATORY WORK PLAN, ANALYTICAL RESULTS, SUMMARY TABLE, AND FIELD PAPERWORK BACKUP

From: Simcik, Robert
Sent: Thursday, June 16, 2011 5:34 PM
To: Sanford, Art F CTR OASN (EI&E), BRAC PMO SE; mark.e.davidson@navy.mil; Martin, Stacin CIV NAVFAC LANT, EV; Vaughn-Wright.Debbie@epamail.epa.gov; Grabka, David; Jonnet, Mark; 'Michael.Halil@CH2M.com'; Jessica Dehart
Cc: Boerio, Megan; Siefken, David; Wimble, Kara; Kelly, Chuck; Simcik, Robert
Subject: Cecil Field _ Information on Site 3 DPT effort

Team, in support of the Site 3 Pilot Test design, Tt was tasked at May BCT meeting (Meeting Minute 2678; Decision 810) to conduct DPT w/ mobile lab sampling and analysis to determine the vertical and horizontal limits of the VC plume in the area of the proposed system (approximately 20 to 40 feet west of the center line of Rowell creek). The intent of this e-mail is to provide some additional information regarding the planned field effort that wasn't provided at the May BCT meeting.

The attached Figure is an aerial view with the Well Point sample locations and results. The proposed groundwater sampling strategy will begin at the original location +0 (WP and MW-31S) and step out parallel to the creek in 25' increments. The attached Figure identifies these DPT locations according to the distance from the original sample location which is assigned the ID of +0.

A DPT drilling contractor and an approved mobile analytical laboratory vendor will be procured to collect and analyze the groundwater samples under the direct supervision of Tt.

Site clearing will be conducted to gain access to the proposed DPT sampling locations (a Clearing contractor is currently being procured and we are working with JAA and Forestry regarding any restrictions). Obviously a utility clearance will also be conducted.

The first DPT sampling location will be at the original sample location (+0, next to CEF-003-31S). This location will be used to identify the vertical extent of contamination, currently observed at the 20' to 30' bgs interval. Groundwater samples will be collected in five foot intervals to a depth of 50 feet bgs using the sealed screen sampling method as described in the Groundwater Sampling and Monitoring with Direct Push Technologies (OSWER No. 9200.1-51, EPA 540/R- 04/2005), attached. The sealed screen method was selected because we anticipate reducing the number of sampling intervals from ten at the first location to approximately four at the other locations and are confident that we can control potential cross contamination and drag-down with proper decontamination using this method. We selected the last groundwater sample to be collected at the 50' depth (screen interval of 48' to 52' with tubing at 50') based on no contamination detected in the deep monitoring well CEF-003-32D [56'-66'] and soil borings in this area (attached) which show a transition to clay ranging from 52' to 46' bgs.

The sealed screen method uses a DPT probe that is equipped with a 4-foot screen that is exposed when the proper groundwater sampling depth is reached. The first sample (5' bgs sample) will have the well screen positioned to depth of 7 feet bgs (screen interval of 3 feet bgs to 7 feet bgs) and the sampling tubing placed at a depth of 5 feet bgs. Groundwater will be purged until clear and the groundwater sample collected will be provided to the on-site mobile lab for VC analysis. Note during the previous WP investigation we analyzed for select VOCs (see e-mail in red below) and the only contaminate detected was VC, therefore only proposing evaluation of this parameter. Samples will continue to be collected at 5 foot intervals with the well screen decontaminated between each sample. The first sample location (+0) will have ten samples collected and analyzed. The next sample location will be 75 feet north (+75) of the original location. This distance was selected because it is the limits of the plume as it was identified in the RI, as shown on the attached Figure. By the time we begin pushing the rods at this sampling location (+75), we should have the shallow groundwater results from location +0 and therefore will be able to determine at what depth to start collecting groundwater samples. It is assumed we will be collecting groundwater samples at 15', 20', 25', and 30' bgs. The next sample location will be 75 feet south (-75) of the original location and same logic will be used to determine which vertical sample intervals will be collected. If VC contamination is identified at the 75 foot locations above the GCTL of 1.0 ug/L (we selected the GCTL rather than the SWCTL to be conservative), then we will step out 25 feet (to the +/-100 location) and collect groundwater samples at the appropriate vertical intervals. If VC is not detected above the GCTL, then we will step-in 25 feet to the +/-50 sample location. This process of stepping-out or stepping-in at 25 foot increments will continue until the plume is delineated. If concentrations are high during subsequent step-outs then we may select to step-out more than 25'.

Given we did not have enough time at the last BCT meeting to discuss this process in this level of detail I am looking to get input or concurrence regarding the proposed sampling logic and the analysis to be conducted.

The current schedule is to conduct the field effort in July in order to have results to present to the Team at the August BCT meeting.

Here is the old e-mail:
From: Simcik, Robert [mailto:Robert.Simcik@tetratech.com]
Sent: Monday, March 28, 2011 3:18 PM
To: Grabka, David; Vaughn-Wright.Debbie@epamail.epa.gov; Sanford, Art F CTR OASN (EI&E), BRAC PMO SE; mark.e.davidson@navy.mil; stacin.martin@navy.mil; Jessica Keener; Jonnet, Mark; Michael.Halil@CH2M.com
Cc: Boerio, Megan
Subject: RE: Site 3 Pilot Test _ additional Well Point sampling.

Dave, we reviewed the GCTL exceedences for the wells that have the potential to migrate to the creek and developed the following list of Select VOCs for the Well Point sampling analysis. Note that this "additional sampling to support the pilot test design" does not match the list of select VOC (19) and select SVOCs (6) in the UFP SAP because we are only looking at the parameters which have the potential to impact the surface water. Also analyzing 1,2-Dichlorobenzene and Naphthalene as a VOC, not SVOC, as cost savings measure. Cis doesn't have a SW limit, but I want to see what, if anything is going on with it.

SW-846 METHOD 8260-B
ANALYTICAL DETECTION LIMITS
Volatile Organic Compounds
NAS Cecil Field

Parameter	62-777 Minimum surface water criteria
VOCs (UG/L)	
1,1-DICHLOROETHENE	3.2
1,2-DICHLOROBENZENE	99
1,4-DICHLOROBENZENE	3

NAPHTHALENE	26
TRICHLOROETHENE	80.7
CIS-1,2-DICHLOROETHENE	NA
VINYL CHLORIDE	2.4

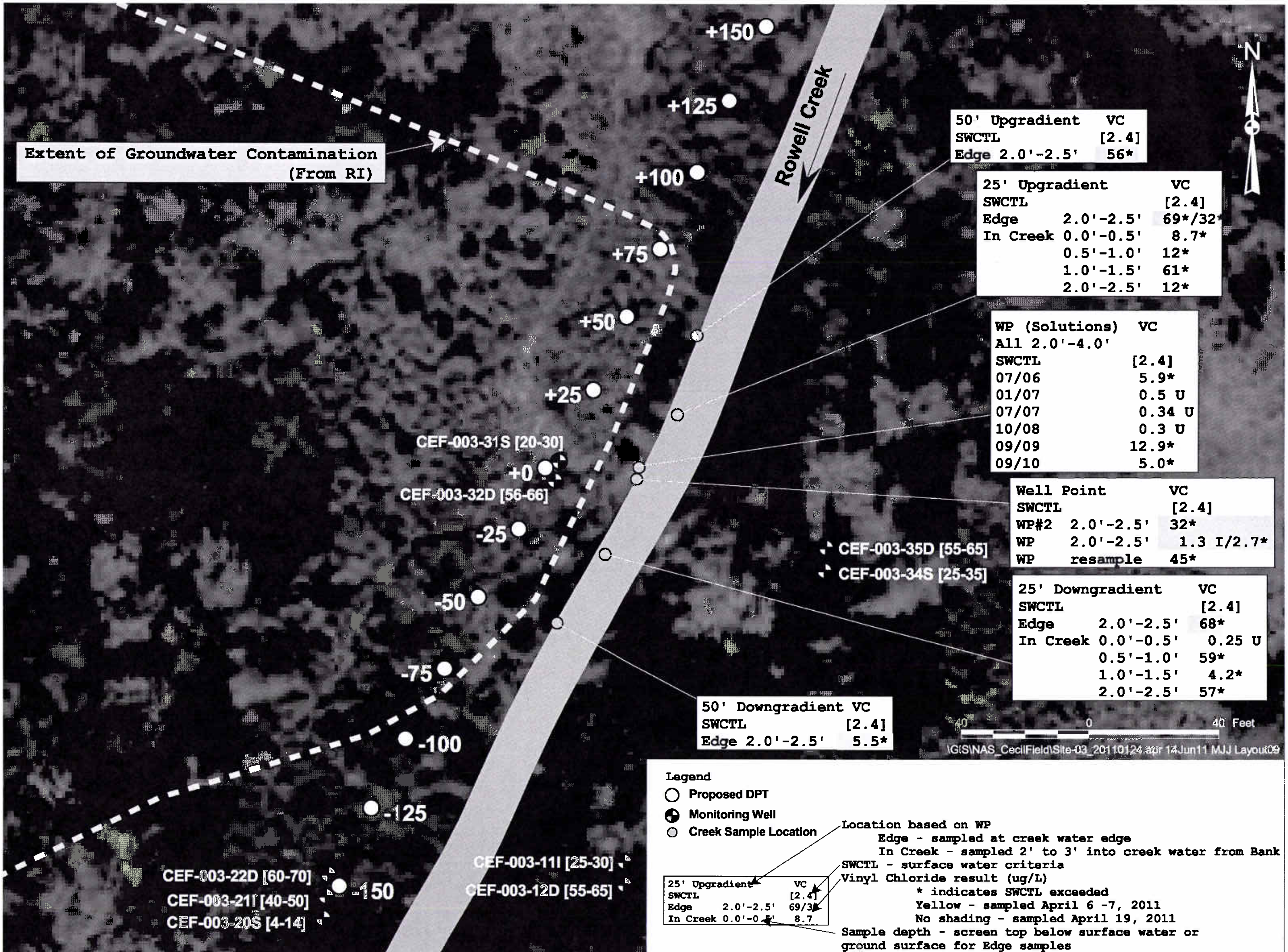
Team, let me know if you are OK with the proposed Select VOC list and proposed sampling effort. Currently planning to collect samples on Tuesday and Wednesday, April 5th and 6th.

Thanks,

Rob.

Robert Simcik P.E. | Project Manager
Direct: 412.921.8163 | Main: 412.921.7090 | Fax: 412.921.4040
robert.simcik@tetratech.com

Tetra Tech | Civil Engineering Group
661 Andersen Drive Foster Plaza 7 | Pittsburgh, PA 15220 | www.tetratech.com



Extent of Groundwater Contamination (From RI)
Rowell Creek
N
+150
+125
+100
+75
+50
+25
+0
-25
-50
-75
-100
-125
-150
CEF-003-31S [20-30]
CEF-003-32D [56-66]
CEF-003-35D [55-65]
CEF-003-34S [25-35]
CEF-003-22D [60-70]
CEF-003-21I [40-50]
CEF-003-20S [4-14]
CEF-003-11I [25-30]
CEF-003-12D [55-65]
50' Upgradient VC
SWCTL [2.4]
Edge 2.0'-2.5' 56*
25' Upgradient VC
SWCTL [2.4]
Edge 2.0'-2.5' 69*/32*
In Creek 0.0'-0.5' 8.7*
0.5'-1.0' 12*
1.0'-1.5' 61*
2.0'-2.5' 12*
WP (Solutions) VC
All 2.0'-4.0'
SWCTL [2.4]
07/06 5.9*
01/07 0.5 U
07/07 0.34 U
10/08 0.3 U
09/09 12.9*
09/10 5.0*
Well Point VC
SWCTL [2.4]
WP#2 2.0'-2.5' 32*
WP 2.0'-2.5' 1.3 I/2.7*
WP resample 45*
25' Downgradient VC
SWCTL [2.4]
Edge 2.0'-2.5' 68*
In Creek 0.0'-0.5' 0.25 U
0.5'-1.0' 59*
1.0'-1.5' 4.2*
2.0'-2.5' 57*
50' Downgradient VC
SWCTL [2.4]
Edge 2.0'-2.5' 5.5*
40 0 40 Feet
\GIS\NAS_CecilField\Site-03_20110124.apr 14Jun11 MJJ Layout09
Legend
Proposed DPT
Monitoring Well
Creek Sample Location
25' Upgradient VC
SWCTL [2.4]
Edge 2.0'-2.5' 69/3
In Creek 0.0'-0.5' 8.7
Location based on WP
Edge - sampled at creek water edge
In Creek - sampled 2' to 3' into creek water from Bank
SWCTL - surface water criteria
Vinyl Chloride result (ug/L)
* indicates SWCTL exceeded
Yellow - sampled April 6 -7, 2011
No shading - sampled April 19, 2011
Sample depth - screen top below surface water or ground surface for Edge samples

PROJECT: NAS Cecil Field RI OUs 1,2,7	**LOG of WELL:**	**LOG OF BORING:** GS-3-53
CLIENT: SOUTHDIVNAVFACENGCOM		**PROJECT NO:** 7537-03
DRILLING SUBCONTRACTOR: Layne Environmental Services	**DATE STARTED:** 10-11-93	**COMPLETED:** 10-12-93
DRILL RIG: Gus Pech BR22 / **DRILL MTHD.:** 4.25" ID HSA	**SAMP. MTHD.:** Aqua Probe	**PROTECTION LEVEL:** D
GROUND ELEV.: 54.8 FT. NGVD / **MONITOR INST.:** Microtip-PID	**TOTAL DEPTH:** 71 FT. BLS	**DEPTH TO ▽** 7 FT. BLS
LOGGED BY: M. Pijnenburg / **HOLE ABANDONMENT DATE:** 10-12-93		**SITE:** 3

DEPTH FT.	SAMP. DEPTH /MATRIX.	SAMPLE INTERVAL	BLOWS/6in.	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	REMARKS
			1-1	0-2 7.4	0-52.0 *Sand (SP)*, 100% quartz, medium brown to colorless, fine-grained, sub-angular to sub-rounded, moderately well sorted, soft, occasionally silty.		SP	0-8 bls: continuous split-spoons
			1-1					
	2-4 soil		2-3	2-4 11.2				
			3-3					
	4-6 soil		2-2	4-6 9.3				
5			4-8					
	6-10 water		5-6	6-8 27.3				wl sampling string 0 wl augers: dry groundwater encountered ▽
			8-8					
10								
15								
	18-22 water							wl sampling string 0 wl augers: 17'bls
20								
25								
	28-32 water							wl sampling string 0 wl augers: 10'bls
30								
35								
40								

 ABB ENVIRONMENTAL SERVICES, INC.

PROJECT: NAS Cecil Field RI OUs 1,2,7	LOG of WELL:	LOG OF BORING: GS-3-53
CLIENT: SOUTHDIVNAVFACENGCOM		PROJECT NO: 7537-03
DRILLING SUBCONTRACTOR: Layne Environmental Services	DATE STARTED: 10-11-93	COMPLETED: 10-12-93
DRILL RIG: Gus Pech BR22	DRILL MTHD.: 4.25" ID HSA	SAMP. MTHD.: Aqua Probe	PROTECTION LEVEL: D
GROUND ELEV.: 54.8 FT. NGVD	MONITOR INST.: Microtip-PID	TOTAL DEPTH: 71 FT. BLS	DEPTH TO ▽ 7 FT. BLS
LOGGED BY: M. Pijnenburg	HOLE ABANDONMENT DATE: 10-12-93		SITE: 3

Continued from PAGE 1

DEPTH FT.	SAMP. DEPTH /MATRIX.	SAMPLE INTERVAL	BLOWS/6in.	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	REMARKS
					Sand continued.		SP	
45								
50								
	52-56 water				52.0-71.0 *Sandy Clay (CL)*, 100%, quartz, gray to gray-green, plastic, soft, dense, sandy, moist.		CL	w/ sampling string: 55'bls w/ augers: 2'bls
55								
60								
65								
					Samples collected were analyzed for USEPA Method 8010/8020 and TPH.			
70	70-71 water				End of boring: 71'bls.			bottom bottom hole augers w/ sampling string: 69'bls w/ augers: 5'bls bottom hole probe
75								
80								

 ABB ENVIRONMENTAL SERVICES, INC.

PROJECT: NAS Cecil Field RI OUs 1,2,7		LOG of WELL:		LOG OF BORING: GS-3-70
CLIENT: SOUTHDIVNAVFACENGCOM				PROJECT NO: 7537-03
DRILLING SUBCONTRACTOR: Layne Environmental Services		DATE STARTED: 10-29-93		COMPLETED: 11-01-93
DRILL RIG: Gus Pech BR22	DRILL MTHD.: 4.25" ID HSA	SAMP. MTHD.: Aqua Probe		PROTECTION LEVEL: D
GROUND ELEV.: 58.7 FT. NGVD	MONITOR INST.: Microtip-PID	TOTAL DEPTH: 108 FT. BLS		DEPTH TO ▽ 7 FT. BLS
LOGGED BY: M. Pijnenburg	HOLE ABANDONMENT DATE: 11-01-93			SITE: 3

DEPTH FT.	SAMP. DEPTH /MATRIX.	SAMPLE INTERVAL	BLOWS/6in.	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	REMARKS
	0-2 soil		woh"6- 4-1	0-2 18.8	0-6.0 *Sand (SP)*, 100%, quartz, medium to light brown, fine-to medium-grained, sub-rounded, poorly to moderately well sorted, occasionally silty.		SP	0-8 bls: continuous split-spoons
			1-2 3-5	2-4 18				
5	4-6 soil		5-4 4-2	4-6 23.4				
			5-7 8-10	6-8 18.8	6.0-8.0 *Clayey Sand (SC)*, 100%, quartz, medium gray, fine-grained, sub-rounded, moderately well sorted, clayey.		SC	groundwater encountered ▽
	8-12 water				8.0-46.0 *Sand (SP)*, 100%, quartz, light brown, medium-grained, sub-rounded, moderately well sorted, occasionally silty.		SP	w/ sampling string 0 w/ augers: dry
10								
15								
	18-22 water							w/ sampling string 0 w/ augers: dry
20								
25								
	28-32 water							w/ sampling string 0 w/ augers: 27'bls
30								
35								
40								

PROJECT: NAS Cecil Field RI OUs 1,2,7		**LOG of WELL:**	**LOG OF BORING:** GS-3-70
CLIENT: SOUTHDIVNAVFACENGCOM			**PROJECT NO:** 7537-03
DRILLING SUBCONTRACTOR: Layne Environmental Services		**DATE STARTED:** 10-29-93	**COMPLETED:** 11-01-93
DRILL RIG: Gus Pech BR22	**DRILL MTHD.:** 4.25" ID HSA	**SAMP. MTHD.:** Aqua Probe	**PROTECTION LEVEL:** D
GROUND ELEV.: 58.7 FT. NGVD	**MONITOR INST.:** Microtip-PID	**TOTAL DEPTH:** 108 FT. BLS	**DEPTH TO ▽** 7 FT. BLS
LOGGED BY: M. Pijnenburg	**HOLE ABANDONMENT DATE:** 11-01-93		**SITE:** 3

Continued from PAGE 1

DEPTH FT.	SAMP. DEPTH /MATRIX.	SAMPLE INTERVAL	BLOWS/6in.	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	REMARKS
					Sand continued.		SP	
45					46.0-69.0 *Sandy Clay (CL)*, 100%, quartz, medium gray, dense, moist to wet, plastic, pliable, grades to clayey sand.		CL	
50	52-56 water							wl sampling string: 0 wl augers: 28'bls
55								
60								
65	68-69 water							wl sampling string: 38'bls wl augers: 34'bls
70					69.0-82.0 *Clayey Sand (SC) with Shell and Marl*, clayey sand, 70%, quartz, medium gray, fine-to medium-grained, sub-rounded, moderately well sorted; shell, 20%, very pale orange, fine fragments; marl, 10%, white, calcareous, soft, wet.		SC MARL	
75								
80	80-82 water							wl sampling string: 68'bls

PROJECT: NAS Cecil Field RI OUs 1,2,7	**LOG of WELL:**	**LOG OF BORING:** GS-3-70
CLIENT: SOUTHDIVNAVFACENGCOM		**PROJECT NO:** 7537-03
DRILLING SUBCONTRACTOR: Layne Environmental Services	**DATE STARTED:** 10-29-93	**COMPLETED:** 11-01-93

DRILL RIG: Gus Pech BR22	**DRILL MTHD.:** 4.25" ID HSA	**SAMP. MTHD.:** Aqua Probe	**PROTECTION LEVEL:** D
GROUND ELEV.: 58.7 FT. NGVD	**MONITOR INST.:** Microtip-PID	**TOTAL DEPTH:** 108 FT. BLS	**DEPTH TO ▽** 7 FT. BLS
LOGGED BY: M. Pijnenburg	**HOLE ABANDONMENT DATE:** 11-01-93		**SITE:** 3

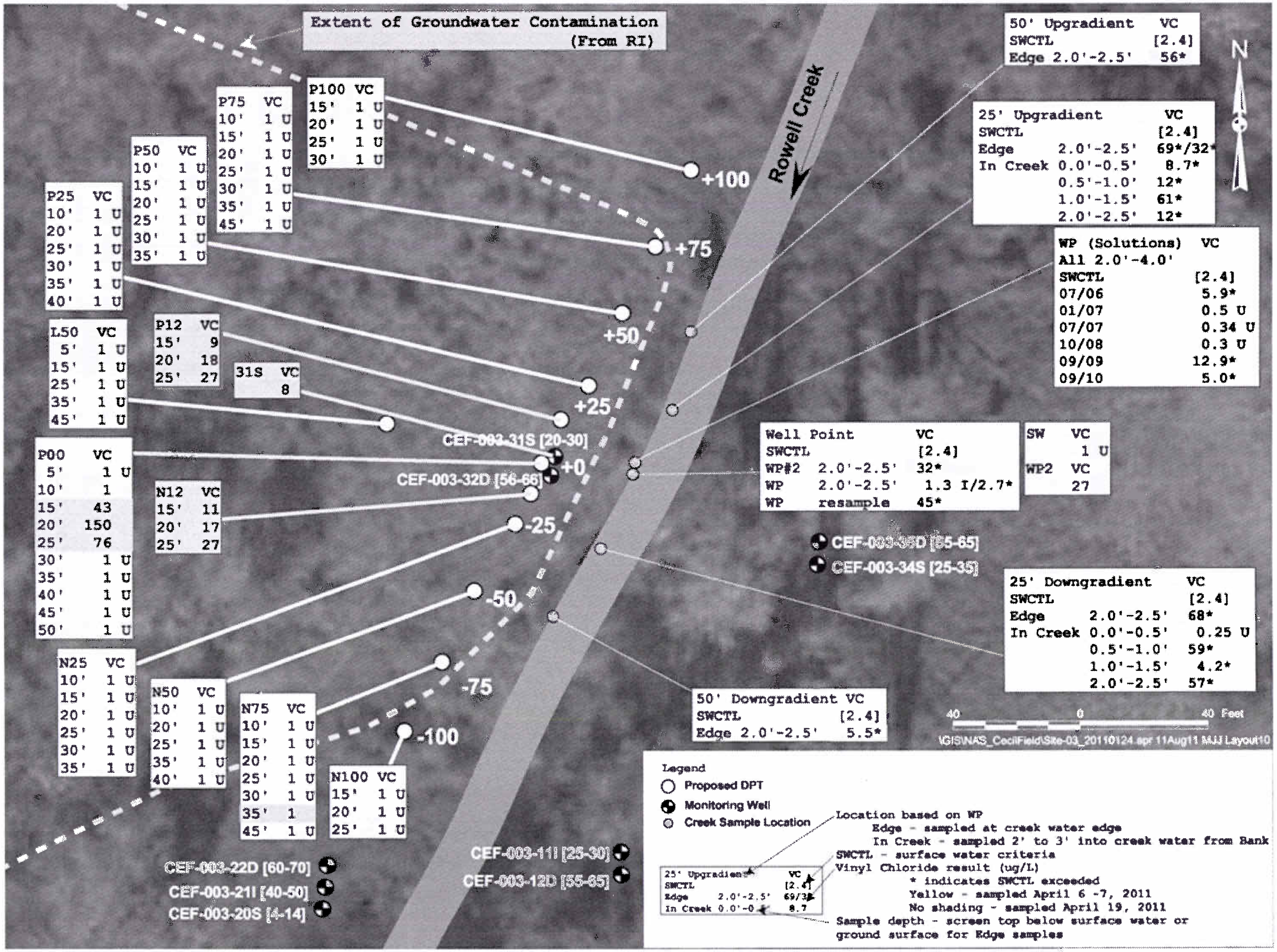
Continued from PAGE 2

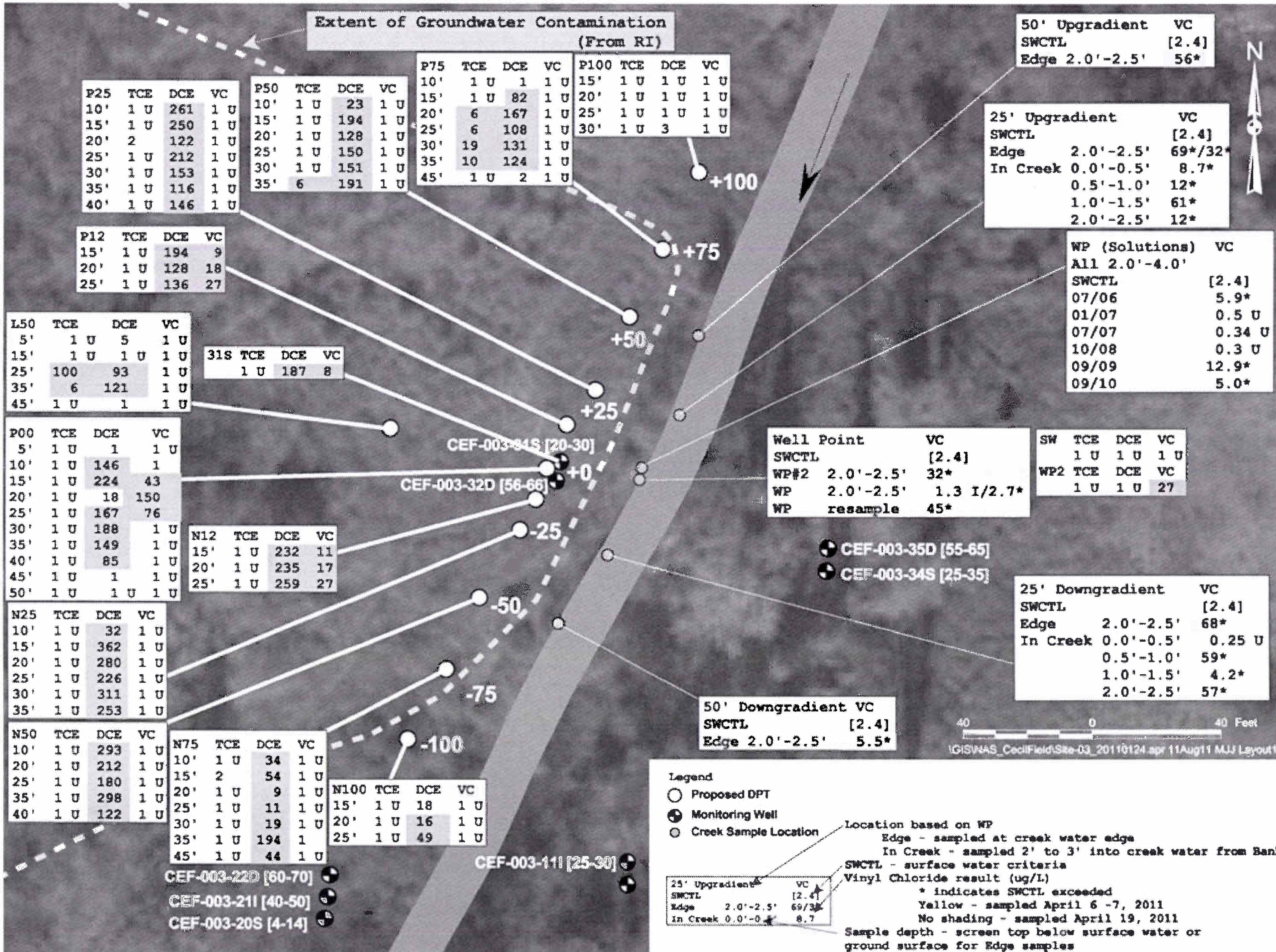
DEPTH FT.	SAMP. DEPTH /MATRIX.	SAMPLE INTERVAL	BLOWS/6in.	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	REMARKS
					Clayey Sand with Shell and Marl continued.		SC MARL	
					82.0–96.0 *Dolomite*, 100%, moderate yellowish-brown, hard, well cemented, microcrystalline, shell replacement features visible, vuggy, sucrosic, oolitic-like-replacement features visible, trace phosphate.		DOLOMITE	bottom hole augers
85								pump rate 6–7 min/ft
								pump rate 4–5 min/ft
90	90-92 water							temporary well point 500 gal purged
								pump rate 4–5 min/ft
95								
					96.0–106.0 *Clay (CH)*, 100%, calcareous, white to light gray, soft, non plastic, wet.		CH	pump rate 30 sec/ft
100								
					Samples collected were analyzed for USEPA Method 8010/8020 and TPH.			
105								
					End of boring: 106'bls.			bottom hole rotary bit
110								
115								
120								

 ABB ENVIRONMENTAL SERVICES, INC.

Field Effort

- Day 1
  - Collected original location (25’ in from CEF-003-31S) from 5’ to 50’ depth (5’ increments).
    - VC identified from 15’ to 25’.
  - Collected Up 75’ and Down 75’ locations at 10’ to 45’ depths.
    - No VC identified.
- Day 2
  - Moved in to Up 50’ and Down 25’ (where creek WPs had VC hits). Collected 10’ to 35’ depth.
    - No VC identified. Looked closer at other parameters.
  - Collected Up 100’ and Up 25’
    - Selected based on TCE hits at up 75’ and to fill in grid.
    - Up 100’ all NDs and Up 25’ no VC or TCE, but high DCE.
  - Collected MW, WP#2, and a surface water sample.
- Day 3
  - Collected samples at Up 25’, Down 50’, Up and Down 12.5’, and deeper sample at Down 75’ to fill in gaps.
  - Collected final samples at 75’ in from creek (50’ in from original location) at depth of 5’ to 45’.


Extent of Groundwater Contamination (From RI)
Rowell Creek
N
P100 VC
15' 1 U
20' 1 U
25' 1 U
30' 1 U
P75 VC
10' 1 U
15' 1 U
20' 1 U
25' 1 U
30' 1 U
35' 1 U
45' 1 U
P50 VC
10' 1 U
15' 1 U
20' 1 U
25' 1 U
30' 1 U
35' 1 U
P25 VC
10' 1 U
20' 1 U
25' 1 U
30' 1 U
35' 1 U
40' 1 U
L50 VC
5' 1 U
15' 1 U
25' 1 U
35' 1 U
45' 1 U
P12 VC
15' 9
20' 18
25' 27
31S VC
8
P00 VC
5' 1 U
10' 1
15' 43
20' 150
25' 76
30' 1 U
35' 1 U
40' 1 U
45' 1 U
50' 1 U
N12 VC
15' 11
20' 17
25' 27
N25 VC
10' 1 U
15' 1 U
20' 1 U
25' 1 U
30' 1 U
35' 1 U
N50 VC
10' 1 U
20' 1 U
25' 1 U
35' 1 U
40' 1 U
N75 VC
10' 1 U
15' 1 U
20' 1 U
25' 1 U
30' 1 U
35' 1
45' 1 U
N100 VC
15' 1 U
20' 1 U
25' 1 U
+100
+75
+50
+25
+0
-25
-50
-75
-100
CEF-003-31S [20-30]
CEF-003-32D [56-66]
CEF-003-35D [55-65]
CEF-003-34S [25-35]
CEF-003-22D [60-70]
CEF-003-21I [40-50]
CEF-003-20S [4-14]
CEF-003-11I [25-30]
CEF-003-12D [55-65]
50' Upgradient VC
SWCTL [2.4]
Edge 2.0'-2.5' 56*
25' Upgradient VC
SWCTL [2.4]
Edge 2.0'-2.5' 69*/32*
In Creek 0.0'-0.5' 8.7*
0.5'-1.0' 12*
1.0'-1.5' 61*
2.0'-2.5' 12*
WP (Solutions) VC
All 2.0'-4.0'
SWCTL [2.4]
07/06 5.9*
01/07 0.5 U
07/07 0.34 U
10/08 0.3 U
09/09 12.9*
09/10 5.0*
Well Point VC
SWCTL [2.4]
WP#2 2.0'-2.5' 32*
WP 2.0'-2.5' 1.3 I/2.7*
WP resample 45*
SW VC
1 U
WP2 VC
27
25' Downgradient VC
SWCTL [2.4]
Edge 2.0'-2.5' 68*
In Creek 0.0'-0.5' 0.25 U
0.5'-1.0' 59*
1.0'-1.5' 4.2*
2.0'-2.5' 57*
50' Downgradient VC
SWCTL [2.4]
Edge 2.0'-2.5' 5.5*
40 0 40 Feet
\GIS\NAS_CecilField\Site-03_20110124.apr 11Aug11 MJJ Layout10
Legend
Proposed DPT
Monitoring Well
Creek Sample Location
Location based on WP
Edge - sampled at creek water edge
In Creek - sampled 2' to 3' into creek water from Bank
SWCTL - surface water criteria
Vinyl Chloride result (ug/L)
* indicates SWCTL exceeded
Yellow - sampled April 6 -7, 2011
No shading - sampled April 19, 2011
Sample depth - screen top below surface water or ground surface for Edge samples
25' Upgradient VC
SWCTL [2.4]
Edge 2.0'-2.5' 69/32
In Creek 0.0'-0 8.7



P25	TCE	DCE	VC
10'	1 U	261	1 U
15'	1 U	250	1 U
20'	2	122	1 U
25'	1 U	212	1 U
30'	1 U	153	1 U
35'	1 U	116	1 U
40'	1 U	146	1 U

P50	TCE	DCE	VC
10'	1 U	23	1 U
15'	1 U	194	1 U
20'	1 U	128	1 U
25'	1 U	150	1 U
30'	1 U	151	1 U
35'	6	191	1 U

P75	TCE	DCE	VC
10'	1 U	1	1 U
15'	1 U	82	1 U
20'	6	167	1 U
25'	6	108	1 U
30'	19	131	1 U
35'	10	124	1 U
45'	1 U	2	1 U

P100	TCE	DCE	VC
15'	1 U	1 U	1 U
20'	1 U	1 U	1 U
25'	1 U	1 U	1 U
30'	1 U	3	1 U

P12	TCE	DCE	VC
15'	1 U	194	9
20'	1 U	128	18
25'	1 U	136	27

L50	TCE	DCE	VC
5'	1 U	5	1 U
15'	1 U	1 U	1 U
25'	100	93	1 U
35'	6	121	1 U
45'	1 U	1	1 U

31S	TCE	DCE	VC
	1 U	187	8

P00	TCE	DCE	VC
5'	1 U	1	1 U
10'	1 U	146	1
15'	1 U	224	43
20'	1 U	18	150
25'	1 U	167	76
30'	1 U	188	1 U
35'	1 U	149	1 U
40'	1 U	85	1 U
45'	1 U	1	1 U
50'	1 U	1 U	1 U

N12	TCE	DCE	VC
15'	1 U	232	11
20'	1 U	235	17
25'	1 U	259	27

N25	TCE	DCE	VC
10'	1 U	32	1 U
15'	1 U	362	1 U
20'	1 U	280	1 U
25'	1 U	226	1 U
30'	1 U	311	1 U
35'	1 U	253	1 U

N50	TCE	DCE	VC
10'	1 U	293	1 U
20'	1 U	212	1 U
25'	1 U	180	1 U
35'	1 U	298	1 U
40'	1 U	122	1 U

N75	TCE	DCE	VC
10'	1 U	34	1 U
15'	2	54	1 U
20'	1 U	9	1 U
25'	1 U	11	1 U
30'	1 U	19	1 U
35'	1 U	194	1
45'	1 U	44	1 U

N100	TCE	DCE	VC
15'	1 U	18	1 U
20'	1 U	16	1 U
25'	1 U	49	1 U

Analytical Laboratories of Florida: Laboratory Results

Field Chemist: Dale A. Schamp

Site Project Name: SITE 3 NAS Cecil Field
Site Location: Jacksonville, Fl.
Client Name: TetraTech, Inc (Pittsburg office)
Client Contact: Robert Simcik (412-921-7090)
Analysis Methodology: EPA 8021 (subset)

Client Purchase Order Number:112G02413-CTO 25
Laboratory Project Name:TT071211
Laboratory Address: 166 Center Street, Suite 111
Cape Canaveral, Florida 32920
321-258-1355
Laboratory Contact: Dale Schamp

Signature: Dale A Schamp
(Draft Copy unless Signature present.)
Date: 7/20/11
NELAC Certification Number: E83934

Target Compounds	Concentration Levels in Parts per Billion (ug/L or ug/Kg)				
Field Laboratory Number:	TT071211-W01	TT071211-W02	TT071211-W02 Duplicate	TT071211-W03	TT071211-W04
Client Field Description:	CEF-003-POO-05	CEF-003-POO-15	CEF-003-POO-15	CEF-003-POO-25	CEF-003-POO-35
Matrix:	Water	Water	Water	Water	Water
Sample Size:	10 ml	10 ml	10 ml	10 ml	10 ml
Sample Collection Date /Received:	7/12/11 0830	7/12/11 0840	7/12/11 0840	7/12/11 0851	7/12/11 0909
Analysis Date:	7/15/2011	7/15/2011	7/15/2011	7/15/2011	7/15/2011
Vinyl chloride	1 U	43	35	76	1 U
1,1-Dichloroethene	1 U	54	44	27	39
cis-1,2-Dichloroethene	1	170	160	140	110
Trichloroethene	1 U	1 U	1 U	1 U	1 U
1,4-Dichlorobenzene	1 U	1 U	1 U	2	1
1,2-Dichlorobenzene	1 U	7	7	100	64
Naphthalene	2	10	10	17	23
Field Laboratory Number:	TT071211-W05	TT071211-W05 Spike	TT071211-W06	TT071211-W07	TT071211-W08
Client Field Description:	CEF-003-POO-45	CEF-003-POO-45	CEF-003-SWPOO	CEF-003-POO-10	CEF-003-POO-20
Matrix:	Water	Water & 10 ppb	Water	Water	Water
Sample Size:	10 ml	10 ml	10 ml	10 ml	10 ml
Sample Collection Date /Received:	7/12/11 0935	7/12/11 0935	7/12/11 1005	7/12/11 1035	7/12/11 1050
Analysis Date:	7/15/2011	7/15/2011	7/15/2011	7/15/2011	7/15/2011
Vinyl chloride	1 U	9.4 (93.8 % Rec.)	1 U	1	150
1,1-Dichloroethene	1 U	9.2 (91.8 % Rec.)	1 U	36	1
cis-1,2-Dichloroethene	1	11 (101.5 % Rec.)	1 U	110	17
Trichloroethene	1 U	11 (110.9 % Rec.)	1 U	1 U	1 U
1,4-Dichlorobenzene	1 U	10 (101.5 % Rec.)	1 U	1 U	2
1,2-Dichlorobenzene	1	11 (94.0 % Rec.)	1 U	1 U	62
Naphthalene	1	11 (96.5 % Rec.)	1 U	1 U	36
Field Laboratory Number:	TT071211-W09	TT071211-W10	TT071211-W11	TT071211-W12	TT071211-W13
Client Field Description:	CEF-003-POO-30	CEF-003-POO-40	CEF-003-POO-50	CEF-003-P75-15	CEF-003-P75-25
Matrix:	Water	Water	Water	Water	Water
Sample Size:	10 ml	10 ml	10 ml	10 ml	10 ml
Sample Collection Date /Received:	7/12/11 1101	7/12/11 1115	7/12/11 1140	7/12/11 1310	7/12/11 1320
Analysis Date:	7/15/2011	7/15/2011	7/16/2011	7/16/2011	7/16/2011
Vinyl chloride	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethene	38	24	1 U	24	27
cis-1,2-Dichloroethene	150	58	1 U	58	81
Trichloroethene	1 U	1 U	1 U	1 U	6
1,4-Dichlorobenzene	2	1 U	1 U	1 U	1 U
1,2-Dichlorobenzene	120	12	1	4	3
Naphthalene	25	8	3	2	1

U = Indicates that the compound was analyzed for but not detected at the quantitation limit. The value associated with the qualifier shall be the method detection limit.
J = Estimated value due to sample response greater than calibration curve.

Analytical Laboratories of Florida: Laboratory Results

Field Chemist: Dale A. Schamp
Signature: Dale A Schamp
(Draft Copy unless Signature present.)
Date: 7/20/11
NELAC Certification Number: E83934

Site Project Name: SITE 3 NAS Cecil Field
Site Location: Jacksonville, Fl.
Client Name: TetraTech, Inc (Pittsburg office)
Client Contact: Robert Simcik (412-921-7090)
Analysis Methodology: EPA 8260 (subset)

Client Purchase Order Number:112G02413-CTO 25
Laboratory Project Name:TT071211
Laboratory Address: 166 Center Street, Suite 111
Cape Canaveral, Florida 32920
321-258-1355
Laboratory Contact: Dale Schamp

Target Compounds	Concentration Levels in Parts per Billion (ug/L or ug/Kg)				
Field Laboratory Number:	TT071211-W14	TT071211-W14 Duplicate	TT071211-W15	TT071211-W16	TT071211-W16 Spike
Client Field Description:	CEF-003-P75-35	CEF-003-P75-35	CEF-003-P75-45	CEF-003-P75-10	CEF-003-P75-10
Matrix:	Water	Water	Water	Water	Water
Sample Size:	10 ml	10 ml	10 ml	10 ml	10 ml
Sample Collection Date /Received:	7/12/11 1335	7/12/11 1335	7/12/11 1352	7/12/11 1415	7/12/11 1415
Analysis Date:	7/16/2011	7/16/2011	7/16/2011	7/16/2011	7/16/2011
Vinyl chloride	1 U	1 U	1 U	1 U	11 (107.6 Rec.)
1,1-Dichloroethene	31	28	1 U	1	11 (101.6 % Rec.)
cis-1,2-Dichloroethene	93	86	2	1 U	12 (122.4 % Rec.)
Trichloroethene	10	10	1 U	1 U	11 (110.4 % Rec.)
1,4-Dichlorobenzene	1 U	1 U	1 U	1 U	11 (114.6 % Rec.)
1,2-Dichlorobenzene	1 U	1 U	1 U	1 U	11 (108.8 % Rec.)
Naphthalene	[redacted]	1 U	1 U	1 U	11 (106.2 % Rec.)
Field Laboratory Number:	[redacted]	TT071211-W18	TT071211-W19	TT071211-W20	TT071211-W21
Client Field Description:	CEF-003-P75-20	CEF-003-P75-30	CEF-003-N75-15	CEF-003-N75-25	CEF-003-N75-35
Matrix:	Water	Water	Water	Water	Water
Sample Size:	10 ml	10 ml	10 ml	10 ml	10 ml
Sample Collection Date /Received:	7/12/11 1425	7/12/11 1440	7/12/11 1535	7/12/11 1543	7/12/11 1558
Analysis Date:	7/16/2011	7/16/2011	7/16/2011	7/16/2011	7/16/2011
Vinyl chloride	1 U	1 U	1 U	1 U	1
1,1-Dichloroethene	47	40	15	4	34
cis-1,2-Dichloroethene	120	91	39	7	160
Trichloroethene	6	19	2	1 U	1 U
1,4-Dichlorobenzene	1 U	1 U	1 U	1 U	1
1,2-Dichlorobenzene	17	1 U	1 U	3	76
Naphthalene	7	1 U	1 U	1	11
Field Laboratory Number:	[redacted]	TT071211-W23	TT071211-W24	TT071211-W25	TT071211-W26
Client Field Description:	CEF-003-N75-10	CEF-003-N75-20	CEF-003-N75-30	CEF-003-P50-15	CEF-003-P50-25
Matrix:	Water	Water	Water	Water	Water
Sample Size:	10 ml	10 ml	10 ml	10 ml	10 ml
Sample Collection Date /Received:	7/12/11 1615	7/12/11 1625	7/12/2011 1650	7/13/2011 0800	7/13/2011 0820
Analysis Date:	7/16/2011	7/16/2011	7/16/2011	7/16/2011	7/16/2011
Vinyl chloride	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethene	11	4	7	64	40
cis-1,2-Dichloroethene	23	5	12	130	110
Trichloroethene	1 U	1 U	1 U	1 U	1 U
1,4-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U
1,2-Dichlorobenzene	1 U	1 U	4	36	21
Naphthalene	1 U	1 U	2	21	6

U = Indicates that the compound was analyzed for but not detected at the quantitation limit. The value associated with the qualifier shall be the method detection limit.
J = Estimated value due to sample response greater than calibration curve AND/OR due to sample carryover inorder to see 1 ppb D.L. for vinyl chloride regardless of other compounds present.

Analytical Laboratories of Florida: Laboratory Results

Site Project Name: SITE 3 NAS Cecil Field
Site Location: Jacksonville, Fl.
Client Name: TetraTech, Inc (Pittsburg office)
Client Contact: Robert Simcik (412-921-7090)
Analysis Methodology: EPA 8260 (subset)

Client Purchase Order Number:112G02413-CTO 25
Laboratory Project Name:TT071211
Laboratory Address: 166 Center Street, Suite 111
Cape Canaveral, Florida 32920
321-258-1355
Laboratory Contact: Dale Schamp

Field Chemist: Dale A. Schamp
Signature: [signature]
(Draft Copy unless Signature present.)
Date: 7/20/11
NELAC Certification Number: E83934

Target Compounds	Concentration Levels in Parts per Billion (ug/L or ug/Kg)				
Field Laboratory Number:	TT071211-W27	TT071211-W28	TT071211-W29	TT071211-W30	TT071211-W31
Client Field Description:	CEF-003-P50-35	CEF-003-P50-10	CEF-003-P50-20	CEF-003-WP02	CEF-003-P50-30
Matrix:	Water	Water	Water	Water	Water
Sample Size:	10 ml	10 ml	10 ml	10 ml	10 ml
Sample Collection Date /Received:	7/13/2011 0835	7/13/2011 0840	7/13/2011 0905	7/13/2011 0915	7/13/2011 0925
Analysis Date:	7/16/2011	7/16/2011	7/16/2011	7/16/2011	7/16/2011
Vinyl chloride	1 U	1 U	1 U	27	1 U
1,1-Dichloroethene	51	8	45	1 U	31
cis-1,2-Dichloroethene	140	15	83	1 U	120
Trichloroethene	6	1 U	1 U	1 U	1 U
1,4-Dichlorobenzene	1 U	1 U	1	1 U	1 U
1,2-Dichlorobenzene	1 U	1 U	54	10	13
Naphthalene	1 U	1 U	36	2	2
Field Laboratory Number:	TT071211-W32	TT071211-W32 Duplicate	TT071211-W33	TT071211-W34	TT071211-W35
Client Field Description:	CEF-003-31S	CEF-003-31S	CEF-003-N25-25	CEF-003-N25-35	CEF-003-N25-10
Matrix:	Water	Water	Water	Water	Water
Sample Size:	10 ml	10 ml	10 ml	10 ml	10 ml
Sample Collection Date /Received:	7/13/2011 0950	7/13/2011 0950	7/13/2011 1035	7/13/2011 1055	7/13/2011 1115
Analysis Date:	7/16/2011	7/16/2011	7/16/2011	7/16/2011	7/16/2011
Vinyl chloride	8	7	1 U	1 U	1 U
1,1-Dichloroethene	47	41	56	63	9
cis-1,2-Dichloroethene	140	130	170	190	23
Trichloroethene	1 U	1 U	1 U	1 U	1 U
1,4-Dichlorobenzene	1 U	1 U	1	3	1 U
1,2-Dichlorobenzene	48	46	73	160	1
Naphthalene	7	8	8	41	1
Field Laboratory Number:	TT071211-W36	TT071211-W37	TT071211-W38	TT071211-W39	TT071211-W40
Client Field Description:	CEF-003-N25-20	CEF-003-N25-30	CEF-003-N25-15	CEF-003-N100-15	CEF-003-N100-25
Matrix:	Water	Water	Water	Water	Water
Sample Size:	10 ml	10 ml	10 ml	10 ml	10 ml
Sample Collection Date /Received:	7/13/2011 1130	7/13/2011 1150	7/13/2011 1020	7/13/11 1300	7/13/11 1315
Analysis Date:	7/16/2011	7/16/2011	7/16/2011	7/16/2011	7/16/2011
Vinyl chloride	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethene	60	71	92	3	16
cis-1,2-Dichloroethene	220	240	270	15	33
Trichloroethene	1 U	1 U	1 U	1 U	1 U
1,4-Dichlorobenzene	1	2	1 U	1 U	1 U
1,2-Dichlorobenzene	71	100	20	2	9
Naphthalene	8	11	2	1 U	5

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Analytical Laboratories of Florida: Laboratory Results

Field Chemist: Dale A. Schamp
Signature: [redacted]
(Draft Copy unless Signature present.)
Date: 7/20/11
NELAC Certification Number: E83934

Site Project Name: SITE 3 NAS Cecil Field
Site Location: Jacksonville, Fl.
Client Name: TetraTech, Inc (Pittsburg office)
Client Contact: Robert Simcik (412-921-7090)
Analysis Methodology: EPA 8260 (subset)

Client Purchase Order Number:112G02413-CTO 25
Laboratory Project Name:TT071211
Laboratory Address: 166 Center Street, Suite 111
Cape Canaveral, Florida 32920
321-258-1355
Laboratory Contact: Dale Schamp

Target Compounds	Concentration Levels in Parts per Billion (ug/L or ug/Kg)				
Field Laboratory Number:	TT071211-W41	TT071211-W42	TT071211-W43	TT071211-W44	TT071211-W44 Spike
Client Field Description:	CEF-003-N100-20	CEF-003-P100-15	CEF-003-P100-25	CEF-003-P100-20	CEF-003-P100-20
Matrix:	Water	Water	Water	Water	Water & 10 ppb
Sample Size:	10 ml	10 ml	10 ml	10 ml	10 ml
Sample Collection Date /Received:	7/13/11 1330	7/13/11 1425	7/13/11 1440	7/13/11 1500	7/13/11 1500
Analysis Date:	7/16/2011	7/16/2011	7/16/2011	7/16/2011	7/16/2011
Vinyl chloride	1 U	1 U	1 U	1 U	10 (95.7 % Rec.)
1,1-Dichloroethene	8	1 U	1 U	1 U	9 (91.9 % Rec.)
cis-1,2-Dichloroethene	8	1 U	1 U	1 U	11 (105.9 % Rec.)
Trichloroethene	1 U	1 U	1 U	1 U	10 (97.0 % Rec.)
1,4-Dichlorobenzene	1 U	1 U	1 U	1 U	10 (102.6 % Rec.)
1,2-Dichlorobenzene	2	1 U	1 U	1 U	10 (97.0 % Rec.)
Naphthalene	3	1 U	1 U	1 U	10 (95.7 % Rec.)
Field Laboratory Number:	TT071211-W45	TT071211-W46	TT071211-W47	TT071211-W48	TT071211-W49
Client Field Description:	CEF-003-P100-30	CEF-003-P25-15	CEF-003-P25-25	CEF-003-P25-10	CEF-003-P25-20
Matrix:	Water	Water	Water	Water	Water
Sample Size:	10 ml	10 ml	10 ml	10 ml	10 ml
Sample Collection Date /Received:	7/13/11 1515	7/13/11 1545	7/13/11 1600	7/13/11 1615	7/13/11 1625
Analysis Date:	7/16/2011	7/16/2011	7/16/2011	7/16/2011	7/16/2011
Vinyl chloride	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethene	2	70	52	5	44
cis-1,2-Dichloroethene	1	180	160	13	78
Trichloroethene	1 U	1 U	1 U	1 U	2
1,4-Dichlorobenzene	1 U	1 U	2	1 U	2
1,2-Dichlorobenzene	1 U	25	100	1	85
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Client Field Description:	CEF-003-P25-30	CEF-003-P25R-20	CEF-003-P25R-30	CEF-003-P25R-40	CEF-003-P25R-40
Matrix:	Water	Water	Water	Water	Water
Sample Size:	10 ml	10 ml	10 ml	10 ml	10 ml
Sample Collection Date /Received:	7/13/11 1645	7/14/11 0808	7/14/11 0824	7/14/11 0840	7/14/11 0840
Analysis Date:	7/16/2011	7/16/2011	7/17/2011	7/17/2011	7/17/2011
Vinyl chloride	1	1 U	1 U	1 U	1 U
1,1-Dichloroethene	33	38	41	36	32
cis-1,2-Dichloroethene	120	69	110	110	99
Trichloroethene	1 U	2	1 U	1 U	1 U
1,4-Dichlorobenzene	1	2	1 U	1 U	1 U
1,2-Dichlorobenzene	65	69	46	3	3
Naphthalene	15	56	13	2	1

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Analytical Laboratories of Florida: Laboratory Results

Site Project Name: SITE 3 NAS Cecil Field
Site Location: Jacksonville, Fl.
Client Name: TetraTech, Inc (Pittsburg office)
Client Contact: Robert Simcik (412-921-7090)
Analysis Methodology: EPA 8260 (subset)

Client Purchase Order Number:112G02413-CTO 25
Laboratory Project Name:TT071211
Laboratory Address: 166 Center Street, Suite 111
Cape Canaveral, Florida 32920
321-258-1355
Laboratory Contact: Dale Schamp

Field Chemist: Dale A. Schamp
Signature: Dale A Schamp
(Draft Copy unless Signature present.)
Date: 7/20/11
NELAC Certification Number: E83934

Target Compounds	Concentration Levels in Parts per Billion (ug/L or ug/Kg)				
Field Laboratory Number:	TT071211-W54	TT071211-W55	TT071211-W56	TT071211-W57	TT071211-W58
Client Field Description:	CEF-003-P25R-15	CEF-003-P25R-25	CEF-003-P25R-35	CEF-003-N50-10	CEF-003-N50-20
Matrix:	Water	Water	Water	Water	Water
Sample Size:	10 ml	10 ml	10 ml	10 ml	10 ml
Sample Collection Date /Received:	7/14/11 0850	7/14/11 0900	7/14/11 0915	7/14/11 0952	7/14/11 0958
Analysis Date:	7/17/2011	7/17/2011	7/17/2011	7/17/2011	7/17/2011
Vinyl chloride	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethene	71	48	39	83	42
cis-1,2-Dichloroethene	190	140	77	210	170
Trichloroethene	1 U	1 U	1 U	1 U	1 U
1,4-Dichlorobenzene	1 U	2	1 U	1 U	1 U
1,2-Dichlorobenzene	40	83	47	1	41
Naphthalene	22	20	29	2	8
Field Laboratory Number:	TT071211-W59	TT071211-W60	TT071211-W61	TT071211-W62	TT071211-W63
Client Field Description:	CEF-003-N50-40	CEF-003-N50-25	CEF-003-N50-35	CEF-003-N75-45	CEF-003-P12-15
Matrix:	Water	Water	Water	Water	Water
Sample Size:	10 ml	10 ml	10 ml	10 ml	10 ml
Sample Collection Date /Received:	7/14/11 1010	7/14/11 1025	7/14/11 1040	7/14/11 1105	7/14/11 1220
Analysis Date:	7/17/2011	7/17/2011	7/17/2011	7/17/2011	7/17/2011
Vinyl chloride	1 U	1 U	1 U	1 U	9
1,1-Dichloroethene	40	40	78	12	54
cis-1,2-Dichloroethene	82	140	220	32	140
Trichloroethene	1 U	1 U	1 U	1 U	1 U
1,4-Dichlorobenzene	1 U	1 U	3	10 U	10 U
1,2-Dichlorobenzene	36	48	130	16	4
Naphthalene	28	6	16	5	3
Field Laboratory Number:	TT071211-W64	TT071211-W65	TT071211-W66	TT071211-W67	TT071211-W68
Client Field Description:	CEF-003-P12-25	CEF-003-P12-20	CEF-003-N12-15	CEF-003-N12-25	CEF-003-N12-20
Matrix:	Water	Water	Water	Water	Water
Sample Size:	10 ml	10 ml	10 ml	10 ml	10 ml
Sample Collection Date /Received:	7/14/11 1228	7/14/11 1235	7/14/11 1250	7/14/11 1300	7/14/11 1305
Analysis Date:	7/17/2011	7/17/2011	7/17/2011	7/17/2011	7/17/2011
Vinyl chloride	27	18	11	24	17
1,1-Dichloroethene	36	37	52	49	45
cis-1,2-Dichloroethene	100	91	180	210	190
Trichloroethene	1 U	1 U	1 U	1 U	1 U
1,4-Dichlorobenzene	3	2	1 U	2	3
1,2-Dichlorobenzene	120	15	35	110	130
Naphthalene	37	49	18	16	26

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Analysis Methodology: EPA 8260 (subset)

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Laboratory Contact: Dale Schamp

Field Chemist: Dale A. Schamp
Signature: Dale A Schamp
(Draft Copy unless Signature present.)
Date: 7/20/11
NELAC Certification Number: E83934

Target Compounds	Concentration Levels in Parts per Billion (ug/L or ug/Kg)				
Field Laboratory Number:	TT071211-W69	[redacted]	TT071211-W70 Spike	[redacted]	[redacted]
Client Field Description:	CEF-003-L50-05	CEF-003-L50-15	CEF-003-L50-15	CEF-003-L50-25	CEF-003-L50-35
Matrix:	Water	Water	Water & 10 ppb	Water	Water
Sample Size:	10 ml	10 ml	10 ml	10 ml	10 ml
Sample Collection Date /Received:	7/14/11 1348	7/14/11 1407	7/14/11 1407	7/14/11 1418	7/14/11 1432
Analysis Date:	7/17/2011	7/17/2011	7/17/2011	7/17/2011	7/17/2011
Vinyl chloride	1 U	1 U	9 (90.6 % Rec.)	1 U	1 U
1,1-Dichloroethene	1 U	1 U	9 (91.7 % Rec.)	48	49
cis-1,2-Dichloroethene	5	1 U	12 (116.5 % Rec.)	45	72
Trichloroethene	1 U	1 U	10 (100.6 % Rec.)	100	6
1,4-Dichlorobenzene	1 U	1 U	10 (101.9 % Rec.)	1	2
1,2-Dichlorobenzene	8	1 U	10 (102.4 % Rec.)	100	75
Naphthalene	2	1 U	11 (110.7 % Rec.)	37	68
Field Laboratory Number:	TT071211-W73	TT071211-W74	TT071211-W74 Duplicate	TT071211-W75	N/A
Client Field Description:	CEF-003-L50-45	CEF-003-DWN25-2025	CEF-003-DWN25-2025	CEF-003-DWN25-0510	N/A
Matrix:	Water	Water	Water	Water	N/A
Sample Size:	10 ml	10 ml	10 ml	10 ml	N/A
Sample Collection Date /Received:	7/14/11 1452	7/14/11 1540	7/14/11 1540	7/14/11 1600	N/A
Analysis Date:	7/17/2011	7/17/2011	7/17/2011	7/17/2011	N/A
Vinyl chloride	1 U	74	66	52	N/A
1,1-Dichloroethene	1 U	1 U	1 U	1 U	N/A
cis-1,2-Dichloroethene	1	2	2	1 U	N/A
Trichloroethene	1 U	1 U	1 U	1 U	N/A
1,4-Dichlorobenzene	1 U	1 U	1 U	1 U	N/A
1,2-Dichlorobenzene	4	5	5	4	N/A
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Client Field Description:	N/A	N/A	N/A	N/A	N/A
Matrix:	N/A	N/A	N/A	N/A	N/A
Sample Size:	N/A	N/A	N/A	N/A	N/A
Sample Collection Date /Received:	N/A	N/A	N/A	N/A	N/A
Analysis Date:	N/A	N/A	N/A	N/A	N/A
Vinyl chloride	N/A	N/A	N/A	N/A	N/A
1,1-Dichloroethene	N/A	N/A	N/A	N/A	N/A
cis-1,2-Dichloroethene	N/A	N/A	N/A	N/A	N/A
Trichloroethene	N/A	N/A	N/A	N/A	N/A
1,4-Dichlorobenzene	N/A	N/A	N/A	N/A	N/A
1,2-Dichlorobenzene	N/A	N/A	N/A	N/A	N/A
Naphthalene	N/A	N/A	N/A	N/A	N/A

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Up Creek (Positive) 100 feet												
LocID	TCE	cis-1,2-DCE	1,1-DCE	VC	Napth	1,4 - DCB	1,2-DCB	DO (mg/L)	ORP	pH	Cond	Temp (°C)
CEF-003-P100-15	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.85	-62.2	6.76	264	26.85
CEF-003-P100-20	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.11	446	7.57	-157.8	27.55
CEF-003-P100-25	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.24	-133.8	7.43	429	27.5
CEF-003-P100-30	1 U	**1**	**2**	1 U	1 U	1 U	1 U	0.27	-156.3	7.35	432	28.3

Up Creek (Positive) 75 feet												
LocID	TCE	cis-1,2-DCE	1,1-DCE	VC	Napth	1,4 - DCB	1,2-DCB	DO (mg/L)	ORP	pH	Cond	Temp (°C)
CEF-003-P75-10	1 U	1 U	**1**	1 U	1 U	1 U	1 U	1.87	-24.3	6.8	308	24.87
CEF-003-P75-15	1 U	**58**	**24**	1 U	**2**	1 U	**4**	0.39	-94.7	7.19	313	27.96
CEF-003-P75-20	**6**	**120**	**47**	1 U	**7**	1 U	**17**	1.07	-32.4	6.68	273	25.77
CEF-003-P75-25	**6**	**81**	**27**	1 U	**1**	1 U	**3**	0.59	-57.2	6.98	320	25.7
CEF-003-P75-30	**19**	**91**	**40**	1 U	1 U	1 U	1 U	0.6	-52.3	7.15	393	27.62
CEF-003-P75-35	**10**	**93**	**31**	1 U	1 U	1 U	1 U	1.44	-48.7	7.35	404	27.98
CEF-003-P75-45	1 U	**2**	1 U	1 U	1 U	1 U	1 U	0.66	-117.9	7.74	492	28.21

Bold - Detected Values
Yellow Highlight - Value exceeds GCTL
Blue Highlight - Value exceeds SW Criteria
Orange Highlight - exceeds both SW and GCTL
Red Highlight - exceeds NADC

Criteria	GCTL (ug/L)	SW (ug/L)	NADC (ug/L)
TCE	3	80.7	300
cis-1,2-DCE	70	NA	700
1,1-DCE	7	3.2	70
VC	1	2.4	100
Napth	14	26	140
1,4- DCB	75	3	7,500
1,2- DCB	600	99	6,000

Up Creek (Positive) 50 feet

LocID	TCE	cis-1,2-DCE	1,1-DCE	VC	Napth	1,4 - DCB	1,2-DCB	DO (mg/L)	ORP	pH	Cond	Temp (°C)
CEF-003-P50-10	1 U	**15**	**8**	1 U	1 U	1 U	1 U	1.14	-51.3	6.4	299	26.03
CEF-003-P50-15	1 U	**130**	**64**	1 U	**21**	1 U	**36**	2.22	-43.7	-22.74	144	22.65
CEF-003-P50-20	1 U	**83**	**45**	1 U	**36**	**1**	**54**	0.78	-31.1	6.31	183	26.7
CEF-003-P50-25	1 U	**110**	**40**	1 U	**6**	1 U	**21**	0.64	-46	6.49	265	21.65
CEF-003-P50-30	1 U	**120**	**31**	1 U	**2**	1 U	**13**	0.33	-67.1	7	329	26.82
CEF-003-P50-35	**6**	**140**	**51**	1 U	1 U	1 U	1 U	0.99	-63.3	6.95	274	24.47

UP Creek (Posi

LocID	TCE	cis-1,2-DCE	1,1-DCE	VC	Napth	1,4 - DCB	1,2-DCB	DO (mg/L)	ORP	pH	Cond	Temp (°C)
CEF-003-P25-10	1 U	**13**	**5**	1 U	1 U	1 U	**1**	0.65	-61.9	6.64	278	31.12
CEF-003-P25-15	1 U	**180**	**70**	1 U	**15**	1 U	**25**	0.3	-38.7	6.1	16.3	27.4
CEF-003-P25-20	**2**	**78**	**44**	1 U	**70**	**2**	**85**	0.3	-22.6	6.09	228	31.5
CEF-003-P25-25	1 U	**160**	**52**	1 U	**22**	**2**	**100**	0.25	-48.6	6.33	217	27.5
CEF-003-P25-30	1 U	**120**	**33**	**1**	**15**	**1**	**65**	0.36	-9.49	6.84	208	31.02

itive) 25 feet

LocID	TCE	cis-1,2-DCE	1,1-DCE	VC	Napth	1,4 - DCB	1,2-DCB	DO (mg/L)	ORP	pH	Cond	Temp (°C)
CEF-003-P25R-15	1 U	**190**	**71**	1 U	**22**	1 U	**40**	0.53	59.7	6	175	24.91
CEF-003-P25R-20	**2**	**69**	**38**	1 U	**56**	**2**	**69**	0.26	112.1	5.92	710	23.83
CEF-003-P25R-25	1 U	**140**	**48**	1 U	**20**	**2**	**83**	0.16	91.2	5.72	208	24.88
CEF-003-P25R-30	1 U	**110**	**41**	1 U	**13**	1 U	**46**	0.15	64.2	6.16	252	24.14
CEF-003-P25R-35	1 U	**77**	**39**	1 U	**29**	1 U	**47**	0.13	49.8	6.26	238	25.27
CEF-003-P25R-40	1 U	**110**	**36**	1 U	**2**	1 U	**3**	0.15	-1	6.43	377	25.05

UP Creek (Positive) 12 feet

LocID	TCE	cis-1,2-DCE	1,1-DCE	VC	Napth	1,4 - DCB	1,2-DCB	DO (mg/L)	ORP	pH	Cond	Temp (°C)
CEF-003-P12-15	1 U	**140**	**54**	**9**	**3**	10 U	**4**	0.41	-22.6	7.6	198	29.38
CEF-003-P12-20	1 U	**91**	**37**	**18**	**49**	**2**	**15**	0.36	162.5	3.59	216	26.83
CEF-003-P12-25	1 U	**100**	**36**	**27**	**37**	**3**	**120**	0.44	49.6	5.6	182	27.04

Original Location

LocID	TCE	cis-1,2-DCE	1,1-DCE	VC	Napth	1,4 - DCB	1,2-DCB	DO (mg/L)	ORP	pH	Cond	Temp (°C)
CEF-003-POO-05	1 U	1	1 U	1 U	2	1 U	1 U	8.99	1.7	5.92	223	26.19
CEF-003-POO-10	1 U	110	36	1	1 U	1 U	1 U	1.26	14.9	5.86	167	25
CEF-003-POO-15	1 U	170	54	43	10	1 U	7	0.33	16.1	5.8	197	23.87
CEF-003-POO-20	1 U	17	1	150	36	2	62	0.72	7.8	6.14	202	25.62
CEF-003-POO-25	1 U	140	27	76	17	2	100	0.27	-10.9	6.29	237	23.9
CEF-003-POO-30	1 U	150	38	1 U	25	2	120	0.33	2.4	6.39	203	26.14
CEF-003-POO-35	1 U	110	39	1 U	23	1	64	0.25	14.1	5.9	203	24.59
CEF-003-POO-40	1 U	58	24	1 U	8	1 U	12	0.88	-43.9	6.89	381	27.88
CEF-003-POO-45	1 U	1	1 U	1 U	1	1 U	1	0.33	-206.8	7.3	520	26.65
CEF-003-POO-50	1 U	1 U	1 U	1 U	3	1 U	1	0.62	-177.6	7.51	538	27.6

Down Creek (Negative) 12 feet

LocID	TCE	cis-1,2-DCE	1,1-DCE	VC	Napth	1,4 - DCB	1,2-DCB	DO (mg/L)	ORP	pH	Cond	Temp (°C)
CEF-003-N12-15	1 U	180	52	11	18	1 U	35	0.55	174.6	3.48	226	29.15
CEF-003-N12-20	1 U	190	45	17	26	3	130	0.29	160.5	4.17	272	28.32
CEF-003-N12-25	1 U	210	49	27	16	2	110	0.39	155.5	4.04	278	28.23

LocID	TCE	cis-1,2-DCE	1,1-DCE	VC	Napth	1,4 - DCB	1,2-DCB	DO (mg/L)	ORP	pH	Cond	Temp (°C)
CEF-003-SW-POO	1 U	1 U	1 U	1 U	1 U	1 U	1 U	---	---	---	---	---
CEF-003-WP02	1 U	1 U	1 U	27	2	1 U	10	5.86	-61.8	6.95	250	24.57
CEF-003-31S	1 U	140	47	8	7	1 U	48	0.39	-62.4	6.55	243	22.74
CEF-003-L50-05	1 U	5	1 U	1 U	2	1 U	8	2.4	49.5	7.28	233	28.25
CEF-003-L50-15	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.15	49.9	6.7	203	28.72
CEF-003-L50-25	100	45	48	1 U	37	1	100	0.39	120.7	5.7	229	32.33
CEF-003-L50-35	6	72	49	1 U	68	2	75	0.41	111.2	5.68	168	27.83
CEF-003-L50-45	1 U	1	1 U	1 U	8	1 U	4	0.17	170.4	5.26	446	28.38

Down Creek (Negative) 25 feet												
LocID	TCE	cis-1,2-DCE	1,1-DCE	VC	Napth	1,4 - DCB	1,2-DCB	DO (mg/L)	ORP	pH	Cond	Temp (°C)
CEF-003-N25-10	1 U	**23**	**9**	1 U	**1**	1 U	**1**	0.14	-50.4	6.56	205	27.81
CEF-003-N25-15	1 U	**270**	**92**	1 U	**2**	1 U	**20**	0.45	-46.2	6.51	219	28.76
CEF-003-N25-20	1 U	**220**	**60**	1 U	**8**	**1**	**71**	0.43	-43.9	5.68	284	28.87
CEF-003-N25-25	1 U	**170**	**56**	1 U	**8**	**1**	**73**	0.15	-63.2	6.64	283	31.71
CEF-003-N25-30	1 U	**240**	**71**	1 U	**11**	**2**	**100**	0.38	-42.4	6.44	242	29.59
CEF-003-N25-35	1 U	**190**	**63**	1 U	**41**	**3**	**160**	0.42	-43.1	6.13	158	28.21

Down Creek (Negative) 50 feet												
LocID	TCE	cis-1,2-DCE	1,1-DCE	VC	Napth	1,4 - DCB	1,2-DCB	DO (mg/L)	ORP	pH	Cond	Temp (°C)
CEF-003-N50-10	1 U	**210**	**83**	1 U	**2**	1 U	**1**	0.32	70.1	6.96	268	25.84
CEF-003-N50-20	1 U	**170**	**42**	1 U	**8**	1 U	**41**	0.3	73.4	6.14	298	24.97
CEF-003-N50-25	1 U	**140**	**40**	1 U	**6**	1 U	**48**	0.27	58	6.67	291	25.11
CEF-003-N50-35	1 U	**220**	**78**	1 U	**16**	**3**	**130**	0.15	21.8	6.55	212	25.95
CEF-003-N50-40	1 U	**82**	**40**	1 U	**28**	1 U	**36**	0.13	84.9	5.33	204	25.48

LocID	TCE	cis-1,2-DCE	1,1-DCE	VC	Napth	1,4 - DCB	1,2-DCB	DO (mg/L)	ORP	pH	Cond	Temp (°C)
CEF-003-DWN25-2025	1 U	**2**	1 U	**74**	1 U	1 U	**5**	0.31	131.5	5.66	338	25.64
- PZ Wells -												
CEF-003-DWN25-0510	1 U	1 U	1 U	**52**	1 U	I U	**4**	2.51	98.5	7.4	351	28.96

Down Creek (Negative) 75 feet

LocID	TCE	cis-1,2-DCE	1,1-DCE	VC	Napth	1,4 - DCB	1,2-DCB	DO (mg/L)	ORP	pH	Cond	Temp (°C)
CEF-003-N75-10	1 U	**23**	**11**	1 U	1 U	1 U	1 U	0.26	-26.1	7.11	228	25.92
CEF-003-N75-15	**2**	**39**	**15**	1 U	1 U	1 U	1 U	0.99	-41.3	7.41	296	24.17
CEF-003-N75-20	1 U	**5**	**4**	1 U	1 U	1 U	1 U	0.58	-22.1	7.29	374	25.59
CEF-003-N75-25	1 U	**7**	**4**	1 U	**1**	1 U	**3**	0.84	-9.3	6.73	349	25.8
CEF-003-N75-30	1 U	**12**	**7**	1 U	**2**	1 U	**4**	0.43	-121.7	6.96	364	26.22
CEF-003-N75-35	1 U	**160**	**34**	**1**	**11**	**1**	**76**	0.8	-86.3	7.01	313	27.35
CEF-003-N75-45	1 U	**32**	**12**	1 U	**5**	10 U	**16**	0.23	45.2	7.1	454	26

Down Creek (Negative) 100 feet

LocID	TCE	cis-1,2-DCE	1,1-DCE	VC	Napth	1,4 - DCB	1,2-DCB	DO (mg/L)	ORP	pH	Cond	Temp (°C)
CEF-003-N100-15	1 U	**15**	**3**	1 U	1 U	1 U	**2**	0.98	-60.5	7.28	362	24.73
CEF-003-N100-20	1 U	**8**	**8**	1 U	**3**	1 U	**2**	0.48	-82.7	7.31	362	24.97
CEF-003-N100-25	1 U	**33**	**16**	1 U	**5**	1 U	**9**	0.6	-84.2	6.95	296	24.57

PERSONNEL: R. SIMCIK, K. WEICHERT (TENUS)

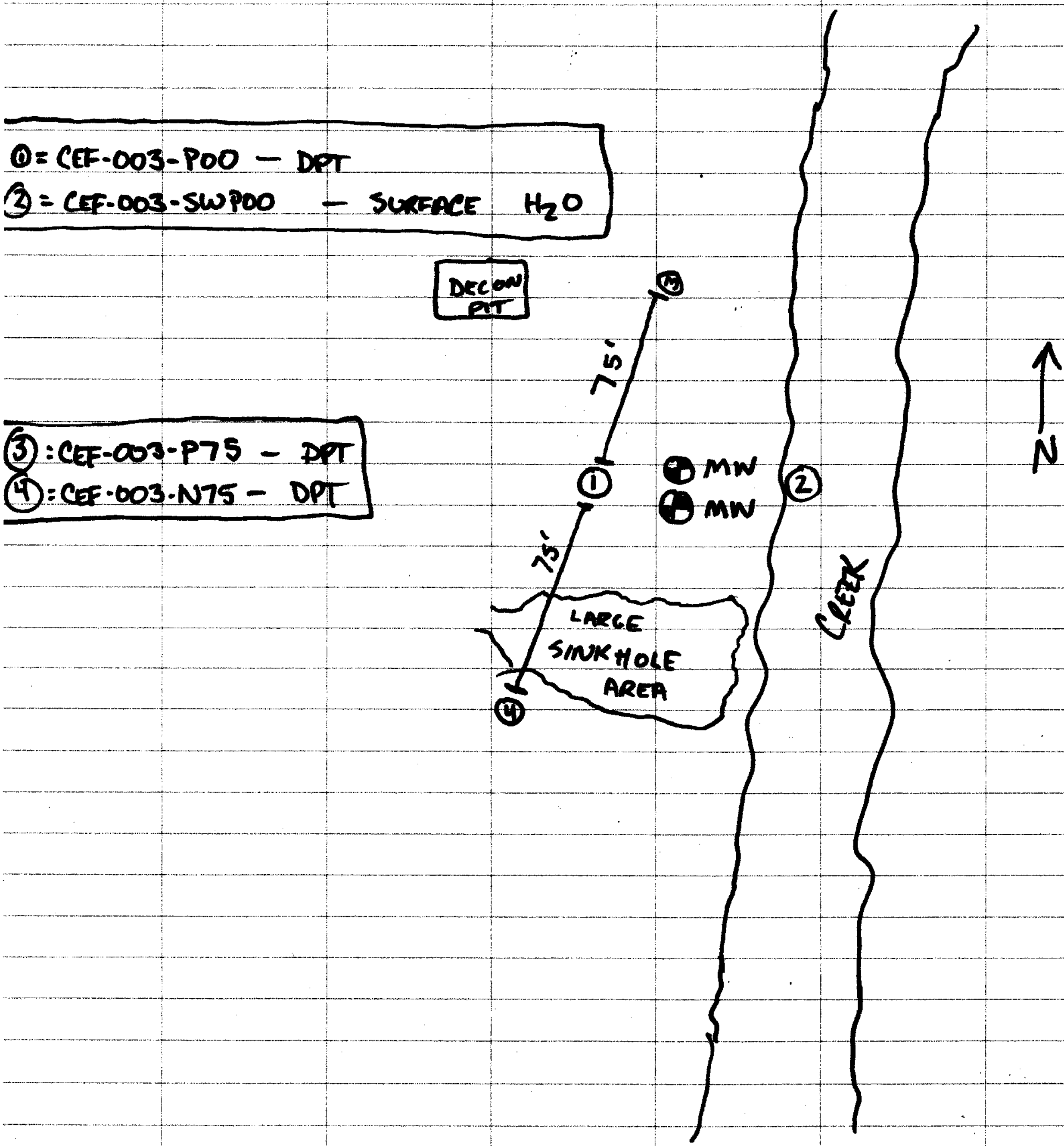
TRUCK: 2001 F-250, RENTAL
PPE: LEVEL "D"
WEATHER: HOT, HUMID, 90°, SUNNY, SCATTERED CLOUDS
OBJECTIVE: BEGIN DPT GW SAMPLING AT SITE 3

0540 KW AT TENUS OFFICE LOADING EQUIPMENT FOR TODAY'S WORK
0605 KW DEPARTS TENUS OFFICE FOR NAS CECIL FIELD - WILL STOP FOR FUEL ON THE WAY
0645 KW ARRIVES AT CECIL FIELD
0650 RS ON SITE - KW + RS AWAIT FOR DRILLERS
0710 DRILLERS ON SITE - KW CONDUCTS SITE H+S MEETING
0735 CREW DEPARTS FOR SITE 3
0750 CREW ON SITE - BEGINS SETTING UP
0815 CREW SETS UP ON LOCATION P00 - BEGINS DRIVING RODS
0830 CEF-003-P00-05 COLLECTED - RELATIVLEY CLEAR H_2O
pH: 5.92 temp: 26.19° C
CONDUCT: 223 uS/cm DO: 8.79 mg/L
ORP: 1.7
0840 CEF-003-P00-15 COLLECTED - GREY H_2O
pH: 5.80 TEMP: 23.87°C
COND: 197 uS/cm DO: 0.33 mg/L
ORP: 16.1
0851 CEF-003-P00-25 COLLECTED - GREY H_2O
pH: 6.29 TEMP: 23.90°C
COND: 237 uS/cm DO: 0.27 mg/L
ORP: -10.9
0909 CEF-003-P00-35 COLLECTED - GREY H_2O
pH: 5.90 TEMP: 24.59 °C
COND: 203 uS/cm DO: 0.25 mg/L
ORP: 14.1
0935 CEF-003-P00-45 COLLECTED - GREY H_2O - HARD PUSHING 35'.
pH: 7.30 TEMP: 26.65 °C
COND: 520 uS/cm DO: 0.33 mg/L
ORP: -206.8
0940 - CREW BEGINS SETTING UP DECON PIT. - DALE ON SITE WITH MOBILE LAB, BEGINS RUNNING SAMPLES

[signature]

WHILE CREW IS DECONNING, KW + RS BEGIN COLLECTING CEF-003-SWP00, IN CREEK DUE EAST OF DPT P00

1005 CEF-003-SWP00 COLLECTED



DECON OF ALL SCREENS AND RODS COMPLETED, CREW RETURNS TO CEF-003-P00 LOCATION FOR SECOND SET OF INTERVALS

*NOTE - ALL SAMPLES COLLECTED FROM 4' SCREEN. SAMPLE TUBING IS PLACED AT MIDPOINT OF SCREEN. SAMPLE NOMENCLATURE REFLECTS TUBING POSITION.
EXAMPLE: CEF-003-P00-35
- SCREENED INTERVAL IS 33'-37' WITH TUBING AT 35' BGS
- CREW BROUGHT MULTIPLE SAMPLING SCREENS. ALL RODS AND SCREENS ARE PULLED AFTER EACH SAMPLE, AND A NEW SCREEN IS THEN INSERTED FOR THE NEXT INTERV[redacted] CUTTING DOWN ON TOTAL DECO[redacted] TIME.

1035 CEF-003-P00-10 COLLECTED
pH: 5.86 TEMP: 25.00 °C
COND: 167 uS/cm DO: 1.26 mg/L
ORP: 14.9 COLOR: BROWN

1050 CEF-003-P00-20 COLLECTED
pH: 6.14 TEMP: 25.62 °C
COND: 202 uS/cm D.O. 0.72 mg/L
ORP: 7.8 COLOR: MILKY WHITE / GREY

1101 CEF-003-P00-30 COLLECTED
pH: 6.39 TEMP: 26.14 °C
COND: 203 uS/cm D.O.: 0.33
ORP: 2.4 COLOR: GREY

1115 CEF-003-P00-40 COLLECTED
pH: 6.89 TEMP: 27.88 °C
COND: 381 uS/cm D.O.: 0.88 mg/L
ORP: -43.9 COLOR: DARK GREY
- LOTS OF AIRPLANE TRAFFIC OVER SITE

1140 CEF-003-P00-50 COLLECTED
pH: 7.51 TEMP: 27.60 °C
COND: 538 uS/cm D.O.: 0.62 mg/L
ORP: -177.6 COLOR: LT. GREY

1200 CREW DEPARTS SITE FOR LUNCH BREAK
1240 CREW BACK ON SITE - BEGINS DECON OF SCREENS AND RODS

CREW SETS UP ON LOCATION CEF-003-P75
- BASED ON MOST CURRENT LAB RESULTS, CREW WILL CUT DOWN ON SOME INTERVALS WHERE APPLICABLE

1310 CEF-003-P75-15 COLLECTED
pH: 7.19 TEMP 27.96 °C
COND: 313 us/cm DO 0.39 mg/L
ORP: -94.7 COLOR: BROWN

1320 CEF-003-P75-25 COLLECTED
pH: 6.98 TEMP: 25.70 °C
COND: 320 us/cm DO 0.59 mg/L
ORP: -57.2 COLOR: LT. GREY

1335 CEF-003-P75-35 COLLECTED
pH: 7.35 TEMP: 27.98 °C
COND: 404 us/cm DO: 1.44 mg/L
ORP: -48.7 COLOR: LT GREY

1352 CEF-003-P75-45
pH: 7.74 TEMP: 28.21 °C
COND: 492 us/cm DO: 0.66 mg/L
ORP: -117.9 COLOR: GREY

1415 CEF-003-P75-10 COLLECTED
pH: 6.80 TEMP: 24.87 °C
COND: 308 us/cm DO: 1.87 mg/L
ORP: -24.3 COLOR: BROWN

1425 CEF-003-P75-20 COLLECTED
pH: 6.68 TEMP: 25.77 °C
COND: 273 us/cm DO: 1.07 mg/L
ORP: -32.4 COLOR: LT. GREY

1440 CEF-003-P75-30
pH: 7.15 TEMP: 27.62 °C
COND: 393 us/cm DO: 0.60 mg/L
ORP: -52.3 COLOR: GREY

1450 DRILLERS TAKE SHORT BREAK TO COOL DOWN
1505 CREW BEGINS DECONTAMINATION OF RODS AND SCREENS

CREW MOVES TO LOCATION N75, AND BEGINS SETTING UP AND DRIVING RODS

1535 CEF-003-N75-15 COLLECTED
PH: 7.41 TEMP: 24.17 °C
COND: 296 uS/cm DO: 0.99 mg/L
ORP: -41.3 COLOR: BROWN

1543 CEF-003-N75-25 COLLECTED
pH: 6.73 TEMP: 25.80 °C
COND: 349 uS/cm DO: 0.84 mg/L
ORP: -9.3 COLOR: LT GREY

1558 CEF-003-N75-35 COLLECTED
pH: 7.01 TEMP: 27.35 °C
COND: 313 uS/cm DO: 0.80 mg/L
ORP: -86.3 COLOR: GREY

1615 CEF-003-N75-10 COLLECTED
pH: 7.29 TEMP: 25.59 °C
COND: 374 uS/cm DO: 0.58 mg/L
ORP: -22.1 COLOR: GREY

1625 CEF-003-N75-20 COLLECTED
pH: 7.11 TEMP: 25.92 °C
COND: 228 uS/cm DO: 0.26 mg/L
ORP: -26.1 COLOR: BROWN

READING SWITCH KW

1650 CEF-003-N75-30 COLLECTED
pH: 6.96 TEMP: 26.22 °C
COND: 364 uS/cm DO: 0.43 mg/L
ORP: -121.7 COLOR: GREY

1720 Secured site & departed

PERSONNEL: R. SIMCIK ; Z. SCRIBNER (TTNUS)
N. Bishop ; B. NAZWORTH (GWP)
VEHICLE: 2006 F-250
PPE: LEVEL "D"
WEATHER: Humid 84°F upon Arrival - Clear / DEPARTURE - SUNNY, Humid 92°F
OBJECTIVE: CONTINUED DPT GW SAMPLING AT SITE 3

0700 ZS + RS MEET NB + BN AT SITE 3 GATE
0715 TTNUS + GWP ONSITE AT SITE 3; RS HELD TAILGATE SAFETY MEETING + SPRAYED WORK AREA WITH BUG RETARDANT SPRAY.
0740 GWP BEGAN HAND AUGERING AND SET-UP AT LOCATION: CEF-003-P50

0800 CEF-003-P50-15 - COLLECTED
pH - 22.71 TEMP: 22.65
COND: 144 DO: 2.22
ORP: -43.7 COLOR: LT GRAY (DARK)

0820 CEF-003-P50-25 -- COLLECTED
pH = 6.49 TEMP = 21.65
COND = 265 DO = 0.64
ORP = -46.0 COLOR = LT. GRAY

0835 CEF-003-P50-35 -- COLLECTED
pH 6.95 TEMP 24.47
COND 274 DO 0.99
ORP -63.3 COLOR Lt. GRAY

0840 moved over 2.5' for collection of 10', 20', and 30' intervals
0840 - CEF-003-P50-10 -- COLLECTED
pH 6.40 TEMP 26.03
COND 299 DO 1.14
ORP -51.3 COLOR

0845 - BEGAN PURGING AT CEF-003-WP02-DPT
0905 CEF-003-P50-20 - COLLECTED
pH 6.31 TEMP 26.70
COND 183 DO 0.78
ORP -31.1 COLOR Lt. GRAY

ZS

7/13/11

0915 - CEF-003-WP02-DPT
pH: 6.95 TEMP: 24.57
COND: 250 DO: ~~6.86~~ 5.86
ORP: -61.8 TURB: 2.97

0925 - CEF-003-P50-30 -- COLLECTED
pH: 7.00 TEMP: 26.82
COND: 329 DO: 0.33
ORP: -67.1 COLOR: DK GRAY

0930 NB+BN BEGAN DECONTAMINATING/CLEANING DRILL RODS IN PREPAR TO MOBILIZE TO THE NEXT SAMPLE LOCATION; ZS SET UP SAMPLING EQUIPMENT AND BEGAN PURGING AT CEF-003-31S

0950 - CEF-003-31S - COLLECTED
pH: 6.55 TEMP: 22.71
COND: 243 DO: 6.39
ORP: -62.4 TURB: 3.03

1000 GWP BEGAN HANDAUGERING AND PUSHING AT CEF-003-N25

1020 - CEF-003-N25-15 -- COLLECTED
pH 6.51 TEMP 28.76
COND 219 DO 0.45
ORP -46.2 COLOR BROWN

1035 - CEF-003-N25-25 -- COLLECTED
pH 6.64 TEMP 31.71
COND 283 DO 0.15
ORP -63.2 COLOR LT. GRAY

1055 CEF-003-N25-35 -- COLLECTED
pH: 6.13 TEMP: 28.21
COND: 158 DO: 0.42
ORP: -43.1 COLOR: DK GRAY

1115 CEF-003-N25-10 -- COLLECTED
pH: 6.56 TEMP: 27.81
COND: 205 DO: 0.14
ORP: -50.4 COLOR: BROWN

1130 - CEF-003-N25-20 -- COLLECTED
pH: 5.68 TEMP: 26.87
COND: 284 DO: 0.43
ORP: -43.9 COLOR: LT. GRAY

1150 CEF-003-N25-30 -- COLLECTED
pH: 6.44 TEMP: 29.59
COND: 242 DO: 0.38
ORP: -42.4 COLOR: DK GRAY

[signature]

1200 - TT + GWP BROKE FROM FOR LUNCH
1235 - RESUMED DPT ACTIVITIES
1300 CEF-003-N100-15 -- COLLECTED
pH: 7.28 TEMP: 24.73
COND: 362 DO: 0.98
ORP: -60.5 COLOR: DK GRAY
1315 CEF-003-N100-25 -- COLLECTED
pH: 6.95 TEMP: 24.57
COND: 296 DO: 0.60
ORP: -84.2 COLOR: LT. GRAY
1330 CEF-003-N100-20 -- COLLECTED
pH: 7.31 TEMP: 24.97
COND: 362 DO: 0.40
ORP: -82.7 COLOR: LT. GRAY
1340 NB+BN (GWP) DECON'D RODS; CREW TOOK BREAK TO COOL DOWN
1405 - RESUMED WORK AT CEF-003-P100
1425 - CEF-003-P100-15 -- COLLECTED
pH: 6.76 TEMP: 26.85
COND: 264 DO: 0.85
ORP: -62.2 COLOR: BROWN
1440 - CEF-003-P100-25 -- COLLECTED
pH: 7.43 TEMP: 27.50
COND: 429 DO: 0.24
ORP: -133.8 COLOR: LT. GRAY
1500 CEF-003-P100-20 -- COLLECTED
pH: 7.57 TEMP: 27.53
COND: -157.8 DO: 0.11
ORP: 446 COLOR: LT. GRAY
1515 CEF-003-P100-30 -- COLLECTED
pH: 7.35 TEMP: 28.13
COND: 432 DO: 0.27
ORP: -156.3 COLOR: LT. GRAY
1545 CEF-003-P25-15 -- COLLECTED
pH: 6.16 TEMP: 27.40
COND: 163 DO: 0.30
ORP: -38.7 COLOR: LT. BROWN
1600 CEF-003-P25-25 -- COLLECTED
pH: 6.33 ORP: -48.6 DO: 0.25
COND: 217 TEMP: 27.29 COLOR: LT. GRAY

1615 - CEF-003-P25-10 -- COLLECTED
PH: 6.64 TEMP: 31.12
COND: 278 DO: 0.65
ORP: -61.9 COLOR: BROWN

1625 - CEF-003-P25-20 -- COLLECTED
PH 6.09 TEMP: 31.51
COND 228 DO: 0.30
ORP -22.6 COLOR: LT. GRAY

1645 CEF-003-P25-30 - COLLECTED
PH: 6.84 TEMP: 31.02
COND: 208 DO: 0.36
ORP: -9.49 COLOR: LT. GRAY

1655 CREW (GWP) BEGAN DECON'ING RODS AND SCREENS
1520 DEPARTED SITE; ZS DEPARTED FOR BLDG 536
1535 ZS ARRIVED AT BLDG 536 + EMPTIED PURGEWATER (IDW) INTO THE TOTE.

1600 ZS DEPARTED CECIL FIELD

ZS 7/13/06

Z. [illegible]

PERSONNEL: R. SIMCIK, K. WEICHERT (TENUS)
N. BISHOP, B. NAZWORTH (GWP)
VEHICLE: 2001 F-250, RENTAL
PPE: LEVEL "D"
WEATHER: HOT, HUMID, 90°, PARTLY CLOUDY - HEAT ADVISORY IN EFFECT ALL DAY WITH HEAT INDEX NEARING 110°F, POSSIBLE THUNDERSTORMS
OBJECTIVE: CONTINUE DPT GW SAMPLING AT SITE 3

0530 KW AT TENUS OFFICE LOADING EQUIPMENT FOR TODAY'S ACTIVITIES
0550 KW DEPARTS FOR NAS CECIL FIELD - WILL STOP FOR ICE ON THE WAY.
0635 KW AT FLIGHT TOWER PARKING LOT, AWAITING ARRIVAL OF CREW
0650 KW PHONES K. DOLLARHIDE TO INFORM HER THAT KW WILL ESCORT DRILLERS THROUGH GATE 37 TO OBTAIN H_2O FOR DRILL RIG - KD OKS THIS.
0700 NB+BZ AT TOWER - KW ESCORTS THEM THROUGH GATE 37 TO HYDRANT
0705 RS AT TOWER
0710 DRILLERS FULL OF H_2O, ALL CREW HEADS TO SITE 3, AND BEGINS SETTING UP.

0755 CREW SETS UP ON LOCATION P25, AND BEGINS DRILLING

0808 CEF-003-P25R-20 COLLECTED
pH: 5.92 TEMP: 23.83 °C
COND: 710 uS/cm DO: 0.26 mg/L
ORP: 112.1 COLOR: GREY
- SAMPLE OF SAME ID COLLECTED FOR FIXED BASE LAB
0824 CEF-003-P25R-30 COLLECTED
pH: 6.16 TEMP: 25.14 °C
COND: 252 uS/cm DO: 0.15 mg/L
ORP: 64.2 COLOR: GREY
- SAMPLE OF SAME ID COLLECTED FOR FIXED BASE LAB
0840 CEF-003-P25R-40 COLLECTED
pH: 6.43 TEMP: 25.05 °C
COND: 377 uS/cm DO: 0.15 mg/L
ORP: -1.0 COLOR: GREY

KDW

K. W[signature]

US NAVY: 112600378 DPT GW SAMPLING 7-14-11

0850 CEF-003-P25R-15 COLLECTED
pH: 6.00 TEMP: 24.91 °C
COND: 175 us/cm DO: 0.53 mg/L
ORP: 59.7 COLOR: GREY

0900 CEF-003-P25R-25 COLLECTED
pH: 5.72 TEMP: 24.88 °C
COND: 208 us/cm DO: 0.16 mg/L
ORP: 91.2 COLOR: GREY

0915 CEF-003-P25R-35 COLLECTED
pH: 6.26 TEMP: 25.27 °C
COND: 238 us/cm DO: 0.13 mg/L
ORP: 49.8 COLOR: GREY

0920 CREW BEGINS DECONTAMINATING RODS + SCREENS
CREW SETS UP ON LOCATION N50

0952 CEF-003-N50-10 COLLECTED
pH: 6.96 TEMP: 25.84 °C
COND: 268 us/cm DO: 0.32 mg/L
ORP: 70.1 COLOR: BROWN

0958 CEF-003-N50-20 COLLECTED
pH: 6.14 TEMP: 24.97 °C
COND: 298 us/cm DO: 0.30 mg/L
ORP: 73.4 COLOR: GREY

1010 CEF-003-N50-40 COLLECTED
pH: 5.33 TEMP: 25.48 °C
COND: 204 us/cm DO: 0.13 mg/L
ORP: 84.9 COLOR: GREY

1025 CEF-003-N50-25 COLLECTED
pH: 6.67 TEMP: 25.11 °C
COND: 291 us/cm DO: 0.27 mg/L
ORP: 58.0 COLOR: GREY

1040 CEF-003-N50-35 COLLECTED
pH: 6.55 TEMP: 25.95 °C
COND: 212 us/cm DO: 0.15 mg/L
ORP: 21.8 COLOR: GREY

1045 - CREW MOVES TO LOCATION N75

1105 CEF-003-N75-45 COLLECTED
pH: 7.10 TEMP: 26.00 °C
COND: 454 us/cm DO: 0.23 mg/L
ORP: 45.2 COLOR: GREY

US NAVY: 112G00378 DPT GW SAMPLING 7-14-11

1115 CREW BREAKS FOR LUNCH
1205 CREW BACK ON SITE DECONTAMINATING RODS + SCREENS
CREW MOVES TO LOCATION P12

1220 CEF-003-P12-15 COLLECTED
pH: 7.60 TEMP: 29.38 °C
COND: 198 uS/cm D.O.: 0.41 mg/L
ORP: -22.6 COLOR: GREY

1228 CEF-003-P12-25 COLLECTED
pH: 5.60 TEMP: 27.04 °C
COND: 182 uS/cm D.O.: 0.44 mg/L
ORP: 49.6 COLOR: GREY

1235 CEF-003-P12-20 COLLECTED
pH: 3.59 TEMP: 26.83 °C
COND: 216 uS/cm D.O. 0.36 mg/L
ORP: 162.5 COLOR: WHITE/ LT GREY

CREW MOVES TO LOCATION N12

1250 CEF-003-N12-15 COLLECTED
pH: 3.48 TEMP: 29.15 °C
COND: 226 uS/cm D.O.: 0.55 mg/L
ORP: 174.6 COLOR GREY

1300 CEF-003-N12-25 COLLECTED
pH: 4.04 TEMP: 28.23 °C
COND: 278 uS/cm D.O: 0.39 mg/L
ORP: 155.5 COLOR: GREY

1305 CEF-003-N12-20 COLLECTED:
pH: 4.17 TEMP: 28.32 °C
COND: 272 uS/cm DO: 0.29 mg/L
ORP: 160.5 COLOR: GREY

1330 CREW MOVES TO LOCATION L50

1348 CEF-003-L50-05 COLLECTED - LOW H_2O PRODUCTION
pH: 7.28 TEMP: 28.25 °C
COND: 233 uS/cm DO: 2.40 mg/L
ORP: 49.5 COLOR: BROWN

1407 CEF-003-L50-15 COLLECTED
pH: 6.70 TEMP: 28.72 °C
COND: 203 uS/cm DO: 0.15 mg/L
ORP: 49.9 COLOR: BROWN

KPW

[signature]

1418 CEF-003-L50-25 COLLECTED
pH: 5.70 TEMP: 32.33 °C
COND: 229 uS/cm DO: 0.39 mg/L
ORP: 120.7 COLOR: GREY

1432 CEF-003-L50-35 COLLECTED
pH: 5.68 TEMP: 27.83 °C
COND: 168 uS/cm DO: 0.41 mg/L
ORP: 111.2 COLOR: GREY

1452 CEF-003-L50-45 COLLECTED
pH: 5.26 TEMP: 28.38 °C
COND: 446 uS/cm DO: 0.17 mg/L
ORP: 170.4 COLOR: GREY

1500 DPT SAMPLING COMPLETE - CREW BEGINS FINAL DECON AND CLEAN UP.

1515 - KW + RS BEGIN SETTING UP ON DWN25 WELLS
- LIGHT RAIN STARTS

1540 CEF-003-DWN25-~~202~~ 2025-DPT COLLECTED
pH: 5.66 TEMP: 25.64 °C
COND: 338 uS/cm DO: 0.31 mg/L
ORP: 131.5 COLOR CLEAR
TURB: 14.86 - FIXED BASED LAB SAMPLE ALSO COLLECTED

1600 CEF-003-DWN25-0510-DPT COLLECTED
pH: 7.40 TEMP: 28.96 °C
COND: 351 uS/cm DO: 2.51 mg/L
ORP: 98.5 COLOR: CLEAR
TURB: 9.87 NTUS

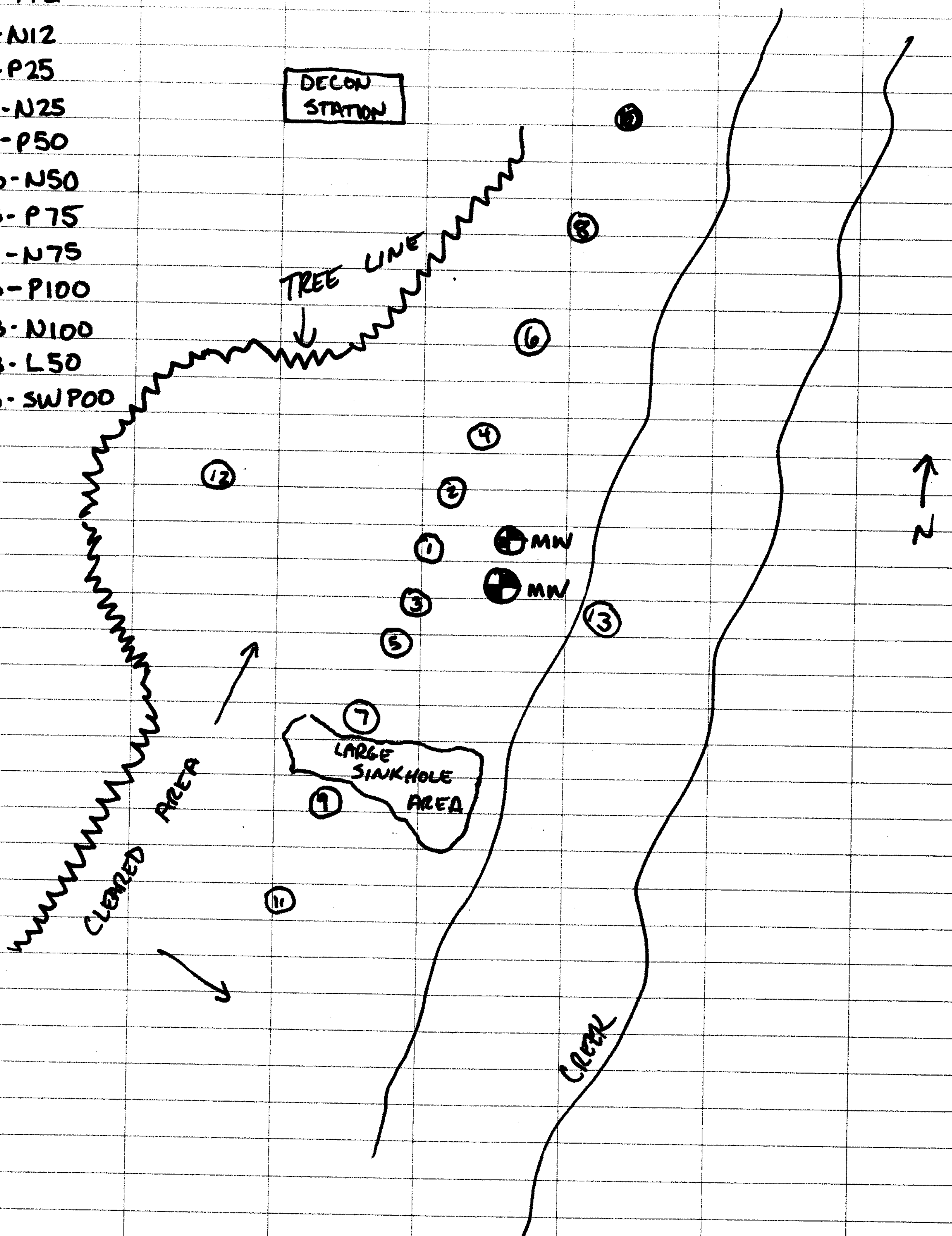
1700 - ALL CREW MEMBERS DEPART + SECURE SITE.
- SEE MAP ON NEXT PAGE FOR SAMPLE LOCATIONS

[redacted]

[illegible signature]

US NAVY: 112G00378 DPT GW SAMPLING 7-14-11

① CEF-003-P00
② CEF-003-P12
③ CEF-003-N12
④ CEF-003-P25
⑤ CEF-003-N25
⑥ CEF-003-P50
⑦ CEF-003-N50
⑧ CEF-003-P75
⑨ CEF-003-N75
⑩ CEF-003-P100
⑪ CEF-003-N100
⑫ CEF-003-L50
⑬ CEF-003-SWP00



[signature]

TETRA TECH NUS, INC. CHAIN OF CUSTODY | NUMBER 2235 | PAGE 1 OF 1

PROJECT NO: 112G00378	FACILITY: NAS CECIL FIELD	PROJECT MANAGER: BOB SIMCIK	PHONE NUMBER: 412-921-8163	LABORATORY NAME AND CONTACT: KAHTAHDIN ANALYTICAL
SAMPLERS (SIGNATURE): [signature]		FIELD OPERATIONS LEADER: BOB SIMCIK	PHONE NUMBER: 412-921-8163	ADDRESS: 95 HUTCHINS DR
		CARRIER/WAYBILL NUMBER:		CITY, STATE: PORTLAND, ME

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

CONTAINER TYPE PLASTIC (P) or GLASS (G): G
PRESERVATIVE USED: HCl
TYPE OF ANALYSIS: 8260B-SELECT VOCS *

DATE YEAR 2011	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	8260B-SELECT VOCS *							COMMENTS
7/14	0808	CEF-003-P25R-20				GW	G	3	3							-COOL TO 4°C
7/14	0824	CEF-003-P25R-30				GW	G	3	3							
7/14	1540	CEF-003-DWN25-2025-DPT				GW	G	3	3							
7/14	0000	TRIPBLANK				QC										-TRIPBLANK
7/14	0000	TEMPBLANK				QC										-TEMPBLANK

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY [signature]	7-15-11	1600	1. RECEIVED BY		
2. RELINQUISHED BY			2. RECEIVED BY		
3. RELINQUISHED BY			3. RECEIVED BY		

COMMENTS * - 1,1-DICHLOROETHENE, 1,2-DICHLOROBENZENE, 1,4-DICHLORDBENZENE, NAPHTHALENE, TCE, VINYL CHLORIDE, → CIS-1,2-DICHLOROETHENE

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R
FORM NO. TtNUS-001

Tetra Tech NUS, Inc.

DAILY ACTIVITIES RECORD

PROJECT NAME: Site 3 PROJECT NUMBER: 112600378

CLIENT: US NAVY LOCATION: Secil Fuel

DATE: 7-12-11 ARRIVAL TIME: 0700

Tt NUS PERSONNEL: K. Woelchert, R. Simsik DEPARTURE TIME: 1720

CONTRACTOR: GW Protection DRILLER:

ITEM	QUANTITY ESTIMATE	QUANTITY TODAY	PREVIOUS TOTAL QUANTITY	CUMULATIVE QUANTITY TO DATE
1 DAY DPT SAMP	3	1	6	1

COMMENTS:

APPROVED BY: [signature]

Tt NUS REPRESENTATIVE

[signature]

DRILLER

DATE: 7/12/11

Tetra Tech NUS, Inc.

DAILY ACTIVITIES RECORD

PROJECT NAME: Site 3
PROJECT NUMBER: 112G00 ~~387~~ 379
CLIENT: US Navy
LOCATION: Cecil Field
DATE: 07/13/11
ARRIVAL TIME: 0700
Tt NUS PERSONNEL: Z. Scribner/R. Simcik
DEPARTURE TIME: 1600
CONTRACTOR: GWP
DRILLER: Nick

ITEM	QUANTITY ESTIMATE	QUANTITY TODAY	PREVIOUS TOTAL QUANTITY	CUMULATIVE QUANTITY TO DATE
1 Day Samp ~~loc.~~	3	1	~~2~~ 1	2

COMMENTS:

APPROVED BY: [signature]

Tt NUS REPRESENTATIVE

[signature]

DRILLER

DATE: 7-13-11

Tetra Tech NUS, Inc.

DAILY ACTIVITIES RECORD

PROJECT NAME:	SITE 3 DPT	PROJECT NUMBER:	112G00378
CLIENT:	US NAVY	LOCATION:	CECIL
DATE:	7-14-11	ARRIVAL TIME:	0700
Tt NUS PERSONNEL:	R. SIMCIK, K. WEICHERT	DEPARTURE TIME:	1600
CONTRACTOR:	GW PROTECTION	DRILLER:	NICK

ITEM	QUANTITY ESTIMATE	QUANTITY TODAY	PREVIOUS TOTAL QUANTITY	CUMULATIVE QUANTITY TO DATE
1 DAY DPT SAMPLING	3	1	2	3

COMMENTS:

APPROVED BY: [signature]

Tt NUS REPRESENTATIVE

[signature]

DRILLER

DATE: 7-14-11

DAILY PROJECT SUMMARY

GROUNDWATER PROTECTION
A Division of DRILLPRO, LLC
Environmental & Geotechnical Drilling

DAILY PROJECT SUMMARY

CLIENT NAME: Tetra-Tech DRILLER: Nick Bishop RIG: 6620A

PROJECT NAME: Cecil Field Site 3 WORK ORDER #: 711008 DATE: 7/12/11

WELL/BORING #	DPT 1A	DPT 1B	DPT 2A	DPT 2B	DPT 3A	DPT 3B		
DIRECT PUSH								
Soil Sampling								
# of Samples								
Total Depth								
H_2O Samples SP15/Profiling								
# of Samples	5	5	4	[redacted] 3	3	3		
Total Depth	52'	47	52'	[redacted]	37	32		
DRILLING								
STP Footage / Sonic Sampling								
0-50' Below Land Surface								
50'-100' Below Land Surface								
100'+ Below Land Surface								
Total Spoons / Samples								
WELL / BOREHOLE ABANDONMENT	Backfill	—	—	—	—	—		
Diameter								
Depth								
Pad Removal								
WELL INFORMATION:								
Size								
Depth								
Screen Length								
SURFACE CASING / DUAL								
Size								
Depth								
Type:								
CAPS:								
LEP								
Slip Cap								
COVER:								
Flush Cover								
Above Grade Protector								
Bumper Post								
Bolt Down Cover								
WELL DEVELOPMENT TIME:								
Pumping								
STEAM CLEANING # HOURS:	10 min	10 min	10 min	10 min	10 min	10 min		
CLEAN-UP # HOURS:	1 hr	—	—	—	—	—		

To the best of my knowledge, the quantities indicated are correct, and I know of no injuries, loss of, or damage to equipment or near miss incidents that occurred during this project.

[illegible] — Signature of Client Field Representative

Rob Simcik — Printed Name of Client Field Representative

7/12/11 — Date Signed

GROUNDWATER PROTECTION
A Division of DRILLPRO, LLC
Environmental & Geotechnical Drilling

DAILY PROJECT SUMMARY

DAILY PROJECT SUMMARY

CLIENT NAME: Tetra - Tech
DRILLER: Nick Bishop
RIG: 6620A

PROJECT NAME: Cecil Field Site 3
WORK ORDER #: 711008
DATE: 7/12/11

OVERNIGHT: ☑ Yes ☐ No

CREW MEMBERS: Nick B
Bryan N

HOURS WORKED:
Time On Site: 700
Lunch: 12 - 1230
Time Off Site: 1720

MATERIALS USED / PURCHASED:

Sand		Riser	
Fine Sand		Screen	
Bentonite		Pre-Packed	
Portland		Manholes	
Concrete		Sample Tubing	1,000'
Locks		Exp. Points	24 spls
Cones		LEP	
Other		Other	

EQUIPMENT RENTAL:
Rental Company:
Equipment Rental: /
Rental Company: /
Equipment Rental: /
Reason: /
# of Days: /
Cost: /
Other:

DRUMS:
Drums Supplied /
Time Spent Relocating Drums On Site

MISCELLANEOUS:
Pavement Cutting (hrs.): /
Concrete Coring: /
Decontamination Structure:

STANDBY TIME:
Hour / Date / Time /
Reason /

DESCRIPTION OF SIGNIFICANT PROBLEMS / ADDITIONAL COMMENTS:
Mobed To site Day before, 7/11

To the best of my knowledge, the quantities indicated are correct, and I know of no injuries, loss of, or damage to equipment or near miss incidents that occurred during this project.

[signature] — Signature of Client Field Representative
Rob Simcik — Printed Name of Client Field Representative
7/12/11 — Date Signed

GROUNDWATER PROTECTION

DAILY PROJECT SUMMARY | **DAILY PROJECT SUMMARY**

A Division of DRILLPRO, LLC
Environmental & Geotechnical Drilling

CLIENT NAME: Tetra Tech DRILLER: Nick Bishop RIG: 6620A

PROJECT NAME: Cecil Field Site 3 WORK ORDER #: 711008 DATE: 7/13/11

WELL/BORING #	DPT4A	DPT4D	DPT5A	DPT5B	DPT6A	DPT6B	DPT7A	DPT7B	DPT8
DIRECT PUSH									
Soil Sampling									
# of Samples									
Total Depth									
H_2O Samples SP15/Profiling									
# of Samples	3	3	2	3	3	3	2	2	3
Total Depth	35'	30'	25'	30'	35'	30'	25'	30'	25'
DRILLING									
STP Footage / Sonic Sampling									
0-50' Below Land Surface									
50'-100' Below Land Surface									
100'+ Below Land Surface									
Total Spoons / Samples									
WELL / BOREHOLE ABANDONMENT	Backfill →								
Diameter									
Depth									
Pad Removal									
WELL INFORMATION:									
Size									
Depth									
Screen Length									
SURFACE CASING / DUAL									
Size									
Depth									
Type:									
CAPS:									
LEP									
Slip Cap									
COVER:									
Flush Cover									
Above Grade Protector									
Bumper Post									
Bolt Down Cover									
WELL DEVELOPMENT TIME:									
Pumping									
STEAM CLEANING # HOURS:	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	[illegible]
CLEAN-UP # HOURS:	1 hr →								

To the best of my knowledge, the quantities indicated are correct, and I know of no injuries, loss of, or damage to equipment or near miss incidents that occurred during this project.

K. W[illegible] — Signature of Client Field Representative

KEVIN WEICHERT — Printed Name of Client Field Representative

7-14-11 — Date Signed

DAILY PROJECT SUMMARY

GROUNDWATER PROTECTION
A Division of DRILLPRO, LLC
Environmental & Geotechnical Drilling

DAILY PROJECT SUMMARY

CLIENT NAME: Tetra-Tech
DRILLER: Nick Bishop
RIG: 6620A

PROJECT NAME: Cecil Field Site 3
WORK ORDER #: 711008
DATE: 7/13/11

OVERNIGHT: ☑ Yes ☐ No

CREW MEMBERS: Nick B
Bryan N

HOURS WORKED:
Time On Site: 700
Lunch: 12 - 1230
Time Off Site: 5 15

MATERIALS USED / PURCHASED:

Sand		Riser	
Fine Sand		Screen	
Bentonite		Pre-Packed	
Portland		Manholes	
Concrete		Sample Tubing	1000'
Locks		Exp. Points	24 28 15
Cones		LEP	
Other		Other	

EQUIPMENT RENTAL:
Rental Company: /
Equipment Rental:
Rental Company:
Equipment Rental:
Reason:
# of Days:
Cost:
Other:

DRUMS:
Drums Supplied /
Time Spent Relocating Drums On Site

MISCELLANEOUS:
Pavement Cutting (hrs.): /
Concrete Coring:
Decontamination Structure:

STANDBY TIME:
Hour / Date / Time /
Reason

DESCRIPTION OF SIGNIFICANT PROBLEMS / ADDITIONAL COMMENTS:

To the best of my knowledge, the quantities indicated are correct, and I know of no injuries, loss of, or damage to equipment or near miss incidents that occurred during this project.

[signature] — Signature of Client Field Representative
KEVIN WUECHERT — Printed Name of Client Field Representative
7-14-11 — Date Signed

DAILY PROJECT SUMMARY

GROUNDWATER PROTECTION
A Division of DRILLPRO, LLC
Environmental & Geotechnical Drilling

DAILY PROJECT SUMMARY

CLIENT NAME: Tetra Tech DRILLER: Dick Bishop RIG: 6620 D

PROJECT NAME: Cecil Field site 3 WORK ORDER #: 71008 DATE: 7/14/11

WELL/BORING #	DPT 9A	DPT 9B	DPT 10A	DPT 10B	DPT 11A	DPT 11B	DPT 12A	DPT 12B	DPT 13
DIRECT PUSH									
Soil Sampling									
# of Samples	3	3	3	3	2	1	2	1	5
Total Depth	35'	30'	35'	30'	25'	20'	25'	20'	45'
H_2O Samples SP15/Profiling									
# of Samples									
Total Depth									
DRILLING									
STP Footage / Sonic Sampling									
0-50' Below Land Surface									
50'-100' Below Land Surface									
100'+ Below Land Surface									
Total Spoons / Samples									
WELL / BOREHOLE ABANDONMENT	Backfill								
Diameter									
Depth									
Pad Removal									
WELL INFORMATION:									
Size									
Depth									
Screen Length									
SURFACE CASING / DUAL									
Size									
Depth									
Type:									
CAPS:									
LEP									
Slip Cap									
COVER:									
Flush Cover									
Above Grade Protector									
Bumper Post									
Bolt Down Cover									
WELL DEVELOPMENT TIME:									
Pumping									
STEAM CLEANING # HOURS:	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min
CLEAN-UP # HOURS:	1 hr								

To the best of my knowledge, the quantities indicated are correct, and I know of no injuries, loss of, or damage to equipment or near miss incidents that occurred during this project.

[signature] Kevin Weichert 7-14-11

KEVIN WEICHERT 7-14-11

Signature of Client Field Representative — Printed Name of Client Field Representative — Date Signed

DAILY PROJECT SUMMARY GROUNDWATER PROTECTION **DAILY PROJECT SUMMARY**

A Division of DRILLPRO, LLC
Environmental & Geotechnical Drilling

CLIENT NAME: Tetra Tech DRILLER: Nick B RIG: 6620 DT

PROJECT NAME: Cecil Field Site 3 WORK ORDER #: 711008 DATE: 7/14/11

OVERNIGHT: ☑ Yes ☐ No

CREW MEMBERS: Nick B
Bryan N

HOURS WORKED:
Time On Site: 700
Lunch: 12 - 1230
Time Off Site: 400

MATERIALS USED / PURCHASED:

Sand		Riser	
Fine Sand		Screen	
Bentonite		Pre-Packed	
Portland		Manholes	
Concrete		Sample Tubing	1000'
Locks		Exp. Points	23 spls
Cones		LEP	
Other		Other	

EQUIPMENT RENTAL:
Rental Company: /
Equipment Rental:
Rental Company:
Equipment Rental:
Reason:
# of Days:
Cost:
Other:

DRUMS:
Drums Supplied /
Time Spent Relocating Drums On Site

MISCELLANEOUS:
Pavement Cutting (hrs.): /
Concrete Coring:
Decontamination Structure:

STANDBY TIME:
Hour / Date / Time
Reason

DESCRIPTION OF SIGNIFICANT PROBLEMS / ADDITIONAL COMMENTS:

To the best of my knowledge, the quantities indicated are correct, and I know of no injuries, loss of, or damage to equipment or near miss incidents that occurred during this project.

[signature] Kevin Weichert 7-14-11

Signature of Client Field Representative | Printed Name of Client Field Representative | Date Signed

Equipment Inspection Checklist for Drill/DPT Rigs

Company: GW PROTECTION **Unit/Serial No#:** GEOPROBE 6620

Inspection Date: 7/12/11 **Time:** 07:15 **Equipment Type:** DPT
(e.g, Drill Rigs Hollow Stem, Mud Rotary, Direct Push, HDD)

Project Name: SITE 3 **Project No#:** 112600378

Yes	No	NA	Requirement	Comments
			Emergency Stop Devices	
☒	☐	☐	• Emergency Stop Devices (At points of operation)	
☒	☐	☐	• Have all emergency shut offs identified been communicated to the field crew?	
☒	☐	☐	• Has a person been designated as the Emergency Stop Device Operator?	
			Highway Use	
☒	☐	☐	• Cab, mirrors, safety glass?	
☒	☐	☐	• Turn signals, lights, brake lights, etc. (front/rear) for equipment approved for highway use?	
☒	☐	☐	• Seat Belts?	
☒	☐	☐	• Is the equipment equipped with audible back-up alarms and back-up lights?	
☒	☐	■	• Horn and gauges	
☒	☐	■	• Brake condition (dynamic, park, etc.)	
☒	☐	☐	• Tires (Tread) or tracks	
☒	☐	☐	• Windshield wipers	
☒	☐	☐	• Exhaust system	
☒	☐	☐	• Steering (standard and emergency)	
☐	☒	☐	• Wheel Chocks?	
☒	☐	☐	• Are tools and material secured to prevent movement during transport? Especially those within the cab?	
☐	☒	■	• Are there flammables or solvents or other prohibited substances stored within the cab?	
☐	☒	■	• Are tools or debris in the cab that may adversely influence operation of the vehicle (in and around brakes, clutch, gas pedals)	

Equipment Inspection Checklist for Drill Rigs
Page 2

Unit/Serial No#: GEOPROBE 6620 **Inspection Date:** 7/12/11

Yes	No	NA	Requirement	Comments
			Fluid Levels:	
X			• Engine oil	
X			• Transmission fluid	
X			• Brake fluid	
X			• Cooling system fluid	-
X			• Hoses and belts	
X			• Hydraulic oil	
			High Pressure Hydraulic Lines	
	X		• Obvious damage	
	X		• Operator protected from accidental release	
	X		• Coupling devices, connectors, retention cables/pins are in good condition and in place	
			Mast Condition	
X			• Structural components/tubing	
X			• Connection points	
X			• Pins	
X			• Welds	
X			• Outriggers	
X			• Operational	
X			• Plumb (when raised)	
			Hooks	
		X	• Are the hooks equipped with Safety Latches?	
		X	• Does it appear that the hook is showing signs of wear in excess of 10% original dimension?	
		X	• Is there a bend or twist exceeding 10% from the plane of an unbent hook?	
		X	• Increase in throat opening exceeding 15% from new condition	
		X	• Excessive nicks and/or gouges	
		X	• Clips	
		X	• Number of U-Type (Crosby) Clips (cable size 5/16 – 5/8 = 3 clips minimum) (cable size 3/4 – 1 inch = 4 clips minimum) (cable size 1 1/8 – 1 3/8 inch = 5 clips minimum)	

Unit/Serial No#: GEOPROBE 6620 **Inspection Date:** 7/12/11

Yes	No	NA	Requirement	Comments
			Power cable and/or hoist cable	
☐	☐	[X]	• Reduction in Rope diameter π (5/16 wire rope>1/64 reduction nominal size -replace) (3/8 to 1/2 wire rope>1/32 reduction nominal size-replace) (9/16 to 3/4 wire rope>3/64 reduction nominal size-replace)	
☐	■	[X]	• Number of broken wires (6 randomly broken wires in one rope lay) (3 broken wires in one strand)	
☐	■	[X]	• Number of wire rope wraps left on the Running Drum at nominal use (≥3 required)	
☐	■	[X]	- Lead (primary) sheave is centered on the running drum	
☐	☐	[X]	• Lubrication of wire rope (adequate?)	
☐	☐	[X]	• Kinks, bends – Flattened to > 50% diameter	
			Hemp/Fiber rope (Cathead/Split Spoon Hammer)	
☐	☐	[X]	• Minimum ¾; maximum 1 inch rope diameter (Inspect for physical damage)	
☐	☐	[X]	• Rope to hammer is securely fastened	
			Safety Guards –	
[X]	☐	☐	• Around rotating apparatus (belts, pulleys, sprockets, spindles, drums, flywheels, chains) all points of operations protected from accidental contact?	
[X]	☐	☐	• Hot pipes and surfaces exposed to accidental contact?	
[X]	☐	☐	• High pressure lines	
[X]	☐	■	• Nip/pinch points	
			Operator Qualifications	
[X]	☐	☐	• Does the operator have proper licensing where applicable, (e.g., CDL)?	
[X]	☐	☐	• Does the operator, understand the equipment's operating instructions?	
[X]	☐	☐	• Is the operator experienced with this equipment?	
[X]	☐	☐	• Is the operator 21 years of age or more?	

Equipment Inspection Checklist for Drill Rigs
Page 4

Unit/Serial No#: GEOPROBE 6620 **Inspection Date:** 7/12/11

Yes	No	NA	Requirement	Comments
			PPE Required for Drill Rig Exclusion Zone	
☒	☐	☐	• Hardhat	
☒	☐	☐	• Safety glasses	
☒	☐	☐	• Work gloves	
☒	☐	☐	• Chemical resistant gloves ______________	
☒	☐	☐	• Steel toed Work Boots	
☐	☒	☐	• Chemical resistant Boot Covers	
■ KW	☒	☐	• Apron	
■ KW	☒	☐	• Coveralls Tyvek, Saranex, cotton)	
			Other Hazards	
☒	☐	☐	• Excessive Noise Levels? ________dBA	
☒	☐	☐	• Chemical hazards (Drilling supplies - Sand, bentonite, grout, fuel, etc.)	
☒	☐	☐	- MSDSs available?	
☐	☒	☐	• Will On-site fueling occur	
☐	■	☒	- Safety cans available?	
☒	☐	☐	- Fire extinguisher (Type/Rating - ________)	

Approved for Use ☒ Yes ☐ No ☐ See Comments

[signature]
Site Health and Safety Officer

[signature]
Operator

ATTACHMENT 5

EQUIPMENT MANUFACTURES INFORMATION

(CUT SHEETS)

SOLAR PANELS

STP190S - 24/Ad+
STP185S - 24/Ad+

SUNTECH
Solar powering a green future™

190 Watt
MONOCRYSTALLINE SOLAR MODULE

Features

14.9% — High module conversion efficiency (up to 14.9%), through superior manufacturing technology

0-5W — Guaranteed 0-5W positive power output tolerance ensures high reliability

<1% — Proprietary Gallium-F22 doping process dramatically reduces initial light-induced degradation to <1%, thus delivering better power and performance over time

4% — New Jumbo cells with 4% larger solar cell area produce more power per module

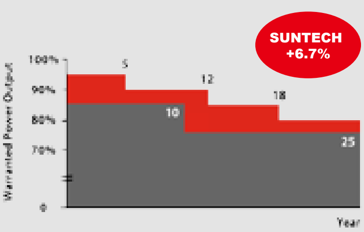
2400Pa 5400Pa — Entire module certified to withstand high wind loads (2400 Pascal) and snow loads (5400 Pascal) *

IEC TÜV CE c UL us

Trust Suntech to Deliver Reliable Performance Over Time

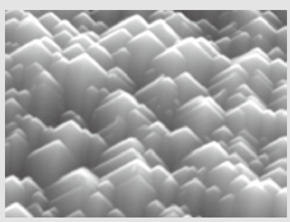
- World's leading manufacturer of crystalline silicon photovoltaic modules
- Unrivaled manufacturing capacity and world-class technology
- Rigorous quality control meeting the highest international standards : ISO 9001: 2008 and ISO 14001: 2004
- Certification and standards: IEC 61215, IEC 61730, conformity to CE

Industry-leading warranty

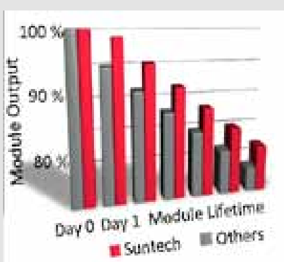


- 25 year transferrable power output warranty: 5 year/95%, 12 year/90%, 18 year/85%, 25 year/80% **
- Based on nominal power
- Warrants 6.7% more power than the market standard over 25 years
- 5 year material and workmanship warranty

* Please refer to Suntech Standard Module Installation Manual for details.
** Please refer to Suntech Product Warranty for details.



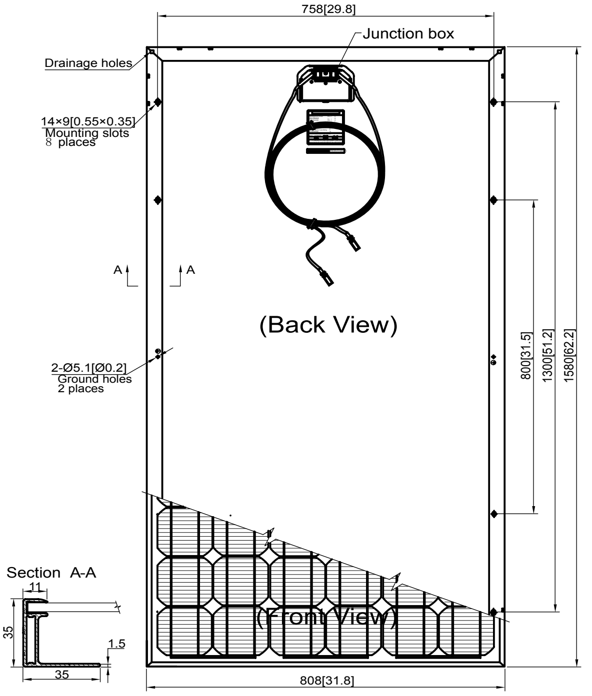
Patented surface pyramids enhance sunlight absorption by redirecting reflected light to other areas on the cell surface to be reabsorbed



Suntech cells feature a breakthrough process that replaces traditional boron doping with gallium doping. The effect of initial light-induced degradation is dramatically reduced, leading to greater power output over the entire module lifetime.

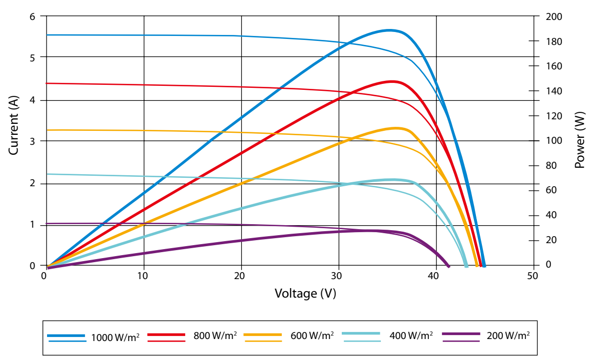
Graph is for illustration only and does not imply any guarantee of module performance. Please check warranty for details.

STP190S - 24/Ad+
STP185S - 24/Ad+



Note: mm [inch]

Current-Voltage & Power-Voltage Curve (190S-24)



Temperature Characteristics

Nominal Operating Cell Temperature (**NOCT**)	45±2°C
Temperature Coefficient of Pmax	-0.48 %/°C
Temperature Coefficient of Voc	-0.34 %/°C
Temperature Coefficient of Isc	0.037 %/°C

Dealer information box

Specifications are subject to change without further notification

Electrical Characteristics

STC	STP190S-24/Ad+	STP185S-24/Ad+
Optimum Operating Voltage (Vmp)	36.5 V	36.4 V
Optimum Operating Current (Imp)	5.20 A	5.09 A
Open - Circuit Voltage (Voc)	45.2 V	45.0 V
Short - Circuit Current (Isc)	5.62 A	5.43 A
Maximum Power at STC (Pmax)	190 W	185 W
Module Efficiency	14.9%	14.5%
Operating Temperature	-40 °C to +85 °C	-40°C to +85°C
Maximum System Voltage	600 V DC	600 V DC
Maximum Series Fuse Rating	15 A	15 A
Power Tolerance	0/+5 W	0/+5 W

STC: Irradiance 1000 W/m², module temperature 25 °C, AM=1.5

NOCT	STP190S-24/Ad+	STP185S-24/Ad+
Maximum Power (W)	139 W	135 W
Maximum Power Voltage (V)	33.1 V	33.0 V
Maximum Power Current (A)	4.19 A	4.10 A
Open Circuit Voltage (Voc)	41.3 V	41.0 V
Short Circuit Current (Isc)	4.56 A	4.40 A
Efficiency Reduction (from 1000 W/m² to 200 W/m²)	<4.5%	<4.5%

NOCT: Irradiance 800 W/m², ambient temperature 20 °C, wind speed 1 m/s

Mechanical Characteristics

Solar Cell	Monocrystalline 125 × 125 mm (5 inches)
No. of Cells	72 (6 × 12)
Dimensions	1580 × 808 × 35mm (62.2 × 31.8 × 1.4 inches)
Weight	15.5 kgs (34.1 lbs.)
Front Glass	3.2 mm (0.13 inches) tempered glass
Frame	Anodized aluminium alloy
Junction Box	IP67 rated
Output Cables	H+S RADOX® SMART cable 4.0 mm² (0.006 inches²), symmetrical lengths (-) 1000 mm (39.4 inches) and (+) 1000 mm (39.4 inches), H4 connectors (MC4 compatible)

Packing Configuration

Container	20' GP	40' GP
Pieces per pallet	26	26
Pallets per container	12	28
Pieces per container	312	728

OIL-LESS COMPRESSORS

WOB-L™

2660/2680 SERIES

MODELS

Standard models
2660CE44
2660CGHI42

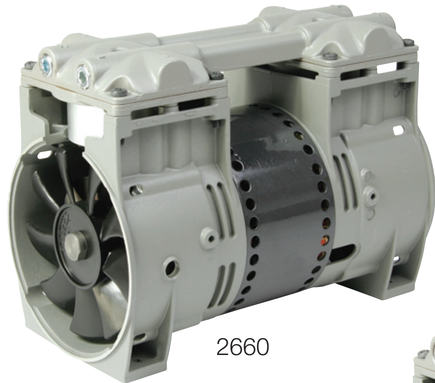
2680CE44
2680CGHI42

Other models based on availability and minimum purchase.

2660CE37
2660CE39
2660CGHI37
2660CGHI39

2680CE37
2680CE39
2680CGHI37
2680CGHI39

TRIGON®



FEATURES

- Head design allows easily replaced piston seal
- Oil-less, non-lube piston and cylinder
- Permanently lubricated bearings
- Stainless steel valves
- Lightweight die cast aluminum components
- Long-life, high performance piston seal
- Thin wall, hard-coated aluminum cylinder for maximum heat transfer
- Twin fans provide cooling air through and around motor and cylinders
- Dual intake/exhaust manifold system for easy piping
- Balanced for smooth, low vibration operation
- Field service capability
- Inlet filter
- Capacitor
- All wetted aluminum parts treated for corrosion protection from moisture
- Patented one piece head for fewer parts and reduced leak paths
- UL Recognized motor and thermal protector, 115v/60Hz models
- CE/TUV approved, 220-240/50Hz models
  (Consult factory for non-standard models)
- Kit options: Guards/Capacitor cover/Cords

Consult factory for custom applications

ISO 9001 CERTIFIED

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A Gardner Denver Product

2660 & 2680 Series Performance Data

						Standard	
MODEL NUMBERS		**2660CE37** **2680CE37**		**2660CE39** **2680CE39**		**2660CE44** **2680CE44**	
HEAD CONFIGURATION		Pressure/Vacuum		Pressure/Vacuum		Pressure/Vacuum	
STROKE		.370 Inches		.390 Inches		.440 Inches	
PRESSURE		Flow @ 115v		Flow @ 115v		Flow @ 115v	
CFM @ PSI	LPM @ bar						
PSI	bar	CFM	LPM	CFM	LPM	CFM	LPM
0	0	3.73	105.6	3.92	110.9	4.40	124.5
5	.5	3.65	101.8	3.82	105.9	4.34	121.4
10	1.0	3.53	95.6	3.65	98.5	4.23	114.6
15	1.5	3.36	88.9	3.46	92.1	4.03	107.0
20	2.0	3.20	81.9	3.31	85.7	3.84	100.0
25	3.0	3.03	70.4	3.15		3.67	
30		2.86		3.00		3.50	
35		2.71		2.90			
40		2.58					
MAX. CONTINUOUS PRESSURE		40 PSI	2.8 bar	35 PSI	2.4 bar	30 PSI	2.1 bar
MAX. INTERMITTENT PRESSURE		40 PSI	2.8 bar	35 PSI	2.4 bar	30 PSI	2.1 bar
VACUUM		Flow @ 115v		Flow @ 220v/230v		Flow @ 115v	
CFM @ IN. hg	LPM @ mbar (gauge)						
IN. hg	mbar (gauge)	CFM	LPM	CFM	LPM	CFM	LPM
0	0	3.73	105.6	3.92	110.9	4.40	124.5
5	-100	2.47	84.5	2.62	89.2	2.96	100.5
10	-200	1.86	66.8	1.98	70.9	2.22	80.0
15	-400	1.27	46.6	1.36	49.7	1.52	55.6
20	-600	0.68	26.8	0.72	28.6	0.83	32.4
25	-800	0.11	7.5	0.12	8.0	0.16	9.7
MAX. VACUUM		27.0" hg	-914 mbar	27.0" hg	-914 mbar	27.0" hg	-914 mbar
MAX. AMBIENT AIR TEMP.		104° F	40°C	104° F	40°C	104° F	40°C
MIN. AMBIENT START TEMP.		50° F	10°C	50° F	10°C	50° F	10°C
MAX. RESTART PRESSURE		0 PSI	0 bar	0 PSI	0 bar	0 PSI	0 bar
MAX. RESTART VACUUM		0"hg	0 mbar	0"hg	0 mbar	0"hg	0 mbar
MOTOR VOLTAGE/FREQUENCY		115/60/1		115/60/1		115/60/1	
MOTOR TYPE		Permanent Split Cap.		Permanent Split Cap.		Permanent Split Cap.	
CURRENT AT RATED LOAD (AMPS)		4.5		4.7		5.0	
POWER AT RATED LOAD (WATTS)		480		490		530	
STARTING CURRENT (LOCKED ROTOR, AMPS)		14.6		14.6		14.6	
CAPACITOR VALUE		15 mfd		15 mfd		15 mfd	
MIN. FULL LOAD SPEED (RPM)		1680		1690		1670	
THERMAL PROTECTOR		Yes		Yes		Yes	
NET WEIGHT		14.8 lbs.	6.7 kg	14.8 lbs.	6.7 kg	14.8 lbs.	6.7 kg

NOTE: Models pictured are representative of the series and do not represent a specific model number. Consult factory for detailed physical description.

NOTE: 2660 models do not have fan guard or cord standard, these are options. 2680 models include fan guard and cord standard.

2660 & 2680 Series Performance Data

						Standard	
MODEL NUMBERS		**2660CGHI37 2680CGHI37**		**2660CGHI39 2680CGHI39**		**2660CGHI42 2680CGHI42**	
HEAD CONFIGURATION		Pressure/Vacuum		Pressure/Vacuum		Pressure/Vacuum	
STROKE		.370 Inches		.390 Inches		.420 Inches	
PRESSURE		Flow @ 220v/230v/60Hz		Flow @ 220v/230v		Flow @ 220v/230v	
CFM @ PSI	LPM @ bar						
PSI	bar	CFM	LPM	CFM	LPM	CFM	LPM
0	0	3.12 / 3.74	88.3 / 105.9	3.38 / 4.01	95.7 / 113.5	3.59 / 4.30	101.6 / 121.7
5	.5	3.05 / 3.65	85.2 / 102.0	3.30 / 3.92	91.7 / 109.0	3.50 / 4.08	97.5 / 114.5
10	1.0	2.96 / 3.55	80.4 / 96.1	3.17 / 3.77	86.1 / 101.3	3.38 / 4.00	91.8 / 108.4
15	1.5	2.83 / 3.38	75.5 / 90.2	3.03 / 3.56	80.8 / 94.0	3.23 / 3.81	85.7 / 100.2
20	2.0	2.71 / 3.24	70.8 / 84.5	2.90 / 3.38	75.9 / 87.2	3.08 / 3.60	80.0 / 93.4
25	3.0	2.59 / 3.09	60.1 / 71.6	2.77 / 3.21	66.8 / 74.3	2.93 / 3.43	
30		2.48 / 2.96		2.66 / 3.05		2.80 / 3.27	
35		2.33 / 2.77		2.53 / 2.88			
40		2.21 / 2.63		2.43 / 2.73			
MAX. CONTINUOUS PRESSURE		40 PSI	2.8 bar	40 PSI	2.8 bar	30 PSI	2.1 bar
MAX. INTERMITTENT PRESSURE		40 PSI	2.8 bar	40 PSI	2.8 bar	30 PSI	2.1 bar
VACUUM		Flow @ 220v/230v/60Hz		Flow @ 220v/230v		Flow @ 220v/230v	
CFM @ IN. hg	LPM @ mbar (gauge)						
IN. hg	mbar (gauge)	CFM	LPM	CFM	LPM	CFM	LPM
0	0	3.12 / 3.74	88.3 / 105.9	3.38 / 4.01	95.7 / 113.5	3.59 / 4.30	101.6 / 121.7
5	-100	2.17 / 2.54	72.4 / 85.8	2.30 / 2.70	77.6 / 91.6	2.44 / 2.84	81.3 / 94.7
10	-200	1.65 / 1.89	58.7 / 68.5	1.76 / 2.02	62.3 / 72.9	1.83 / 2.13	65.9 / 76.7
15	-400	1.12 / 1.30	41.2 / 47.4	1.20 / 1.39	44.0 / 50.7	1.26 / 1.47	45.9 / 53.5
20	-600	0.61 / 0.69	23.8 / 27.4	0.66 / .75	25.6 / 29.5	0.65 / .81	26.2 / 31.4
25	-800	0.10 / 0.11	6.8 / 7.6	0.11 / .12	7.4 / 8.3	0.11 / .15	7.3 / 9.3
MAX. VACUUM		27.0" hg	-914 mbar	27.0" hg	-914 mbar	27.0" hg	-914 mbar
MAX. AMBIENT AIR TEMP.		104˚ F	40°C	104˚ F	40°C	104˚ F	40°C
MIN. AMBIENT START TEMP.		50˚ F	10°C	50˚ F	10°C	50˚ F	10°C
MAX. RESTART PRESSURE		0 PSI	0 bar	0 PSI	0 bar	0 PSI	0 bar
MAX. RESTART VACUUM		0"hg	0 mbar	0"hg	0 mbar	0"hg	0 mbar
MOTOR VOLTAGE/FREQUENCY		220-240/50/1 - 230/60/1		220-240/50/1 - 230/60/1		220-240/50/1 - 230/60/1	
MOTOR TYPE		Permanent Split Cap.		Permanent Split Cap.		Permanent Split Cap.	
CURRENT AT RATED LOAD (AMPS)		1.9 / 9.2		2.0 / 2.2		1.9 / 2.2	
POWER AT RATED LOAD (WATTS)		425 / 480		435 / 485		405 / 475	
STARTING CURRENT (LOCKED ROTOR, AMPS)		5.8 / 5.6		5.8 / 5.6		5.8 / 5.6	
CAPACITOR VALUE		15 mfd		15 mfd		15 mfd	
MIN. FULL LOAD SPEED (RPM)		1360 / 1640		1360 / 1640		1400 / 1680	
THERMAL PROTECTOR		Yes		Yes		Yes	
NET WEIGHT		15 lbs.	6.8 kg	15 lbs.	6.8 kg	15 lbs.	6.8 kg

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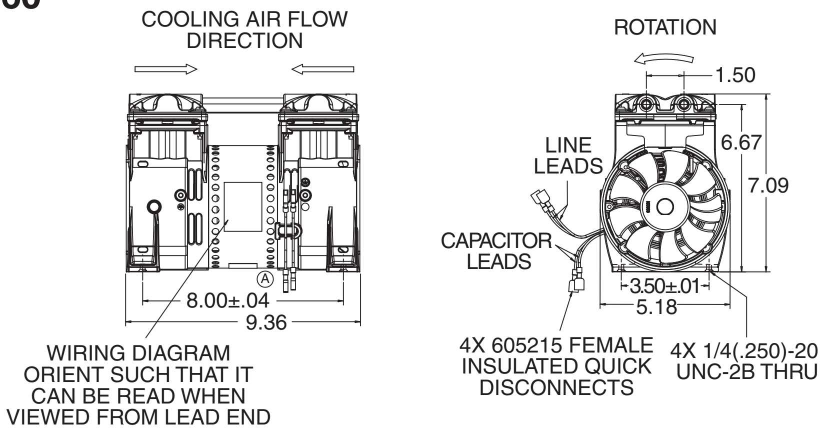
Dimensions

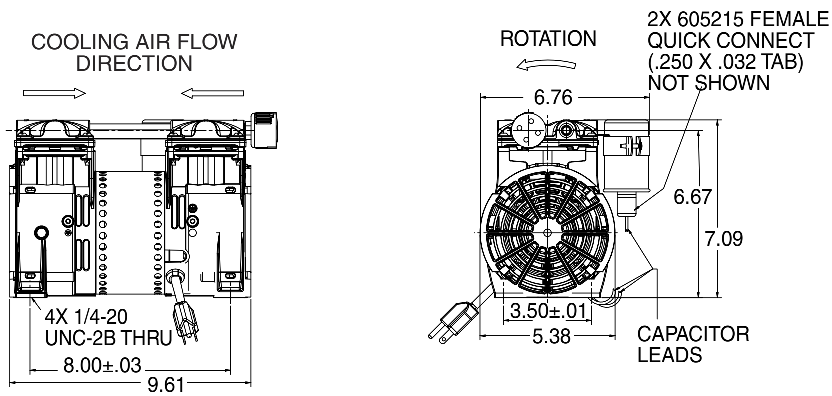
2660



MODEL	A
2668 2688	#8-32 UNC-2B THREAD THRU
2660/2669 2680/2689	1/4-20 UNC-2B THREAD THRU

Patent No. 6056521

2680



MODEL	A
2668 2688	#8-32 UNC-2B THREAD THRU
2660/2669 2680/2689	1/4-20 UNC-2B THREAD THRU

Patent No. 6056521

THOMAS
A Gardner Denver Product

Thomas Products Division
1419 Illinois Ave
Sheboygan, WI 53082 USA
Phone: (920) 457-4891
Fax: (920) 451-4276
www.thomaspumps.com

Printed in U.S.A. Form No. 850-3311 2/07

EQUIPMENT CABINETS

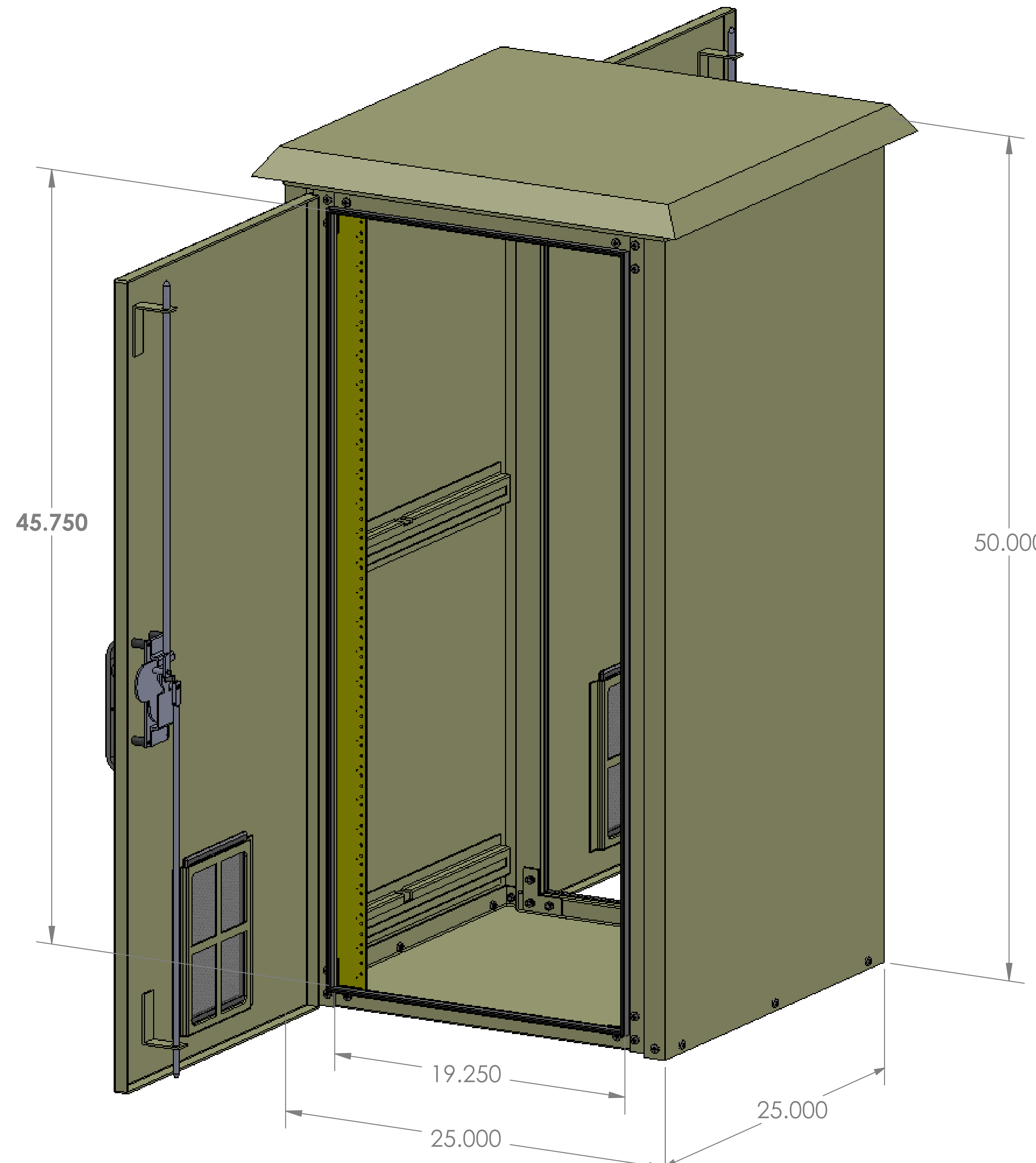
This is the OD-50DX(C) Outdoor Rack Mount Enclosure. This cabinet comes standard with the following components:

- {2} Poly Filters
- {1} Set of 19" EIA Standard Racking Rails
- {2} 3 Point Locking Handles

Options for this cabinet include:

- Air Conditioner
- Back Up Fan Unit
- Mounting Brackets
- Bases
    - Pad
    - Pedistal
- I Hooks
- Casters
- C-Channel Feet
- Spoolbox
- Windlocks
- Alarm Switches
- Lexan Windows
- Fan Kits
- Lightbars
- Power Strips
- Junction Boxes
- 2 Outlet 110V Recepticles
- 4 Outlet 110V Recepticles
- GFI Outlets
    - Covered, Uncovered
    - Switched, Unswitched
    - Dual GFI, Single GFI w/ 2 outlet 110V recept.
- 220V Twist
- Flex Heaters
    - 100w, 300w, 600w
- HVL {400w Fan Heater}
- Insulation
- Grounding Studs
- Extra 19" EIA Standard Rails
- 23" EIA Standard Rails
- Vibrabobbins
- Shelves
    - SMT, MT, SMT Fan
- Battery Trays
    - Center Racked, Mid Racked
- Batteries
    - Various Amp Hours Available

The 50 inch tall cabinet has a usable racking space of 27RU. The racking space is centered in the door opening. The opening for the door is 19.25 inches wide by 45.75 inches high.



DDB UNLIMITED

Dimention:	Dimention Unit:
Height:	50 inches
Width:	25 inches
Depth:	25 inches
Color:	Powder Baked Cream/Unpainted

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES

DO NOT SCALE DRAWING

MAJOR MATERIAL: **Aluminum**

	NAME:	DATE:
DRAWN:	R. Lamson	12/3/2008
CHECKED:		
ENG APPR:		
MFG APPR:		
Q&A:		

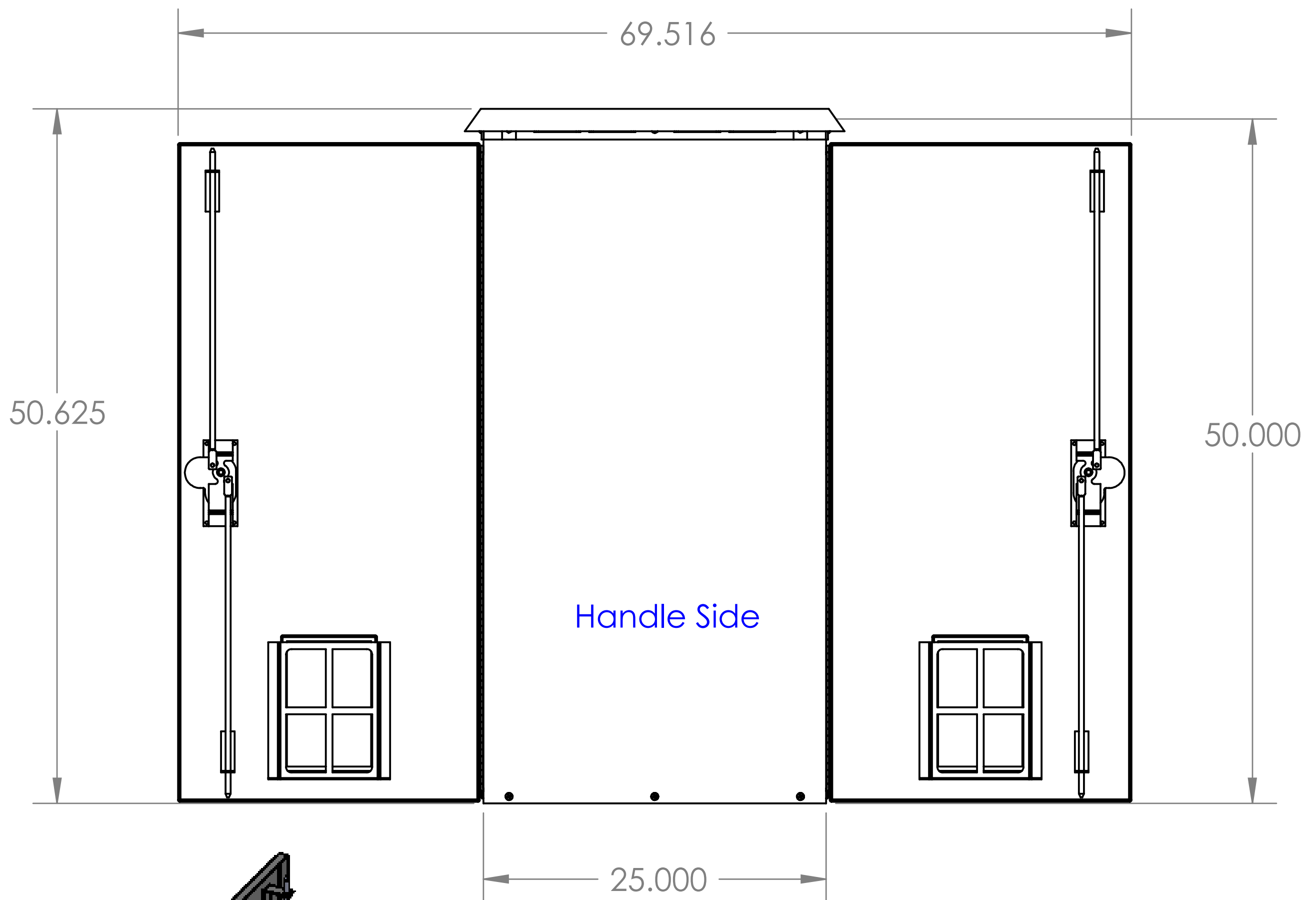
COMMENTS:
1. Unless otherwise noted, Material Thickness is 1/8 (.125) inches thick.

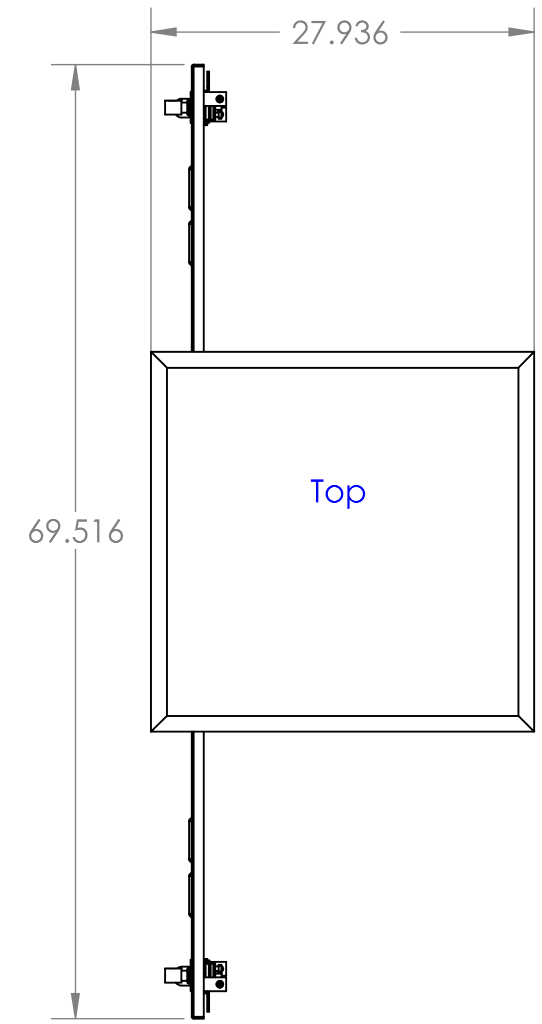
DDB Unlimited Inc.

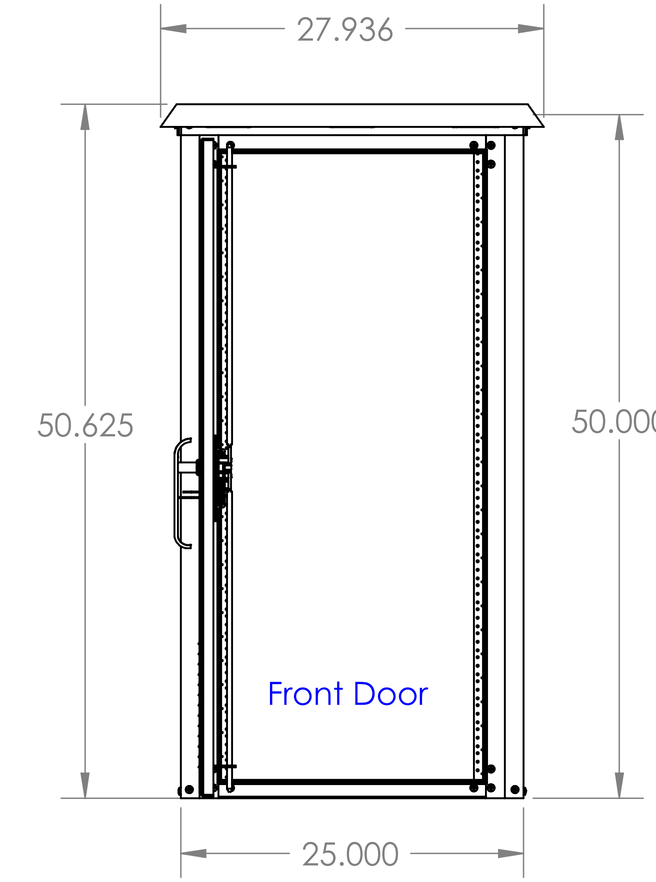
TITLE: **OD**

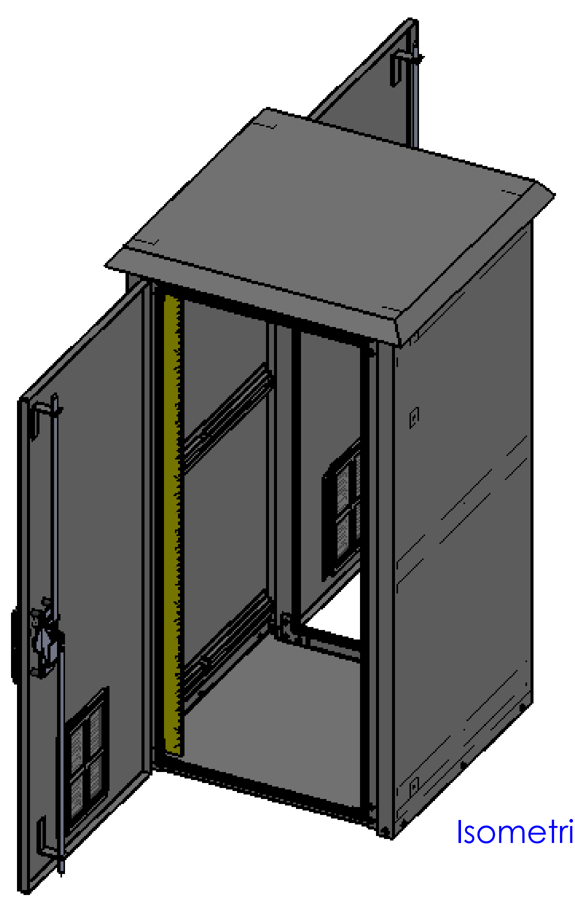
SIZE	DWG. NO.	VER.
A	50DX(C)	2

Scale= 1: 8 Weight:~120 lbs Sheet 9 of 26









Isometric View

The dimensions shown above and to the left of these views represent the total occupied space of the cabinet with both doors opened. The dimensions below and to the right of these views are the actual dimensions of the cabinet itself. The view shown is the "Plain Jane" versions of the cabinet without any added accesories.

Accesories will alter the total space or the weight of the cabinet. The weight identified in the legend represents the raw weight of the cabinet.

Dimentions:	Cabinet Unit Size:	Total Occupied Space:
Height:	50 inches	50.63 inches
Width:	25 inches	27.94 inches
Depth:	25 inches	69.52 inches
Color:	Unpainted/Powder Baked Cream	

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES

DO NOT SCALE DRAWING

NOTE: All drawings are at the scale listed in legend, unless specifically identified in drawing view.

MAJOR MATERIAL: **Aluminum**

	NAME:	DATE:
DRAWN:	R. Lamson	12/12/2008
CHECKED:		
ENG APPR:		
MFG APPR:		
Q&A:		

COMMENTS:
1} Unless otherwise noted, Material Thickness is 1/8 (.125) inches thick.

DDB Unlimited Inc.

TITLE: **OD**

NEMA Rating:	DWG. NO.	VER.
4, 4X	50DX(C)	2
Scale= 1: 14	Weight: ~120 lbs.	Sheet: 10 of 26

PROGRAMMABLE TIMING RELAYS

EASY Intelligent Relays Product Family Overview

EASY Intelligent Relays

The EASY intelligent relays combine timers, relays, counters, special functions, inputs and outputs into one compact device that is easily programmed. The EASY family of products provides an exception level of flexibility together with substantial savings of commissioning time and effort.

The EASY intelligent relays are available in more than 35 styles that support from 12 I/O up to a network of up to 320 I/O points, providing the ideal solution for lighting, energy management, industrial control, irrigation, pump control, HVAC and home automation.

Once EASY products are installed, changes are easily accomplished through front panel programming, eliminating the need to change wiring and minimizing downtime.

Application Description

The EASY intelligent relays excel in traditional applications where multiple relays, timers and pushbuttons are used. Applications span residential, commercial and industrial installations.

Typical control applications are:

- Car washes
- Automatic doors
- Commercial and residential lighting
- Pump control
- 12 Vdc automotive
- Greenhouse
- Machinery
- Irrigation
- Heating and air conditioning

EASY 500/700/800/MFD Intelligent Relays

EASY 500/700/800/MFD Intelligent Relays

General Description

Three families make up the EASY intelligent relay product line. Models are available with and without displays. DIN rail mounted.

EASY500 Series—for controlling small applications with up to 12 input/output signals.

EASY700 Series—for controlling medium-sized applications with 20 I/O points (expandable to 40 I/O points).

EASY800 Series—for controlling large-scale applications with 20 points, expandable to 40 points locally, and expandable using the **EASY-NET** network up to 320 I/O points.

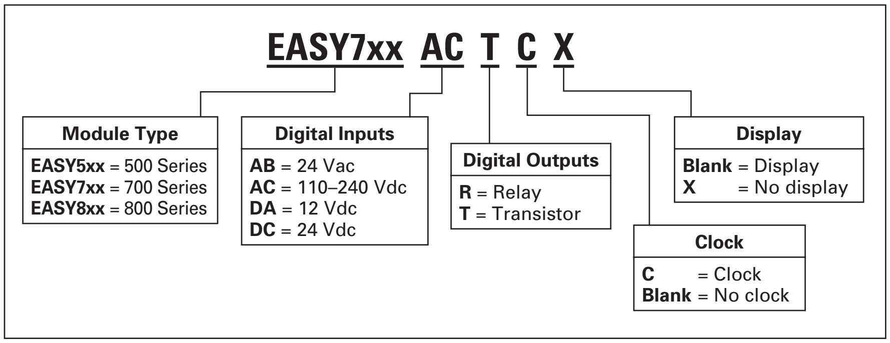
The **EASY-NET** integrated network provides easy and inexpensive linking of up to eight EASY800 devices over a distance of up to 1000 meters. Each EASY800 device can run its own program, or be used as a distributed input/output module. Connect up to eight controllers with up to 40 I/O to obtain 320 I/O.

Standards and Certifications

- EN 50178
- IEC/EN 60947
- UL
- CSA
- CSA Class I, Div. 2, Groups A, B, C, D; Temp. Code T3C

Catalog Number Selection

Table 34.2-1. EASY500/700/800 Module Definition Catalog Numbering System



Note: Not all combinations are possible. See product selection tables.

Product Selection

EASY500 Intelligent Relays

EASY500 with Display

EASY500 without Display

Table 34.2-2. EASY500 Intelligent Relays

Description	Inputs					Outputs		Catalog Number
	24 Vac	110–240 Vac	12 Vdc	24 Vdc	Analog ①	Relay	Transistor	
Display								
12 I/O, no clock	—	8	—	—	—	4	—	EASY512-AC-R
	—	—	—	8	2	4	—	EASY512-DC-R
12 I/O, clock	8	—	—	—	2	4	—	EASY512-AB-RC
	—	8	—	—	—	4	—	EASY512-AC-RC
	—	—	8	—	2	4	—	EASY512-DA-RC
	—	—	—	8	2	4	—	EASY512-DC-RC
	—	—	—	8	2	—	4	EASY512-DC-TC
No Display								
12 I/O, clock	8	—	—	—	2	4	—	EASY512-AB-RCX
	—	8	—	—	—	4	—	EASY512-AC-RCX
	—	—	8	—	2	4	—	EASY512-DA-RCX
	—	—	—	8	2	4	—	EASY512-DC-RCX
	—	—	—	8	2	—	4	EASY512-DC-TCX

① Analog inputs optional. Use of analog inputs will result in a decrease in the same number of available digital inputs.

Technical Data and Specifications

Table 34.2-5. EASY500 Series

Type	EASY512-AB…	EASY512-AC…	EASY512-DA…	EASY512-DC-R…	EASY512-DC-TC…
Supply voltage	24 Vac	100–240 Vac	12 Vdc	24 Vdc	24 Vdc
Heat dissipation	5 VA	5 VA	2W	2W	2W
Continuous current outputs ①	8A	8A	8A	8A	0.5A
Short-circuit proof with power factor 1	Line protection B16, 600A				—
Short-circuit proof with power factor 0.7…0.7	Line protection B16, 900A				—
Mounting	On top-hat rail to DIN 50022, 35 mm or screw mounting with EASYB4-101-GF1 fixing brackets				
Connection cables—solid	0.2–4.0 mm^2 (AWG 22-12)	0.2–4.0 mm^2 (AWG 22-12)	0.2–4.0 mm^2 (AWG 22-12)	0.2–4.0 mm^2 (AWG 22-12)	0.2–4.0 mm^2 (AWG 22-12)
Connection cables—flexible	0.2–2.5 mm^2 (AWG 22-12)	0.2–2.5 mm^2 (AWG 22-12)	0.2–2.5 mm^2 (AWG 22-12)	0.2–2.5 mm^2 (AWG 22-12)	0.2–2.5 mm^2 (AWG 22-12)
Degree of protection	IP 20	IP 20	IP 20	IP 20	IP 20
RFI suppression	EN 55011, EN 55022 Class B, IEC 61000-6-1, 2, 3, 4				
Ambient operating temperature	–25° to 55°C	–25° to 55°C	–25° to 55°C	–25° to 55°C	–25° to 55°C
Transport and storage temperature	–40° to 70°C	–40° to 70°C	–40° to 70°C	–40° to 70°C	–40° to 70°C
Hazardous location	CSA Class I, Div. 2, Groups A, B, C, D; Temp. Code T3C				

① Relay = 8A (10A to UL) with resistive load, 3A with inductive load. Transistor outputs = 0.5A/24 Vdc, maximum four outputs switchable in parallel.

Table 34.2-6. EASY700 Series

Type	EASY719-AB…	EASY719-AC…	EASY719-DA…	EASY719-DC-RC…	EASY721-DC-TC…
Supply voltage	24 Vac	100–240 Vac	12 Vdc	24 Vdc	24 Vdc
Heat dissipation	7 VA	10 VA	3.5W	3.5W	3.5W
Continuous current outputs ②	8A	8A	8A	8A	0.5A
Short-circuit proof with power factor 1	Line protection B16, 600A	Line protection B16, 600A	Line protection B16, 600A	Line protection B16, 600A	—
Short-circuit proof with power factor 0.7…0.7	Line protection B16, 900A	Line protection B16, 900A	Line protection B16, 900A	Line protection B16, 900A	—
Mounting	On top-hat rail to DIN 50022, 35 mm or screw mounting with EASYB4-101-GF1 fixing brackets				
Connection cables—solid	0.2–4.0 mm^2 (AWG 22-12)	0.2–4.0 mm^2 (AWG 22-12)	0.2–4.0 mm^2 (AWG 22-12)	0.2–4.0 mm^2 (AWG 22-12)	0.2–4.0 mm^2 (AWG 22-12)
Connection cables—flexible	0.2–2.5 mm^2 (AWG 22-12)	0.2–2.5 mm^2 (AWG 22-12)	0.2–2.5 mm^2 (AWG 22-12)	0.2–2.5 mm^2 (AWG 22-12)	0.2–2.5 mm^2 (AWG 22-12)
Degree of protection	IP 20	IP 20	IP 20	IP 20	IP 20
RFI suppression	EN 55011, EN 55022 Class B, IEC 61000-6-1, 2, 3, 4				
Ambient operating temperature	–25° to 55°C	–25° to 55°C	–25° to 55°C	–25° to 55°C	–25° to 55°C
Transport and storage temperature	–40° to 70°C	–40° to 70°C	–40° to 70°C	–40° to 70°C	–40° to 70°C
Hazardous location	CSA Class I, Div. 2, Groups A, B, C, D; Temp. Code T3C				

② Relay = 8A (10A to UL) with resistive load, 3A with inductive load. Transistor outputs = 0.5A/24 Vdc, maximum four outputs switchable in parallel.

Table 34.2-7. EASY800 Series

Type	EASY819-AC…	EASY819-DC-RC…	EASY820-DC-RC…	EASY821-DC-TC…	EASY822-DC-TC…
Supply voltage	100–240 Vac	24 Vdc	24 Vdc	24 Vdc	24 Vdc
Heat dissipation	10 VA	3.4W	3.4W	3.4W	3.4W
Continuous current outputs ①	8A	8A	8A	8A	0.5A
Short-circuit proof with power factor 1	Line protection B16, 600A	Line protection B16, 600A	Line protection B16, 600A	Line protection B16, 600A	—
Short-circuit proof with power factor 0.7…0.7	Line protection B16, 900A	Line protection B16, 900A	Line protection B16, 900A	Line protection B16, 900A	—
Mounting	On top-hat rail to DIN 50022, 35 mm or screw mounting with ZB4-101-GF1 fixing brackets				
Connection cables—solid	0.2–4.0 mm^2 (AWG 22-12)	0.2–4.0 mm^2 (AWG 22-12)	0.2–4.0 mm^2 (AWG 22-12)	0.2–4.0 mm^2 (AWG 22-12)	0.2–4.0 mm^2 (AWG 22-12)
Connection cables—flexible	0.2–2.5 mm^2 (AWG 22-12)	0.2–2.5 mm^2 (AWG 22-12)	0.2–2.5 mm^2 (AWG 22-12)	0.2–2.5 mm^2 (AWG 22-12)	0.2–2.5 mm^2 (AWG 22-12)
Degree of protection	IP 20	IP 20	IP 20	IP 20	IP 20
RFI suppression	EN 55011, EN 55022 Class B, IEC 61000-6-1, 2, 3, 4				
Ambient operating temperature	–25 to 55°C	–25 to 55°C	–25 to 55°C	–25 to 55°C	–25 to 55°C
Transport and storage temperature	–40 to 70°C	–40 to 70°C	–40 to 70°C	–40 to 70°C	–40 to 70°C
Hazardous location	CSA Class I, Div. 2, Groups A, B, C, D; Temp. Code T3C				

① Relay = 8A (10A to UL) with resistive load, 3A with inductive load. Transistor outputs = 0.5A/24 Vdc, maximum four outputs switchable in parallel.

Dimensions

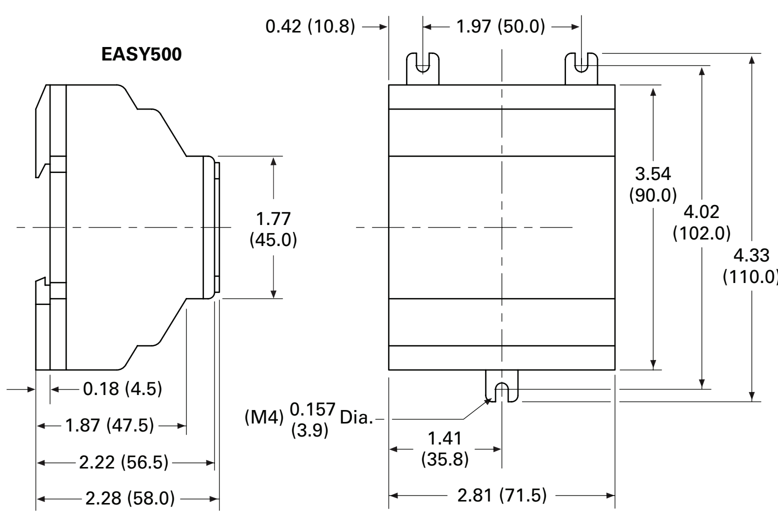
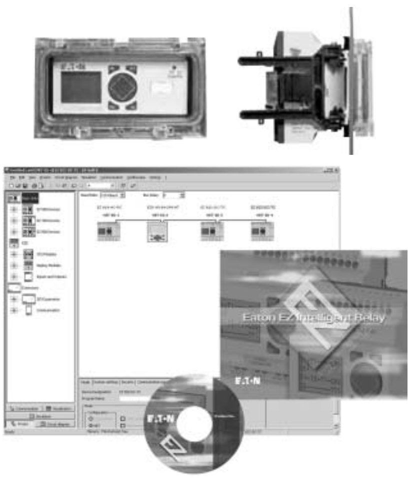


Figure 34.2-1. EASY500 Series, Drawing Number MD05013001E—Approximate Dimensions in Inches (mm)

EASY/MFD Power Supplies, Accessories and Software



EASY/MFD Power Supplies, Accessories and Software

General Description

EASY/MFD Power Supplies

12 Vdc and 24 Vdc power supplies for applications where only 100–240 Vac is available.

EASY/MFD Accessories

Memory modules, cables and other components to complete your automation solutions.

EASYSoft Software

The EASYSoft software is used to program all of the EASY and MFD controllers and displays. The Windows®-based software provides straightforward circuit diagram input and editing, and the diagrams can be displayed in the format desired. When EASY800 and MFD controllers are connected using EASY-NET, all connected devices can be accessed and their programs loaded from a single controller.

EASYSoft includes an integrated offline simulation tool that allows users to test a circuit diagram before commissioning.

Product Selection

Table 34.2-18. EASY Power Supplies ①

Description	Catalog Number
100–240 Vac input to 12 Vdc at 20 mA/24 Vdc at 250 mA	**EASY200-POW**
100–240 Vac input to 24 Vdc at 1.25A	**EASY400-POW**

① See Technical Data and Specifications on **Page 34.2-16** for more information.

Accessories

Table 34.2-19. EASY/MFD Memory Storage Modules

Description	Catalog Number
EASY500/700 32K memory storage module	**EASY-M-32K**
EASY800/MFD 256K memory storage module	**EASY-M-256K**

Table 34.2-20. EASY/MFD Cables and Connectors

Description	Catalog Number
EASY500/700 to PC programming cable RS-232 from PC	**EASY-PC-CAB**
EASY800/MFD to PC programming cable RS-232 from PC	**EASY800-PC-CAB**
EASY500/700 to MFD-CP4 communication cable, 5m	**MFD-CP4-500-CAB5**
EASY800 to MFD-CP8 communication cable, 2m	**MFD-800-CAB**
EASY800 to MFD-CP8 communication cable, 5m	**MFD-800-CAB5**
EASY800 to MFD-CP4 communication cable, 5m	**MFD-CP4-800-CAB5**
EASY800/MFD EASY-NET cable, 0.3m networking cable	**EASY-NT-30**
EASY800/MFD EASY-NET cable, 0.8m networking cable	**EASY-NT-80**
EASY800/MFD EASY-NET cable, 1.5m networking cable	**EASY-NT-150**
EASY800/MFD network termination resistor, 2/pack	**EASY-NT-R**
EASY800/MFD EASY-NET cable (cable only, no connectors, see EASY-NT-RJ45), 100m	**EASY-NT-CAB**
RJ45 network connectors for EASY-NET cable (EASY-NT-CAB), 10/pack	**EASY-NT-RJ45**

Table 34.2-21. EASY/MFD Miscellaneous Parts

Description	Catalog Number
EASY500 relay simulator	**EASY412-DC-SIM-NA**
EASY500 panel window	**SKF-FF4**
EASY700/800 panel window	**SKF-FF6**
EASY500/700/800 panel window mounting kit to front mount units	**SKF-HA**
EASY/MFD panel mount brackets, 9/pack	**ZB4-101-GF1**
EASY/MFD grounding kit	**ZB4-102-KS1**
MFD display DIN rail mount kit	**MFD-TS144**
MFD display protective membrane cover	**MFD-XM-80**
MFD display protective plastic cover	**MFD-XS-80**
EASY/MFD six-channel high current input adapter ②	**EASY256-HCI**
EASY/MFD spare interface connector, base to expander	**EASY-LINK-DS**
EASY starter kit (includes EASY512-DC-RC, EASY-PC-CAB, EASY412-DC-SIM-NA, EASYSoft)	**EZSTARTKIT1**

② See Technical Data and Specifications on **Page 34.2-16** for more information.

EASY Software

Table 34.2-22. EASY/MFD Software

Description	Catalog Number
Programming software for EASY500/700/800 and MFD	**EASYSOFT**

Technical Data and Specifications

Table 34.2-23. EASY Power Supplies

Type	EASY200-POW	EASY400-POW
Supply voltage	100–240 Vac	100–240 Vac
Maximum range	85–264 Vac	85–264 Vac
Output voltage	24 Vdc (±3%)	24 Vdc (±3%)
Output current (rated value)	0.25A	1.25A
Overcurrent limitation form	0.3A	1.4A
Short-circuit proof (secondary)	Yes	Yes
Overload proof	Yes	Yes
Potential isolation (primary/secondary)	Yes, SELV, (to EN 600950, VDE 805)	Yes, SELV, (to EN 600950, VDE 805)
Others	Additional output voltage 12 DC, 20 mA	Additional output voltage 12 DC, 20 mA
Connection cables—solid	0.2–4.0 mm^2 (AWG 22-12)	0.2–4.0 mm^2 (AWG 22-12)
Connection cables—flexible	0.2–2.5 mm^2 (AWG 22-12)	0.2–2.5 mm^2 (AWG 22-12)
Degree of protection	IP 20	IP 20
RFI suppression	EN 55011, EN 55022 Class B, IEC 61000-6-1, 2, 3, 4	EN 55011, EN 55022 Class B, IEC 61000-6-1, 2, 3, 4
Ambient operating temperature	–25° to 55°C	–25° to 55°C
Transport and storage temperature	–40° to 70°C	–40° to 70°C
Mounting	On top-hat rail to DIN 50022, 35 mm or screw mounting with ZB4-101-GF1 fixing brackets	

Wiring Diagram

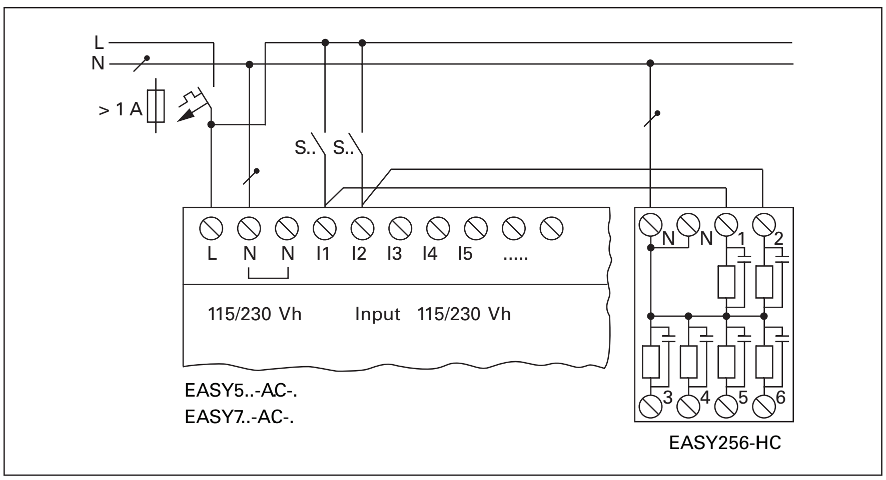


Figure 34.2-13. EASY256-HCI

PRESSURE SWITCHES

Important Points!

Product must be maintained and installed in strict accordance with the National Electrical Code and Dwyer product catalog and instruction bulletin. Failure to observe this warning could result in serious injuries or damages.

For hazardous area applications involving such things as (but not limited to) ignitable mixtures, combustible dust and flammable materials, use an appropriate explosion-proof enclosure or intrinsically safe interface device.

The pressure and temperature limitations shown on the individual catalog pages and drawings for the specified flow switches must not be exceeded. These pressures and temperatures take into consideration possible system surge pressures/temperatures and their frequencies.

Selection of materials for compatibility with the media is critical to the life and operation of Dwyer products. Take care in the proper selection of materials of construction, particularly wetted materials.

Life expectancy of switch contacts varies with applications. Contact Dwyer if life cycle testing is required.

Ambient temperature changes do affect switch set points, since the specific gravity of a liquid can vary with temperature.

Dwyer Products have been designed to resist shock and vibration; however, shock and vibration should be minimized.

Filter liquid media containing particulate and/or debris to ensure the proper operation of our products.

Electrical entries and mounting points in an enclosed tank may require liquid/vapor sealing.

Dwyer Products must not be field-repaired.

Physical damage sustained by the product may render it unserviceable.

DWYER INSTRUMENTS,INC.
P.O.BOX 373 MICHIGAN CITY, INDIANA 46361, U.S.A.

Phone: 219/879-8000
Fax: 219/872-9057
Lit-By Fax: 888/891-4963
www.dwyer-inst.com
e-mail: info@dwyer-inst.com

A2 Pressure Switches

Instruction Bulletin No. 204117

Installation

To install the switches, use a suitable wrench on the port and plumb into place with the proper sealant. For electrical wiring, refer to wiring codes on the next page and to the specification sheet for the switch ratings. For low DC loads (<50 mA, TTL logic) use switches with gold contacts. All the switches are adjustable unless they were ordered with the IP68 submersible option, in which case they are factory set and not field adjustable. All switches are maintenance-free.

Adjusting the Set point

1) Using a 1/8 inch Allen (Hex) wrench, adjust ***clockwise to increase*** the set point and ***counterclockwise to lower*** the set point. (Adjustments are done while applying a known pressure and monitoring the switch’s state.)
2) After verifying the set point re-assemble the switch.

Specifications

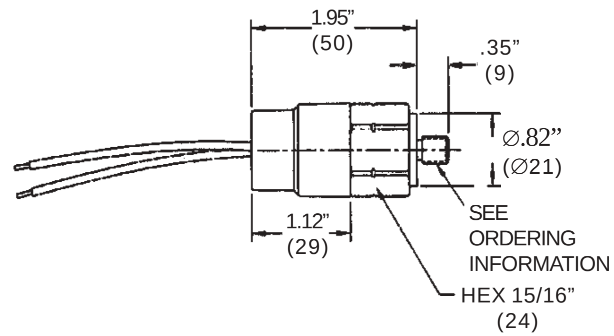
Process Temperature	-4°F to +250°F (-20°C to +120°C)
Ambient Temperature	-40°F to +250°F (-40°C to +120°C)
Switch	SPST, 100 VA, 42V max. (>2 million cycles @ 1,000 psi, max. 200 cycles/min.)
Approvals	CE
Repeatability	5% of Highest Set Point @ 70°F (20°C)
Wetted Parts	
Diaphragm	Kapton®
Fitting	Brass
Electrical Termination	6.3mm (1/4") Spade or Screw Terminals
Process Fitting	G or NPT 1/4"(optional 1/8")
Deadband	1-2 psi
Proof Pressure	500 psi (34.5 bar)
Weight, Approximate	0.14 lbs. (0.06 kg)

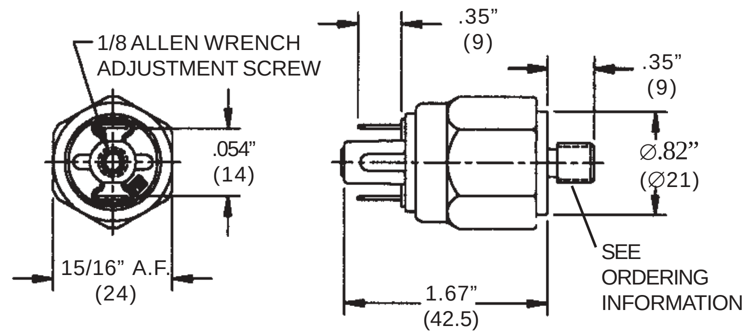
The pressure switch is designed and manufactured in accordance with Sound Engineering Practice as defined by the Pressure Equipment Directive 97/23/EC. This pressure switch must not be used as a "safety accessory" as defined by the Pressure Equipment, Article 1, Paragraph 2.1.3.

The CE Mark on the unit does not relate to the Pressure Equipment Directive.

Dimensions

Submersible Option





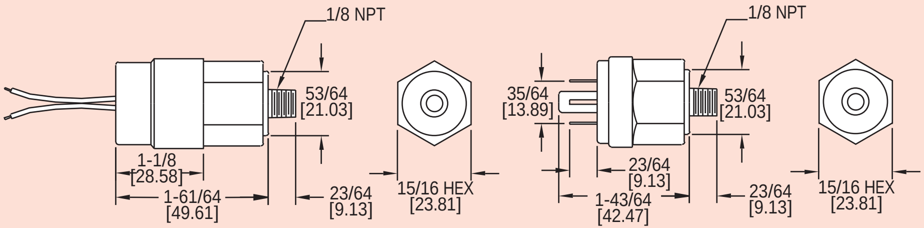
Maintenance/Repair

Regular maintenance of the total system is recommended to assure sustained optimum performance. These devices are not field repairable and should be returned to the factory if recalibration or other service is required. After first obtaining a Returned Goods Authorization (RGA) number, send the unit freight prepaid to the following. Please include a clear description of the problem plus any application information available.

Dwyer Instruments, Inc.
Attn: Repair Department
102 Highway 212
Michigan City, IN 46360

Series A2 Subminiature Pressure Switch

Field Adjustable, Submersible Models



Designed for OEM applications, the Series A2 is economical and is equipped with high proof pressure capabilities for demanding applications. The A2 is available with either spade terminals or flying leads (submersible). Switches with spade terminals can be easily adjusted in the field.

SPECIFICATIONS

Service: Compatible liquids and gases.
Wetted Materials: Polymide film and brass.
Temperature Limits: -40 to 250°F (-40 to 121°C).
Pressure Limits: 500 psi (34 bar).
Enclosure Rating: IP68 (submersible models only).
Repeatability: ±5% of highest set point.
Switch Type: SPST, 100VA, 42V.
Electrical Connection: 1/4˝ (6.3 mm) spade terminals or flying leads.
Process Connection: 1/8˝ male NPT.
Weight: 0.14 lb (0.06 kg).
Deadband: 1-2 psi (0.07-0.14 bar).
Agency Approvals: CE.

Model	Range psi (bar)	Electrical Connection	NO/NC	Model	Range psi (bar)	Electrical Connection	NO/NC
A2-2801	5-25 (.48-1.72)	Spade Terminals	NO	**A2-3801**	20-60 (1.4-4.1)	Spade Terminals	NO
A2-28032*	5-25 (.48-1.72)	Flying Leads (Submersible)	NO	**A2-38032***	20-60 (1.4-4.1)	Flying Leads (Submersible)	NO
A2-2811	5-25 (.48-1.72)	Spade Terminals	NC	**A2-3811**	20-60 (1.4-4.1)	Spade Terminals	NC
A2-28132*	5-25 (.48-1.72)	Flying Leads (Submersible)	NC	**A2-38132***	20-60 (1.4-4.1)	Flying Leads (Submersible)	NC
				A2-4801	50-150 (3.5-10.3)	Spade Terminals	NO
				A2-48032*	50-150 (3.5-10.3)	Flying Leads (Submersible)	NO
				A2-4811	50-150 (3.5-10.3)	Spade Terminals	NC
				A2-48132*	50-150 (3.5-10.3)	Flying Leads (Submersible)	NC

* Submersible models are not field adjustable. Set point must be given at time of order.

RUN-TIME COUNTERS

TRUMETER Keep you in control

020009-0 Issue 1.3 10/10

CE cULus

7111, 7111HV, 7111QUAD

8 Digit Totalising Counter

8-Stelliger Summenzähler

Compteur Totalisateur à 8 chiffres

Contador totalizador de 8 Dígitos

Contatore Totalizzatore ad 8 cifre

7511, 7511HV

8 Digit Timer

8-stelliger Zeitzähler

Compteur horaire à 8 chiffres

Temporizador de 8 dígitos

Timer ad 8 cifre

WARNING

THIS UNIT CONTAINS A LITHIUM BATTERY AND MUST NOT BE DISPOSED OF IN A FIRE OR EXPOSED TO TEMPERATURES BELOW -20°C OR ABOVE +70°C.

Any signal cables connected to this device must not exceed 30 metres in length.

If signal cables are installed that are routed outside the building, it will be necessary to install additional surge protection devices.

ACHTUNG:

DIESES GERÄT ENTHÄLT EINE LITHIUMBATTERIE UND DARF DAHER BEI DER ENTSORGUNG NICHT VERBRANNT ODER TEMPERATUREN UNTER -20°C ODER ÜBER +70°C AUSGESETZT WERDEN.

Die Signalleitungen, die an dieses Gerät angeschlossen werden, dürfen eine Gesamtlänge von 30m nicht überschreiten.

Werden Signalleitungen außerhalb von Gebäuden verlegt, müssen zusätzliche Schutzmaßnahmen gegen Surge Störimpulse vorgesehen werden.

RECOMMANDATION IMPORTANTE:

CET APPAREIL CONTIENT UNE PILE AU LITHIUM ET NE DOIT PAS ETRE JETE DANS UN FEU OU EXPOSE A DES TEMPERATURES INFERIEURES A -20°C OU SUPERIEURES A +70°C.

La longueur de tout câble mesure (signal) raccordé à cet appareil ne doit pas excéder 30 mètres.

Si les câbles « mesure » passent à l'extérieur du bâtiment, il est nécessaire d'installer des dispositifs additionnels de protections de surtensions.

ATENCIÓN:

ESTA UNIDAD CONTIENE UNA BATERIA DE LITIO QUE NO DEBE SER SITUADA CERCA DEL FUEGO NI EXPUESTA A TEMPERATURAS FUERA DEL RANGO DE -20°C A +70°C.

Cualquier cable de señal conectado a esta unidad no debe de exceder de 30 metros.

Si se instalan cables de señal que sean llevados fuera del edificio, sera necesario instalar unidades adicionales de protección de onda.

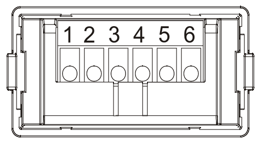
ATTENZIONE:

QUESTA UNITA' CONTIENE UNA BATTERIA AL LITIO E PERTANTO NON DEVE ESSERE SMALTITA MEDIANTE COMBUSTIONE O ESPOSTA A TEMPERATURE INFERIORI A -20°C O SUPERIORI A +70°C.

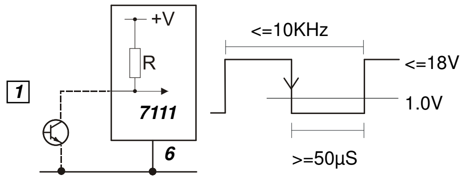
Ogni cavo di segnale collegato a questo dispositivo non puo essere piu lungo di 30 metri

Se i cavi di segnale sono installati su un percorso esterno all'edificio, è necessario installare dispositivi di protezione di rete addizionali.

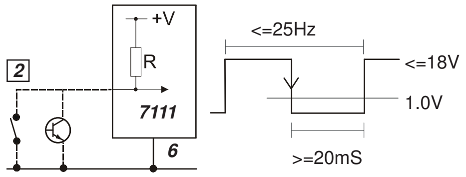
7111



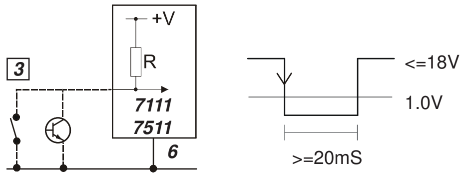
English	Deutsche	Français	Español	Italiano
1 High Speed Count Input 2 Low Speed Count Input 3 External Reset Input 4 Direction Input 5 External power for backlight 6 0V, Common	1 Hoher Zähleingang 2 Langsamer Zähleingang 3 Externer Rücksetzeingang 4 Eingang Zählrichtung 5 Externe Versorgung für Hintergrundbeleuchtung 6 0 V, gemeinsamer Anschluss	1 Entrée comptage haute vitesse 2 Entrée comptage basse vitesse 3 Entrée externe de remise à zéro 4 Entrée de sens de comptage 5 Alimentation externe pour rétroéclairage 6 0 V, Commun	1 Entrada de conteo de alta velocidad 2 Entrada de conteo de baja velocidad 3 Entrada de rearme externo 4 Entrada de dirección 5 Alimentación externa para luz de fondo 6 0 V, Común	1 Ingresso conteggio alta velocità 2 Ingresso conteggio bassa velocità 3 Ingresso di reset esterno 4 Ingresso di direzione 5 Alimentazione esterna per retroilluminazione 6 0V, comune



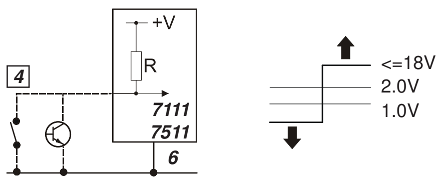
English	Deutsche	Français	Español	Italiano
High Speed Count Input • sink signal (NPN) • R = internal resistor 3.3MΩ • maximum 18V, threshold 1V • negative edge trigger • maximum 10KHz, minimum 50µS	**Hoher Zähleingang** • Sink-Signal (NPN) • R = interne Widerstände 3,3 MΩ • Maximum 18 V, Schwelle 1 V • negative Flankensteuerung • Maximum 10 kHz, Minimum 50 µs	**Entrée comptage haute vitesse** • signal capteur (NPN) • R = résistance interne 3,3 MΩ • maximum 18 V, seuil 1 V • déclenchement par impulsion négative • maximum 10 KHz, minimum 50µS	**Entrada de conteo de alta velocidad** • señal de carga (NPN) • R = resistencia interna 3,3 MΩ • máximo 18 V, umbral 1 V • disparo por borde negativo • máximo 10 KHz, mínimo 50µS	**Ingresso conteggio alta velocità** • segnale di pozzetto (NPN) • R = Resistore interno 3,3 MΩ • massimo 18 V, limite 1 V • circuito d'ingresso a impulso negativo • massimo 10 KHz, minimo 50 µS



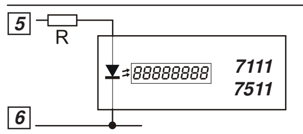
English	Deutsche	Français	Español	Italiano
Low Speed Count Input • sink signal (NPN) or contact closure • R = internal resistor 3.3MΩ • maximum 18V, threshold 1V • negative edge trigger • maximum 25Hz, minimum 20mS	**Langsamer Zähleingang** • Sink-Signal (NPN) oder Schließkontakt • R = interne Widerstände 3,3 MΩ • Maximum 18 V, Schwelle 1 V • negative Flankensteuerung • Maximum 25 Hz, Minimum 20 ms	**Entrée comptage basse vitesse** • signal capteur (NPN) ou contact sec • R = résistance interne 3,3 MΩ • maximum 18 V, seuil 1 V • déclenchement par impulsion négative • maximum 25 Hz, minimum 20 mS	**Entrada de conteo de baja velocidad** • señal de recuento (NPN) o cierre por contacto • R = resistencia interna 3,3 MΩ • máximo 18 V, umbral 1 V • disparo por borde negativo • máximo 25 Hz, mínimo 20 mS	**Ingresso conteggio bassa velocità** • segnale di pozzetto (NPN) o chiusura del contatto • R = Resistore interno 3,3 MΩ • massimo 18 V, limite 1 V • circuito d'ingresso a impulso negativo • massimo 25 Hz, minimo 20 mS



English	Deutsche	Français	Español	Italiano
External Reset Input • sink signal (NPN) or contact closure • R = internal resistor 3.3MΩ • maximum 18V, threshold 1V • negative edge trigger • minimum 20mS	**Externer Rücksetzeingang** • Sink-Signal (NPN) oder Schließkontakt • R = interne Widerstände 3,3 MΩ • Maximum 18 V, Schwelle 1 V • negative Flankensteuerung • Minimum 20 ms	**Entrée externe de remise à zéro** • signal capteur (NPN) ou contact sec • R = résistance interne 3,3 MΩ • maximum 18 V, seuil 1 V • déclenchement par impulsion négative • minimum 20 mS	**Entrada de rearme externo** • señal de recuento (NPN) o cierre por contacto • R = resistencia interna 3,3 MΩ • máximo 18 V, umbral 1 V • disparo por borde negativo • mínimo 20 mS	**Ingresso di reset esterno** • segnale di pozzetto (NPN) o chiusura del contatto • R = Resistore interno 3,3 MΩ • massimo 18 V, limite 1 V • circuito d'ingresso a impulso negativo • Min. 20 mS



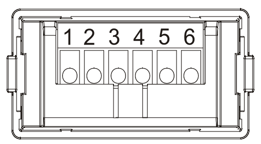
English	Deutsche	Français	Español	Italiano
Direction Input • sink signal (NPN) or contact closure • R = internal resistor 3.3MΩ • Up: not connected or >2V (logic 1), maximum 18V • Down: connected to common or <1V (logic 0) • Direction signal must change >5µS before Count signal	**Eingang Zählrichtung** • Sink-Signal (NPN) oder Schließkontakt • R = interne Widerstände 3,3 MΩ • Vor: nicht angeschlossen oder >2 V (Logik 1), Maximum 18 V • Zurück: angeschlossen an gemeinsamen Anschluss oder <1 V (Logik 0) • Richtungssignal muss sich >5 µs vor Zählsignal ändern	**Entrée de sens de comptage** • signal capteur (NPN) ou contact sec • R = résistance interne 3,3 MΩ • Haut : pas branché ou >2V (logic 1), maximum 18 V • Bas : branché au commun ou <1 V (logic 0) • Le sens du signal doit changer >5µS avant le signal de comptage	**Entrada de dirección** • señal de recuento (NPN) o cierre por contacto • R = resistencia interna 3,3 MΩ • Arriba: no conectado o >2 V (lógica 1), máximo 18 V • Abajo: conectada a común o >1 V (lógica 0) • Señal de dirección debe cambiar >5µS antes de la señal de conteo	**Ingresso di direzione** • segnale di pozzetto (NPN) o chiusura del contatto • R = Resistore interno 3,3 MΩ • Su: non connesso oppure >2 V (logico 1), massimo 18 V • Giù: connesso a controllo comune oppure <1 V (logico 0) • Il segnale di direzione deve diventare >5µS prima del segnale di conteggio



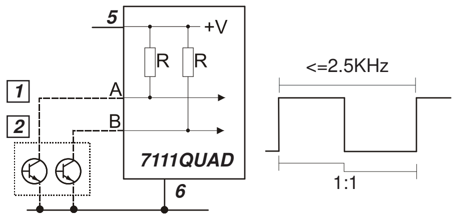
5V: R = 0Ω
12V: R = 360Ω
24V: R = 1KΩ
30V: R = 1.2KΩ

English	Deutsche	Français	Español	Italiano
External Supply for backlight • 5V DC ±0.5V @ 20mA • R = external resistor: see table next to diagram	**Externe Versorgung für Hintergrundbeleuchtung** • 5 VDC ± 0,5 V @ 20 mA • R = externer Widerstand: siehe Tabelle neben Diagramm	**Alimentation externe pour rétroéclairage** • 5 V c.c. ±0,5 V @ 20 mA • R = résistance externe : voir le tableau en regard du diagramme	**Alimentación externa para luz de fondo** • 5 V CC ±0,5 V a 20 mA • R = resistencia externa: véase tabla junto al diagrama	**Alimentazione esterna per retroilluminazione** • 5 V DC ± 0,5 V a 20 mA • R = Resistore esterno: vedere tabella accanto al diagramma

7111QUAD



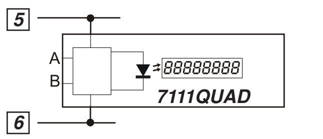
English	Deutsche	Français	Español	Italiano
1 Count Input A 2 Count Input B 3 External Reset Input 4 unused 5 External power for backlight and input circuit 6 0V, Common	1 Zähleingang A 2 Zähleingang B 3 Externer Rücksetzeingang 4 unbenutzt 5 Externe Versorgung für Hintergrundbeleuchtung und Eingangsschaltung 6 0 V, gemeinsamer Anschluss	1 Entrée de comptage A 2 Entrée de comptage B 3 Entrée externe de remise à zéro 4 non utilisée 5 Alimentation externe pour rétroéclairage et circuit d'entrée 6 0 V, Commun	1 Entrada de conteo A 2 Entrada de conteo B 3 Entrada de rearme externo 4 no se utiliza 5 Alimentación externa para luz de fondo y circuito de entrada 6 0 V, Común	1 Ingresso conteggio A 2 Ingresso conteggio B 3 Ingresso di reset esterno 4 non utilizzato 5 Alimentazione esterna per retroilluminazione e circuito di ingresso 6 0V, commune



English	Deutsche	Français	Español	Italiano
Count Inputs A & B • sink signals (NPN) or push-pull signals, NOT source only • R = internal resistor 3.3MΩ • maximum: +V • maximum 2.5KHz • mark to space ratio 1:1	**Zähleingängen A & B** • Sink-Signale (NPN) oder Gegentakt-Signale, NICHT nur Quelle • R = interne Widerstände 3,3 MΩ • Maximum: +V • Maximum 2,5 kHz • Tastverhältnis 1:1	**Entrée de comptage A & B** • signaux de capteur (NPN) ou signaux poussoirs, PAS seulement source • R = résistance interne 3,3 MΩ • maximum : +V • maximum 2,5 KHz • ratio marque/espace 1:1	**Entradas de conteo A y B** • señales de carga (NPN) o señales de contrafase, NO sólo de fuente • R = resistencia interna 3,3 MΩ • máximo: +V • máximo 2,5 KHz • relación de trabajo-reposo: 1-1	**Ingressi conteggio A e B** • segnali di pozzetto (NPN) o segnali push-pull, solo source NOT • R = Resistore interno 3,3 MΩ • Max: +V • Max 2,5 KHz • marcatura per rapporto spaziale 1:1

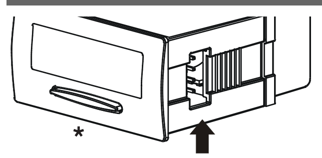
3

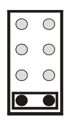
English	Deutsche	Français	Español	Italiano
External Reset Input • see 7111, above	**Externer Rücksetzeingang** • siehe 7111, oben	**Entrée externe de remise à zéro** • voir 7111, ci-dessus	**Entrada de rearme externo** • véase 7111, arriba	**Ingresso di reset esterno** • vedere 7111, sopra



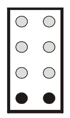
English	Deutsche	Français	Español	Italiano
External Supply for backlight and input circuit • 10-30V DC @ 30mA max • no external resistor necessary	**Externe Versorgung für Hintergrundbeleuchtung und Eingangsschaltung** • 10-30 VDC @ 30 mA max. • kein externer Widerstand notwendig	**Alimentation externe pour rétroéclairage et circuit d'entrée** • 10-30 V c.c.@ 30 mA max • résistance externe pas nécessaire	**Alimentación externa para luz de fondo y circuito de entrada** • 10 - 30 V CC a 30 mA máx. • no es necesaria resistencia externa	**Alimentazione esterna per retroilluminazione e circuito di ingresso** • 10-30 V CC a 30 mA max • Non richiesto un resistore esterno

7111, 7111HV, 7111QUAD: Configuration, Konfiguration, Configuration, Configuración, Configurazione

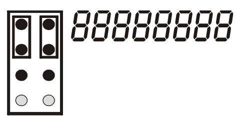


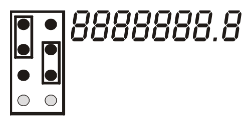


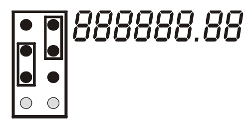
* Front panel reset enabled
Frontblende-Rücksetzung aktiviert
Remise à zéro de la face avant activée
Rearme de panel frontal habilitado
Reset pannello anteriore abilitato



* Front panel reset disabled
Frontblende-Rücksetzung deaktiviert
Remise à zéro de la face avant désactivée
Rearme de panel frontal inhabilitado
Reset pannello anteriore disabilitato

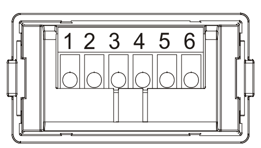






English	Deutsche	Français	Español	Italiano

7111HV



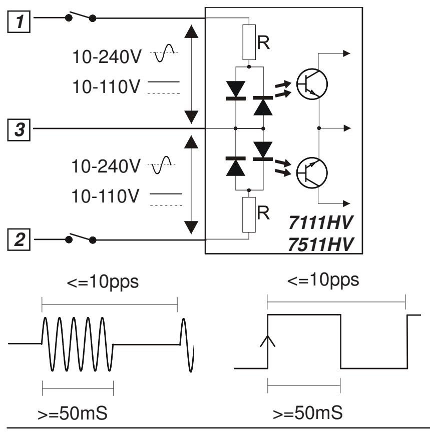
English
1 High Voltage Count Input
2 High Voltage External Reset Input
3 Common for pins 1 & 2
4 Direction Input
5 External power for backlight
6 0V, Common for pins 4 & 5

Deutsche
1 Hochspannungs-Zähleingang
2 Externer Hochspannungs-Rücksetzeingang
3 Gemeinsamer Anschluss für Stift 1 & 2
4 Eingang Zählrichtung
5 Externe Versorgung für Hintergrundbeleuchtung
6 0V, Gemeinsamer Anschluss für Stift 4 & 5

Français
1 Entrée comptage haute tension
2 Entrée externe haute tension de remise à zéro
3 Commun pour bornes 1 & 2
4 Entrée de sens de comptage
5 Alimentation externe pour rétroéclairage
6 0V, Commun pour bornes 4 & 5

Español
1 Entrada de conteo de alto voltaje
2 Entrada de rearme externo de alto voltaje
3 Común para clavijas 1 y 2
4 Entrada de dirección
5 Alimentación externa para luz de fondo
6 0V, Común para clavijas 4 y 5

Italiano
1 Ingresso conteggio alta tensione
2 Ingresso di reset esterno alta tensione
3 Comune per pin 1 e 2
4 Ingresso di direzione
5 Alimentazione esterna per retroilluminazione
6 0V, Comune per pin 4 e 5



High Voltage Count Input
- Opto-isolated
- R = internal resistor 50KΩ
- 10 - 240V AC ±10%
- 10 - 110V DC ±10%
- maximum 10 pulses per second, minimum 50mS

Hochspannungs-Zähleingang
- Optoisoliert
- R = interne Widerstände 50 KΩ
- 10 - 240 VAC ± 10%
- 10 - 110 VDC ± 10%
- Maximum 10 Pulse pro Sekunde, Minimum 50 ms

Entrée comptage haute tension
- Photocouplé
- R = résistance interne 50 KΩ
- 10 - 240 V c.a. ±10 %
- 10 - 110 V c.c. ±10 %
- maximum 10 impulsions par seconde, minimum 50 mS

Entrada de conteo de alto voltaje
- Optoaislado
- R = resistencia interna 50 KΩ
- 10 - 240 V CA ±10%
- 10 - 110 V CC ±10%
- máximo 10 impulsos por segundo, mínimo 50 mS

Ingresso conteggio alta tensione
- Optoisolato
- R = Resistore interno 50 KΩ
- 10 - 240 V CA ±10%
- 10 - 110 V CC ±10%
- Max 10 impulsi al secondo, min. 50 mS

High Voltage External Reset Input
- Opto-isolated
- R = internal resistor 50KΩ
- 10 - 240V AC ±10%
- 10 - 110V DC ±10%
- minimum 50mS

Externer Hochspannungs-Rücksetzeingang
- Optoisoliert
- R = interne Widerstände 50 KΩ
- 10 - 240 VAC ± 10%
- 10 - 110 VDC ± 10%
- Minimum 50 ms

Entrée externe haute tension de remise à zéro
- Photocouplé
- R = résistance interne 50 KΩ
- 10 - 240 V c.a. ±10 %
- 10 - 110 V c.c. ±10 %
- minimum 50 mS

Entrada de rearme externo de alto voltaje
- Optoaislado
- R = resistencia interna 50 KΩ
- 10 - 240 V CA ±10%
- 10 - 110 V CC ±10%
- mínimo 50 mS

Ingresso di reset esterno alta tensione
- Optoisolato
- R = Resistore interno 50 KΩ
- 10 - 240 V CA ±10%
- 10 - 110 V CC ±10%
- Min. 50 mS

4
5
6

Direction Input
- see 7111, overleaf

External Supply for backlight
- see 7111, overleaf

Eingang Zählrichtung
- siehe 7111, umseitig

Externe Versorgung für Hintergrundbeleuchtung
- siehe 7111, umseitig

Entrée de sens de comptage
- voir 7111, sur l'autre page

Alimentation externe pour rétroéclairage
- voir 7111, sur l'autre page

Entrada de dirección
- véase 7111, en el reverso

Alimentación externa para luz de fondo
- véase 7111, en el reverso

Ingresso di direzione
- vedere 7111, a tergo

Alimentazione esterna per retroilluminazione
- vedere 7111, a tergo

Configuration
- see 7111, overleaf

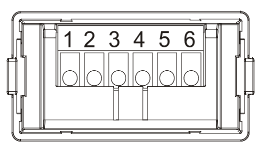
Konfiguration
- siehe 7111, umseitig

Configuration
- voir 7111, sur l'autre page

Configuración
- véase 7111, en el reverso

Configurazione
- vedere 7111, a tergo

7511



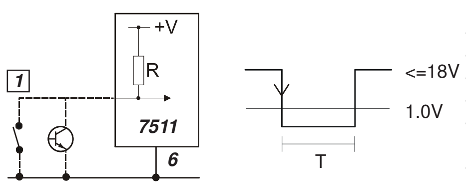
English
1 Timing Input
2 unused
3 External Reset Input
4 Direction Input
5 External power for backlight
6 0V, Common

Deutsche
1 Zeitzähleingang
2 unbenutzt
3 Externer Rücksetzeingang
4 Eingang Zählrichtung
5 Externe Versorgung für Hintergrundbeleuchtung
6 0 V, gemeinsamer Anschluss

Français
1 Entrée comptage temps
2 non utilisée
3 Entrée externe de remise à zéro
4 Entrée de sens de comptage
5 Alimentation externe pour rétroéclairage
6 0 V, Commun

Español
1 Entrada de tiempo
2 no se utiliza
3 Entrada de rearme externo
4 Entrada de dirección
5 Alimentación externa para luz de fondo
6 0 V, Común

Italiano
1 Ingresso timer
2 non utilizzato
3 Ingresso di reset esterno
4 Ingresso di direzione
5 Alimentazione esterna per retroilluminazione
6 0V, comune



Timing Input
- sink signal (NPN)
- R = internal resistor 3.3MΩ
- maximum 18V, threshold 1V
- negative edge trigger
- Seconds, Minutes - Seconds: T = minimum 1 second
- Hours - 1/100, Hours - Minutes: T = minimum 6 seconds

Zeitzähleingang
- Sink-Signal (NPN)
- R = interne Widerstände 3,3 MΩ
- Maximum 18 V, Schwelle 1 V
- negative Flankensteuerung
- Sekunden, Minuten - Sekunden: T = Minimum 1 Sekunde
- Stunden - 1/100, Stunden - Minuten: T = Minimum 6 Sekunden

Entrée comptage temps
- signal capteur (NPN)
- R = résistance interne 3,3 MΩ
- maximum 18 V, seuil 1 V
- déclenchement par impulsion négative
- Secondes, Minutes - Secondes : T = minimum 1 seconde
- Heures - 1/100, Heures - Minutes : T = minimum 6 secondes

Entrada de tiempo
- señal de carga (NPN)
- R = resistencia interna 3,3 MΩ
- máximo 18 V, umbral 1 V
- disparo por borde negativo
- Segundos, minutos - segundos: T = mínimo 1 segundo
- Horas - 1/100, Horas - minutos T = mínimo 6 segundos

Ingresso timer
- segnale di pozzetto (NPN)
- R = Resistore interno 3,3 MΩ
- massimo 18 V, limite 1 V
- circuito d'ingresso a impulso negativo
- Secondi, minuti - Secondi: T = min. 1 secondo
- Ore - 1/100, Ore - Minuti: T = min. 6 secondi

3
4

External Reset Input
- see 7111, overleaf

Direction Input
- see 7111, overleaf

Externer Rücksetzeingang
- siehe 7111, umseitig

Eingang Zählrichtung
- siehe 7111, umseitig

Entrée externe de remise à zéro
- voir 7111, sur l'autre page

Entrée de sens de comptage
- voir 7111, sur l'autre page

Entrada de rearme externo
- véase 7111, en el reverso

Entrada de dirección
- véase 7111, en el reverso

Ingresso di reset esterno
- vedere 7111, a tergo

Ingresso di direzione
- vedere 7111, a tergo

5
6

External Supply for backlight
- see 7111, overleaf

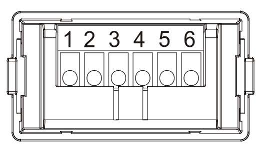
Externe Versorgung für Hintergrundbeleuchtung
- siehe 7111, umseitig

Alimentation externe pour rétroéclairage
- voir 7111, sur l'autre page

Alimentación externa para luz de fondo
- véase 7111, en el reverso

Alimentazione esterna per retroilluminazione
- vedere 7111, a tergo

7511HV



English
1 High Voltage Timing Input
2 High Voltage External Reset Input
3 Common for pins 1 & 2
4 Direction Input
5 External Supply for Backlight
6 0V, Common for pins 4 & 5

Deutsche
1 Hochspannungs-Zeitzähleingang
2 Externer Hochspannungs-Rücksetzeingang
3 Gemeinsamer Anschluss für Stift 1 & 2
4 Eingang Zählrichtung
5 Externe Versorgung für Hintergrundbeleuchtung
6 0V, Gemeinsamer Anschluss für Stift 4 & 5

Français
1 Entrée comptage temps haute tension
2 Entrée externe haute tension de remise à zéro
3 Commun pour bornes 1 & 2
4 Entrée de sens de comptage
5 Alimentation externe pour rétroéclairage
6 0V, Commun pour bornes 4 & 5

Español
1 Entrada de tiempo de alto voltaje
2 Entrada de rearme externo de alto voltaje
3 Común para clavijas 1 y 2
4 Entrada de dirección
5 Alimentación externa para luz de fondo
6 0V, Común para clavijas 4 y 5

Italiano
1 Ingresso timer alta tensione
2 Ingresso di reset esterno alta tensione
3 Comune per pin 1 e 2
4 Ingresso di direzione
5 Alimentazione esterna per retroilluminazione
6 0V, Comune per pin 4 e 5

1
3
2

High Voltage Timing Input
- T: see 7511, above
  HV: see 7111HV, above

High Voltage External Reset Input
- see 7111HV, above

Hochspannungs-Zeitzähleingang
- T: siehe 7511, oben
  Hochspannung: siehe 7111HV, oben

Externer Hochspannungs-Rücksetzeingang
- siehe 7111HV, oben

Entrée comptage temps haute tension
- T : voir 7511, ci-dessus. HV : voir 7111HV

Entrée externe haute tension de remise à zéro
- voir 7111HV, ci-dessus

Entrada de tiempo de alto voltaje
- T: véase 7511, arriba.
  HV: véase 7111HV, arriba

Entrada de rearme externo de alto voltaje
- véase 7111HV, arriba

Ingresso timer alta tensione
- T: vedere 7511, sopra
  HV: vedere 7111HV, sopra

Ingresso di reset esterno alta tensione
- vedere 7111HV, sopra

4
5
6

Direction Input
- see 7111, overleaf

External Supply for backlight
- see 7111, overleaf

Eingang Zählrichtung
- siehe 7111, umseitig

Externe Versorgung für Hintergrundbeleuchtung
- siehe 7111, umseitig

Entrée de sens de comptage
- voir 7111, sur l'autre page

Alimentation externe pour rétroéclairage
- voir 7111, sur l'autre page

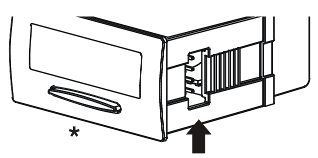
Entrada de dirección
- véase 7111, en el reverso

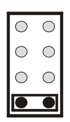
Alimentación externa para luz de fondo
- véase 7111, en el reverso

Ingresso di direzione
- vedere 7111, a tergo

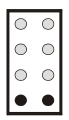
Alimentazione esterna per retroilluminazione
- vedere 7111, a tergo

7511 , 7511HV Configuration, Konfiguration, Configuration, Configuración, Configurazione



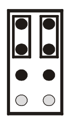


*
Front panel reset enabled
Frontblende-Rücksetzung aktiviert
Remise à zéro de la face avant activée
Rearme de panel frontal habilitado
Reset pannello anteriore abilitato

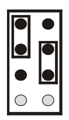


*
Front panel reset disabled
Frontblende-Rücksetzung deaktiviert
Remise à zéro de la face avant désactivée
Rearme de panel frontal inhabilitado
Reset pannello anteriore disabilitato

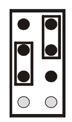
Timing range, Zeitzählerbereich, Base de temps, Rango de temporizador, Gamme di timer



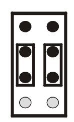
99999999
Seconds
Sekunden
Secondes
Segundos
Secondi



99999-59
Minutes - Seconds
Minuten - Sekunden
Minutes - Secondes
Minutos - Segundos
Minuti - Secondi



99999-99
Hours - 1/100
Stunden - 1/100
Heures - 1/100
Horas - 1/100
Ore - 1/100



99999-59
Hours - Minutes
Stunden - Minuten
Heures - Minutes
Horas - Minutos
Ore - Minuti

Specification

Battery
Non-replaceable Lithium battery, expected life 10 years at 20°C

Display
8 digit black LCD, 9mm characters, leading zero blanking, backlight requires external supply

7111 Count Range
99999999 - rollover to 0

7511 Timing Range
See '*Timing Range*', below

Connections
Finger-proof screw connections for wires up to 1.5mm²

Operating temperature -10°C to +60°C
Storage temperature -20°C to +60°C

Altitude
Up to 2000m

Relative Humidity
80% max up to 31°C, decreasing to 50% max at 40°C

Sealing IP65/NEMA4X: **Remove film from self-adhesive gasket before use!** Overvoltage Category II, Pollution Degree 2 (IEC 64)

Spezifikation

Batterie
Nicht ersetzbare Lithiumbatterie, Nutzungsdauer mindestens 10 Jahre bei 20°C

Anzeige
LCD, 8-stellig, Zeichenhöhe 9 mm, führende Nullen ausgeblendet, Hintergrundbeleuchtung erfordert externe Versorgung

7111 Zählbereich
99999999 - Überlauf zu 0

7511 Zeitzählerbereich
Siehe ‚Zeitzählerbereich', unten

Anschlüsse
Berührungssichere Schraubanschlüsse für Kabel bis zu 1,5 mm²

Betriebstemperatur -10°C bis +60°C
Lagertemperatur -20°C bis +60°C

Betriebshöhe
Bis zu 2000 m

Relative Luftfeuchtigkeit
80% max. bis 31°C, abnehmend um max. 50% bis 40°C

Dichtung IP65/NEMA4X: **Vor Gebrauch Folie von Selbstklebedichtung entfernen!**
Schutzklasse II, Entstörgrad 2 (IEC 64)

Caractéristiques

Pile
Pile au lithium non remplaçable. Durée de vie prévue 10 ans à 20°C

Afficheur
Afficheur à cristaux liquides noirs à 8 chiffres, caractères 9 mm, remise à zéro de conduction, le rétroéclairage nécessite alimentation externe

Base de comptage 7111
99999999 - décroissant jusqu'à 0

Base de temps 7511
Voir 'Base de temps' ci-dessous

Raccordements
Connexions à vis protège-doigts pour fil jusqu'à 1,5 mm².

Température de fonctionnement -10°C à +60°C
..de stockage -20°C à +60°C

Altitude
Jusqu'à 2000 m

Humidité relative
80% max jusqu'à 31°C ; 50% max à 40°C

Etanchéité IP65/NEMA4X : **Avant utilisation, retirer le film du joint d'étanchéité fourni**
Catégorie surtension II, niveau de pollution 2 (IEC 64)

Especificación

Pila
Pila de litio no reemplazable, vida útil prevista 10 años a 20º C

Pantalla
LCD con 8 dígitos negros, caracteres de 9 mm, se borran los ceros a la izquierda, luz de fondo requiere alimentación externa

7111 Rango de conteo
99999999 - vuelve a 0

7511 Rango de tiempo
Véase "Rango de tiempo", más abajo

Conexiones
Conexiones tornillo a prueba de dedos para cables de hasta 1,5 mm²

Temperatura de funcionamiento -10° C a +60° C
..almacenaje -20° C a +60° C

Altitud
Hasta 2000 m

Humedad relativa
Máx. 80% hasta 31º C, disminuyendo a 50% máx. a 40º C

Estanqueidad IP65/NEMA4X: **RETIRAR la película protectora de la junta autoadhesiva antes de su uso** Categoría II de sobrevoltaje, grado de contaminación 2 (IEC 64)

Specifiche

Batteria
Batteria al litio non sostituibile, durata prevista 10 anni a 20°C

Visualizzazione
LCD nero a 8 cifre, caratteri da 9 mm, soppressione degli zero non significativi, retroilluminazione ad alimentazione esterna

Gamme di conteggio 7111
99999999 - ritorno a 0

Gamme di conteggio 7511
Vedere 'Gamme di timer', sotto

Collegamenti
Collegamenti a vite a prova di dita per fili metallici fino a 1,5 mm².

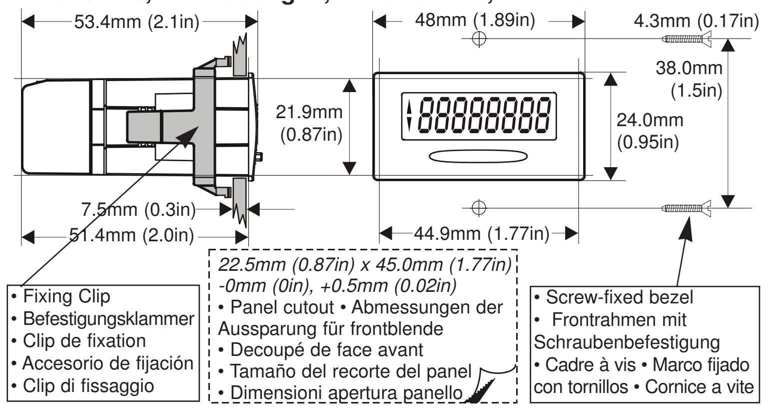
Temperatura di funzionamento Da -10°C a +60°C
..di immagazzinamento Da -20°C a +60°C

Altitudine
Fino a 2000 m

Umidità relativa Max 80% fino a 31°C, a scendere fino al 50% max a 40°C

Tenuta IP65/NEMA4X: **prima dell'uso, rimuovere la pellicola dalla guarnizione autoadesiva**. Categoria di sovratensione II, grado di inquinamento 2 (IEC 64)

Dimensions, Abmessungen, Dimensiones, Dimensioni



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ATTACHMENT 6

COMPRESSOR MANUFACTURE TEST DATA

Pressure Performance Test - Unit #1
2660CE37-XXX

Test No: T06-0298
Tech: Richard Rabitoy
Date: 4/27/2006

UNIT #1
PRESSURE PERFORMANCE TEST
2660CE37-XXX

TEST NO: **T06-0298**

Date 4/27/2006
Tech: Richard Rabitoy

LINE TEST SPEC DATA

VOLTAGE	104.0		VOLTS	Panel #	10
FREQ	60		Hz		
PRESSURE	15.0		PSI	CAP mfd	15
MAX VAC	0.0	-3%	in Hg		
FLOW	3.53	2.89	SCFM	CAP volts	n/a
CURRENT	3.49	4.12	AMPS		
POWER	345.6	407.8	WATTS	TUBE TEMP	28
SPEED	1702		RPM		
				BAROMETER	29.35

VOLTS AC	PRESSURE PSIG	FLOW P SCFM	VACUUM in HG	FLOW V SCFM	AMPS AC	POWER WATTS	SPEED RPM	TEMP Pres.	TEMP Vac.
104.0	15.0	3.53	0.0	0.00	3.49	345.6	1702	28	26
127.1	6.7	3.89	0.0	0.00	3.45	326.5	1753	28	26
127.1	10.0	3.76	0.0	0.00	3.59	355.7	1745	28	26
127.0	15.0	3.55	0.0	0.00	3.79	393.6	1734	29	26
127.0	20.0	3.38	0.0	0.00	3.97	424.6	1725	29	26
126.9	25.0	3.19	0.0	0.00	4.14	452.9	1716	29	26
127.0	30.0	3.01	0.0	0.00	4.27	474.3	1710	29	26
115.0	6.3	3.76	0.0	0.00	2.84	278.6	1746	30	26
115.0	10.0	3.64	0.0	0.00	3.08	312.1	1735	31	26
115.0	15.0	3.45	0.0	0.00	3.39	353.6	1721	31	26
115.1	20.0	3.28	0.0	0.00	3.68	390.1	1708	31	26
115.1	25.0	3.11	0.0	0.00	3.93	421.4	1696	32	26
115.1	30.0	2.93	0.0	0.00	4.14	446.4	1686	32	26
104.0	6.3	3.71	0.0	0.00	2.63	254.4	1735	33	26
104.0	10.0	3.59	0.0	0.00	2.97	291.3	1719	33	26
104.0	15.0	3.39	0.0	0.00	3.41	338.1	1699	34	26
103.9	20.0	3.21	0.0	0.00	3.77	375.9	1682	34	26
104.0	25.0	3.04	0.0	0.00	4.15	414.2	1662	34	26
103.9	30.0	2.85	0.0	0.00	4.47	446.3	1643	35	26

ATTACHMENT 7

SOLAR ARRAY SIZING CALCULATIONS

PV SYSTEM WORKSHEET
Page 1 - Loads List

Version 3.2 February 2004

REFER to "INSTRUCTIONS & APPLICATION NOTES"

Client:	TETRATECH
	Compressor Load
Date:	9/16/2011
Prepared by:	Dwight
rev:	1.1

AC LOADS	Qty	Watts Ea.	Hrs/Day	Days/wk	WH/Day	Notes
1/2HP AC MOTOR	1	425	7	7	2975	(EXAMPLE)
					0	
					0	
					0	
					0	
					0	
					0	
					0	
					0	
					0	
					0	
					0	
					0	
					0	
					0	
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					0	
					0	
					0	
					0	
					0	
					0	
					0	
					0	
					0	
					0	
					0	
Inverter's min. running power (idle)	0	30	4	7	0	(EXAMPLE)
				TOTAL AC LOADS	**2975**	**Watt-Hours per Day**
PEAK AC LOAD (everything on)		425	Watts			

DC LOADS	Quant.	Watts Ea.	Hrs/Day	Days/wk	WH/Day	Notes
	0	0	0	0	0	
					0	
					0	
					0	
					0	
					0	
					0	
					0	
					0	
				TOTAL DC LOADS	**0**	**Watt-Hours per Day**

PV SYSTEM WORKSHEET
Page 2 - Power System

TOTAL AC + DC LOAD from P.1	2975	Watt-hours/Day

DC NOMINAL VOLTAGE | 24

EFFICIENCY / LOSS FACTORS

Battery Average Efficiency	85%	
Inverter Average Efficiency	85%	
Wiring & Distribution Efficiency	97%	
Energy to Be Generated	**4245**	**Watt-Hours/Day**
PV loss factor	85%	
PV:Battery mismatch factor	100%	(100% if using MPPT)
PV charge controller efficiency	97%	
PV Array Required	**1030**	**Watts (peak rating)**

SOLAR PERIOD

Avg. Peak Sun Hrs/Day	5.0
for design season	YR
Solar Tracker Gain ?	0%

PV ARRAY - MODULE SELECTION

ENTER HERE, AS 12V MODULES

Full Array	12	90	**Watt modules**	**Total**	1080	**Watts** full array
Proposed Array	12	90	**Watt modules**	**Total**	1080	**Watts** proposed array

To default back to Full Array, enter " =K16"

EQUIVALENT, WITH 24V MODULES

Full Array	6	180	**Watt Modules**
Proposed Array	6.0	180	**Watt Modules**

Planning to use 24V modules? Enter 12V modules of half the wattage.

Some controllers accept nominal array voltage higher than system voltage. If doing, note:

Alternative Array V |

This will not effect calculation

PV CHARGE CONTROLLER min. amp rating

= full array current	32	**amps**
for proposed array	32	**amps**

CHARGE CONTROLLER with MPPT

with 25% boosted current	40	**amps**
for proposed array	40	**amps**

MPPT = maximum power point tracking

It boosts current under favorable conditions

BATTERY CAPACITY

Days of Energy Storage | 2

CAUTION Battery capacity is small relative to the charge current. Increase Days of Energy Storage.

At Maximum Depth of Discharge	80%	
Batt Capacity at Low-Temp	90%	of 77°F standard rating
Requires Battery Bank min.	**491**	**Amp-Hours**
For 2 parallel strings, each	246	amp-hrs
For 3 parallel strings, each	164	amp-hrs CAUTION
For 4 parallel strings, each	123	NOT RECOMMENDED

BACKUP CHARGER & ENGINE-GENERATOR

Battery Charger Watts	**1200**	42	Load Generator to	50%	3000	Altitude, FEET
Batt Charger Efficiency	80%	amps			90%	Altitude Loss Factor
			Minimum Generator Rating		**3.4**	**Kilowatts**

With proposed array,

Peak Sun Hrs/Day is		**Est. Generator Run Time**		**EXCESS ENERGY**	
5.0	**will be**	**0.0**	**Hours/Week**	207	Watt-Hours/Day
7.5		**0.0**	**Hours/Week**	2433	Watt-Hours/Day
6.0		**0.0**	**Hours/Week**	1098	Watt-Hours/Day
4.0		**4.0**	**Hours/Week**	0	Watt-Hours/Day
3.0		**9.2**	**Hours/Week**	0	Watt-Hours/Day

Ratio of Required Battery AH capacity to Batt. Charger Amps | 12 | If this ratio is less than 10 (in reality) charge amps will taper sooner than 80% full charge, and generator run time will be longer than shown above.

Please refer to "INSTRUCTIONS & APPLICATION NOTES"
a separate document

ATTACHMENT 8

SYSTEM EVALUATION WORKSHEET

Sparge Curtain Pressure and Flow Checklist

Date: ______________________
Time: ______________________
Field Personnel:________________

Ambient temp, weather, cloud cover:____
System operational on arrival?:____
System restarted on arrival?:____

Describe cause of shutdown if applicable:	

System Pressures and Flows

Location	Parameter	Instrument Description (P&ID Symbol)	Open Solenoid Valve ID	Pressure Value [(1)]	Units	Calculated Injection Flow [(2)] (CFM)
Equipment Module A	Discharge Pressure	Pressure Gauge (PG-A)	SV-A1		psi	
Equipment Module A	Discharge Pressure	Pressure Gauge (PG-A)	SV-A2		psi	
Equipment Module A	Discharge Pressure	Pressure Gauge (PG-A)	SV-A3		psi	
Equipment Module B	Discharge Pressure	Pressure Gauge (PG-B)	SV-B1		psi	
Equipment Module B	Discharge Pressure	Pressure Gauge (PG-B)	SV-B2		psi	
Equipment Module B	Discharge Pressure	Pressure Gauge (PG-B)	SV-B3		psi	
Equipment Module C	Discharge Pressure	Pressure Gauge (PG-C)	SV-C1		psi	
Equipment Module C	Discharge Pressure	Pressure Gauge (PG-C)	SV-C2		psi	
Equipment Module C	Discharge Pressure	Pressure Gauge (PG-C)	SV-C3		psi	

Based on flow-pressure compressor manufacturer test data (verified during system start up)

(1) Pressure Value obtained from pressure gauges PG-A, PG-b, and PG-C

(2) Calculated Flow obtained by the following equation: Flow = (0.0351 X Pressure Value) + 3.9832

Sparge Curtain Pulsing Settings and Runtime Checklist

Date: ____________________

Time: ____________________

Field Personnel: ____________________

Ambient temp, weather, cloud cover: ____________________

System operational on arrival?: ____________________

System restarted on arrival?: ____________________

Timers information

Solenoid valve ID	Programmed [1] solenoid open time (minutes)	Actual [2] solenoid open time (minutes)	Hour Meter ID	Sparge well hour meter [3] (hours)
SV-A1			TR-A1	---
SV-A2			TR-A2	---
SV-A3			TR-A3	---
na	---	---	TR-A	
SV-B1			TR-B1	---
SV-B2			TR-B2	---
SV-B3			TR-B3	---
na	---	---	TR-B	
SV-C1			TR-C1	---
SV-C2			TR-C2	---
SV-C3			TR-C3	---
na	---	---	TR-C	

(1) Programed solenoid open time obtained from programmable timers TR-A, TR-B and

(2) Actual solenoid open time obtained by calculation using hour meters readings,

(3) Sparge well hour meter readings obtained from direct read on the corresponding hour meter.

Sparge Curtain Solar Array Checklist

Date: ____________________
Time: ____________________
Field Personnel: ____________________

Ambient temp, weather, cloud cover: ____________________
System operational on arrival?: ____________________
System restarted on arrival?: ____________________

Solar Arrays parameters

Solar Array	Solar array timer daily run time setting (hours)	Charge controller elapsed runtime (hours)	Solar aray set angle	Timer elapsed runtime (hours)
A				
B				
C				

Optimum solar array settings for different months

Month	Solar array angle (deg off horizontal)	Solar array timer daily run time[1] (hours)
June	6	9
July	14	8.5
August	22	8
September	30	7.5
October	38	7
November	46	6.5
December	54	6
January	46	6.5
February	38	7
March	30	7.5
April	22	8
May	14	8.5

[1] *Shown for illustration assuming 9 hours in June and 6 hours in december daily run time*

ROI Measurement Data

Date: ______________
Time: ______________
Field Personnel: __________________

Monitoring Location ID	Description	Field Parameters						Notes
		DTW (feet)	DO (mg/L)	ORP (mV)	Temp. (degF)	pH (ntu)	Cond. (µS/cm)	
CEF-003-31S	Monitoring Well							
CEF-003-32D	Monitoring Well							
CEF-003-40S	Monitoring Well							
CEF-003-41S	Monitoring Well							
CEF-003-WP2	Creek well point							
CEF-003-WP3	Creek well point							
CEF-003-WP4	Creek well point							
CEF-003-20S	Monitoring Well							
CEF-003-28S	Monitoring Well							

Observations (bubbling, changes in conditions, etc):

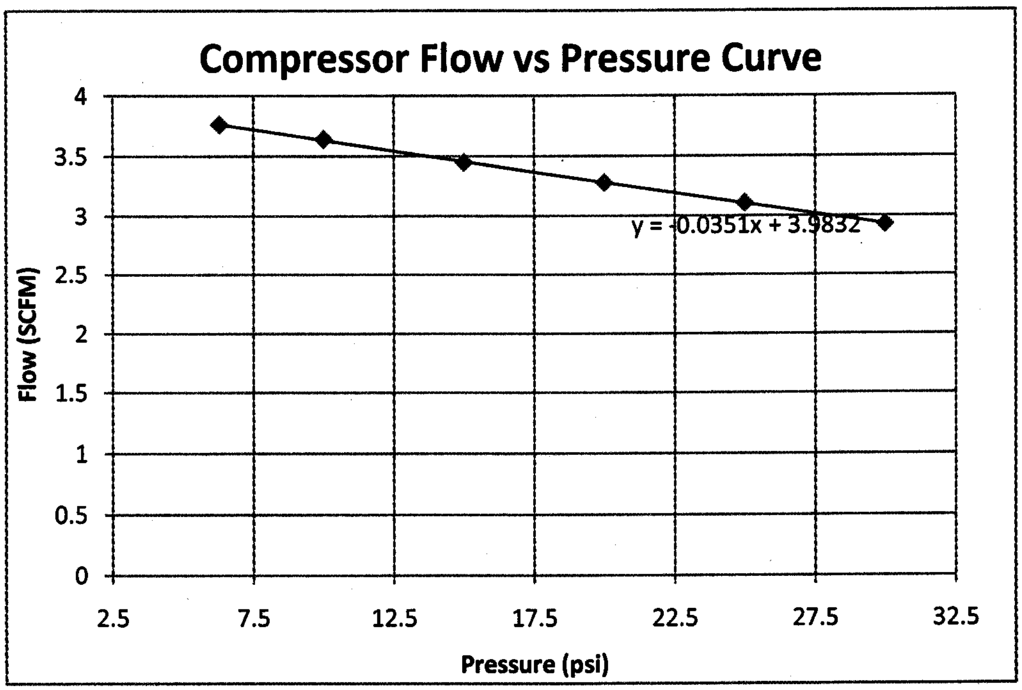
Creek: ______________________________

Ground surface: ______________________________

Comments: ______________________________

Compressor Manufacturer test data
Compressor Model: Thomas model: 2660CE37, 1/3hp, 115VAC

Voltage (115VAC)	*Pressure (psi)*	*Flow (CFM)*	*Current (Amps)*	*Power (Watts)*	*Speed (RPM)*
115	*6.3*	*3.76*	*2.84*	*278.6*	*1746*
115	*10*	*3.64*	3.08	*312.1*	*1735*
115	*15*	*3.45*	3.39	*353.6*	*1721*
115	*20*	*3.28*	3.68	*390.1*	*1708*
115	*25*	*3.11*	3.93	*421.4*	*1696*
115	*30*	*2.93*	4.14	*446.4*	*1686*



Field Notes and additional comments

Date: ______________________
Time: ______________________
Field Personnel: ______________________

Comments: ______________________